GENERAL INFORMATION

00
SECTION

GENERAL INFORMATION 00-00

00–00 GENERAL INFORMATION

HOW TO USE THIS MANUAL

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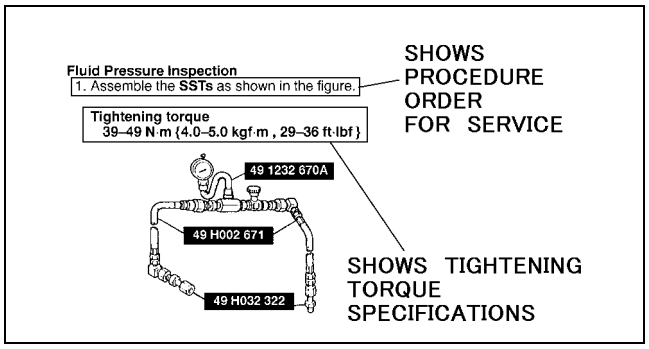
Range of Topics

- 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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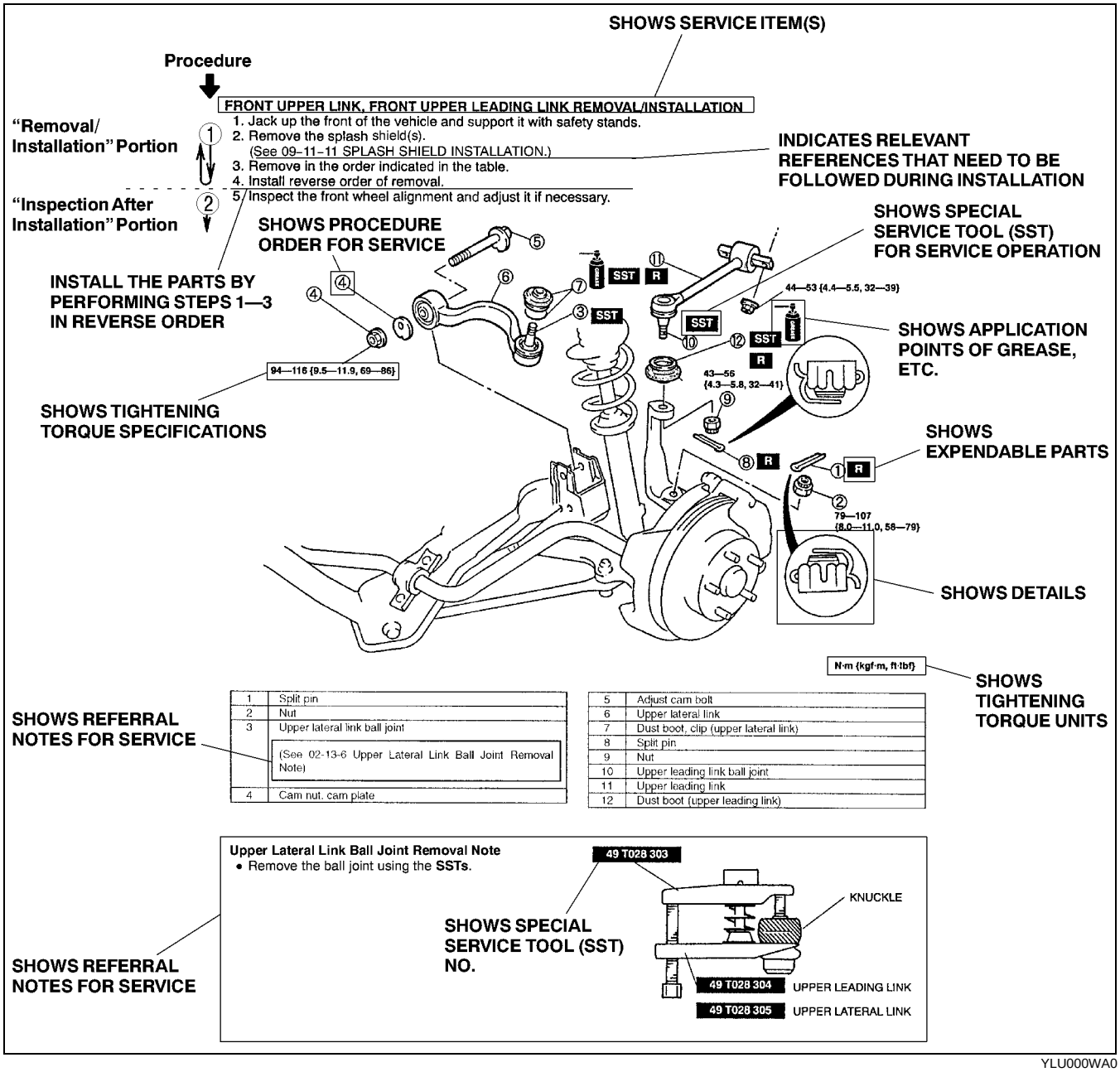
Repair procedure

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.



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Symbols

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

Symbol	Meaning	Kind
	Apply oil	New appropriate engine oil or gear oil

Symbol	Meaning	Kind
	Apply brake fluid	New appropriate brake fluid
	Apply automatic transaxle/ transmission fluid	New appropriate automatic transaxle/ transmission fluid
	Apply grease	Appropriate grease
	Apply sealant	Appropriate sealant
	Apply petroleum jelly	Appropriate petroleum jelly
	Replace part	O-ring, gasket, etc.
	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.

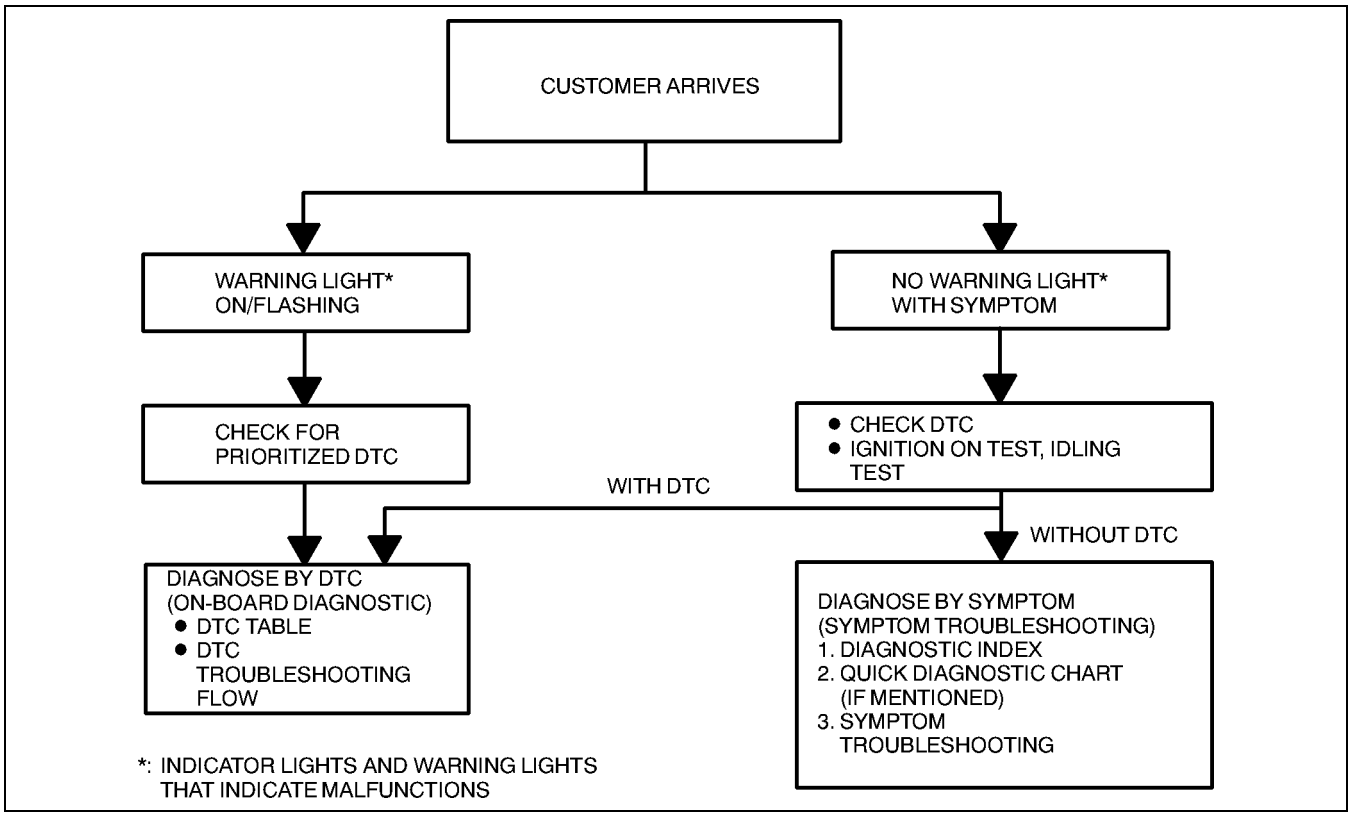
Caution
- A Caution indicates a situation in which damage to the vehicle or parts could result if the caution is ignored.

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



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DTC troubleshooting flow (on-board diagnostic)

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

Diagnostic index

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

Quick diagnosis chart (If mentioned)

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

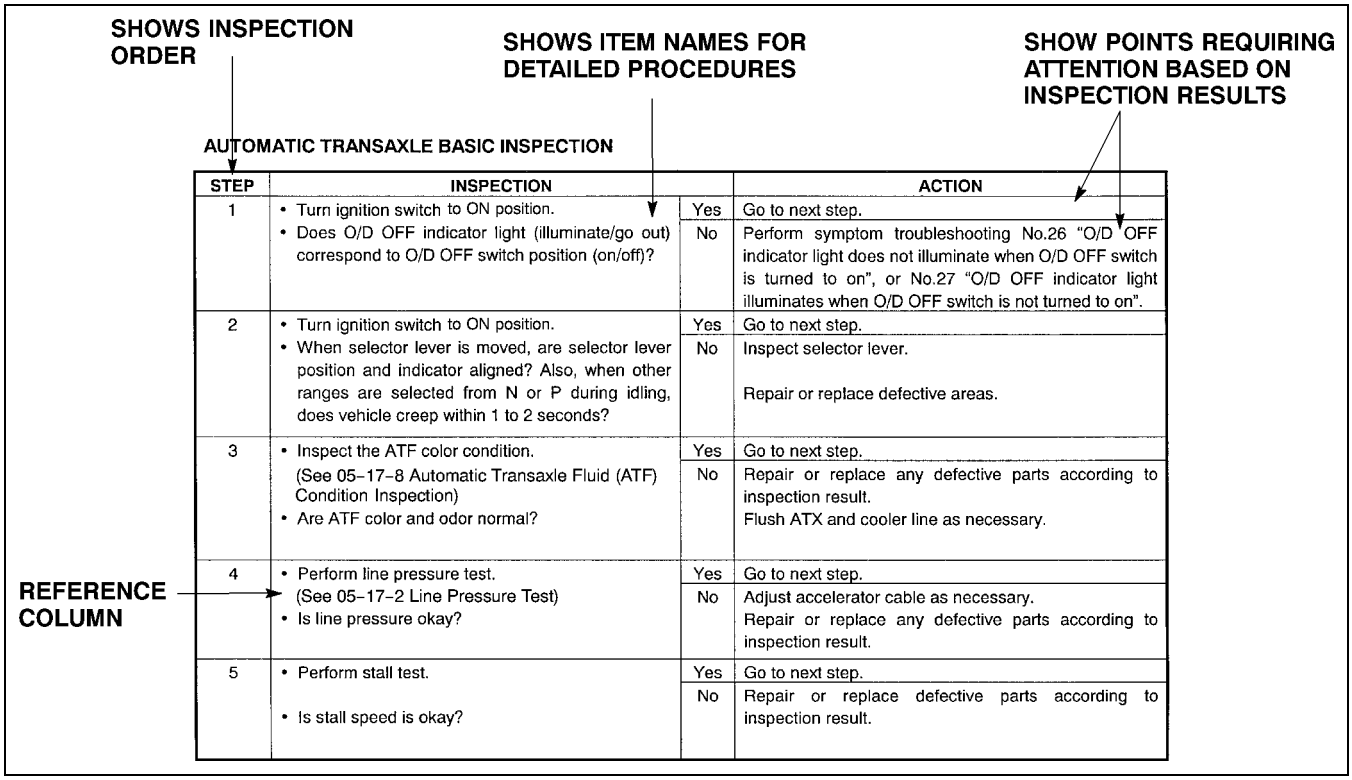
Symptom troubleshooting

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

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.



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.

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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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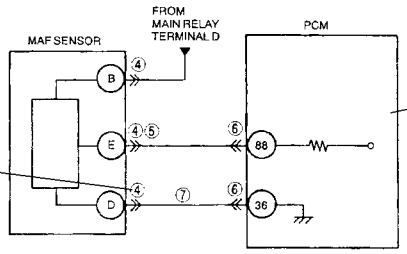
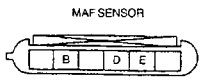
DTC P0103	MAF circuit high input
DETECTION CONDITION	PCM monitors input voltage from TP sensor after ignition key is turned on. If input voltage at PCM terminal 68 is above 8.25 V, PCM determines that TP circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL 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

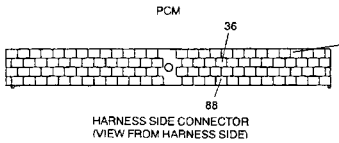
POSSIBLE CAUSE describes possible point(s) of malfunction.



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

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





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. (See 01-03-33 INTERMITTENT CONCERN TROUBLESHOOTING)
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion etc.). • Are there any malfunctions?	Yes	Repair or replace terminals, then go to Step 8.

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

Reference item(s) to perform ACTION

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

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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)																				

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

Reference item(s) for additional information to perform INSPECTION

INSPECTION describes the method to quickly determine the failed part.

ACTION describes the appropriate action to take as 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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UNITS

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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 qt (U.S. quart)
	Imp qt (Imperial quart)
	ml (milliliter)
	cc (cubic centimeter)
	cu in (cubic inch)
	fl oz (fluid ounce)
Weight	g (gram)
	oz (ounce)

Conversion to SI Units (Système International d'Unités)

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

Rounding Off

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

Upper and Lower Limits

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

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

- The actual converted values for 2.7 kgf/cm^2 are 264 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

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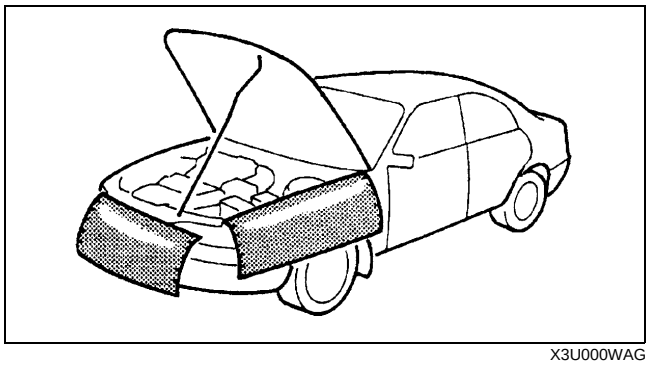
Protection of the Vehicle

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



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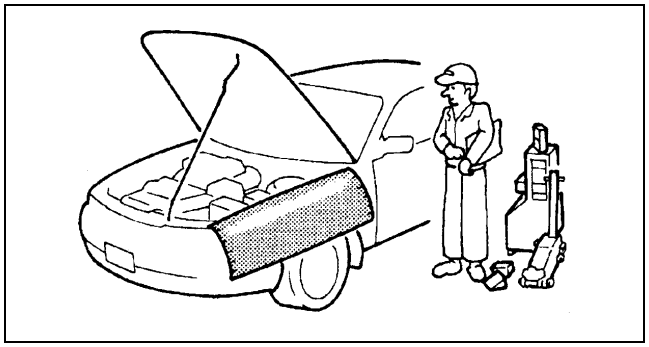
Preparation of Tools and Measuring Equipment

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



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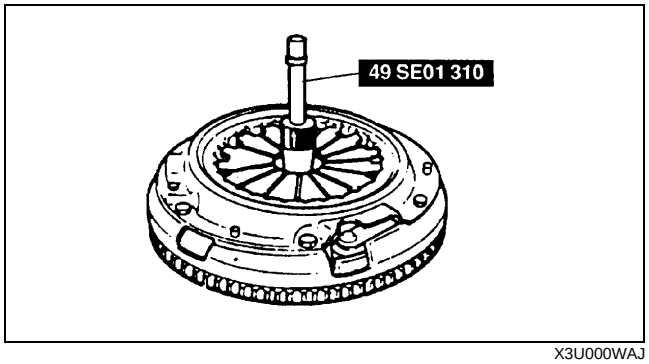
Special Service Tools

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



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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).

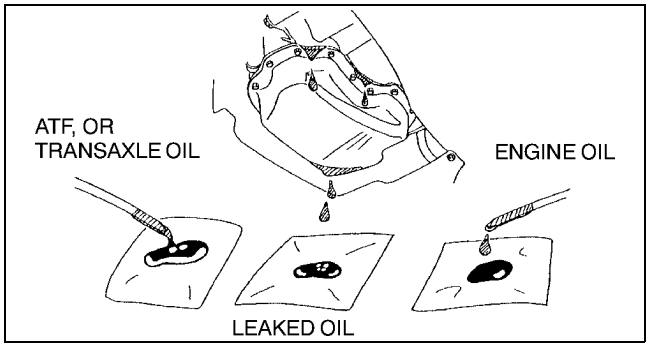
2. Pour the fluorescent dye into the engine oil or ATF (or transaxle oil).
3. Allow the engine to run for 30 minutes.
4. Inspect for dye leakage by irradiating with UV light (black light), and identify the type of oil that is leaking.
   - If no dye leakage is found, allow the engine to run for another 30 minutes 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.
4. Remove any oil on the engine or transaxle.
5. Allow the engine to run for 30 minutes.
6. Check the area where the oil is leaking, then make necessary repairs.



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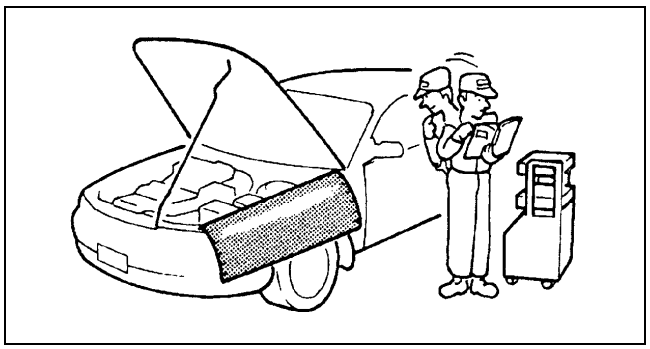
Disconnection of the Negative Battery Cable

- Before beginning any work, 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. 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.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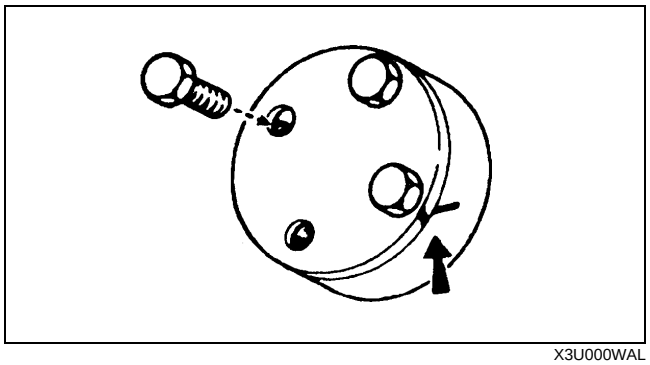
Disassembly

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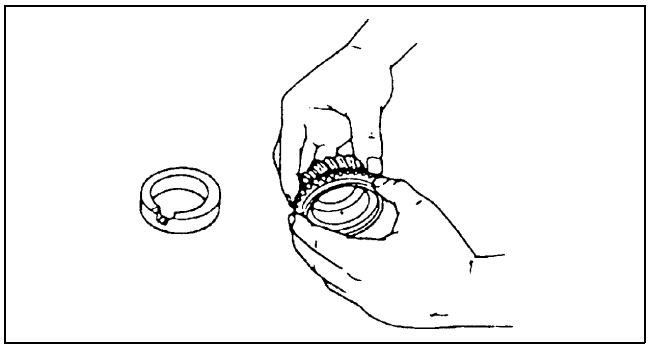
Inspection During Removal, Disassembly

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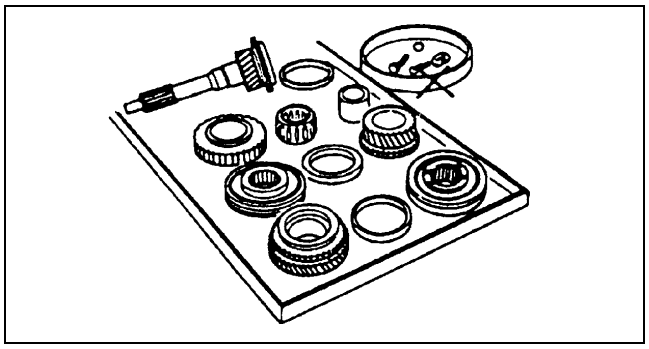
Arrangement of Parts

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



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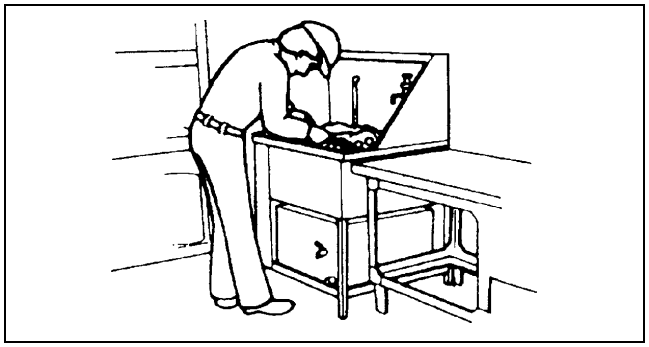
Cleaning of Parts

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

Warning

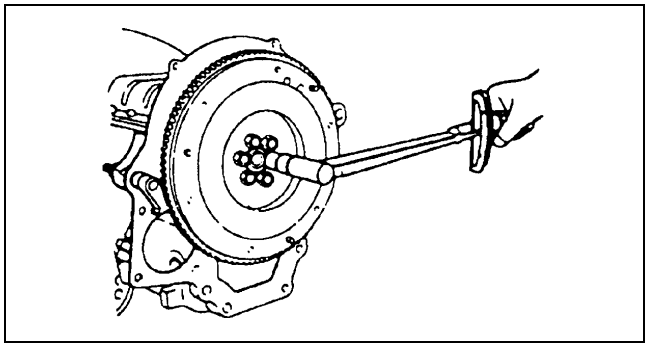
- **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**



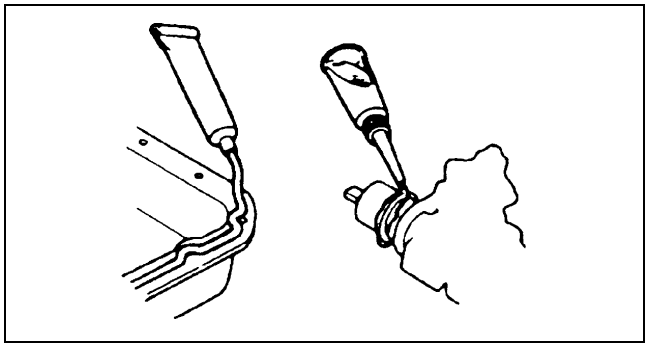
X3U000WAP

Reassembly

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, these parts should be replaced with new ones:
  - — Oil seals
  - — Gaskets
  - — O-rings
  - — Lockwashers
  - — Cotter pins
  - — Nylon nuts
- 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.



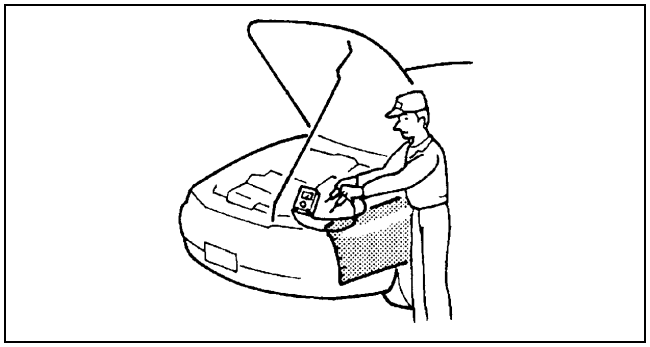
X3U000WAQ



X3U000WAR

Adjustment

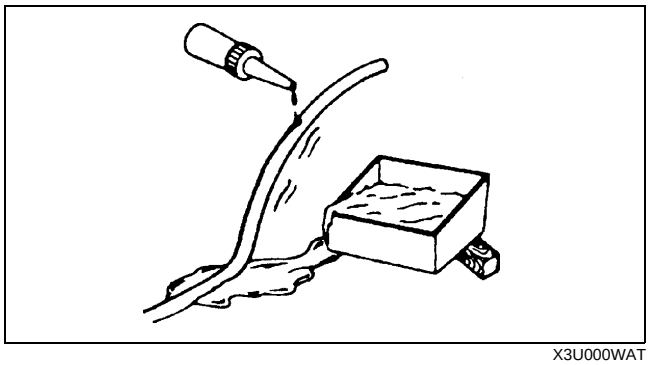
- Use suitable gauges and/or testers when making adjustments.



X3U000WAS

Rubber Parts and Tubing

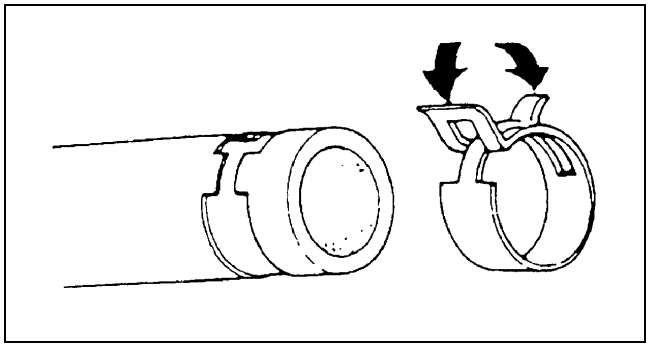
- Prevent gasoline or oil from getting on rubber parts or tubing.



X3U000WAT

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.

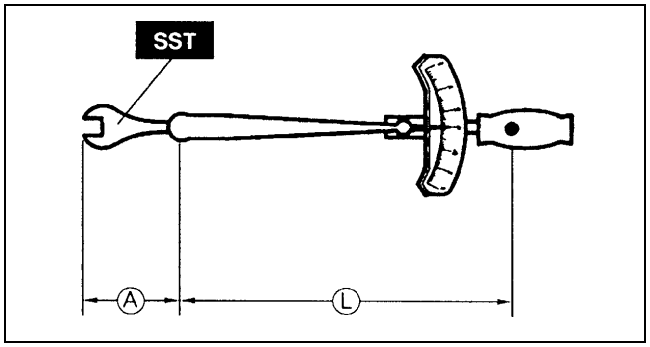


X3U000WAU

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)]

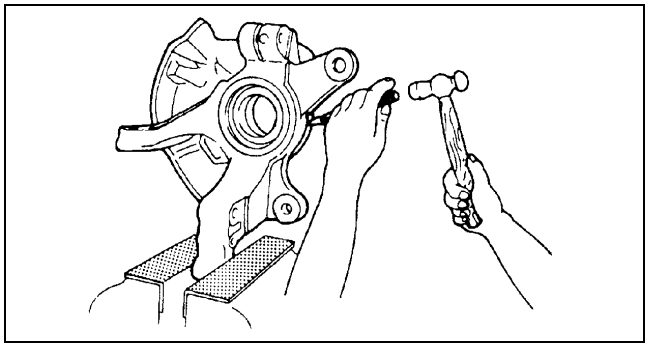


X3U000WAV

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

Vise

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



X3U000WAW

Dynamometer

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

Note

- When the vehicle is on a chassis roller and only the front wheels rotate, the ABS warning light may illuminate. (Refer to 04–10–1 PRECAUTION (BRAKES) to turn off the warning light.)

INSTALLATION OF RADIO SYSTEM

A3U000000005W01

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.

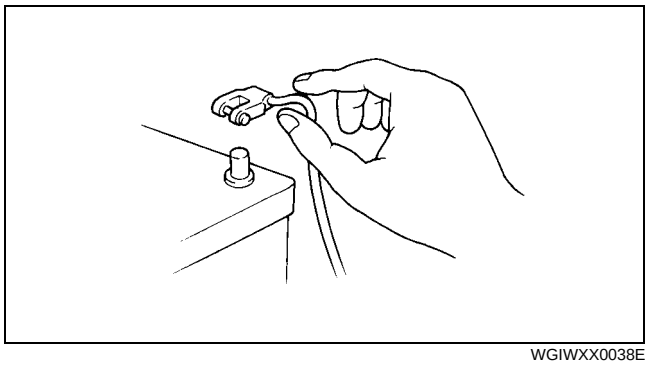
ELECTRICAL SYSTEM

A3U000000006W01

Electrical Parts

Battery cable

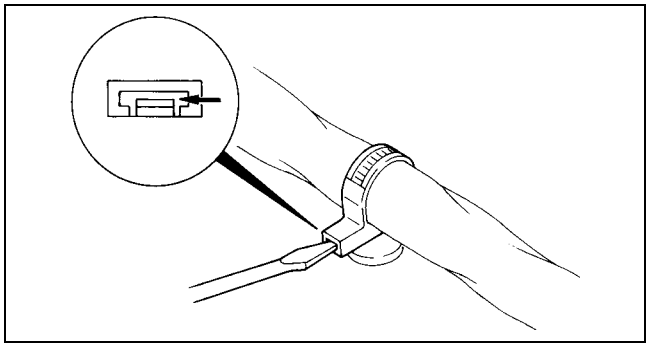
- Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.



WGIWXX0038E

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.

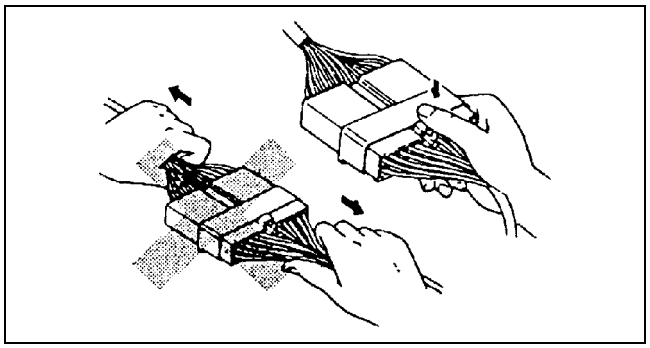


WGIWXX0039E

Connectors

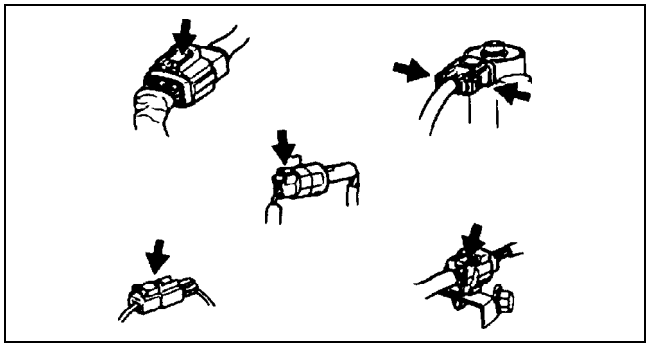
Disconnecting connectors

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



WGIWXX0041E

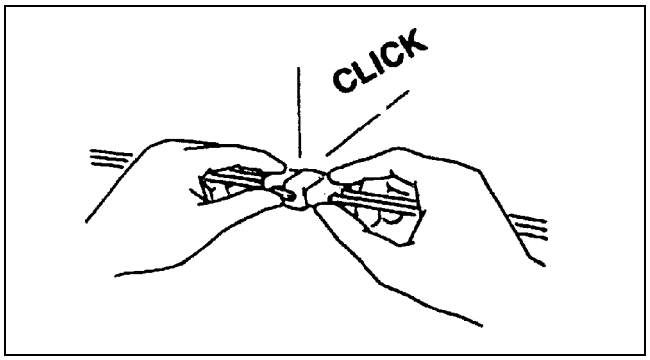
- Connectors can be disconnected by pressing or pulling the lock lever as shown.



WGIWXX0042E

Locking connector

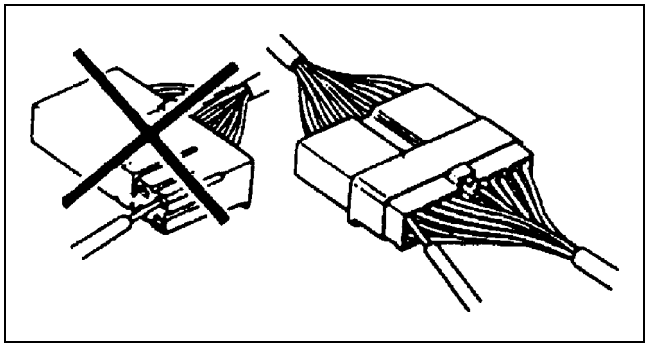
- When locking connectors, listen for a click indicating they are securely locked.



WGIWXX0043E

Inspection

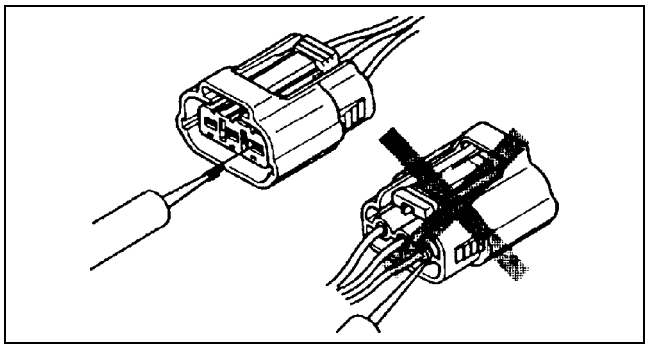
- When a tester is used to inspect for continuity or measuring voltage, insert the tester probe from the wiring harness side.
- Inspect the terminals of waterproof connectors from the connector side since they cannot be accessed from the wiring harness side.



WGIWXX0044E

Caution

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

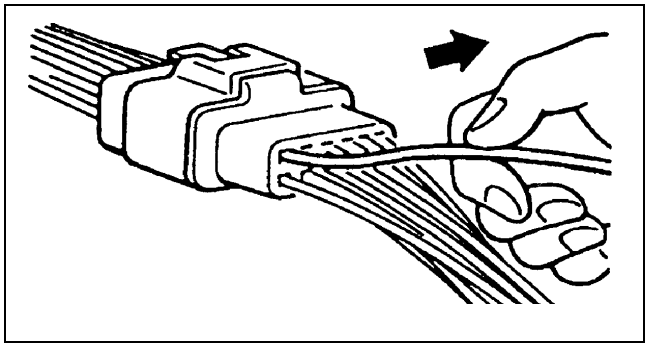


WGIWXX0045E

Terminals

Inspection

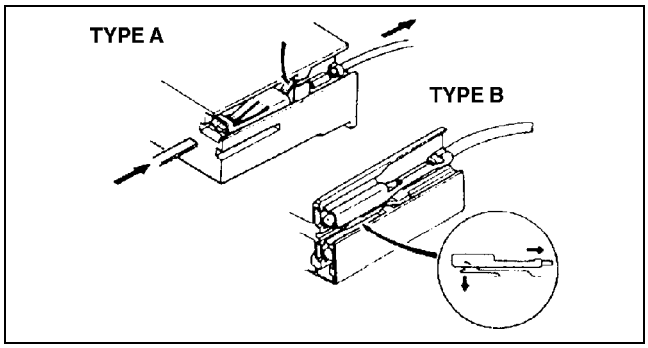
- Pull lightly on individual wires to verify that they are secured in the terminal.



X3U000WB4

Replacement

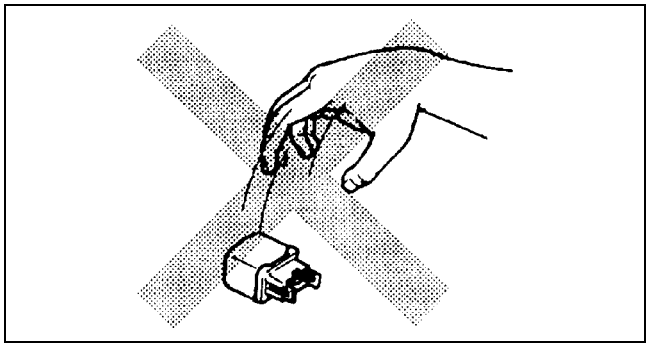
- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.



WGIWXX0046E

Sensors, Switches, and Relays

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



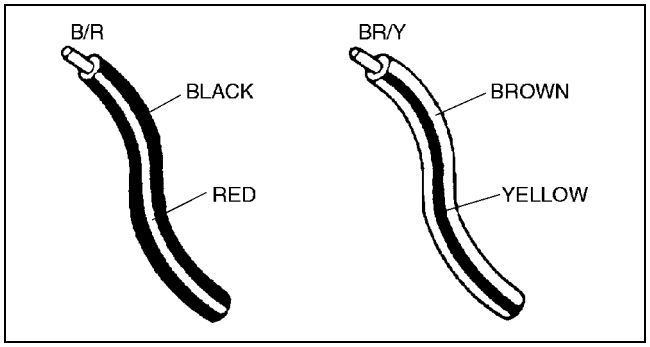
WGIWXX0047E

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	Light Blue	Y	Yellow
LG	Light Green		

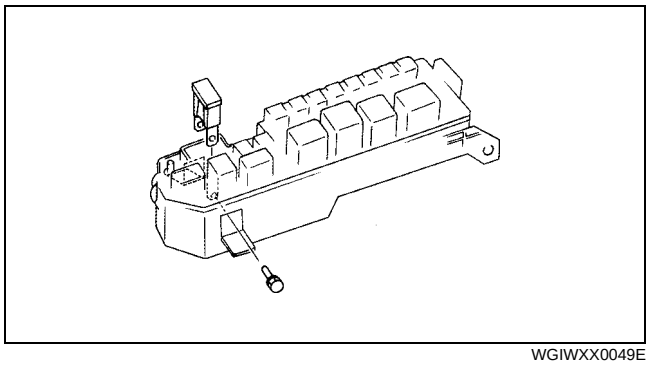


WGIWXX0048E

Fuse

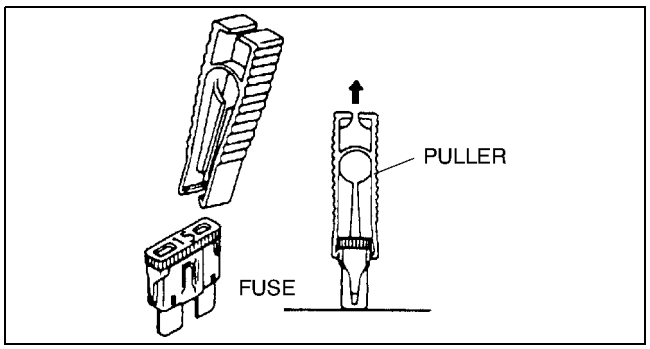
Replacement

- 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

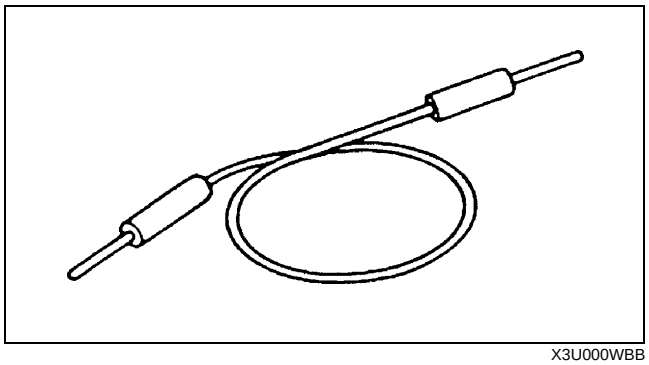
Electrical Troubleshooting Tools

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

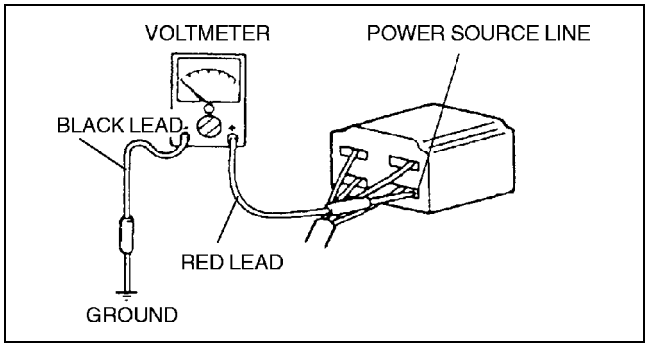
- **Do not connect a jumper wire from the power source line to a body ground. This may cause burning or other damage to wiring harnesses or electronic components.**



X3U000WBB

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.



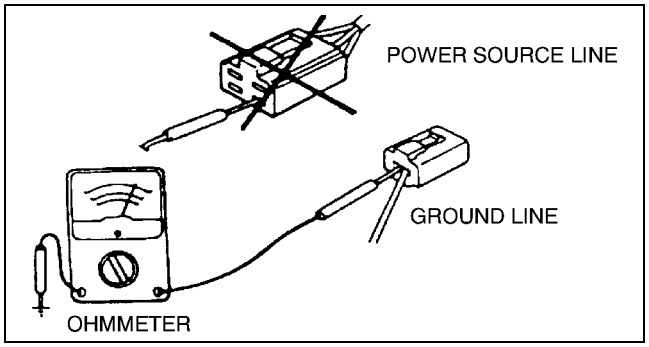
WGIWXX0051E

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.**



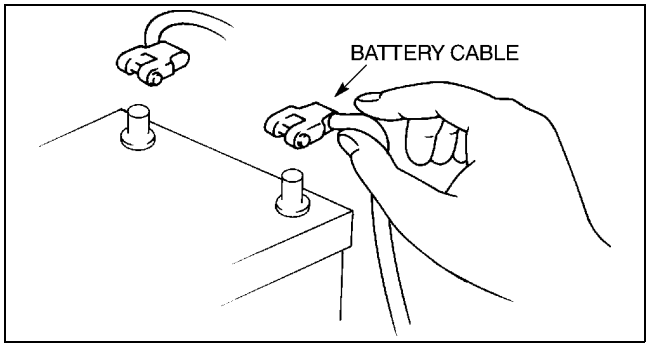
WGIWXX0052E

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.

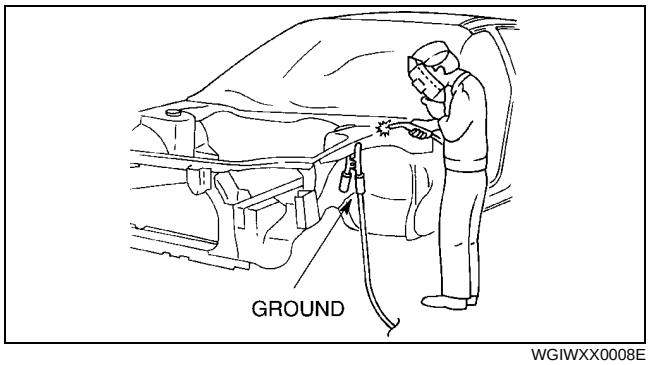
1. Turn the ignition switch to the LOCK position.

2. Disconnect the battery cables.



WGIWXX0007E

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



WGIWXX0008E

JACKING POSITIONS

A3U000000007W01

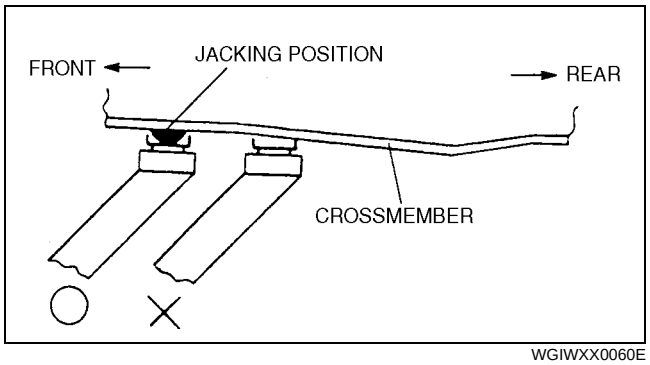
Warning

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

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

Front

- At the center of the crossmember



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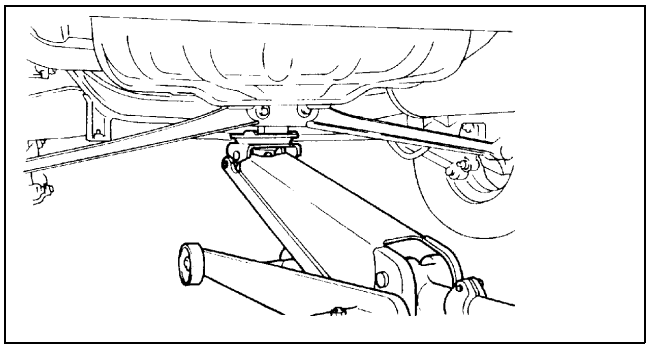
Rear

- At the center of the crossmember



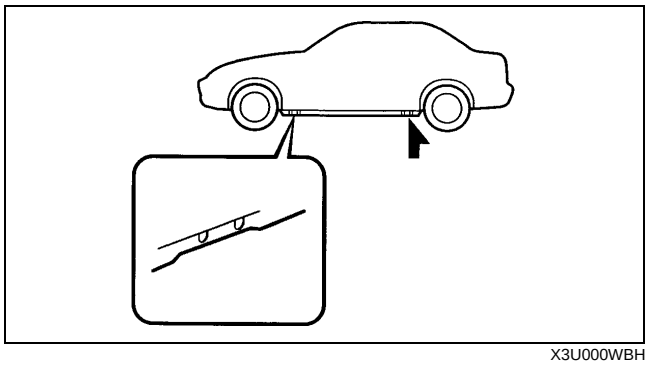
X3U000WBF

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

A3U000000008W01

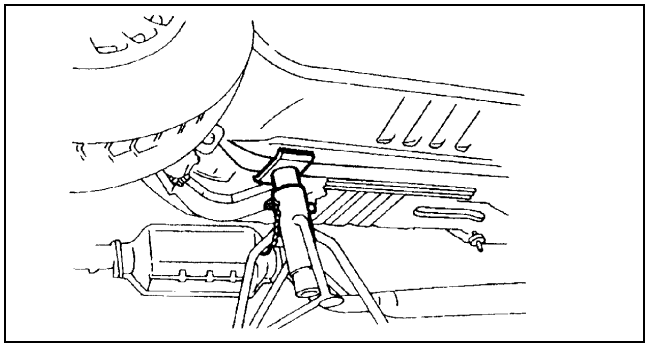
Vehicle Lift Positions
Front and rear

Warning
- **Unstably lifting a vehicle is dangerous. The vehicle can slip off the lift and cause serious injury and/or vehicle damage. Make sure that the vehicle is on the lift horizontally by adjusting the height of support at the end of the arm of the lift.**



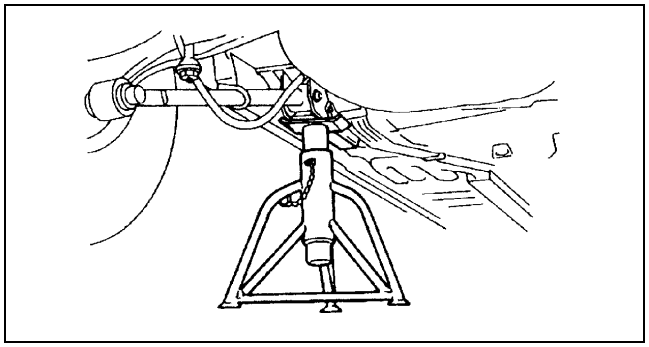
X3U000WBH

Safety Stand Positions
Front
- Both sides of the vehicle, on side sills.



X3U000WBJ

Rear
- Both sides of the vehicle, on side sills.



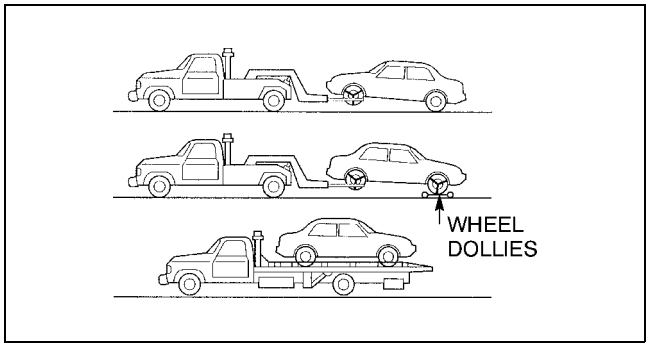
X3U000WBK

TOWING

A3U000000009W01

- Proper lifting and towing are necessary to prevent damage to the vehicle. State and local laws must be followed.
- A towed vehicle usually should have its 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.



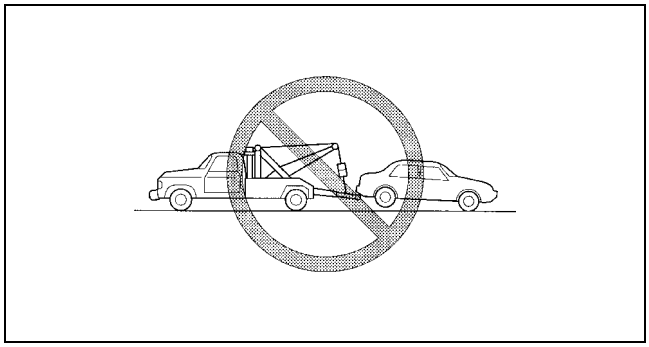
YLU000WA5

Caution

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

Caution

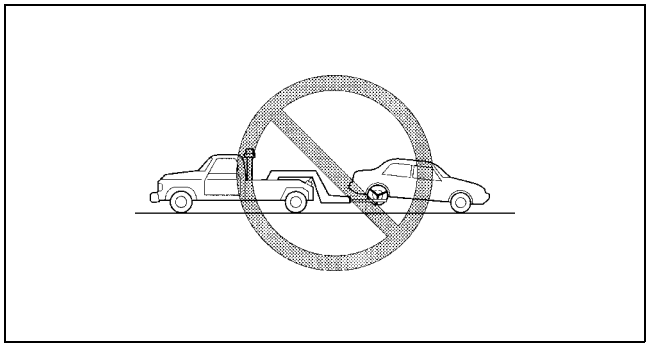
- **Do not tow the vehicle backward with driving wheels on the ground. This may cause internal damage to the transaxle.**



YLU000WA7

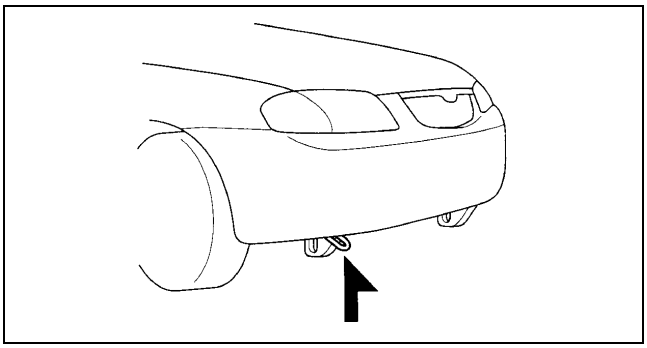
Caution

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



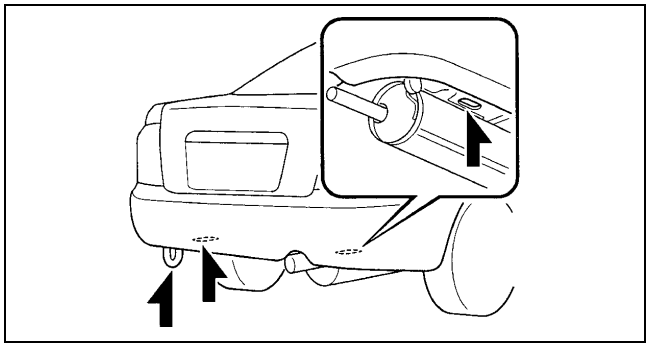
YLU000WA6

Tiedown Hooks
Front



X3U000WBP

Rear

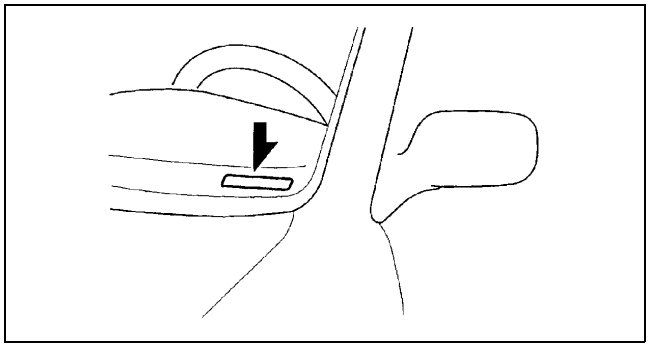


X3U000WBQ

IDENTIFICATION NUMBER LOCATIONS

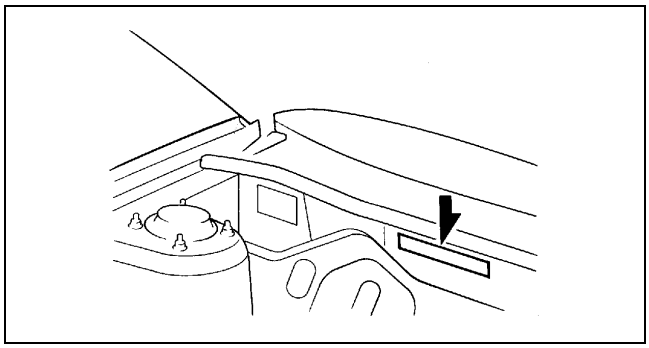
A3U000000010W01

Vehicle Identification Number (VIN)



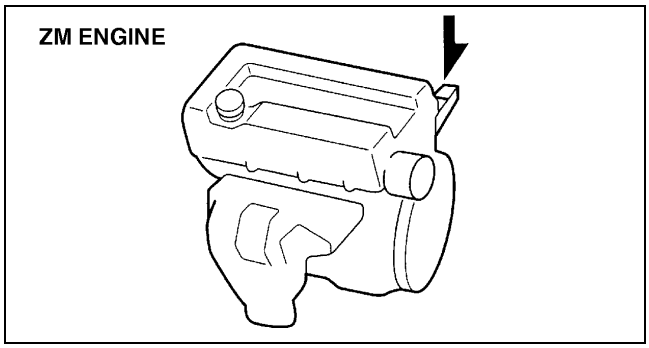
X3U000WBV

Chassis Number

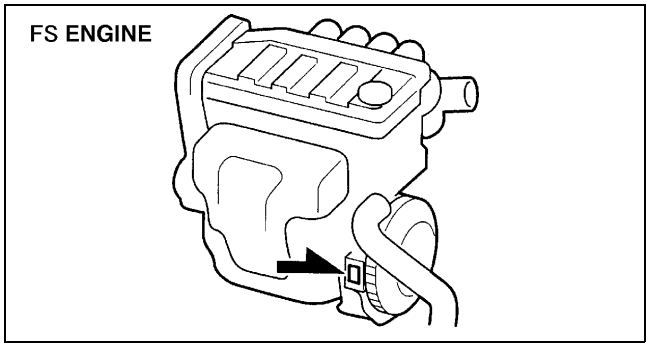


X3U000WBR

Engine Identification Number



X3U000WBS



X3U000WBT

SAE STANDARDS

A3U000000003W01

- 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	Accelerator 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 Trouble Code(s)	
DI	Distributor Ignition	
EI	Electronic Ignition	#2
ECT	Engine Coolant Temperature	
EM	Engine Modification	
EVAP	Evaporative Emission	
EGR	Exhaust Gas Recirculation	
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	

SAE Standard		Remark
Abbreviation	**Name**	
MAP	Manifold Absolute Pressure	
MAF sensor	Mass Air Flow Sensor	
MFI	Multiport Fuel Injection	
OBD	On-Board Diagnostic	
OL	Open Loop	
OC	Oxidation Catalytic Converter	
O2S	Oxygen Sensor	
PNP	Park/Neutral 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 Multipoint 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	
WUTWC	Warm Up Three Way Catalytic Converter	#4
WOT	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

A3U000000011W01

AAS	Air adjusting screw
ABS	Antilock brake system
ACC	Accessories
ATF	Automatic transaxle fluid
ATX	Automatic transaxle
BDC	Bottom dead center
BTDC	Before top dead center
CDCV	Canister drain cut valve
CCM	Comprehensive component monitor
CM	Control module
DC	Drive cycle
DRL	Daytime running light
E/L	Electric load
ELR	Emergency locking retractor
EX	Exhaust
HI	High
HU	ABS hydraulic unit
HVAC	Heater, ventilation, and air conditioning
IG	Ignition
IN	Intake
INT	Intermittent
LF	Left front
LH	Left hand
LO	Low
LR	Left rear
M	Motor
MAX	Maximum
MTX	Manual transaxle
O/D	Overdrive
OFF	Switch off
ON	Switch on
PCV	Positive crankcase ventilation
PRC	Pressure regulator control
P/S	Power steering
RF	Right front
RH	Right hand
RR	Right rear
SST	Special service tool
SW	Switch
TAS	Throttle adjusting screw
TDC	Top dead center
TNS	Tail number side lights
TR	Transmission range
VICS	Variable inertia charging system
VTCS	Variable tumble control system
1GR	First gear
2GR	Second gear
4SD	4 door sedan
5HB	5 door hatchback

PRE-DELIVERY INSPECTION

A3U000000012W01

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
☐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 aiming
INSTALLthe following parts:
☐Wheel caps

Under hood—engine off

INSPECTand **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 and clutch fluid level
☐Windshield washer reservoir fluid level
☐Radiator coolant level and specific gravity
☐Tightness of water hose clamps
☐Tightness of battery terminals, electrolyte level and specific gravity
☐Drive belt(s) tension
☐Accelerator cable and linkage for free movement **CLEAN** the spark plugs

Interior

INSPECT the operations of the following items:
☐Seat controls (slide and recline) and headrests
☐Folding rear seat (if equipped)
☐Door locks, including childproof door locks (if equipped)
☐Seat belts and warning system
☐Ignition switch and steering lock
☐Air bag system using warning light
☐Cruise control system (if equipped)
☐Shift-lock system (if equipped)
☐Starter interlock
☐All lights including warning, and indicator lights
☐Sound warning system
☐Horn, wipers, and washers
☐Wiper blades performance
Clean wiper blades and windshield, if necessary
☐Antenna
☐Audio system (if equipped)
☐Cigarette lighter and clock
☐Power windows (if equipped)
☐eater, defroster, and air conditioner at various mode selections (if equipped)
INSPECT the following items:
☐Presence of spare fuse
☐Upholstery and interior finish
INSPECT and **ADJUST**, if necessary, the following items:
☐Operation and fit of windows
☐Pedal height and free play of clutch pedal
☐Parking brake

Under hood—engine running at operating temperature

INSPECT 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
INSPECT the following items:
☐Manual transaxle oil level
☐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

Road test
INSPECT the following items:
☐Brake operation
☐Clutch operation
☐Steering control
☐Operation of gauges
☐Squeaks, rattles, and unusual noises
☐Engine general performance
☐Emergency locking retractors and automatic locking retractors
☐Cruise control system (if equipped)

After road test
INSPECT 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 on the door label.)
☐Clean outside of vehicle
☐Install fuses for accessories
☐Remove seat and cabin carpet protective covers
☐Vacuum inside of vehicle

SCHEDULED MAINTENANCE

A3U000000013W01

Scheduled Maintenance Table

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

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

Maintenance Item	Maintenance Interval (Number of months or kilometers(miles), whichever comes first)								
	Months	6	12	18	24	30	36	42	48
	× 1000 km	12	24	36	48	60	72	84	96
	(× 1000 Miles)	(7.5)	(15)	(22.5)	(30)	(37.5)	(45)	(52.5)	(60)
ENGINE									
Engine valve clearance									I
Engine timing belt		Inspect at 96,000 km (60,000 miles). Replace every 168,000 km (105,000 miles).							
Drive belts (tension)					I				I
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 72,000 km (45,000 miles) or 36 months; after that, every 48,000 km (30,000 miles) or 24 months.							
FUEL SYSTEM									
Idle speed					I				I
Air cleaner element					R				R
Fuel lines & hoses	*1				I				I
Hoses & tubes for emission	*1								I
IGNITION SYSTEM									
Spark plugs					R				R
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
Drive shaft 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.

*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.

Schedule 2 : Canada, Puerto Rico and (Unique driving conditions) U.S.A.

Unique driving conditions consist of :

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

Maintenance Item		Maintenance Interval (Number of months or kilometers (miles), whichever comes first)											
	Months	4	8	12	16	20	24	28	32	36	40	44	48
	× 1000 km	8	16	24	32	40	48	56	64	72	80	88	96
	(× 1000 Miles)	(5)	(10)	(15)	(20)	(25)	(30)	(35)	(40)	(45)	(50)	(55)	(60)
ENGINE													
Engine valve clearance													I
Engine timing belt	*2	Inspect at 96,000 km (60,000 miles). Replace every 168,000 km (105,000 miles).											
Drive belts (tension)							I						I
Engine oil	except for Puerto Rico	R	R	R	R	R	R	R	R	R	R	R	R
	for Puerto Rico	Replace every 5,000 km (3,000 miles) (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 72,000 km (45,000 miles) or 36 months; after that, every 48,000 km (30,000 miles) 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 & hoses	*1						I						I
Hoses & tubes for emission	*1												I
IGNITION SYSTEM													
Spark plugs							R						R
ELECTRICAL SYSTEM													
Function of all lights		I	I	I	I	I	I	I	I	I	I	I	I
CHASSIS & BODY													
Brake lines, hoses & 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 & 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 & nuts on chassis & 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 vehicle is operated in cold districts **{below -18 °C (0 °F)}**, replace the timing belt at 96,000 km **(60,000 miles)**.

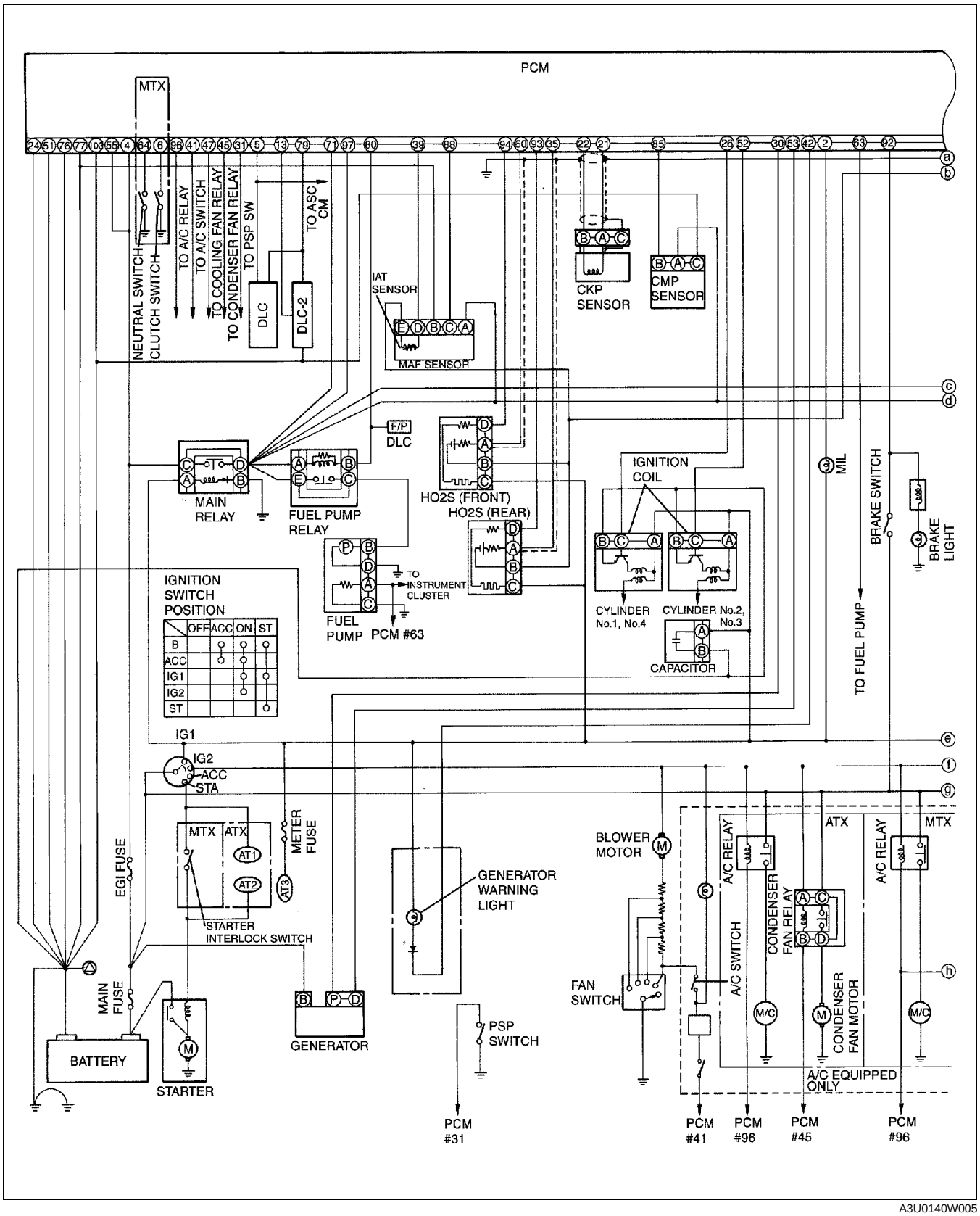
ENGINE

01
SECTION

01–02A ON-BOARD DIAGNOSTIC [ENGINE CONTROL SYSTEM (ZM)]

CONTROL SYSTEM WIRING DIAGRAM [ZM]

A3U010218881W15



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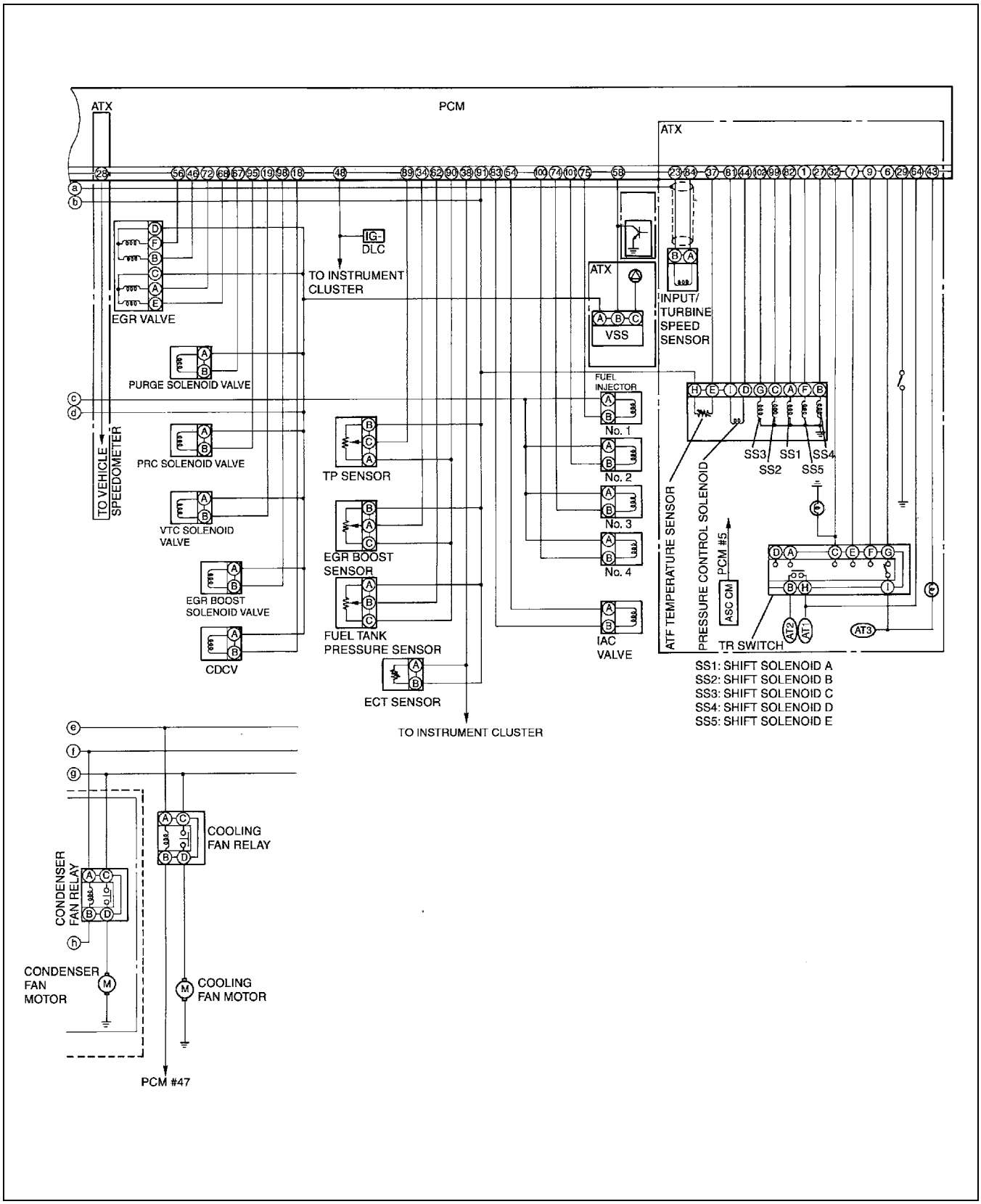


Z3U0140W005

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [ZM]

A3U010218881W16

Engine Control System

Component	Idle air control (IAC)	Fuel injection control	Pressure regulator control (PRC)	Electronic spark advance(ESA) control	Fuel pump control	HO2S heater (front) control	HO2S heater (rear) control	Electric fan control	Purge control	EGR control	VTCS	A/C cut-out control	Generator control
Input													
Brake switch		x		x									
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier	x	x		x				x				x	
PSP switch	x	x		x								x	
DLC in engine compartment (TEN)	x	x	x	x				x					
Neutral switch (MTX)	x	x	x	x									
Clutch switch (MTX)	x	x	x	x									
TR switch (ATX)	x	x	x	x									
CKP sensor	x	x	x	x	x	x	x	x	x	x	x	x	x
CMP sensor	x	x		x									
VSS	x	x		x						x			x
MAF sensor	x	x		x		x	x		x	x			
ECT sensor	x	x	x	x		x	x	x	x	x	x	x	x
IAT sensor	x	x	x	x		x			x	x			x
TP sensor	x	x	x	x		x		x	x	x	x	x	x
EGR boost sensor	x	x							x			x	
Battery positive voltage		x		x		x			x				x
Generator	x			x									x
HO2S (front)		x							x				
HO2S (rear)													
Output													
IAC valve	x												
A/C relay												x	
Cooling fan relay								x					
Condenser fan relay								x					
Fuel pump relay					x								
PRC solenoid valve			x										
Purge solenoid valve									x				
VTCS solenoid valve											x		
EGR valve										x			
HO2S heater						x	x						
Ignition coils				x									
Fuel injectors		x											
Generator (field coil)													x
Generator warning light													x

Monitoring System

× : Applied

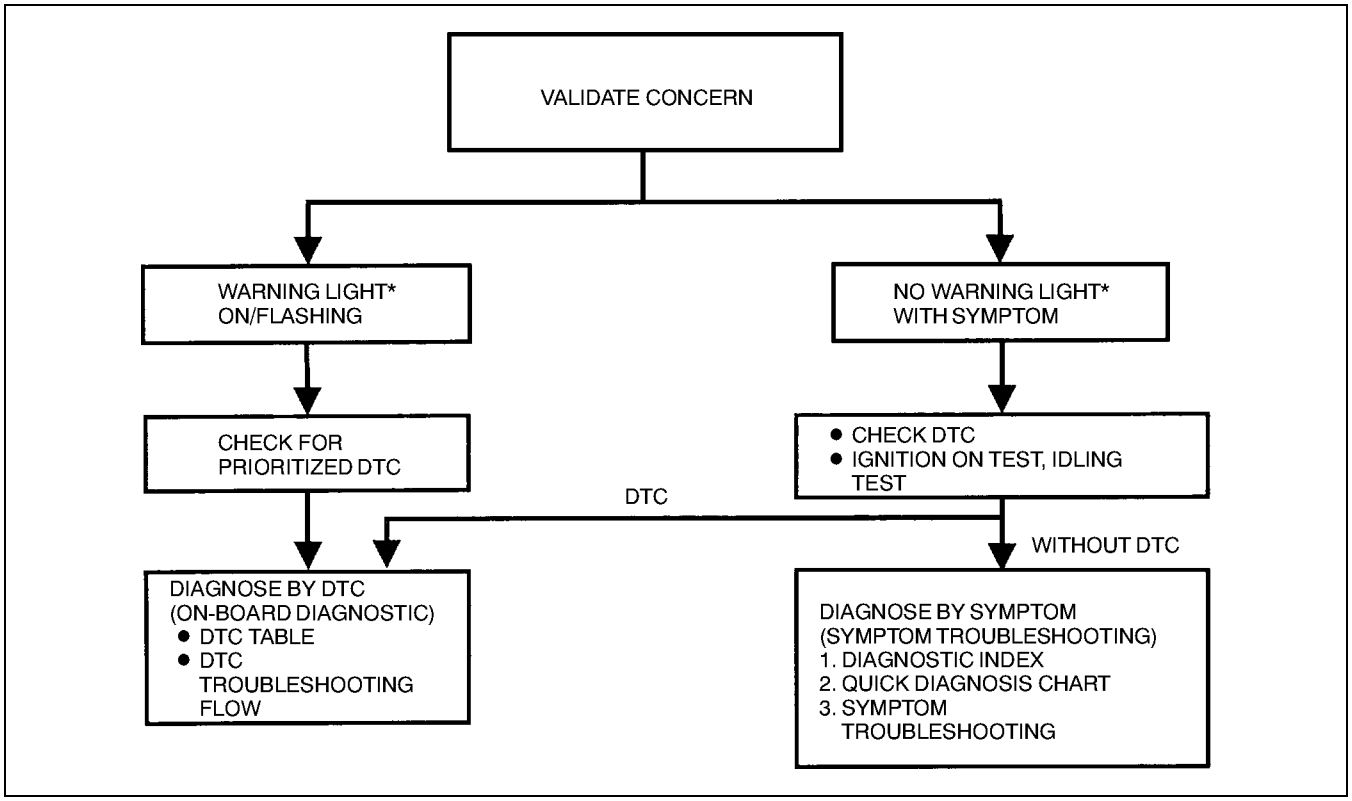
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier		×		×			×
PSP switch		×		×			×
CKP sensor	×	×	×	×	×	×	×
CMP sensor	×	×	×	×	×	×	×
VSS	×	×	×	×	×		×
MAF sensor	×	×	×	×	×	×	×
ECT sensor	×	×	×	×	×	×	×
IAT sensor	×	×	×	×	×		×
TP sensor	×	×	×	×	×		×
EGR boost sensor							×
Fuel level sensor			×				
Fuel gauge sender unit			×				
Rear HO2S	×				×	×	
Front HO2S	×			×	×	×	
Output							
DLC-2 in passenger compartment (Terminal KLN)	×	×	×	×	×	×	×
MIL	×	×	×	×	×	×	×
Purge solenoid valve			×	×	×		
EGR valve							×
EGR boost sensor solenoid valve							×
Canister drain cut valve			×				
Fuel injectors				×			

Y3U102WBC

FOREWORD [ZM]

A3U010218881W17

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) 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–15 DTC TABLE [ZM].)
  - — If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].)



YMU102WBX

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

OBD-II PENDING TROUBLE CODES [ZM]

A3U010218881W18

- 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 store the DTC.

OBD-II FREEZE FRAME DATA [ZM]

A3U010218881W19

- 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 [ZM]

A3U010218881W20

- This shows OBD-II systems operating status. If any monitor function is incomplete, WDS or equivalent will identify which monitor function has not been completed. Misfires, Fuel System and Comprehensive Components (CCM) are continuous monitoring-type functions. The catalyst, EGR system, evaporation system and oxygen sensor will be monitored under drive cycles. 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 [ZM]

A3U010218881W21

- 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 [ZM]

A3U010218881W22

- The following 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 [ZM]

A3U010218881W23

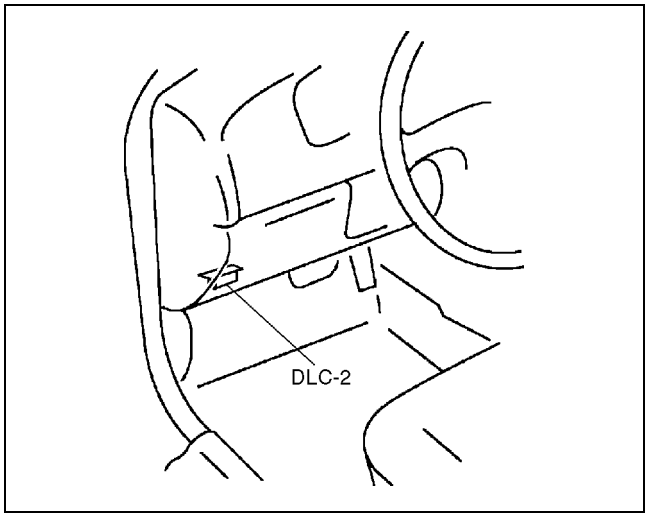
- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST [ZM]

A3U010218881W24

DTCs Retrieving Procedure

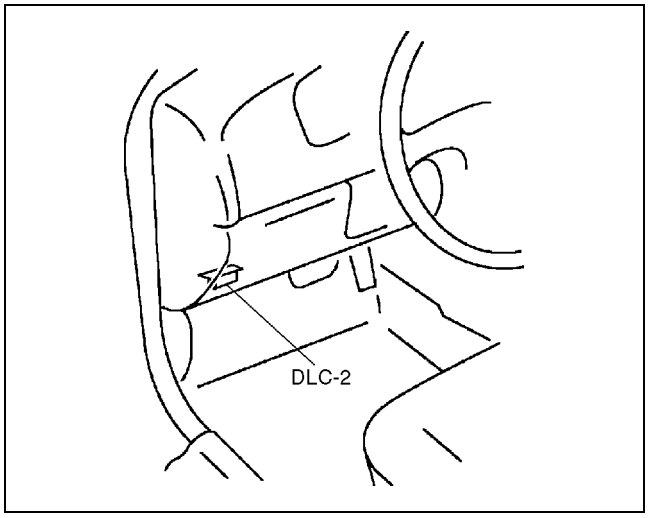
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve DTC using WDS or equivalent.



Z3U0102W001

Pending Trouble Code Access Procedure

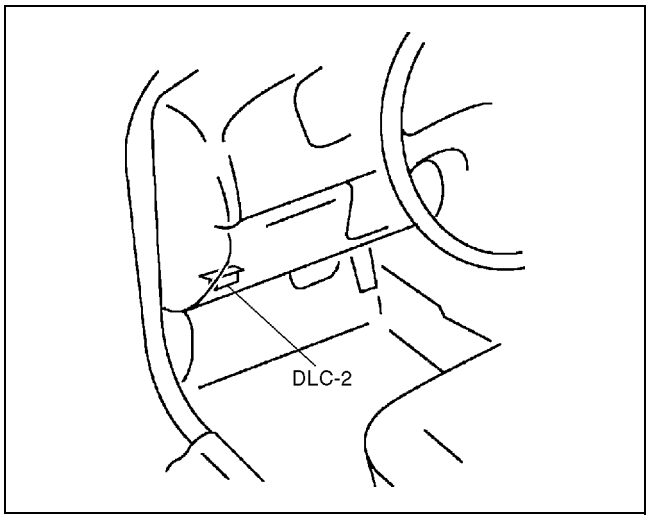
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve pending trouble code using WDS or equivalent.



Z3U0102W001

Freeze Frame PID Data Access Procedure

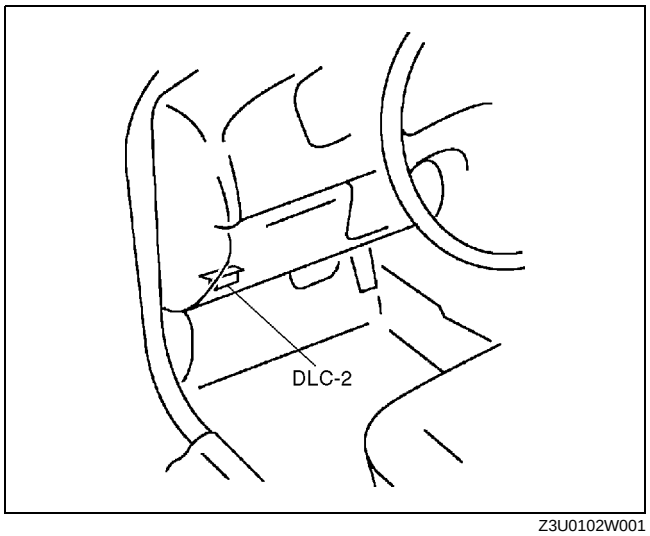
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve FREEZE FRAME PID DATA using WDS or equivalent.



Z3U0102W001

On-Board System Readiness Tests Access Procedure

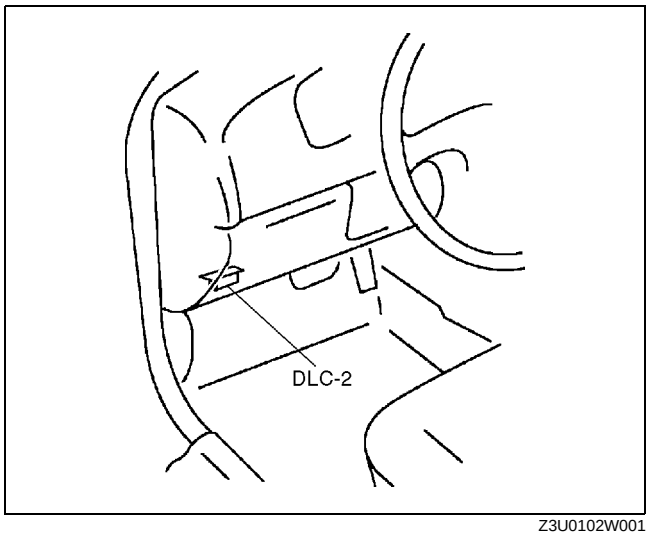
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Monitor the OBD-II system operating status using WDS or equivalent.



Z3U0102W001

PID/DATA Monitor and Record Procedure

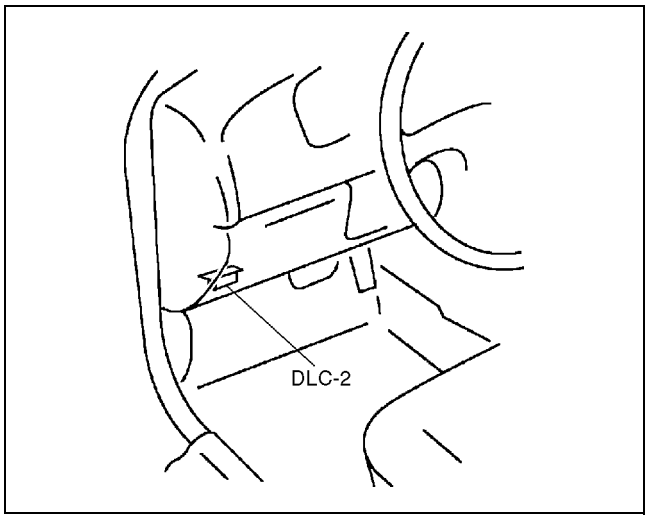
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access and monitor DTCs using WDS or equivalent.



Z3U0102W001

Diagnostic Monitoring Test Results Access Procedure

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access the DIAGNOSTIC MONITORING TEST RESULTS and read the test results using WDS or equivalent.

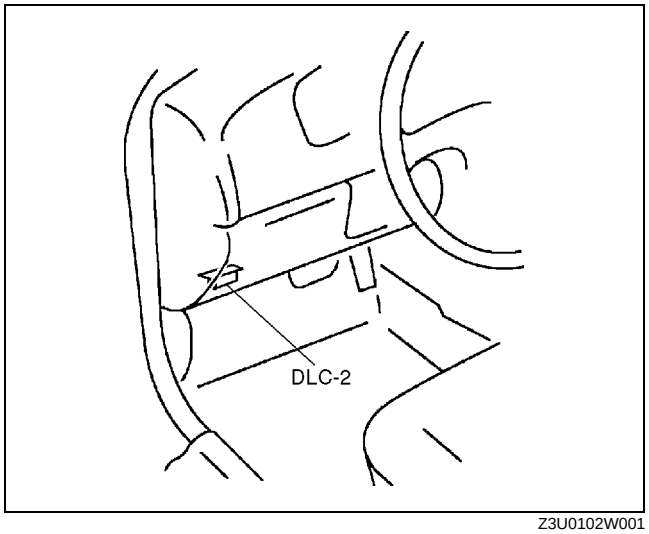


Z3U0102W001

AFTER REPAIR PROCEDURE [ZM]

A3U010218881W25

1. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering clumn.
2. Cycle the ignition key from OFF to ON.
3. Record DTC if retrieved.
4. Erase all diagnostic data using WDS or equivalent.



Z3U0102W001

OBD-II DRIVE MODE [ZM]

A3U010218881W26

- Performing the Drive Mode inspects 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 inspected:
  - — EGR system
  - — Oxygen sensor (HO2S)
  - — Oxygen sensor heater
  - — Catalytic converter (TWC)
  - — Fuel, misfire and evaporative (EVAP) system

Caution

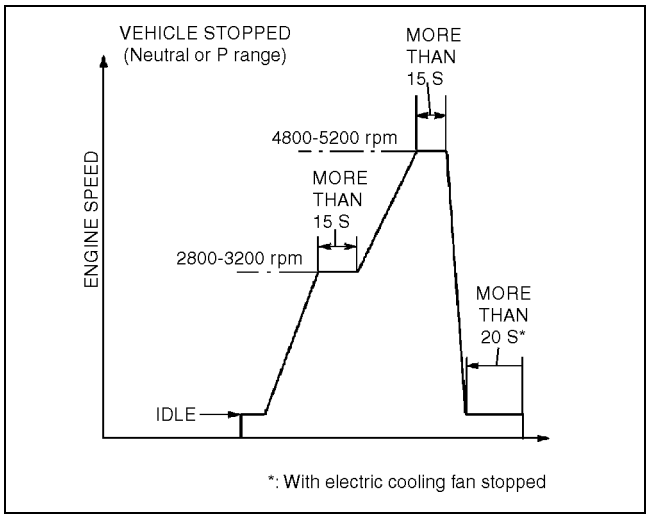
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the WDS or equivalent is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the WDS or equivalent using the PID/DATA MONITOR AND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

Note

- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the WDS or equivalent to monitor vehicle speed.
- If the OBD-II system inspection is not completed during the Drive Mode, the following causes are considered:
  1. The OBD-II system detects the malfunction.
  2. The Drive Mode procedure is not completed correctly.
- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after Drive Mode.

Mode 1 (PCM adaptive memory procedure drive mode)

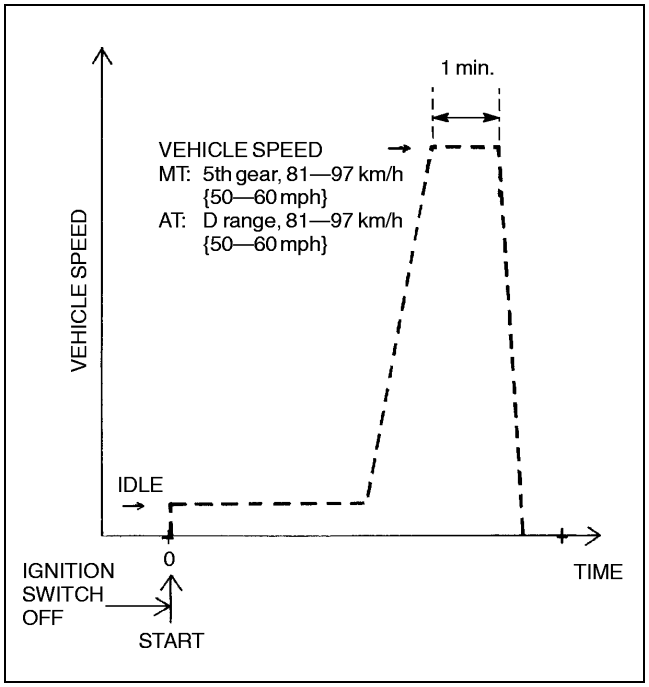
1. Start the engine and warm up completely.
2. Verify the following conditions and correct if necessary.
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
   - Initial ignition timing and idle speed are within specification.
   - TEN and GND of DLC are not connected.
3. Perform no load racing at the engine speed shown in the graph, then idle the engine for **more than 20 seconds** after the cooling fan stopped. If possible, monitor RPM PID for engine speed and cooling fan status during this procedure.



Z3U0102W002

Mode 2 (EGR system repair verification drive mode)

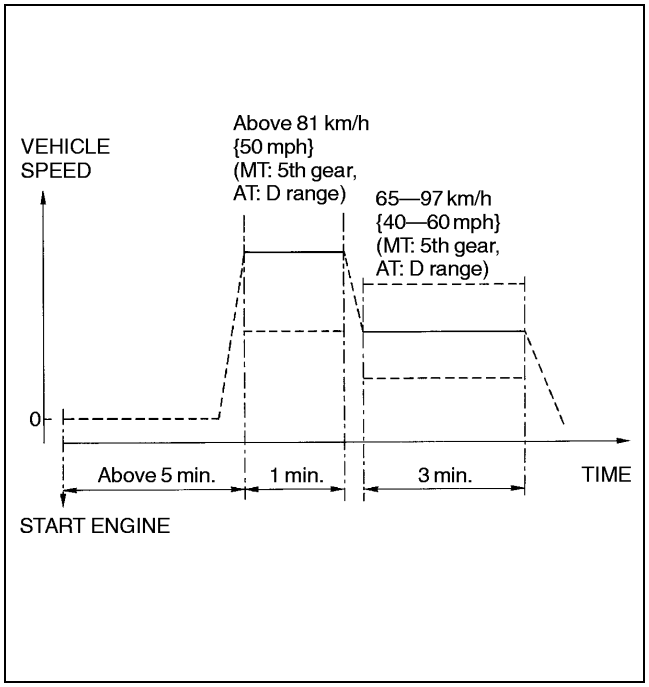
1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph.
4. Stop vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
5. If not completed, turn the ignition key off then go back to Step 3.
6. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTIONS to inspect the monitor results. If MEAS are not within specification, repair has not been completed.
7. Verify no DTCs are available.



X3U101WBL

Mode 3 (HO2S heater, HO2S, and TWC repair verification drive mode)

1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph. Driving condition before the constant speed driving is not specified.
4. Stop vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
5. If not completed, turn the ignition key off then go back to Step 3.
6. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTIONS to inspect the monitor results. If MEAS are not within specification, repair has not been completed.
7. Verify no DTCs are available.

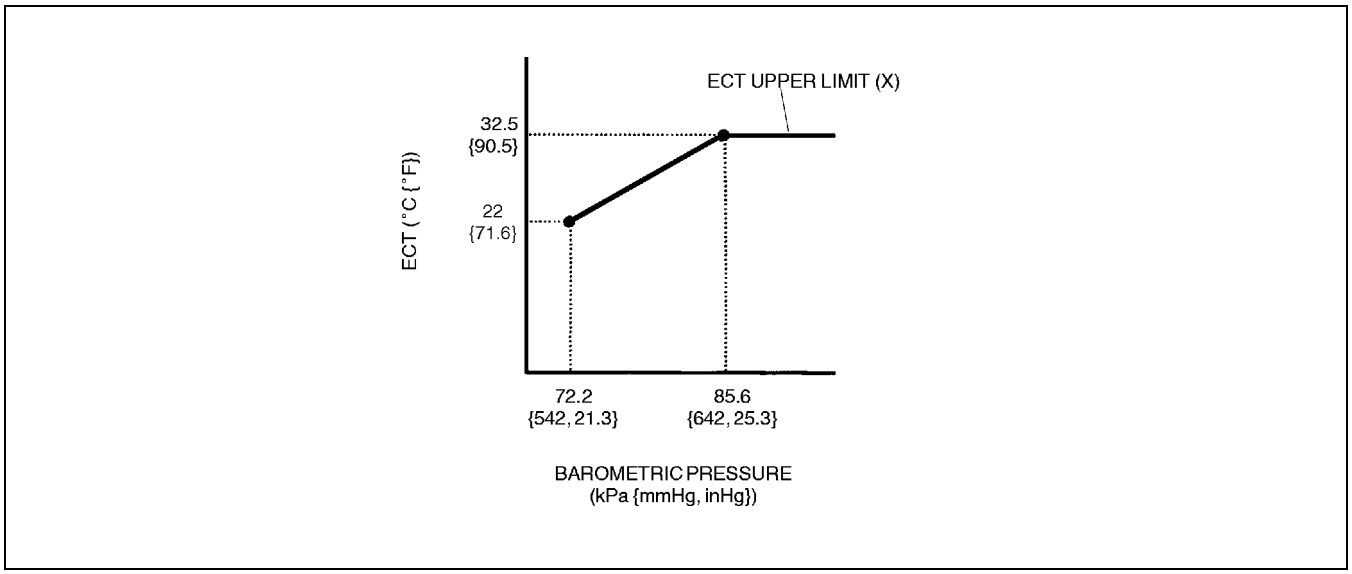


X3U101WBM

Mode 4 (EVAP system repair verification drive mode)

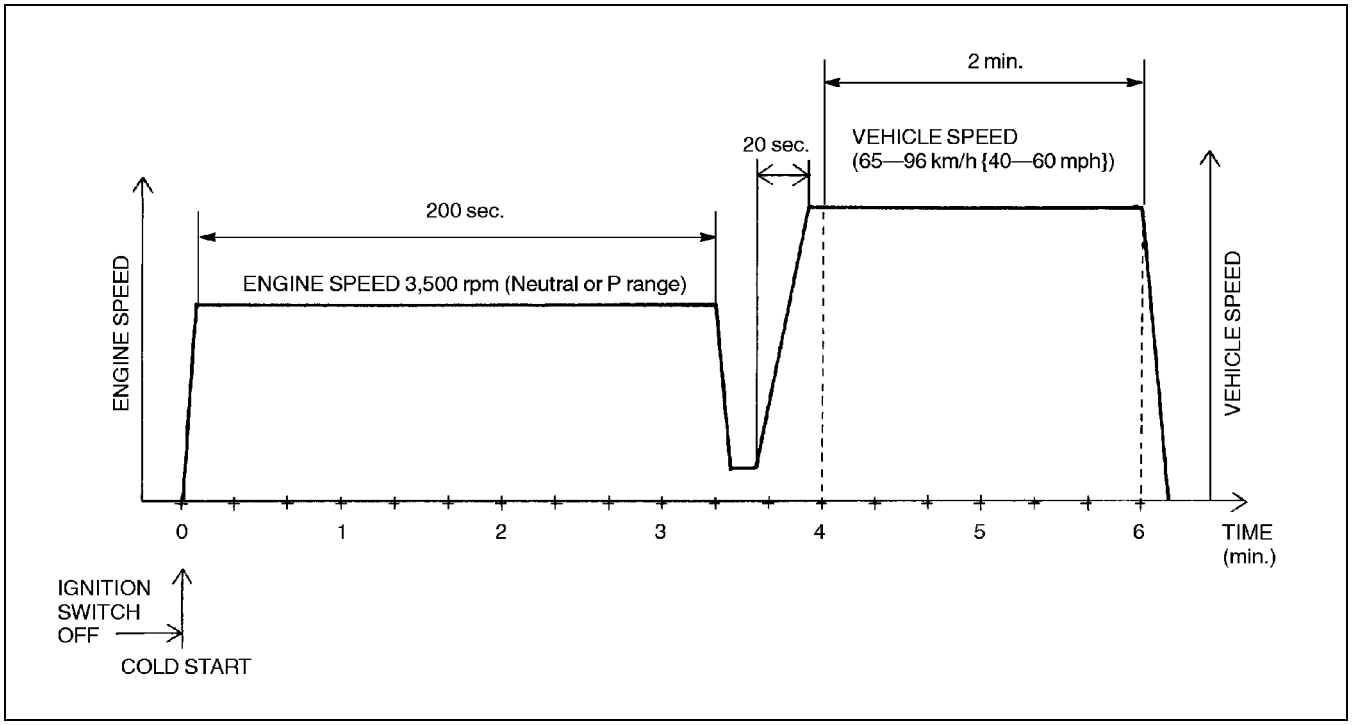
Note
- If Mode 4 can not be performed (you can not drive the vehicle under Mode 4 condition), perform evaporative system test procedure as an alternative. (See 01–03A–56 Evaporative System Leak Inspection Using Vacuum Pump.)
- Mode 4 can be performed regardless RFC FLAG condition.

1. Verify that the following conditions are met. All conditions must be within specifications before engine is started to initiate the evaporative system test.
   - Barometric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or higher**
   - Intake air temperature: **10—60 °C {50—140 °F}**
   - Fuel tank level: **0.5—2.5 V**
   - Engine coolant temperature: **–10 °C—X °C {14 °F—X °F}** (X, the Engine coolant temperature upper limit, is determined according to the barometric pressure as shown the graph below.)



Z3U0102W003

2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Start the engine and race it at **3,500 rpm** to warm up completely.
4. Drive the vehicle as shown in the graph.



X3U101WBN

5. Stop vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
6. If not completed, turn the ignition key off then go back to Step 1.
7. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTION to inspect the monitor results. If MEAS are not within specification, repair has not been completed.
8. Verify no DTCs are available.

DIAGNOSTIC MONITORING TEST RESULTS [ZM]

A3U010218881W27

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

TEST ID	Description	Related system	Initial value (MEAS)
10:01:11	HO2S (Front) inversion cycles	HO2S	(0)
10:02:11	HO2S (Front) lean-to-rich response time		(0)
10:03:11	HO2S (Front) rich-to-lean response time		(0)
10:04:01	HO2S (Front) rich/lean inversion voltage		113
10:04:02	Middle/HO2S (Rear) rich/lean inversion voltage		113
10:05:01	HO2S (Front) lean threshold voltage		72
10:06:01	HO2S (Front) rich threshold voltage		113
10:11:11	Front and rear HO2S (RH) switching time ratio	TWC	(65535)
10:21:00	In-tank pressure evaporative purge system (small leak)	EVAP	(0)
10:22:00	In-tank pressure evaporative purge system (large leak)		(0)
10:41:00	EGR pressure variation	EGR	(32768)

DTC TABLE [ZM]

A3U010218881W28

DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0031	HO2S heater (front) circuit low	ON	—	2	O_2 sensor heater	×	(See 01–02A–19 DTC P0031 [ZM])
P0032	HO2S heater (front) circuit high	ON	—	2	O_2 sensor heater	×	(See 01–02A–20 DTC P0032 [ZM])
P0037	HO2S heater (rear) circuit low	ON	—	2	O_2 sensor heater	×	(See 01–02A–22 DTC P0037 [ZM])
P0038	HO2S heater (rear) circuit high	ON	—	2	O_2 sensor heater	×	(See 01–02A–23 DTC P0038 [ZM])
P0102	MAF circuit low input	ON	—	1	CCM	×	(See 01–02A–25 DTC P0102 [ZM])
P0103	MAF circuit high input	ON	—	1	CCM	×	(See 01–02A–28 DTC P0103 [ZM])
P0106	BARO circuit performance problem	ON	—	2	CCM	×	(See 01–02A–29 DTC P0106 [ZM])
P0107	BARO circuit low input	ON	—	1	CCM	×	(See 01–02A–31 DTC P0107 [ZM])
P0108	BARO circuit high input	ON	—	1	CCM	×	(See 01–02A–32 DTC P0108 [ZM])
P0111	IAT circuit performance problem	ON	—	2	CCM	×	(See 01–02A–34 DTC P0111 [ZM])
P0112	IAT circuit low input	ON	—	1	CCM	×	(See 01–02A–35 DTC P0112 [ZM])
P0113	IAT circuit high input	ON	—	1	CCM	×	(See 01–02A–36 DTC P0113 [ZM])
P0117	ECT circuit low input	ON	—	1	CCM	×	(See 01–02A–39 DTC P0117 [ZM])
P0118	ECT circuit high input	ON	—	1	CCM	×	(See 01–02A–41 DTC P0118 [ZM])
P0122	TP circuit low input	ON	Flashing	1	CCM	×	(See 01–02A–42 DTC P0122 [ZM])
P0123	TP circuit high input	ON	Flashing	1	CCM	×	(See 01–02A–45 DTC P0123 [ZM])
P0125	Excessive time to enter closed loop fuel control	ON	—	2	CCM	×	(See 01–02A–46 DTC P0125 [ZM])
P0130	HO2S (Front) circuit malfunction	ON	—	2	O_2 sensor	×	(See 01–02A–48 DTC P0130 [ZM])
P0134	HO2S (Front) circuit no activity detected	ON	—	2	CCM	×	(See 01–02A–50 DTC P0134 [ZM])
P0138	HO2S (Rear) circuit high input	ON	—	2	CCM	×	(See 01–02A–53 DTC P0138 [ZM])
P0140	HO2S (Rear) circuit no activity detected	ON	—	2	CCM	×	(See 01–02A–55 DTC P0140 [ZM])
P0171	Fuel trim system too lean	ON	—	2	Fuel	×	(See 01–02A–57 DTC P0171 [ZM])
P0172	Fuel trim system too rich	ON	—	2	Fuel	×	(See 01–02A–60 DTC P0172 [ZM])
P0300	Random misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02A–61 DTC P0300 [ZM])
P0301	Cylinder 1 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM])
P0302	Cylinder 2 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM])
P0303	Cylinder 3 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM])
P0304	Cylinder 4 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM])
P0335	CKP sensor circuit malfunction	ON	—	1	CCM	×	(See 01–02A–67 DTC P0335 [ZM])

DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0401	EGR flow insufficient detected	ON	—	2	EGR	×	(See 01–02A–69 DTC P0401 [ZM])
P0402	EGR flow excessive detected	ON	—	2	EGR	×	(See 01–02A–70 DTC P0402 [ZM])
P0421	Warm-up catalyst system efficiency below threshold	ON	—	2	Catalyst	×	(See 01–02A–71 DTC P0421 [ZM])
P0442	Evaporative emission system leak detected (small leak)	ON	—	2	Evaporative	×	(See 01–02A–72 DTC P0442 [ZM])
P0443	Evaporative emission control system purge solenoid valve circuit malfunction	OFF	—	—	Other	—	(See 01–02A–75 DTC P0443 [ZM])
P0451	Fuel tank pressure sensor performance problem	ON	—	2	CCM	×	(See 01–02A–77 DTC P0451 [ZM])
P0452	Fuel tank pressure sensor low input	ON	—	2	CCM	×	(See 01–02A–78 DTC P0452 [ZM])
P0453	Fuel tank pressure sensor high input	ON	—	2	CCM	×	(See 01–02A–80 DTC P0453 [ZM])
P0455	Evaporative emission control system leak detected (blockage or large leak)	ON	—	2	Evaporative	×	(See 01–02A–83 DTC P0455 [ZM])
P0461	Fuel gauge sender unit circuit range/performance	ON	—	2	CCM	×	(See 01–02A–87 DTC P0461 [ZM])
P0462	Fuel gauge sender unit circuit low input	ON	—	2	CCM	×	(See 01–02A–88 DTC P0462 [ZM])
P0463	Fuel gauge sender unit circuit high input	ON	—	2	CCM	×	(See 01–02A–90 DTC P0463 [ZM])
P0464	Fuel gauge sender unit circuit performance (slosh check)	ON	—	2	CCM	×	(See 01–02A–91 DTC P0464 [ZM])
P0480	Cooling fan relay malfunction	OFF	—	2	CCM	×	(See 01–02A–92 DTC P0480 [ZM])
P0500	VSS circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02A–94 DTC P0500 [ZM])
	VSS circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0506	Idle control system RPM lower than expected	ON	—	2	CCM	×	(See 01–02A–96 DTC P0506 [ZM])
P0507	Idle control system RPM higher than expected	ON	—	2	CCM	×	(See 01–02A–97 DTC P0507 [ZM])
P0550	PSP switch circuit malfunction	ON	—	2	CCM	×	(See 01–02A–99 DTC P0550 [ZM])
P0703	Brake switch input malfunction	ON	—	2	CCM	×	(See 01–02A–100 DTC P0703 [ZM])
P0704	Clutch switch input circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02A–102 DTC P0704 [ZM])
P0705	Neutral switch input circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02A–104 DTC P0705 [ZM])
P0705	TR switch circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0706	TR switch circuit malfunction (Open circuit) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0710	Transaxle temperature sensor circuit malfunction (Open or short) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					

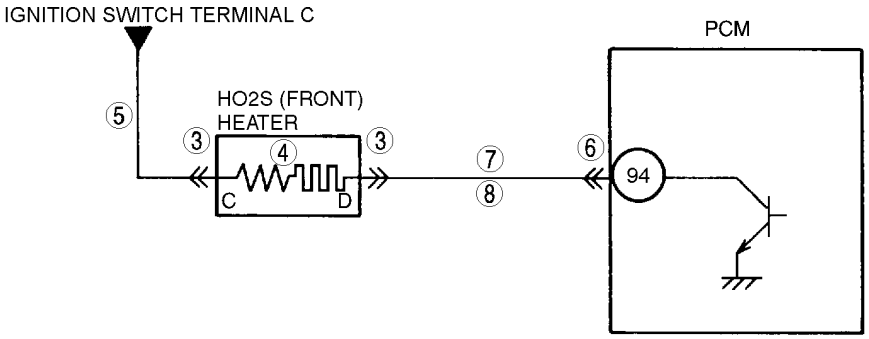
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0711	Transaxle temperature sensor circuit range/ performance (Stuck) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0715	Input/turbine speed sensor circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0731	Gear 1 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0732	Gear 2 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0733	Gear 3 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0734	Gear 4 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0741	TCC (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0742	TCC (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0745	Pressure control solenoid valve malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0751	Shift solenoid A malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0752	Shift solenoid A malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0753	Shift solenoid A malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0756	Shift solenoid B malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0757	Shift solenoid B malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0758	Shift solenoid B malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0761	Shift solenoid C malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0762	Shift solenoid C malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0763	Shift solenoid C malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0766	Shift solenoid D malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0767	Shift solenoid D malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0768	Shift solenoid D malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0771	Shift solenoid E malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0772	Shift solenoid E malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0773	Shift solenoid E malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					

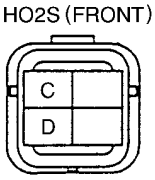
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P1102	MAF sensor inconsistent with TP sensor (Lower than expected)	ON	—	2	CCM	×	(See 01–02A–106 DTC P1102 [ZM])
P1103	Mass air flow inconsistent with engine speed (Greater than expected)	ON	—	2	CCM	×	(See 01–02A–107 DTC P1103 [ZM])
P1122	Throttle position stuck closed (lower than expected)	ON	—	2	CCM	×	(See 01–02A–108 DTC P1122 [ZM])
P1123	Throttle position stuck open (higher than expected)	ON	—	2	CCM	×	(See 01–02A–110 DTC P1123 [ZM])
P1170	HO2S (front) no inversion	ON	—	2	CCM	×	(See 01–02A–111 DTC P1170 [ZM])
P1250	PRC solenoid valve circuit malfunction	OFF	—	2	CCM	×	(See 01–02A–114 DTC P1250 [ZM])
P1345	CMP sensor circuit malfunction	ON	—	1	CCM	×	(See 01–02A–116 DTC P1345 [ZM])
P1449	CDCV circuit malfunction	OFF	—	—	Other	—	(See 01–02A–118 DTC P1449 [ZM])
P1450	Evaporative emission control system malfunction (excessive vacuum)	ON	—	2	CCM	×	(See 01–02A–120 DTC P1450 [ZM])
P1487	EGR boost sensor solenoid valve circuit malfunction	OFF	—	—	Other	—	(See 01–02A–121 DTC P1487 [ZM])
P1496	EGR valve stepping motor coil 1 open or short	OFF	—	—	Other	—	(See 01–02A–123 DTC P1496 [ZM])
P1497	EGR valve stepping motor coil 2 open or short	OFF	—	—	Other	—	(See 01–02A–125 DTC P1497 [ZM])
P1498	EGR valve stepping motor coil 3 open or short	OFF	—	—	Other	—	(See 01–02A–127 DTC P1498 [ZM])
P1499	EGR valve stepping motor coil 4 open or short	OFF	—	—	Other	—	(See 01–02A–129 DTC P1499 [ZM])
P1504	IAC valve circuit malfunction	ON	—	1	CCM	×	(See 01–02A–131 DTC P1504 [ZM])
P1512	VTCS shutter valve close stuck	ON	—	2	CCM	×	(See 01–02A–134 DTC P1512 [ZM])
P1562	PCM +BB voltage low	ON	—	1	CCM	×	(See 01–02A–135 DTC P1562 [ZM])
P1569	VTCS solenoid valve circuit low input	ON	—	2	CCM	×	(See 01–02A–137 DTC P1569 [ZM])
P1570	VTCS solenoid valve circuit high input	ON	—	2	CCM	×	(See 01–02A–139 DTC P1570 [ZM])
P1631	Generator output voltage signal no electricity	OFF	—	—	Other	×	(See 01–02A–141 DTC P1631 [ZM])
P1632	Battery voltage monitor signal circuit malfunction	OFF	—	—	Other	×	(See 01–02A–143 DTC P1632 [ZM])
P1633	Battery overcharge	OFF	—	—	Other	×	(See 01–02A–144 DTC P1633 [ZM])
P1634	Generator terminal B circuit open	OFF	—	—	Other	×	(See 01–02A–145 DTC P1634 [ZM])

DTC P0031 [ZM]

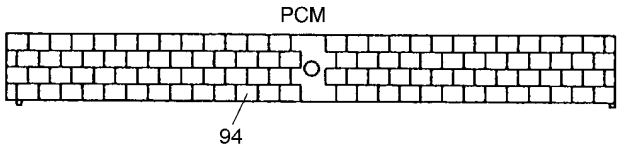
A3U010201084W29

DTC P0031	HO2S heater (front) circuit low
DETECTION CONDITION	• PCM monitors HO2S heater (front) control signal at PCM terminal 94. If PCM turns the HO2S heater (front) off but voltage at terminal 94 still remains low, PCM determines that HO2S heater (front) circuit has malfunction. **Note** • HO2S heater (front) is controlled by a duty signal. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• HO2S (front) malfunction • Open circuit between ignition switch terminal C and HO2S (front) terminal C • Open circuit between HO2S (front) terminal D and PCM terminal 94 • Short to ground circuit between HO2S (front) terminal D and PCM terminal 94 • Poor connection at HO2S (front) or PCM connector • PCM malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 HO2S (FRONT) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (front) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.

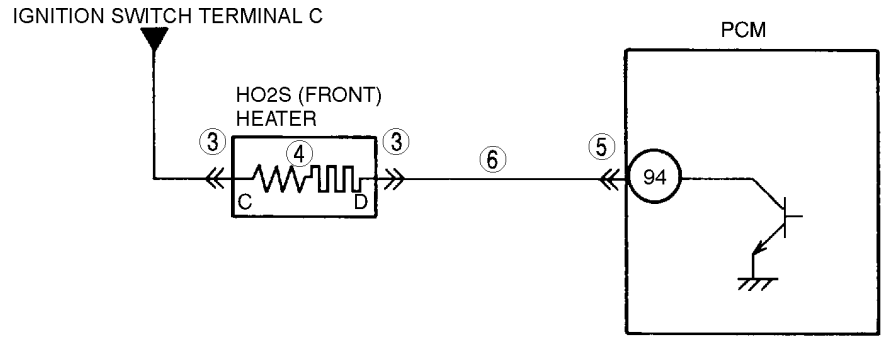
STEP	INSPECTION		ACTION
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 9.
5	**INSPECT POWER CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (front) terminal C (vehicle harness-side) and body GND. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 94 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT CONTROL CIRCUIT OF HO2S HEATER (FRONT) FOR SHORT TO GROUND** • Check for continuity between HO2S (front) terminal D (vehicle harness-side) and body GND. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
8	**INSPECT CONTROL CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • Connect breakout box with PCM connector disconnected. • Check for continuity between HO2S (front) terminal D (vehicle 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 Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0031 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • Is same PENDING CODE of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

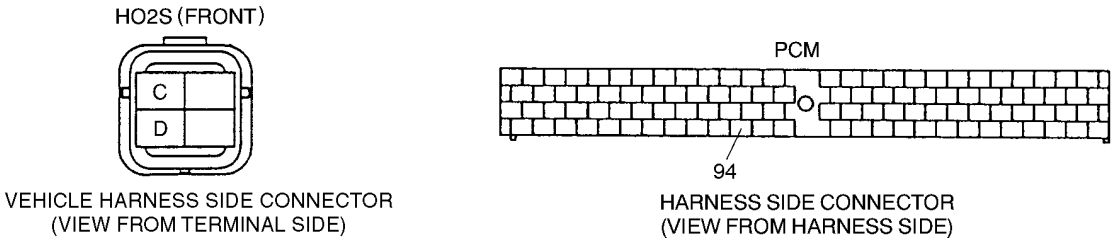
DTC P0032 [ZM]

A3U010201084W30

DTC P0032	HO2S heater (front) circuit high
DETECTION CONDITION	• PCM monitors HO2S heater (front) control signal at PCM terminal 94. If PCM turns HO2S heater (front) on but voltage at terminal 94 still remains high, PCM determines that HO2S heater (front) circuit has malfunction. **Note** • HO2S heater (front) is controlled by a duty signal. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• Short to power circuit between HO2S (front) terminal D and PCM terminal 94 • Shorted HO2S (front) or PCM terminal • PCM malfunction

DTC P0032	HO2S heater (front) circuit high





Diagnostic procedure

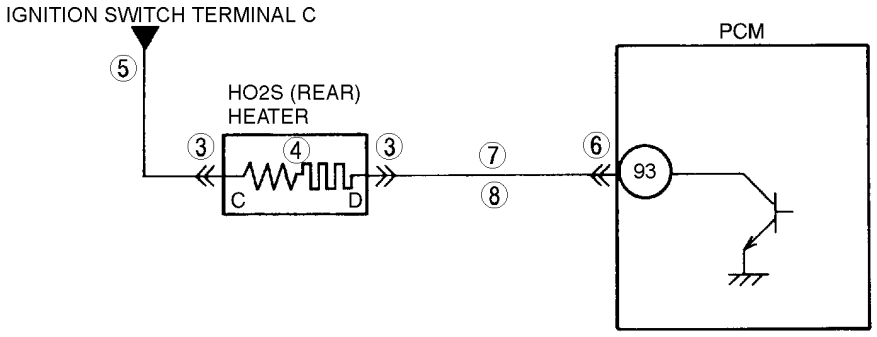
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 HO2S (FRONT) TERMINALS** • Turn ignition key to OFF. • Disconnect HO2S (front) connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 7.
5	**INSPECT PCM TERMINAL** • Disconnect PCM connector. • Check for bent terminal at terminal 94. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
6	**INSPECT HO2S (FRONT) HEATER CONTROL CIRCUIT FOR SHORT TO POWER CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (front) terminal D (vehicle harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0032 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

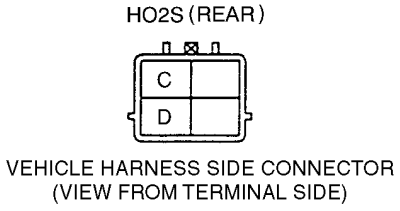
STEP	INSPECTION		ACTION
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

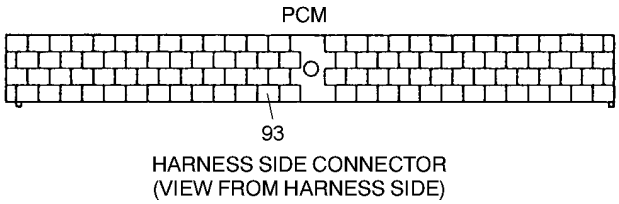
DTC P0037 [ZM]

A3U010201084W31

DTC P0037	HO2S heater (rear) circuit low
DETECTION CONDITION	• PCM monitors HO2S heater (rear) control signal at PCM terminal 93. If PCM turns HO2S heater (rear) off but voltage at terminal 93 still remains low, PCM determines that HO2S heater (rear) circuit has malfunction. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• HO2S (rear) malfunction • Open circuit between ignition switch terminal C and HO2S (rear) terminal C • Open circuit between HO2S (rear) terminal D and PCM terminal 93 • Short to ground circuit between HO2S (rear) terminal D and PCM terminal 93 • Poor connection at HO2S (rear) or PCM connector • PCM malfunction







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 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.

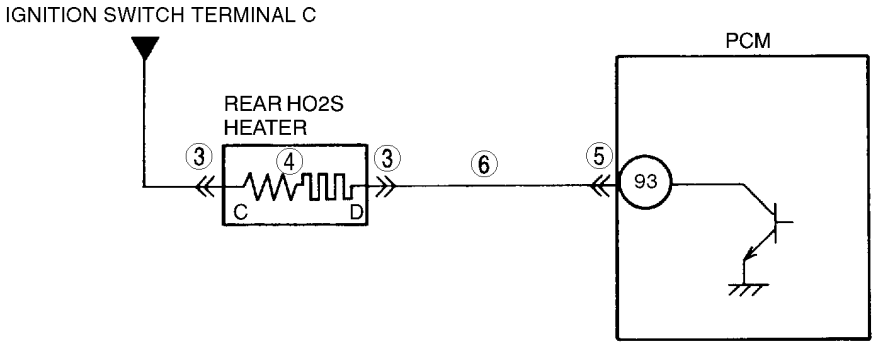
STEP	INSPECTION		ACTION
3	**INSPECT HO2S (REAR) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
4	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (rear) terminals C and D (part-side). • Is resistance **approx. 15.7 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (rear), then go to Step 9.
5	**INSPECT HO2S HEATER (REAR) POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal C (vehicle 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.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 93 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between HO2S (rear) terminal D (vehicle 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.
8	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM connector disconnected. • Check for continuity between HO2S (rear) terminal D (vehicle 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 Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0037 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

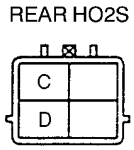
DTC P0038 [ZM]

A3U010201084W32

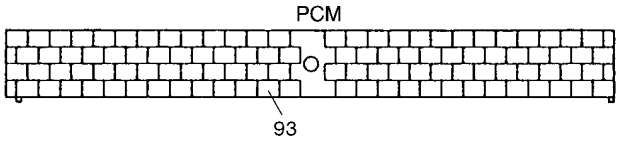
DTC P0038	HO2S heater (rear) circuit high
DETECTION CONDITION	• PCM monitors HO2S heater (rear) control signal at PCM terminal 93. If PCM turns HO2S heater (rear) on but voltage at terminal 93 still remains high, PCM determines that HO2S heater (rear) circuit has malfunction. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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.

DTC P0038	HO2S heater (rear) circuit high
POSSIBLE CAUSE	• HO2S (rear) malfunction • Short to power circuit between HO2S (rear) terminal D (harness-side) and PCM terminal 93 (harness-side) • Shorted HO2S (rear) or PCM terminal • PCM malfunction





VEHICLE HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

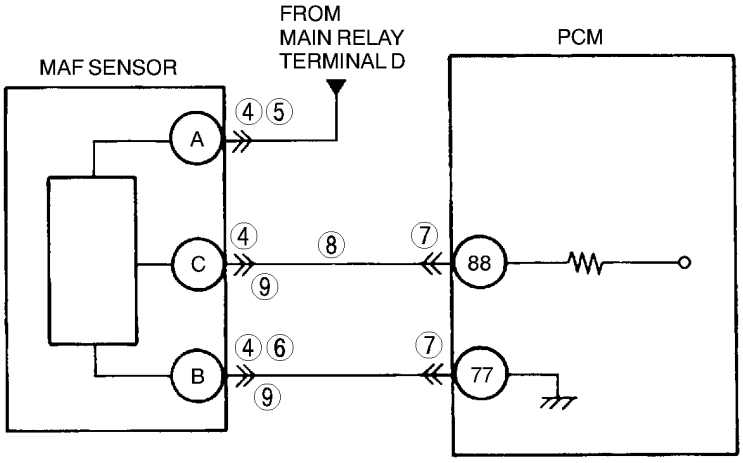
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 HO2S (REAR) TERMINAL** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (rear) terminals C and D (part-side). • Is resistance **approx. 15.7 ohms**	Yes	Go to next step.
		No	Replace the HO2S (rear), then go to Step 7.
5	**INSPECT PCM TERMINAL** • Disconnect PCM connector. • Check for bent terminal at terminal 93. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
6	**INSPECT HO2S (REAR) HEATER CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal D (vehicle harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.

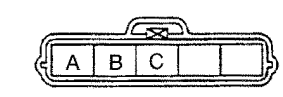
STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0038 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0102 [ZM]

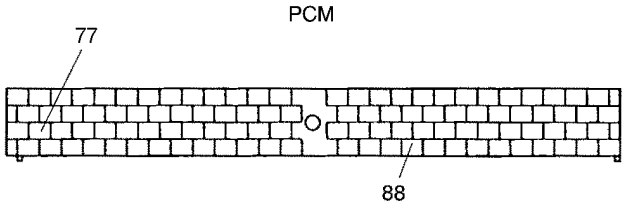
A3U010201084W33

DTC P0102	MAF circuit low input
DETECTION CONDITION	• PCM monitors input voltage from MAF sensor. If input voltage at PCM terminal 88 is **below 0.21 V**, PCM determines that MAF 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 PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between MAF sensor terminal C and PCM terminal 88 • Open circuit in wiring between MAF sensor terminal C and PCM terminal 88 • PCM malfunction • Open circuit in wiring between MAF sensor terminal B and PCM terminal 77 • Open circuit in wiring between main relay and MAF sensor terminal A





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

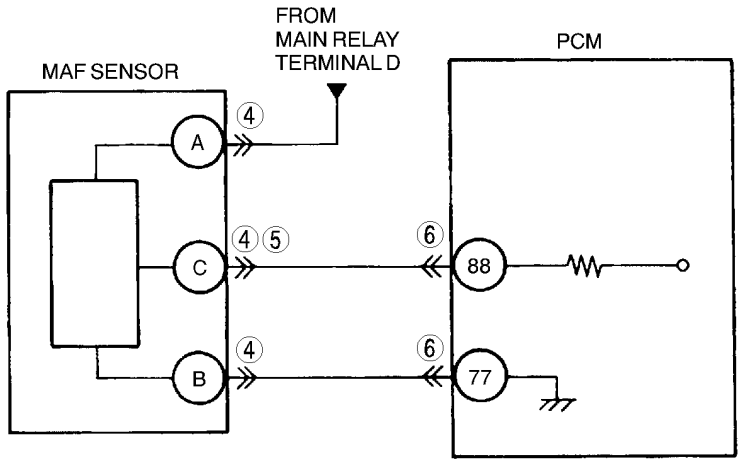
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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** • Connect WDS or equivalent to DLC-2. • Start engine. • Access MAF PID. • Is MAF PID **above 0 g/s** and **168.7 g/s or below**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
		No	Go to next step.
4	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 10.
		No	Go to next step.
5	**CHECK POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Check voltage at MAF sensor terminal A (harness-side). • Is voltage **B+**?	Yes	Go to next step.
		No	Inspect for open circuit in wiring harness between MAF sensor terminal A (harness-side) and main relay. Repair or replace harness, then go to Step 10.
6	**INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT** • Check for continuity between MAF sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Check for open circuit between PCM terminal 36 (harness-side) and MAF sensor terminal B (harness-side). Repair or replace suspected harness, then go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between MAF sensor terminal C (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 C (harness-side) and body ground — MAF sensor connector terminal B (harness-side) and C (harness-side) • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.

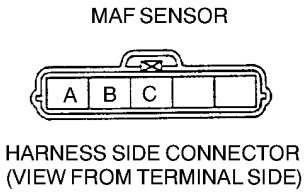
STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P0102 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using WDS or equivalent. • Access MAF PID. **Note** • MAF PID should indicate **above 0 g/s** and **168.7 g/s or below**. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

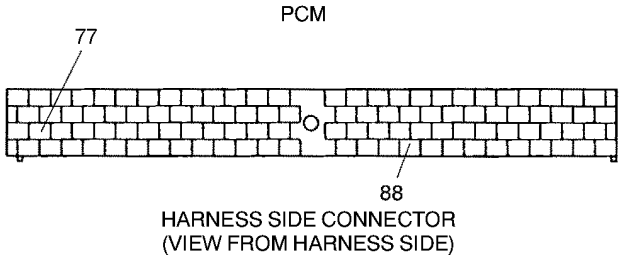
DTC P0103 [ZM]

A3U010201084W34

DTC P0103	MAF circuit high input
DETECTION CONDITION	• PCM monitors input voltage from MAF sensor after ignition key is turned on. If input voltage at PCM terminal 88 is **above 4.90 V**, PCM determines that MAF 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 PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to power circuit in wiring between MAF sensor terminal C and PCM terminal 88







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 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 WDS or equivalent to DLC-2. • Start engine. • Access MAF PID. • Is MAF PID **above 0 g/s** and **168.7 g/s or below**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect the MAF sensor connector. • Check for bent terminal. • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 7.
		No	Go to next step.
5	**INSPECT MAF SIGNAL CIRCUIT FOR SHORT TO POWER CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between MAF sensor terminal C (harness-side) and body ground. • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 7.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using WDS or equivalent. • Access MAF PID. **Note** • MAF PID should indicate **above 0 g/s** and **168.7 g/s or below**. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0106 [ZM]

A3U010201084W35

DTC P0106	BARO circuit performance problem
DETECTION CONDITION	• PCM monitors differences between intake manifold vacuum and atmospheric pressure at idle, which EGR boost sensor detects by switching EGR boost sensor solenoid. If difference is **below 6.43 kPa {48.2 mmHg, 1.90 inHg}**, PCM determines that there is EGR boost sensor performance problem. **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	• EGR boost sensor malfunction or substandard performance • EGR boost sensor solenoid malfunction • Loose, damaged, misconnected, clogged or frozen moisture in vacuum hose from EGR boost sensor solenoid to EGR boost sensor • PCM malfunction • Loose, damaged, misconnected, clogged or frozen moisture in vacuum hose from EGR boost sensor solenoid to EGR valve

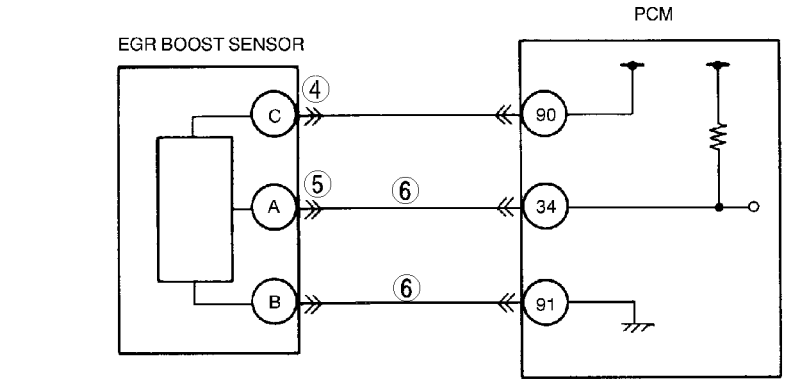
Diagnostic procedure

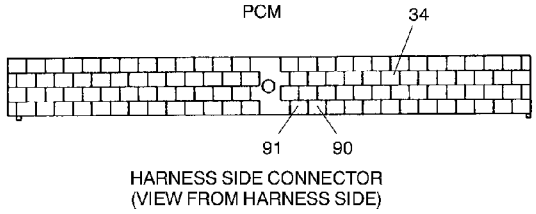
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 STORED DTC** • Turn ignition key to OFF then start engine. • Has DTC P1487 been stored?	Yes	Inspect and repair DTC P1487.
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0106 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**INSPECT CONNECTION OF EGR BOOST SENSING RELATED VACUUM HOSES** • Inspect the following vacuum hoses for looseness, damage, improper connection and/or clogging. — From EGR boost sensor to EGR boost sensor solenoid — From EGR boost sensor solenoid to intake manifold • Are they okay?	Yes	Go to next step.
		No	Repair or replace vacuum hose, then go to Step 9.
6	**INSPECT EGR BOOST SENSOR SOLENOID AIR FILTER FOR CLOGGING** • Has EGR boost sensor solenoid air filter been clogged?	Yes	Repair air clogging, then go to Step 9.
		No	Go to next step.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE FOR WHETHER STUCK OPEN OR CLOSED** • Inspect EGR boost sensor solenoid valve. (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION) • Is EGR boost sensor solenoid okay?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid, then go to Step 9.
8	**INSPECT EGR BOOST SENSOR FOR WHETHER STUCK OPEN OR CLOSED** • Inspect EGR boost sensor. (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM]) • Is EGR boost sensor okay?	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to next step.
9	**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 WDS or equivalent. • Run OBD-ll DRIVE MODE 1, 2 and 3. (See 01–02A–11 OBD-II DRIVE MODE [ZM]) • Stop vehicle. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0107 [ZM]

A3U010201084W36

DTC P0107	BARO circuit low input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor when monitoring conditions are met. If input voltage at PCM terminal 34 is **below 0.35 V**, PCM determines that EGR boost sensor circuit is malfunctioning. **MONITORING CONDITIONS** — Intake air temperature is **above 10 °C {50 °F}**. — EGR boost sensor solenoid is turned OFF. (Barometric pressure is applied to EGR boost sensor.) **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 PCM memory.
POSSIBLE CAUSE	• EGR boost 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 • PCM malfunction





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 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 SIGNAL CIRCUIT VOLTAGE WHEN EGR BOOST SENSOR CONNECTOR IS DISCONNECTED** • Disconnect EGR boost sensor connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor connector terminal A (harness-side) and body GND. • Is voltage **above 4.9 V**?	Yes	Go to next step.
		No	Go to Step 5.

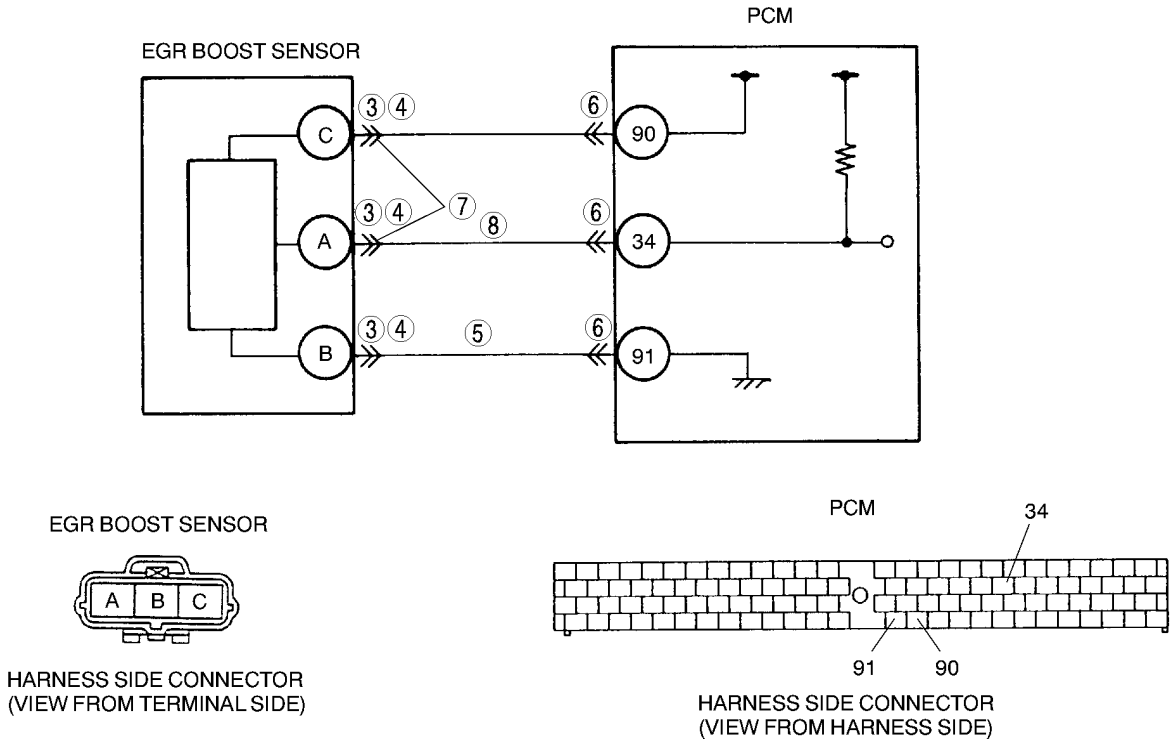
STEP	INSPECTION		ACTION
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT EGR BOOST SENSOR CONNECTOR** **Note** • If DTCs P0122 and P0452 are also retrieved with P0107, go to REFERENCE VOLTAGE troubleshooting procedure. • Measure voltage between EGR boost sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5—5.5 V?**	Yes	Check for poor connection of EGR boost sensor terminal C (harness-side). • Repair or replace terminal as necessary. • If okay, replace EGR boost sensor. Then go to Step 7.
		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 7.
5	**INSPECT EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for 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	Go to next step.
6	**INSPECT EGR BOOST SENSOR SIGNAL AND GROUND CIRCUIT FOR INTERMEDIATE SHORT** • Check for continuity between EGR boost sensor terminals B and A (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then to go to next step.
		No	Go to next step.
7	**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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0108 [ZM]

A3U010201084W37

DTC P0108	BARO circuit high input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor when monitoring conditions are met. If input voltage at PCM terminal 34 is **above 4.92 V**, PCM determines that EGR boost sensor circuit is malfunctioning. **MONITORING CONDITIONS** — Intake air temperature is **above 10 °C {50 °F}**. — EGR boost sensor solenoid is turned OFF. (Barometric pressure is applied to EGR boost sensor.) **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 PCM memory.
POSSIBLE CAUSE	• EGR boost sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between EGR boost sensor terminal B and PCM terminal 91 • EGR boost sensor signal circuit is shorted to reference voltage (Vref) supply circuit. • PCM malfunction

DTC P0108	BARO circuit high input



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 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 EGR BOOST SENSOR CONNECTOR FOR CONNECTION** • Turn ignition key to OFF. • Verify that 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 EGR BOOST SENSOR CONNECTOR FOR POOR CONNECTION** • Disconnect the EGR boost sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there 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 CIRCUIT** • Check for 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 at terminal 91 (damaged/pulled-out pins, corrosion, etc.). • Is there 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 REFERENCE VOLTAGE CIRCUIT** • Check for continuity between EGR boost sensor terminals 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 CIRCUIT** • Check for 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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0111 [ZM]

A3U010201084W38

DTC P0111	IAT circuit performance problem
DETECTION CONDITION	• Intake air temperature is higher than engine coolant temperature by **40 °C {72 °F}** and ignition key is ON. **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	• IAT sensor malfunction • Poor connection at MAF/IAT sensor or PCM connector • PCM malfunction

Diagnostic procedure

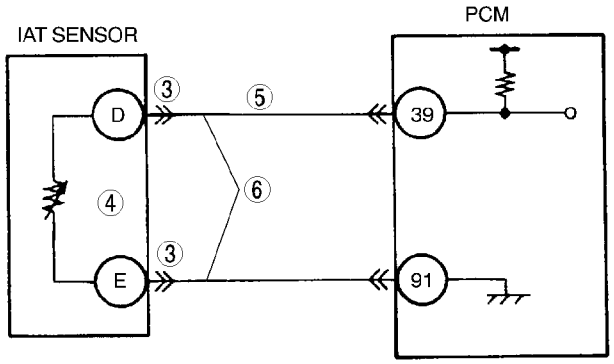
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 MAF/IAT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect MAF/IAT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 6.
		No	Go to next step.
4	**INSPECT IAT SENSOR** • Measure resistance between MAF/IAT sensor terminals D and E (part-side). • Is resistance **below 550 ohms**?	Yes	Replace MAF/IAT sensor, then go to Step 6.
		No	Go to next step.

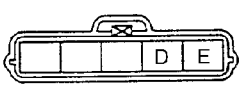
STEP	INSPECTION		ACTION
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 39 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 6.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0111 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • 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.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0112 [ZM]

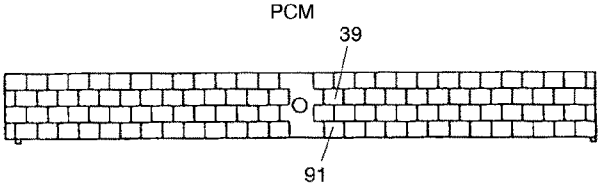
A3U010201084W39

DTC P0112	IAT circuit low input
DETECTION CONDITION	• PCM monitors IAT sensor signal at PCM terminal 39. If voltage at PCM terminal 39 is **below 0.15 V**, PCM determines that IAT sensor circuit has 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 PCM memory.
POSSIBLE CAUSE	• IAT sensor malfunction • Short to ground circuit between MAF/IAT sensor terminal D and PCM terminal 39 • IAT signal and IAT ground circuits are shorted each other. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

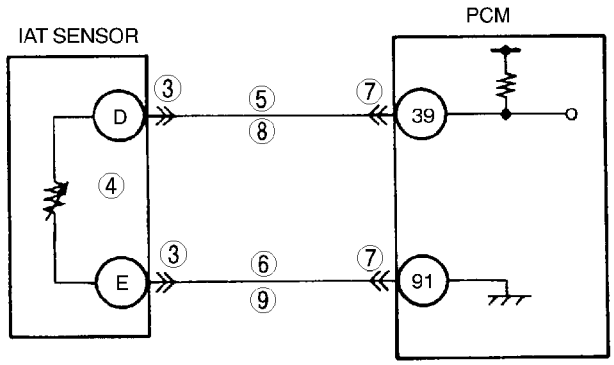
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 IAT SENSOR TERMINAL** • Turn ignition key to OFF. • Disconnect MAF/IAT sensor connector. • Check for bent terminals of MAF/IAT sensor terminals E and D (part-side). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**CLASSIFY IAT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Disconnect MAF/IAT sensor connector. • Measure resistance between IAT sensor terminals E and D (part-side). • Is resistance **within 0.117—28.616 kilohms**?	Yes	Go to next step.
		No	Replace MAF/IAT sensor, then go to Step 7.
5	**INSPECT IAT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check for continuity between MAF/IAT sensor terminal D (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.
6	**INSPECT IAT CIRCUITS FOR INTERMEDIATE SHORT** • Check for continuity between MAF/IAT sensor terminals D and E (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

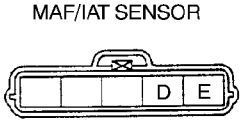
DTC P0113 [ZM]

A3U010201084W40

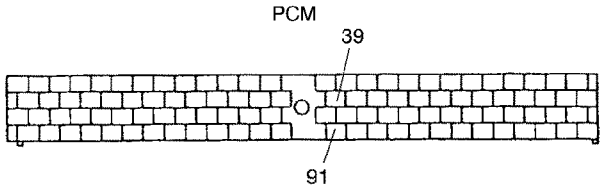
DTC P0113	IAT circuit high input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If voltage at PCM terminal 39 is **above 4.84 V**, PCM determines that IAT sensor circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• IAT sensor malfunction • Open circuit between MAF/IAT sensor terminal D and PCM terminal 39 • Short to power circuit between MAF/IAT sensor terminal D and PCM terminal 39 • Open circuit between MAF/IAT sensor terminal E and PCM terminal 91 • Short to power circuit between MAF/IAT sensor terminal E and PCM terminal 91 • Poor connection at MAF/IAT sensor or PCM connector • PCM malfunction

DTC P0113	IAT circuit high input





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

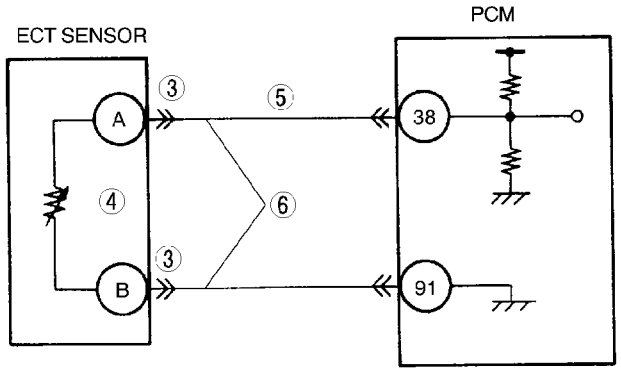
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 IAT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect MAF/IAT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
4	**INSPECT IAT SENSOR** • Disconnect MAF/IAT sensor connector. • Measure resistance between IAT sensor terminals E and D (part-side). • Is resistance **within 0.117—28.616 kilohms**?	Yes	Replace MAF/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 MAF/IAT sensor terminal E (harness-side) and body ground. • Is there 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 MAF/IAT sensor terminal D (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.

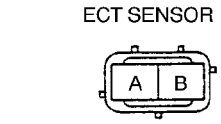
STEP	INSPECTION		ACTION
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Inspect PCM terminal 39 and 91 (harness-side) for tightness using feeler tool. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between MAF/IAT sensor terminal D (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 CIRCUIT** • Check for continuity between MAF/IAT sensor terminal E (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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0117 [ZM]

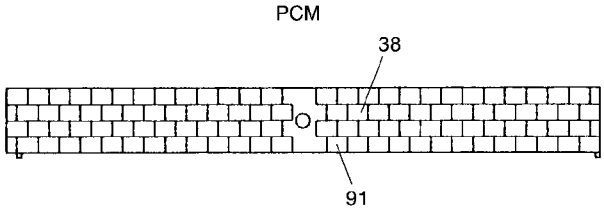
A3U010201084W41

DTC P0117	ECT circuit low input
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38. If voltage at terminal 38 is **below 0.20 V**, PCM determines that ECT sensor circuit has 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 PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Short to ground circuit between ECT sensor terminal A and PCM connector terminal 38 • ECT signal and ground circuits are shorted each other. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

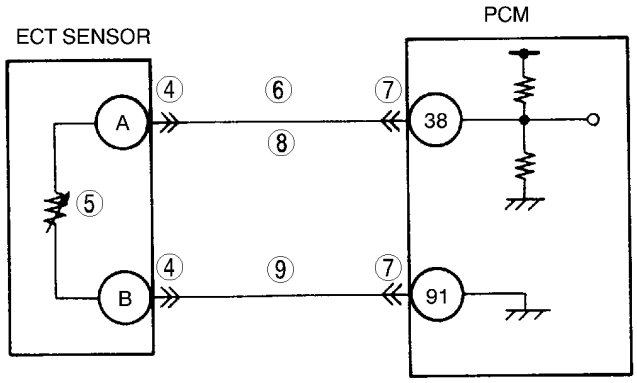
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 TERMINAL FOR BENDING** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for bent of ECT sensor terminals A and B (part-side). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**CLASSIFY ECT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Measure resistance between ECT sensor teminals A and B (part-side). • Is resistance **within 0.111—25.403 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.

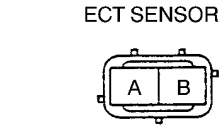
STEP	INSPECTION		ACTION
5	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 7.
		No	Go to next step.
6	**INSPECT ECT CIRCUIT FOR SHORT** • Check for continuity between ECT sensor terminals 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.
7	**VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0118 [ZM]

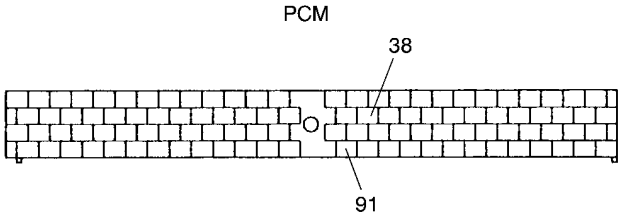
A3U010201084W42

DTC P0118	ECT circuit high input
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38. If voltage at terminal 38 is **above 4.94 V**, PCM determines that ECT sensor circuit has 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 PCM memory.
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





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 ECT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.

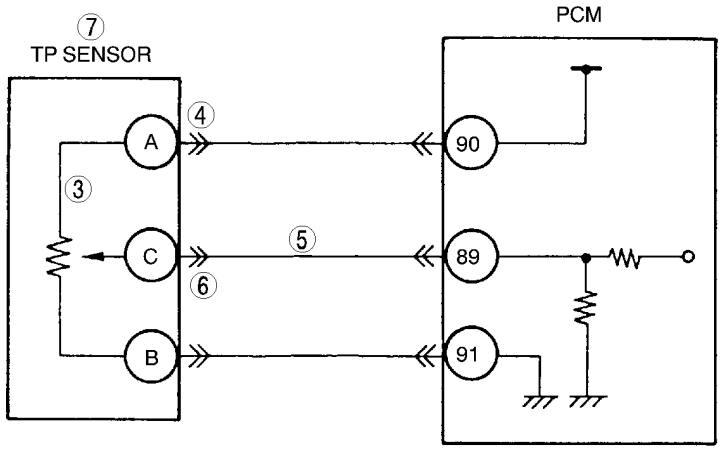
STEP	INSPECTION		ACTION
4	**CLASSIFY ECT SENSOR OR HARNESS MALFUNCTION** • Measure resistance between ECT sensor teminals A and B (part-side). • Is resistance **within 0.111—25.403 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 10.
5	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between ECT sensor terminal A (harness-side) and body ground. • Is there voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 38 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
7	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for 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 10.
8	**INSPECT ECT SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT** • Check for 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.
9	**VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

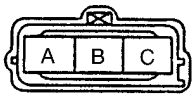
DTC P0122 [ZM]

A3U010201084W43

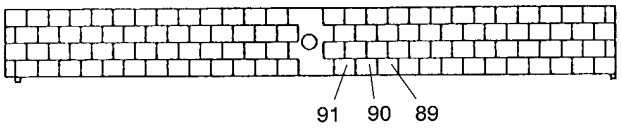
DTC P0122	TP circuit low input
DETECTION CONDITION	• If PCM detects TP sensor voltage at PCM terminal 89 **below 0.10 V** after engine start, PCM determines that TP circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
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 A and PCM terminal 90 • Short to ground circuit between TP sensor terminal A and PCM terminal 90 • PCM malfunction

DTC P0122	TP circuit low input





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

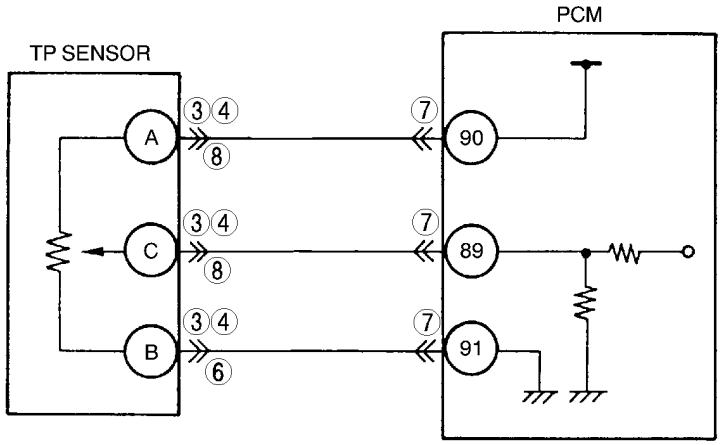
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 TP SENSOR CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between TP sensor terminals A and C (part-side). • Is there continuity?	Yes	Check TP sensor connector terminal A for poor connection. Repair or replace as necessary, then go to Step 8.
		No	Go to Step 8.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT TP SENSOR CONNECTOR** **Note** • If DTC P0107 and P0452 are also retrieved with P0122, go to REFERENCE VOLTAGE troubleshooting procedure. (See 01–03A–50 NO.30 CONSTANT VOLTAGE [ZM].) • 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 next step.
		No	Repair or replace open circuit in wiring harness between TP sensor terminal A (harness-side) and PCM terminal 90 (harness-side), then go to Step 8.

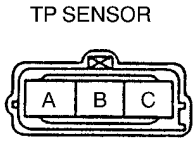
STEP	INSPECTION		ACTION
5	**VERIFY TP SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Disconnect PCM connector. • Connect breakout box with PCM disconnected. • Disconnect TP sensor connector. • Check for continuity between TP sensor terminal C (harness-side) and breakout box terminal 89. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 8.
6	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between TP sensor connector terminal C and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 8.
		No	Go to next step.
7	**INSPECT TP SENSOR** • Perform TP sensor inspection. (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM].) • Is TP sensor Okay?	Yes	Go to next step.
		No	Replace TP sensor.
8	**VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Depress and release accelerator pedal several times. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0123 [ZM]

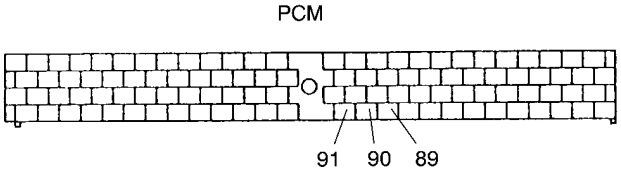
A3U010201084W44

DTC P0123	TP circuit high input
DETECTION CONDITION	• If PCM detects TP sensor voltage at PCM terminal 89 is **above 4.77 V** after engine start, 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 conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal B and PCM terminal 91 • Short to reference voltage (Vref) supply circuit between TP sensor terminal C and PCM terminal 89 • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 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 9.

STEP	INSPECTION		ACTION
4	**INSPECT TP SENSOR CONNECTOR FOR POOR CONNECTION** • Disconnect TP 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	**CHECK TP SENSOR RESISTANCE** • Check resistance between following TP sensor terminals (part-side): Terminals A and B: **Within 3.2—4.8 kilohms** Terminals B and C: **Within 0.2—1.2 kilohms** • Are both resistances within specifications?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 9.
6	**VERIFY TP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT AT TP SENSOR CONNECTOR** • Check for continuity between TP sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to Step 8.
		No	Go to next step.
7	**CHECK PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection at terminals 89, 90 and 91 (damaged/pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Repair or replace open circuit in wiring harness between TP sensor terminal B and PCM connector terminal 91 (harness-side). Then, go to Step 9.
8	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT** • Check for continuity between TP sensor terminals A and C. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equipment. • Race engine a few times. • Does the same DTC appear?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0125 [ZM]

A3U010201084W45

DTC P0125	Excessive time to enter closed loop fuel control
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38 after engine is started engine is cold. If ECT voltage does not reach the expected temperature within 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 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

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 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** • Clear DTC using WDS or equivalent. • Start engine. • Warm up engine completely. • Access ECT PID using WDS or equivalent. • Is ECT PID **above 35.6 °C {96 °F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
		No	Go to next step.
4	**INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
5	**INSPECT ECT SENSOR** • Measure resistance between ECT sensor terminals A and B (part-side). • Is resistance **approx. 2 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 38 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, 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 WDS or equivalent. • Access ECT PID using WDS or equivalent. • Wait until ECT PID is **below 20 °C {68 °F}**. • Start engine and warm it up completely. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0130 [ZM]

A3U010201084W46

DTC P0130	HO2S (Front) circuit malfunction

DETECTION CONDITION	• PCM monitors inversion cycle period, lean-to-rich response time and rich-to-lean response time of the sensor. PCM calculates the average of the inversion cycle period-specified inversion cycles, average response time from lean-to-rich, and from rich-to-lean when monitoring conditions are met. If any exceeds threshold, PCM determines that circuit has malfunction.
	MONITORING CONDITIONS
	— Drive mode 3
	— Following conditions are met:
	  • Calculation load is **20—59%** [at engine speed **2,000 rpm**]
	  • Engine speed is **1,410—4,000 rpm**
	  • Vehicle speed is **over 3.77km/h {2.34 mph}**.
	  • Engine coolant temperature is **above –10°C {14°F}**.
	Diagnostic support note
	• This is an intermittent monitor. (OXYGEN SENSOR)
	• MIL illuminates if PCM detects either of above malfunction conditions 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	• Front HO2S deterioration • Front HO2S heater malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel filter clogged or restricted • Fuel leakage on fuel line from fuel distribution pipe and fuel pump • Fuel return hose clogged • Leakage from exhaust system • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • Insufficient compression • Engine malfunction

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 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and/or stored DTCs using WDS or equivalent. • Is the following DTC also present? — P0442, P0443, P0455, P0031, P0032 or P1450 with P0130	Yes	Go to appropriate DTC troubleshooting procedures, then go to Step 15. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0130 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02A–15 DTC TABLE [ZM].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal conditions (in PARK). — **More than 0.55 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.55 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECT INSTALLATION OF FRONT HO2S** • Check if HO2S (front) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Retighten sensor, then go to Step 15.
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust manifold and HO2S (front). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 15.
		No	Replace sensor, then go to Step 15.
8	**INSPECT LONG TERM FUEL TRIM** • Access LONGFT1 PIDs. • Compare it with FREEZE FRAME DATA (FFD) recorded at Step 1. • Is it below FFD value?	Yes	Engine is driven under rich condition. Go to next step.
		No	Engine is driven under lean condition. Go to Step 11.
9	**INSPECT FUEL LINE PRESSURE (Excessive fuel line pressure)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	Go to next step.
10	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return pipe for clogging. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • If any problem is found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 15.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve. • If not, reconnect vacuum hoses to correct position. Then go to Step 15.
11	**INSPECT FUEL LINE PRESSURE (Low fuel line pressure)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	Go to next step.
12	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Perform fuel pump maximum pressure test. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. • Repair or replace suspected circuit. • If circuit is okay, replace fuel pump. Then go to Step 15.
13	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 15.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure) • Foreign material or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). • If all items above are okay, replace pressure regulator. Then go to Step 15.

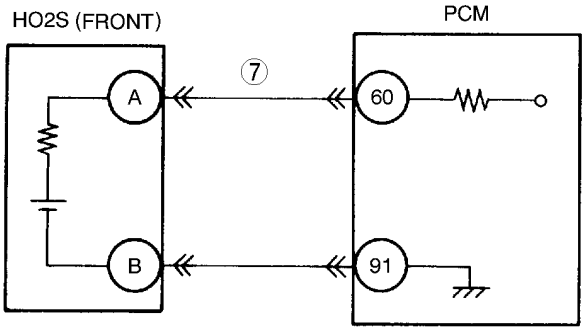
STEP	INSPECTION		ACTION
14	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble, which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
15	**VERIFY TROUBLESHOOTING OF DTC P0130 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Run OBD-ll DRIVE MODE 1 and 3. (See 01–02A–11 OBD-II DRIVE MODE [ZM].) • Stop vehicle and access ON BOARD SYSTEM READINESS TEST to inspect DRIVE MODE completion status. • Verify RFC changes to YES for OXYGEN SENSOR. — If not, run DRIVE MODE again. • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify following TEST # values: — 10:01:11, 10:02:11 or 10:03:11 • Are they all below MAX value?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

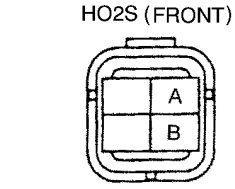
DTC P0134 [ZM]

A3U010201084W47

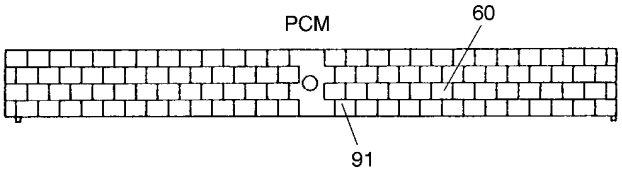
DTC P0134	HO2S (Front) circuit no activity detected
DETECTION CONDITION	• PCM monitors input voltage from HO2S (front) when the following monitoring conditions are met. If input voltage from sensor never **exceeds 0.55 V** for **94.4 seconds**, PCM determines that sensor circuit is not activated. **MONITORING CONDITIONS** — Drive mode 3 — Following conditions are met: • Engine speed is **above 1,500 rpm**. • Engine coolant temperature is **above 80 °C {176 °F}**. **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.

DTC P0134	HO2S (Front) circuit no activity detected
POSSIBLE CAUSE	• HO2S (front) deterioration • HO2S (front) heater malfunction • Leakage from exhaust system • Open or short to ground circuit between HO2S (front) terminal A and PCM terminal 60 • Insufficient compression • Engine malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

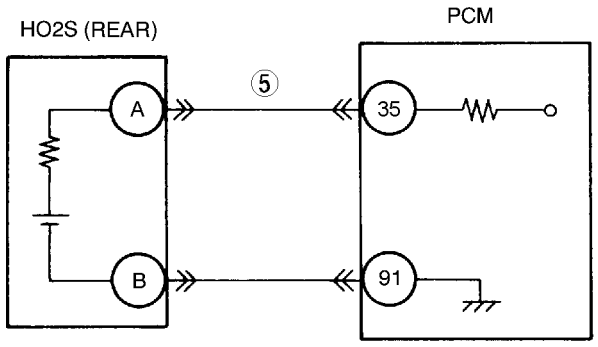
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Is other DTC present except P1170?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0134 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02A–15 DTC TABLE [ZM].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition (in PARK). — **More than 0.55 V** when suddenly depressing accelerator pedal (rich condition). — **Less than 0.55 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to Step 8.
		No	Go to next step.

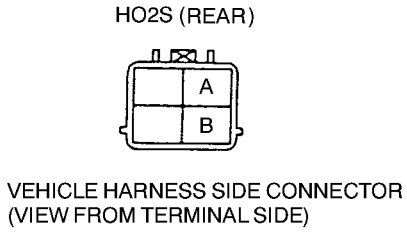
STEP	INSPECTION		ACTION
6	**INSPECT INSTALLATION OF HO2S** • Check if HO2S (front) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Install sensor securely, then go to Step 10.
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust manifold and HO2S (front). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 10.
		No	• Inspect the following harnesses for open or short to ground circuit. Repair or replace harness if necessary. — HO2S (front) terminal A (harness-side) to PCM terminal 60 (harness-side) • Repair or replace harness if necessary. • If all items above are okay, replace faulty sensor. Then go to Step 10.
8	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 10.
		No	Go to next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0134 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Access RPM and ECT PIDs using WDS or equivalent. • Verify that ECT PID is reading **above 80 °C {176 °F}**. • Increase engine speed **above 1,500 rpm** (RPM PID reading) for **more than 94.4 seconds**. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

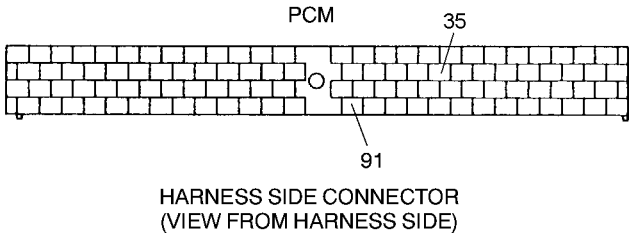
DTC P0138 [ZM]

A3U010201084W48

DTC P0138	HO2S (rear) circuit high input
DETECTION CONDITION	• PCM monitors input voltage from HO2S (rear). If input voltage from sensor is **above 0.45 V** for **6 seconds** during deceleration fuel cut, PCM determines that the circuit input is high. **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	• HO2S (rear) malfunction • Short to power circuit in wiring between HO2S (rear) terminal A and PCM terminal 35







Diagnostic procedure

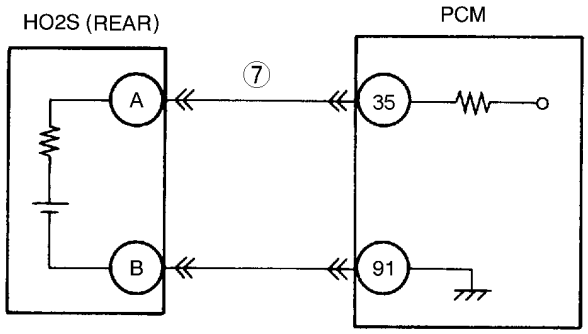
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then Start engine. • Verify pending codes or stored DTCs using WDS or equivalent. • Is other DTC present?	Yes	Go to appropriate DTC troubleshooting procedures. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0138 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02A–15 DTC TABLE [ZM].)

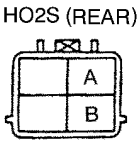
STEP	INSPECTION		ACTION
5	**INSPECT HO2S (REAR) SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY CIRCUIT** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal A (harness-side) and body ground. • Is any voltage reading?	Yes	Replace short to power supply circuit, then go to Step 7.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS** • Start engine. • Access O2S12 PID using WDS or equivalent. • Verify PID while racing engine at least **10 times** (in neutral position). • Does PID reading stay **above 0.45 V**?	Yes	Replace HO2S (rear), then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0138 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1 and 3. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0140 [ZM]

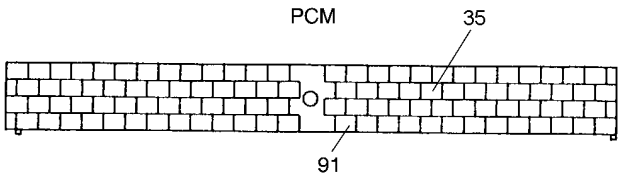
A3U010201084W49

DTC P0140	HO2S (rear) circuit no activity detected
DETECTION CONDITION	• PCM monitors input voltage from HO2S (rear) when the following monitoring conditions are met. If input voltage from sensor never **exceeds 0.55 V** for **30 seconds**, PCM determines that sensor circuit is not activated. **MONITORING CONDITIONS** — Drive mode 3 — Following conditions are met: • Engine speed is **above 1,500 rpm**. • Engine coolant temperature is **above 80 °C {176 °F}**. **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	• HO2S (rear) deterioration • HO2S (rear) heater malfunction • Leakage from exhaust system • Open or short to ground circuit between HO2S (rear) terminal A and PCM terminal 35 • Insufficient compression • Engine malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Is other DTC present except P1170?	Yes	Go to appropriate DTC troubleshooting procedures. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0140 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02A–15 DTC TABLE [ZM].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S12 PID using WDS or equivalent. • Verify PID while racing engine at least **10 times** (in neutral position). • Is PID reading okay? — **More than 0.55 V** at least once during engine racing.	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT INSTALLATION OF HO2S (REAR)** • Check if HO2S (rear) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Install sensor securely, then go to Step 10.
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust pipe and HO2S (rear). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 10.
		No	• Inspect for open or short to ground circuit between HO2S (rear) terminal A (harness-side) and PCM terminal 35 (harness-side). — Repair or replace harness if necessary. • If all items above are okay, replace HO2S (rear). Then go to Step 10.
8	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 10.
		No	Go to next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0140 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Access RPM and ECT PIDs using WDS or equivalent. • Verify that ECT PID is reading **above 80 °C {176 °F}**. • Increase engine speed **above 1,500 rpm** (RPM PID reading) for **more than 30 seconds**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0171 [ZM]

A3U010201084W50

DTC P0171	Fuel trim system too lean
DETECTION CONDITION	• PCM monitors short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) values when DRIVE MODE 1 is run. If fuel trim exceeds preprogrammed criteria, PCM determines that the fuel system is too lean. **Diagnostic support note** • This is a continuous monitor. (FUEL SYSTEM) • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction conditions during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Misfire • HO2S (front) deterioration • HO2S (front) heater malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel filter clogged or restricted • Fuel leakage on fuel line from fuel delivery pipe and fuel pump • Fuel return hose clogged • Leakage from exhaust system • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • Insufficient compression

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify related PENDING CODE or stored DTCs. • Are other DTCs present?	Yes	If misfire DTC is present, go to Step 8. If other DTC is present, go to appropriate DTC troubleshooting procedures. (See 01–02A–15 DTC TABLE [ZM].)
		No	If drivability concern is present, go to Step 8. If not, go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0171 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, MAF, TP and VS PIDs using WDS or equivalent. (See 01–40A–8 PID/DATA MONITOR table (Reference).) • Is there any signal that is far out of specification when ignition key is ON and engine runs?	Yes	Inspect suspected sensor and excessive resistance in related wiring harnesses. Repair or replace if necessary. Then go to Step 20.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as Step 5 while simulating FREEZE FRAME DATA condition. • Is there any input signal which causes drastic changes?	Yes	Inspect suspected sensor and related wiring harnesses, and repair or replace it. Then go to Step 20.
		No	Go to next step.
7	**VERIFY CURRENT INPUT SIGNAL STATUS OF HO2S FRONT** • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition. (in PARK) — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Inspect following for air suction due to cracks, damages and loose parts: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold • Vacuum hoses **Note** • Engine speed may change when rust penetrating agent is sprayed on the air suction area. Repair or replace any faulty part, then go to Step 20.
		No	Visually inspect for any gas leakage between exhaust manifold and HO2S (front). • If there is no leakage, replace HO2S (front). Then go to Step 20.
8	**INSPECT MAF SIGNAL** • Start engine. • Access MAF PID using WDS or equivalent. • Verify that MAF PID changes quickly according to race engine RPM. • Is MAF PID response okay?	Yes	Go to next step.
		No	Replace MAF sensor, then go to Step 20.
9	**INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE-AIR SYSTEM** • Visually inspect for loose, cracked or damaged hoses on intake-air system. • Is there malfunction?	Yes	Repair or replace source of air suction, then go to Step 20.
		No	Go to next step.
10	**INSPECT FUEL LINE PRESSURE** • Turn ignition key to OFF. **Note** • If engine will not start, inspect fuel line pressure with ignition key ON. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	If fuel line pressure is too high: Go to next step. If fuel line pressure is too low: Go to Step 12.
11	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return hose for clogging. • If any problem is found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 20.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve, then go to Step 20. • If not, reconnect vacuum hoses to correct position, then go to Step 20.
12	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Perform fuel pump maximum pressure test. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. Repair or replace suspected circuit, then go to Step 20. • If circuit is okay, replace fuel pump. Then go to Step 20.

STEP	INSPECTION		ACTION
13	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 20.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure). • Foreign materials or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign materials or stain is found inside fuel filter (low-pressure), clean of fuel tank and fuel filter (low-pressure). • If all items above are okay, replace pressure regulator. Then go to Step 20.
14	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinders using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 18.
		No	Go to next step.
15	**CHECK HIGH-TENSION LEADS OF NON-BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 20.
16	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Check voltage at ignition coil connector terminal D (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 20.
17	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to Step 20.
18	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to Step 20.
19	**INSPECT FUEL INJECTOR OPERATION** • Remove fuel injector from suspected bank. (See 01–14–24 FUEL INJECTOR INSPECTION.) • Inspect injector operation. • Is fuel injector okay?	Yes	Go to next step.
		No	Replace injector, then go to Step 20.
20	**VERIFY TROUBLESHOOTING OF DTC P0171 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1, 2 and 3. • Is PENDING CODE P0171 present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
21	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0172 [ZM]

A3U010201084W51

DTC P0172	Fuel trim system (RH) too rich
DETECTION CONDITION	• PCM monitors short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) values when DRIVE MODE 1 is run. If fuel trim exceeds pre programmed criteria, PCM determines that the fuel system is too rich. **Diagnostic support note** • This is a continuous monitor. (FUEL SYSTEM) • MIL illuminates if PCM detects the above malfunction conditions 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	• Misfire • HO2S (front) deterioration • HO2S heater (front) malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel return hose clogged • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • PCV valve malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	If drivability concern or rough idle is present, go to Step 10. If not, go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0172 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, MAF, TP and VS PIDs using WDS or equivalent. (See 01–40A–8 PID/DATA MONITOR table (Reference).) • Is there any signal that is far out of specification when ignition key is ON and engine runs?	Yes	Inspect suspected sensor and excessive resistance in related wiring harnesses. Repair or replace if necessary. Then go to Step 12.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 5 while simulating FREEZE FRAME DATA condition. • Is there any input signal which causes drastic changes?	Yes	Inspect suspected sensor and related wiring harnesses, and repair or replace it. Then go to Step 12.
		No	Go to next step.
7	**VERIFY CURRENT INPUT SIGNAL STATUS OF HO2S (FRONT)** • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition (in PARK or NEUTRAL). — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to next step.
		No	Replace suspected HO2S (front). Then go to Step 12.

STEP	INSPECTION		ACTION
8	**INSPECT FUEL LINE PRESSURE** • Turn ignition key to OFF. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 10.
		No	Go to next step.
9	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Start engine. • Disconnect vacuum hose from pressure regulator. • Verify that the vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return hose for clogging. • If any problem found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 12.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve, then go to Step 12. • If not, reconnect vacuum hoses to correct position, then go to Step 12.
10	**INSPECT PURGE SOLENOID VALVE FOR WHETHER STUCK OPEN** • Turn ignition key to OFF. • Disconnect both hoses from purge solenoid valve. • Blow air through purge solenoid valve. • Does air blow through?	Yes	Replace purge solenoid valve. Then go to Step 12.
		No	Go to next step.
11	**INSPECT PCV VALVE OPERATION** • Inspect PCV valve operation. (See 01–03A–59 Pressure Regulator Control Inspection.) • Is PCV valve okay?	Yes	Go to next step.
		No	Replace PCV valve, then go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0172 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1, 2 and 3. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0300 [ZM]

A3U010201085W06

DTC P0300	Random misfire detection
DETECTION CONDITION	• PCM monitors CKP sensor input signal interval time. PCM calculates the change of the interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, PCM detects a misfire in the corresponding cylinder. While the engine is running, PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, PCM determines that a misfire occured, which can damage the catalytic converter or affect emission performance. **Diagnostic support note** • This is a continuous monitor (MISFIRE). • MIL illuminates if PCM detects the misfire which affects emission performance in two consecutive drive cycles. • PENDING CODE is available if PCM detects the misfire which affects emission performance during first drive cycle. • MIL flashes if PCM detects the misfire which can damage the catalytic converter during first drive cycle. Therefore, PENDING CODE is not available while MIL flashes. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P0300	Random misfire detection
POSSIBLE CAUSE	• CKP sensor malfunction • CMP sensor malfunction • Ignition coil malfunction • High-tension lead malfunction • MAF sensor contamination • Excess air suction in intake-air system (between MAF sensor and dynamic chamber) • Fuel pump malfunction • Fuel pressure regulator malfunction • Fuel line clogged • Fuel filter clogged • Fuel leakage in fuel line • Purge control solenoid valve malfunction • PCV valve malfunction • EGR valve malfunction • Vacuum hoses damaged or improper connection • Related connector and terminal malfunction • Related wiring harness malfunction • Poor fuel quality

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 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 RELATED PENDING CODE OR STORED DTCs** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, IAT, MAF, RPM, TP, and VS PIDs using WDS or equivalent. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) • Is there any signal that is far out of specification when ignition switch is ON and engine runs at idle?	Yes	Inspect suspected circuit and/or part according to inspection results. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) Then go to Step 23.
		No	Go to next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 4 while simulating FREEZE FRAME DATA condition. • Is there any signal which causes drastic changes?	Yes	Inspect suspected circuit and/or part according to inspection results. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) Then go to Step 23.
		No	Go to next step.
6	**INSPECT CMP SENSOR** • Inspect CMP sensor. (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM].) • Is CMP sensor okay?	Yes	Go to next step.
		No	Inspect installation condition and damages on timing belt and gears, repair faulty parts. • If it is okay, replace CMP sensor. Then go to Step 23.
7	**VERIFY CKP SENSOR INSTALLATION CONDITION** • Check CKP sensor for looseness. • Is CKP sensor loose?	Yes	Retighten CKP sensor, then go to Step 23.
		No	Go to next step.
8	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinder using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 12.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**CHECK HIGH-TENSION LEADS OF NON-BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 23.
10	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between ignition coil terminal A (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 23.
11	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to Step 23.
		No	Replace ignition coil, then go to Step 23.
12	**INSPECT MAF SIGNAL** • Start engine. • Access MAF PID using WDS or equivalent. • Verify that MAF PID changes quickly according to race engine RPM. • Is MAF PID response okay?	Yes	Go to next step.
		No	Replace MAF sensor, then go to Step 23.
13	**INSPECT EXCESSIVE AIR SUCTION IN INTAKE-AIR SYSTEM** • Inspect for air leakage at following: — Between MAF sensor and throttle body — Between throttle body and dynamic chamber • Is there malfunction?	Yes	Repair or replace suspected part, then go to Step 23.
		No	Go to next step.
14	**INSPECT FUEL LINE PRESSURE** • Inspect fuel line pressure. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure okay?	Yes	Go to Step 18.
		No	If fuel line pressure is too high, go to next step. If fuel line pressure is too low, go to Step 16.
15	**VERIFY VACUUM LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Start engine. • Is vacuum felt at opening end of vacuum hose?	Yes	Check following: • Fuel pump maximum pressure (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Fuel return hose for clogging — If all above are okay, replace pressure regulator. Then go to Step 23.
		No	Verify vacuum hoses are connected correctly. • If okay, replace pressure regulator control solenoid valve. • If not, reconnect vacuum hose in proper position. Then go to Step 23.
16	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Inspect fuel pump maximum pressure. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. Repair or replace suspected circuit, then go to Step 23. • If okay, replace fuel pump, then go to Step 23.
17	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect for fuel leakage in fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 23.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure). • Foreign material or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). • If all items above are okay, replace pressure regulator. Then, go to Step 23.

STEP	INSPECTION		ACTION
18	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to Step 23.
19	**INSPECT PURGE CONTROL SOLENOID VALVE FOR OPERATION** • Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge control solenoid valve operation okay?	Yes	Go to next step.
		No	Replace purge control solenoid valve, then go to Step 23.
20	**INSPECT PCV VALVE OPERATION** • Turn ignition key to OFF. • Remove PCV valve and check valve operation. (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION.) • Is PCV valve operation okay?	Yes	Replace PCV valve, then go to Step 23.
		No	Go to next step.
21	**INSPECT EGR VALVE FOR OPERATION** • Remove EGR valve. • Visually check for stuck open condition. • Is EGR valve stuck open?	Yes	Repair or replace EGR valve, then go to Step 23.
		No	Go to next step.
22	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
23	**VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine and perform OBD-II DRIVE MODE 1. (See 01–02A–11 Mode 1 (PCM adaptive memory procedure drive mode).) • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
24	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0301, P0302, P0303, P0304 [ZM]

A3U010201085W07

DTC P0301 **DTC P0302** **DTC P0303** **DTC P0304**	**Cylinder No.1 misfire detected** **Cylinder No.2 misfire detected** **Cylinder No.3 misfire detected** **Cylinder No.4 misfire detected**
DETECTION CONDITION	• PCM monitors CKP sensor input signal interval time. PCM calculates the change of the interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, PCM detects a misfire in the corresponding cylinder. While the engine is running, PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, PCM determines that a misfire occured, which can damage the catalytic converter or affect emission performance. **Diagnostic support note** • This is a continuous monitor (MISFIRE). • MIL illuminates if PCM detects the misfire which affects emission performance in two consecutive drive cycles. • PENDING CODE is available if PCM detects the misfire which affects emission performance during first drive cycle. • MIL flashes if PCM detects the misfire which can damage the catalytic converter during first drive cycle. Therefore, PENDING CODE is not available while MIL flashes. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Spark plug malfunction • High-tension lead malfunction • Fuel injector malfunction • Air suction in intake-air system (between dynamic chamber and cylinder head) • Inadequate engine compression due to engine internal malfunction • Related connector or terminal malfunction • Related wiring harness malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON /IDLE)** • Access ECT, IAT, MAF, RPM, TP and VS PIDs using WDS or equivalent. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) • Is there any signal that is far out of specification when ignition switch is ON and engine runs at idle?	Yes	Inspect suspected circuit and/or part according to inspection results. Then go to Step 13. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).)
		No	Go to next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 4 while simulating FREEZE FRAME DATA condition. • Is there any signal which causes drastic changes?	Yes	Inspect suspected circuit and/or part according to inspection results. Then go to Step 13. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).)
		No	Go to next step.

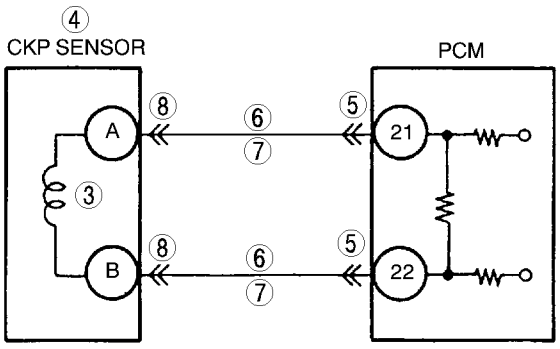
STEP	INSPECTION		ACTION
6	**INSPECT SPARK PLUG CONDITION** • Turn ignition key to OFF. • Remove spark plug from suspected cylinder. • Check spark plug condition: — Cracks — Excessive wear — Gap — Wet • Is any problem found on spark plug?	Yes	• If spark plug is wet, fuel flooding is suspected. Go to Step 13. • If spark plug has cracks, excessive wear or improper gap, replace faulty spark plug. Then go to Step 13.
		No	Go to next step.
7	**VERIFY HIGH-TENSION LEAD CONDITION** • Remove high-tension lead. • Check high-tension lead condition and resistance. — Cracks — Spark shorts to cylinder head through high-tension lead insulator • Is high-tension lead okay?	Yes	Go to next step.
		No	Replace high-tension lead, then go to Step 13.
8	**INSPECT FOR AIR SUCTION AT INTAKE-AIR SYSTEM** • Inspect for air leakage at following: — Around connection of dynamic chamber and intake manifold — Around connection of intake manifold and cylinder head • Is air leakage found?	Yes	Repair or replace suspected part, then go to Step 13.
		No	Go to next step.
9	**INSPECT FUEL INJECTOR HARNESS** • Remove intake-air system parts. • Disconnect fuel injector connector on suspected cylinder. • Connect TEST LIGHT to fuel injector connector terminals. • Check dim of light during cranking. • Does TEST LIGHT illuminate?	Yes	Go to next step.
		No	Check for fuel injector harnesses. Repair or replace if necessary, then go to Step 13.
10	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous, Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 13.
		No	Go to next step.
11	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul the engine, then go to next step.
12	**INSPECT FUEL INJECTOR OPERATION** • Remove fuel injector from suspected cylinder. • Swap injector with injector on other cylinder. • Start engine and run it at idle. • Does misfire DTC move to cylinder with suspected injector?	Yes	Replace injector, then go to Step 13.
		No	Go to next step.

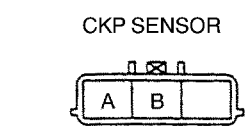
STEP	INSPECTION		ACTION
13	**VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Perform ODB-II DRIVE MODE 1. (See 01–02A–11 Mode 1 (PCM adaptive memory procedure drive mode).) • Is same PENDING CODE or stored code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0335 [ZM]

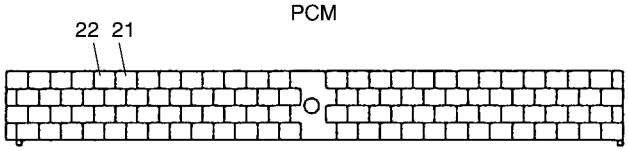
A3U010201085W08

DTC P0335	CKP sensor circuit malfunction
DETECTION CONDITION	• If PCM does not receive input signal from CKP sensor for **4.2 seconds** while MAF is **2.43 g/s {0.32 lb/min} or above**, PCM determines that CKP sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• CKP sensor malfunction • Connector or terminal malfunction • CKP sensor is dirty. • Short to ground between CKP sensor terminal A and PCM terminal 21 • Short to ground between CKP sensor terminal B and PCM terminal 22 • Open circuit between CKP sensor terminal A and PCM terminal 21 • Open circuit between CKP sensor terminal B and PCM terminal 22 • CKP sensor pulse wheel malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 CKP SENSOR VOLTAGE** • Disconnect CKP sensor. • Connect voltmeter between CKP sensor terminals A and B (part-side). • Check voltage in AC range while cranking the engine. • Is any voltage reading?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT CKP SENSOR RESISTANCE** • Inspect CKP sensor. (See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM].) • Is CKP sensor okay?	Yes	Check for poor connection (damaged/pulled-out terminals, corrosion, etc.), bent terminal of CKP sensor connector or plate. • Repair if necessary, then go to Step 9.
		No	Replace CKP sensor, then go to Step 9.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminals 21 and 22 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
6	**INSPECT CKP CIRCUIT FOR OPEN CIRCUIT** • Check for continuity between following circuits: — CKP sensor terminal A and PCM terminal 21 (harness-side) — CKP sensor terminal B and PCM terminal 22 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 9.
7	**INSPECT CKP CIRCUIT FOR SHORT TO GROUND** • Check for 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 suspected harness, then go to Step 9.
		No	Go to next step.
8	**INSPECT CKP CIRCUITS FOR INTERMEDIATE SHORT** • Check for continuity between CKP sensor terminals A and B. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0335 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Access MAF PID using WDS or equivalent. **Note** • MAF PID should indicate **above 2.43 g/s {0.32 lb./min}** during this test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0401 [ZM]

A3U010201086W16

DTC P0401	EGR flow insufficient detected
DETECTION CONDITION	• Difference in intake manifold pressures when EGR is operated and when it is stopped is too small. **Diagnostic support note** • This is an intermittent monitor (EGR). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and 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	• EGR valve malfunction • EGR boost sensor malfunction • EGR boost sensor solenoid valve malfunction • EGR gasket malfunction • PCM malfunction

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 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Have other DTCs been stored?	Yes	Go to applicable DTC troubleshooting.
		No	Go to next step.
4	**INSPECT VACUUM HOSE CONDITION** • Inspect vacuum hoses for clogging, any damages, freeze, or vacuum leakage. • Is there malfunction?	Yes	Replace vacuum hoses, then go to Step 9.
		No	Go to next step.
5	**INSPECT EGR VALVE FOR MALFUNCTION** • Inspect EGR valve. (See 01–16–15 EGR VALVE INSPECTION.) • Is EGR valve okay?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 9.
6	**INSPECT EGR BOOST SENSOR FOR MALFUNCTION** • Inspect EGR boost sensor. (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM].) • Is EGR boost sensor okay?	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to Step 9.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Inspect EGR boost sensor solenoid valve. (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION.) • Is EGR boost sensor solenoid valve okay?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 9.
8	**INSPECT EGR VALVE PASSAGE** • Remove EGR valve. • Is gasket installation normal?	Yes	Go to next step.
		No	Install gasket correctly, then go to next step.

STEP	INSPECTION		ACTION
9	**MONITOR EGR SYSTEM BY DRIVE MODE** • Make sure to reconnect all disconnected connectors. • Run OBD-II Drive Mode 1 and 2. (See 01–02A–11 OBD-II DRIVE MODE [ZM].) • Check EGR System Monitor completion status using On-Board Readiness Test function. • Has EGR system been monitored?	Yes	Go to next step.
		No	Retry this step.
10	**VERIFY TROUBLESHOOTING OF DTC P0401 COMPLETED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:41:00 value. • Is value within specification?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0402 [ZM]

A3U010201086W17

DTC P0402	EGR flow excessive detected
DETECTION CONDITION	• Difference in intake manifold pressures when EGR is operated and when it is stopped is too large. **Diagnostic support note** • This is an intermittent monitor (EGR). • MIL illuminates if PCM detects the above malfunction conditions 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	• EGR valve gasket is not installed. • EGR valve gasket has been damaged. • PCM malfunction

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 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Have other DTCs been stored?	Yes	Go to applicable DTC troubleshooting.
		No	Go to next step.
4	**INSPECT EGR VALVE GASKET** • Turn ignition key to OFF. • Remove EGR valve. • Is EGR valve gasket installed?	Yes	Go to next step.
		No	Install EGR valve gasket, then go to Step 6.
5	**INSPECT EGR VALVE GASKET MALFUNCTION** • Does EGR valve gasket have any crack and/or damage?	Yes	Replace EGR valve gasket, then go to Step 6.
		No	Go to next step.
6	**MONITOR EGR SYSTEM BY DRIVE MODE** • Make sure to reconnect all disconnected connectors. • Run OBD-II Drive Mode 1 and 2. (See 01–02A–11 OBD-II DRIVE MODE [ZM].) • Check EGR System Monitor completion status using On-Board Readiness Test function. • Has EGR system been monitored?	Yes	Go to next step.
		No	Retry this step.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0402 COMPLETED** • Make sure to reconnect all disconnected connectors. • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:41:00 value. • Is value within specification?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0421 [ZM]

A3U010201086W18

DTC P0421	Warm-up catalyst system efficiency below threshold
DETECTION CONDITION	• PCM compares the number of HO2S (front) and HO2S (rear) inversions for a predetermined time. PCM monitors the number of inversions the rear side performs while the front side inverts for a specified number of times when the following monitoring conditions are met. PCM detects the inversion ratio. If inversion ratio is below threshold, PCM determines that catalyst system has deteriorated. **MONITORING CONDITIONS** — Engine speed is **1,500—3,000 rpm**. — Calculated load is **17—48%**(*1). — Vehicle speed is **28—120 km/h {17.3—74.5 mph}**. *1: Maximum calculated load value varies depending on engine speed. **Diagnostic support note** • This is an intermittent monitor. (CATALYST) • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS are available. • PENDING CODE is stored if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• WU-TWC deterioration or malfunction • Exhaust gas leakage • Looseness of HO2S (front) • Looseness of HO2S (rear) • HO2S (front) malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting.
		No	Go to next step.
4	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually inspect exhaust gas leakage in exhaust system. • Is there any gas leakage?	Yes	Repair or replace faulty exhaust parts, then go to Step 7.
		No	Go to next step.
5	**INSPECT INSTALLATION OF FRONT AND REAR OXYGEN SENSORS** • Inspect for looseness of front and rear oxygen sensors. • Is it okay?	Yes	Go to next step.
		No	Retighten sensor, then go to Step 7.

STEP	INSPECTION		ACTION
6	**INSPECT WU-TWC** • Clear DTC using WDS or equivalent. • Inspect WU-TWC. (See 01–16–19 WARM UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION.) • Is WU-TWC okay?	Yes	Replace suspected oxygen sensor, then go to next step.
		No	Replace WU-TWC, then go to next step.
7	**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 WDS or equivalent. • Start engine and perform OBD-II DRIVE MODE except for MODE 4. (See 01–02A–11 OBD-II DRIVE MODE [ZM].) • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0442 [ZM]

A3U010201086W19

DTC P0442	Evaporative emission control system leak detected (small leak)
DETECTION CONDITION	• PCM measures the fuel tank pressure (ftp2), which is the vacuum when a specified period has passed after EVAP system is sealed. PCM determines the pressure difference between ftp1 and ftp2. If pressure difference exceeds the threshold, PCM determines that the EVAP system has a small leak. This monitor can activate when the PCM determines that the CONSTANTLY LEAK DETECTED test results are passed. **THRESHOLD VALUE** — Fuel tank pressure (ftp2—ftp1): **1.17—3.91 kPa {8.78—29.30 mmHg, 0.34—1.15 inHg}** • Threshold valve varies depends on ECT at engine start BARO. **MONITORING CONDITIONS** — PCM monitors EVAP system when driving under following conditions: • Remaining fuel**: 15—85%** • ECT at engine start: **–10.0 °C—32.5 °C {14.0—90.5 °F}** • Atmospheric pressure: **above 72.2 kPa {542 mmHg, 21.3 inHg}** • Vehicle speed: **39.5—120.3 km/h {24.5—74.7 mph}** • Engine speed: **1,000—4,000 rpm** • Calculated load: **9—65%** • Throttle opening angle: **3.1—12.5%** • IAT during monitor: **–10—60 °C {14—140 °F}** **Diagnostic support note** • This is an intermittent monitor (Evaporative leak monitor). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and PENDING CODE are stored if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Canister drain cut valve (CDCV) malfunction • Tank pressure control valve (TPCV) malfunction • Pressure control valve malfunction • Loose or defective fuel filler cap • Charcoal canister malfunction • Catch tank malfunction • Rollover valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • EVAP hose damaged or loose

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify related pending code or stored DTCs. • Are DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FUEL-FILLER CAP** • Verify fuel-filler cap is neither loose nor damaged. • Is it okay? **Note** • When fuel-filler caps other than OEM caps are attached, it is considered a malfunction.	Yes	Go to next step.
		No	Retighten fuel-filler cap or replace it if it is damaged. Then go to Step 15.
5	**INSPECT WHOLE EVAP CONTROL SYSTEM** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03B–55 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	No leaks were detected in EVAP control system at this time. Go to Step 15.
		No	If evaporative emission tester is available, go to Step 14. If not, go to next step.
6	**INSPECT FOR LEAKAGE FROM CHARCOAL CANISTER TO FUEL TANK** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to fuel tank”. (See 01–03B–55 Inspection from charcoal canister to fuel tank.) • Does voltage change under to specified readings and hold for a **minimum of 2 minutes**?	Yes	Go to Step 9.
		No	Go to next step.
7	**INSPECT ATTACHED ACCESSORIES ON FUEL TANK** • Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge. • Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to Step 15.
8	**INSPECT ROLLOVER VALVE** • Remove rollover valve and inspect for damage. • Is it okay?	Yes	Inspect for detached, incorrectly installed or cracked hoses on fuel tank and from charcoal canister to fuel tank. Repair or replace as necessary. Then go to step 15.
		No	Replace rollover valve, then go to Step 15.
9	**INSPECT LEAKAGE BETWEEN CHARCOAL CANISTER AND PURGE SOLENOID VALVE** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to purge solenoid valve”. (See 01–03B–55 Inspection from charcoal canister to purge solenoid valve.) • Does voltage change under to specified readings and hold for **a minimum of 2 minutes**?	Yes	Go to Step 15.
		No	Go to next step.

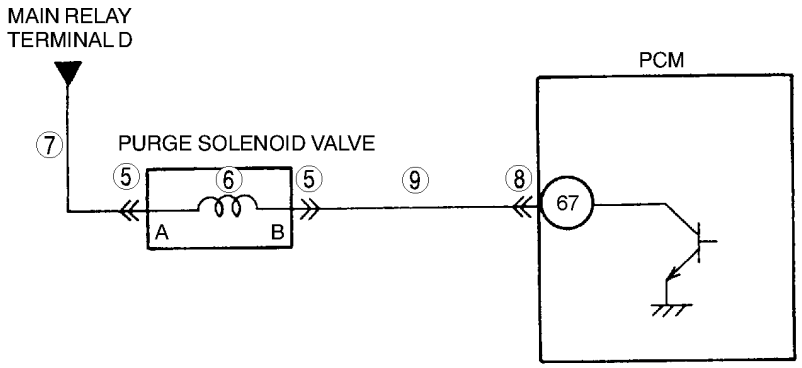
STEP	INSPECTION		ACTION
10	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 15.
11	**INSPECT PURGE SOLENOID VALVE** • Remove purge solenoid valve and inspect for damage and air leakage. • Is it okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 15.
12	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 15.
13	**INSPECT CDCV** • Remove CDCV and inspect for damage and air leakage. • Is it okay?	Yes	Inspect and repair or replace detached, incorrectly installed or cracked hoses from charcoal canister to CDCV. Then go to Step 15.
		No	Replace CDCV, then go to Step 15.
14	**INSPECT FOR LEAKAGE IN EVAPORATIVE CONTROL SYSTEM** • Inspect evaporative control system for leakage using evaporative emission tester. (See 01–16–13 FUEL-FILLER CAP INSPECTION.) • Is any leakage found?	Yes	Repair or replace faulty area, then go to next step.
		No	Go to next step.
15	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — BARO: **72.2 kPa {542 mmHg, 21.3 inHg} or higher** — ECT: **–10.0—22.0 °C {14.0—72.0 °F} [at atmospheric pressure 72.2 kPa {542 mmHg, 21.3 inHg}]** — IAT: **–10—60 °C {14—140 °F}** — Fuel tank level: **15—85%** • Is there any PID that is out of specification?	Yes	Go to next step.
		No	Go to Step 18.
16	**VERIFY EVAP SYSTEM REPAIRED** • Carry out evaporative system test even if it is not test condition. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is system test result of small leak okay?	Yes	EVAP system repaired. Go to Step 22.
		No	Go to next step.
17	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST OR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — BARO: **72.2 kPa {542 mmHg, 21.3 inHg} or higher** — ECT: **–10.0—22.0 °C {14.0—72.0 °F} [at atmospheric pressure 72.2 kPa {542 mmHg, 21.3 inHg}]** — IAT: **–10—60 °C {14—140 °F}** — Fuel tank level: **15—85%** • 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	Then go to next step.
18	**DECIDE ON AFTER REPAIR PROCEDURE ACCORDING TO REPAIR SHOP CONDITION** • Clear DTC from memory using WDS or equivalent. • Is repair shop possible to perform Drive Mode 4?	Yes	Go to Step 20.
		No	Go to next step.
19	**VERIFY EVAP SYSTEM REPAIRED BY EVAPORATIVE SYSTEM TEST** • Carry out evaporative system test. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is system test result okay?	Yes	EVAP system repaired. Go to Step 22.
		No	Replace PCM, then go to Step 22.

STEP	INSPECTION		ACTION
20	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run Drive Mode 4. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 17.
21	**VERIFY EVAP SYSTEM REPAIRED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Is it below MAX value?	Yes	Go to next step.
		No	Replace PCM, then go next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

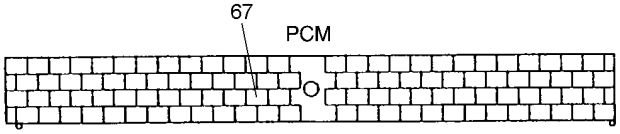
DTC P0443 [ZM]

A3U010201086W20

DTC P0443	Evaporative emission solenoid system purge control valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from purge solenoid valve. If voltage at PCM terminal 67 remains low or high, PCM determines that purge solenoid valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored one per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between purge solenoid valve terminal B and PCM terminal 67 • Open circuit in wiring between main relay terminal D and purge solenoid valve terminal A • Open circuit in wiring between purge solenoid valve terminal B and PCM terminal 67 • Short to power circuit between purge solenoid valve terminal B and PCM terminal 67 • PCM malfunction



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to OFF then start engine. • Is same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect purge solenoid valve tube that is connected to intake manifold. • Connect vacuum pump to purge solenoid valve. • Pump vacuum pump several times and stop. • Wait **a few seconds**. • Is vacuum maintained?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT PASSAGE CONTROL OF PURGE SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect purge solenoid valve connector. • Pump vacuum pump several times and wait **a few seconds**. • Is vacuum maintained?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Replace purge solenoid valve, then go to Step 10.
5	**INSPECT PURGE SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
6	**INSPECT PURGE SOLENOID VALVE** • Measure resistance between purge solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 10.
7	**INSPECT PURGE SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between purge solenoid valve connector terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
9	**INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between purge solenoid valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between purge solenoid valve terminal B (harness-side) and breakout box terminal 67. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0443 COMPLETED** • Make sure to reconnect all disconnected connectors. • 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
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0451 [ZM]

A3U010201086W21

DTC P0451	Fuel tank pressure sensor performance problem
DETECTION CONDITION	• Difference in fuel tank pressure, which PCM monitors while operating evaporative leak monitor function or purge solenoid valve is intentionally closed, is too small or too large. **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	• Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction • CDCV malfunction • Poor connection of CDCV, fuel tank pressure sensor and/or PCM • Short circuit in wiring at CDCV • Charcoal canister clogging

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 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Verify stored DTC. • Have DTCs P0443 and/or P1449 been stored?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 8.
5	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 8.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See 01–16–9 CHARCOAL CANISTER INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 8.
7	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 8.

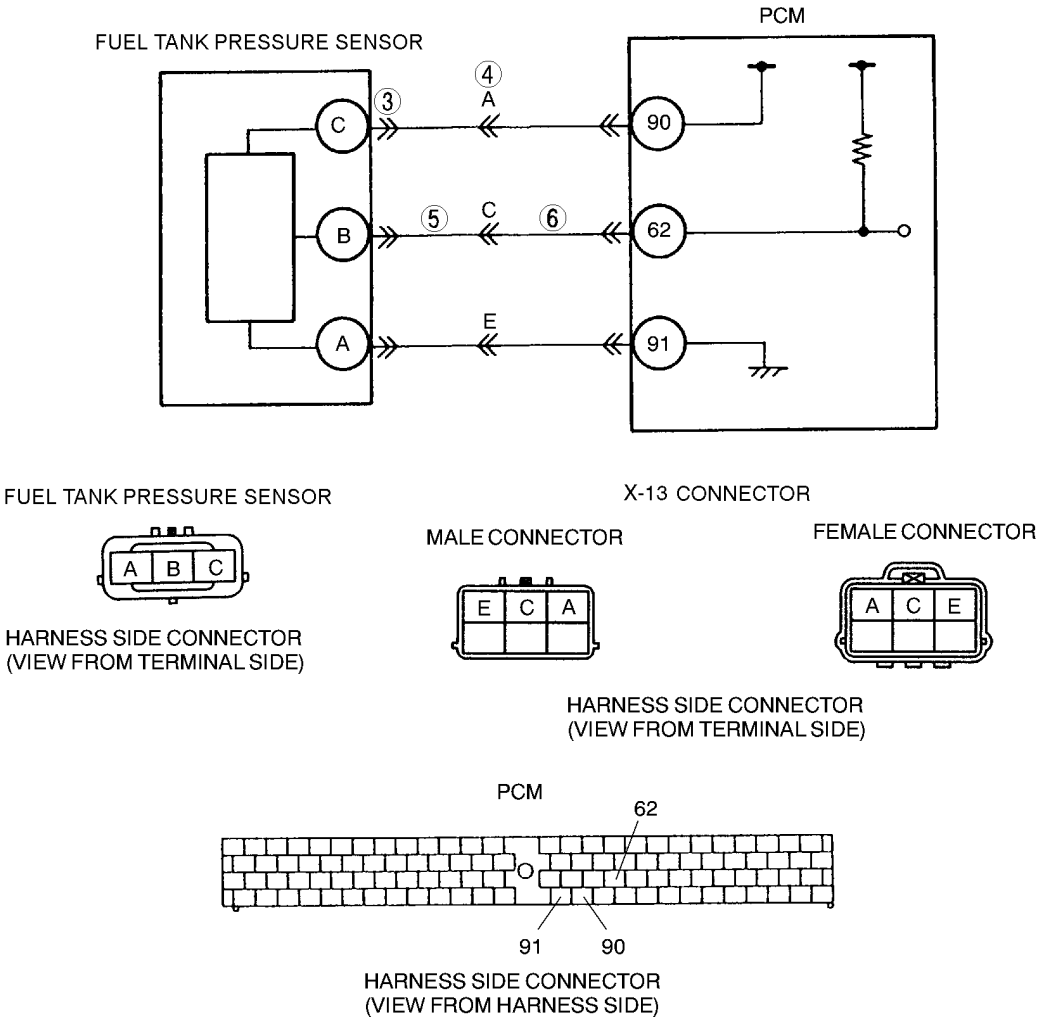
STEP	INSPECTION		ACTION
8	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — Engine coolant temperature (at engine start): **–10—32.5 °C {14.0—90.5 °F}** — Barometric pressure: **Above 72.2 kPa {542 mmHg, 21.3 inHg}** — Vehicle: **39.5—105.5 km/h {24.5—65.4 mph}** — Load: **9—65%** — Throttle position: **0.15—0.85 %** — Intake air temperature: **–10—60 °C {14—140 °F}** • Is there any condition 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	Correct condition, then go to next step.
9	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Run OBD-II Drive Mode 4. (See 01–02A–13 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 8.
10	**VERIFY TROUBLESHOOTING OF DTC P0451 COMPLETED** • Turn ignition key to 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0452 [ZM]

A3U010201086W22

DTC P0452	Fuel tank pressure sensor circuit low input
DETECTION CONDITION	• PCM monitors input voltage from fuel tank pressure sensor when monitoring condition is met. If PCM terminal 62 voltage is **below 0.20 V** after engine is started, PCM determines that fuel tank pressure sensor circuit is malfunctioning. **MONITORING CONDITION** — Engine coolant temperature is **below 80 °C {176 °F}**. **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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Fuel tank pressure 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 and PCM terminal 90 • PCM malfunction

DTC P0452	Fuel tank pressure sensor circuit low input



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 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 POWER SUPPLY CIRCUIT VOLTAGE AT FUEL TANK PRESSURE SENSOR CONNECTOR** **Note** • If DTCs P0107 and P0122 are also retrieved with P0452, go to REFERENCE VOLTAGE troubleshooting procedure. (See 01–03A–50 NO.30 CONSTANT VOLTAGE [ZM].) • Turn ignition key to ON (Engine OFF). • Check voltage between FTP sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5—5.5 V**?	Yes	Check fuel tank pressure sensor terminal C for poor connection. Repair or replace as necessary. • If okay, replace fuel tank pressure sensor. Then go to Step 7.
		No	Go to next step.

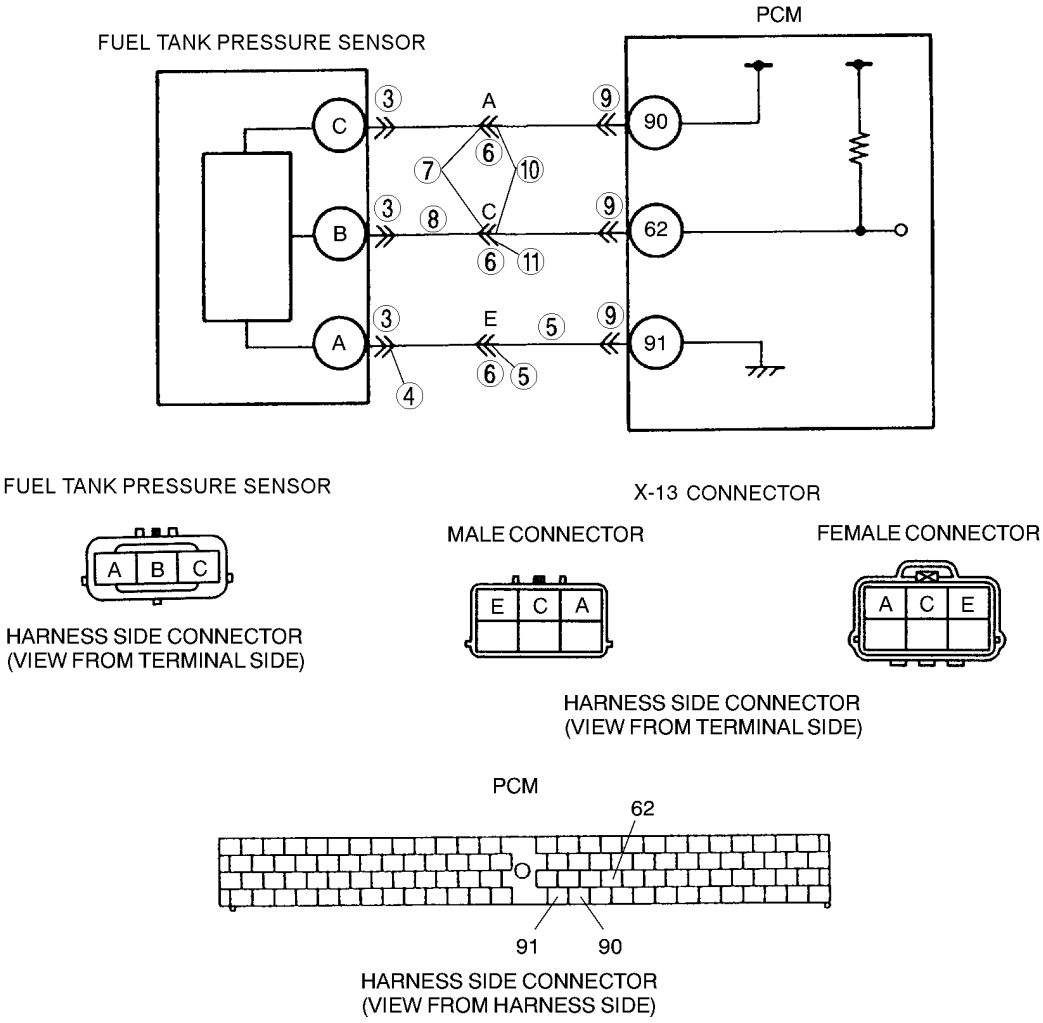
STEP	INSPECTION		ACTION
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FUEL TANK PRESSURE SENSOR INTERMEDIATE CONNECTOR** • Disconnect X-13 connector. • Measure voltage at X-13 male terminal A. • Is voltage **within 4.5—5.5 V**?	Yes	Check for open circuit between following terminals: • X-13 connector female terminal A 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-13 connector male terminal A. — Repair or replace suspected harness, then go to Step 7.
5	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 INTERMEDIATE CONNECTOR)** • Turn ignition key to OFF. • Disconnect X-13 connector. • Check for continuity between X-13 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-13 INTERMEDIATE CONNECTOR)** • Disconnect PCM connector. • Check for continuity between X-13 male terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check fuel tank pressure sensor signal circuit and fuel tank pressure sensor 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 WDS or equivalent. • Start engine. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0453 [ZM]

A3U010201086W23

DTC P0453	Fuel tank pressure sensor circuit high input
DETECTION CONDITION	• PCM monitors input voltage from FUEL TANK PRESSURE sensor when monitoring condition is met. If PCM terminal voltage is **above 4.79 V** after engine is started, PCM determines that FUEL TANK PRESSURE sensor circuit has malfunction. **MONITORING CONDITION** — Engine coolant temperature is **below 80 °C {176 °F}**. **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 detection condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
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 from fuel tank pressure sensor terminal A and PCM terminal 91 • FUEL TANK PRESSURE sensor signal circuit is shorted to reference voltage (Vref) supply circuit.

DTC P0453	Fuel tank pressure sensor circuit high input



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 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 FUEL TANK PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect FTP sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal, then go to Step 12.
		No	Go to next step.
4	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT (AT FUEL TANK PRESSURE SENSOR CONNECTOR)** • Check for continuity between fuel tank pressure sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Go to Step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT (AT X-13 CONNECTOR)** • Disconnect X-13 connector. • Check for continuity between X-13 male terminal E and body ground. • Is there continuity?	Yes	Check for open circuit between following terminals: • X-13 female terminal E and FTP sensor terminal A (harness-side) Repair or replace suspected harness, then go to Step 12.
		No	Check for open circuit between following terminals: • PCM terminal 91 (harness-side) and X-13 male terminal E Repair or replace suspected harness, then go to Step 12.
6	**CHECK 6-PIN INTERMEDIATE CONNECTOR** • Disconnect X-13 connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal, then go to Step 12.
		No	Go to next step.
7	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 CONNECTOR)** • Check for continuity between X-13 female terminals A and C. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 12.
		No	Go to next step.
8	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 CONNECTOR)** • Check for continuity between fuel tank pressure sensor terminal B (harness-side) and X-13 female terminal C. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 12.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 62, 90 and 91 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 12.
		No	Go to next step.
10	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (X-13 CONNECTOR AND PCM CONNECTOR)** • Check for continuity between X-13 terminals A and C (PCM-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 12.
		No	Go to next step.
11	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN CIRCUIT (X-13 CONNECTOR AND PCM CONNECTOR)** • Connect breakout box with PCM disconnected. • Check for continuity between X-13 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.
12	**VERIFY TROUBLESHOOTING OF DTC P0453 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0455 [ZM]

A3U010201086W24

DTC P0455	Evaporative emission control system leak detected (blockage or large leak)
DETECTION CONDITION	• PCM measures the fuel tank pressure (ftp1), which is the vacuum when a specified period has passed after the tank pressure has reached the preprogrammed target pressure and purge control valve has been closed when monitoring conditions are met. If fuel tank pressure is above threshold, PCM determines that the EVAP system is blocked or has a large leak. **THRESHOLD VALUE** — Fuel tank pressure (ftp1): **–1.3—1.95 kPa {–9.76—14.65 mmHg, –0.38—0.58 inHg}** • Threshold valve varies depends on ECT at engine start BARO. **MONITORING CONDITIONS** — Fuel tank pressure (ftp 1): **–3.92 kPa {–29.4 mmHg, –1.16 inHg}** — PCM monitors EVAP system when driving under following conditions: • Remaining fuel: **15—85%** • ECT at engine start: **–10—32.5 °C {14.0—90.5 °F}** • Atmospheric pressure: **above 72.2 kPa {542 mmHg, 21.3 inHg}** • Vehicle speed: **39.5—120.3 km/h {24.5—74.7 mph}** • Engine speed: **1,000—4,000 rpm** • Calculated load: **9—65%** • Throttle opening angle: **3.1—12.5%** • IAT during monitor: **–10—60 °C {14—140 °F}** **Diagnostic support note** • This is an intermittent monitor (Evaporative leak monitor). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and PENDING CODE are 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	• Purge solenoid valve malfunction • Canister drain cut valve (CDCV) malfunction • Loose, missing or defective fuel filler cap • Charcoal canister malfunction • Catch tank malfunction • Check valve malfunction • Rollover valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • EVAP hose damaged or loose • Fuel tank pressure sensor malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify related PENDING CODE or stored DTCs. • DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FUEL-FILLER CAP** • Verify fuel-filler cap is neither disconnected loose nor damaged. • Is it okay? **Note** • When fuel-filler caps other than OEM caps are attached, it is considered malfunction.	Yes	Go to next step.
		No	Retighten fuel-filler cap or replace it if it is damaged. Then go to Step 27.

STEP	INSPECTION		ACTION
5	**INSPECT PURGE SOLENOID VALVE FOR STUCKING** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.
6	**INSPECT CDCV FOR STUCKING** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 27.
7	**CLASSIFY EVAPORATIVE EMISSION CONTROL SYSTEM FOR LEAKAGE OR BLOCKAGE** **Note** • If evaporative emission tester is not available, go to next step. • Carry out evaporative emission control system inspection using evaporative emission tester. (See 01–03A–55 Evaporative System Leak Inspection Using Leak Tester.) • Does red “FAILED” light turn ON (leakage)?	Yes	Tester detects leakage. • Inspect evaporative control system for leakage using evaporative emission tester. (See 01–03A–55 Evaporative System Leak Inspection Using Leak Tester.) • Repair or replace faulty area, then go to Step 27.
		No	Go to next step.
8	**VERIFY REPAIR SHOP CONDITION** • Is repair shop possible to perform Drive Mode 4?	Yes	Go to next step.
		No	Go to Step 16.
9	**VERIFY MONITORING CONDITION FOR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — Barometric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or higher** — Engine coolant temperature: **–10.0—22.0 °C {14.0—72.0 °F}** [at barometric pressure **72.2 kPa {542 mmHg, 21.3 inHg}**] — Intake air temperature: **–10—60 °C {50—140 °F}** — Fuel tank level: **15—85%** • Is there any conditions 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 4** • Clear DTC from memory using WDS or equivalent. • Run OBD-II Drive Mode 4 and verify that CDCV and FTP graphs. (See 01–02A–13 Mode 4 (EVAP system repair verification drive mode).) • Is there any problem detected?	Yes	FTP does not change: • EVAP monitoring system is inoperative. Go to next step. FTP changes, but does not reach **2.0 kPa {15 mmHg, 0.59 inHg}**: • There is a large leak in EVAP system. Go to Step 13. FTP reaches **2.0 kPa {15 mmHg, 0.59 inHg}**, but suddenly goes back: • Pressure in fuel tank cannot be reduced and only gas from EVAP line can be drawn. Inspect following and repair or replace suspected parts. • Rollover valve for large ventilation resistance. • Check valve for inoperative or blockage. • Air filter for clogging. Then go to Step 27.
		No	No leaks were detected in EVAP control system at this time. Go to Step 30.
11	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.

STEP	INSPECTION		ACTION
12	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM].) • Is fuel tank pressure sensor okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 27.
13	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 27.
14	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 27.
15	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 27.
16	**INSPECT WHOLE SYSTEM OF EVAP CONTROL SYSTEM** • Implement “01-03A ENGINE CONTROL SYSTEM OPERATION INSPECTION [ZM], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03A–56 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Intermittent concern exists. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].) Inspect purge solenoid valve and CDCV circuit.
		No	Go to next step.
17	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM].) • Is fuel tank pressure sensor okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 27.
18	**INSPECT LEAKAGE FROM CHARCOAL CANISTER TO FUEL TANK** • Implement “01-03A ENGINE CONTROL OPERATION INSPECTION [ZM], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to fuel tank”. (See 01–03A–56 Inspection from charcoal canister to fuel tank.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Go to Step 22.
		No	Go to next step.
19	**INSPECT ATTACHED ACCESSORIES ON FUEL TANK** • Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge. • Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to Step 27.
20	**INSPECT FUEL SHUT-OFF VALVE** • Inspect fuel shut-off valve for ventilation. (See 01–14–13 FUEL TANK INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank, then go to Step 27.
21	**INSPECT ROLLOVER VALVE** • Inspect rollover valve for ventilation. • Is it okay?	Yes	Inspect following and repair or replace for detached, incorrectly installed or cracked hoses: • Charcoal canister • Fuel tank (include fuel shut-off valve and rollover valve) • Fuel tank pressure sensor Then go to Step 27.
		No	Replace fuel tank, then go to Step 27.

STEP	INSPECTION		ACTION
22	**INSPECT LEAKAGE FROM CHARCOAL CANISTER TO PURGE SOLENOID VALVE** • Implement "01-03A ENGINE CONTROL SYSTEM OPERATION INSPECTION [ZM], Evaporative Leak System Inspection Using Vacuum Pump, Inspection from charcoal canister to purge solenoid valve". (See 01–03A–56 Inspection from charcoal canister to purge solenoid valve.) • Does voltage change under to specified readings and hold for a **minimum of 2 minutes**?	Yes	Go to Step 27.
		No	Go to next step.
23	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 27.
24	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.
25	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for plugging, damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 27.
26	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to next step.
27	**DECIDE ON AFTER REPAIR PROCEDURE ACCORDING TO REPAIR SHOP CONDITION** • Clear DTC from memory using WDS or equivalent. • Is repair shop possible to perform Drive Mode 4?	Yes	Go to next step.
		No	Go to step 31.
28	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST OR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — Barometric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or higher** — Engine coolant temperature: **–10.0—22.0 °C {14.0—72.0 °F}** [at barometric pressure **72.2 kPa {542 mmHg, 21.3 inHg}**] — Intake air temperature: **10—60 °C {50—140 °F}** — Fuel tank level: **15—85%** • Is there any conditions 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.
29	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run OBD-II Drive Mode 4. (See 01–02A–13 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 28.

STEP	INSPECTION		ACTION
30	**VERIFY EVAP SYSTEM REPAIRED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:22:00 value. (See 01–02A–10 Diagnostic Monitoring Test Results Access Procedure.) • Is it below maximum value?	Yes	Go to Step 32.
		No	Replace PCM, then go to Step 32.
31	**INSPECT WHOLE EVAP CONTROL SYSTEM** • Implement “01-03A ENGINE CONTROL SYSTEM OPERATION INSPECTION [ZM], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03A–56 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Go to Step 32.
		No	Replace PCM, then go to Step 32.
32	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0461 [ZM]

A3U010201086W25

DTC P0461	Fuel gauge sender unit circuit range/performance
DETECTION CONDITION	• PCM monitors fuel gauge sender unit input voltage difference before and after PCM-calculated fuel consumption has reached **17.5 liters {18.5 US qt., 15.4 Imp qt.}**. If fuel gauge sender unit operation reflects **5% less** than PCM-calculated fuel consumption, PCM determines that fuel gauge sender unit range/performance is in error. **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	• Fuel gauge sender unit malfunction or substandard performance

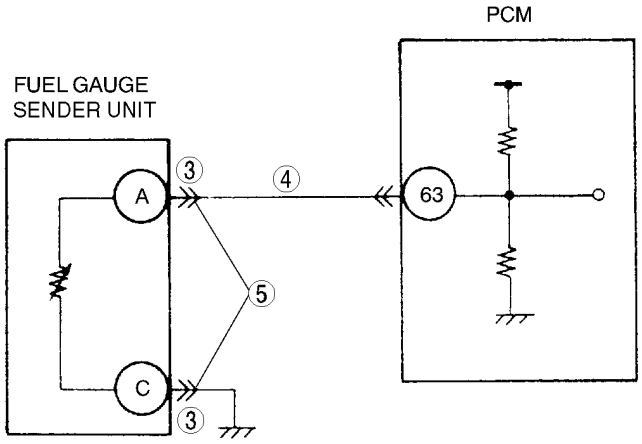
Diagnostic procedure

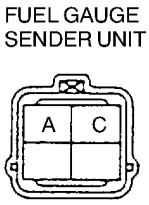
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See 09–22–13 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0462 [ZM]

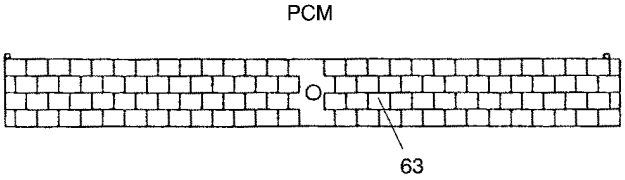
A3U010201086W26

DTC P0462	Fuel gauge sender unit circuit low input
DETECTION CONDITION	• PCM monitors the voltage of fuel gauge sender unit. If PCM detects PCM terminal 63 voltage **below 0.08 V** for **5 seconds**, PCM determines that 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.
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 • PCM malfunction • Bent terminals of fuel gauge sender unit





HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

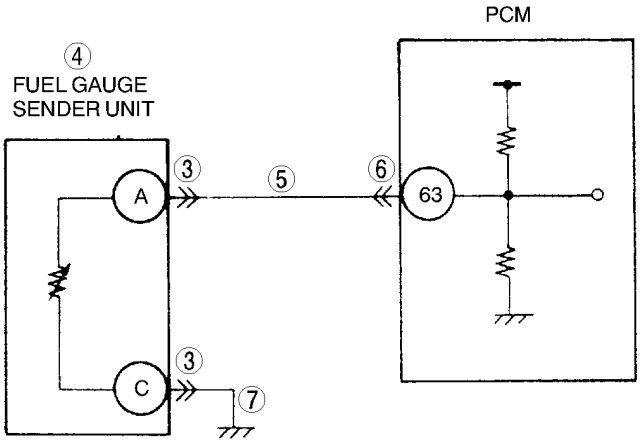
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 TERMINAL FOR BENT** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for bent terminal. • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 6.
		No	Go to next step.

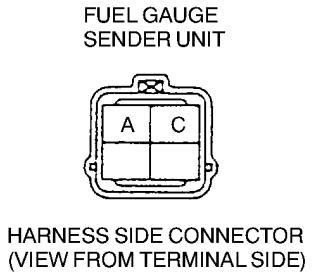
STEP	INSPECTION		ACTION
4	**INSPECT FUEL LEVEL SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between fuel gauge sender unit terminal A (harness-side) and body GND. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 6.
		No	Go to next step.
5	**INSPECT FUEL GAUGE SENDER UNIT CIRCUITS FOR SHORTS** • Check for continuity between fuel gauge sender unit terminals A and C (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 6.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0462 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

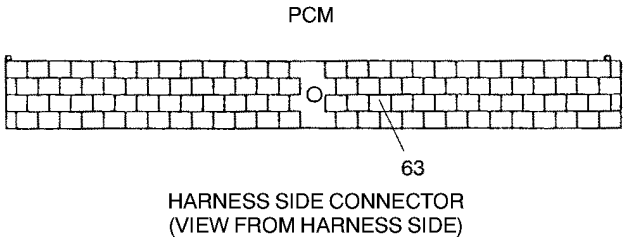
DTC P0463 [ZM]

A3U010201086W27

DTC P0463	Fuel gauge sender unit circuit high input
DETECTION CONDITION	• PCM monitors the voltage of fuel gauge sender unit. If PCM detects PCM terminal 63 voltage **above 4.92 V** for **5 seconds**, PCM determines that 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.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction • 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 • PCM malfunction







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 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 FUEL GAUGE SENDER UNIT CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT FUEL GAUGE SENDER UNIT** • Inspect fuel gauge sender unit. (See 09–22–13 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Connect fuel gauge sender unit connector, then go to next step.
		No	Replace fuel gauge sender unit, then go to Step 8.
5	**INSPECT FTL SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between fuel gauge sender unit terminal A (harness-side) and body ground. • Is voltage **above 4.5—5.5 V**?	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 8.
		No	Repair or replace open circuit between fuel gauge sender unit terminal A (harness-side) and PCM terminal 63 (harness-side), then go to Step 8.
7	**INSPECT FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between fuel gauge sender 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 next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0463 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0464 [ZM]

A3U010201086W28

DTC P0464	Fuel gauge sender unit circuit performance (slosh check)
DETECTION CONDITION	• PCM monitors fuel gauge sender unit input voltage at PCM terminal 63 while engine is running. If differences are high for **14 seconds** while vehicle is stopped, PCM determines that FTL signal is incorrect. **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	• Fuel gauge sender unit malfunction or substandard performance

Diagnostic procedure

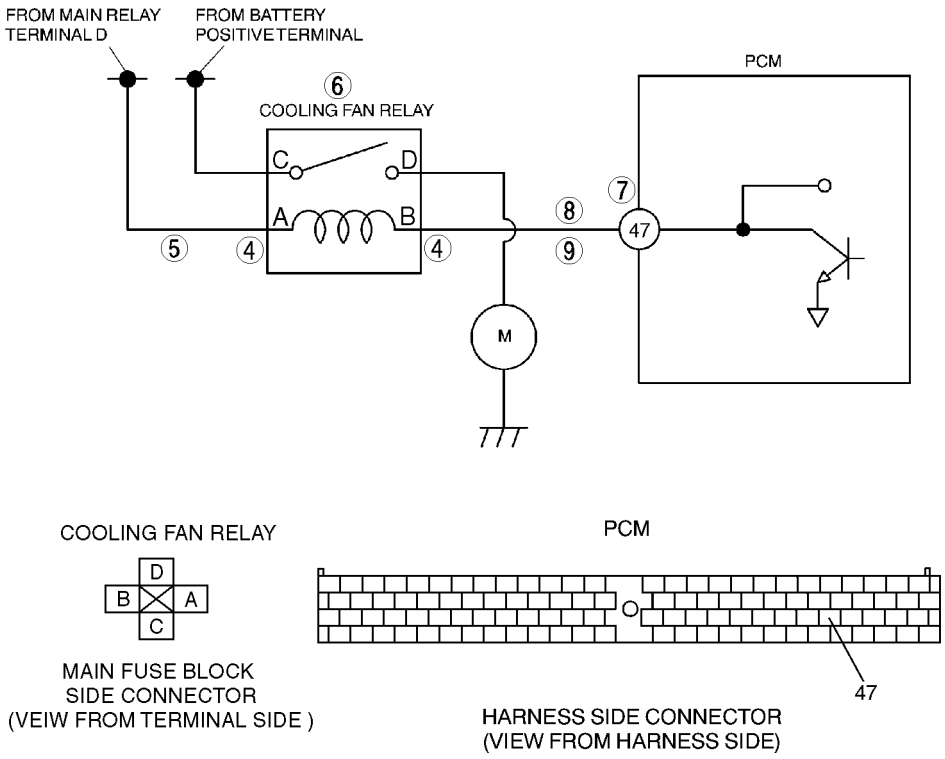
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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.

STEP	INSPECTION		ACTION
3	**INSPECT FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See 09–22–13 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0480 [ZM]

A3U010201086W29

DTC P0480	Cooling fan relay circuit
DETECTION CONDITION	• PCM monitors control signal to cooling fan relay coil control circuit. If signal at PCM terminal 47 remains low or high, PCM determines that cooling fan relay circuit has malfunction. **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 first drive cycles. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Cooling fan relay malfunction • Connector or terminal malfunction • Short to GND circuit in wiring between cooling fan relay terminal B and PCM terminal 47 • Open circuit in wiring between cooling fan relay terminal B and PCM terminal 47 • Open circuit in wiring between main relay terminal D and cooling fan relay terminal C • PCM malfunction



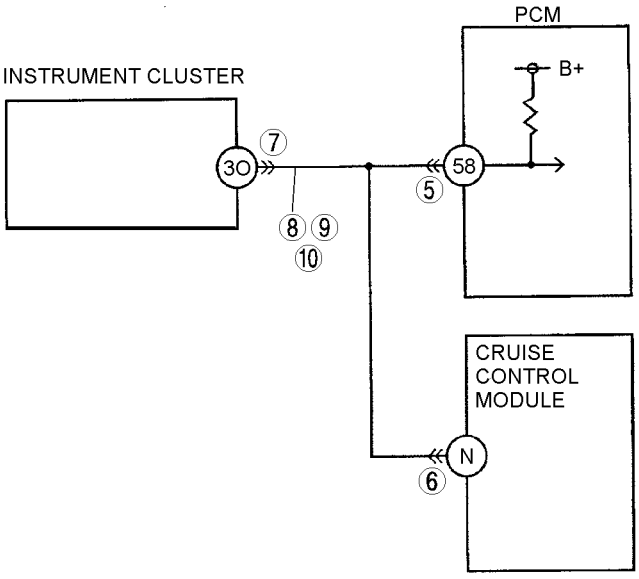
Diagnostic procedure

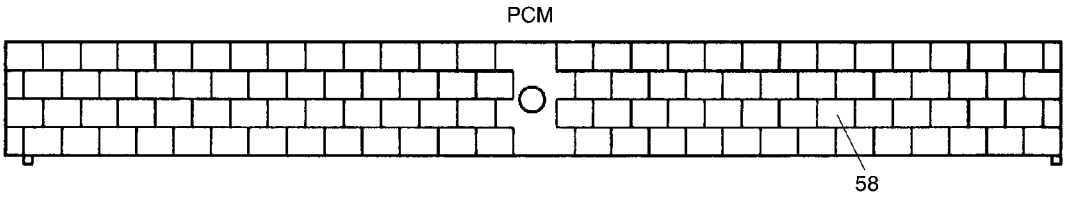
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any Service 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Start engine. • Operate A/C to operate cooling fan relay. • Is same of DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**INSPECT COOLING FAN RELAY FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect cooling fan relay connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, go to Step 10.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between cooling fan relay terminal C (harness-side) and body GND. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness, go to Step 10.
6	**INSPECT COOLING FAN RELAY** • Inspect cooling fan relay. • Is cooling fan relay okay?	Yes	Go to next step.
		No	Replace cooling fan relay, go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 47 (damaged, pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, go to Step 10.
		No	Go to next step.
8	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check for continuity between cooling fan relay terminal B (harness-side) and body GND. • Is there continuity?	Yes	Repair or replace harness for short to GND, go to Step 10.
		No	Turn ignition switch to ON (Engine OFF). Measure voltage between cooling fan relay terminal B and body GND. • If voltage is **B+**, repair or replace harness for short to power, go to next step. • If voltage is **approx. 0 V**, go to next step.
9	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between cooling fan relay terminal B (harness-side) and PCM terminal 47 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0480 COMPLETED** • Reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Operate A/C for operate cooling fan relay. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0500 [ZM]

A3U010201087W06

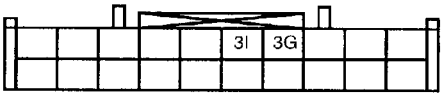
DTC P0500	Vehicle speed sensor (VSS) circuit malfunction (MTX)
DETECTION CONDITION	• Vehicle speed signal does not input after following conditions are met: — Gear is in position other than neutral. — Load is above **40%**. — Engine speed is **2,000 rpm or above**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • ABS HU/CM malfunction • Open circuit between PCM terminal 58 and instrument cluster terminal 3O • Short to ground between PCM terminal 58 and instrument cluster terminal 3O • Vehicle speedometer sensor malfunction • Open circuit between vehicle speedometer sensor terminal A and instrument cluster terminal 3G • Short to ground between vehicle speedometer sensor terminal A and instrument cluster terminal 3G • Open circuit between vehicle speedometer sensor terminal B and instrument cluster terminal 3I • Short to ground between vehicle speedometer sensor terminal B and instrument cluster terminal 3I





HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

VEHICLE SPEEDOMETER
SENSOR HARNESS SIDE
(VIEW FROM TERMINAL SIDE)



INSTRUMENT CLUSTER
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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** • Connect WDS or equivalent to DLC-2. • Start engine. • Access VS PID using WDS or equivalent. — Vehicle speed **20 km/h {12.4 mph}: 20km/h {12.4 mph}** — Vehicle speed **40 km/h {24.8 mph}: 40km/h {24.8 mph}** • Are PID readings within specification?	Yes	Go to intermittent concern troubleshooting procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
		No	Go to next step.
4	**CHECK INPUT/OUTPUT CHECK MODE** • Turn ignition key to ON (engine OFF). • Is instrument cluster DTCs 10 or 12 detected? (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.).	Yes	DTC 10 and/or 12 displayed: Inspect Instrument cluster. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)
		No	Go to next step.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace pin or connector, then go to Step 11.
6	**INSPECT CRUISE CONTROL MODULE CONNECTOR** • Disconnect cruise control module connector. • Inspect for bent terminals. • Are terminals okay?	Yes	Go to next step.
		No	Repair terminals, then go to Step 11.
7	**INSPECT INSTRUMENT CLUSTER CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect instrument cluster connector. • Check for poor connections (damaged/pulled-out terminals, corrosion, etc.). • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace terminals, then go to Step 11.
8	**INSPECT VOLTAGE** • Connect PCM connector. • Turn ignition key to ON (engine OFF). • Measure voltage at instrument cluster terminal 3O (harness-side). • Is there **5 V** at instrument cluster terminal 3O (harness-side)?	Yes	Replace instrument cluster, then go to Step 11. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Go to next step.
9	**INSPECT INSTRUMENT CLUSTER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Check for continuity between instrument cluster terminal 3O (harness-side) and breakout box terminal 58. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT INSTRUMENT CLUSTER CIRCUIT FOR SHORT TO GROUND** • Check for continuity between instrument cluster terminal 3O (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Replace instrument cluster, then go to next step.

STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Warm up engine. • Drive vehicle under following conditions for 16 seconds. — Engine speed: **1,800 rpm or above** — Gear: not in neutral. — Load: **40% or above** • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0506 [ZM]

A3U010201087W07

DTC P0506	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 72.2 kPa {542 mmHg, 21.3 inHg}** or intake air temperature is **below –10°C {14°F}**, PCM cancels diagnosis of P0506. **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 • Air cleaner element clogged • Air intake passage clogged • A/C relay control circuit malfunction • Generator control circuit malfunction • Purge solenoid valve malfunction • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

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 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Repair applicable DTCs. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Perform IAC inspection. (See 01–13A–7 IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM].) • Is IAC valve okay?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 11.

STEP	INSPECTION		ACTION
5	**INSPECT A/C MAGNETIC CLUTCH OPERATION** • Turn blower motor switch off. • Is magnetic 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 11. (See 01–03A–46 NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM].)
		No	Go to next step.
6	**INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION** • Turn ignition key to OFF. • Disconnect generator connector. • Turn ignition key to ON. • Measure voltage between generator connector terminal D (harness-side) and body GND. • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair short to power circuit in generator control circuit, then go to Step 11.
7	**INSPECT PURGE SOLENOID VALVE CONTROL MALFUNCTION** • Perform purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 11.
8	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step 11.
		No	Go to next step.
9	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body passage clogged?	Yes	Clean or replace throttle body, then go to Step 11.
		No	Go to next step.
10	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0506 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • 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.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0507 [ZM]

A3U010201087W08

DTC P0507	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 72.2 kPa {542 mmHg, 21.3 inHg}** or intake air temperature is **below –10°C {14°F}**, PCM cancels diagnosis of P0507. **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.

DTC P0507	Idle control system RPM higher than expected
POSSIBLE CAUSE	• IAC valve malfunction • Accelerator cable misadjustment • Actuator cable misadjustment • Throttle valve malfunction • Vacuum hose misconnection • PCM malfunction

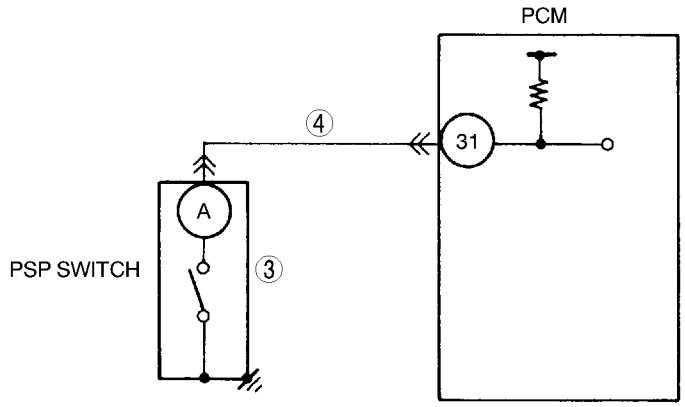
Diagnostic procedure

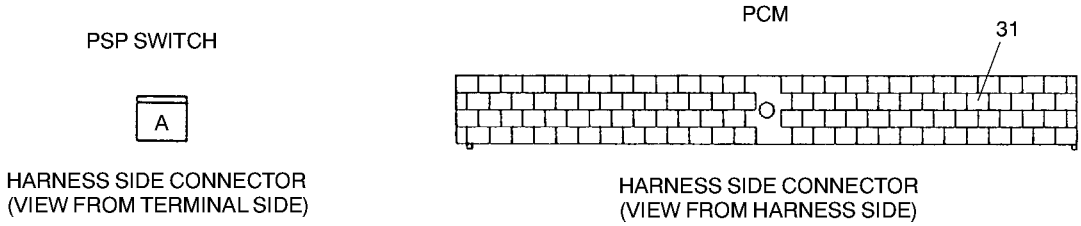
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending code or stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Repair applicable DTCs. (See 01–02A–15 DTC TABLE [ZM].)
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Perform IAC inspection. (See 01–13A–7 IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM].) • Is IAC valve okay?	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 01–13A–13 ACCELERATOR CABLE INSPECTION/ADJUSTMENT [ZM].)	Yes	Go to next step.
		No	Adjust accelerator cable free play, then go to Step 9. (See 01–13A–13 ACCELERATOR CABLE INSPECTION/ ADJUSTMENT [ZM].)
6	**INSPECT ACTUATOR CABLE FREE PLAY** • Is actuator cable adjustment okay?	Yes	Go to next step.
		No	Adjust actuator cable free play, then go to Step 9.
7	**INSPECT VACUUM HOSE CONNECTION** • Are vacuum hoses connected accurately? (See 01–13A–3 VACUUM HOSE ROUTING DIAGRAM [ZM].)	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 P0507 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0550 [ZM]

A3U010201087W09

DTC P0550	PSP switch circuit malfunction
DETECTION CONDITION	• PCM monitors PSP switch signal at PCM terminal 31. If input voltage is low (switch stays on) for **1 minute** when the VSS is **above 60.1 km/h {37.3 mph}** and ECT is **above 60°C {140°F}**, PCM determines that PSP switch circuit has 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	• PSP switch malfunction • Short to ground between PSP switch terminal and PCM terminal 31 • PCM malfunction





Diagnostic procedure

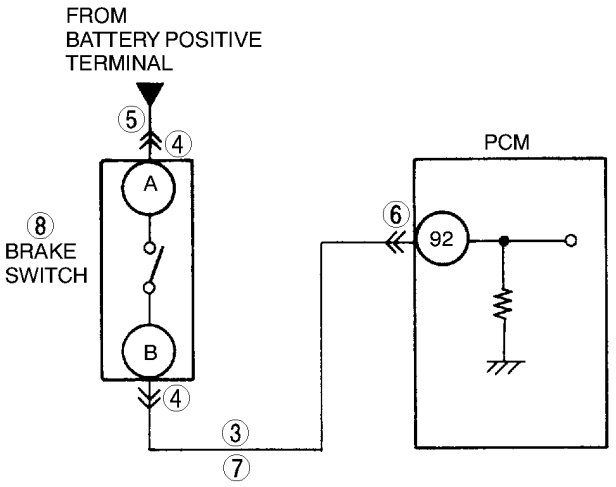
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 PSP SWITCH** • Perform PSP switch inspection (See 01–40A–43 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [ZM].) • Is PSP switch okay?	Yes	Go to next step.
		No	Replace the PSP switch, then go to Step 5.
4	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check for 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.

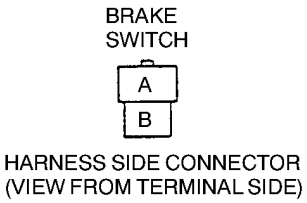
STEP	INSPECTION		ACTION
5	**VERIFY TROUBLESHOOTING OF DTC P0550 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 60.1 km/h {37.3 mph}** for **1 minute**. • Verify that ECT PID is **above 60°C {140°F}** using WDS or equivalent. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

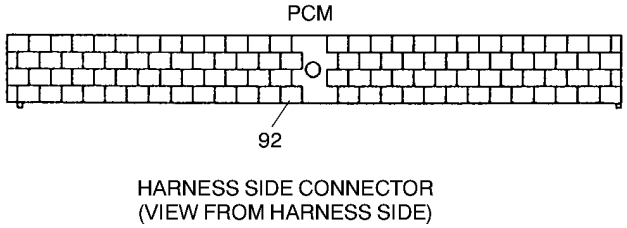
DTC P0703 [ZM]

A3U010201089W04

DTC P0703	Brake switch input malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from brake switch. If PCM does not detect PCM terminal 92 voltage changes while accelerating and decelerating **10 times** repeatedly, it determines that brake switch circuit has 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	• Brake switch malfunction • Open harness between brake switch terminal B and PCM connector terminal 92 • PCM malfunction







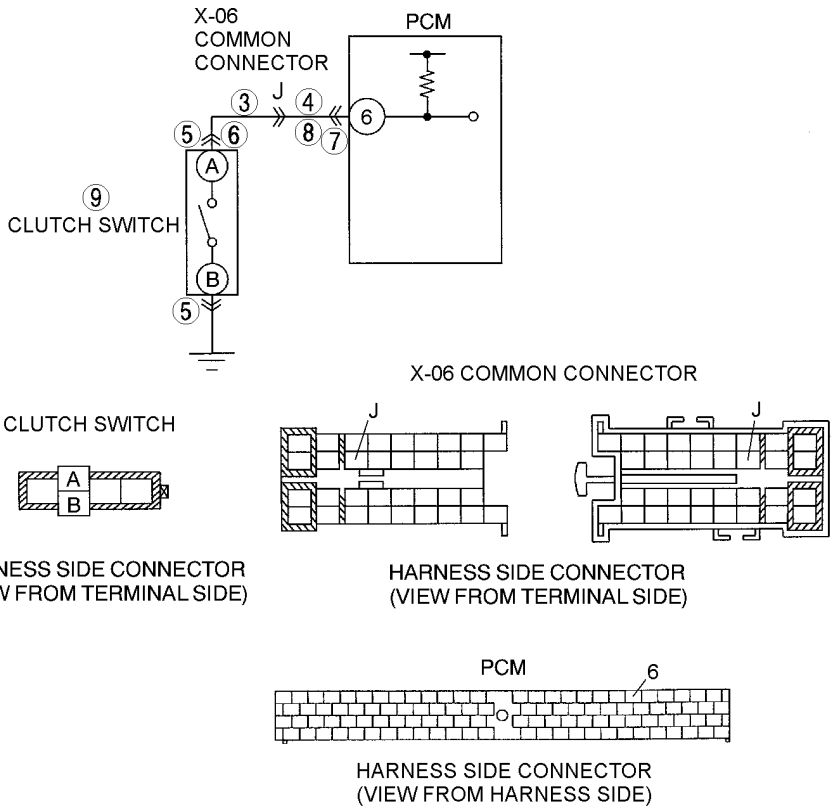
Diagnostic procedure

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 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 BRAKE SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Measure voltage between brake switch connector terminal B 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.
4	**INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition switch to OFF. • Disconnect brake switch connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
5	**INSPECT BRAKE SWITCH POWER CIRCUIT FOR OPEN CIRCUIT** • Measure voltage between brake switch connector terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace brake switch power circuit for open, then Go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition switch 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.
7	**INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN CURCUIT** • Connect breakout box with PCM connector disconnected. • Connect brake switch connector. • Turn ignition switch to ON (engine OFF). • Depress brake pedal and measure voltage between breakout box terminal 92 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
8	**INSPECT BRAKE SWITCH** • Perform brake switch inspection. (See 04–11–5 BRAKE SWITCH INSPECTION.) • Is brake switch okay?	Yes	Go to next step.
		No	Replace brake switch, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0703 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle **30 km/h {18.6 mph} or more**. • Depress and release brake pedal **more than 10 times** while driving vehicle. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P0704 [ZM]

A3U010201089W05

DTC P0704	Clutch switch circuit malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from the clutch switch. If PCM does not detect PCM terminal 6 voltage changes while running vehicle with vehicle speed **above 30 km/h {19 mph}** and stopping vehicle **10 times** repeatedly, it determines that clutch switch circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• CLT switch malfunction • Open harness between clutch switch terminal A and PCM terminal 6 • PCM malfunction



Diagnostic procedure

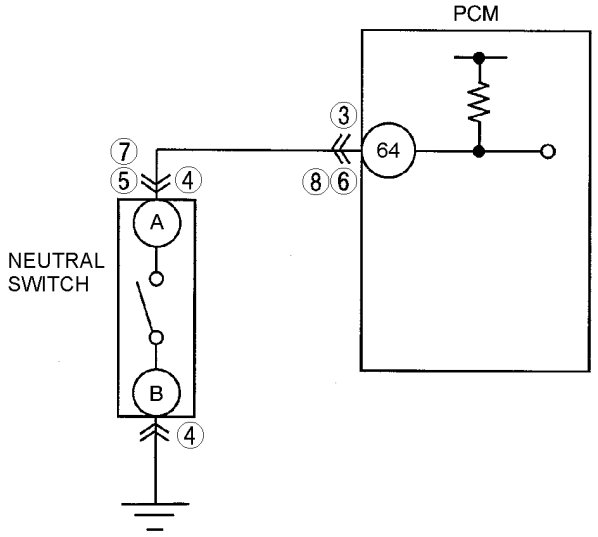
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 X-06 COMMON CONNECTOR CIRCUIT FOR SHORT TO POWER** • Disconnect X-06 common connector. • Turn ignition key to ON (engine OFF). • Measure voltage between X-06 common connector male terminal J 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.

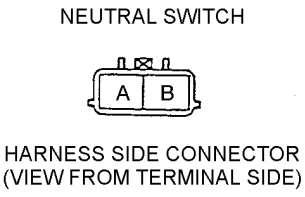
STEP	INSPECTION		ACTION
4	**INSPECT CLUTCH SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Measure voltage between breakout box terminal 6 and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
5	**INSPECT CLUTCH SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect clutch switch connector. • Check for poor connection (damaged/pilled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go Step 10.
		No	Go to next step.
6	**INSPECT CLUTCH SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Measure voltage between clutch switch terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace clutch switch signal circuit for open, then go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 6 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT X-06 COMMON CONNECTOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect X-06 common connector. • Turn ignition key to ON (engine OFF). • Depress clutch pedal and measure voltage between X-06 common connector male terminal J and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
9	**INSPECT CLUTCH SWITCH** • Perform clutch switch inspection. (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM].) • Is clutch switch okay?	Yes	Go to next step.
		No	Replace clutch switch, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0704 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 29.8 km/h {18.5 mph}** and stop vehicle. • Depress and release clutch pedal **more than 10 times** during drive cycle. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

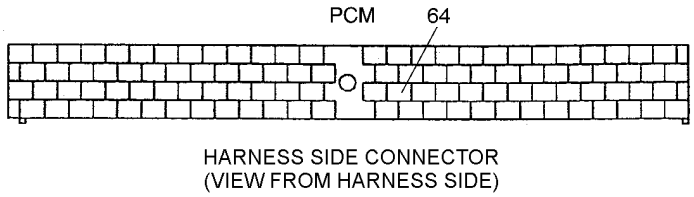
DTC P0705 [ZM]

A3U010201089W06

DTC P0705	Neutral switch circuit malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from neutral switch. If PCM does not detect PCM terminal 64 voltage changes when clutch pedal is depressed **10 times** while driving with vehicle speed **above 30 km/h {19 mph}** and vehicle stopped repeatedly, it determines that neutral switch circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Neutral switch malfunction • Open harness between neutral switch terminal A and PCM terminal 64 • PCM malfunction







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 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.

STEP	INSPECTION		ACTION
3	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM connector disconnected. • Disconnect neutral switch connector. • Turn ignition key to ON (engine OFF). • Measure voltage between breakout box terminal 64 (harness-side) 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.
4	**INSPECT POOR CONNECTION OF NEUTRAL SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect neutral switch connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go Step 9.
		No	Go to next step.
5	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connector. • Turn ignition key to ON (engine OFF). • Measure voltage between neutral switch terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace neutral switch signal circuit for open, then go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 64 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT NEUTRAL SWITCH CONNECTOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect neutral switch connector. • Turn ignition key to ON (engine OFF). • Measure voltage between neutral switch terminal A (harness-side) and body ground. • Is voltage **below 1.0 V**?	Yes	Repair or replace harness for open, then go to Step 9.
		No	Go to next step.
8	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Depress clutch pedal and measure voltage between breakout box terminal 64 and body ground. • Is voltage **below 1.0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0705 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 29.8 km/h {18.5 mph}** and stop vehicle. • Depress and release clutch pedal **more than 10 times** during drive cycle. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1102 [ZM]

A3U010201083W17

DTC P1102	MAF sensor inconsistent with TP sensor (lower than expected)
DETECTION CONDITION	• PCM compares actual input signal from MAF sensor with expected input signal from MAF sensor which PCM calculates by input voltage from TP sensor. If mass intake air flow amount is **below 4.8 g/s {0.63 lb/min}** for **5 seconds** and throttle opening angle is **above 50%** with engine running, 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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • TP sensor malfunction • Electrical corrosion in MAF signal circuit • Voltage drops in MAF signal circuit

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 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** • Connect WDS or equivalent to DLC-2. • Start the engine. • Access ECT, TP and MAF PIDs. • Warm up the engine until ECT PID is **above 80°C {176°F}**. • Drive the vehicle. • Read MAF PID while TP PID is **above 50%**. • Is MAF PID reading **below 4.8 g/s {0.63 lb/min}**?	Yes	Make sure that TP sensor resistance changes smoothly while gradually opening throttle valve. • If not, replace TP sensor and go to Step 6. • For others, go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect MAF/IAT sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal or MAF/IAT sensor, then go to Step 6.
		No	Go to next step.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to next step.
		No	Replace MAF/IAT sensor, then go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P1102 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent generic OBD-II function. • Start the engine. • Access ECT, TP and MAF PIDs using WDS or equivalent. • Warm up the engine until ECT PID is reading **above 80°C {176°F}**. • Drive the vehicle and read TP and MAF PIDs. **Note** • Verify PIDs reading are within specifications **more than 5 seconds**. — MAF PID: **above 4.8 g/s {0.63 lb/min.}** — TP PID: **above 50%** • 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 “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1103 [ZM]

A3U010201083W18

DTC P1103	Mass air flow sensor inconsistent with engine speed (greater than expected)
DETECTION CONDITION	• PCM compares actual input signal from MAF sensor with expected input signal from MAF sensor which PCM calculates by engine speed. If mass intake air flow amount is **above 66.6 g/s {8.79 lb/min}** for **5 seconds** and engine speed is **less than 2,000 rpm** with engine running, PCM determines that detected mass intake air flow amount is too high. **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	• MAF sensor malfunction • Electrical corrosion in MAF RETURN circuit • Voltage drops in ground circuit

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 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.

STEP	INSPECTION		ACTION
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect WDS or equivalent to DLC-2. • Start the engine. • Access ECT, MAF and RPM PIDs using WDS or equivalent. • Warm up engine until ECT PID is **above 80 °C {176 °F}**. • Read MAF PID while RPM PID is **below 2,000 rpm**. • Is MAF PID reading **above 66.6 g/s {8.79 lb/min}**?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**CHECK MAF SENSOR TERMINALS FOR ELECTRICAL CORROSION** • Turn ignition key to OFF. • Disconnect MAF/IAT sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is any problem corrosion found?	Yes	Repair or replace suspected terminal or MAF/IAT sensor, then go to Step 6.
		No	Go to next step.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to next step.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1103 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent generic OBD-II function. • Start the engine. • Warm up engine until ECT PID is **above 80 °C {176 °F}**. • Read MAF and RPM PIDs. **Note** • MAF PID should indicate **below 66.6 g/s {8.79 lb/min}** while RPM PID is **below 2,000 rpm**. • 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 “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1122 [ZM]

A3U010201083W19

DTC P1122	Throttle position stuck closed (lower than expected)
DETECTION CONDITION	• If PCM detects that throttle valve opening angle is **below 12.5%** for **5 seconds** after following conditions are met, PCM determines that TP is stuck closed: **MONITORING CONDITIONS** — Engine coolant temperature is **above 80 °C {176 °F}**. — MAF sensor signal is **above 58.3 g/s {7.7 lb/min}**. **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 if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P1122	Throttle position stuck closed (lower than expected)
POSSIBLE CAUSE	• TP sensor malfunction • Electrical corrosion in TP signal circuit • Voltage drops in reference voltage (vref) supply circuit • PCM malfunction

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 PENDING CODE OR STORED DTC** • Turn ignition key to ON (Engine OFF). • Retrieve pending or stored DTCs using WDS or equivalent. • Is DTC P1103 also retrieved?	Yes	Go to DTC P1103 troubleshooting procedure.
		No	Go to next step.
3	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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.
4	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Start the engine. • Access ECT, TP and MAF PIDs using WDS or equivalent. • Warm up the engine until ECT PID is **above 80 °C {176 °F}**. • Drive the vehicle. • Read TP PID while MAF PID is **above 58.3 g/s {7.7 lb/min}**. • Is TP PID reading **above 12.5%**?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
5	**CHECK TP SENSOR TERMINALS FOR ELECTRICAL CORROSION** • Turn ignition key to OFF. • Disconnect TP sensor connector. • Check for electrical corrosion on male and female TP sensor terminals. • Is any electrical corrosion found?	Yes	Repair or replace suspected terminal or TP sensor, then go to Step 8.
		No	Go to next step.
6	**VERIFY TP SENSOR** • Does TP sensor resistance smoothly change while gradually opening throttle valve?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 8.
7	**CHECK PCM TERMINALS FOR ELECTRICAL CORROSION** • Disconnect PCM connector. • Check for electrical corrosion on PCM male and female terminals at 89, 90 and 91. • Is any electrical corrosion found?	Yes	Repair terminal, then go to Step 8.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1122 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine. • Clear DTC from PCM memory using WDS or equivalent generic OBD-II function. • Access ECT, TP and MAF PIDs using WDS or equivalent. • Warm up the engine until ECT PID is reading **above 80 °C {176°F}**. • Drive the vehicle and read TP and MAF PIDs. • Verify PID readings are within specifications MAF PID: **above 58.3 g/s {7.7 lb/min}** TP PID: **above 12.5% more than 5 seconds** • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1123 [ZM]

A3U010201083W20

DTC P1123	Throttle position stuck open (higher than expected)
DETECTION CONDITION	• If PCM detects that throttle valve opening angle is **above 50%** for **5 seconds** after following conditions are met, PCM determines that TP is stuck open: **MONITORING CONDITIONS** — Engine speed is **above 500 rpm**. — MAF sensor signal is **below 4.8 g/s {0.6 lb/min}**. **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 if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TP sensor malfunction • MAF sensor malfunction • Electrical corrosion in TP signal circuit • Voltage drops in ground circuit • PCM malfunction

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 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 TP PID** • Clear DTC from PCM memory using WDS or equivalent generic OBD II function. • Start engine. • Access TP, MAF and RPM PIDs using WDS or equivalent. • Read TP PID while MAF PID is **below 4.8g/s {0.6 lb/min}** and RPM PID is **above 500 rpm**. • Is TP PID reading **above 50%**?	Yes	Go to Step 5.
		No	Go to next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Drive the vehicle and read MAF PID. • Does MAF PID change in compliance with driving condition?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN troubleshooting procedure.
		No	Check MAF sensor and related circuits and terminals. (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM].) Repair or replace as necessary, then go to Step 9.
5	**CHECK TP SENSOR TERMINALS FOR ELECTRICAL CORROSION** • Turn ignition key to OFF. • Disconnect TP sensor connector. • Check for electrical corrosion on male and female TP sensor terminals. • Is any electrical corrosion found?	Yes	Repair or replace suspected terminal or TP sensor, then go to Step 9.
		No	Go to next step.
6	**CHECK GROUND CIRCUIT FOR VOLTAGE DROP** • Check resistance between TP sensor terminal B (harness-side) and body ground. • Does resistance read **approx. 0 ohm**?	Yes	Go to next step.
		No	Repair or replace rusted or corroded PCM terminal 91 (harness-side). Disconnect breakout box and go to Step 9.

STEP	INSPECTION		ACTION
7	**INSPECT TP SENSOR** • Check resistance between TP sensor terminals A and C (part-side). • Does resistance smoothly change while gradually opening throttle valve?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 9.
8	**CHECK PCM TERMINALS FOR ELECTRICAL CORROSION** • Disconnect PCM connector. • Check for electrical corrosion on PCM and PCM connector male and female terminals. • Is any electrical corrosion found?	Yes	Repair terminal, then go to next step.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1123 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent generic OBD-II function. • Access RPM, TP and MAF PIDs using WDS or equivalent. • Verify TP PID is reading **below 50%** while MAF PID is **below 4.8 g/s {0.63 lb/min}** and RPM PID is **above 500 rpm**. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1170 [ZM]

A3U010201083W21

DTC P1170	HO2S (front) no inversion
DETECTION CONDITION	• PCM monitors input voltage from HO2S (front) when the following monitoring conditions are met. If input voltage from sensor remains **below or above 0.45 V** for **42.9 s**, PCM determines that there is no HO2S (front, RH) inversion. **MONITORING CONDITIONS** — Engine speed is **above 1,500 rpm**. — Engine coolant temperature is **above 80 °C {176 °F}**. **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	• HO2S (front) malfunction • HO2S (front) heater malfunction • Fuel injector malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel delivery hose clogging or leakage • Fuel filter clogging • Fuel return hose clogging or leakage • Air suction or leakage • PCV valve malfunction • Purge solenoid valve malfunction • Purge solenoid hoses are hooked up incorrectly. • Ignition coil malfunction • Insufficient compression • Engine malfunction

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 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 RELATED PENDING AND STORED DTCs** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P1170 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Verify PID while racing engine (in PARK). • Is PID reading okay? — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition)	Yes	Go to next step.
		No	Replace HO2S (front), then go to Step 21.
6	**INSPECT LONG TERM FUEL TRIM** • Access LONGFT1 PID using WDS or equivalent. • Compare it with FREEZE FRAME DATA recorded at Step1. • Is it decreased?	Yes	Engine is driven under rich condition. Go to next step.
		No	Engine is driven under lean condition. Go to Step 10.
7	**INSPECT FUEL LINE PRESSURE (EXCESSIVE FUEL LINE PRESSURE)** • Turn ignition key to OFF. • Inspect fuel line pressure. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **more than 150 kPa {1.5 kgf/cm^2, 22 psi}**?	Yes	Go to Step 9.
		No	Go to next step.
8	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect following parts and repair or replace if necessary: • Fuel pump maximum pressure • Fuel return pipe for clogging — If all items above are okay, replace pressure regulator. Then, go to Step 21.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve. Then go to Step 21. • If not, reconnect vacuum hoses to correct position. Then go to Step 21.
9	**INSPECT PURGE SOLENOID VALVE FOR WHETHER STUCK OPEN** • Turn ignition key to OFF. • Disconnect both hoses from purge solenoid valve. • Blow air through purge solenoid valve. • Does air blow through?	Yes	Replace purge solenoid valve. Go to Step 21.
		No	Go to Step 14.
10	**INSPECT PCV VALVE OPERATION** • Inspect PCV valve operation. (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION.) • Is PCV valve okay?	Yes	Go to next step.
		No	Replace PCV, then go to Step 21.

STEP	INSPECTION		ACTION
11	**INSPECT FUEL LINE PRESSURE (LOW FUEL LINE PRESSURE)** • Turn ignition key to OFF. • Inspect fuel line pressure. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **more than 150 kPa {1.5 kgf/cm^2, 22 psi}**?	Yes	Go to Step 14.
		No	Go to next step.
12	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Stop engine. • Turn ignition key to ON (Engine OFF). • Perform fuel pump maximum pressure test. (See 01–14–17 Fuel Pump Maximum Pressure Inspection.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. • Repair or replace suspected circuit. • If circuit is okay, replace fuel pump. Then go to Step 21.
13	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PUMP** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 21.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure) • Foreign material or stain inside fuel filter (low-pressure) — If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). — If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). — If all items above are okay, replace pressure regulator. Then, go to Step 21.
14	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinder using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 18.
		No	Go to next step.
15	**CHECK HIGH-TENSION LEADS OF NON-BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 21.
16	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between ignition coil connector terminal D (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 21.
17	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to Step 21.
18	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.
19	**INSPECT FUEL INJECTOR OPERATION** • Turn ignition key to OFF. • Inspect injector. (See 01–14–24 FUEL INJECTOR INSPECTION.) • Is injector okay?	Yes	Go to next step.
		No	Replace injector, then go to Step 21.

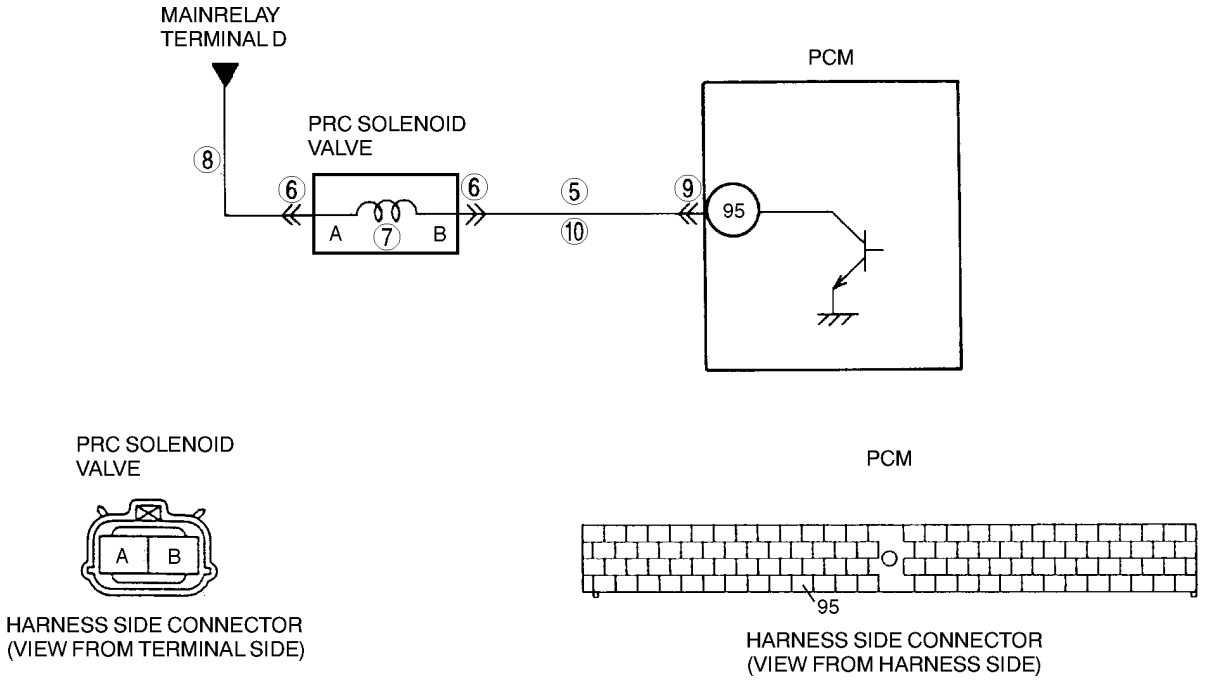
STEP	INSPECTION		ACTION
20	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing to head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
21	**VERIFY TROUBLESHOOTING OF DTC P1170 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Access ECT and RPM PIDs using WDS or equivalent. • Make sure that ECT PID is **above 80 °C {176 °F}**. • Increase and keep engine speed **above 1,500 rpm** for at **least 1 minute**. • Is pending code of same DTC present?	Yes	Replace or reprogram PCM. Then go to next step.
		No	Go to next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1250 [ZM]

A3U010201083W22

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from PRC solenoid valve. If voltage at PCM terminal 95 remains low or high, PCM determines that PRC solenoid valve circuit has malfunction. **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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• PRC solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between PRC solenoid valve terminal B and PCM terminal 95 • Open circuit in wiring between main relay terminal D and PRC solenoid valve terminal A • Open circuit in wiring between PRC solenoid valve terminal B and PCM terminal 95 • Short to power circuit between PRC solenoid valve terminal B and PCM terminal 95 • PCM malfunction

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction



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, go to next step.
		No	Go to next step.
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF then Start engine. • Is PENDING CODE of same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**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 6.
		No	Go to next step.
5	**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 95 and PRC solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace PRC solenoid valve, then go to Step 11.
6	**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 malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT PRC SOLENOID VALVE** • Measure resistance between PRC solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace PRC solenoid valve, then go to Step 11.

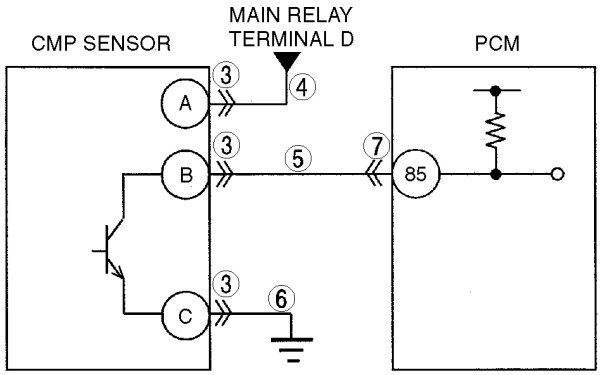
STEP	INSPECTION		ACTION
8	**INSPECT PRC SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 95 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT PRC SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between PRC solenoid valve terminal B (harness-side) and breakout box terminal 95. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1250 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF then start engine. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

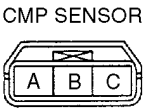
DTC P1345 [ZM]

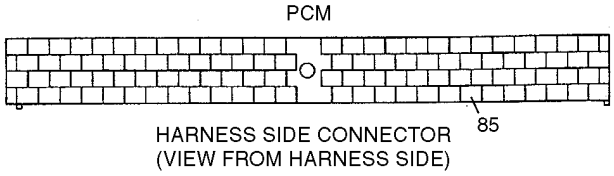
A3U010201083W23

DTC P1345	Camshaft position (CMP) sensor circuit malfunction
DETECTION CONDITION	• PCM monitor input voltage from CMP sensor. If PCM does not receive pulse signal the proper pulse signal from CMP sensor while crankshaft 12 rotations, PCM determines that CMP circuit has malfunction. **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. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• CMP sensor malfunction • Connector or terminal malfunction • Open circuit between main relay terminal D and CMP sensor terminal A • Open circuit between CMP sensor terminal B and PCM terminal 85 • Open circuit between CMP sensor terminal C and body ground • Short to ground circuit between main relay terminal D and CMP sensor terminal A • Short to ground circuit between CMP sensor terminal B and PCM terminal 85

DTC P1345	Camshaft position (CMP) sensor circuit malfunction







Diagnostic procedure

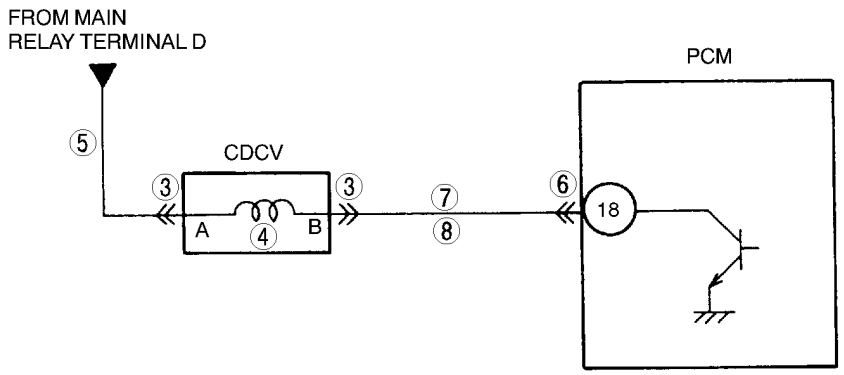
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to available Service Information • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to ON (engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**INSPECT CMP SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect CMP sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 8.
		No	Go to next step.
4	**INSPECT CMP SENSOR POWER CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between CMP sensor terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace for open or short to ground, then go to Step 8.
5	**INSPECT CMP SENSOR SIGNAL CIRCUIT** • Measure voltage between CMP sensor terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step
		No	Repair or replace for open, then go to Step 8.
6	**INSPECT CMP SENSOR GROUND CIRCUIT** • Turn ignition key to OFF. • Check continuity between CMP sensor terminal C (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace for open, then go to Step 8.

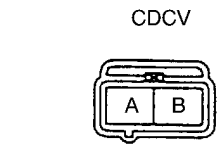
STEP	INSPECTION		ACTION
7	**INSPECT CMP SENSOR** • Check pulsation signal coming out from PCM terminal 85 (harness-side) using voltmeter while cranking engine. • Is there signal?	Yes	Go to next step.
		No	Replace CMP sensor, then go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1345 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1449 [ZM]

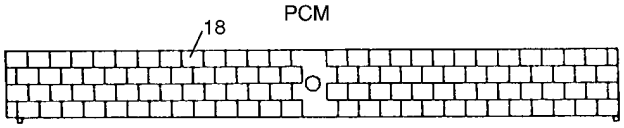
A3U010201083W24

DTC P1449	Canister drain cut valve (CDCV) circuit malfunction
DETECTION CONDITION	• PCM monitors the input voltages from CDCV just after turning the ignition key to ON. If voltage at PCM terminal 18 remains low or high, PCM determines that CDCV circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored one per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• CDCV malfunction • Connector or terminal malfunction • Short to ground in wiring between CDCV terminal B and PCM terminal 18 • Open circuit in wiring between main relay terminal D and CDCV terminal A • Open circuit in wiring between CDCV terminal B and PCM terminal 18 • Short to power circuit between CDCV terminal B and PCM terminal 18 • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**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. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**INSPECT CDCV CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
4	**INSPECT CDCV** • Measure resistance between CDCV terminals (part-side). • Is resistance **within 17—21 ohms**?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 9.
5	**INSPECT CDCV POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • 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 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 18. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check for 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 9.
		No	Go to next step.
8	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between CDCV terminal B (harness-side) and body ground. • Is the voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between CDCV terminal B (harness-side) and breakout box terminal 18. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1449 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1450 [ZM]

A3U010201083W25

DTC P1450	Evaporative emission control system malfunction (excessive vacuum)
DETECTION CONDITION	• PCM monitors fuel tank pressure signal when monitoring conditions are met. If vacuum is **above –3.92 kPa {–29.4 mmHg, –1.16 inHg}** for **10 seconds**, PCM determines the excessive vacuum. **MONITORING CONDITIONS** — Intake air temperature is **above –10 °C {14 °F}**. — Engine coolant temperature is **100 °C {212 °F} or below**. — Vehicle speed is **99.8 km/h {61.9 mph} or below**. — Engine coolant temperature at engine start is **below 35 °C {95 °F}**. **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	• CDCV malfunction • Air filter clogged • Charcoal canister malfunction • Evaporative drain passage clogged (including check valve) • Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction

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 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 RELATED STORED DTCS** • Turn ignition key to OFF then start engine. • Verify stored DTC. • Are DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT CDCV FOR OPERATION SOUND** • Perform CDCV inspection. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace it if necessary, then go to Step 9.
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 wait **a few seconds**. • Does vacuum hold?	Yes	Disconnect vacuum pump and connect vacuum hose to purge solenoid valve. Go to next step.
		No	Inspect purge solenoid valve and related harness. Replace it if necessary, then go to Step 9.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See 01–16–9 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 SENSOR** • Inspect fuel tank pressure sensor. (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM].) • 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 connected to CDCV for clogging. • Is it okay?	Yes	Inspect for clogging in following area: • From charcoal canister to CDCV • Drain passage including check valve — Repair or replace faulty area, then go to next step.
		No	Repair or replace air filter, then go to next step.

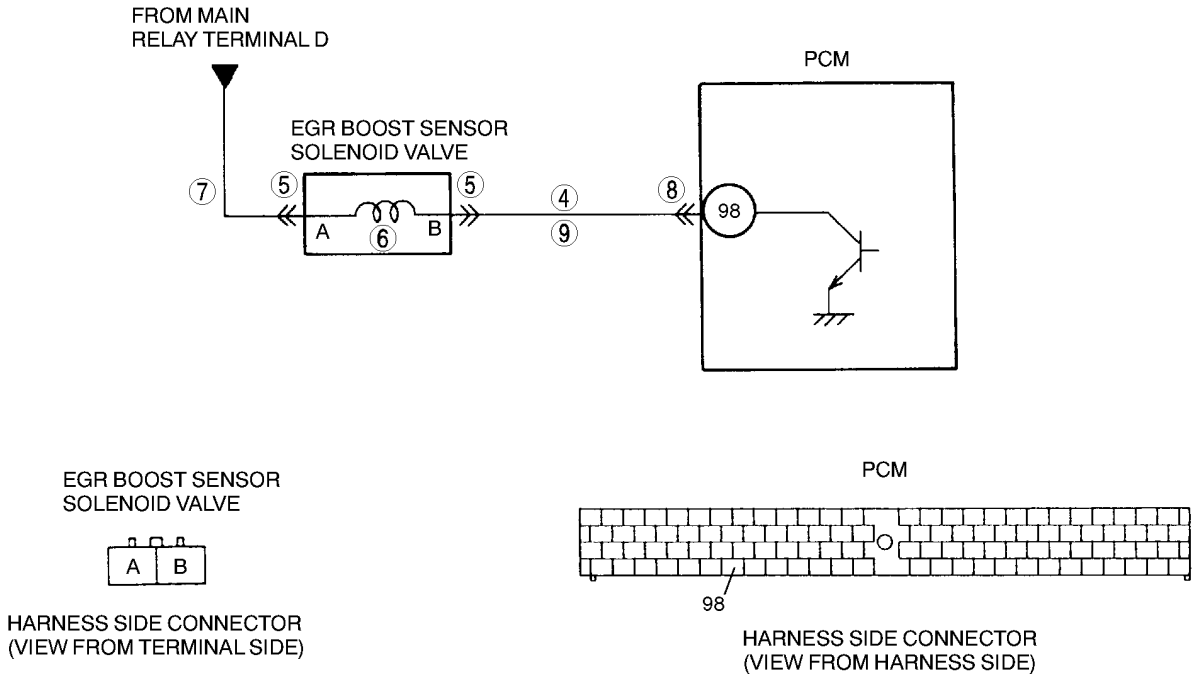
STEP	INSPECTION		ACTION
9	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Verify that following conditions are met. — BARO: **72.2 kPa {542 mmHg, 21.3 inHg} or higher** — ECT: **–10.0—22.0 °C {14.0—72.0 °F}** [at barometric pressure **72.2 kPa {542 mmHg, 21.3 inHg}]** — IAT: **–10—60 °C {50—140 °F}** — Fuel tank level: **15—85%** • Is there any condition 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 4.
		No	Go to next step.
10	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run Drive Mode 4. (See 01–02A–13 Mode 4 (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 been monitored?	Yes	Go to next step.
		No	Go back to Step 9.
11	**VERIFY TROUBLESHOOTING OF DTC P1450 COMPLETED** • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1487 [ZM]

A3U010201083W26

DTC P1487	EGR boost sensor solenoid valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from EGR boost sensor solenoid valve just after turning the ignition key to ON. If voltage at PCM terminal 98 remains low or high, PCM determines that EGR boost sensor solenoid valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
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 D and EGR boost sensor solenoid valve terminal A • Open circuit in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • Short to power circuit between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • PCM malfunction

DTC P1487	EGR boost sensor solenoid valve circuit malfunction



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**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	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**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 5.
		No	Go to next step.
4	**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 10.
		No	Replace EGR boost sensor solenoid valve, then go to Step 10.
5	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.

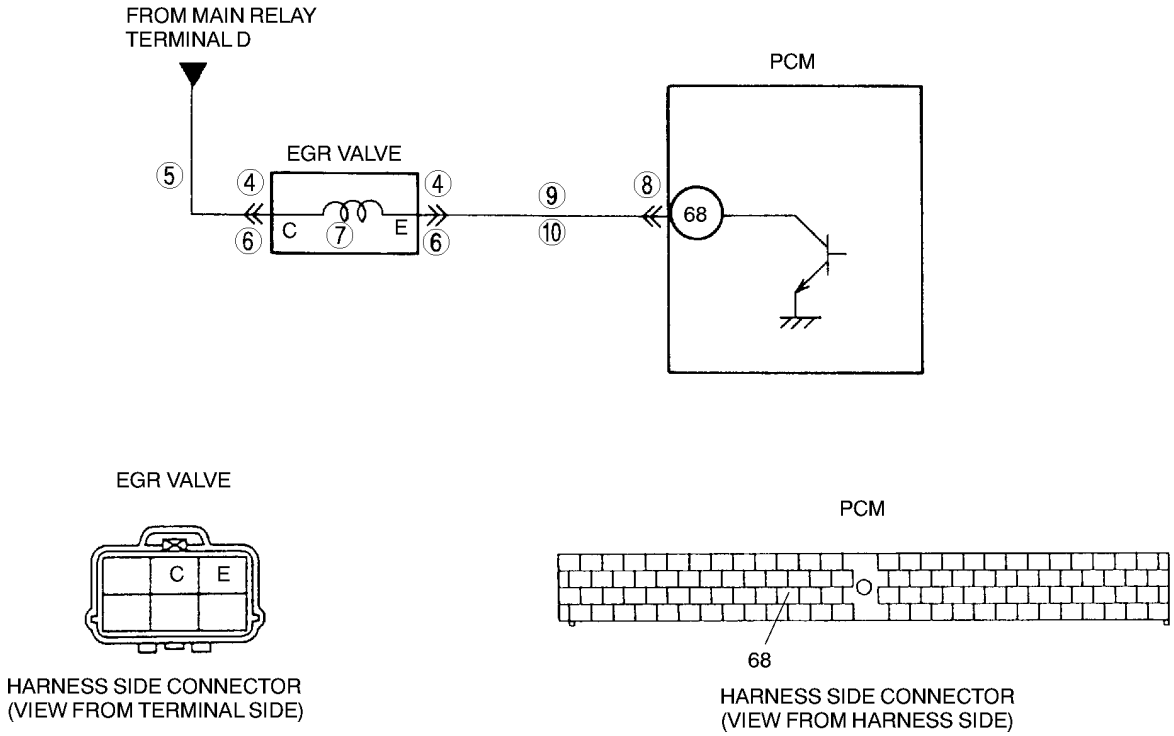
STEP	INSPECTION		ACTION
6	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Measure resistance between EGR boost sensor solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 10.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • 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 10.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 98. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
9	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between EGR boost sensor solenoid valve terminal B (harness-side) and breakout box terminal 98. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P1487 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1496 [ZM]

A3U010201083W27

DTC P1496	EGR valve stepping motor coil 1 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 68 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle) • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between EGR valve terminal E and PCM terminal 68 • Short to power circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between main relay terminal D and EGR valve terminal C • PCM malfunction

DTC P1496	EGR valve stepping motor coil 1 open or short circuit



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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	**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. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1497 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 1 and 2. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.

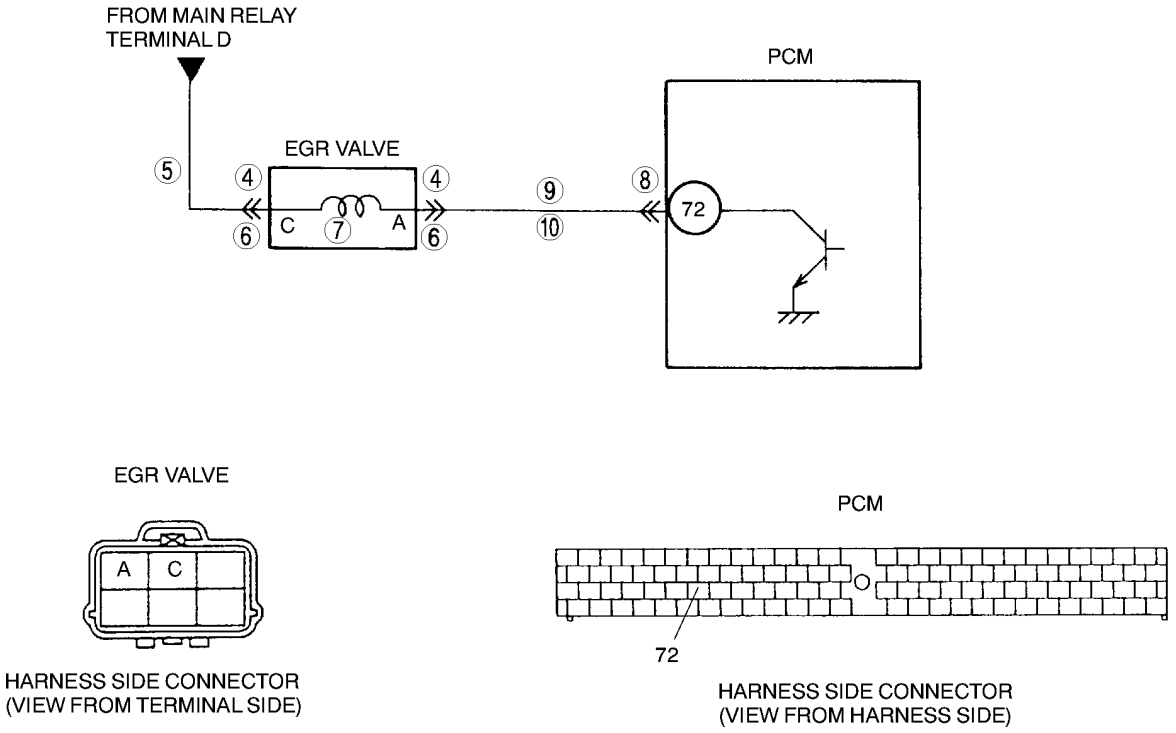
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and E (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 68 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal E (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal E and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal E (harness-side) and breakout box terminal 68. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1496 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1497 [ZM]

A3U010201083W28

DTC P1497	EGR valve stepping motor coil 2 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 72 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between EGR valve terminal A and PCM terminal 72 • Short to power circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between main relay terminal D and EGR valve terminal C • PCM malfunction

DTC P1497	EGR valve stepping motor coil 2 open or short circuit



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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	**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. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1496 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 1 and 2. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, then go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.

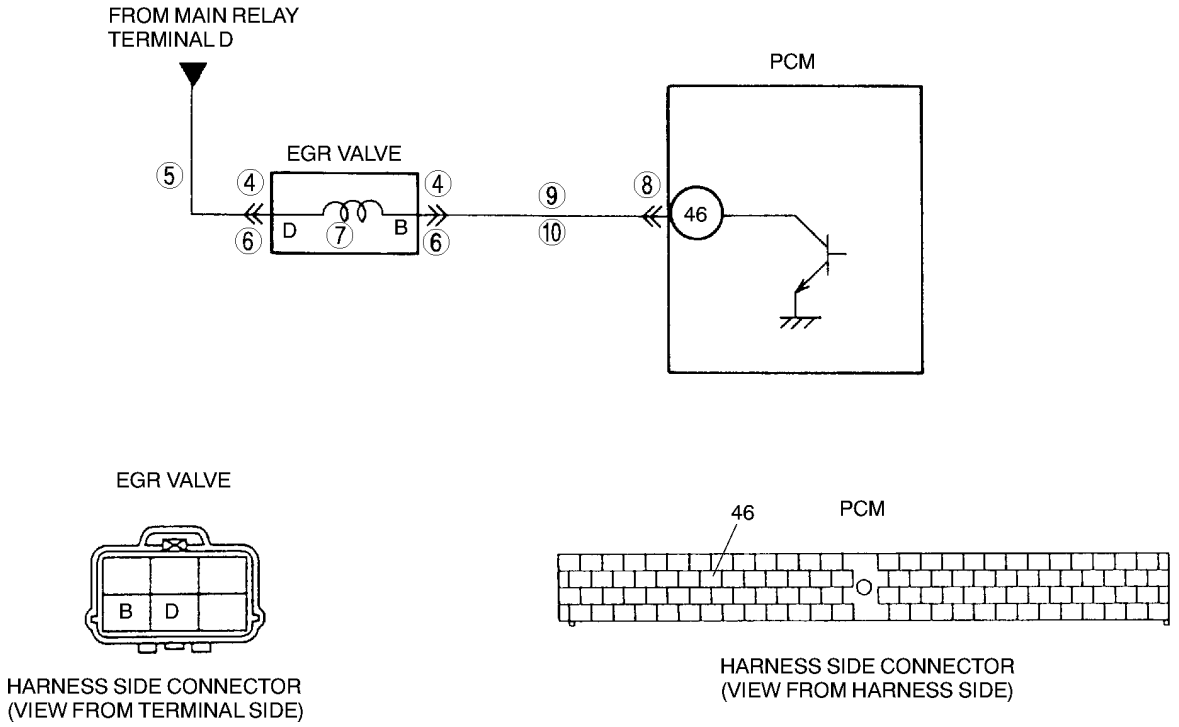
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and A (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 72 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal A and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal A (harness-side) and breakout box terminal 72. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1497 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1498 [ZM]

A3U010201083W29

DTC P1498	EGR valve stepping motor coil 3 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 46 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between EGR valve terminal B and PCM terminal 46 • Short to power circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between main relay terminal D and EGR valve terminal D • PCM malfunction

DTC P1498	EGR valve stepping motor coil 3 open or short circuit



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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	**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. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1499 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 3 and 4. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.

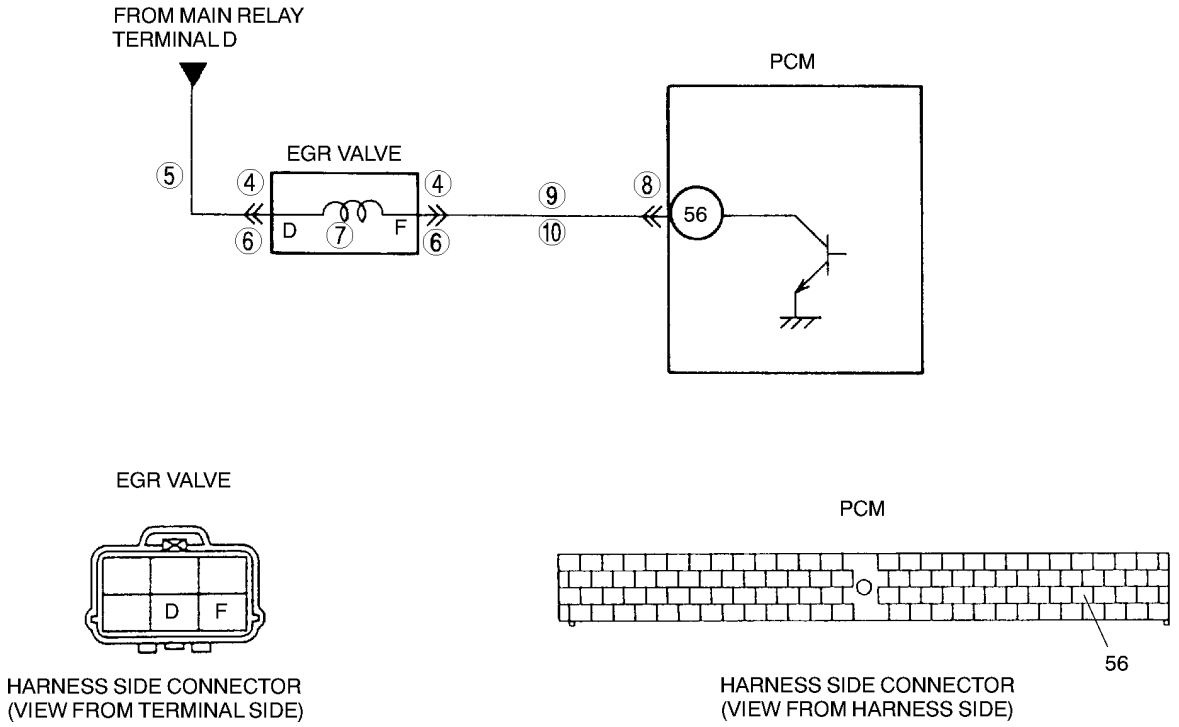
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals D and B (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 46 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal B and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal B (harness-side) and breakout box terminal 46. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1498 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1499 [ZM]

A3U010201083W30

DTC P1499	EGR valve stepping motor coil 4 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 56 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between EGR valve terminal F and PCM terminal 56 • Short to power circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between main relay terminal D and EGR valve terminal D • PCM malfunction

DTC P1499	EGR valve stepping motor coil 4 open or short circuit



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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	**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. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Are same DTC and P1498 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 3 and 4. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.

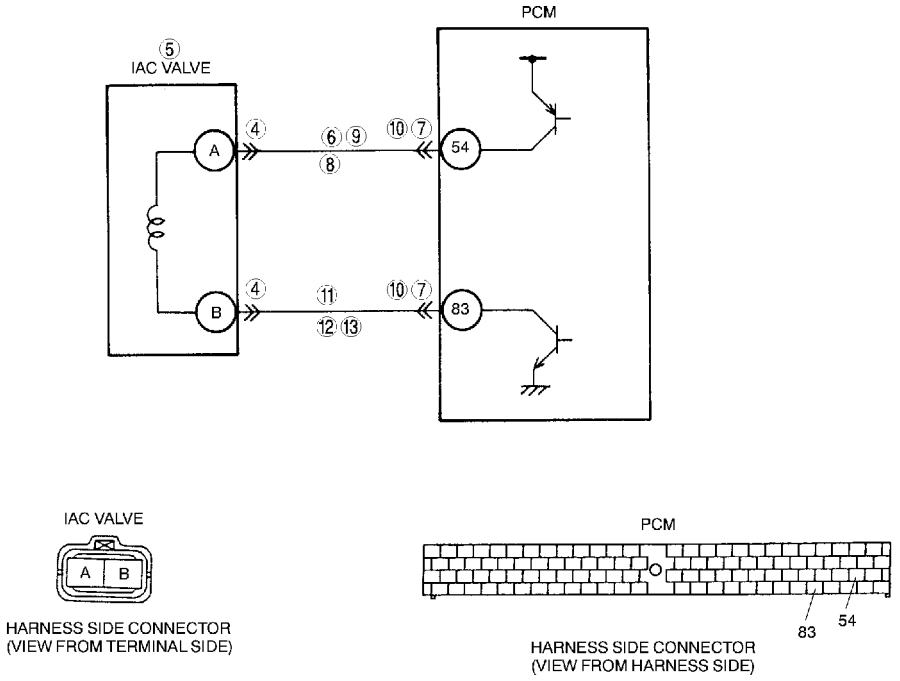
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminal D and F (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 56 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check for continuity between EGR valve terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal F and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal F (harness-side) and breakout box terminal 56. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1499 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1504 [ZM]

A3U010201083W31

DTC P1504	IAC valve circuit malfunction
DETECTION CONDITION	• PCM monitors IAC valve circuit current while IAC duty is within **18—70%**. If PCM detects IAC valve circuit current **below 100 mA (25 °C {77 °F})** or **above 4.5 A (25 °C {77 °F})** for **1 second**, PCM determines that IAC valve circuit has 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 PCM memory.
POSSIBLE CAUSE	• IAC valve circuit malfunction • Short to ground between IAC valve terminal A and PCM terminal 54 • Open circuit between IAC valve terminal A and PCM terminal 54 • Short to ground between IAC valve terminal B and PCM terminal 83 • Short to power between IAC valve terminal B and PCM terminal 83 • Open circuit between IAC valve terminal B and PCM terminal 83 • Poor connection of IAC valve connector or PCM connector • PCM malfunction

DTC P1504	IAC valve circuit malfunction



Diagnostic procedure

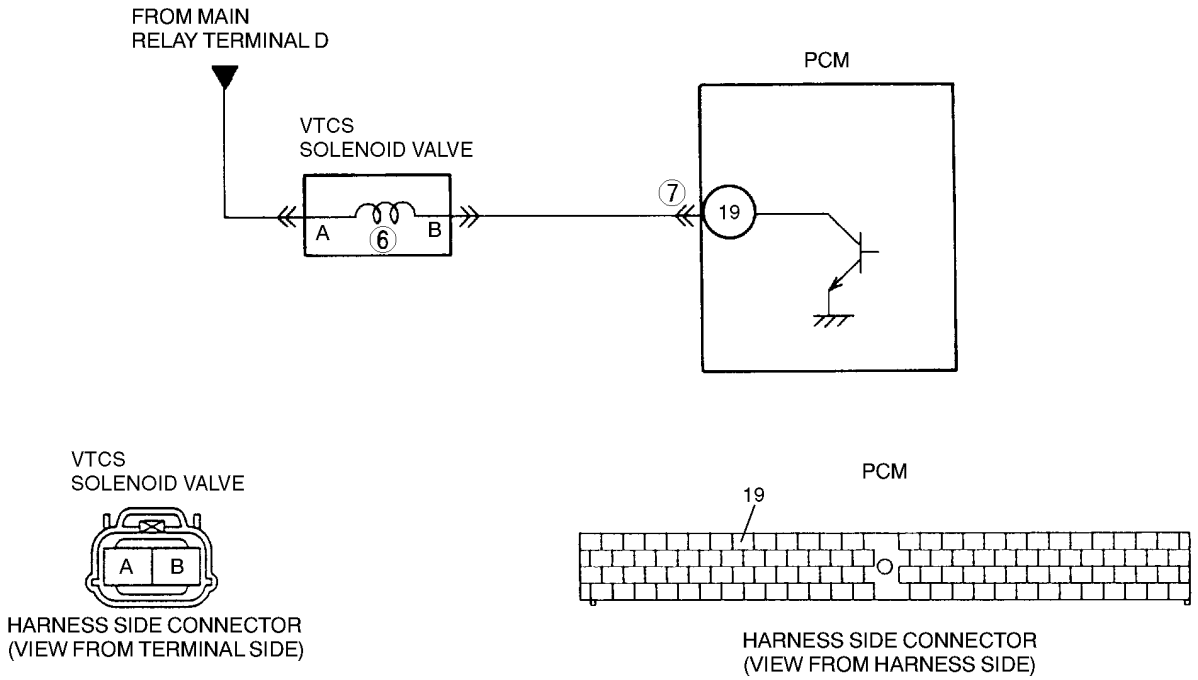
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine and warm it up completely. • Is same DTC detected?	Yes	Go to next step.
		No	Go to intermittent concern. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**INSPECT IAC VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect IAC valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 14.
		No	Go to next step.
5	**INSPECT IAC VALVE ELECTRICAL MALFUNCTION** • Measure resistance between IAC valve terminals A and B (part-side). • Is resistance **within 8.7—10.5 ohms**?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 14.
6	**CLASSIFY MALFUNCTION AT POWER SUPPLY CIRCUIT OR CONTROL CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between IAC valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Malfunction at control circuit. Go to Step 10.
		No	Malfunction at power supply circuit. Go to next step.

STEP	INSPECTION		ACTION
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 54 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 14.
		No	Go to next step.
8	**INSPECT POWER CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between IAC valve terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 14.
		No	Go to next step.
9	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF • Connect breakout box with PCM disconnected. • Check for continuity between IAC valve terminal A (harness-side) and breakout box terminal 54. • Is there continuity?	Yes	Repair or replace harness for open circuit, then go to Step 14.
		No	Go to Step 14.
10	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 83 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 14.
		No	Go to next step.
11	**INSPECT CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between IAC valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 14.
		No	Go to next step.
12	**INSPECT CONTROL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between IAC valve terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 14.
		No	Go to next step.
13	**INSPECT CONTROL CIRCUIT MALFUNCTION FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between IAC valve terminal B (harness-side) and breakout box terminal 83. • Is there continuity?	Yes	Repair or replace harness for open, then go to next step.
		No	Go to next step.
14	**VERIFY TROUBLESHOOTING OF DTC P1504 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Start engine and warm it up completely. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1512 [ZM]

A3U010201083W32

DTC P1512	Variable tumble control system (VTCS) shutter valve close stuck
DETECTION CONDITION	• PCM monitors air flow amount is **above 30 g/s {4.0 lb/min}** when the following monitoring conditions are met. PCM determines that VTCS shutter valve has closed stuck malfunction. **MONITORING CONDITIONS** — Engine speed is **above 3,000 rpm**. — Engine coolant temperature is **above 80 °C {176 °F}**. — Throttle valve opening angle is **above 75%**. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• ECT sensor malfunction • MAF sensor malfunction • IAT sensor malfunction • EGR boost sensor malfunction • TP sensor malfunction • CKP sensor malfunction • VTCS solenoid valve malfunction • VTCS shutter valve malfunction (stuck closed) • VTCS shutter valve actuator malfunction (stuck closed). • Short to ground circuit between VTCS solenoid valve terminal B and PCM terminal 19 • Short to power circuit between VTCS solenoid valve terminal B and PCM terminal 19 • PCM malfunction



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK 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	**CHECK RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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.

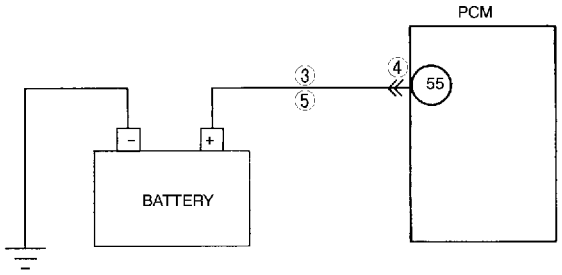
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 30 g/s {4.0 lb/min}** • Is pending code of same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**VERIFY STORED OTHER DTCS** • Verify stored DTCs using WDS or equipment. • Is other DTC present except P1512?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
5	**INSPECT VTCS SHUTTER VALVE ACTUATOR** • Carry out “VTCS operation inspection” (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.) • Is VTCS shutter valve actuator okay?	Yes	Go to next step.
		No	Replace VTCS shutter valve actuator, then go to Step 8.
6	**INSPECT VTCS SOLENOID VALVE** • Carry out “VTCS solenoid valve airflow inspection” (See 01–13A–11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [ZM].) • Is VTCS solenoid valve okay?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 8.
7	**CHECK PCM FOR POOR CONNECTION** • Check for poor connection at PCM terminal 19 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1512 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 30 g/s {4.0 lb/min}** • 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 “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

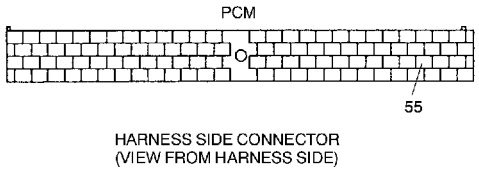
DTC P1562 [ZM]

A3U010201083W33

DTC P1562	PCM +BB voltage low
DETECTION CONDITION	• PCM monitors voltage of backup battery positive terminal at PCM terminal 55 after engine is started. If the PCM detected battery positive terminal voltage **below 2.5 V** for **2 seconds**, PCM determines that backup voltage circuit has 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 PCM memory.
POSSIBLE CAUSE	• Open circuit or short to ground in wiring between battery positive terminal and PCM terminal 55 • Poor connection of PCM connector • PCM malfunction

DTC P1562	PCM +BB voltage low





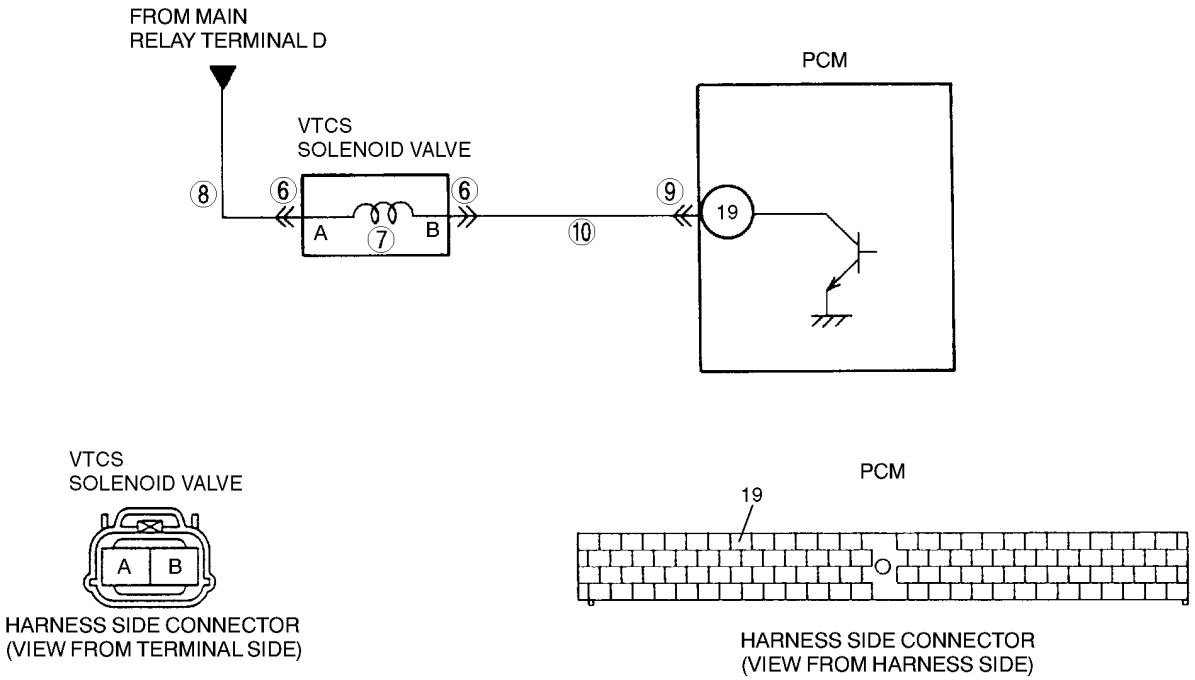
Diagnostic procedure

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 availability. • Is any 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 MONITOR CIRCUIT FOR SHORT TO GROUND** • Disconnect both battery cables. • Measure resistance between battery positive cable and body ground. • Is resistance more than **500 ohms**?	Yes	Go to next step.
		No	Repair or replace harness between battery positive left terminal and PCM terminal 55 for short to ground, then go to Step 6.
4	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 55 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 6.
		No	Go to next step.
5	**INSPECT MONITOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect battery cables. • Connect breakout box with PCM disconnected. • Check for continuity between battery positive cable 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 P1562 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • 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.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1569 [ZM]

A3U010201083W34

DTC P1569	Variable tumble control system (VTCS) solenoid valve circuit low input
DETECTION CONDITION	• PCM monitors input voltages from VTCS solenoid valve. If voltage at PCM 19 is low when VTCS solenoid valve OFF, PCM determines that VTCS solenoid valve has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Poor connection of connectors at PCM and/or VTCS solenoid valve • Short to ground in wiring between VTCS solenoid valve terminal B and PCM terminal 19 • Open circuit in wiring between main relay terminal D and VTCS solenoid valve terminal A • Open circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 19 • VTCS solenoid valve malfunction • PCM malfunction



Diagnostic procedure

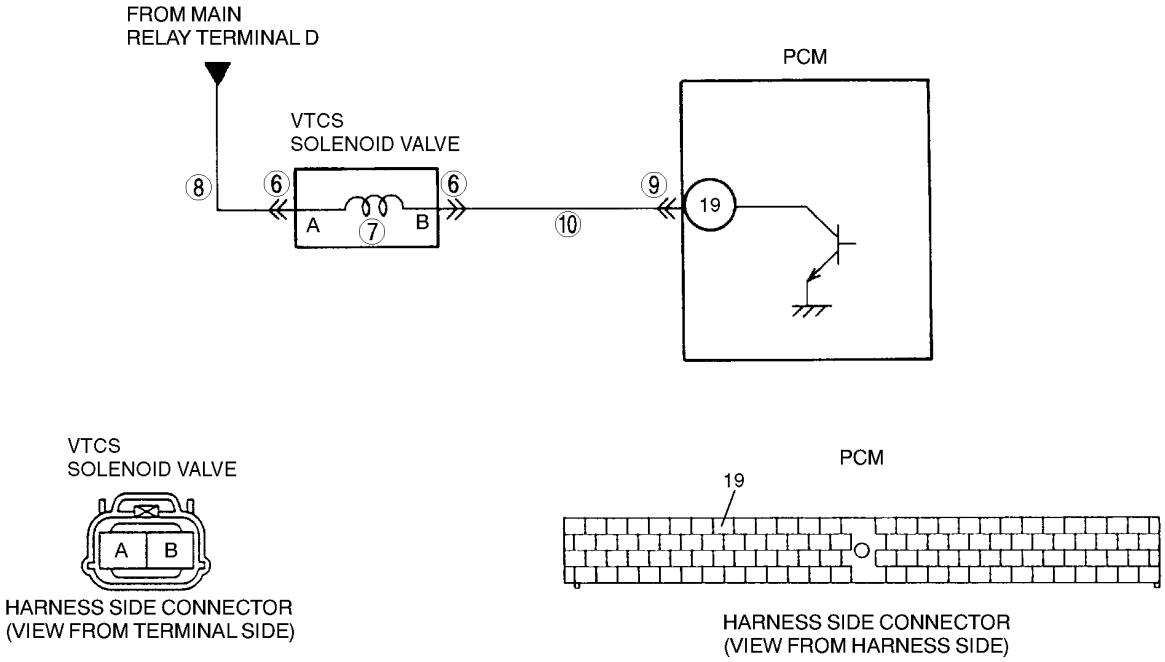
STEP	INSPECTION		ACTION
1	**CHECK FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine and warm it up completely. • Is pending code of same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)

STEP	INSPECTION		ACTION
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect VTCS solenoid valve tube that connects to intake manifold. • Connect vacuum pump to VTCS solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT PASSAGE CONTROL OF VTCS SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect VTCS solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 19 and VTCS solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace VTCS solenoid valve, then go to Step 11.
6	**INSPECT VTCS SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT VTCS SOLENOID VALVE** • Measure resistance between VTCS solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 11.
8	**INSPECT VTCS SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Disconnect VTCS solenoid valve connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between 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 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 19. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT VTCS SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect VTCS solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 19 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open or short to ground circuit, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1569 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Verify that following conditions are met. — ECT: **above 65 °C {149 °F}** — Engine speed: **below 3,250 rpm** • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1570 [ZM]

A3U010201083W35

DTC P1570	Variable tumble control system (VTCS) solenoid valve circuit high input
DETECTION CONDITION	• PCM monitors input voltages from VTCS solenoid valve. If voltage at PCM 19 is high when the VTCS solenoid valve ON, PCM determines that VTCS solenoid valve malfunction. **MONITORING CONDITIONS** — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle valve opening angle is **below 14% for ATX, 12.50% for MTX [at engine speed 2,500 rpm]**. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Poor connection of connectors at PCM and/or VTCS solenoid valve • Short to power circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 19 • Open circuit in wiring between main relay terminal D and VTCS solenoid valve terminal A • Open circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 19 • VTCS solenoid valve malfunction • PCM malfunction



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK 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 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.

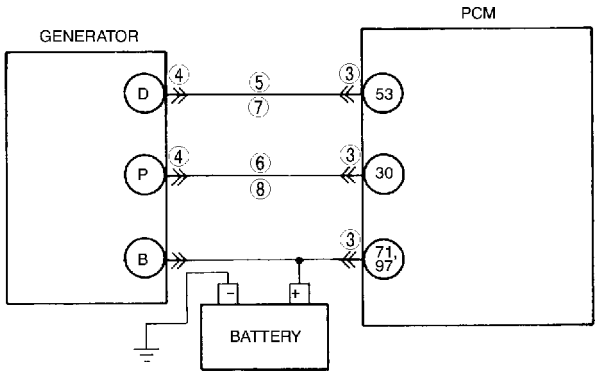
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle valve opening angle is **below 14% for ATX, 12.50% for MTX [at engine speed 2,500 rpm]**. • Is pending code of same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect VTCS solenoid valve tube that connects to intake manifold. • Connect vacuum pump to VTCS solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT VTCS SOLENOID VALVE FOR PASSAGE CONTROL** • Turn ignition key to OFF. • Disconnect VTCS solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 19 and VTCS solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace VTCS solenoid valve, then go to Step 11.
6	**INSPECT POOR CONNECTION OF VTCS SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT VTCS SOLENOID VALVE** • Measure resistance between VTCS solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 11.
8	**INSPECT VTCS SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Disconnect VTCS solenoid valve connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between 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 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 19. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT VTCS SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER** • Disconnect VTCS solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 19 and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.

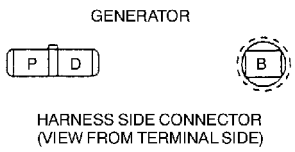
STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P1570 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65 °C {149 °F}**. — Throttle valve opening angle is **below 14% for ATX, 12.50% for MTX [at engine speed 2,500 rpm]**. • 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** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

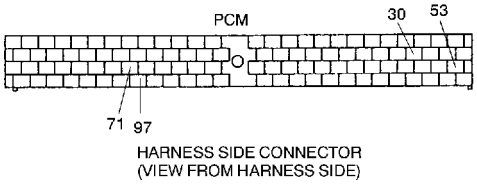
DTC P1631 [ZM]

A3U010201083W36

DTC P1631	Generator output voltage signal no electricity
DETECTION CONDITION	• PCM monitors input voltage from generator. If PCM detect generator output voltage **below 8.5 V** or generated current **above 19.5 A** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Open or short to ground circuit between generator terminal P and PCM terminal 30 • Open or short to ground circuit between generator terminal D and PCM terminal 53 • Drive belt is cut off or has come off • Generator malfunction — Rectifier circuit malfunction — Brush abrasion • PCM malfunction







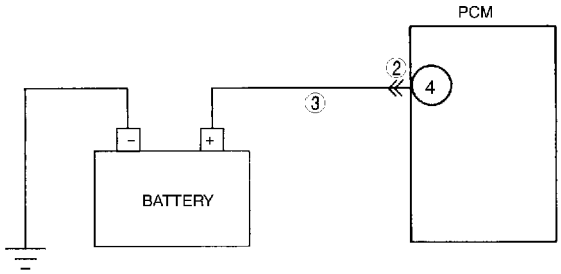
Diagnostic procedure

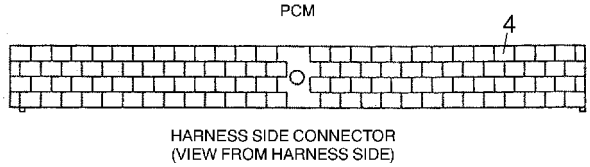
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT DRIVE BELT CONDITION** • Verify that drive belt auto tensioner indicator mark in not exceeding limit. (See 01–10A–3 DRIVE BELT INSPECTION [ZM].) • Is front drive belt okay?	Yes	Go to next step.
		No	Replace and/or adjust drive belt, then go to Step 9.
3	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 9.
		No	Go to next step.
4	**INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION** • Disconnect generator connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 9.
		No	Go to next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between generator 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.
6	**INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR GROUND** • Check continuity between generator terminal P (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 GENERATOR CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Measure resistance between generator terminal D (harness-side) and breakout box terminal 53. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
8	**INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR OPEN CIRCUIT** • Measure resistance between generator terminal P (harness-side) and breakout box terminal 30. • Is there continuity?	Yes	Repair or replace generator, then go to next step.
		No	Repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1631 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition switch to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

DTC P1632 [ZM]

A3U010201083W37

DTC P1632	Battery voltage monitor signal circuit malfunction
DETECTION CONDITION	• PCM monitors voltage of battery positive terminal at PCM terminal 4. If PCM detects battery positive terminal voltage **below 7.97 V** for **5 seconds**, PCM determines that battery positive voltage circuit has malfunction.
POSSIBLE CAUSE	• Open circuit in wiring between battery positive terminal and PCM terminal 4 • Poor connection of PCM connector • PCM malfunction





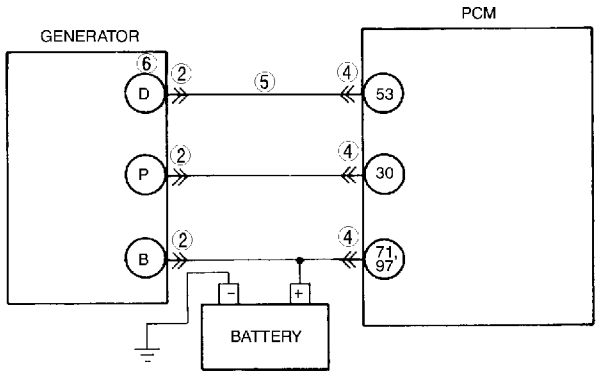
Diagnostic procedure

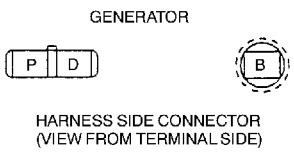
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 4.
		No	Go to next step.
3	**INSPECT MONITOR CIRCUIT FOR OPEN** • Disconnect battery cables. • Check for continuity between Battery positive terminal and PCM terminal 4. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1632 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

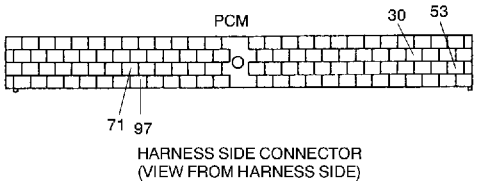
DTC P1633 [ZM]

A3U010201083W38

DTC P1633	Battery overcharge
DETECTION CONDITION	• PCM monitors input voltage from generator and battery positive terminal. If PCM detects generator output voltage **above 18.47 V** or battery voltage **above 15.94 V** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Short to power circuit between generator connector terminal D and PCM connector terminal 53 • Generator malfunction • PCM malfunction







Diagnostic procedure

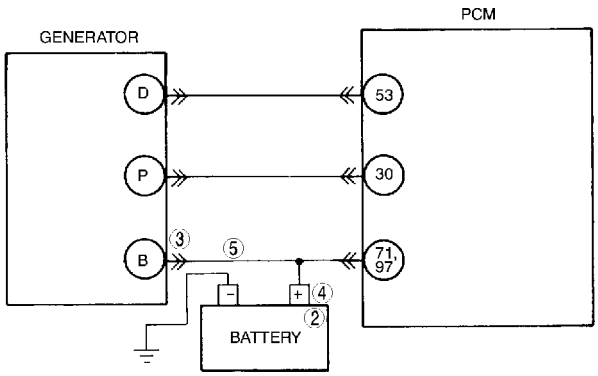
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect generator connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 7.
		No	Go to next step.
3	**CLASSIFY GENERATOR MALFUNCTION OR OTHER MALFUNCTION** • Turn ignition key to ON (Engine OFF). • Measure voltage between generator terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Malfunction at generator. Go to Step 6.
4	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace pins, then go to Step 7.
		No	Go to next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between generator terminal D (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 Step 7.

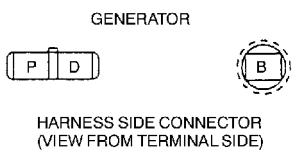
STEP	INSPECTION		ACTION
6	**INSPECT GENERATOR CONTROL TERMINAL FOR SHORT TO POWER** • Measure resistance between generator terminal D (part-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace generator, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P1633 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

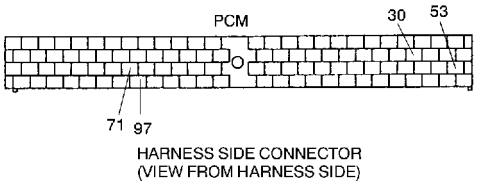
DTC P1634 [ZM]

A3U010201083W39

DTC P1634	Generator terminal B circuit open
DETECTION CONDITION	• PCM monitors input voltage from generator and battery positive terminal. If PCM detects generator output voltage **above 16.97 V** and battery voltage **below 10.94 V** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Open circuit between generator terminal B and battery positive terminal • Battery malfunction • PCM malfunction







Diagnostic procedure

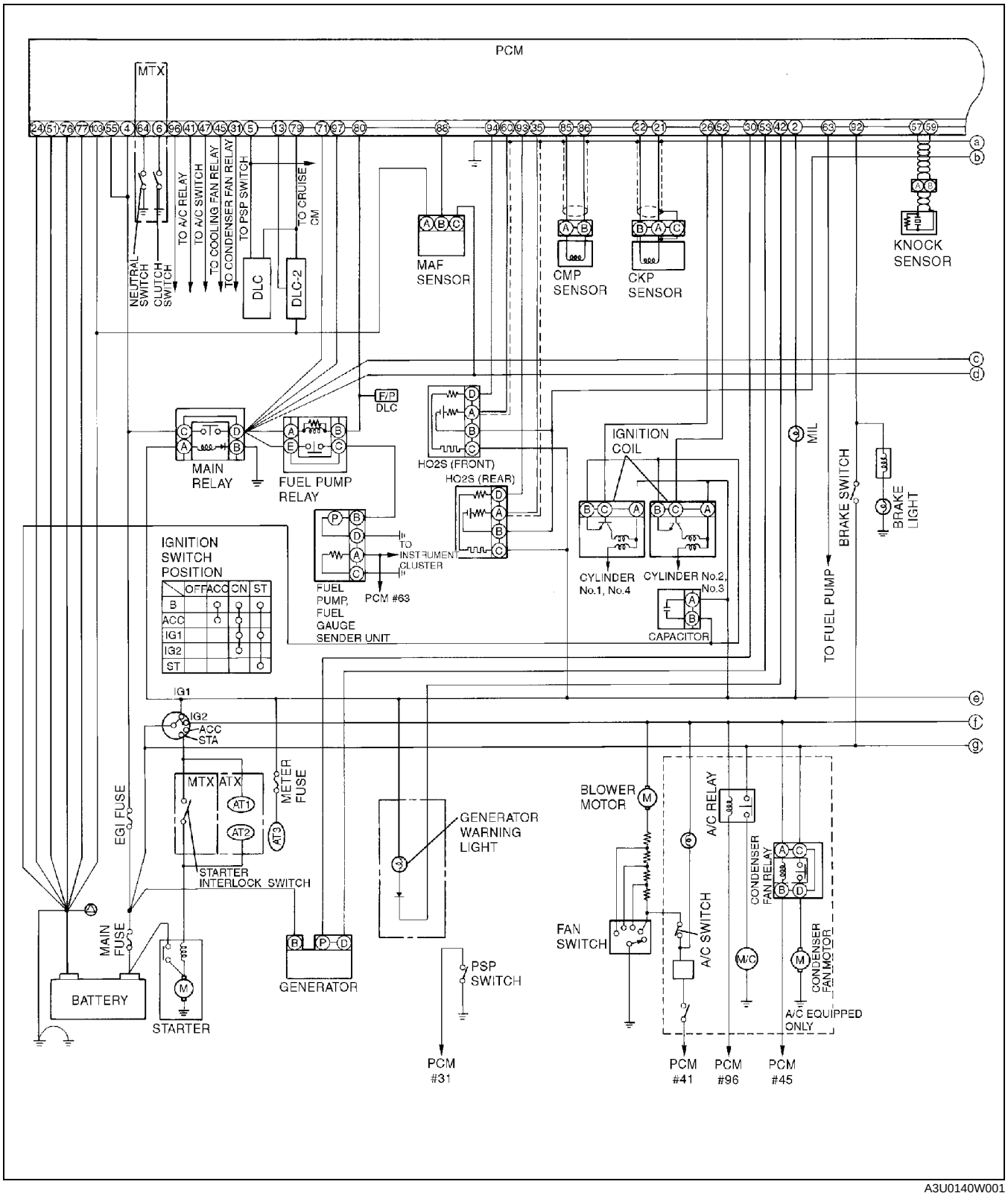
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT BATTERY** • Turn ignition key to OFF. • Inspect battery. (See 01–17–1 BATTERY INSPECTION.) • Is battery okay?	Yes	Replace battery, then go to Step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT GENERATOR TERMINAL FOR POOR INSTALLATION** • Turn ignition key to OFF. • Check for looseness of generator terminal B installation nut. • Is nut loose?	Yes	Tighten generator terminal B installation nut, then go to Step 6.
		No	Go to next step.
4	**INSPECT BATTERY POSITIVE TERMINAL FOR POOR INSTALLATION** • Check for looseness of battery positive terminal. • Is terminal loose?	Yes	Connect battery positive terminal correctly, then go to Step 6.
		No	Go to next step.
5	**INSPECT BATTERY CHARGING CIRCUIT** • Start engine. • Disconnect battery positive terminal. • Does engine stall?	Yes	Repair or replace harness between generator terminal B and battery positive terminal, then go to next step.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1634 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02A–15 DTC TABLE [ZM].)
		No	Troubleshooting completed.

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

CONTROL SYSTEM WIRING DIAGRAM [FS]

A3U010218881W01



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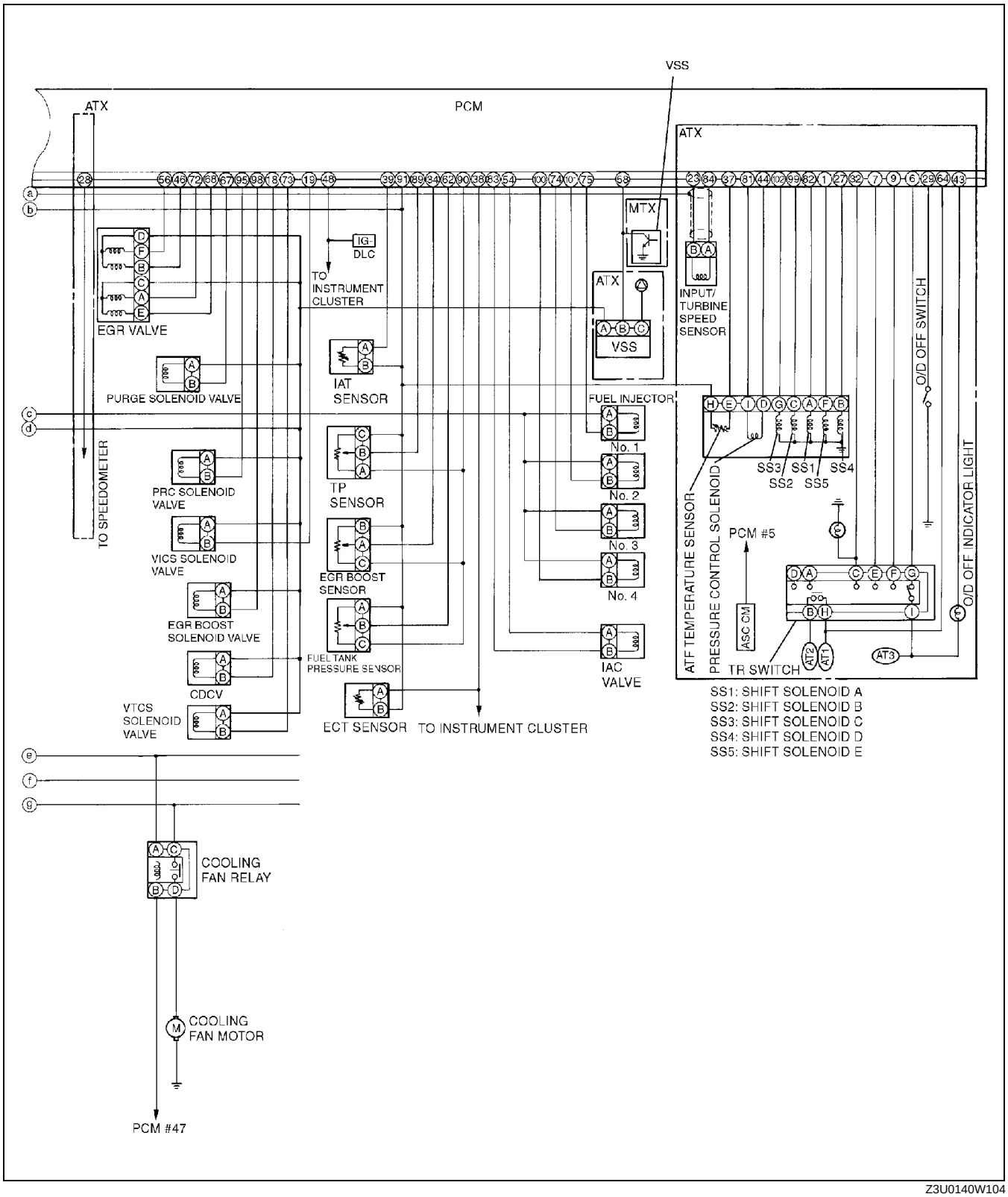


Z3U0140W104

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [FS]

A3U010218881W02

Engine Control System

Component	Idle air control (IAC)	Fuel injection control	Pressure regulator control (PRC)	Electronic spark advance(ESA) control	Fuel pump control	HO2S heater (front) control	HO2S heater (rear) control	Electric fan control	Purge control	EGR control	VICS	VTCS	A/C cut-out control	Generator control
Input														
Brake switch		x		x										
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier	x	x		x				x					x	
PSP switch	x	x		x									x	
DLC in engine compartment (TEN)	x	x	x	x				x						
Neutral switch (MTX)	x	x	x	x										
Clutch switch (MTX)	x	x	x	x										
TR switch (ATX)	x	x	x	x										
CKP sensor	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CMP sensor	x	x		x										
VSS	x	x		x						x				x
MAF sensor	x	x		x		x	x		x	x				
ECT sensor	x	x	x	x		x	x	x	x	x		x	x	x
IAT sensor	x	x	x	x		x			x	x				x
TP sensor	x	x	x	x		x		x	x	x		x	x	x
EGR boost sensor	x	x							x				x	
Battery positive voltage		x		x		x			x					x
Generator	x			x										x
HO2S (front)		x							x					
HO2S (rear)														
Output														
IAC valve	x													
A/C relay													x	
Cooling fan relay								x						
Condenser fan relay								x						
Fuel pump relay					x									
PRC solenoid valve			x											
Purge solenoid valve									x					
VICS solenoid valve											x			
VTCS solenoid valve												x		
EGR valve										x				
HO2S heater						x	x							
Ignition coils				x										
Fuel injectors		x												
Generator (field coil)														x
Generator warning light														x

Monitoring System

× : Applied

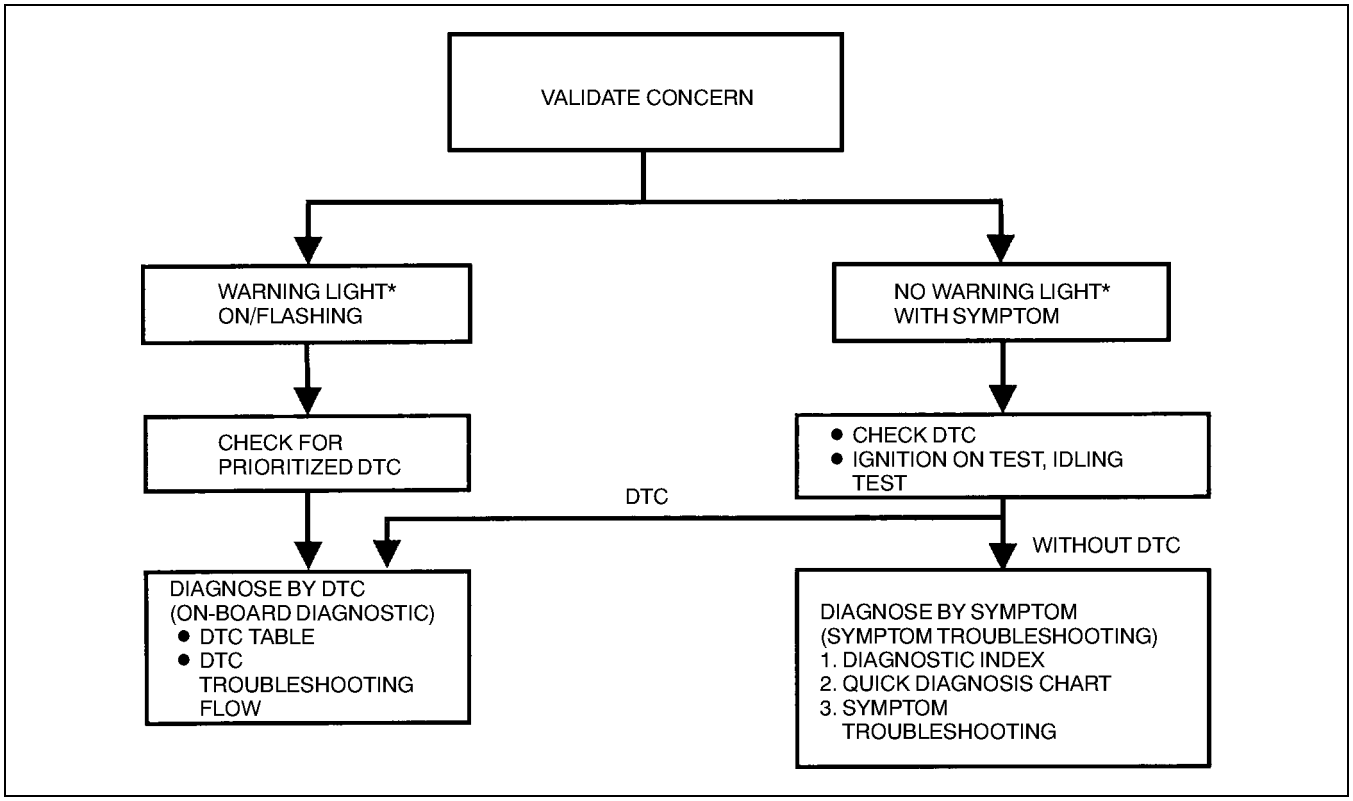
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier		×		×			×
PSP switch		×		×			×
CKP sensor	×	×	×	×	×	×	×
CMP sensor	×	×	×	×	×	×	×
VSS	×	×	×	×	×		×
MAF sensor	×	×	×	×	×	×	×
ECT sensor	×	×	×	×	×	×	×
IAT sensor	×	×	×	×	×		×
TP sensor	×	×	×	×	×		×
EGR boost sensor							×
Fuel level sensor			×				
Fuel gauge sender unit			×				
Rear HO2S	×				×	×	
Front HO2S	×			×	×	×	
Output							
DLC-2 in passenger compartment (Terminal KLN)	×	×	×	×	×	×	×
MIL	×	×	×	×	×	×	×
Purge solenoid valve			×	×	×		
EGR valve							×
EGR boost sensor solenoid valve							×
Canister drain cut valve			×				
Fuel injectors				×			

Y3U102WBC

FOREWORD [FS]

A3U010218881W03

- 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–15 DTC TABLE [FS].)
  - — If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].)



YMU102WBX

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

OBD-II PENDING TROUBLE CODES [FS]

A3U010218881W04

- 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 store the DTC.

OBD-II FREEZE FRAME DATA [FS]

A3U010218881W05

- 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]

A3U010218881W06

- This shows OBD-II systems operating status. If any monitor function is incomplete, WDS or equivalent will identify which monitor function has not been completed. Misfires, Fuel System and Comprehensive Components (CCM) are continuous monitoring-type functions. The catalyst, EGR system, evaporation system and oxygen sensor will be monitored under drive cycles. 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]

A3U010218881W07

- 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]

A3U010218881W08

- The following 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]

A3U010218881W09

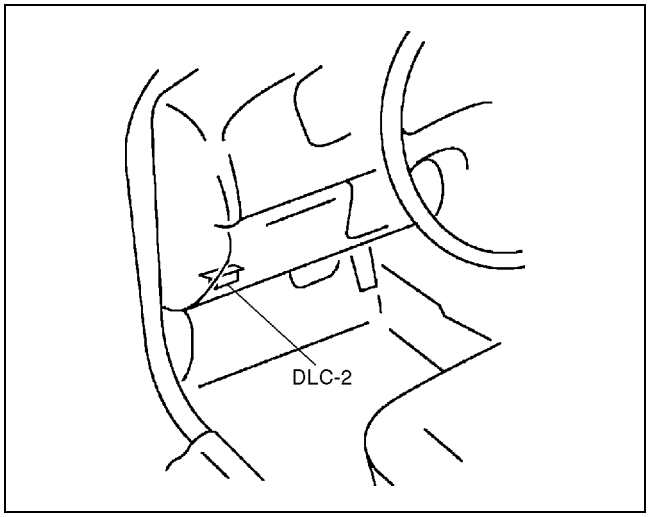
- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST [FS]

A3U010218881W10

DTCs Retrieving Procedure

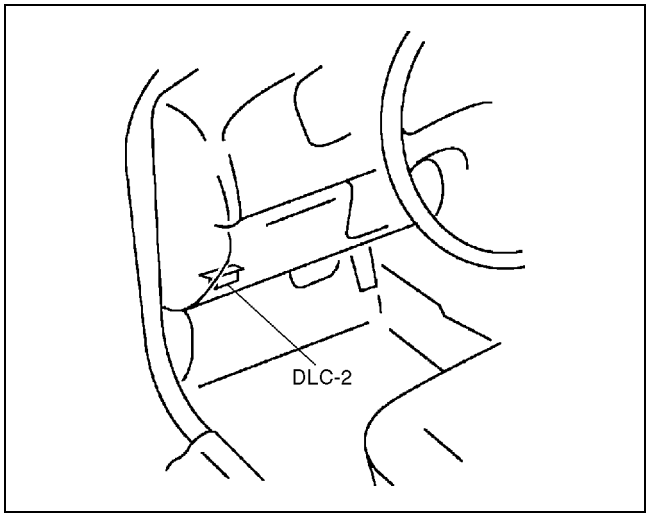
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve DTC using WDS or equivalent.



Z3U0102W001

Pending Trouble Code Access Procedure

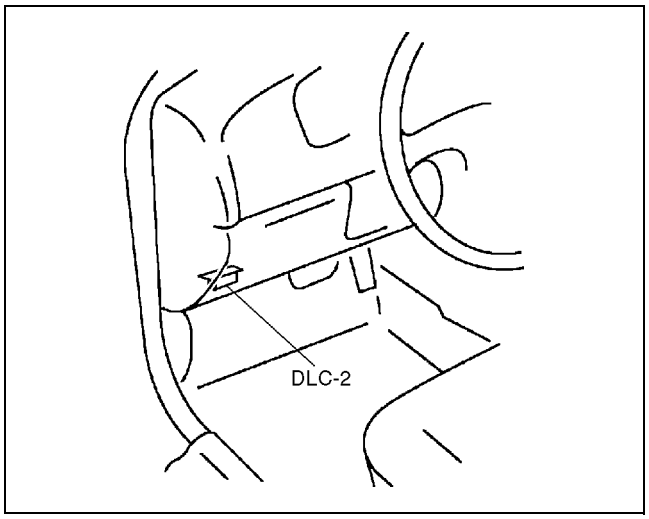
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve pending trouble code using WDS or equivalent.



Z3U0102W001

Freeze Frame PID Data Access Procedure

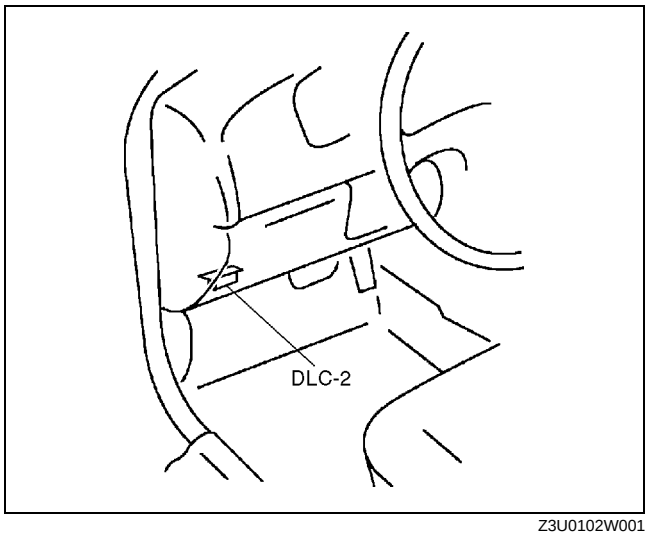
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve FREEZE FRAME PID DATA using WDS or equivalent.



Z3U0102W001

On-Board System Readiness Tests Access Procedure

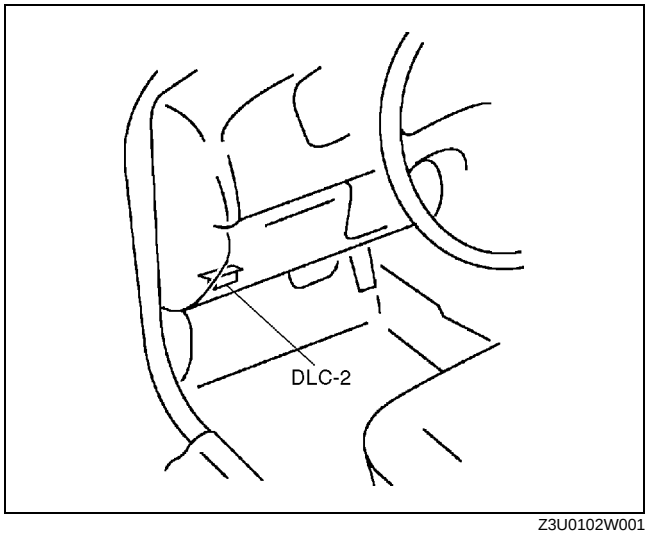
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Monitor the OBD-II system operating status using WDS or equivalent.



Z3U0102W001

PID/DATA Monitor and Record Procedure

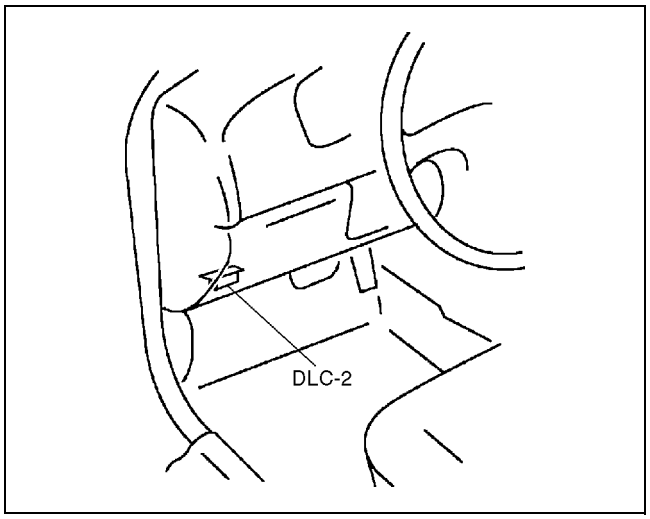
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access and monitor PIDs using WDS or equivalent.



Z3U0102W001

Diagnostic Monitoring Test Results Access Procedure

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access the DIAGNOSTIC MONITORING TEST RESULTS and read the test results using WDS or equivalent.

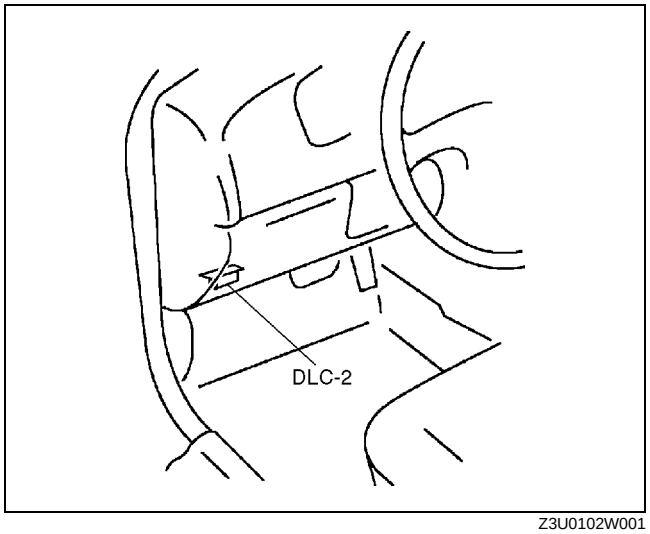


Z3U0102W001

AFTER REPAIR PROCEDURE [FS]

A3U010218881W11

1. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
2. Cycle the ignition key from OFF to ON.
3. Record DTC if retrieved.
4. Erase all diagnostic data by using WDS or equivalent.



Z3U0102W001

OBD-II DRIVE MODE [FS]

A3U010218881W12

- Performing the Drive Mode inspects 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 inspected:
  - — EGR system
  - — Oxygen sensor (HO2S)
  - — Oxygen sensor heater
  - — Catalytic converter (TWC)
  - — Fuel, misfire and evaporative (EVAP) system

Caution

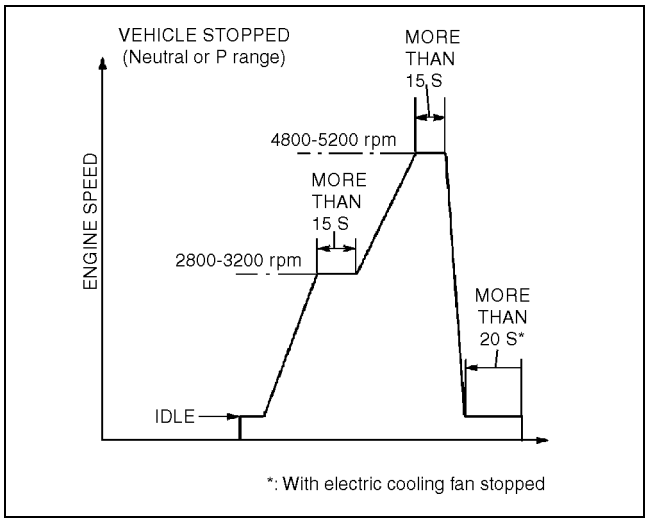
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the WDS or equivalent is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the WDS or equivalent using the PID/DATA MONITOR AND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

Note

- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the WDS or equivalent to monitor vehicle speed.
- If the OBD-II system inspection is not completed during the Drive Mode, the following causes are considered:
  1. The OBD-II system detects the malfunction.
  2. The Drive Mode procedure is not completed correctly.
- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after Drive Mode.

Mode 1 (PCM adaptive memory procedure drive mode)

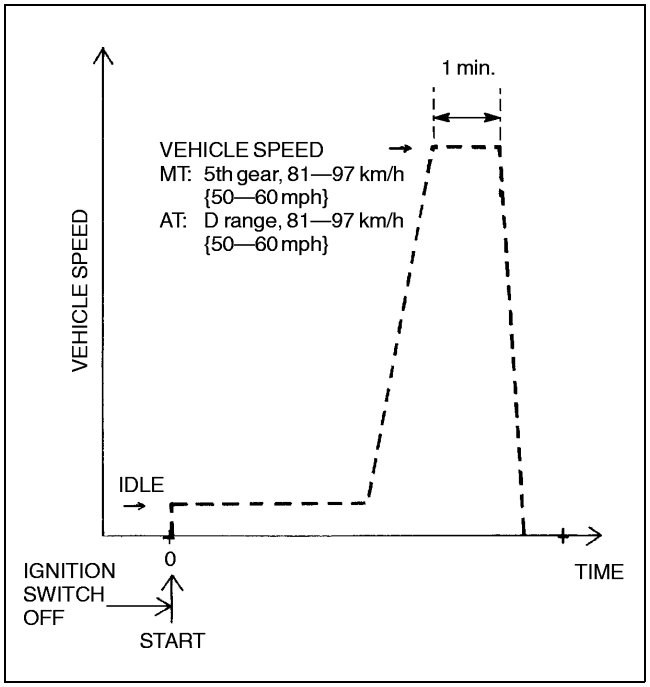
1. Start the engine and warm up completely.
2. Verify the following conditions and correct if necessary.
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
   - Initial ignition timing and idle speed are within specification.
   - TEN and GND of DLC are not connected.
3. Perform no load racing at the engine speed shown in the graph, then idle the engine for **more than 20 seconds** after the cooling fan stopped. If possible, monitor RPM PID for engine speed and cooling fan status during this procedure.



Z3U0102W002

Mode 2 (EGR system repair verification drive mode)

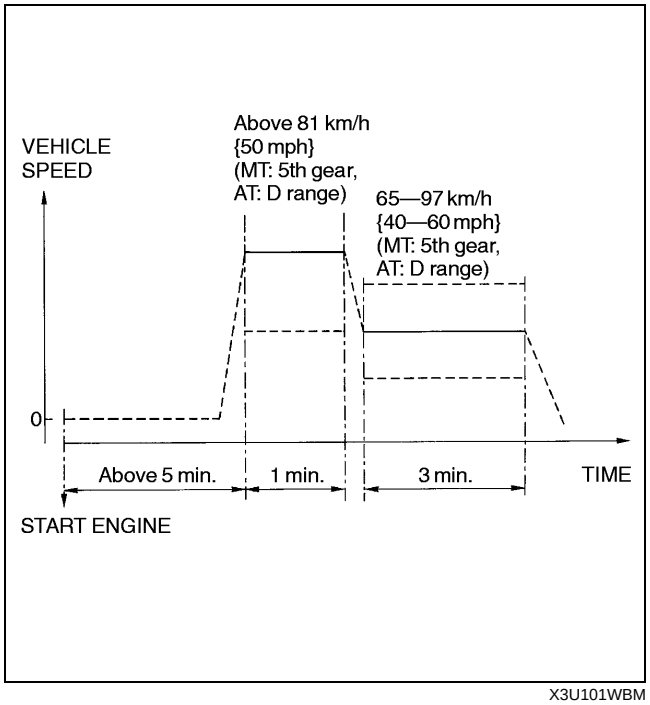
1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph.
4. Stop vehicle and access to ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
5. If not completed, turn the ignition key off then go back to Step 3.
6. Access to DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTIONS to inspect the monitor results. If MEAS are not within specification, repair has not completed.
7. Verify no DTCs are available.



X3U101WBL

Mode 3 (HO2S heater, HO2S, and TWC repair verification drive mode)

1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph. Driving condition before the constant speed driving is not specified.
4. Stop vehicle and access to ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
5. If not completed, turn the ignition key off then go back to Step 3.
6. Access to DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTIONS to inspect the monitor results. If MEAS are not within specification, repair has not completed.
7. Verify no DTCs are available.

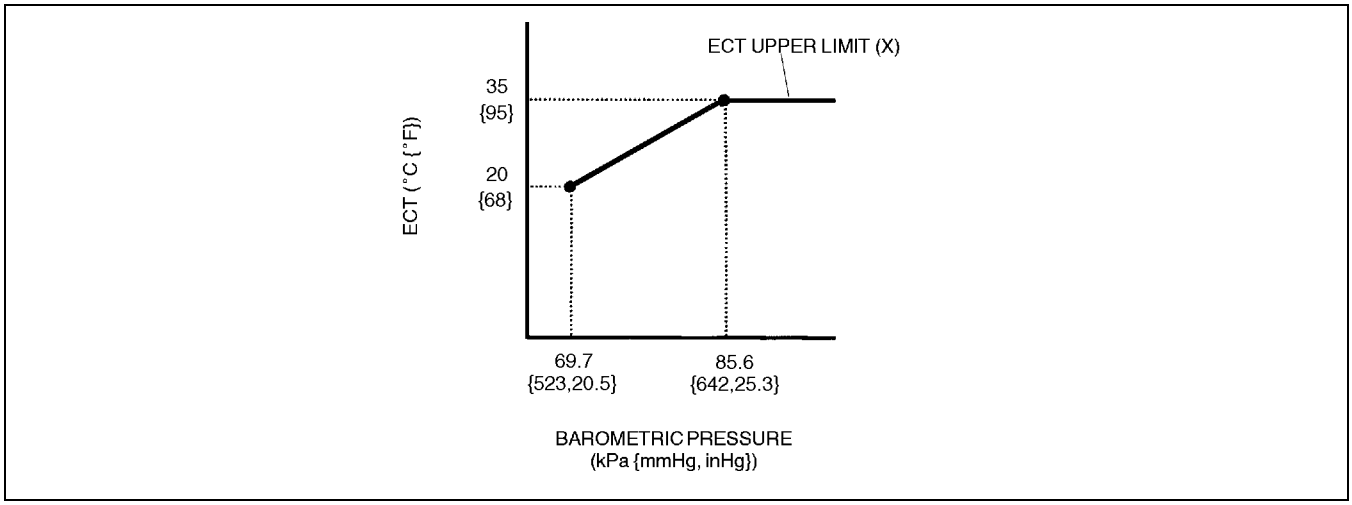


X3U101WBM

Mode 4 (EVAP system repair verification drive mode)

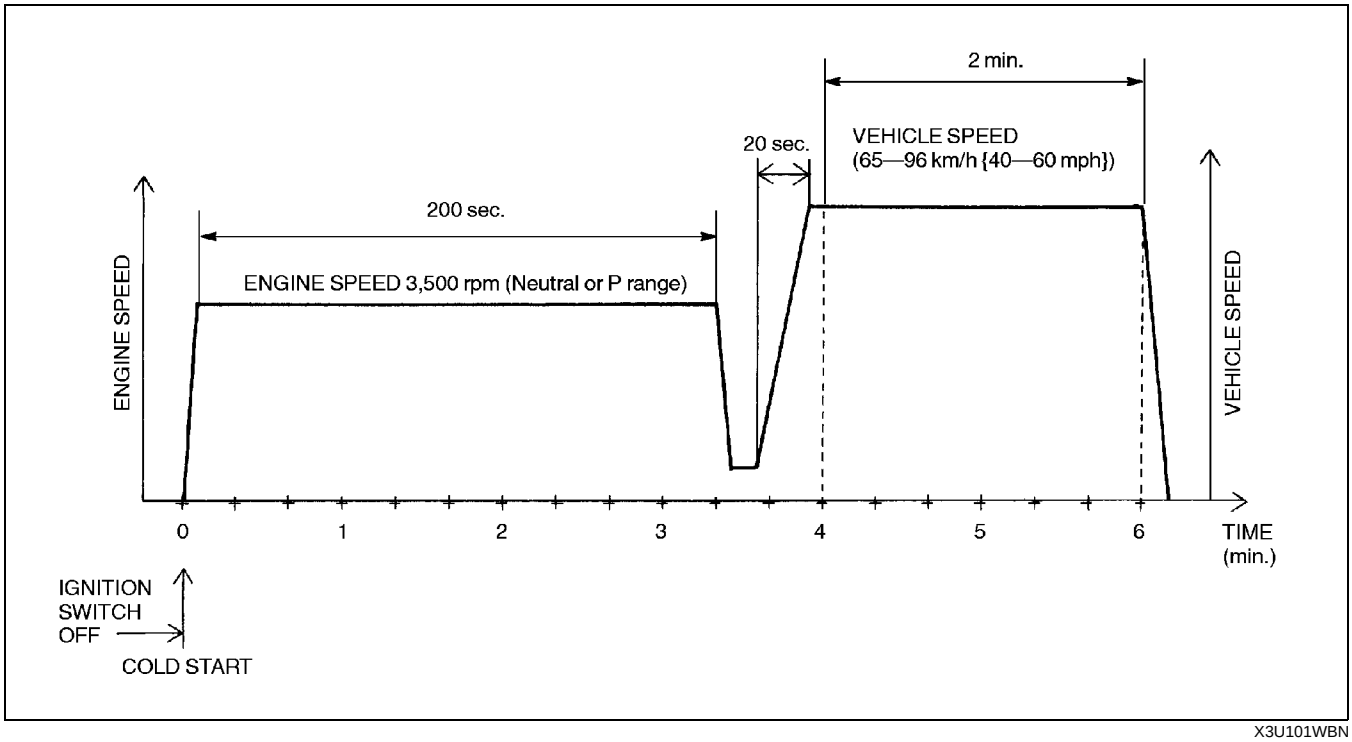
Note
- If Mode 4 can not be performed (you can not drive the vehicle under Mode 4 condition), perform evaporative system test procedure as an alternative. (See 01–03B–54 ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS].)
- Mode 4 can be performed regardless of RFC FLAG condition.

1. Verify that the following conditions are met. All conditions must be within specifications before engine started to initiate the evaporative system test.
   - Barometric pressure: **69.7 kPa {523 mmHg, 20.5 inHg} or higher**
   - Intake air temperature: **–10—60 °C {14—131 °F}**
   - Fuel tank level: **1.3—3.75 V**
   - Engine coolant temperature: **–10 °C—X °C {14 °F—X °F}** (X, the Engine coolant temperature upper limit, is determined according to the barometric pressure as shown the graph below.)



A3U0102W001

2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Start the engine and race it at **3,500 rpm** to warm up completely.
4. Drive the vehicle as shown in the graph.



X3U101WBN

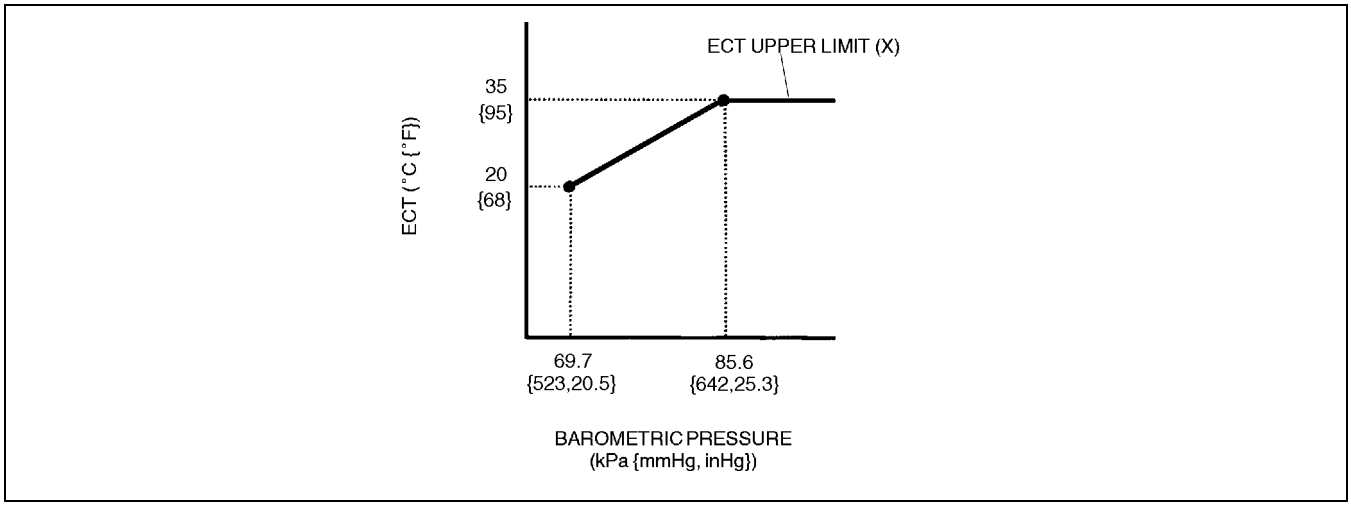
5. Stop vehicle and access to ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
6. If not completed, turn the ignition key off then go back to Step 1.

7. Access to DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTION to inspect the monitor results. If MEAS are not within specification, repair has not completed.
8. Verify no DTCs are available.

Mode 5 (EVAP system very small leak repair verification drive mode)

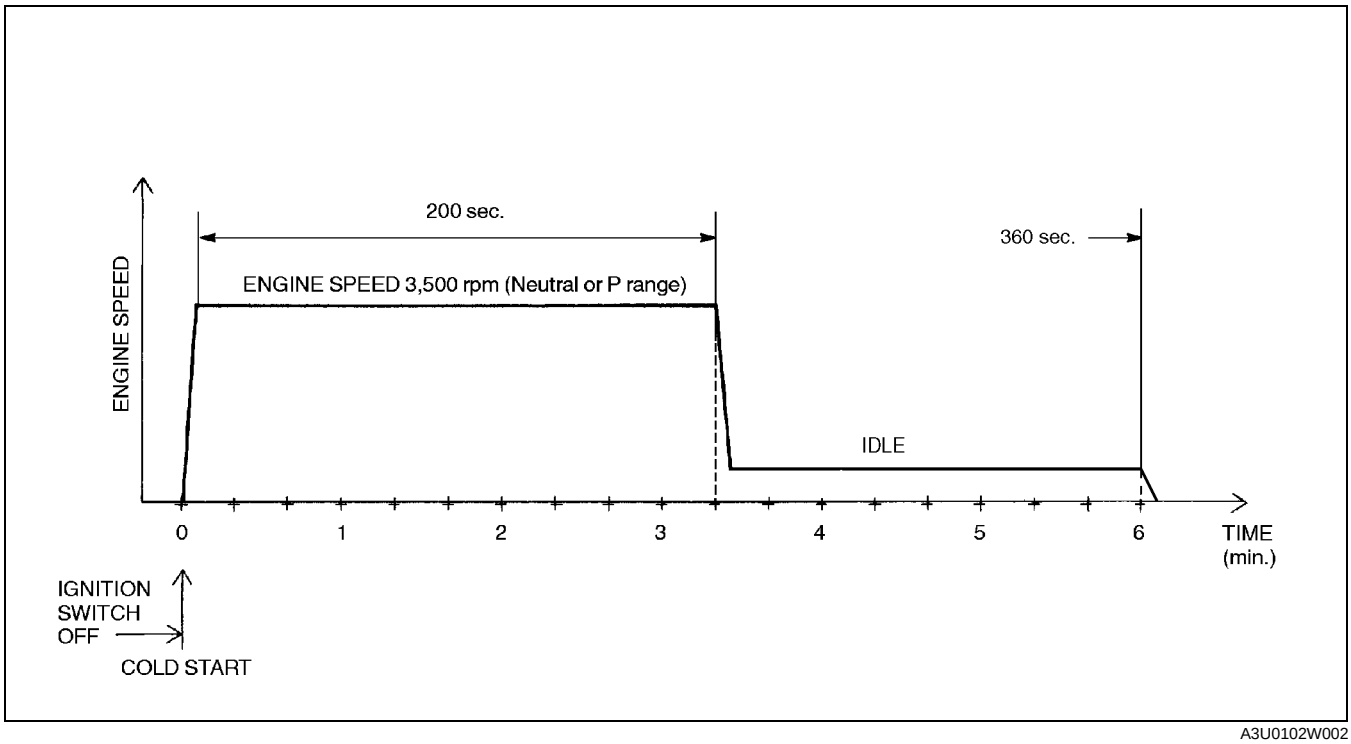
Note
- If Mode 5 can not be performed (you can not drive the vehicle under Mode 5 condition), perform evaporative system test procedure as an alternative. (See 01–03B–54 ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS].)
- Mode 5 can be performed regardless of RFC FLAG condition.

1. Verify that the following conditions are met. All conditions must be within specifications before engine started to initiate the evaporative system test.
   - Barometric pressure: **69.7 kPa {523 mmHg, 20.5 inHg} or higher**
   - Intake air temperature: **–10—60 °C {14—131 °F}**
   - Fuel tank level: **1.3—3.75 V**
   - Engine coolant temperature: **–10 °C—X °C {14 °F—X °F}** (X, the Engine coolant temperature upper limit, is determined according to the barometric pressure as shown the graph below.)



A3U0102W001

2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Start the engine and race it at **3,500 rpm** to warm up completely, then idle the engine for **120 seconds**.



A3U0102W002

4. Stop vehicle and access to ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, RFC changes from NO to YES.
5. If not completed, turn the ignition key off then go back to Step 1.
6. Access to DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTION to inspect the monitor results. If MEAS are not within specification, repair has not completed.
7. Verify no DTCs are available.

DIAGNOSTIC MONITORING TEST RESULTS [FS]

A3U010218881W13

- 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)
10:01:11	HO2S (Front) inversion cycles	HO2S	(0)
10:02:11	HO2S (Front) lean-to-rich response time		(0)
10:03:11	HO2S (Front) rich-to-lean response time		(0)
10:04:01	HO2S (Front) rich/lean inversion voltage		113
10:04:02	Middle/HO2S (Rear) rich/lean inversion voltage		113
10:05:01	HO2S (Front) lean threshold voltage		72
10:06:01	HO2S (Front) rich threshold voltage		113
10:11:11	Front and rear HO2S (RH) switching time ratio	TWC	(65535)
10:21:00	In-tank pressure evaporative purge system (small leak)	EVAP	(0)
10:22:00	In-tank pressure evaporative purge system (large leak)		(0)
10:23:00	In-tank pressure evaporative purge system (very small leak)		(0)
10:31:00	Heat radiation ratio	THERMOSTAT	(0)
10:32:00	ECT	THERMOSTAT	(65535)
10:41:00	EGR pressure variation	EGR	(32768)

DTC TABLE [FS]

A3U010218881W14

DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0031	HO2S heater (front) circuit low	ON	—	2	O_2 sensor heater	×	(See 01–02B–19 DTC P0031 [FS])
P0032	HO2S heater (front) circuit high	ON	—	2	O_2 sensor heater	×	(See 01–02B–20 DTC P0032 [FS])
P0037	HO2S heater (rear) circuit low	ON	—	2	O_2 sensor heater	×	(See 01–02B–22 DTC P0037 [FS])
P0038	HO2S heater (rear) circuit high	ON	—	2	O_2 sensor heater	×	(See 01–02B–23 DTC P0038 [FS])
P0101	MAF circuit range/ performance problem	ON	—	2	CCM	×	(See 01–02B–25 DTC P0101 [FS])
P0102	MAF circuit low input	ON	—	1	CCM	×	(See 01–02B–27 DTC P0102 [FS])
P0103	MAF circuit high input	ON	—	1	CCM	×	(See 01–02B–29 DTC P0103 [FS])
P0106	BARO circuit performance problem	ON	—	2	CCM	×	(See 01–02B–30 DTC P0106 [FS])
P0107	BARO circuit low input	ON	—	1	CCM	×	(See 01–02B–31 DTC P0107 [FS])
P0108	BARO circuit high input	ON	—	1	CCM	×	(See 01–02B–34 DTC P0108 [FS])
P0111	IAT circuit performance problem	ON	—	2	CCM	×	(See 01–02B–35 DTC P0111 [FS])
P0112	IAT circuit low input	ON	—	1	CCM	×	(See 01–02B–36 DTC P0112 [FS])
P0113	IAT circuit high input	ON	—	1	CCM	×	(See 01–02B–38 DTC P0113 [FS])
P0117	ECT circuit low input	ON	—	1	CCM	×	(See 01–02B–40 DTC P0117 [FS])
P0118	ECT circuit high input	ON	—	1	CCM	×	(See 01–02B–42 DTC P0118 [FS])
P0121	TP circuit range/ performance problem	ON	—	2	CCM	×	(See 01–02B–43 DTC P0121 [FS])
P0122	TP circuit low input	ON	Flashing	1	CCM	×	(See 01–02B–46 DTC P0122 [FS])
P0123	TP circuit high input	ON	Flashing	1	CCM	×	(See 01–02B–47 DTC P0123 [FS])
P0125	Excessive time to enter closed loop fuel control	ON	—	2	CCM	×	(See 01–02B–49 DTC P0125 [FS])
P0126	Coolant thermostat stuck to open	ON	—	2	THERMOS TAT	×	(See 01–02B–50 DTC P0126, P0128 [FS])
P0128	Coolant thermostat stuck to open	ON	—	2	THERMOS TAT	×	(See 01–02B–50 DTC P0126, P0128 [FS])
P0131	HO2S (front) no inversion (low voltage stuck)	ON	—	2	CCM	×	(See 01–02B–52 DTC P0131 [FS])
P0132	HO2S (front) no inversion (high voltage stuck)	ON	—	2	CCM	×	(See 01–02B–55 DTC P0132 [FS])
P0133	HO2S (front) circuit slow response	ON	—	2	O_2 sensor	×	(See 01–02B–57 DTC P0133 [FS])
P0134	HO2S (front) circuit no activity detected	ON	—	2	CCM	×	(See 01–02B–61 DTC P0134 [FS])
P0138	HO2S (rear) circuit high input	ON	—	2	CCM	×	(See 01–02B–63 DTC P0138 [FS])
P0140	HO2S (rear) circuit no activity detected	ON	—	2	CCM	×	(See 01–02B–64 DTC P0140 [FS])
P0171	Fuel trim system too lean	ON	—	2	Fuel	×	(See 01–02B–67 DTC P0171 [FS])
P0172	Fuel trim system too rich	ON	—	2	Fuel	×	(See 01–02B–70 DTC P0172 [FS])

DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0300	Random misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02B–71 DTC P0300 [FS])
P0301	Cylinder 1 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])
P0302	Cylinder 2 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])
P0303	Cylinder 3 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])
P0304	Cylinder 4 misfire detected	Flashing or ON	—	1 or 2	Misfire	×	(See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])
P0325	Knock sensor circuit malfunction	ON	—	1	CCM	×	(See 01–02B–77 DTC P0325 [FS])
P0335	CKP sensor circuit malfunction	ON	—	1	CCM	×	(See 01–02B–79 DTC P0335 [FS])
P0340	CMP sensor circuit malfunction	ON	—	1	CCM	×	(See 01–02B–80 DTC P0340 [FS])
P0401	EGR flow insufficient detected	ON	—	2	EGR	×	(See 01–02B–82 DTC P0401 [FS])
P0402	EGR flow excessive detected	ON	—	2	EGR	×	(See 01–02B–83 DTC P0402 [FS])
P0421	Warm-up catalyst system efficiency below threshold	ON	—	2	Catalyst	×	(See 01–02B–84 DTC P0421 [FS])
P0442	Evaporative emission system leak detected (small leak)	ON	—	2	Evaporative	×	(See 01–02B–86 DTC P0442 [FS])
P0443	Evaporative emission control system purge solenoid valve circuit malfunction	OFF	—	—	Other	—	(See 01–02B–89 DTC P0443 [FS])
P0451	Fuel tank pressure sensor performance problem	ON	—	2	CCM	×	(See 01–02B–90 DTC P0451 [FS])
P0452	Fuel tank pressure sensor low input	ON	—	2	CCM	×	(See 01–02B–93 DTC P0452 [FS])
P0453	Fuel tank pressure sensor high input	ON	—	2	CCM	×	(See 01–02B–95 DTC P0453 [FS])
P0455	Evaporative emission control system leak detected (blockage or large leak)	ON	—	2	Evaporative	×	(See 01–02B–97 DTC P0455 [FS])
P0456	Evaporative emission control system leak detected (very small leak)	ON	—	2	Evaporative	×	(See 01–02B–102 DTC P0456 [FS])
P0461	Fuel gauge sender unit circuit range/performance	ON	—	2	CCM	×	(See 01–02B–104 DTC P0461 [FS])
P0462	Fuel gauge sender unit circuit low input	ON	—	2	CCM	×	(See 01–02B–105 DTC P0462 [FS])
P0463	Fuel gauge sender unit circuit high input	ON	—	2	CCM	×	(See 01–02B–107 DTC P0463 [FS])
P0464	Fuel gauge sender unit circuit performance (slosh check)	ON	—	2	CCM	×	(See 01–02B–108 DTC P0464 [FS])
P0480	Cooling fan relay malfunction	OFF	—	2	CCM	×	(See 01–02B–109 DTC P0480 [FS])
P0500	VSS circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02B–111 DTC P0500 [FS])
	VSS circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0505	IAC valve circuit malfunction	ON	—	1	CCM	×	(See 01–02B–113 DTC P0505 [FS])
P0506	Idle control system RPM lower than expected	ON	—	2	CCM	×	(See 01–02B–115 DTC P0506 [FS])

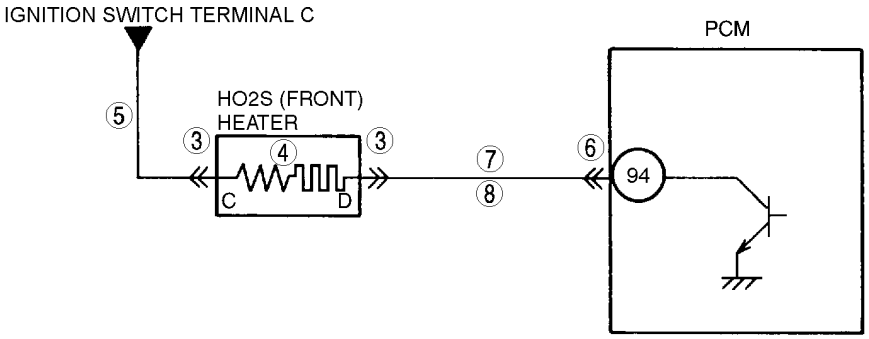
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0507	Idle control system RPM higher than expected	ON	—	2	CCM	×	(See 01–02B–117 DTC P0507 [FS])
P0550	PSP switch circuit malfunction	ON	—	2	CCM	×	(See 01–02B–118 DTC P0550 [FS])
P0660	VICS solenoid valve circuit malfunction	OFF	—	2	CCM	×	(See 01–02B–119 DTC P0660 [FS])
P0703	Brake switch input malfunction	ON	—	2	CCM	×	(See 01–02B–122 DTC P0703 [FS])
P0704	Clutch switch input circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02B–123 DTC P0704 [FS])
P0705	Neutral switch input circuit malfunction (MTX)	ON	—	2	CCM	×	(See 01–02B–125 DTC P0705 [FS])
P0705	TR switch circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0706	TR switch circuit malfunction (open circuit) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0710	Transaxle temperature sensor circuit malfunction (open or short) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0711	Transaxle temperature sensor circuit range/ performance (stuck) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0715	Input/turbine speed sensor circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0731	Gear 1 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0732	Gear 2 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0733	Gear 3 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0734	Gear 4 incorrect (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0741	TCC (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0742	TCC (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0745	Pressure control solenoid valve malfunction (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0751	Shift solenoid A malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0752	Shift solenoid A malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0753	Shift solenoid A malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0756	Shift solenoid B malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0757	Shift solenoid B malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0758	Shift solenoid B malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0761	Shift solenoid C malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0762	Shift solenoid C malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					

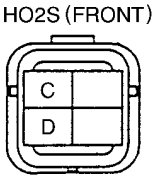
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0763	Shift solenoid C malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0766	Shift solenoid D malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0767	Shift solenoid D malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0768	Shift solenoid D malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0771	Shift solenoid E malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0772	Shift solenoid E malfunction (stuck on) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0773	Shift solenoid E malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P1250	PRC solenoid valve circuit malfunction	OFF	—	2	CCM	×	(See 01–02B–127 DTC P1250 [FS])
P1449	CDCV circuit malfunction	OFF	—	—	Other	–	(See 01–02B–129 DTC P1449 [FS])
P1450	Evaporative emission control system malfunction (excessive vacuum)	ON	—	2	CCM	×	(See 01–02B–131 DTC P1450 [FS])
P1487	EGR boost sensor solenoid valve circuit malfunction	OFF	—	—	Other	–	(See 01–02B–133 DTC P1487 [FS])
P1496	EGR valve stepping motor coil 1 open or short	OFF	—	—	Other	–	(See 01–02B–135 DTC P1496 [FS])
P1497	EGR valve stepping motor coil 2 open or short	OFF	—	—	Other	–	(See 01–02B–137 DTC P1497 [FS])
P1498	EGR valve stepping motor coil 3 open or short	OFF	—	—	Other	–	(See 01–02B–139 DTC P1498 [FS])
P1499	EGR valve stepping motor coil 4 open or short	OFF	—	—	Other	–	(See 01–02B–141 DTC P1499 [FS])
P1512	VTCS shutter valve close stuck	ON	—	2	CCM	×	(See 01–02B–143 DTC P1512 [FS])
P1562	PCM +BB voltage low	ON	—	1	CCM	×	(See 01–02B–144 DTC P1562 [FS])
P1569	VTCS solenoid valve circuit low input	ON	—	2	CCM	×	(See 01–02B–146 DTC P1569 [FS])
P1570	VTCS solenoid valve circuit high input	ON	—	2	CCM	×	(See 01–02B–148 DTC P1570 [FS])
P1631	Generator output voltage signal no electricity	OFF	—	—	Other	×	(See 01–02B–150 DTC P1631 [FS])
P1632	Battery voltage monitor signal circuit malfunction	OFF	—	—	Other	×	(See 01–02B–152 DTC P1632 [FS])
P1633	Battery overcharge	OFF	—	—	Other	×	(See 01–02B–153 DTC P1633 [FS])
P1634	Generator terminal B circuit open	OFF	—	—	Other	×	(See 01–02B–154 DTC P1634 [FS])

DTC P0031 [FS]

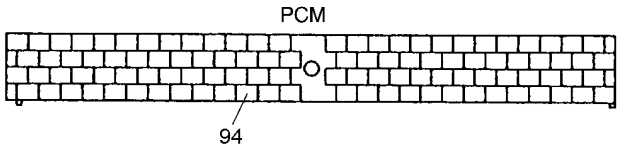
A3U010201084W01

DTC P0031	HO2S heater (front) circuit low
DETECTION CONDITION	• PCM monitors HO2S heater (front) control signal at PCM terminal 94. If PCM turns the HO2S heater (front) off but voltage at terminal 94 still remains low, PCM determines that HO2S heater (front) circuit has malfunction. **Note** • HO2S heater (front) is controlled by a duty signal. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• HO2S (front) malfunction • Open circuit between ignition switch terminal C and HO2S (front) terminal C • Open circuit between HO2S (front) terminal D and PCM terminal 94 • Short to ground circuit between HO2S (front) terminal D and PCM terminal 94 • Poor connection at HO2S (front) or PCM connector • PCM malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 HO2S (FRONT) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (front) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.

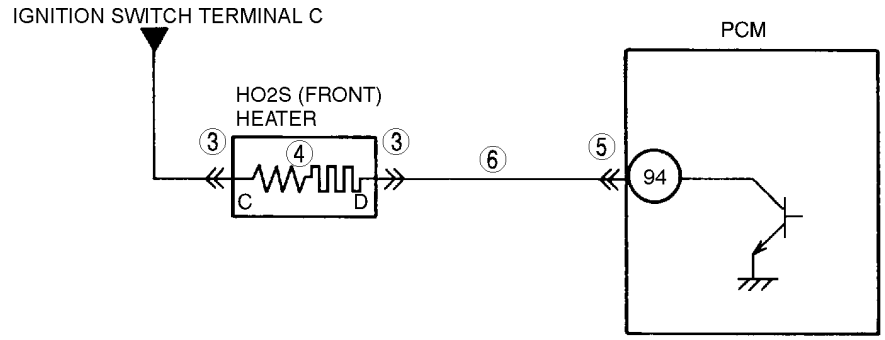
STEP	INSPECTION		ACTION
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 9.
5	**INSPECT POWER CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (front) terminal C (vehicle harness-side) and body GND. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 94 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT CONTROL CIRCUIT OF HO2S HEATER (FRONT) FOR SHORT TO GROUND** • Check for continuity between HO2S (front) terminal D (vehicle harness-side) and body GND. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
8	**INSPECT CONTROL CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • Connect breakout box with PCM connector disconnected. • Check for continuity between HO2S (front) terminal D (vehicle 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 Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0031 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • Is same PENDING CODE of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

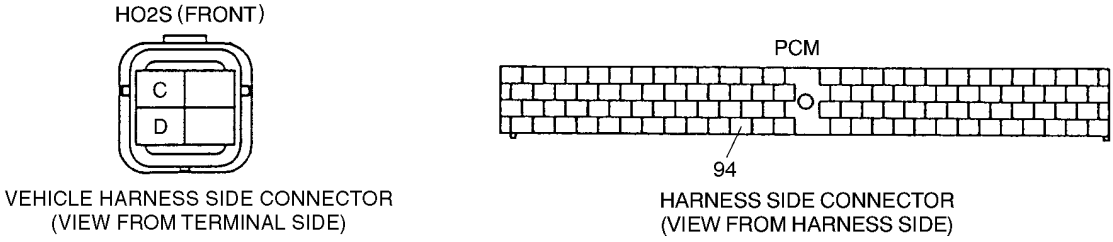
DTC P0032 [FS]

A3U010201084W02

DTC P0032	HO2S heater (front) circuit high
DETECTION CONDITION	• PCM monitors HO2S heater (front) control signal at PCM terminal 94. If PCM turns HO2S heater (front) on but voltage at terminal 94 still remains high, PCM determines that HO2S heater (front) circuit has malfunction. **Note** • HO2S heater (front) is controlled by a duty signal. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• Short to power circuit between HO2S (front) terminal D and PCM terminal 94 • Shorted HO2S (front) or PCM terminal • PCM malfunction

DTC P0032	HO2S heater (front) circuit high





Diagnostic procedure

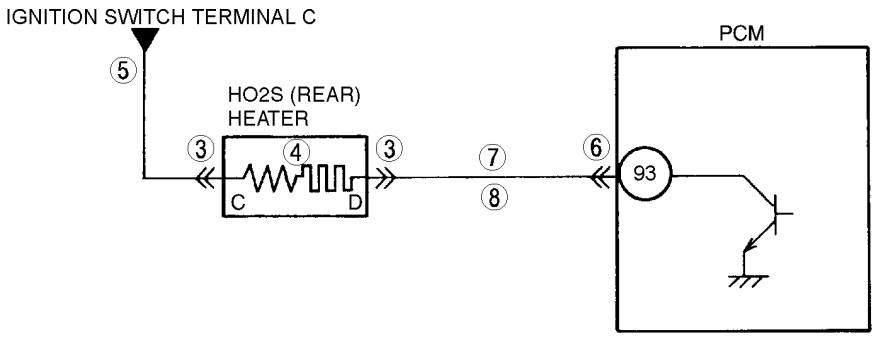
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 HO2S (FRONT) TERMINALS** • Turn ignition key to OFF. • Disconnect HO2S (front) connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 7.
5	**INSPECT PCM TERMINAL** • Disconnect PCM connector. • Check for bent terminal at terminal 94. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
6	**INSPECT HO2S (FRONT) HEATER CONTROL CIRCUIT FOR SHORT TO POWER CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (front) terminal D (vehicle harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0032 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

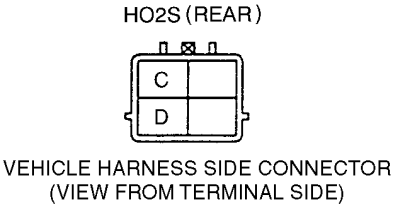
STEP	INSPECTION		ACTION
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

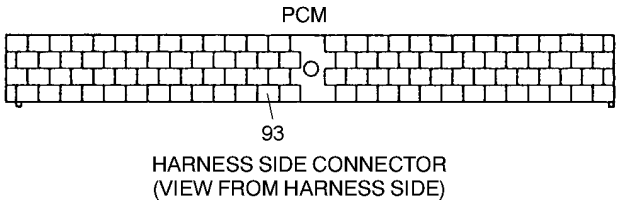
DTC P0037 [FS]

A3U010201084W03

DTC P0037	HO2S heater (rear) circuit low
DETECTION CONDITION	• PCM monitors HO2S heater (rear) control signal at PCM terminal 93. If PCM turns HO2S heater (rear) off but voltage at terminal 93 still remains low, PCM determines that HO2S heater (rear) circuit has malfunction. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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	• HO2S (rear) malfunction • Open circuit between ignition switch terminal C and HO2S (rear) terminal C • Open circuit between HO2S (rear) terminal D and PCM terminal 93 • Short to ground circuit between HO2S (rear) terminal D and PCM terminal 93 • Poor connection at HO2S (rear) or PCM connector • PCM malfunction







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 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.

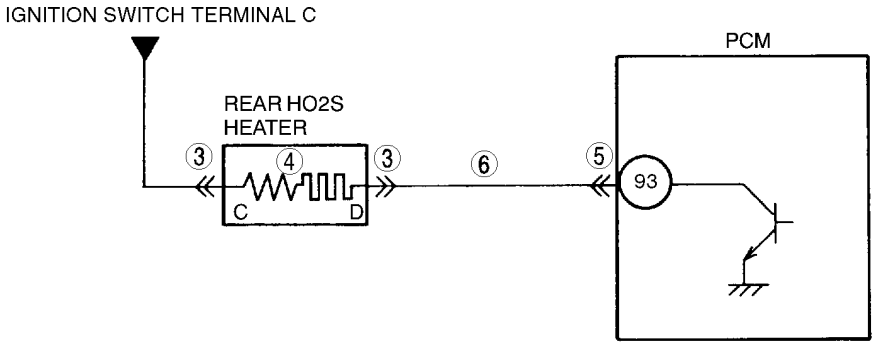
STEP	INSPECTION		ACTION
3	**INSPECT HO2S (REAR) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
4	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (rear) terminals C and D (part-side). • Is resistance **approx. 15.7 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (rear), then go to Step 9.
5	**INSPECT HO2S HEATER (REAR) POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal C (vehicle 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.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 93 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between HO2S (rear) terminal D (vehicle 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.
8	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM connector disconnected. • Check for continuity between HO2S (rear) terminal D (vehicle 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 Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0037 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

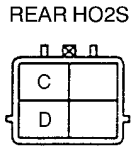
DTC P0038 [FS]

A3U010201084W04

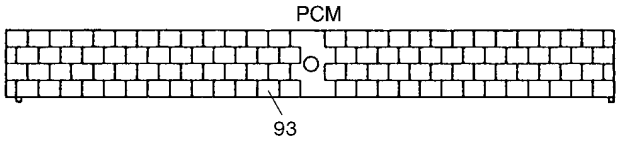
DTC P0038	HO2S heater (rear) circuit high
DETECTION CONDITION	• PCM monitors HO2S heater (rear) control signal at PCM terminal 93. If PCM turns HO2S heater (rear) on but voltage at terminal 93 still remains high, PCM determines that HO2S heater (rear) circuit has malfunction. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • 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.

DTC P0038	HO2S heater (rear) circuit high
POSSIBLE CAUSE	• HO2S (rear) malfunction • Short to power circuit between HO2S (rear) terminal D (harness-side) and PCM terminal 93 (harness-side) • Shorted HO2S (rear) or PCM terminal • PCM malfunction





VEHICLE HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

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 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 HO2S (REAR) TERMINAL** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (rear) terminals C and D (part-side). • Is resistance **approx. 15.7 ohms**	Yes	Go to next step.
		No	Replace the HO2S (rear), then go to Step 7.
5	**INSPECT PCM TERMINAL** • Disconnect PCM connector. • Check for bent terminal at terminal 93. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
6	**INSPECT HO2S (REAR) HEATER CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal D (vehicle harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0038 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine and warm it up completely. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0101 [FS]

A3U010201084W05

DTC P0101	MAF circuit range/performance problem
DETECTION CONDITION	• PCM compares actual input signal from MAF sensor with expected input signal from MAF sensor which PCM calculates by engine speed. If mass intake air flow amount is **above 83.5 g/s {11.05 lb/min}** for **5 seconds** and engine speed is **less than 2,000 rpm** with engine running, PCM determines that detected mass intake air flow amount is too high. • PCM compares actual input signal from MAF sensor with expected input signal from MAF sensor which PCM calculates by input voltage from TP sensor. If mass intake air flow amount is **below 5 g/s {0.66 lb/min}** for **5 seconds** and throttle opening angle is **above 50%** with engine running, 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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • TP sensor malfunction • Electrical corrosion in MAF signal circuit • Electrical corrosion in MAF RETURN circuit • Voltage drops in MAF signal circuit • Voltage drops in ground circuit

Diagnostic procedure

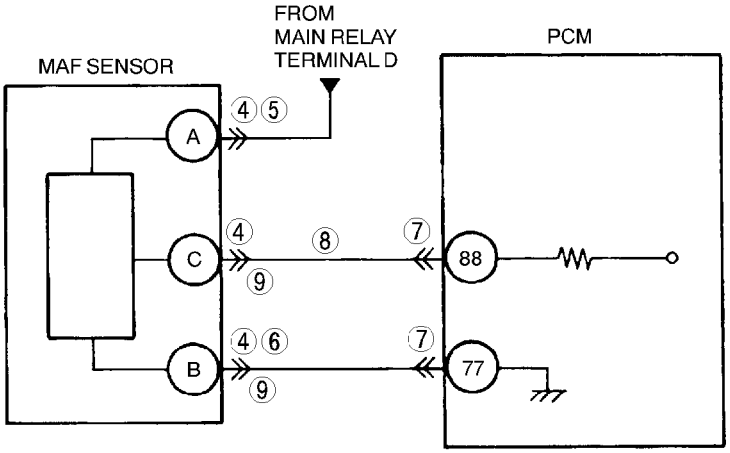
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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** • Connect WDS or equivalent to DLC-2. • Start the engine. • Access ECT, RPM and MAF PIDs. • Warm up the engine until ECT PID is **above 70°C {158°F}**. • Read MAF PID while RPM PID is **below 2,000 rpm**. • Is MAF PID reading **above 83.5 g/s {11.05 lb/min}**?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)

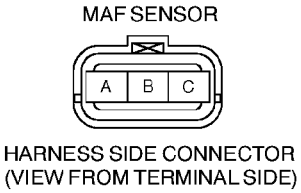
STEP	INSPECTION		ACTION
4	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect WDS or equivalent to DLC-2. • Start the engine. • Access ECT, TP and MAF PIDs. • Warm up the engine until ECT PID is **above 70°C {158°F}**. • Drive the vehicle. • Read MAF PID while TP PID is **above 50%**. • Is MAF PID reading **below 5 g/s {0.66 lb/min}**?	Yes	Make sure that TP sensor resistance changes smoothly while gradually opening throttle valve. • If not, replace TP sensor and go to step 7. • For others, go to next step .
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
5	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal or MAF sensor, then go to Step 7.
		No	Go to next step.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to next step.
		No	Replace MAF sensor, then go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0101 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start the engine. • Access ECT, TP, RPM and MAF PIDs using WDS or equivalent. • Warm up the engine until ECT PID is reading **above 70°C {158°F}**. • Read MAF and RPM PIDs. **Note** • MAF PID should indicate **below 83.5 g/s {11.05 lb/min}** while RPM PID is **below 2,000 rpm**. • Drive the vehicle and read TP and MAF PIDs. **Note** • Verify PIDs reading are within specifications **more than 5 seconds**. — MAF PID: **above 5 g/s {0.66 lb/min}** — TP PID: **above 50%** • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

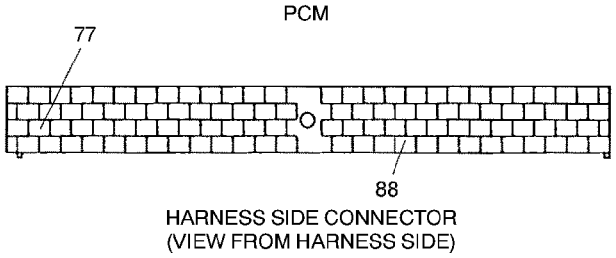
DTC P0102 [FS]

A3U010201084W06

DTC P0102	MAF circuit low input
DETECTION CONDITION	• PCM monitors input voltage from MAF sensor. If input voltage at PCM terminal 88 is **below 0.86 V**, PCM determines that MAF 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 PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between MAF sensor terminal C and PCM terminal 88 • Open circuit in wiring between MAF sensor terminal C and PCM terminal 88 • PCM malfunction • Open circuit in wiring between MAF sensor terminal B and PCM terminal 77 • Open circuit in wiring between main relay and MAF sensor terminal A







Diagnostic procedure

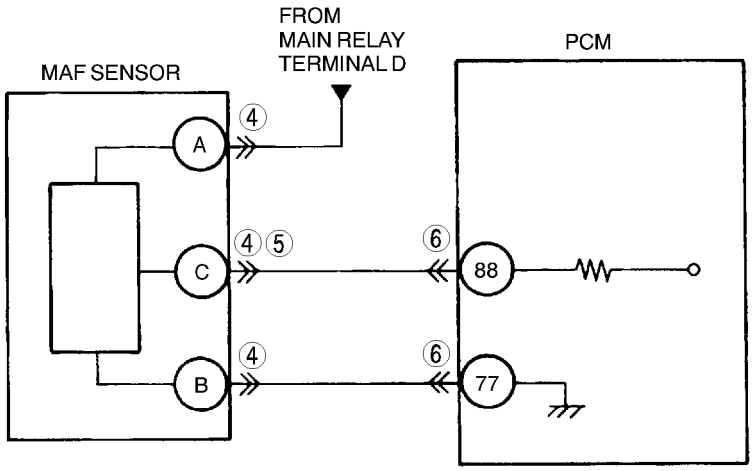
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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** • Connect WDS or equivalent to DLC-2. • Start engine. • Access MAF PID. • Is MAF PID **above 0 g/s** and **217.8 g/s or below**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Go to next step.

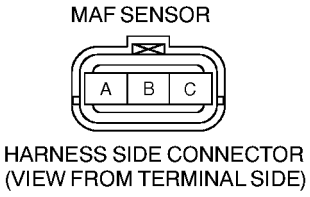
STEP	INSPECTION		ACTION
4	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 10.
		No	Go to next step.
5	**CHECK POWER SUPPLY CIRCUIT FOR OPEN CURCUIT** • Turn ignition key to ON (Engine OFF). • Check voltage at MAF sensor terminal A (harness-side). • Is voltage **B+**?	Yes	Go to next step.
		No	Inspect for open circuit in wiring harness between MAF sensor terminal A (harness-side) and main relay. Repair or replace harness, then go to Step 10.
6	**INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN** • Check for continuity between MAF sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Check for open circuit between PCM terminal 36 (harness-side) and MAF sensor terminal B (harness-side). Repair or replace suspected harness, then go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between MAF sensor terminal C (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 C (harness-side) and body ground — MAF sensor connector terminal B (harness-side) and C (harness-side) • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	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 WDS or equivalent. • Access MAF PID. **Note** • MAF PID should indicate **above 0 g/s** and **217.8 g/s or below**. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

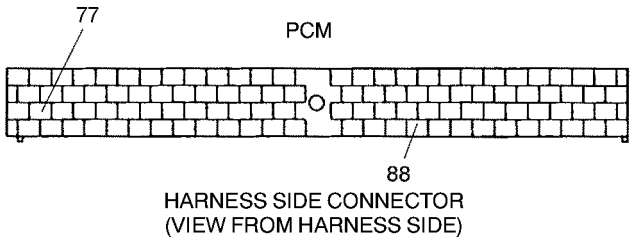
DTC P0103 [FS]

A3U010201084W07

DTC P0103	MAF circuit high input
DETECTION CONDITION	• PCM monitors input voltage from MAF sensor after ignition key is turned on. If input voltage at PCM terminal 88 is **above 4.90 V**, PCM determines that MAF 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 PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to power circuit in wiring between MAF sensor terminal C and PCM terminal 88







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 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 WDS or equivalent to DLC-2. • Start engine. • Access MAF PID. • Is MAF PID **above 0 g/s** and **217.8 g/s or below**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Go to next step.
4	**INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect the MAF sensor connector. • Check for bent terminal. • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT MAF SIGNAL CIRCUIT FOR SHORT TO POWER CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between MAF sensor terminal C (harness-side) and body ground. • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 7.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for bent terminals. • Is there malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using WDS or equivalent. • Access MAF PID. **Note** • MAF PID should indicate **above 0 g/s** and **217.8 g/s or below**. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0106 [FS]

A3U010201084W08

DTC P0106	BARO circuit performance problem
DETECTION CONDITION	• PCM monitors differences between intake manifold vacuum and atmospheric pressure at idle, which EGR boost sensor detects by switching EGR boost sensor solenoid. If difference is **below 6.43 kPa {48.2 mmHg, 1.90 inHg}**, PCM determines that there is EGR boost sensor performance problem. **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	• EGR boost sensor malfunction or substandard performance • EGR boost sensor solenoid malfunction • Loose, damaged, misconnected, clogged or frozen moisture in vacuum hose from EGR boost sensor solenoid to EGR boost sensor • PCM malfunction • Loose, damaged, misconnected, clogged or frozen moisture in vacuum hose from EGR boost sensor solenoid to EGR valve

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 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 STORED DTC** • Turn ignition key to OFF then start engine. • Has DTC P1487 been stored?	Yes	Inspect and repair DTC P1487.
		No	Go to next step.

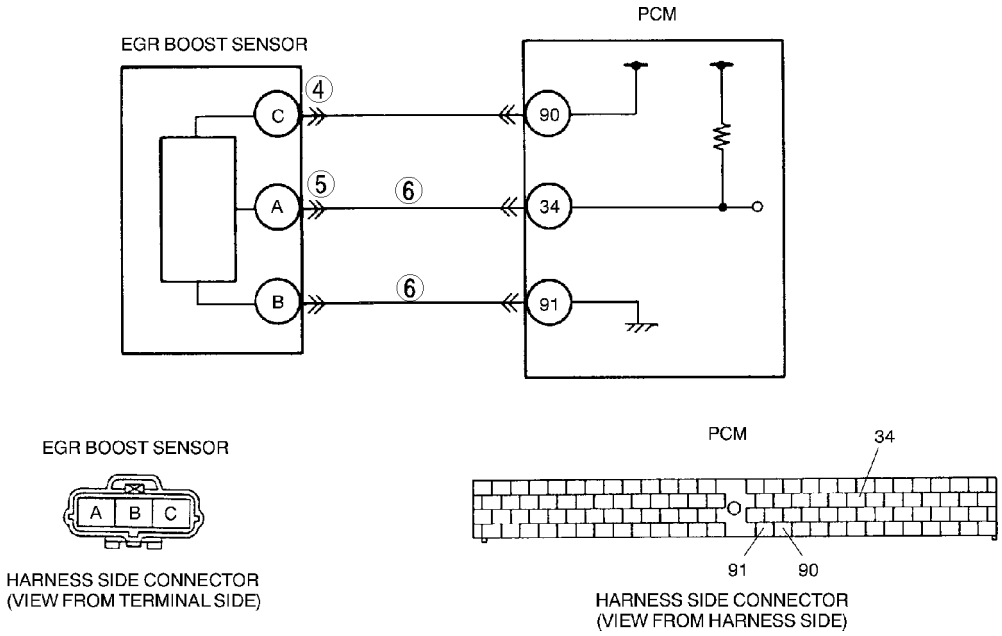
STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0106 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**INSPECT CONNECTION OF EGR BOOST SENSING RELATED VACUUM HOSES** • Inspect the following vacuum hoses for looseness, damage, improper connection and/or clogging. — From EGR boost sensor to EGR boost sensor solenoid — From EGR boost sensor solenoid to intake manifold • Are they okay?	Yes	Go to next step.
		No	Repair or replace vacuum hose, then go to Step 9.
6	**INSPECT EGR BOOST SENSOR SOLENOID AIR FILTER FOR CLOGGING** • Has EGR boost sensor solenoid air filter been clogged?	Yes	Repair air clogging, then go to Step 9.
		No	Go to next step.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE FOR WHETHER STUCK OPEN OR CLOSED** • Inspect EGR boost sensor solenoid valve. (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION) • Is EGR boost sensor solenoid okay?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid, then go to Step 9.
8	**INSPECT EGR BOOST SENSOR FOR WHETHER STUCK OPEN OR CLOSED** • Inspect EGR boost sensor. (See 01–40B–39 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.
9	**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 WDS or equivalent. • Run OBD-ll DRIVE MODE 1, 2 and 3. (See 01–02B–10 OBD-II DRIVE MODE [FS].) • Stop vehicle. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0107 [FS]

A3U010201084W09

DTC P0107	BARO circuit low input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor when monitoring conditions are met. If input voltage at PCM terminal 34 is **below 0.35 V**, PCM determines that EGR boost sensor circuit is malfunctioning. **MONITORING CONDITIONS** — Intake air temperature is **above 10 ºC {50 ºF}**. — EGR boost sensor solenoid is turned OFF. (Barometric pressure is applied to EGR boost sensor.) **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 PCM memory.

DTC P0107	BARO circuit low input
POSSIBLE CAUSE	• EGR boost 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 • PCM malfunction



Diagnostic procedure

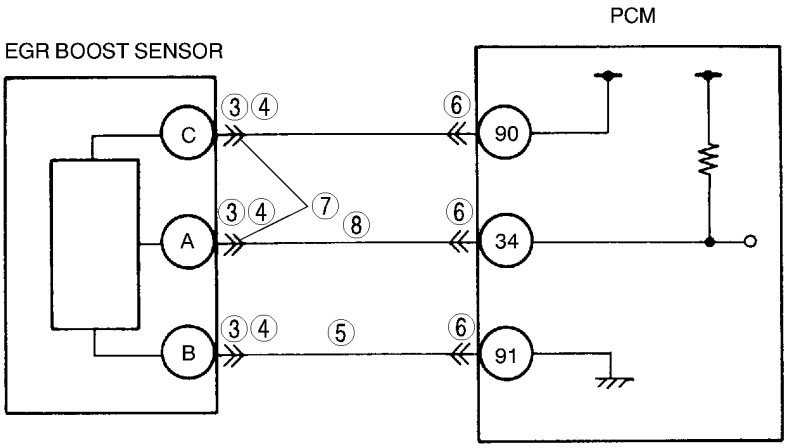
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 SIGNAL CIRCUIT VOLTAGE WHEN EGR BOOST SENSOR CONNECTOR IS DISCONNECTED** • Disconnect EGR boost sensor connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor connector terminal A (harness-side) and body GND. • Is voltage **above 4.9 V**?	Yes	Go to next step.
		No	Go to Step 5.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT EGR BOOST SENSOR CONNECTOR** **Note** • If DTCs P0122 and P0452 are also retrieved with P0107, go to REFERENCE VOLTAGE troubleshooting procedure. • 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 EGR boost sensor terminal C (harness-side). • Repair or replace terminal as necessary. • If okay, replace EGR boost sensor. Then go to Step 7.
		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 7.

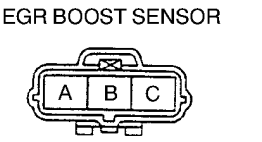
STEP	INSPECTION		ACTION
5	**INSPECT EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between EGR boost sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
6	**INSPECT EGR BOOST SENSOR SIGNAL AND GROUND CIRCUIT FOR INTERMEDIATE SHORT** • Check for continuity between EGR boost sensor terminals B and A (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then to go to next step.
		No	Go to next step.
7	**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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0108 [FS]

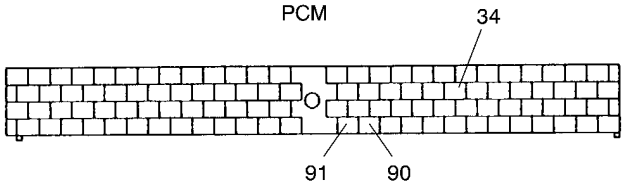
A3U010201084W10

DTC P0108	BARO circuit high input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor when monitoring conditions are met. If input voltage at PCM terminal 34 is **above 4.92 V**, PCM determines that EGR boost sensor circuit is malfunctioning. **MONITORING CONDITIONS** — Intake air temperature is **above 10 °C {50 °F}**. — EGR boost sensor solenoid is turned OFF. (Barometric pressure is applied to EGR boost sensor.) **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 PCM memory.
POSSIBLE CAUSE	• EGR boost sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between EGR boost sensor terminal B and PCM terminal 91 • EGR boost sensor signal circuit is shorted to reference voltage (Vref) supply circuit. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 CONNECTION OF EGR BOOST SENSOR CONNECTOR** • Turn ignition key to OFF. • Verify that EGR boost sensor connector is connected securely. • Is connection okay?	Yes	Go to next step.
		No	Reconnect the connector, then go to Step 9.

STEP	INSPECTION		ACTION
4	**INSPECT EGR BOOST SENSOR CONNECTOR FOR POOR CONNECTION** • Disconnect the EGR boost sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there 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 CIRCUIT** • Check for 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 at terminal 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**VERIFY EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO REFERENCE VOLTAGE CIRCUIT** • Check for continuity between EGR boost sensor terminals 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 CIRCUIT** • Check for 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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0111 [FS]

A3U010201084W11

DTC P0111	IAT circuit performance problem
DETECTION CONDITION	• Intake air temperature is higher than engine coolant temperature by **40 °C {72 °F}** and ignition key is ON. **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	• IAT sensor malfunction • Poor connection at IAT sensor or PCM connector • PCM malfunction

Diagnostic procedure

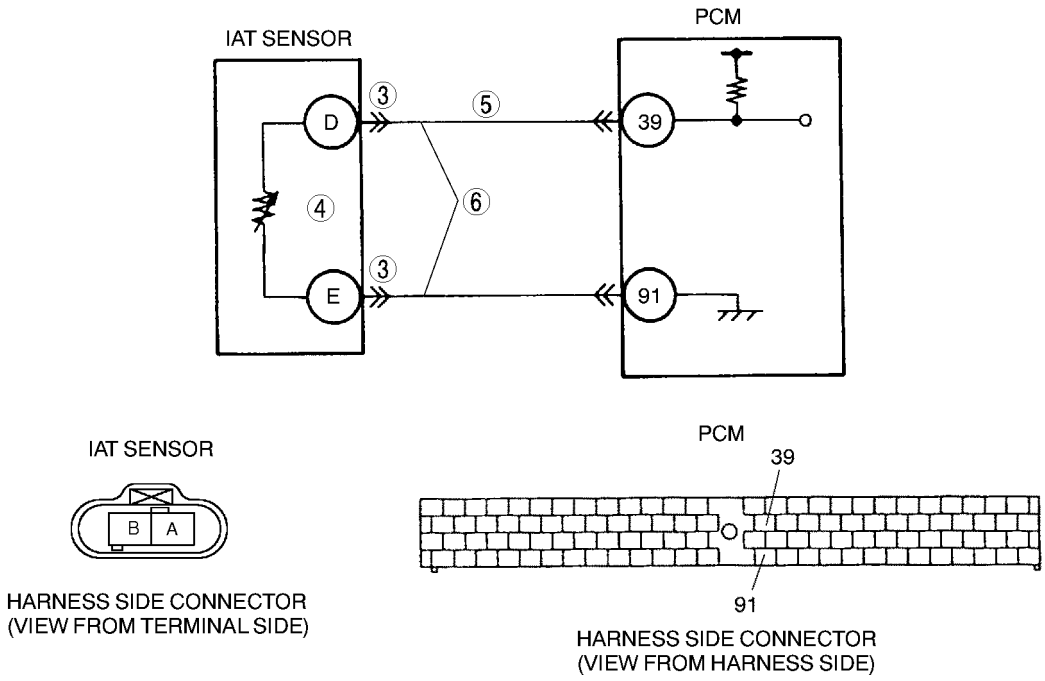
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 IAT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect IAT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 6.
		No	Go to next step.
4	**INSPECT IAT SENSOR** • Measure resistance between IAT sensor terminals A and B (part-side). • Is resistance **below 550 ohms**?	Yes	Replace IAT sensor, then go to Step 6.
		No	Go to next step.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 39 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 6.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0111 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • 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.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0112 [FS]

A3U010201084W12

DTC P0112	IAT circuit low input
DETECTION CONDITION	• PCM monitors IAT sensor signal at PCM terminal 39. If voltage at PCM terminal 39 is **below 0.16 V**, PCM determines that IAT sensor circuit has 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 PCM memory.
POSSIBLE CAUSE	• IAT sensor malfunction • Short to ground circuit between IAT sensor terminal A and PCM terminal 39 • IAT signal and IAT ground circuits are shorted each other. • PCM malfunction

DTC P0112	IAT circuit low input



Diagnostic procedure

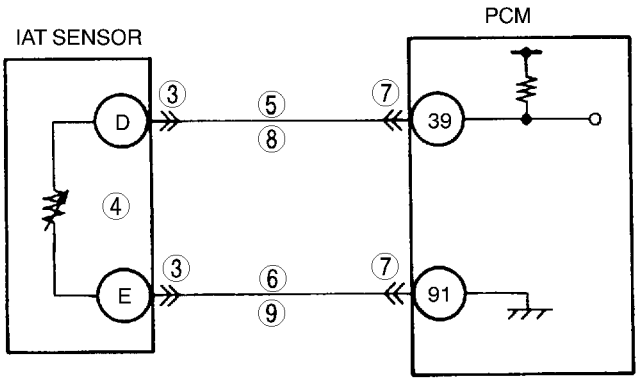
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 IAT SENSOR TERMINALS** • Turn ignition key to OFF. • Disconnect IAT sensor connector. • Check for bent terminals of IAT sensor terminals A and B (part-side). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**CLASSIFY IAT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Disconnect IAT sensor connector. • Measure resistance between IAT sensor terminals A and B (part-side). • Is resistance **within 0.117—28.616 kilohms**?	Yes	Go to next step.
		No	Replace IAT sensor, then go to Step 7.
5	**INSPECT IAT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for 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 7.
		No	Go to next step.
6	**INSPECT IAT CIRCUITS FOR INTERMEDIATE SHORT** • Check for continuity between IAT sensor terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to Step 8.
		No	Go to next step.

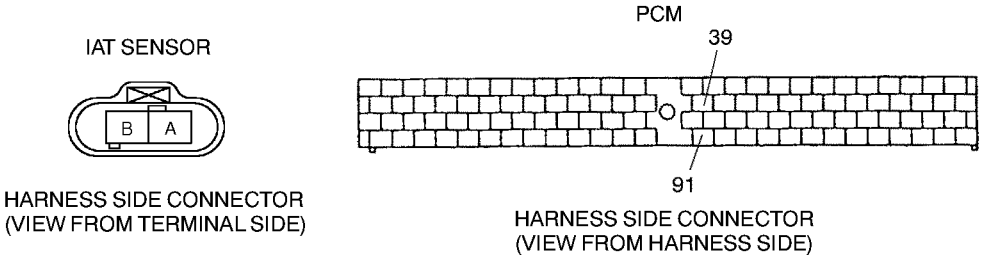
STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0113 [FS]

A3U010201084W13

DTC P0113	IAT circuit high input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If voltage at PCM terminal 39 is **above 4.84 V**, PCM determines that IAT sensor circuit has 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 not stored in PCM memory.
POSSIBLE CAUSE	• IAT 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 • Short to power circuit between IAT sensor terminal B and PCM terminal 91 • Poor connection at IAT sensor or PCM connector • PCM malfunction





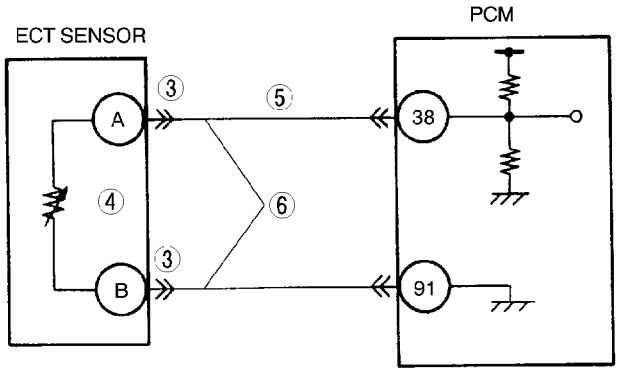
Diagnostic procedure

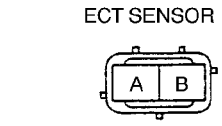
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 IAT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect IAT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
4	**INSPECT IAT SENSOR** • Disconnect IAT sensor connector. • Measure resistance between IAT sensor terminals A and B (part-side). • Is resistance **within 0.117—28.616 kilohms**?	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 B (harness-side) and body ground. • Is there 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 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.
7	**INSPECT PCM CONNECTOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Inspect PCM terminal 39 and 91 (harness-side) for tightness using feeler tool. • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for 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 CIRCUIT** • Check for 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 WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0117 [FS]

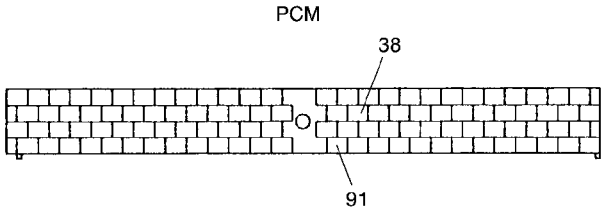
A3U010201084W14

DTC P0117	ECT circuit low input
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38. If voltage at terminal 38 is **below 0.20 V**, PCM determines that ECT sensor circuit has 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 PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Short to ground circuit between ECT sensor terminal A and PCM connector terminal 38 • ECT signal and ground circuits are shorted each other. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

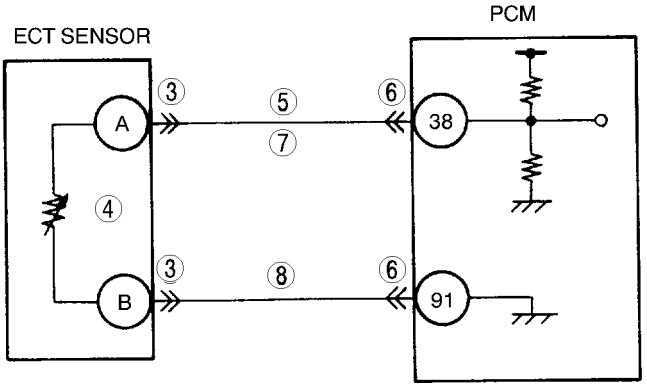
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 ECT SENSOR TERMINAL BENT** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for bent of ECT sensor terminals A and B (part-side). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
4	**CLASSIFY ECT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Measure resistance between ECT sensor teminals A and B (part-side). • Is resistance **within 0.111—25.403 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.

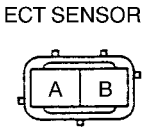
STEP	INSPECTION		ACTION
5	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 7.
		No	Go to next step.
6	**INSPECT ECT CIRCUIT FOR SHORT** • Check for continuity between ECT sensor terminals 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.
7	**VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0118 [FS]

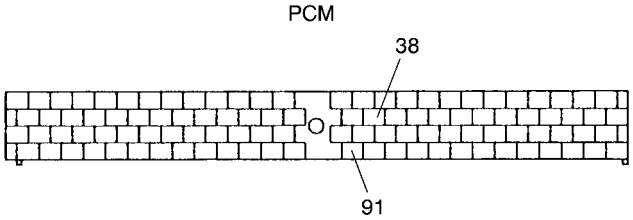
A3U010201084W15

DTC P0118	ECT circuit high input
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38. If voltage at terminal 38 is **above 4.94 V**, PCM determines that ECT sensor circuit has 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 PCM memory.
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





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 ECT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**CLASSIFY ECT SENSOR OR HARNESS MALFUNCTION** • Measure resistance between ECT sensor teminals A and B (part-side). • Is resistance **within 0.111—25.403 kilohms**?	Yes	Replace ECT sensor, then go to Step 9.
		No	Go to next step.
5	**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 there voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 38 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for 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 9.
8	**INSPECT ECT SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT** • Check for 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.
9	**VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0121 [FS]

A3U010201084W16

DTC P0121	TP circuit range/performance problem
DETECTION CONDITION	• If PCM detects that throttle valve opening angle is **below 12.5%** for **5 seconds** after following conditions are met, PCM determines that TP is stuck closed: **MONITORING CONDITIONS** — Engine coolant temperature is **above 70 °C {158 °F}**. — MAF sensor signal is **above 73.4 g/s {9.7 lb/min}**. • If PCM detects that throttle valve opening angle is **above 50%** for **5 seconds** after following conditions are met, PCM determines that TP is stuck open: **MONITORING CONDITIONS** — Engine speed is **above 500 rpm**. — MAF sensor signal is **below 5 g/s {0.66 lb/min}**. **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 if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P0121	TP circuit range/performance problem
POSSIBLE CAUSE	• TP sensor malfunction • MAF sensor malfunction • Electrical corrosion in TP signal circuit • Voltage drops in reference voltage (vref) supply circuit • Voltage drops in ground circuit • PCM malfunction

Diagnostic procedure

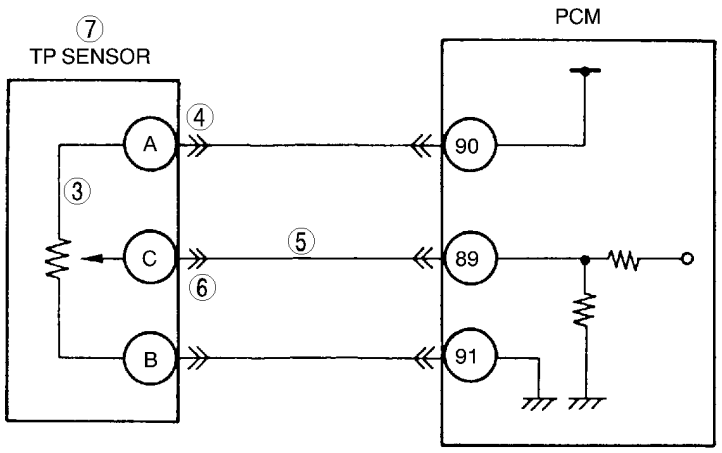
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED PENDING CODE OR STORED DTC** • Turn ignition key to ON (Engine OFF). • Retrieve pending or stored DTCs using WDS or equivalent. • Is DTC P0101 also retrieved?	Yes	Go to DTC P0101 troubleshooting procedure.
		No	Go to next step.
3	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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.
4	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Start the engine. • Access ECT, TP and MAF PIDs using WDS or equivalent. • Warm up the engine until ECT PID is **above 70 °C {158 °F}**. • Drive the vehicle. • Read TP PID while MAF PID is **above 73.4 g/s {9.7 lb/min}**. • Is TP PID reading **above 12.5%**?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
5	**VERIFY TP PID** • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Access TP, MAF and RPM PIDs using WDS or equivalent. • Read TP PID while MAF PID is **below 4.8g/s {0.6 lb/min}** and RPM PID is **above 500 rpm**. • Is TP PID reading **above 50%**?	Yes	Go to Step 7.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Drive the vehicle and read MAF PID. • Does MAF PID change in compliance with driving condition?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Check MAF sensor and related circuits and terminals. (See 01–40B–28 MASS AIR FLOW (MAF) SENSOR INSPECTION [FS].) Repair or replace as necessary, then go to Step 11.
7	**CHECK TP SENSOR TERMINALS FOR ELECTRICAL CORROSION** • Turn ignition key to OFF. • Disconnect TP sensor connector. • Check for electrical corrosion on male and female TP sensor terminals. • Is any electrical corrosion found?	Yes	Repair or replace suspected terminal or TP sensor, then go to Step 11.
		No	Go to next step.
8	**CHECK GROUND CIRCUIT FOR VOLTAGE DROP** • Check resistance between TP sensor terminal B (harness-side) and body ground. • Does resistance read **approx. 0 ohm**?	Yes	Go to next step.
		No	Repair or replace rusted or corroded PCM terminal 91 (harness-side). Disconnect breakout box and go to Step 11.
9	**VERIFY TP SENSOR** • Does TP sensor resistance smoothly change while gradually opening throttle valve?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 11.

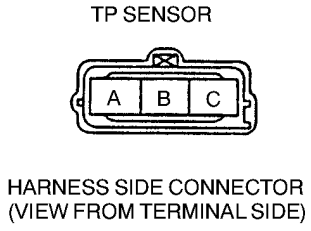
STEP	INSPECTION		ACTION
10	**CHECK PCM TERMINALS FOR ELECTRICAL CORROSION** • Disconnect PCM connector. • Check for electrical corrosion on PCM male and female terminals at 89, 90 and 91. • Is any electrical corrosion found?	Yes	Repair terminal, then go to next step.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0121 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine. • Clear DTC from PCM memory using WDS or equivalent. • Access RPM, ECT, TP and MAF PIDs using WDS or equivalent. • Verify TP PID is reading **below 50%** while MAF PID is **below 5 g/s {0.66 lb/min}** and RPM PID is **above 500 rpm**. • Warm up the engine until ECT PID is reading **above 70 °C {158°F}**. • Drive the vehicle and read TP and MAF PIDs. • Verify PID readings are within specifications MAF PID: **above 73.4 g/s {9.7 lb/min}** TP PID: **above 12.5% more than 5 seconds** • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

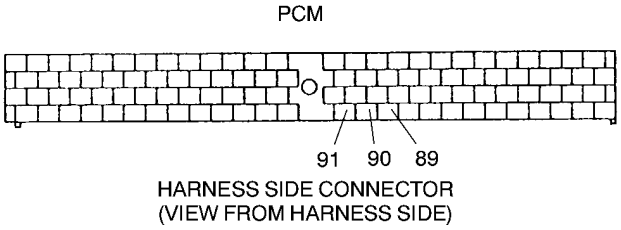
DTC P0122 [FS]

A3U010201084W17

DTC P0122	TP circuit low input
DETECTION CONDITION	• If PCM detects TP sensor voltage at PCM terminal 89 **below 0.10 V** after engine start, 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 conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
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 A and PCM terminal 90 • Short to ground circuit between TP sensor terminal A and PCM terminal 90 • PCM malfunction







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 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 TP SENSOR CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between TP sensor terminals A and C (part-side). • Is there continuity?	Yes	Check TP sensor connector terminal A for poor connection. Repair or replace as necessary, then go to Step 8.
		No	Go to Step 8.

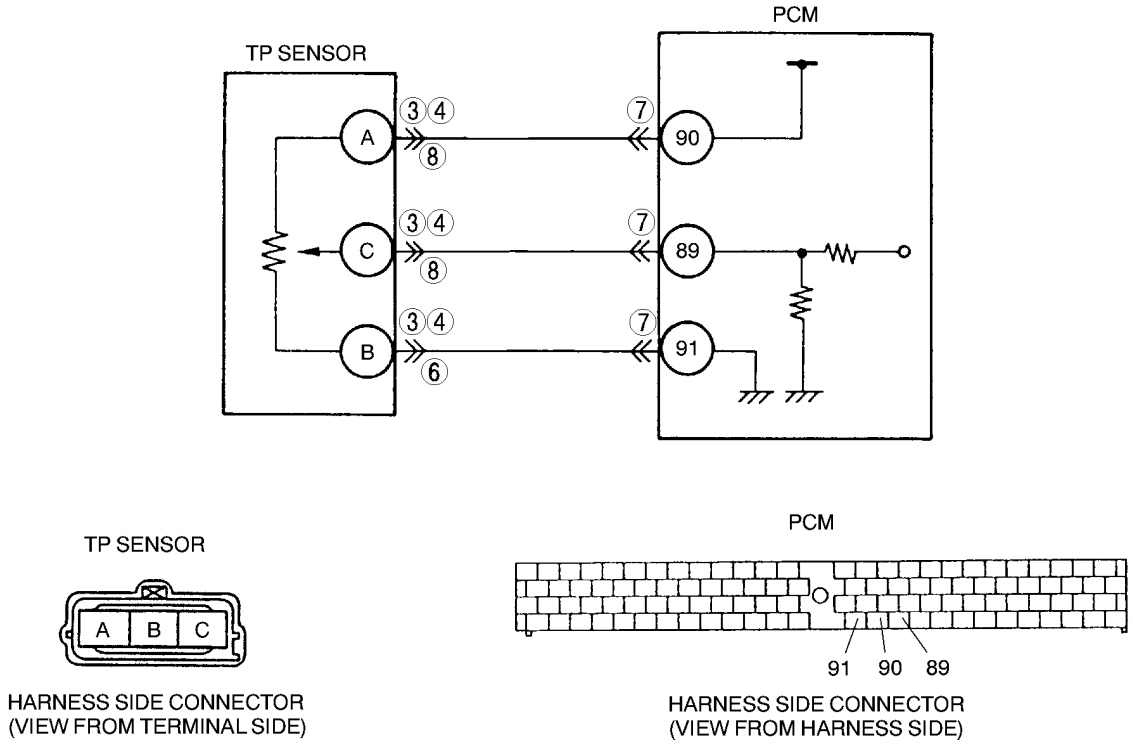
STEP	INSPECTION		ACTION
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT TP SENSOR CONNECTOR** **Note** • If DTC P0107 and P0452 are also retrieved with P0122, go to REFERENCE VOLTAGE troubleshooting procedure. (See 01–03B–49 NO.30 REFERENCE VOLTAGE [FS].) • Turn ignition key to ON (Engine OFF). • Check voltage at TP sensor terminal A (harness-side). • Is voltage **within 4.5—5.5 V**?	Yes	Go to next step.
		No	Repair or replace open circuit in wiring harness between TP sensor terminal A (harness-side) and PCM terminal 90 (harness-side), then go to Step 8.
5	**VERIFY TP SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Disconnect PCM connector. • Connect breakout box with PCM disconnected. • Disconnect TP sensor connector. • Check for 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 suspected harness, then go to Step 8.
6	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between TP sensor connector terminal C and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 8.
		No	Go to next step.
7	**INSPECT TP SENSOR** • Perform TP sensor inspection. (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS].) • Is TP sensor okay?	Yes	Go to next step.
		No	Replace TP sensor.
8	**VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Depress and release accelerator pedal several times. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0123 [FS]

A3U010201084W18

DTC P0123	TP circuit high input
DETECTION CONDITION	• If PCM detects TP sensor voltage at PCM terminal 89 is **above 4.90 V** after engine start, 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 conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal B and PCM terminal 91 • Short to constant voltage (Vref) supply circuit between TP sensor terminal C and PCM terminal 89 • PCM malfunction

DTC P0123	TP circuit high input



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 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 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 9.
4	**INSPECT TP SENSOR CONNECTOR FOR POOR CONNECTION** • Disconnect TP 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	**CHECK TP SENSOR RESISTANCE** • Check resistance between following TP sensor terminals (part-side): Terminals A and B: **Within 3.2—4.8 kilohms** Terminals B and C: **Within 0.2—1.2 kilohms** • Are both resistances within specifications?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 9.
6	**VERIFY TP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT AT TP SENSOR CONNECTOR** • Check for continuity between TP sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**CHECK PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection at terminals 89, 90 and 91 (damaged/pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Repair or replace open circuit in wiring harness between TP sensor terminal B and PCM connector terminal 91 (harness-side). Then, go to Step 9.
8	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT** • Check for continuity between TP sensor terminals A and C. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equipment. • Depress and release accelerator pedal several times. • Does the same DTC appear?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0125 [FS]

A3U010201084W19

DTC P0125	Excessive time to enter closed loop fuel control
DETECTION CONDITION	• PCM monitors ECT sensor signal at PCM terminal 38 after engine is started engine is cold. If ECT voltage does not reach the expected temperature within 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 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

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 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** • Clear DTC using WDS or equivalent. • Start engine. • Warm up engine completely. • Access ECT PID using WDS or equivalent. • Is ECT PID **above 35.6 °C {96 °F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 7.
		No	Go to next step.
5	**INSPECT ECT SENSOR** • Measure resistance between ECT sensor terminals A and B (part-side). • Is resistance **approx. 2 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 38 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, 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 WDS or equivalent. • Access ECT PID using WDS or equivalent. • Wait until ECT PID is **below 20 °C {68 °F}**. • Start engine and warm it up completely. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0126, P0128 [FS]

A3U010201084W20

DTC P0126 DTC 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 **above 25 km/h {15 mph} for ATX, 40 km/h {25 mph} for MTX** **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

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 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 WHETHER STUCK OPEN** • Remove coolant thermostat and inspect for stuck open. (See 01–12–7 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 inside and outside 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 WDS or equivalent. • 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 using WDS or epuivalent 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 be used 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 using WDS or equivalent 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 be used 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0131 [FS]

A3U010201084W21

DTC P0131	HO2S (front) no inversion (low voltage stuck)
DETECTION CONDITION	• PCM monitors input voltage from HO2S (front) when the following monitoring conditions are met. If input voltage from sensor remains **below 0.45 V** for **42.8 s**, PCM determines that there is no HO2S (front) inversion. **MONITORING CONDITIONS** — Engine speed is **above 1,500 rpm**. — Engine coolant temperature is **above 70 °C {158 °F}**. **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.

DTC P0131	HO2S (front) no inversion (low voltage stuck)
POSSIBLE CAUSE	• HO2S (front) malfunction • HO2S (front) heater malfunction • Fuel injector malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel delivery hose leakage • Fuel filter clogging • Fuel return hose leakage • Air suction or leakage • PCV valve malfunction • Purge solenoid valve malfunction • Purge solenoid hoses are hooked up incorrectly. • Ignition coil malfunction • Insufficient compression • Engine malfunction

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 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 RELATED PENDING AND STORED DTCs** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0131 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Verify PID while racing engine (in PARK). • Is PID reading okay? — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition)	Yes	Go to next step.
		No	Replace HO2S (front), then go to Step 18.
6	**INSPECT PURGE SOLENOID VALVE OPERATION** • Turn ignition key to OFF. • Inspect purge solenoid valve operation. • Is purge solenoid valve okay?	Yes	Go to Step 11.
		No	Replace purge solenoid valve. Then go to Step 18.
7	**INSPECT PCV VALVE OPERATION** • Inspect PCV valve operation. (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION.) • Is PCV valve okay?	Yes	Go to next step.
		No	Replace PCV, then go to Step 18.
8	**INSPECT FUEL LINE PRESSURE (LOW FUEL LINE PRESSURE)** • start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 11.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PUMP** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 18.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure) • Foreign material or stain inside fuel filter (low-pressure) — If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). — If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). — If all items above are okay, go to next step.
10	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Stop engine. • Turn ignition key to ON (Engine OFF). • Perform fuel pump maximum pressure test. (See 01–14–17 Fuel Pump Maximum Pressure Inspection.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Replace pressure regulator, then go to step 18.
		No	Inspect fuel pump circuit for open or poor connection. • Repair or replace suspected circuit. • If circuit is okay, replace fuel pump. Then go to Step 18.
11	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinder using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 15.
		No	Go to next step.
12	**CHECK HIGH-TENSION LEADS OF NON-BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 18.
13	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between ignition coil connector terminal D (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 18.
14	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to Step 18.
15	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.
16	**INSPECT FUEL INJECTOR OPERATION** • Turn ignition key to OFF. • Inspect injector. (See 01–14–24 FUEL INJECTOR INSPECTION.) • Is injector okay?	Yes	Go to next step.
		No	Replace injector, then go to Step 18.

STEP	INSPECTION		ACTION
17	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing to head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
18	**VERIFY TROUBLESHOOTING OF DTC P0131 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Access ECT and RPM PIDs using WDS or equivalent. • Make sure that ECT PID is **above 70 °C {158 °F}**. • Increase and keep engine speed **above 1,500 rpm** for at **least 1 minute**. • Is pending code of same DTC present?	Yes	Replace or reprogram PCM. Then go to next step.
		No	Go to next step.
19	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0132 [FS]

A3U010201084W22

DTC P0132	HO2S (front) no inversion (high voltage stuck)
DETECTION CONDITION	• PCM monitors input voltage from HO2S (front) when the following monitoring conditions are met. If input voltage from sensor remains **above 0.45 V** for **42.8 s**, PCM determines that there is no HO2S (front) inversion. **MONITORING CONDITIONS** — Engine speed is **above 1,500 rpm**. — Engine coolant temperature is **above 70 °C {158 °F}**. **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	• HO2S (front) malfunction • HO2S (front) heater malfunction • Fuel injector malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel return hose clogging • PCV valve malfunction • Purge solenoid valve malfunction • Purge solenoid hoses are hooked up incorrectly. • Engine malfunction

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 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 RELATED PENDING AND STORED DTCs** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0132 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Verify PID while racing engine (in PARK). • Is PID reading okay? — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition)	Yes	Go to next step.
		No	Replace HO2S (front), then go to Step 12.
6	**INSPECT FUEL LINE PRESSURE (EXCESSIVE FUEL LINE PRESSURE)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 9.
		No	Go to next step.
7	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect following parts and repair or replace if necessary: • Fuel pump maximum pressure • Fuel return pipe for clogging — If all items above are okay, replace pressure regulator. Then, go to Step 12.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve. Then go to Step 12. • If not, reconnect vacuum hoses to correct position. Then go to Step 12.
8	**INSPECT PURGE SOLENOID VALVE OPERATION** • Turn ignition key to OFF. • Inspect purge solenoid valve operation. • Is purge solenoid valve okay?	Yes	Go to Step 10.
		No	Replace purge solenoid valve. Then go to Step 12.
9	**INSPECT PCV VALVE OPERATION** • Inspect PCV valve operation. (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION.) • Is PCV valve okay?	Yes	Go to next step.
		No	Replace PCV, then go to Step 12.
10	**INSPECT FUEL INJECTOR OPERATION** • Turn ignition key to OFF. • Inspect injector. (See 01–14–24 FUEL INJECTOR INSPECTION.) • Is injector okay?	Yes	Go to next step.
		No	Replace injector, then go to Step 12.

STEP	INSPECTION		ACTION
11	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing to head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0132 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Access ECT and RPM PIDs using WDS or equivalent. • Make sure that ECT PID is **above 70 °C {158 °F}**. • Increase and keep engine speed **above 1,500 rpm** for at **least 1 minute**. • Is pending code of same DTC present?	Yes	Replace or reprogram PCM. Then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0133 [FS]

A3U010201084W23

DTC P0133	HO2S (Front) circuit slow response
DETECTION CONDITION	• PCM monitors inversion cycle period, lean-to-rich response time and rich-to-lean response time of the sensor. PCM calculates the average of the inversion cycle period-specified inversion cycles, average response time from lean-to-rich, and from rich-to-lean when monitoring conditions are met. If any exceeds threshold, PCM determines that circuit has malfunction. **MONITORING CONDITIONS** — Drive mode 3 — Following conditions are met: • Calculation load is **20—59%** [at engine speed **2,000 rpm**] • Engine speed is **1,410—4,000 rpm** • Vehicle speed is **over 3.77 km/h {2.34 mph}**. • Engine coolant temperature is **above –10°C {14°F}**. **Diagnostic support note** • This is an intermittent monitor. (OXYGEN SENSOR) • MIL illuminates if PCM detects either of above malfunction conditions 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.

DTC P0133	HO2S (Front) circuit slow response
POSSIBLE CAUSE	• Front HO2S deterioration • Front HO2S heater malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel filter clogged or restricted • Fuel leakage on fuel line from fuel distribution pipe and fuel pump • Fuel return hose clogged • Leakage from exhaust system • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • Insufficient compression • Engine malfunction

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 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and/or stored DTCs using WDS or equivalent. • Is the following DTC also present? — P0442, P0443, P0455, P0031, P0032 or P1450 with P0133	Yes	Go to appropriate DTC troubleshooting procedures, then go to Step 15. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0133 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02B–15 DTC TABLE [FS].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal conditions (in PARK). — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT INSTALLATION OF FRONT HO2S** • Check if HO2S (front) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Retighten sensor, then go to Step 15.
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust manifold and HO2S (front). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 15.
		No	Replace sensor, then go to Step 15.
8	**INSPECT LONG TERM FUEL TRIM** • Access LONGFT1 PIDs. • Compare it with FREEZE FRAME DATA (FFD) recorded at Step 1. • Is it below FFD value?	Yes	Engine is driven under rich condition. Go to next step.
		No	Engine is driven under lean condition. Go to Step 11.

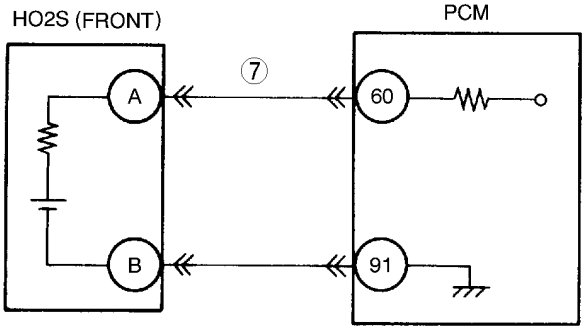
STEP	INSPECTION		ACTION
9	**INSPECT FUEL LINE PRESSURE (Excessive fuel line pressure)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	Go to next step.
10	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return pipe for clogging. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • If any problem is found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 15.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve. • If not, reconnect vacuum hoses to correct position. Then go to Step 15.
11	**INSPECT FUEL LINE PRESSURE (Low fuel line pressure)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	Go to next step.
12	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 15.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure) • Foreign material or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). • If all items above are okay, go to next step.
13	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Perform fuel pump maximum pressure test. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Replace pressure regulator, then go to step 15.
		No	Inspect fuel pump circuit for open or poor connection. • Repair or replace suspected circuit. • If circuit is okay, replace fuel pump. Then go to Step 15.
14	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble, which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.

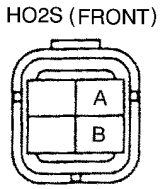
STEP	INSPECTION		ACTION
15	**VERIFY TROUBLESHOOTING OF DTC P0133 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Run OBD-ll DRIVE MODE 1 and 3. (See 01–02B–10 OBD-II DRIVE MODE [FS].) • Stop vehicle and access ON BOARD SYSTEM READINESS TEST to inspect DRIVE MODE completion status. • Verify RFC changes to YES for OXYGEN SENSOR. — If not, run DRIVE MODE again. • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify following TEST # values: — 10:01:11, 10:02:11 or 10:03:11 • Are they all below MAX value?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0134 [FS]

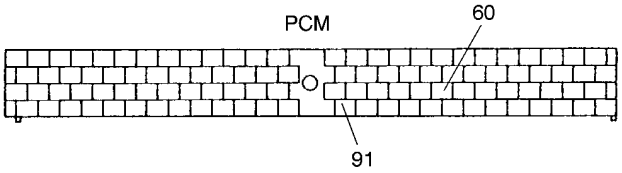
A3U010201084W24

DTC P0134	HO2S (Front) circuit no activity detected
DETECTION CONDITION	• PCM monitors input voltage from HO2S (front) when the following monitoring conditions are met. If input voltage from sensor never **exceed 0.55 V** for **120 seconds**, PCM determines that sensor circuit is not activated. **MONITORING CONDITIONS** — Drive mode 3 — Following conditions are met: • Engine speed is **above 1,500 rpm**. • Engine coolant temperature is **above 70 °C {158 °F}**. **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	• HO2S (front) deterioration • HO2S (front) heater malfunction • Leakage from exhaust system • Open or short to ground circuit between HO2S (front) terminal A and PCM terminal 60 • Insufficient compression • Engine malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Is other DTC present except P0131 and P0132?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.

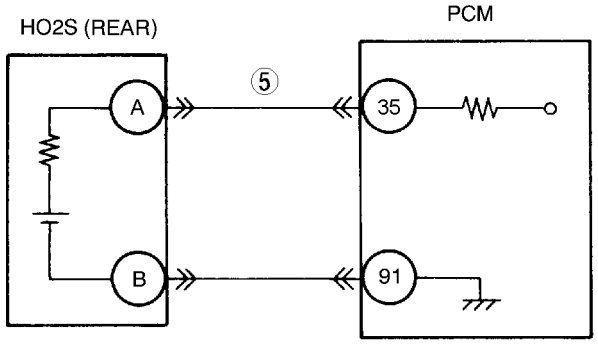
STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0134 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02B–15 DTC TABLE [FS].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition (in PARK). — **More than 0.55 V** when suddenly depressing accelerator pedal (rich condition). — **Less than 0.55 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT INSTALLATION OF HO2S** • Check if HO2S (front) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Install sensor securely, then go to Step 10.
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust manifold and HO2S (front). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 10.
		No	• Inspect the following harnesses for open or short to ground circuit. Repair or replace harness if necessary. — HO2S (front) terminal A (harness-side) to PCM terminal 60 (harness-side) • Repair or replace harness if necessary. • If all items above are okay, replace faulty sensor. Then go to Step 10.
8	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 10.
		No	Go to next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.

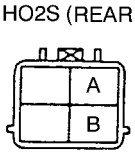
STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P0134 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Access RPM and ECT PIDs using WDS or equivalent. • Verify that ECT PID is reading **above 70 °C {158 °F}**. • Increase engine speed **above 1,500 rpm** (RPM PID reading) for **more than 120 seconds**. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0138 [FS]

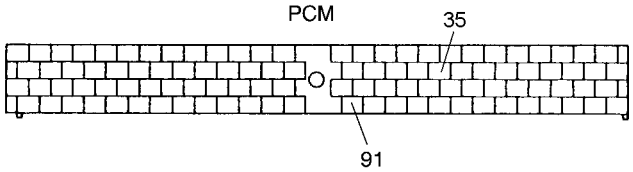
A3U010201084W25

DTC P0138	HO2S (rear) circuit high input
DETECTION CONDITION	• PCM monitors input voltage from HO2S (rear). If input voltage from sensor is **above 0.45 V** for **6 seconds** during deceleration fuel cut, PCM determines that the circuit input is high. **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	• HO2S (rear) malfunction • Short to power circuit in wiring between HO2S (rear) terminal A and PCM terminal 35





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

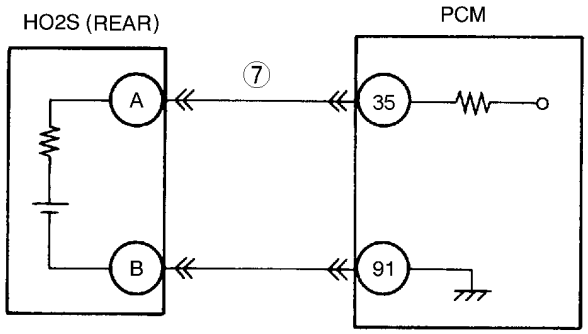
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then Start engine. • Verify pending codes or stored DTCs using WDS or equivalent. • Is other DTC present?	Yes	Go to appropriate DTC troubleshooting procedures. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0138 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02B–15 DTC TABLE [FS].)
5	**INSPECT HO2S (REAR) SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY CIRCUIT** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (rear) terminal A (harness-side) and body ground. • Is any voltage reading?	Yes	Replace short to power supply circuit, then go to Step 7.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS** • Start engine. • Access O2S12 PID using WDS or equivalent. • Verify PID while racing engine at least **10 times** (in neutral position). • Does PID reading stay **above 0.45 V**?	Yes	Replace HO2S (rear), then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0138 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1 and 3. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

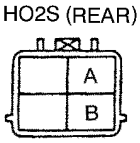
DTC P0140 [FS]

A3U010201084W26

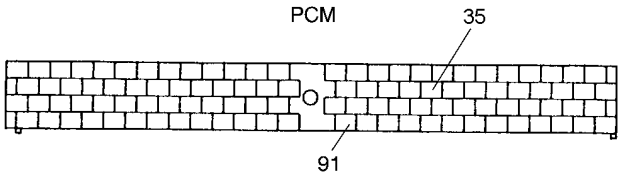
DTC P0140	HO2S (rear) circuit no activity detected
DETECTION CONDITION	• PCM monitors input voltage from HO2S (rear) when the following monitoring conditions are met. If input voltage from sensor never **exceed 0.55 V** for **30 seconds**, PCM determines that sensor circuit is not activated. **MONITORING CONDITIONS** — Drive mode 3 — Following conditions are met: • Engine speed is **above 1,500 rpm**. • Engine coolant temperature is **above 70 °C {158 °F}**. **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.

DTC P0140	HO2S (rear) circuit no activity detected
POSSIBLE CAUSE	• HO2S (rear) deterioration • HO2S (rear) heater malfunction • Leakage from exhaust system • Open or short to ground circuit between HO2S (rear) terminal A and PCM terminal 35 • Insufficient compression • Engine malfunction





VEHICLE HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

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 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 RELATED PENDING AND STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending and stored DTCs using WDS or equivalent. • Is other DTC present except P0131 and P0132?	Yes	Go to appropriate DTC troubleshooting procedures. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0140 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02B–15 DTC TABLE [FS].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S12 PID using WDS or equivalent. • Verify PID while racing engine at least **10 times** (in neutral position). • Is PID reading okay? — **More than 0.55 V** at least once during engine racing.	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT INSTALLATION OF HO2S (REAR)** • Check if HO2S (rear) is loosely installed. • Is sensor installed securely?	Yes	Go to next step.
		No	Install sensor securely, then go to Step 10.

STEP	INSPECTION		ACTION
7	**INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE** • Visually check if any gas leakage is found between exhaust pipe and HO2S (rear). • Is there any gas leakage?	Yes	Repair or replace any faulty exhaust parts, then go to Step 10.
		No	• Inspect for open or short to ground circuit between HO2S (rear) terminal A (harness-side) and PCM terminal 35 (harness-side). — Repair or replace harness if necessary. • If all items above are okay, replace HO2S (rear). Then go to Step 10.
8	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 10.
		No	Go to next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0140 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Access RPM and ECT PIDs using WDS or equivalent. • Verify that ECT PID is reading **above 70 °C {158 °F}**. • Increase engine speed **above 1,500 rpm** (RPM PID reading) for **more than 30 seconds**. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0171 [FS]

A3U010201084W27

DTC P0171	Fuel trim system too lean
DETECTION CONDITION	• PCM monitors short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) values when DRIVE MODE 1 is run. If fuel trim exceeds preprogrammed criteria, PCM determines that the fuel system is too lean. **Diagnostic support note** • This is a continuous monitor. (FUEL SYSTEM) • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction conditions during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Misfire • HO2S (front) deterioration • HO2S (front) heater malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel filter clogged or restricted • Fuel leakage on fuel line from fuel delivery pipe and fuel pump • Fuel return hose clogged • Leakage from exhaust system • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • Insufficient compression

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify related PENDING CODE or stored DTCs. • Are other DTCs present?	Yes	If misfire DTC is present, go to Step 8. If other DTC is present, go to appropriate DTC troubleshooting procedures. (See 01–02B–15 DTC TABLE [FS].)
		No	If drivability concern is present, go to Step 8. If not, go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0171 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, MAF, TP and VS PIDs using WDS or equivalent. (See 01–40B–8 PID/DATA MONITOR table (Reference).) • Is there any signal that is far out of specification when ignition key is ON and engine runs?	Yes	Inspect suspected sensor and excessive resistance in related wiring harnesses. Repair or replace if necessary. Then go to Step 20.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as Step 5 while simulating FREEZE FRAME DATA condition. • Is there any input signal which causes drastic changes?	Yes	Inspect suspected sensor and related wiring harnesses, and repair or replace it. Then go to Step 20.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY CURRENT INPUT SIGNAL STATUS OF HO2S FRONT** • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition. (in PARK) — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Inspect following for air suction due to cracks, damages and loose parts: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold • Vacuum hoses **Note** • Engine speed may change when rust penetrating agent is sprayed on the air suction area. Repair or replace any faulty part, then go to Step 20.
		No	Visually inspect for any gas leakage between exhaust manifold and HO2S (front). • If there is no leakage, replace HO2S (front). Then go to Step 20.
8	**INSPECT MAF SIGNAL** • Start engine. • Access MAF PID using WDS or equivalent. • Verify that MAF PID changes quickly according to race engine RPM. • Is MAF PID response okay?	Yes	Go to next step.
		No	Replace MAF sensor, then go to Step 20.
9	**INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE-AIR SYSTEM** • Visually inspect for loose, cracked or damaged hoses on intake-air system. • Is there malfunction?	Yes	Repair or replace source of air suction, then go to Step 20.
		No	Go to next step.
10	**INSPECT FUEL LINE PRESSURE** • Turn ignition key to OFF. **Note** • If engine will not start, inspect fuel line pressure with ignition key ON. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	If fuel line pressure is too high: Go to next step. If fuel line pressure is too low: Go to Step 12.
11	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Verify that vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return hose for clogging. • If any problem is found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 20.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve, then go to Step 20. • If not, reconnect vacuum hoses to correct position, then go to Step 20.
12	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Perform fuel pump maximum pressure test. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. Repair or replace suspected circuit, then go to Step 20. • If circuit is okay, replace fuel pump. Then go to Step 20.

STEP	INSPECTION		ACTION
13	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 20.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure). • Foreign materials or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign materials or stain is found inside fuel filter (low-pressure), clean of fuel tank and fuel filter (low-pressure). • If all items above are okay, replace pressure regulator. Then go to Step 20.
14	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinders using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 18.
		No	Go to next step.
15	**CHECK HIGH-TENSION LEADS OF NO BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 20.
16	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Check voltage at ignition coil connector terminal D (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 20.
17	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to Step 20.
18	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to Step 20.
19	**INSPECT FUEL INJECTOR OPERATION** • Remove fuel injector from suspected bank. (See 01–14–24 FUEL INJECTOR INSPECTION.) • Inspect injector operation. • Is fuel injector okay?	Yes	Go to next step.
		No	Replace injector, then go to Step 20.
20	**VERIFY TROUBLESHOOTING OF DTC P0171 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1, 2 and 3. • Is PENDING CODE P0171 present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
21	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0172 [FS]

A3U010201084W28

DTC P0172	Fuel trim system (RH) too rich
DETECTION CONDITION	• PCM monitors short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) values when DRIVE MODE 1 is run. If fuel trim exceeds pre programmed criteria, PCM determines that the fuel system is too rich. **Diagnostic support note** • This is a continuous monitor. (FUEL SYSTEM) • MIL illuminates if PCM detects the above malfunction conditions 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	• Misfire • HO2S (front) deterioration • HO2S heater (front) malfunction • PRC solenoid valve malfunction • Pressure regulator malfunction • Fuel pump malfunction • Fuel return hose clogged • Purge solenoid valve malfunction • Purge solenoid hoses improper connection • PCV valve malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	If drivability concern or rough idle is present, go to Step 10. If not, go to next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0172 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, MAF, TP and VS PIDs using WDS or equivalent. (See 01–40B–8 PID/DATA MONITOR table (Reference).) • Is there any signal that is far out of specification when ignition key is ON and engine runs?	Yes	Inspect suspected sensor and excessive resistance in related wiring harnesses. Repair or replace if necessary. Then go to Step 12.
		No	Go to next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 5 while simulating FREEZE FRAME DATA condition. • Is there any input signal which causes drastic changes?	Yes	Inspect suspected sensor and related wiring harnesses, and repair or replace it. Then go to Step 12.
		No	Go to next step.
7	**VERIFY CURRENT INPUT SIGNAL STATUS OF HO2S (FRONT)** • Access O2S11 PID using WDS or equivalent. • Check PID under following accelerator pedal condition (in PARK or NEUTRAL). — **More than 0.45 V** when suddenly depressing accelerator pedal (rich condition) — **Less than 0.45 V** just after release of accelerator pedal (lean condition) • Is PID reading okay?	Yes	Go to next step.
		No	Replace suspected HO2S (front). Then go to Step 12.

STEP	INSPECTION		ACTION
8	**INSPECT FUEL LINE PRESSURE** • Turn ignition key to OFF. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 10.
		No	Go to next step.
9	**VERIFY VACUUM IS LEADING TO PRESSURE REGULATOR** • Start engine. • Disconnect vacuum hose from pressure regulator. • Verify that the vacuum is felt at opening port of disconnected vacuum hose. • Is vacuum felt?	Yes	Inspect fuel pump maximum pressure and fuel return hose for clogging. • If any problem found, repair or replace suspected parts. • If all items above are okay, replace pressure regulator. Then go to Step 12.
		No	Verify vacuum hoses are connected correctly. • If okay, replace PRC solenoid valve, then go to Step 12. • If not, reconnect vacuum hoses to correct position, then go to Step 12.
10	**INSPECT PURGE SOLENOID VALVE FOR WHETHER STUCK OPEN** • Turn ignition key to OFF. • Disconnect both hoses from purge solenoid valve. • Blow air through purge solenoid valve. • Does air blow through?	Yes	Replace purge solenoid valve. Then go to Step 12.
		No	Go to next step.
11	**INSPECT PCV VALVE OPERATION** • Inspect PCV valve operation. (See 01–03B–58 Pressure Regulator Control Inspection.) • Is PCV valve okay?	Yes	Go to next step.
		No	Replace PCV valve, then go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0172 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Run OBD-II DRIVE MODE 1, 2 and 3. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0300 [FS]

A3U010201085W01

DTC P0300	Random misfire detection
DETECTION CONDITION	• PCM monitors CKP sensor input signal interval time. PCM calculates the change of the interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, PCM detects a misfire in the corresponding cylinder. While the engine is running, PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred. **Diagnostic support note** • This is a continuous monitor (MISFIRE). • MIL illuminates if PCM detects the misfire which affects emission performance in two consecutive drive cycles. • PENDING CODE is available if PCM detects the misfire which affects emission performance during first drive cycle. • MIL flashes if PCM detects the misfire which can damage the catalytic converter during first drive cycle. Therefore, PENDING CODE is not available while MIL flashes. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P0300	Random misfire detection
POSSIBLE CAUSE	• CKP sensor malfunction • CMP sensor malfunction • Ignition coil malfunction • High-tension lead malfunction • MAF sensor contamination • Excess air suction in intake-air system (between MAF sensor and dynamic chamber) • Fuel pump malfunction • Fuel pressure regulator malfunction • Fuel line clogged • Fuel filter clogged • Fuel leakage in fuel line • Purge control solenoid valve malfunction • PCV valve malfunction • EGR valve malfunction • Vacuum hoses damages or improper connection • Related connector and terminal malfunction • Related wiring harness malfunction • Poor fuel quality

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 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 RELATED PENDING CODE OR STORED DTCs** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON/IDLE)** • Access ECT, IAT, MAF, RPM, TP, and VS PIDs using WDS or equivalent. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).) • Is there any signal that is far out of specification when ignition switch is ON and engine runs at idle?	Yes	Inspect suspected circuit and/or part according to inspection results. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).) Then go to Step 23.
		No	Go to next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 4 while simulating FREEZE FRAME DATA condition. • Is there any signal which causes drastic changes?	Yes	Inspect suspected circuit and/or part according to inspection results. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).) Then go to Step 23.
		No	Go to next step.
6	**INSPECT CMP SENSOR** • Inspect CMP sensor. (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS].) • Is CMP sensor okay?	Yes	Go to next step.
		No	Inspect installation condition and damages on timing belt and gears, repair faulty parts. • If it is okay, replace CMP sensor. Then go to Step 23.
7	**VERIFY CKP SENSOR INSTALLATION CONDITION** • Check CKP sensor for looseness. • Is CKP sensor loose?	Yes	Retighten CKP sensor, then go to Step 23.
		No	Go to next step.
8	**CHECK IGNITION COIL OPERATION AND HIGH-TENSION LEAD WITH TIMING LIGHT** • Verify blinking condition on each cylinders using timing light at idle. • Do all cylinders show blinking condition?	Yes	Go to Step 12.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**CHECK HIGH-TENSION LEADS OF NON-BLINKING CYLINDER** • Turn ignition key to OFF. • Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. • Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Replace faulty high-tension lead, then go to Step 23.
10	**INSPECT POWER SUPPLY TERMINAL AT IGNITION COIL CONNECTOR** • Disconnect ignition coil connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between ignition coil terminal A (harness-side) and body ground. • Is voltage reading **B+**?	Yes	Go to next step.
		No	Check for open circuit between ignition coil connector and ignition switch. Repair or replace wiring harness, then go to Step 23.
11	**INSPECT IGNITION COIL RESISTANCE** • Check ignition coil resistance. (See 01–18–2 IGNITION COIL INSPECTION.) • Is coil resistance okay?	Yes	Go to Step 23.
		No	Replace ignition coil, then go to Step 23.
12	**INSPECT MAF SIGNAL** • Start engine. • Access MAF PID using WDS or equivalent. • Verify that MAF PID changes quickly according to race engine RPM. • Is MAF PID response okay?	Yes	Go to next step.
		No	Replace MAF sensor, then go to Step 23.
13	**INSPECT EXCESSIVE AIR SUCTION IN INTAKE-AIR SYSTEM** • Inspect for air leakage at following: — Between MAF sensor and throttle body — Between throttle body and dynamic chamber • Is there malfunction?	Yes	Repair or replace suspected part, then go to Step 23.
		No	Go to next step.
14	**INSPECT FUEL LINE PRESSURE** • Inspect fuel line pressure. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure okay?	Yes	Go to Step 18.
		No	If fuel line pressure is too high, go to next step. If fuel line pressure is too low, go to Step 16.
15	**VERIFY VACUUM LEADING TO PRESSURE REGULATOR** • Disconnect vacuum hose from pressure regulator. • Start engine. • Is vacuum felt at opening end of vacuum hose?	Yes	Check following: • Fuel pump maximum pressure (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Fuel return hose for clogging — If all above are okay, replace pressure regulator. Then go to Step 23.
		No	Verify vacuum hoses are connected correctly. • If okay, replace pressure regulator control solenoid valve. • If not, reconnect vacuum hose in proper position. Then go to Step 23.
16	**INSPECT FUEL PUMP MAXIMUM PRESSURE** • Inspect fuel pump maximum pressure. (See 01–14–15 FUEL PUMP UNIT INSPECTION.) • Is fuel pump maximum pressure **within 450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}**?	Yes	Go to next step.
		No	Inspect fuel pump circuit for open or poor connection. Repair or replace suspected circuit, then go to Step 23. • If okay, replace fuel pump, then go to Step 23.
17	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE** • Visually inspect for fuel leakage in fuel line for any leakage. • Is any fuel leakage found?	Yes	Replace suspected fuel line, then go to Step 23.
		No	Inspect fuel filters for following: • Restriction or clogging at fuel filter (high-pressure). • Foreign material or stain inside fuel filter (low-pressure) Perform following actions as result. • If restriction or clogging is found at fuel filter (high-pressure), replace fuel filter (high-pressure). • If foreign material or stain is found inside fuel filter (low-pressure), clean fuel tank and fuel filter (low-pressure). • If all items above are okay, replace pressure regulator. Then, go to Step 23.

STEP	INSPECTION		ACTION
18	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul for repairs, then go to Step 23.
19	**INSPECT OPERATION OF PURGE CONTROL SOLENOID VALVE** • Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge control solenoid valve operation okay?	Yes	Go to next step.
		No	Replace purge control solenoid valve, then go to Step 23.
20	**INSPECT PCV VALVE OPERATION** • Turn ignition key to OFF. • Remove PCV valve and check valve operation. (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION.) • Is PCV valve operation okay?	Yes	Replace PCV valve, then go to Step 23.
		No	Go to next step.
21	**INSPECT OPERATION OF EGR VALVE** • Remove EGR valve. • Visually check for stuck open condition. • Is EGR valve stuck open?	Yes	Repair or replace EGR valve, then go to Step 23.
		No	Go to next step.
22	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to next step.
		No	Go to next step.
23	**VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine and perform OBD-II DRIVE MODE 1. (See 01–02B–10 Mode 1 (PCM adaptive memory procedure drive mode).) • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
24	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0301, P0302, P0303, P0304 [FS]

A3U010201085W02

DTC P0301 **DTC P0302** **DTC P0303** **DTC P0304**	**Cylinder No.1 misfire detected** **Cylinder No.2 misfire detected** **Cylinder No.3 misfire detected** **Cylinder No.4 misfire detected**
DETECTION CONDITION	• PCM monitors CKP sensor input signal interval time. PCM calculates the change of the interval time for each cylinder. If the change of interval time exceeds the pre programmed criteria, PCM detects a misfire in the corresponding cylinder. While the engine is running, PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the pre programmed criteria, PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred. **Diagnostic support note** • This is a continuous monitor (MISFIRE). • MIL illuminates if PCM detects the misfire which affects emission performance in two consecutive drive cycles. • PENDING CODE is available if PCM detects the misfire which affects emission performance during first drive cycle. • MIL flashes if PCM detects the misfire which can damage the catalytic converter during first drive cycle. Therefore, PENDING CODE is not available while MIL flashes. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Spark plug malfunction • High-tension lead malfunction • Fuel injector malfunction • Air suction in intake-air system (between dynamic chamber and cylinder head) • Inadequate engine compression due to engine internal malfunction • Related connector or terminal malfunction • Related wiring harness malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION KEY TO ON /IDLE)** • Access ECT, IAT, MAF, RPM, TP and VS PIDs using WDS or equivalent. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).) • Is there any signal that is far out of specification when ignition switch is ON and engine runs at idle?	Yes	Inspect suspected circuit and/or part according to inspection results. Then go to Step 12. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).)
		No	Go to next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION** • Inspect same PIDs as in Step 4 while simulating FREEZE FRAME DATA condition. • Is there any signal which causes drastic changes?	Yes	Inspect suspected circuit and/or part according to inspection results. Then go to Step 13. (See 01–40B–7 PCM Inspection Using the SST (WDS or equivalent).)
		No	Go to next step.
6	**INSPECT SPARK PLUG CONDITION** • Turn ignition key to OFF. • Remove spark plug from suspected cylinder. • Check spark plug condition: — Cracks — Excessive wear — Gap — Wet • Is any problem found on spark plug?	Yes	• If spark plug is wet, fuel flooding is suspected. Go to Step 13. • If spark plug has cracks, excessive wear or improper gap, replace faulty spark plug. Then go to Step 13.
		No	Go to next step.

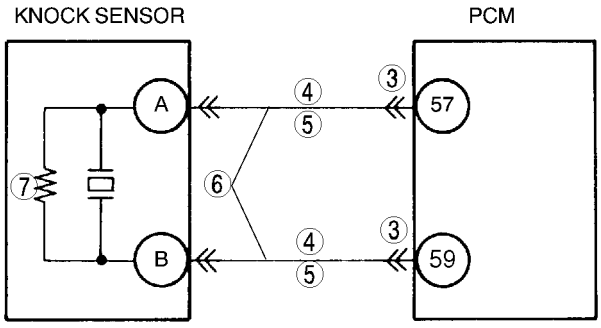
STEP	INSPECTION		ACTION
7	**VERIFY HIGH-TENSION LEAD CONDITION** • Remove high-tension lead. • Check high-tension lead condition and resistance. — Cracks — Spark shorts to cylinder head through high-tension lead insulator • Is high-tension lead okay?	Yes	Go to next step.
		No	Replace high-tension lead, then go to Step 13.
8	**INSPECT FOR AIR SUCTION AT INTAKE-AIR SYSTEM** • Inspect for air leakage at following: — Around connection of dynamic chamber and intake manifold — Around connection of intake manifold and cylinder head • Is air leakage found?	Yes	Repair or replace suspected part, then go to Step 13.
		No	Go to next step.
9	**INSPECT FUEL INJECTOR HARNESS** • Remove intake-air system parts. • Disconnect fuel injector connector on suspected cylinder. • Connect TEST LIGHT (LED) to fuel injector connector terminals. • Check dim of light during cranking. • Does TEST LIGHT (LED) illuminate?	Yes	Go to next step.
		No	Check for fuel injector harnesses. Repair or replace if necessary, then go to Step 13.
10	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous, Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap thick cloth around and turn it slowly.** • Remove radiator cap. • Implement procedure to bleed air from engine coolant, then run engine at idle. • Is there any small bubble which makes engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 13.
		No	Go to next step.
11	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul the engine, then go to next step.
12	**INSPECT FUEL INJECTOR OPERATION** • Remove fuel injector from suspected cylinder. • Swap injector with injector on other cylinder. • Start engine and run it at idle. • Does misfire DTC move to cylinder with suspected injector?	Yes	Replace injector, then go to Step 13.
		No	Go to next step.

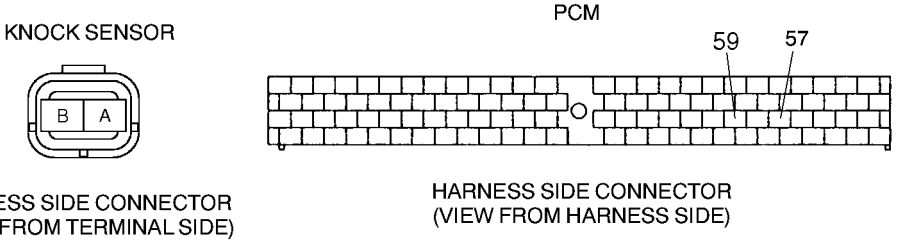
STEP	INSPECTION		ACTION
13	**VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Perform OBD-II DRIVE MODE 1. (See 01–02B–10 Mode 1 (PCM adaptive memory procedure drive mode).) • Is same PENDING CODE or stored code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0325 [FS]

A3U010201085W03

DTC P0325	Knock sensor circuit malfunction
DETECTION CONDITION	• PCM monitors input signal from knock sensor when the following monitoring conditions are met. If PCM does not receive input signal from knock sensor for **5 seconds**, PCM determines that knock sensor circuit is malfunctioning. **MONITORING CONDITIONS** — Engine load is **above 50%** — Engine coolant temperature is **above 60 °C {140 °F}**. — Engine speed is **within 1,500—5,000 rpm**. **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. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Knock sensor malfunction • Connector or terminal malfunction • Open or short to ground circuit between knock sensor connector terminal A and PCM terminal 57 • Open or short to ground circuit between knock sensor connector terminal B and PCM terminal 59 • Short between two wires of knock sensor





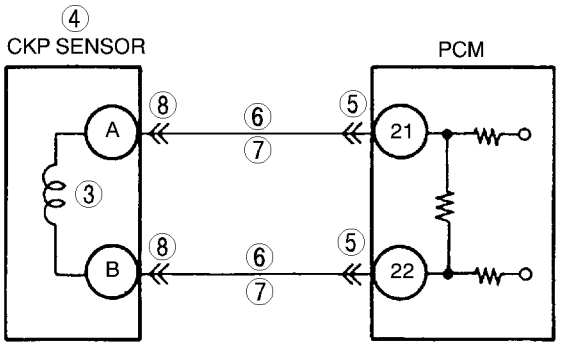
Diagnostic procedure

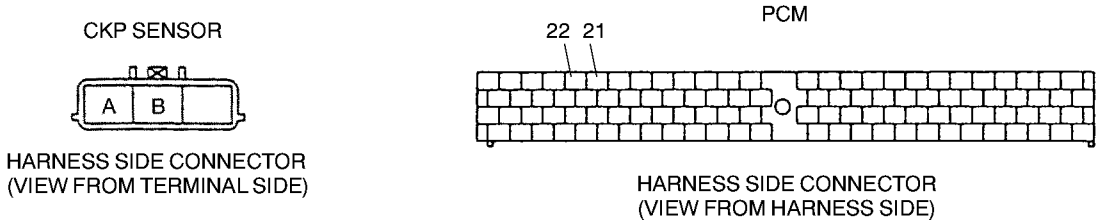
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 PCM CONNECTOR TERMINAL** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminals 57 and 66 (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 8.
		No	Go to next step.
4	**INSPECT KNOCK SENSOR CIRCUITS FOR OPEN CIRCUIT** • Disconnect knock sensor connector. • Check continuity between the following circuits: — Knock sensor female terminal A (harness-side) and PCM terminal 57 (harness-side) — Knock sensor female terminal B (harness-side) and PCM terminal 59 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected wiring harness, then go to Step 8.
5	**INSPECT KNOCK SENSOR CIRCUITS FOR SHORT TO GROUND** • Check continuity between following circuits: — Knock sensor female terminal A (harness-side) and body ground — Knock sensor female terminal B (harness-side) and body ground • Is there continuitity?	Yes	Repair or replace suspected wiring harness, then go to Step 8.
		No	Go to next step.
6	**CHECK FOR SHORT CIRCUITS** • Check continuity between knock sensor female terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 8.
		No	Go to next step.
7	**CHECK KNOCK SENSOR RESISTANCE** • Measure resistance between knock sensor terminals (part-side). • Is resistance **approx. 560 kilohms**?	Yes	Go to next step.
		No	Replace knock sensor, then go to next step.
8	**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 WDS or equivalent. • Start engine. • Access ECT, RPM and LOAD PIDs using WDS or equivalent. • Run vehicle **more than 5 seconds** in the following conditions: — ECT: **above 60 °C {140 °F}** — RPM: **1,500—5,000 rpm** — LOAD: **above 50%** • Is same DTC present?	Yes	Replace or reprogram PCM. Then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure” (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0335 [FS]

A3U010201085W04

DTC P0335	CKP sensor circuit malfunction
DETECTION CONDITION	• If PCM does not receive input signal from CKP sensor for **4.2 seconds** while MAF is **2.2 g/s {0.29 lb/min} or above**, PCM determines that CKP sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• CKP sensor malfunction • Connector or terminal malfunction • CKP sensor is dirty. • Short to ground between CKP sensor terminal A and PCM terminal 21 • Short to ground between CKP sensor terminal B and PCM terminal 22 • Open circuit between CKP sensor terminal A and PCM terminal 21 • Open circuit between CKP sensor terminal B and PCM terminal 22 • CKP sensor pulse wheel malfunction





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 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 CKP SENSOR VOLTAGE** • Disconnect CKP sensor. • Connect voltmeter between CKP sensor terminals A and B (part-side). • Check voltage in AC range while cranking the engine. • Is any voltage present?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT CKP SENSOR RESISTANCE** • Inspect CKP sensor. (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS].) • Is CKP sensor okay?	Yes	Check for poor connection (damaged/pulled-out terminals, corrosion, etc.), bent terminal of CKP sensor connector or plate. • Repair if necessary, then go to Step 9.
		No	Replace CKP sensor, then go to Step 9.

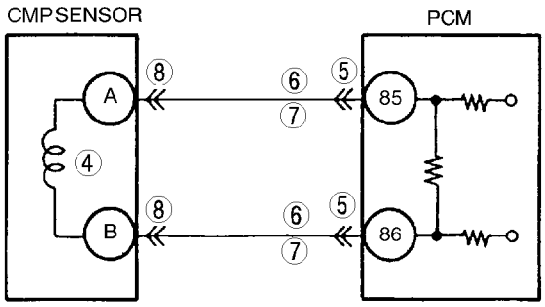
STEP	INSPECTION		ACTION
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminals 21 and 22 (damaged,/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
6	**INSPECT CKP CIRCUIT FOR OPEN CIRCUIT** • Check for continuity between following circuits: — CKP sensor terminal A and PCM terminal 21 (harness-side) — CKP sensor terminal B and PCM terminal 22 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 9.
7	**INSPECT CKP CIRCUIT FOR SHORT TO GROUND** • Check for 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 suspected harness, then go to Step 9.
		No	Go to next step.
8	**INSPECT CKP CIRCUITS FOR INTERMEDIATE SHORT** • Check for continuity between CKP sensor terminals A and B. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0335 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Access MAF PID using WDS or equivalent. **Note** • MAF PID should indicate **above 2.2 g/s {0.29 lb./min}** during this test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

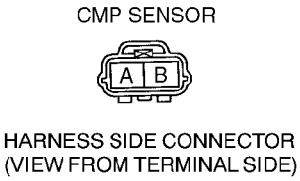
DTC P0340 [FS]

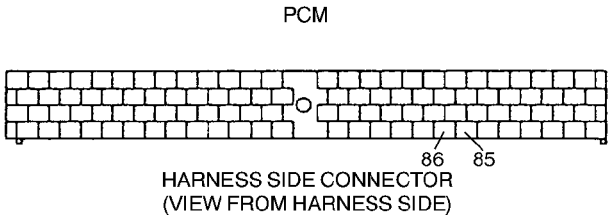
A3U010201085W05

DTC P0340	CMP sensor circuit malfunction
DETECTION CONDITION	• PCM monitors input voltage from CMP sensor while MAF is **above 2.2 g/s {0.29 ib/min}**. if PCM does not receive pulse signal the proper pulse signal timing basis on the CKP sensor signal, determines that CMP circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P0340	CMP sensor circuit malfunction
POSSIBLE CAUSE	• CMP sensor malfunction • Connector or terminal malfunction • CMP sensor is dirty. • Short to ground between CMP sensor terminal A and PCM terminal 85 • Short to ground between CMP sensor terminal B and PCM terminal 86 • Open circuit between CMP sensor terminal A and PCM terminal 85 • Open circuit between CMP sensor terminal B and PCM terminal 86 • CKP sensor pulse wheel malfunction







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 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 CMP SENSOR VOLTAGE** • Disconnect CMP sensor. • Connect voltmeter between CMP sensor terminals A and B (part-side). • Check voltage in AC range while cranking the engine. • Is any voltage reading?	Yes	Go to Step 5.
		No	Go to next step.
4	**CHECK CMP SENSOR RESISTANCE** • Check resistance between CMP sensor terminals A and B (part-side). • Is resistance **within 0.95—1.25 kilohms**?	Yes	Check for poor connection (damaged/pulled-out terminals, corrosion, etc.), bent terminal of CMP sensor connector or plate. • Repair if necessary, then go to Step 10.
		No	Replace CMP sensor, then go to Step 10.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminals 85 and 86 (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
6	**INSPECT CMP CIRCUIT FOR OPEN CIRCUIT** • Check for continuity between following circuits: — CMP sensor terminal A and PCM terminal 85 (harness-side) — CMP sensor terminal B and PCM terminal 86 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 10.
7	**INSPECT CMP CIRCUIT FOR SHORT TO GROUND** • Check for continuity between following terminal and body ground: — CMP sensor terminal A (harness-side) — CMP sensor terminal B (harness-side) • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 10.
		No	Go to next step.
8	**INSPECT CMP CIRCUITS FOR INTERMEDIATE SHORT** • Check for continuity between CMP sensor terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Go to next step.
9	**INSPECT CKP SENSOR** • Check CKP sensor. (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS].) • Is CKP sensor okay?	Yes	Go to next step.
		No	Replace CKP sensor, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0340 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Access MAF PID using WDS or equivalent. **Note** • MAF PID should indicate **above 2.2 g/s {0.29 lb./min}** during this test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0401 [FS]

A3U010201086W01

DTC P0401	EGR flow insufficient detected
DETECTION CONDITION	• Difference in intake manifold pressures when EGR is operated and when it is stopped is too small. **Diagnostic support note** • This is an intermittent monitor (EGR). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and 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	• EGR valve malfunction • EGR boost sensor malfunction • EGR boost sensor solenoid valve malfunction • EGR gasket malfunction • PCM malfunction

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 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Have other DTCs been stored?	Yes	Go to applicable DTC troubleshooting.
		No	Go to next step.
4	**INSPECT VACUUM HOSE CONDITION** • Inspect vacuum hoses for clogging, any damages, freeze, or vacuum leakage. • Is there malfunction?	Yes	Replace vacuum hoses, then go to Step 9.
		No	Go to next step.
5	**INSPECT EGR VALVE MALFUNCTION** • Inspect EGR valve. (See 01–16–15 EGR VALVE INSPECTION.) • Is EGR valve okay?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 9.
6	**INSPECT EGR BOOST SENSOR MALFUNCTION** • Inspect EGR boost sensor. (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS].) • Is EGR boost sensor okay?	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to Step 9.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Inspect EGR boost sensor solenoid valve. (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION.) • Is EGR boost sensor solenoid valve okay?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 9.
8	**INSPECT EGR VALVE PASSAGE** • Remove EGR valve. • Is gasket installation normal?	Yes	Go to next step.
		No	Install gasket correctly, then go to next step.
9	**MONITOR EGR SYSTEM BY DRIVE MODE** • Make sure to reconnect all disconnected connectors. • Run OBD-II Drive Mode 1 and 2. (See 01–02B–10 OBD-II DRIVE MODE [FS].) • Check EGR System Monitor completion status using On-Board Readiness Test function. • Has EGR system been monitored?	Yes	Go to next step.
		No	Retry this step.
10	**VERIFY TROUBLESHOOTING OF DTC P0401 COMPLETED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:41:00 value. • Is value within specification?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0402 [FS]

A3U010201086W02

DTC P0402	EGR flow excessive detected
DETECTION CONDITION	• Difference in intake manifold pressures when EGR is operated and when it is stopped is too large. **Diagnostic support note** • This is an intermittent monitor (EGR). • MIL illuminates if PCM detects the above malfunction conditions 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.

DTC P0402	EGR flow excessive detected
POSSIBLE CAUSE	• EGR valve gasket is not installed. • EGR valve gasket has been damaged. • PCM malfunction

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 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Have other DTCs been stored?	Yes	Go to applicable DTC troubleshooting.
		No	Go to next step.
4	**INSPECT EGR VALVE GASKET** • Turn ignition key to OFF. • Remove EGR valve. • Is EGR valve gasket installed?	Yes	Go to next step.
		No	Install EGR valve gasket, then go to Step 6.
5	**INSPECT EGR VALVE GASKET MALFUNCTION** • Does EGR valve gasket have any crack and/or damage?	Yes	Replace EGR valve gasket, then go to Step 6.
		No	Go to next step.
6	**MONITOR EGR SYSTEM BY DRIVE MODE** • Make sure to reconnect all disconnected connectors. • Run OBD-II Drive Mode 1 and 2. (See 01–02B–10 OBD-II DRIVE MODE [FS].) • Check EGR System Monitor completion status using On-Board Readiness Test function. • Has EGR system been monitored?	Yes	Go to next step.
		No	Retry this step.
7	**VERIFY TROUBLESHOOTING OF DTC P0402 COMPLETED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:41:00 value. • Is value within specification?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0421 [FS]

A3U010201086W03

DTC P0421	Warm-up catalyst system efficiency below threshold
DETECTION CONDITION	• PCM compares the number of HO2S (front) and HO2S (rear) inversions for a predetermined time. PCM monitors the number of inversions the rear side performs while the front side inverts for a specified number of times when the following monitoring conditions are met. PCM detects the inversion ratio. If inversion ratio is below threshold, PCM determines that catalyst system has deteriorated. **MONITORING CONDITIONS** — Engine speed is **1,500—3,000 rpm**. — Calculated load is **15—48%**(*1). — Vehicle speed is **28—120 km/h {17.3—74.5 mph}**. *1: Maximum calculated load value varies depending on engine speed. **Diagnostic support note** • This is an intermittent monitor. (CATALYST) • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS is available. • PENDING CODE is stored if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.

DTC P0421	Warm-up catalyst system efficiency below threshold
POSSIBLE CAUSE	• WU-TWC deterioration or malfunction • Exhaust gas leakage • Looseness of HO2S (front) • Looseness of HO2S (rear) • HO2S (front) malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then start engine. • Verify related pending code or stored DTCs. • Are other DTCs present?	Yes	Go to appropriate DTC troubleshooting.
		No	Go to next step.
4	**INSPECT EXHAUST SYSTEM GAS LEAKAGE** • Visually inspect exhaust gas leakage in exhaust system. • Is there any gas leakage?	Yes	Repair or replace faulty exhaust parts, then go to Step 7.
		No	Go to next step.
5	**INSPECT INSTALLATION OF FRONT AND REAR OXYGEN SENSORS** • Inspect for looseness of front and rear oxygen sensors. • Is it okay?	Yes	Go to next step.
		No	Retighten sensor, then go to Step 7.
6	**INSPECT WU-TWC** • Clear DTC using WDS or equivalent. • Inspect WU-TWC. (See 01–16–19 WARM UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION.) • Is WU-TWC okay?	Yes	Replace suspected oxygen sensor, then go to next step.
		No	Replace WU-TWC, then go to next step.
7	**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 WDS or equivalent. • Start engine and perform OBD-II DRIVE MODE except for MODE 4. (See 01–02B–10 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.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0442 [FS]

A3U010201086W04

DTC P0442	Evaporative emission control system leak detected (small leak)
DETECTION CONDITION	• PCM measures the fuel tank pressure (ftp2), which is the vacuum when a specified period has passed after EVAP system is sealed. PCM determines the pressure difference between ftp1 and ftp2. If pressure difference exceeds the threshold, PCM determines that the EVAP system has a small leak. This monitor can activate when the PCM determines that the CONSTANTLY LEAK DETECTED test results are passed. **THRESHOLD VALUE** — Fuel tank pressure (ftp2—ftp1): **1.17—3.91 kPa {8.78—29.30 mmHg, 0.34—1.15 inHg}** • Threshold valve varies depends on ECT at engine start BARO. **MONITORING CONDITIONS** — PCM monitors EVAP system when driving under following conditions: • Remaining fuel**: 35—85%** • ECT at engine start: **–10.0 °C—35 °C {14.0—95.0 °F}** • Atmospheric pressure: **above 69.7 kPa {523 mmHg, 20.5 inHg}** • Vehicle speed: **39.5—120.3 km/h {24.5—74.7 mph}** • Engine speed: **1,000—4,000 rpm** • Calculated load: **9—65%** • Throttle opening angle: **3.1—12.5%** • IAT during monitor: **–10—60 °C {14—140 °F}** **Diagnostic support note** • This is an intermittent monitor (Evaporative leak monitor). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and PENDING CODE are stored if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Canister drain cut valve (CDCV) malfunction • Pressure control valve malfunction • Loose or defective fuel filler cap • Charcoal canister malfunction • Catch tank malfunction • Rollover valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • EVAP hose damaged or loose

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify related pending code or stored DTCs. • Are DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FUEL-FILLER CAP** • Verify fuel-filler cap is not either loose or damaged. • Is it okay? **Note** • When fuel-filler caps other than OEM caps are attached, it is considered malfunction.	Yes	Go to next step.
		No	Retighten fuel-filler cap or replace it if it is damaged. Then go to Step 15.

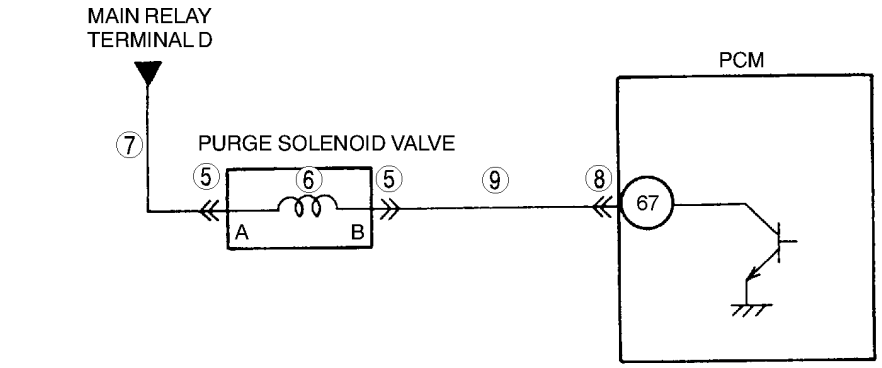
STEP	INSPECTION		ACTION
5	**INSPECT WHOLE EVAP CONTROL SYSTEM** • Implement "01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection". (See 01–03B–55 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	No leaks were detected in EVAP control system at this time. Go to Step 15.
		No	If evaporative emission tester is available, go to Step 14. If not, go to next step.
6	**INSPECT LEAKAGE OF FROM CHARCOAL CANISTER TO FUEL TANK** • Implement "01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to fuel tank". (See 01–03B–55 Inspection from charcoal canister to fuel tank.) • Does voltage change under to specified readings and hold for a **minimum of 2 minutes**?	Yes	Go to Step 9.
		No	Go to next step.
7	**INSPECT ATTACHED ACCESSORIES ON FUEL TANK** • Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge. • Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to Step 15.
8	**INSPECT ROLLOVER VALVE** • Remove rollover valve and inspect for damage. • Is it okay?	Yes	Inspect for detached, incorrectly installed or cracked hoses on fuel tank and from charcoal canister to fuel tank. Repair or replace as necessary. Then go to step 15.
		No	Replace rollover valve, then go to Step 15.
9	**INSPECT LEAKAGE BETWEEN CHARCOAL CANISTER AND PURGE SOLENOID VALVE** • Implement "01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to purge solenoid valve". (See 01–03B–55 Inspection from charcoal canister to purge solenoid valve.) • Does voltage change under to specified readings and hold for **a minimum of 2 minutes**?	Yes	Go to Step 15.
		No	Go to next step.
10	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 15.
11	**INSPECT PURGE SOLENOID VALVE** • Remove purge solenoid valve and inspect for damage and air leakage. • Is it okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 15.
12	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 15.
13	**INSPECT CDCV** • Remove CDCV and inspect for damage and air leakage. • Is it okay?	Yes	Inspect and repair or replace detached, incorrectly installed or cracked hoses from charcoal canister to CDCV. Then go to Step 15.
		No	Replace CDCV, then go to Step 15.
14	**INSPECT LEAKAGE OF EVAPORATIVE CONTROL SYSTEM** • Inspect evaporative control system for leakage using evaporative emission tester. (See 01–16–13 FUEL-FILLER CAP INSPECTION.) • Is any leakage found?	Yes	Repair or replace faulty area, then go to next step.
		No	Go to next step.

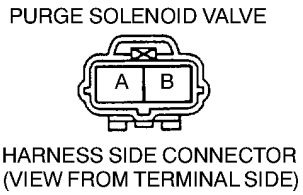
STEP	INSPECTION		ACTION
15	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — BARO: **69.7 kPa {523 mmHg, 20.5 inHg} or higher** — ECT: **–10.0—20.0 °C {14.0—68.0 °F} [at atmospheric pressure 69.7 kPa {523 mmHg, 20.5 inHg}]** — IAT: **–10—60 °C {14—140 °F}** — Fuel tank level: **35—85%** • Is there any PID that is out of specification?	Yes	Go to next step.
		No	Go to Step 18.
16	**VERIFY EVAP SYSTEM REPAIRED** • Carry out evaporative system test even if it is not test condition. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is system test result of small leak okay?	Yes	EVAP system repaired. Go to Step 22.
		No	Go to next step.
17	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST OR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — BARO: **69.7 kPa {523 mmHg, 20.5 inHg} or higher** — ECT: **–10.0—20.0 °C {14.0—68.0 °F} [at atmospheric pressure 69.7 kPa {523 mmHg, 20.5 inHg}]** — IAT: **–10—60 °C {14—140 °F}** — Fuel tank level: **35—85%** • 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	Then go to next step.
18	**DECIDE ON AFTER REPAIR PROCEDURE ACCORDING TO REPAIR SHOP CONDITION** • Clear DTC from memory using WDS or equivalent. • Is repair shop possible to perform Drive Mode 4?	Yes	Go to Step 20.
		No	Go to next step.
19	**VERIFY EVAP SYSTEM REPAIRED BY EVAPORATIVE SYSTEM TEST** • Carry out evaporative system test. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is system test result okay?	Yes	EVAP system repaired. Go to Step 22.
		No	Replace PCM, then go to Step 22.
20	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run Drive Mode 4. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 17.
21	**VERIFY EVAP SYSTEM REPAIRED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Is it below MAX value?	Yes	Go to next step.
		No	Replace PCM, then go next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

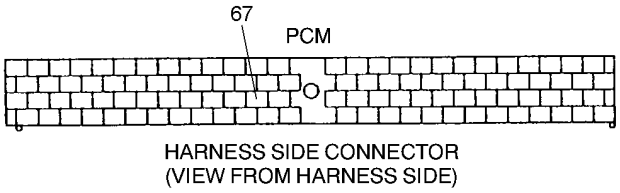
DTC P0443 [FS]

A3U010201086W05

DTC P0443	Evaporative emission solenoid system purge control valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from purge solenoid valve. If voltage at PCM terminal 67 remains low or high, PCM determines that purge solenoid valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored one per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between purge solenoid valve terminal B and PCM terminal 67 • Open circuit in wiring between main relay terminal D and purge solenoid valve terminal A • Open circuit in wiring between purge solenoid valve terminal B and PCM terminal 67 • Short to power circuit between purge solenoid valve terminal B and PCM terminal 67 • PCM malfunction







Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to OFF then start engine. • Is same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect purge solenoid valve tube that is connected to intake manifold. • Connect vacuum pump to purge solenoid valve. • Pump vacuum pump several times and stop. • Wait **a few seconds**. • Is vacuum maintained?	Yes	Go to Step 5.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT PASSAGE CONTROL OF PURGE SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect purge solenoid valve connector. • Pump vacuum pump several times and wait **a few seconds**. • Is vacuum maintained?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Replace purge solenoid valve, then go to Step 10.
5	**INSPECT PURGE SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
6	**INSPECT PURGE SOLENOID VALVE** • Measure resistance between purge solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 10.
7	**INSPECT PURGE SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between purge solenoid valve connector terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
9	**INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between purge solenoid valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between purge solenoid valve terminal B (harness-side) and breakout box terminal 67. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0443 COMPLETED** • Make sure to reconnect all disconnected connectors. • 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.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0451 [FS]

A3U010201086W06

DTC P0451	Fuel tank pressure sensor performance problem
DETECTION CONDITION	• Difference in fuel tank pressure, which PCM monitors while operating evaporative leak monitor function or purge solenoid valve is intentionally closed, is too small or too large. **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.

DTC P0451	Fuel tank pressure sensor performance problem
POSSIBLE CAUSE	• Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction • CDCV malfunction • Poor connection of CDCV, fuel tank pressure sensor and/or PCM • Short circuit in wiring at CDCV • Charcoal canister clogging

Diagnostic procedure

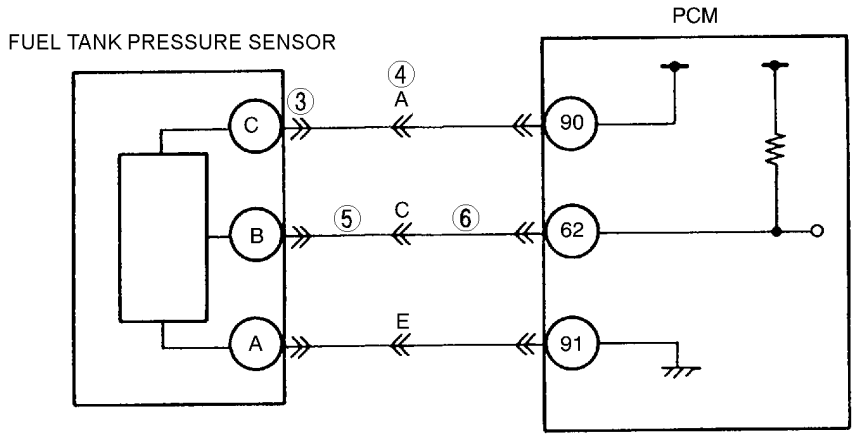
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 FOR OTHER DTCS** • Turn ignition key to OFF then start engine. • Verify stored DTC. • Have DTCs P0443 and/or P1449 been stored?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 8.
5	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 8.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See 01–16–9 CHARCOAL CANISTER INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 8.
7	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS].) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 8.
8	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — ECT (at engine start): **–10—35 °C {14.0—95.0 °F}** — BARO: **Above 69.7kPa {523 mmHg, 20.5 inHg}** — VSS: **39.5—105.5 km/h {24.5—65.4 mph}** — Load: **9—65%** — TP: **0.15—0.85 %** — IAT: **–10—60 °C {14—140 °F}** • Is there any condition 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	Correct condition, then go to next step.

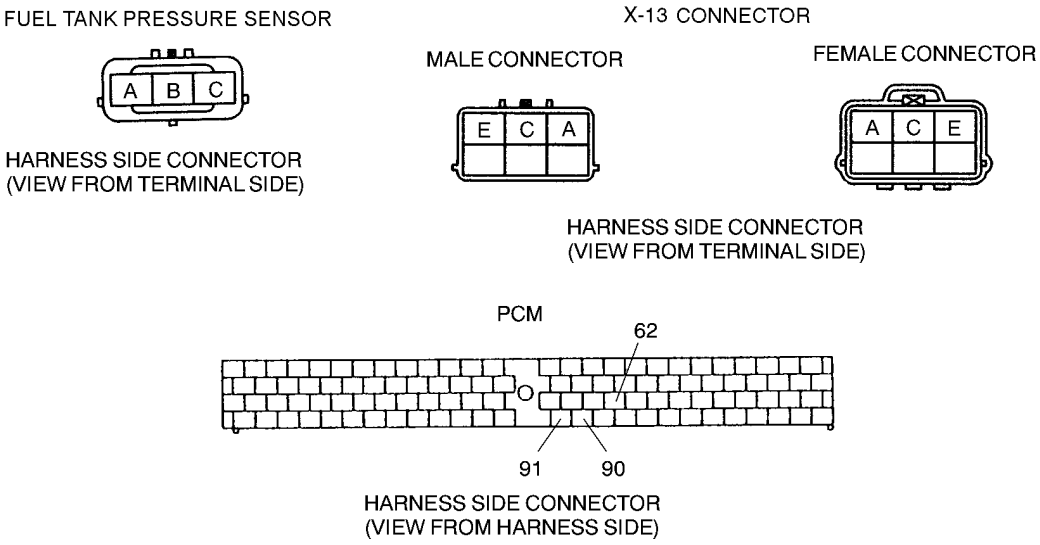
STEP	INSPECTION		ACTION
9	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Run OBD-II Drive Mode 4. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 8.
10	**VERIFY TROUBLESHOOTING OF DTC P0451 COMPLETED** • Turn ignition key to 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0452 [FS]

A3U010201086W07

DTC P0452	Fuel tank pressure sensor circuit low input
DETECTION CONDITION	• PCM monitors input voltage from fuel tank pressure sensor when monitoring condition is met. If PCM terminal 62 voltage is **below 0.20 V** after engine is started, PCM determines that fuel tank pressure sensor circuit is malfunctioning. **MONITORING CONDITION** — Engine coolant temperature is **below 80 °C {176 °F}**. **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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Fuel tank pressure 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 and PCM terminal 90 • PCM malfunction





Diagnostic procedure

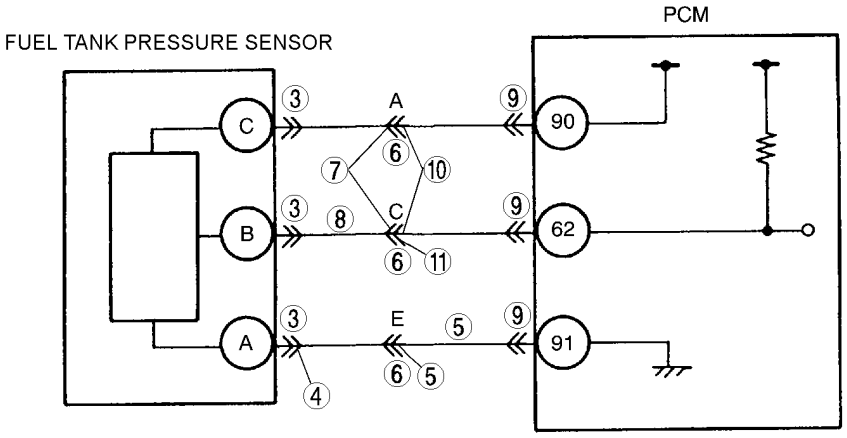
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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.

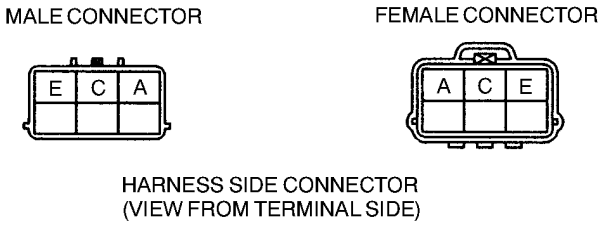
STEP	INSPECTION		ACTION
3	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FUEL TANK PRESSURE SENSOR CONNECTOR** **Note** • If DTCs P0107 and P0122 are also retrieved with P0452, go to REFERENCE VOLTAGE troubleshooting procedure. (See 01–03B–49 NO.30 REFERENCE VOLTAGE [FS].) • Turn ignition key to ON (Engine OFF). • Check voltage between FTP sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5—5.5 V**?	Yes	Go to Step 5.
		No	Go to next step.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FUEL TANK PRESSURE SENSOR INTERMEDIATE CONNECTOR** • Disconnect X-13 connector. • Measure voltage at X-13 male terminal A. • Is voltage **within 4.5—5.5 V**?	Yes	Check for open circuit between following terminals: • X-13 connector female terminal A 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-13 connector male terminal A. — Repair or replace suspected harness, then go to Step 7.
5	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 INTERMEDIATE CONNECTOR)** • Turn ignition key to OFF. • Disconnect X-13 connector. • Check for continuity between X-13 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-13 INTERMEDIATE CONNECTOR)** • Disconnect PCM connector. • Check for continuity between X-13 male terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check fuel tank pressure sensor signal circuit and fuel tank pressure sensor 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 WDS or equivalent. • Start engine. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

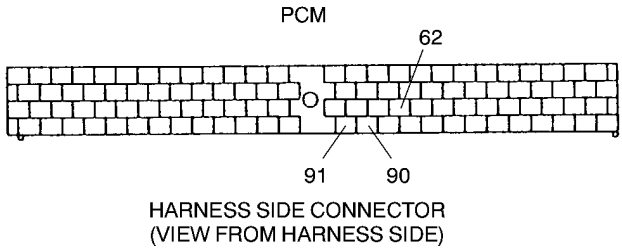
DTC P0453 [FS]

A3U010201086W08

DTC P0453	Fuel tank pressure sensor circuit high input
DETECTION CONDITION	• PCM monitors input voltage from FUEL TANK PRESSURE sensor when monitoring condition is met. If PCM terminal voltage is **above 4.79 V** after engine is started, PCM determines that FUEL TANK PRESSURE sensor circuit has malfunction. **MONITORING CONDITION** — Engine coolant temperature is **below 80 °C {176 °F}**. **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 detection condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
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 from fuel tank pressure sensor terminal A and PCM terminal 91 • FUEL TANK PRESSURE sensor signal circuit is shorted to reference voltage (Vref) supply circuit.







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.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 FUEL TANK PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect FTP sensor connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal, then go to Step 12.
		No	Go to next step.
4	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT (AT FUEL TANK PRESSURE SENSOR CONNECTOR)** • Check for continuity between fuel tank pressure sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT (AT X-13 CONNECTOR)** • Disconnect X-13 connector. • Check for continuity between X-13 male terminal E and body ground. • Is there continuity?	Yes	Check for open circuit between following terminals: • X-13 female terminal E and FTP sensor terminal A (harness-side) Repair or replace suspected harness, then go to Step 12.
		No	Check for open circuit between following terminals: • PCM terminal 91 (harness-side) and X-13 male terminal E Repair or replace suspected harness, then go to Step 12.
6	**CHECK 6-PIN INTERMEDIATE CONNECTOR** • Disconnect X-13 connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace suspected terminal, then go to Step 12.
		No	Go to next step.
7	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 CONNECTOR)** • Check for continuity between X-13 female terminals A and C. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 12.
		No	Go to next step.
8	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-13 CONNECTOR)** • Check for continuity between fuel tank pressure sensor terminal B (harness-side) and X-13 female terminal C. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 12.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 62, 90 and 91 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 12.
		No	Go to next step.
10	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (X-13 CONNECTOR AND PCM CONNECTOR)** • Check for continuity between X-13 terminals A and C (PCM-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 12.
		No	Go to next step.

STEP	INSPECTION		ACTION
11	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN CIRCUIT (X-13 CONNECTOR AND PCM CONNECTOR)** • Connect breakout box with PCM disconnected. • Check for continuity between X-13 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.
12	**VERIFY TROUBLESHOOTING OF DTC P0453 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0455 [FS]

A3U010201086W09

DTC P0455	Evaporative emission control system leak detected (blockage or large leak)
DETECTION CONDITION	• PCM measures the fuel tank pressure (ftp1), which is the vacuum when a specified period has passed after the tank pressure has reached the preprogrammed target pressure and purge control valve has been closed when monitoring conditions are met. If fuel tank pressure is above threshold, PCM determines that the EVAP system is blocked or has a large leak. **THRESHOLD VALUE** — Fuel tank pressure (ftp1): **–1.3—1.95 kPa {–9.76—14.65 mmHg, –0.38—0.58 inHg}** • Threshold valve varies depends on ECT at engine start BARO. **MONITORING CONDITIONS** — Fuel tank pressure (ftp 1):**above –3.92 kPa {–29.42 mmHg, –1.16 inHg}** — PCM monitors EVAP system when driving under following conditions: • Remaining fuel: **35—85%** • ECT at engine start: **–10—35 °C {14.0—95.0 °F}** • Atmospheric pressure: **above 69.7 kPa {523 mmHg, 20.5 inHg}** • Vehicle speed: **39.5—120.3 km/h {24.5—74.7 mph}** • Engine speed: **1,000—4,000 rpm** • Calculated load: **9—65%** • Throttle opening angle: **3.1—12.5%** • IAT during monitor: **–10—60 °C {14—140 °F}** **Diagnostic support note** • This is an intermittent monitor (Evaporative leak monitor). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS and PENDING CODE are 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	• Purge solenoid valve malfunction • Canister drain cut valve (CDCV) malfunction • Loose, missing or defective fuel filler cap • Charcoal canister malfunction • Catch tank malfunction • Check valve malfunction • Rollover valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • EVAP hose damaged or loose • Fuel tank pressure sensor malfunction

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 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 RELATED PENDING CODE OR STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify related PENDING CODE or stored DTCs. • DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FUEL-FILLER CAP** • Verify fuel-filler cap is not either disconnected, loose or damaged. • Is it okay? **Note** • When fuel-filler caps other than OEM caps are attached, it is considered malfunction.	Yes	Go to next step.
		No	Retighten fuel-filler cap or replace it if it is damaged. Then go to Step 27.
5	**INSPECT PURGE SOLENOID VALVE STUCK** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.
6	**INSPECT CDCV STUCK** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 27.
7	**CLASSIFY EVAPORATIVE EMISSION CONTROL SYSTEM FOR LEAKAGE OR BLOCKAGE** **Note** • If evaporative emission tester is not available, go to next step. • Carry out evaporative emission control system inspection using evaporative emission tester. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Does red “FAILED” light turn ON (leakage)?	Yes	Tester detects leakage. • Inspect evaporative control system for leakage using evaporative emission tester. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Repair or replace faulty area, then go to Step 27.
		No	Go to next step.
8	**VERIFY REPAIR SHOP CONDITION** • Is repair shop possible to perform Drive Mode 4?	Yes	Go to next step.
		No	Go to Step 16.
9	**VERIFY MONITORING CONDITION FOR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — Barometric pressure: **69.7 kPa {523 mmHg, 20.5 inHg} or higher** — Engine coolant temperature: **–10.0—20.0 °C {14.0—68.0 °F}** [at barometric pressure **69.7 kPa {523 mmHg, 20.5 inHg}**] — Intake air temperature: **–10—60 °C {50—140 °F}** — Fuel tank level: **35—85%** • Is there any conditions 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.

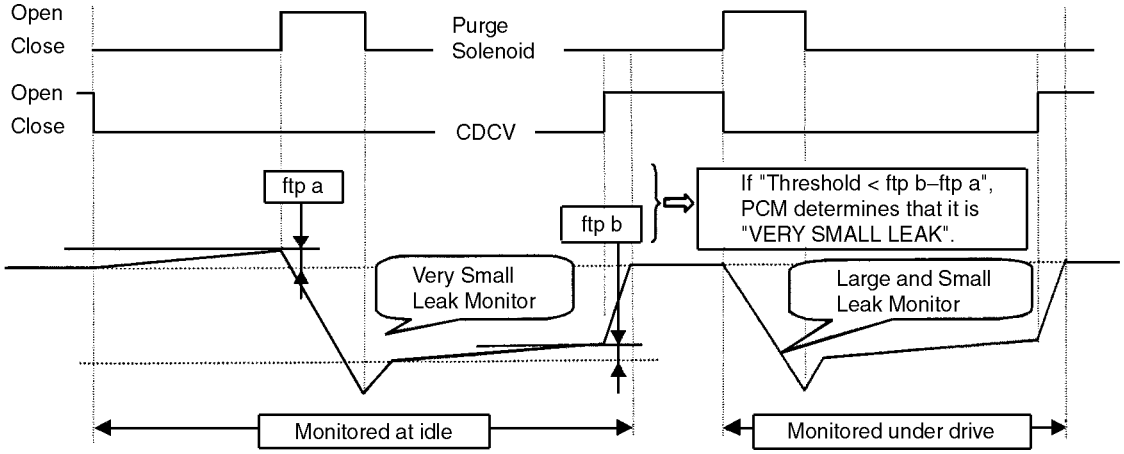
STEP	INSPECTION		ACTION
10	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Clear DTC from memory using WDS or equivalent. • Run OBD-II Drive Mode 4 and verify that CDCV and FTP graphs. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Is there any problem detected?	Yes	FTP does not change: • EVAP monitoring system is inoperative. Go to next step. FTP changes, but does not reach **2.0 kPa {15 mmHg, 0.59 inHg}**: • There is a large leak in EVAP system. Go to Step 13. FTP reaches **2.0 kPa {15 mmHg, 0.59 inHg}**, but suddenly goes back: • Pressure in fuel tank cannot be reduced and only gas from EVAP line can be drawn. Inspect following and repair or replace suspected parts. • Rollover valve for large ventilation resistance. • Check valve for inoperative or blockage. • Air filter for clogging. Then go to Step 27.
		No	No leaks were detected in EVAP control system at this time. Go to Step 30.
11	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.
12	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS].) • Is fuel tank pressure sensor okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 27.
13	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 27.
14	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 27.
15	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 27.
16	**INSPECT WHOLE SYSTEM OF EVAP CONTROL SYSTEM** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03B–55 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Intermittent concern exists. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].) Inspect purge solenoid valve and CDCV circuit.
		No	Go to next step.
17	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect fuel tank pressure sensor. (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS].) • Is fuel tank pressure sensor okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 27.
18	**INSPECT LEAKAGE FROM CHARCOAL CANISTER TO FUEL TANK** • Implement “01-03B ENGINE CONTROL OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Inspection from charcoal canister to fuel tank”. (See 01–03B–55 Inspection from charcoal canister to fuel tank.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Go to Step 22.
		No	Go to next step.

STEP	INSPECTION		ACTION
19	**INSPECT ATTACHED ACCESSORIES ON FUEL TANK** • Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge. • Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to Step 27.
20	**INSPECT FUEL SHUT-OFF VALVE** • Inspect fuel shut-off valve for ventilation. (See 01–14–13 FUEL TANK INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank, then go to Step 27.
21	**INSPECT ROLLOVER VALVE** • Inspect rollover valve for ventilation. • Is it okay?	Yes	Inspect following and repair or replace for detached, incorrectly installed or cracked hoses: • Charcoal canister • Fuel tank (include fuel shut-off valve and rollover valve) • Fuel tank pressure sensor Then go to Step 27.
		No	Replace fuel tank, then go to Step 27.
22	**INSPECT LEAKAGE FROM CHARCOAL CANISTER TO PURGE SOLENOID VALVE** • Implement "01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative Leak System Inspection Using Vacuum Pump, Inspection from charcoal canister to purge solenoid valve". (See 01–03B–55 Inspection from charcoal canister to purge solenoid valve.) • Does voltage change under to specified readings and hold for a **minimum of 2 minutes**?	Yes	Go to Step 27.
		No	Go to next step.
23	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 27.
24	**INSPECT PURGE SOLENOID VALVE OPERATION** • Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 27.
25	**INSPECT CHARCOAL CANISTER** • Remove charcoal canister and inspect for plugging, damage and pinhole. • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 27.
26	**INSPECT CDCV OPERATION** • Inspect CDCV. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to next step.
27	**DECIDE ON AFTER REPAIR PROCEDURE ACCORDING TO REPAIR SHOP CONDITION** • Clear DTC from memory using WDS or equivalent. • Is repair shop possible to perform Drive Mode 4?	Yes	Go to next step.
		No	Go to step 31.

STEP	INSPECTION		ACTION
28	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST OR DRIVE MODE 4** • Turn ignition key to ON (Engine OFF). • Verify that following conditions are met. — Barometric pressure: **69.7 kPa {523 mmHg, 20.5 inHg} or higher** — Engine coolant temperature: **–10.0—22.0 °C {14.0—71.6 °F}** [at barometric pressure **69.7 kPa {523 mmHg, 20.5 inHg}**] — Intake air temperature: **–10—60 °C {50—140 °F}** — Fuel tank level: **35—85%** • Is there any conditions 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.
29	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run OBD-II Drive Mode 4. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 28.
30	**VERIFY EVAP SYSTEM REPAIRED** • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:22:00 value. (See 01–02B–9 Diagnostic Monitoring Test Results Access Procedure.) • Is it below maximum value?	Yes	Go to Step 32.
		No	Replace PCM, then go to Step 32.
31	**INSPECT WHOLE EVAP CONTROL SYSTEM** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03B–55 Whole system inspection.) • Does voltage change under to specified readings and hold for **minimum of 2 minutes**?	Yes	Go to Step 32.
		No	Replace PCM, then go to Step 32.
32	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0456 [FS]

A3U010201086W10

DTC P0456	Evaporative emission control system leak detected (very small leak)
DETECTION CONDITION	• PCM measures the fuel tank pressure ftp a and ftp b when monitoring conditions are met. If the difference between ftp a and ftp b exceeds the threshold, PCM determines that EVAP system has a very small leak (**0.5 mm {0.02 in}** hole equivalent). **MONITORING CONDITION** — ECT at engine start **35 °C {95 °F} or below** — ECT **70—108 °C {158—226 °F}** — Atmospheric pressure: **above 69.7 kPa {523 mmHg, 20.5 inHg}** — Remaining fuel **35%—85%** — IAT **-10—60 °C {14—140 °F}** — Throttle opening angle closed — **16 minutes or less** after engine start  **Diagnostic support note** • This is an intermittent monitor (Evaporative leak monitor). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE are stored if PCM detects the above malfunction condition during first drive cycle. • DIAGNOSTIC MONITORING TEST RESULTS is available. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Canister drain cut valve (CDCV) malfunction • Charcoal canister malfunction • Catch tank malfunction • Fuel cap malfunction • Fuel tank malfunction • Fuel pump unit poor seal • EVAP hose damaged or loose • EVAP pipe damaged

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 RELATED PENDING CODE OR STORED DTC** • Turn ignition key to OFF then ON (Engine OFF). • Verify related pending code or stored DTC. • Is other DTC present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Perform evaporative system leak inspection. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is test result failed (red light turns on)?	Yes	Go to next step.
		No	Intermittent concern existing. Inspect purge solenoid valve and CDCV circuit for intermittent concern. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
5	**LOCATE LEAK POINT** • Check leakage for the following using Ultrasonic leak detector. — Charcoal canister — Catch tank — Fuel cap — EVAP hoses and pipes — Fuel tank • Is leakage found?	Yes	Repair leakage or replace part, then go to Step 10.
		No	Go to next step.
6	**INSPECT PURGE SOLENOID VALVE** • Disconnect purge solenoid valve tube that is connected to intake manifold. • Connect vacuum pump to purge solenoid valve. • Apply vacuum and wait for **5 seconds**. • Is vacuum maintained?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 10.
7	**INSPECT CDCV** • Connect all disconnected connectors and hoses. • Place clamp on CDCV hose between CDCV and air filter. • Perform evaporative system leak inspection. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is test result failed (red light turns on)?	Yes	Go to Step 10.
		No	Go to next step.
8	**CONFIRM CDCV LEAKAGE** • Remove clamp. • Perform evaporative system leak inspection. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is test result failed (red light turns on)?	Yes	Replace CDCV, then go to Step 11.
		No	Go to Step 11.
9	**INSPECT FUEL PUMP UNIT INSTALLATION** • Remove fuel tank. • Visually inspect for damage, insufficient sealing or poorly installed fuel pump unit. • Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to next step.
10	**PERFORM LEAK INSPECTION** • Connect all disconnected connectors and hoses. • Perform evaporative system leak inspection. (See 01–03B–54 Evaporative System Leak Inspection Using Leak Tester.) • Is test result failed (red light turns on)?	Yes	Leakage still exists. Locate leak point and repair. Then go to next step.
		No	Go to next step.
11	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST OR DRIVE MODE 5** • Turn ignition key to ON (Engine OFF). • Access ECT and FTL V PIDs using NGS tester. — ECT: **35 °C {95 °F} or below** — FTL V: **1.3 V—3.75 V** (**35—85%** fuel tank level equivalent) — IAT: **-10—60 °C {14—140 °F}** **Note** • All PIDs must be within specification to start monitor. • Is there any PID that is out of specification?	Yes	Cool down engine with fan or adjust fuel level, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
12	**VERIFY TROUBLESHOOTING OF DTC P0456 COMPLETED** • Clear DTC using NGS tester generic OBD-II function. • Run engine at **3.500 rpm** for **3 minutes**, then run at idle for **6 minutes**. • Access DIAGNOSTIC MONITORING TEST RESULTS. • Verify TEST ID 10:23:00 value. • Does it indicate 0 or 65535.	Yes	Monitoring was not implemented. Repeat Step 10.
		No	Go to next step.
13	**VERIFY P0456 MONITOR RESULT** • Is below MAX value?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to appropriate DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0461 [FS]

A3U010201086W11

DTC P0461	Fuel gauge sender unit circuit range/performance
DETECTION CONDITION	• PCM monitors fuel gauge sender unit input voltage difference before and after PCM-calculated fuel consumption has reached **19.3 liters {20.4 US qt., 17.0 Imp qt.}**. If fuel gauge sender unit operation reflects **5% less** than PCM-calculated fuel consumption, PCM determines that fuel gauge sender unit range/performance is in error. **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	• Fuel gauge sender unit malfunction or substandard performance

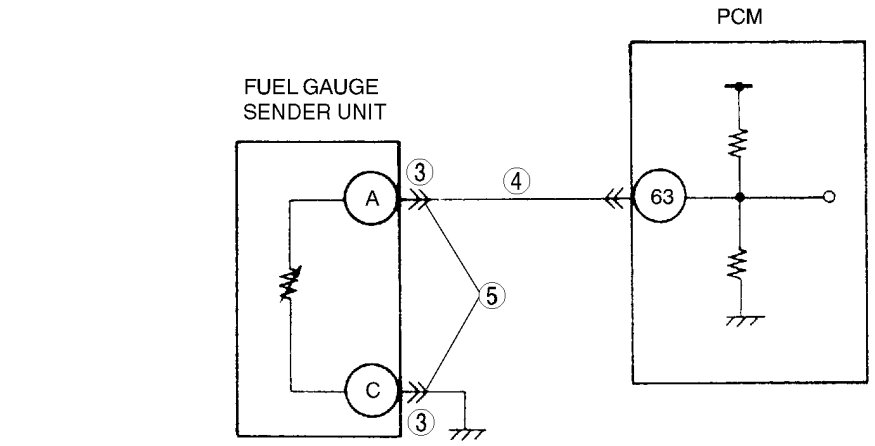
Diagnostic procedure

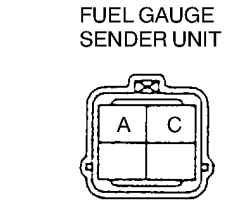
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See 09–22–13 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0462 [FS]

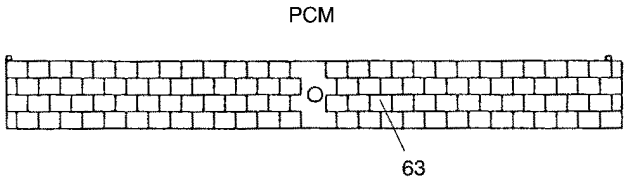
A3U010201086W12

DTC P0462	Fuel gauge sender unit circuit low input
DETECTION CONDITION	• PCM monitors the voltage of fuel gauge sender unit. If PCM detects PCM terminal 63 voltage **below 0.08 V** for **5 seconds**, PCM determines that 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.
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 • PCM malfunction • Bent terminals of fuel gauge sender unit





HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

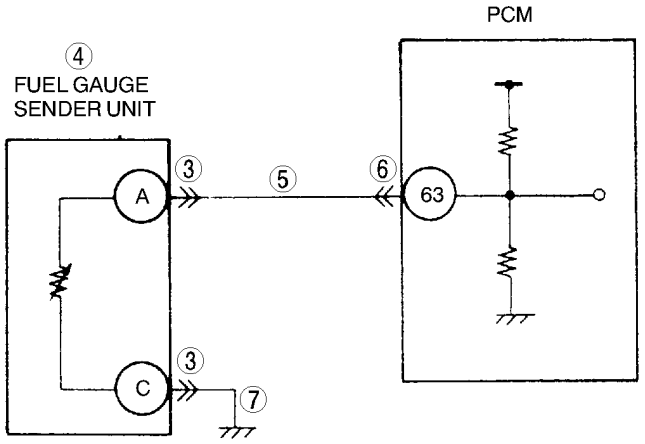
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 TERMINAL FOR BENT** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for bent terminal. • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 6.
		No	Go to next step.

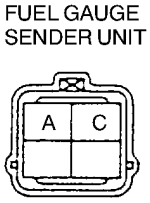
STEP	INSPECTION		ACTION
4	**INSPECT FUEL LEVEL SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between fuel gauge sender unit terminal A (harness-side) and body GND. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 6.
		No	Go to next step.
5	**INSPECT FUEL GAUGE SENDER UNIT CIRCUITS FOR SHORTS** • Check for continuity between fuel gauge sender unit terminals A and C (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 6.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0462 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0463 [FS]

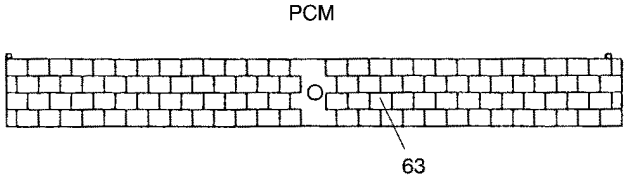
A3U010201086W13

DTC P0463	Fuel gauge sender unit circuit high input
DETECTION CONDITION	• PCM monitors the voltage of fuel gauge sender unit. If PCM detects PCM terminal 63 voltage **above 4.92 V** for **5 seconds**, PCM determines that 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.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction • 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 • PCM malfunction





HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

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 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 FUEL GAUGE SENDER UNIT CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT FUEL GAUGE SENDER UNIT** • Inspect fuel gauge sender unit. (See 09–22–13 FUEL GAUGE SENDER UNIT INSPECTION.) • Is fuel gauge sender unit okay?	Yes	Connect fuel gauge sender unit connector, then go to next step.
		No	Replace fuel gauge sender unit, then go to Step 8.
5	**INSPECT FTL SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between fuel gauge sender unit terminal A (harness-side) and body ground. • Is voltage **above 4.5—5.5 V**?	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair suspected terminal, then go to Step 8.
		No	Repair or replace open circuit between fuel gauge sender unit terminal A (harness-side) and PCM terminal 63 (harness-side), then go to Step 8.
7	**INSPECT FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between fuel gauge sender 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 next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0463 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0464 [FS]

A3U010201086W14

DTC P0464	Fuel gauge sender unit circuit performance (slosh check)
DETECTION CONDITION	• PCM monitors fuel gauge sender unit input voltage at PCM terminal 63 while engine is running. If differences are high for **14 seconds** while vehicle is stopped, PCM determines that FTL signal is incorrect. **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	• Fuel gauge sender unit malfunction or substandard performance

Diagnostic procedure

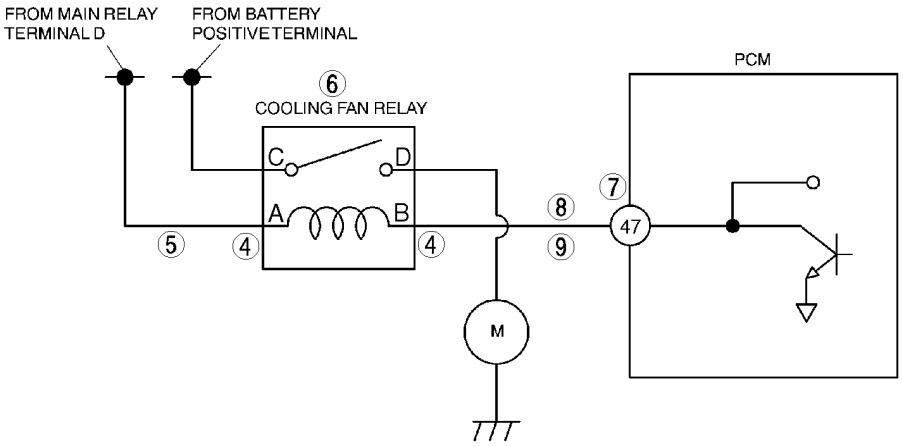
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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.

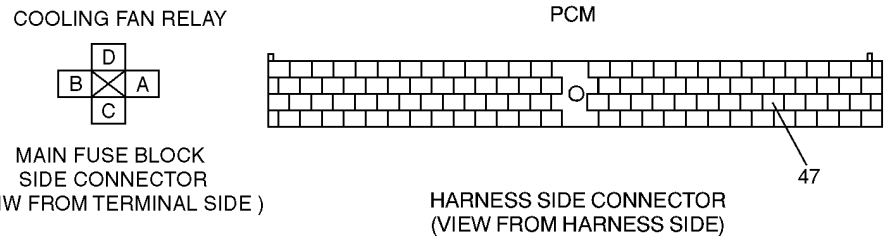
STEP	INSPECTION		ACTION
3	**INSPECT FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See 09–22–13 FUEL GAUGE SENDER UNIT INSPECTION.) • Is fuel gauge sender unit okay?	Yes	Replace PCM, then go to next step.
		No	Repair or replace fuel gauge sender unit, then go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0480 [FS]

A3U010201086W15

DTC P0480	Cooling fan relay circuit
DETECTION CONDITION	• PCM monitors control signal to cooling fan relay coil control circuit. If signal at PCM terminal 47 remains low or high, PCM determines that cooling fan relay circuit has malfunction. **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 first drive cycles. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Cooling fan relay malfunction • Connector or terminal malfunction • Short to GND circuit in wiring between cooling fan relay terminal B and PCM terminal 47 • Open circuit in wiring between cooling fan relay terminal B and PCM terminal 47 • Open circuit in wiring between main relay terminal D and cooling fan relay terminal C • PCM malfunction





Diagnostic procedure

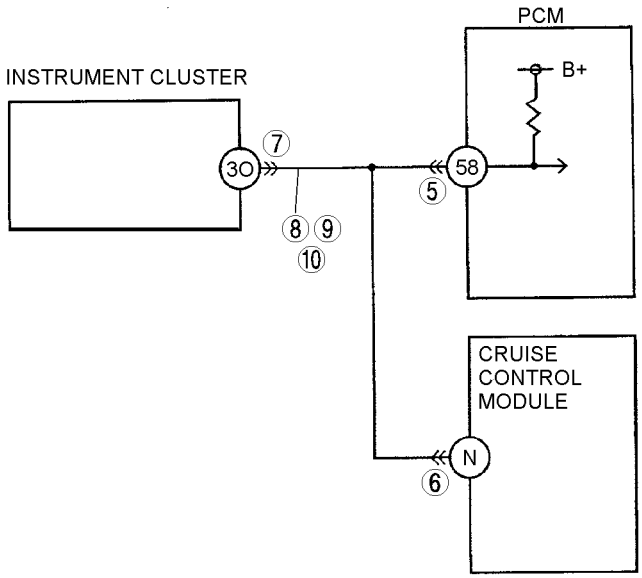
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.

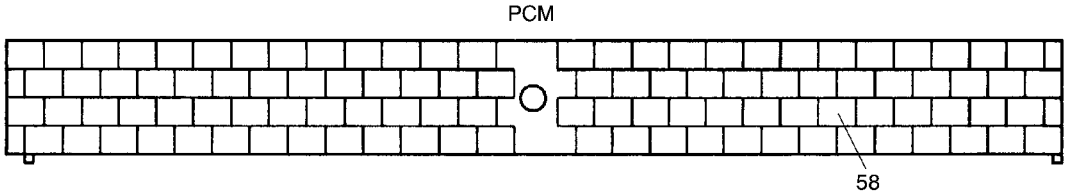
STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on - line repair information availability. • Is any Service Information available?	Yes	Perform repair or diagnosis according to available repair Information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Start engine. • Operate A/C to operate cooling fan relay. • Is same of DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
4	**INSPECT COOLING FAN RELAY FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect cooling fan relay connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, go to Step 10.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between cooling fan relay terminal C (harness-side) and body GND. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness, go to Step 10.
6	**INSPECT COOLING FAN RELAY** • Inspect cooling fan relay. • Is cooling fan relay okay?	Yes	Go to next step.
		No	Replace cooling fan relay, go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 47 (damaged, pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, go to Step 10.
		No	Go to next step.
8	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check for continuity between cooling fan relay terminal B (harness-side) and body GND. • Is there continuity?	Yes	Repair or replace harness for short to GND, go to Step 10.
		No	Turn ignition key to ON. Measure voltage between cooling fan relay terminal B and body GND. • If voltage is **B+**, repair or replace harness for short to power, go to next step. • If voltage is **approx. 0 V**, go to next step.
9	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Check for continuity between cooling fan relay terminal B (harness-side) and PCM terminal 47 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0480 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Operate A/C for operate cooling fan relay. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0500 [FS]

A3U010201087W01

DTC P0500	Vehicle speed sensor (VSS) circuit malfunction (MTX)
DETECTION CONDITION	• Vehicle speed signal does not input after following conditions are met: — Gear is in position other than neutral. — Load is above **40%**. — Engine speed is **2,000 rpm 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 if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • ABS HU/CM malfunction • Open circuit between PCM terminal 58 and instrument cluster terminal 3O • Short to ground between PCM terminal 58 and instrument cluster terminal 3O • Vehicle speedometer sensor malfunction • Open circuit between vehicle speedometer sensor terminal A and instrument cluster terminal 3G • Short to ground between vehicle speedometer sensor terminal A and instrument cluster terminal 3G • Open circuit between vehicle speedometer sensor terminal B and instrument cluster terminal 3I • Short to ground between vehicle speedometer sensor terminal B and instrument cluster terminal 3I



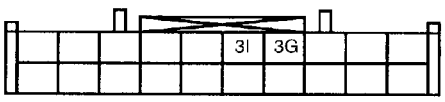


HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

VEHICLE SPEEDOMETER

SENSOR HARNESS SIDE
(VIEW FROM TERMINAL SIDE)

INSTRUMENT CLUSTER



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

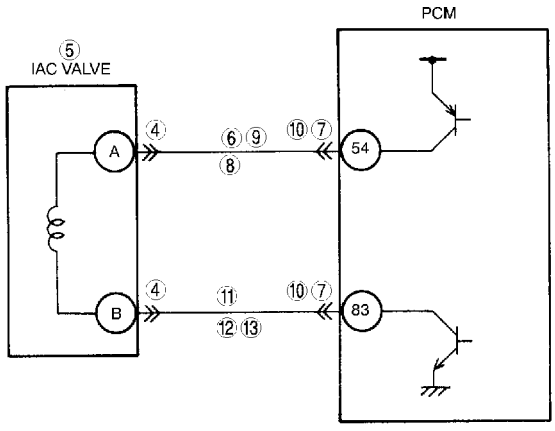
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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** • Connect WDS or equivalent to DLC-2. • Start engine. • Access VS PID using WDS or equivalent. — Vehicle speed **20 km/h {12.4 mph}: 20km/h {12.4 mph}** — Vehicle speed **40 km/h {24.8 mph}: 40km/h {24.8 mph}** • Are PID readings within specification?	Yes	Go to intermittent concern troubleshooting procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Go to next step.
4	**CHECK INPUT/OUTPUT CHECK MODE** • Turn ignition key to ON (engine OFF). • Is instrument cluster DTCs 10 or 12 detected? (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.).	Yes	DTC 10 and/or 12 displayed: Inspect instrument cluster. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)
		No	Go to next step.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace pin or connector, then go to Step 11.
6	**INSPECT CRUISE CONTROL MODULE CONNECTOR** • Disconnect cruise control module connector. • Inspect for bent terminals. • Are terminals okay?	Yes	Go to next step.
		No	Repair terminals, then go to Step 11.
7	**INSPECT INSTRUMENT CLUSTER CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect instrument cluster connector. • Check for poor connections (damaged/pulled-out terminals, corrosion, etc.). • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace terminals, then go to Step 11.
8	**INSPECT VOLTAGE** • Connect PCM connector. • Turn ignition key to ON (engine OFF). • Measure voltage at instrument cluster terminal 3O (harness-side). • Is there **5 V** at instrument cluster terminal 3O (harness-side)?	Yes	Replace instrument cluster, then go to Step 11. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Go to next step.
9	**INSPECT INSTRUMENT CLUSTER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Check for continuity between instrument cluster terminal 3O (harness-side) and breakout box terminal 58. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT INSTRUMENT CLUSTER CIRCUIT FOR SHORT TO GROUND** • Check for continuity between instrument cluster terminal 3O (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Replace instrument cluster, then go to next step.

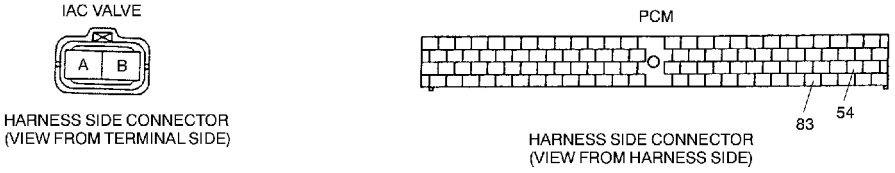
STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Warm up engine. • Drive vehicle under following conditions for 16 seconds. — Engine speed: **1,800 rpm or above** — Gear: not in neutral. — Load: **40% or above** • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0505 [FS]

A3U010201087W02

DTC P0505	IAC valve circuit malfunction
DETECTION CONDITION	• PCM monitors IAC valve circuit current while IAC duty is within **18—70 %**. If PCM detects IAC valve circuit current **below 100 mA (25 °C {77 °F})** or **above 4.5 A (25 °C {77 °F})** for **1 second**, PCM determines that IAC valve circuit has 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 PCM memory.
POSSIBLE CAUSE	• IAC valve circuit malfunction • Short to ground between IAC valve terminal A and PCM terminal 54 • Open circuit between IAC valve terminal A and PCM terminal 54 • Short to ground between IAC valve terminal B and PCM terminal 83 • Short to power between IAC valve terminal B and PCM terminal 83 • Open circuit between IAC valve terminal B and PCM terminal 83 • Poor connection of IAC valve connector or PCM connector • PCM malfunction





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 availability. • Is any 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC using WDS or equivalent. • Start engine and warm it up completely. • Is same DTC detected?	Yes	Go to next step.
		No	Go to intermittent concern. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
4	**INSPECT IAC VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect IAC valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair or replace terminal, then go to Step 14.
		No	Go to next step.
5	**INSPECT IAC VALVE ELECTRICAL MALFUNCTION** • Measure resistance between IAC valve terminals A and B (part-side). • Is resistance **within 8.7— 10.5 ohms**?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 14.
6	**CLASSIFY MALFUNCTION AT POWER SUPPLY CIRCUIT OR CONTROL CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between IAC valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Malfunction at control circuit. Go to Step 10.
		No	Malfunction at power supply circuit. Go to next step.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 54 (damaged/pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair terminal, then go to Step 14.
		No	Go to next step.
8	**INSPECT POWER CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between IAC valve terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 14.
		No	Go to next step.
9	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF • Connect breakout box with PCM disconnected. • Check for continuity between IAC valve terminal A (harness-side) and breakout box terminal 54. • Is there continuity?	Yes	Repair or replace harness for open circuit, then go to Step 14.
		No	Go to Step 14.
10	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 83 (damaged/pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair terminal, then go to Step 14.
		No	Go to next step.

STEP	INSPECTION		ACTION
11	**INSPECT CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between IAC valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 14.
		No	Go to next step.
12	**INSPECT CONTROL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between IAC valve terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 14.
		No	Go to next step.
13	**INSPECT CONTROL CIRCUIT MALFUNCTION FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between IAC valve terminal B (harness-side) and breakout box terminal 83. • Is there continuity?	Yes	Repair or replace harness for open, then go to next step.
		No	Go to next step.
14	**VERIFY TROUBLESHOOTING OF DTC P0505 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • Start engine and warm it up completely. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0506 [FS]

A3U010201087W03

DTC P0506	Idle control system RPM lower than expected
DETECTION CONDITION	• Actual idle speed is lower than expected by **100 rpm** for **14.1 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}**, PCM cancels diagnosis of P0506. **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 • Air cleaner element clogged • Air intake passage clogged • A/C relay control circuit malfunction • Generator control circuit malfunction • Purge solenoid valve malfunction • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

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.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Repair applicable DTCs. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Perform IAC inspection. (See 01–13B–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 11.
5	**INSPECT A/C MAGNETIC CLUTCH OPERATION** • Turn blower motor switch off. • Is magnetic 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 11. (See 01–03B–45 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS].)
		No	Go to next step.
6	**INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION** • Turn ignition key to OFF. • Disconnect generator connector. • Turn ignition key to ON. • Measure voltage between generator connector terminal D (harness-side) and body GND. • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair short to power circuit in generator control circuit, then go to Step 11.
7	**INSPECT PURGE SOLENOID VALVE CONTROL MALFUNCTION** • Perform purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to Step 11.
8	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step 11.
		No	Go to next step.
9	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body passage clogged?	Yes	Clean or replace throttle body, then go to Step 11.
		No	Go to next step.
10	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0506 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • 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.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0507 [FS]

A3U010201087W04

DTC P0507	Idle control system RPM higher than expected
DETECTION CONDITION	• Actual idle speed is higher than expected by **200 rpm** for **14.1 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}**, PCM cancels diagnosis of P0507. **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 misadjustment • Actuator cable misadjustment • Throttle valve malfunction • Vacuum hose misconnection • PCM malfunction

Diagnostic procedure

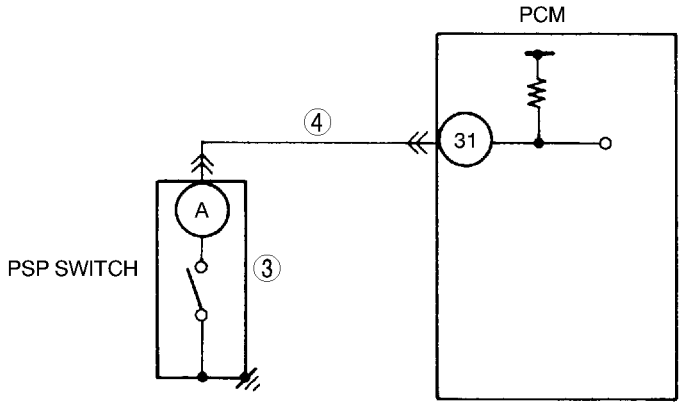
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then start engine. • Verify pending code or stored DTCs using WDS or equivalent. • Are other DTCs present?	Yes	Repair applicable DTCs. (See 01–02B–15 DTC TABLE [FS].)
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Perform IAC inspection. (See 01–13B–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.
5	**INSPECT ACCELERATOR CABLE FREE PLAY** • Turn ignition key to OFF. • Is accelerator cable free play okay? (See 01–13B–17 ACCELERATOR CABLE INSPECTION [FS].)	Yes	Go to next step.
		No	Adjust accelerator cable free play, then go to Step 9. (See 01–13B–17 ACCELERATOR CABLE ADJUSTMENT [FS].)
6	**INSPECT ACTUATOR CABLE FREE PLAY** • Is actuator cable adjustment okay?	Yes	Go to next step.
		No	Adjust actuator cable free play, then go to Step 9.
7	**INSPECT VACUUM HOSE CONNECTION** • Are vacuum hoses connected accurately? (See 01–13B–5 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.

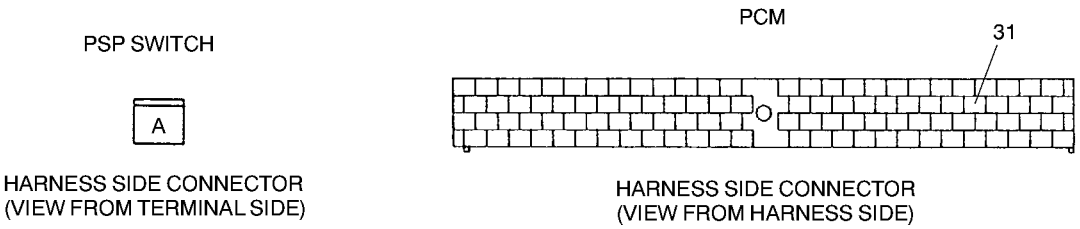
STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P0507 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Depress brake pedal for **14.1 seconds or more**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0550 [FS]

A3U010201087W05

DTC P0550	PSP switch circuit malfunction
DETECTION CONDITION	• PCM monitors PSP switch signal at PCM terminal 31. If input voltage is low (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}**, PCM determines that PSP switch circuit has 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	• PSP switch malfunction • Short to ground between PSP switch terminal and PCM terminal 31 • PCM malfunction





Diagnostic procedure

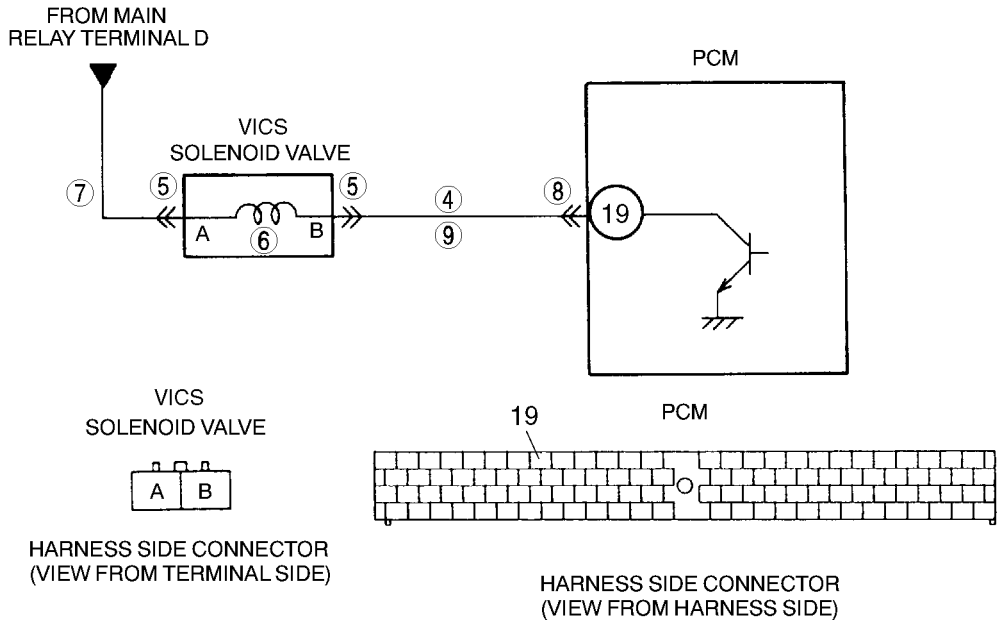
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 PSP SWITCH** • Perform PSP switch inspection (See 01–40B–44 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [FS].) • Is PSP switch okay?	Yes	Go to next step.
		No	Replace the PSP switch, then go to Step 5.
4	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check for 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.
5	**VERIFY TROUBLESHOOTING OF DTC P0550 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 60.2 km/h {37.4 mph}** for **1 minute**. • Verify that ECT PID is **above 60°C {140°F}** using WDS or equivalent. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0660 [FS]

A3U010201088W01

DTC P0660	VICS solenoid valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from VICS solenoid valve while engine running. If voltage at PCM terminal 19 remains low or high, PCM determines that VICS solenoid valve circuit has malfunction. **Diagnostic support note** • This is a intermittent 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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• VICS solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between VICS solenoid valve terminal B and PCM terminal 19 • Open circuit in wiring between main relay terminal D and VICS solenoid valve terminal A • Open circuit in wiring between VICS solenoid valve terminal B and PCM terminal 19 • Short to power circuit between VICS solenoid valve terminal B and PCM terminal 19 • PCM malfunction

DTC P0660	VICS solenoid valve circuit malfunction



Diagnostic procedure

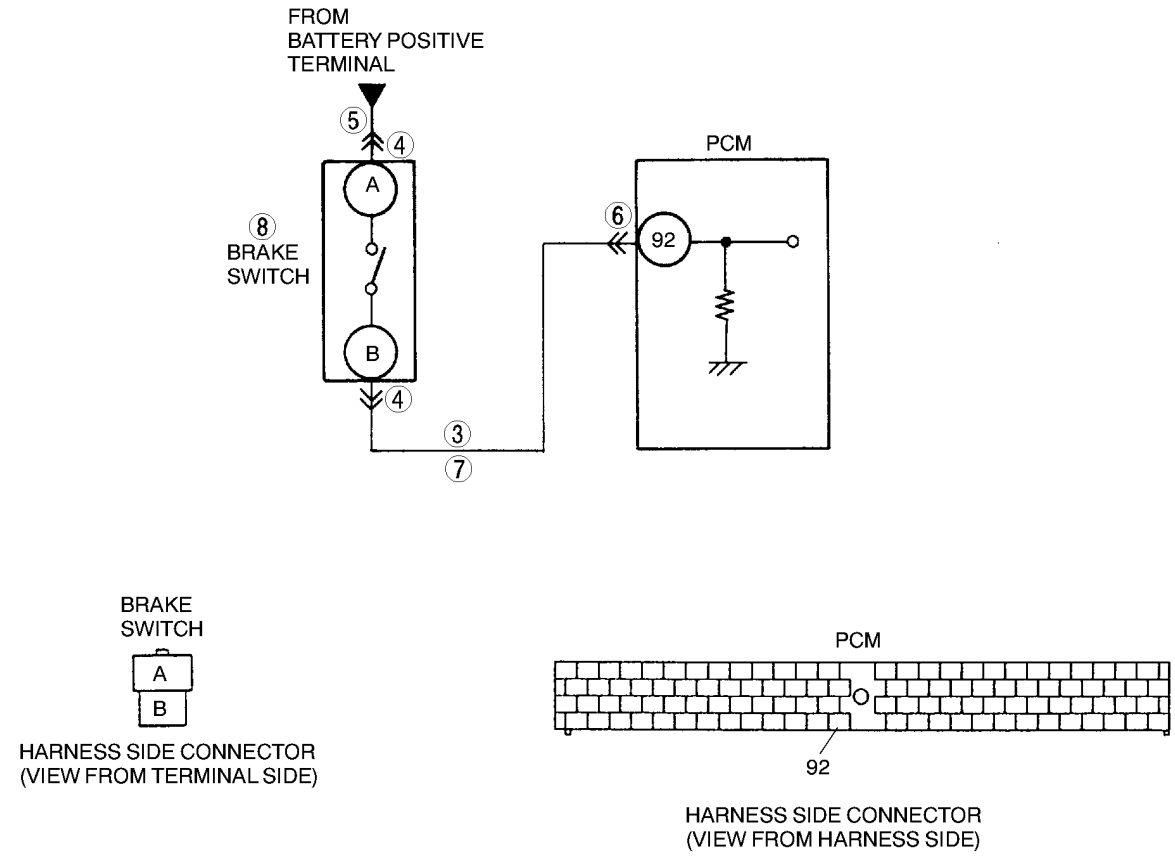
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Start engine. • Increase engine speed **above 4,750 rpm**. • Is PENDING CODE same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect VICS solenoid valve tube at solenoid side that connects to VICS solenoid valve. • Connect vacuum pump to VICS solenoid valve. • Apply vacuum. • Wait **for 5 seconds**. • Is vacuum maintained?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT PASSAGE CONTROL OF VICS SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect VICS 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 19 for short to ground, then go to Step 10.
		No	Replace VICS solenoid valve, then go to Step 10.
5	**INSPECT VICS SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
6	**INSPECT VICS SOLENOID VALVE** • Measure resistance between VICS solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace VICS solenoid valve, then go to Step 10.

STEP	INSPECTION		ACTION
7	**INSPECT VICS SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between VICS 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 10.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 19. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
9	**INSPECT VICS SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect VICS solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout 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.
10	**VERIFY TROUBLESHOOTING OF DTC P0660 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Increase engine speed **above 4,750 rpm**. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0703 [FS]

A3U010201089W01

DTC P0703	Brake switch input malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from brake switch. If PCM does not detect PCM terminal 92 voltage changes while accelerating and decelerating **10 times** repeatedly, it determines that brake switch circuit has 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	• Brake switch malfunction • Open harness between brake switch terminal B and PCM connector terminal 92 • PCM malfunction



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 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 BRAKE SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Measure voltage between brake switch connector terminal B 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.

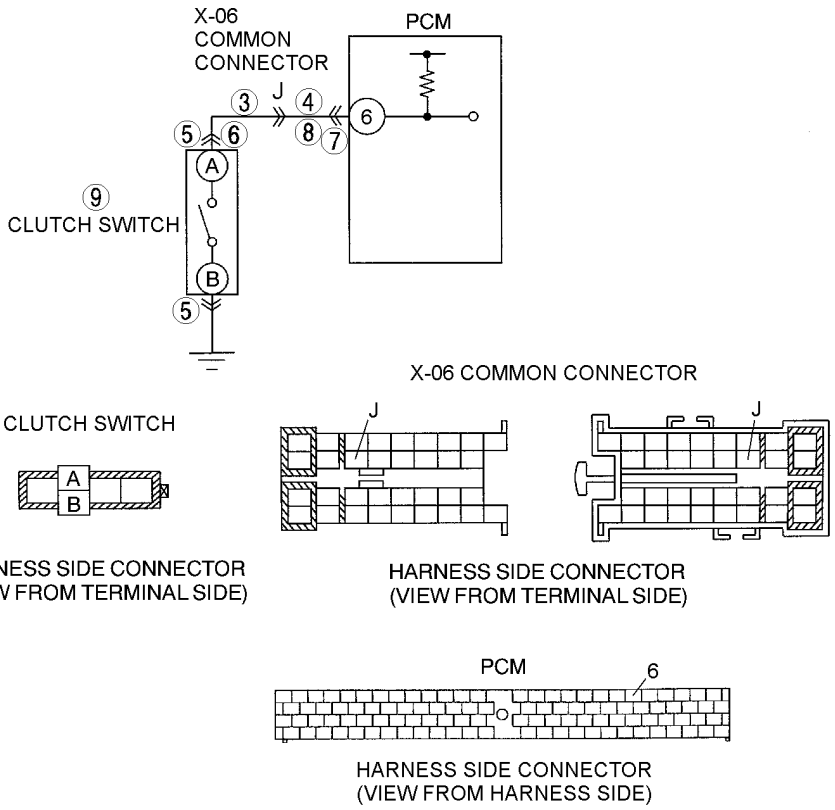
STEP	INSPECTION		ACTION
4	**INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition switch to OFF. • Disconnect brake switch connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
5	**INSPECT BRAKE SWITCH POWER CIRCUIT FOR OPEN CIRCUIT** • Measure voltage between brake switch connector terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace brake switch power circuit for open, then Go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition switch 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.
7	**INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM connector disconnected. • Connect brake switch connector. • Turn ignition switch to ON (engine OFF). • Depress brake pedal and measure voltage between breakout box terminal 92 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
8	**INSPECT BRAKE SWITCH** • Perform brake switch inspection. (See 04–11–5 BRAKE SWITCH INSPECTION.) • Is brake switch okay?	Yes	Go to next step.
		No	Replace brake switch, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0703 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle **30 km/h {18.6 mph} or more**. • Depress and release brake pedal **more than 10 times** while driving vehicle. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P0704 [FS]

A3U010201089W02

DTC P0704	Clutch switch circuit malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from the clutch switch. If PCM does not detect PCM terminal 6 voltage changes while running vehicle with vehicle speed **above 30 km/h {19 mph}** and stopping vehicle **10 times** repeatedly, it determines that clutch switch circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• CLT switch malfunction • Open harness between clutch switch terminal A and PCM terminal 6 • PCM malfunction

DTC P0704	Clutch switch circuit malfunction



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 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 X-06 COMMON CONNECTOR CIRCUIT FOR SHORT TO POWER** • Disconnect X-06 common connector. • Turn ignition key to ON (engine OFF). • Measure voltage between X-06 common connector male terminal J 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.
4	**INSPECT CLUTCH SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Measure voltage between breakout box terminal 6 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.
5	**INSPECT CLUTCH SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect clutch switch connector. • Check for poor connection (damaged/pilled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go Step 10.
		No	Go to next step.

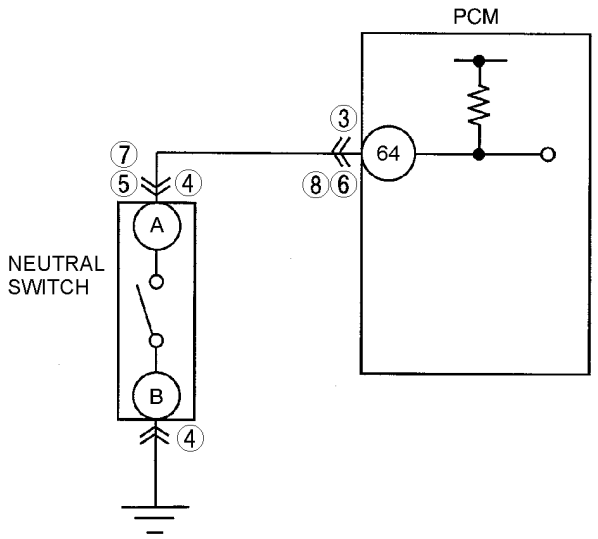
STEP	INSPECTION		ACTION
6	**INSPECT CLUTCH SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Measure voltage between clutch switch terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace clutch switch signal circuit for open, then go to Step 10.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 6 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
8	**INSPECT X-06 COMMON CONNECTOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect X-06 common connector. • Turn ignition key to ON (engine OFF). • Depress clutch pedal and measure voltage between X-06 common connector male terminal J and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
9	**INSPECT CLUTCH SWITCH** • Perform clutch switch inspection. (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS].) • Is clutch switch okay?	Yes	Go to next step.
		No	Replace clutch switch, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0704 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 30 km/h {19 mph}** and stop vehicle. • Depress and release clutch pedal **more than 10 times** during drive cycle. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

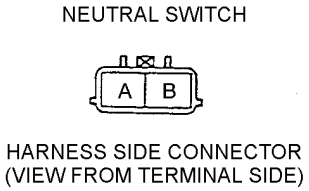
DTC P0705 [FS]

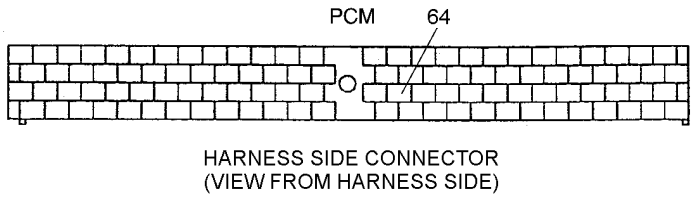
A3U010201089W03

DTC P0705	Neutral switch circuit malfunction
DETECTION CONDITION	• PCM monitors changes in input voltage from neutral switch. If PCM does not detect PCM terminal 64 voltage changes when clutch pedal is depressed **10 times** while driving with vehicle speed **above 30 km/h {19 mph}** and vehicle stopped repeatedly, it determines that neutral switch circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Neutral switch malfunction • Open harness between neutral switch terminal A and PCM terminal 64 • PCM malfunction

DTC P0705	Neutral switch circuit malfunction







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 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 NEUTRAL SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM connector disconnected. • Disconnect neutral switch connector. • Turn ignition key to ON (engine OFF). • Measure voltage between breakout box terminal 64 (harness-side) 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.
4	**INSPECT NEUTRAL SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect neutral switch connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go Step 9.
		No	Go to next step.

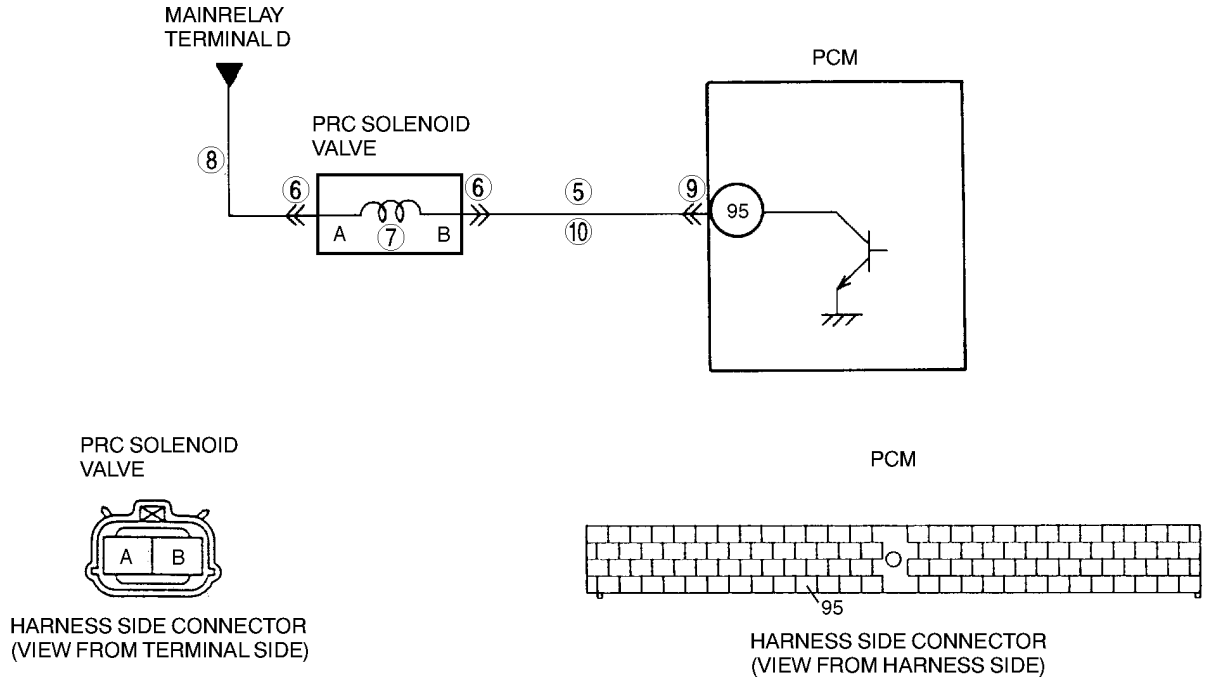
STEP	INSPECTION		ACTION
5	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Measure voltage between neutral switch terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace neutral switch signal circuit for open, then go to Step 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 64 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
7	**INSPECT NEUTRAL SWITCH CONNECTOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect neutral switch connector. • Turn ignition key to ON (engine OFF). • Depress clutch pedal and measure voltage between neutral switch terminal A (harness-side) and body ground. • Is voltage **below 1.0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
8	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Connect breakout box with PCM connector disconnected. • Turn ignition key to ON (engine OFF). • Depress clutch pedal and measure voltage between breakout box terminal 64 and body ground. • Is voltage **below 1.0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0705 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 30 km/h {19 mph}** and stop vehicle. • Depress and release clutch pedal **more than 10 times** during drive cycle. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1250 [FS]

A3U010201083W01

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from PRC solenoid valve. If voltage at PCM terminal 95 remains low or high, PCM determines that PRC solenoid valve circuit has malfunction. **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 first drive cycle. • FREEZE FRAME DATA is available. • DTC is not stored in PCM memory.

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction
POSSIBLE CAUSE	• PRC solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between PRC solenoid valve terminal B and PCM terminal 95 • Open circuit in wiring between main relay terminal D and PRC solenoid valve terminal A • Open circuit in wiring between PRC solenoid valve terminal B and PCM terminal 95 • Short to power circuit between PRC solenoid valve terminal B and PCM terminal 95 • PCM malfunction



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 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF then Start engine. • Is PENDING CODE of same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
4	**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 6.
		No	Go to next step.
5	**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 95 and PRC solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace PRC solenoid valve, then go to Step 11.

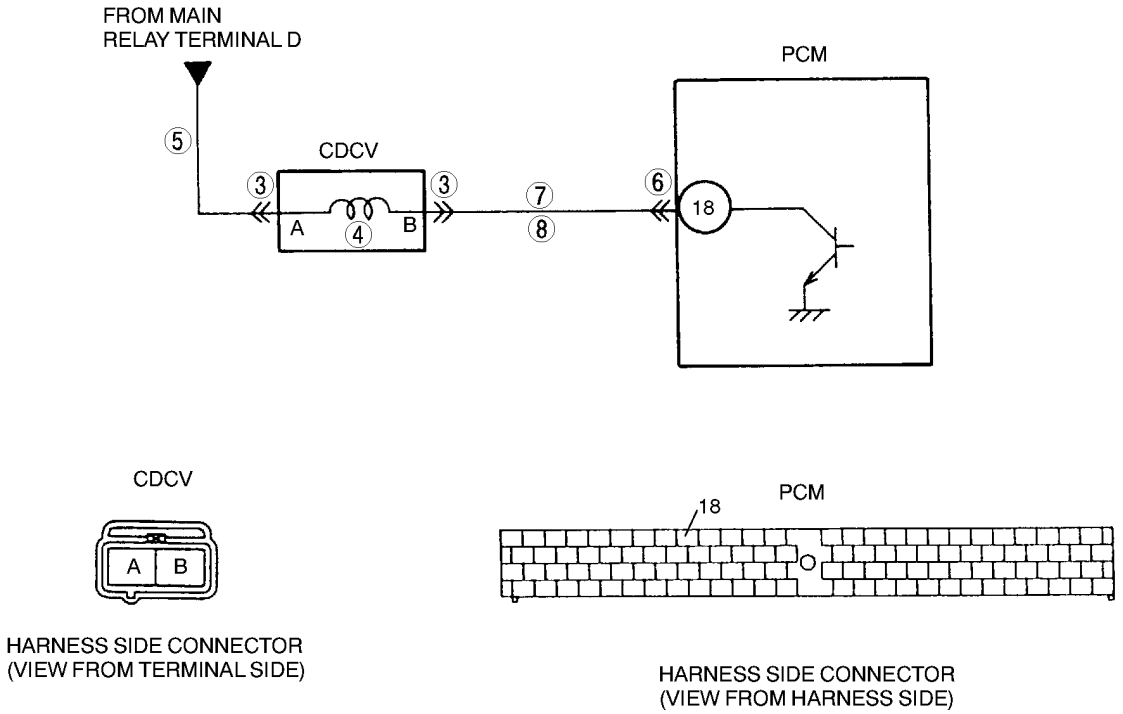
STEP	INSPECTION		ACTION
6	**INSPECT PRC SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT PRC SOLENOID VALVE** • Measure resistance between PRC solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace PRC solenoid valve, then go to Step 11.
8	**INSPECT PRC SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • 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 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 95 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT PRC SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between PRC solenoid valve terminal B (harness-side) and breakout box terminal 95. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1250 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF then start engine. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1449 [FS]

A3U010201083W02

DTC P1449	Canister drain cut valve (CDCV) circuit malfunction
DETECTION CONDITION	• PCM monitors the input voltages from CDCV just after turning the ignition key to ON. If voltage at PCM terminal 18 remains low or high, PCM determines that CDCV circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored one per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• CDCV malfunction • Connector or terminal malfunction • Short to ground in wiring between CDCV terminal B and PCM terminal 18 • Open circuit in wiring between main relay terminal D and CDCV terminal A • Open circuit in wiring between CDCV terminal B and PCM terminal 18 • Short to power circuit between CDCV terminal B and PCM terminal 18 • PCM malfunction

DTC P1449	Canister drain cut valve (CDCV) circuit malfunction



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**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. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**INSPECT CDCV CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to next step.
4	**INSPECT CDCV** • Measure resistance between CDCV terminals (part-side). • Is resistance **within 17—21 ohms**?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 9.
5	**INSPECT CDCV POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • 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 9.
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 18. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check for 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 9.
		No	Go to next step.
8	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between CDCV terminal B (harness-side) and body ground. • Is the voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between CDCV terminal B (harness-side) and breakout box terminal 18. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1449 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1450 [FS]

A3U010201083W03

DTC P1450	Evaporative emission control system malfunction (excessive vacuum)
DETECTION CONDITION	• PCM monitors fuel tank pressure signal when monitoring conditions are met. If vacuum is **above –3.92 kPa {–29.4 mmHg, –1.16 inHg}** for **10 seconds**, PCM determines the excessive vacuum. **MONITORING CONDITIONS** — Intake air temperature is **above –10 °C {14 °F}**. — Engine coolant temperature is **100 °C {212 °F} or below**. — Vehicle speed is **99.8 km/h {61.9 mph} or below**. — Engine coolant temperature at engine start is **below 35 °C {95 °F}**. **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	• CDCV malfunction • Air filter clogged • Charcoal canister malfunction • Evaporative drain passage clogged (including check valve) • Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction

Diagnostic procedure

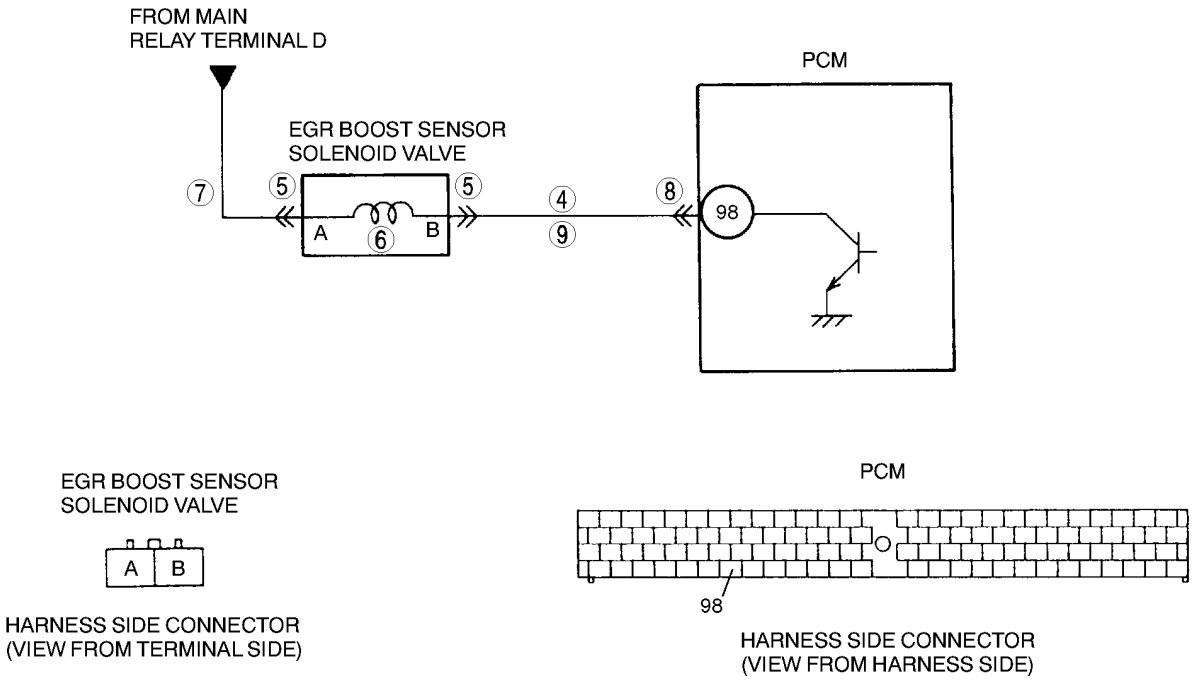
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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 RELATED STORED DTCS** • Turn ignition key to OFF then start engine. • Verify stored DTC. • Are DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT FOR OPERATION SOUND OF CDCV** • Perform CDCV inspection. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace it if necessary, then go to Step 9.
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 wait **a few seconds**. • Does vacuum hold?	Yes	Disconnect vacuum pump and connect vacuum hose to purge solenoid valve. Go to next step.
		No	Inspect purge solenoid valve and related harness. Replace it if necessary, then go to Step 9.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See 01–16–9 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 SENSOR** • Inspect fuel tank pressure sensor. (See 01–40B–40 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 connected to CDCV for clogging. • Is it okay?	Yes	Inspect for clogging in following area: • From charcoal canister to CDCV • Drain passage including check valve — 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** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Verify that following conditions are met. — BARO: **69.7 kPa {523 mmHg, 20.5 inHg} or higher** — ECT: **–10.0—20.0 °C {14.0—68.0 °F}** [at barometric pressure **69.7 kPa {523 mmHg, 20.5 inHg}]** — IAT: **–10—55 °C {50—131 °F}** — Fuel tank level: **15—85%** • Is there any condition 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 4.
		No	Go to next step.
10	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Run Drive Mode 4. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM been monitored?	Yes	Go to next step.
		No	Go back to Step 9.
11	**VERIFY TROUBLESHOOTING OF DTC P1450 COMPLETED** • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1487 [FS]

A3U010201083W04

DTC P1487	EGR boost sensor solenoid valve circuit malfunction
DETECTION CONDITION	• PCM monitors input voltages from EGR boost sensor solenoid valve just after turning the ignition key to ON. If voltage at PCM terminal 98 remains low or high, PCM determines that EGR boost sensor solenoid valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
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 D and EGR boost sensor solenoid valve terminal A • Open circuit in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • Short to power circuit between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • PCM malfunction



Diagnostic procedure

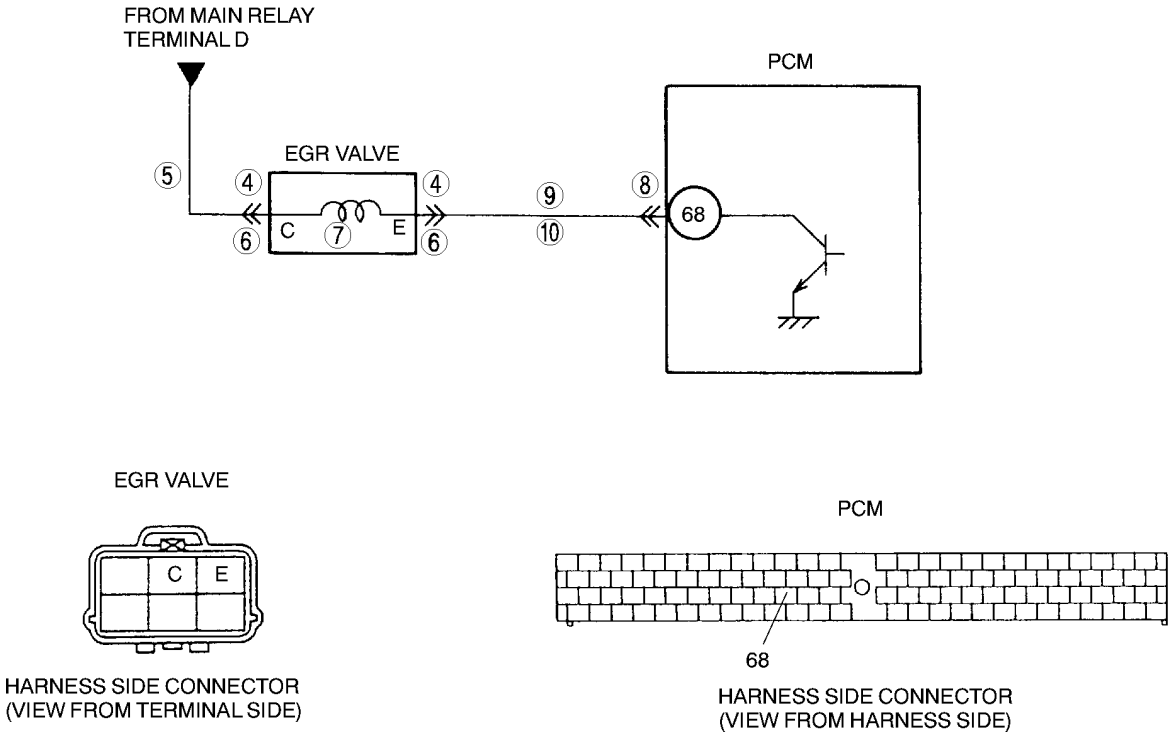
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**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 5.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**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 10.
		No	Replace EGR boost sensor solenoid valve, then go to Step 10.
5	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 10.
		No	Go to next step.
6	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Measure resistance between EGR boost sensor solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 10.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • 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 10.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 98. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
9	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONTROL CIRCUIT** • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Check for continuity between EGR boost sensor solenoid valve terminal B (harness-side) and breakout box terminal 98. • If there is continuity, go to next step. • If there is no continuity, repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P1487 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1496 [FS]

A3U010201083W05

DTC P1496	EGR valve stepping motor coil 1 open or short
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 68 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle) • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between EGR valve terminal E and PCM terminal 68 • Short to power circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between main relay terminal D and EGR valve terminal C • PCM malfunction



Diagnostic procedure

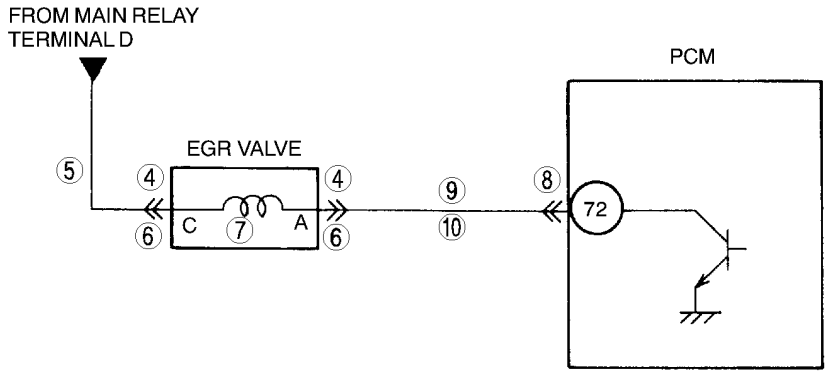
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1497 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.

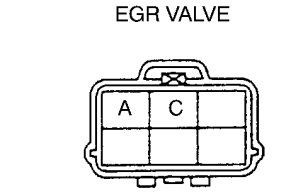
STEP	INSPECTION		ACTION
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 1 and 2. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and E (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 68 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal E (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal E and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal E (harness-side) and breakout box terminal 68. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1496 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1497 [FS]

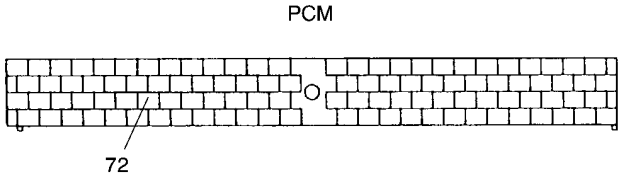
A3U010201083W06

DTC P1497	EGR valve stepping motor coil 2 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 72 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between EGR valve terminal A and PCM terminal 72 • Short to power circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between main relay terminal D and EGR valve terminal C • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

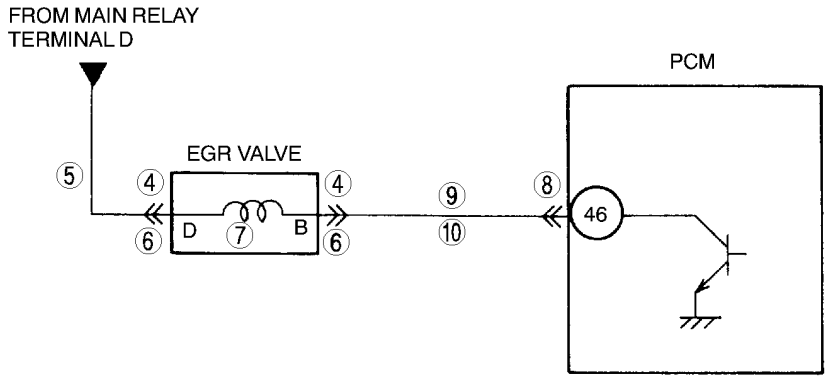
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1496 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.

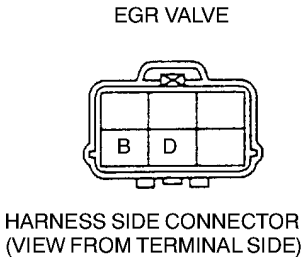
STEP	INSPECTION		ACTION
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 1 and 2. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, then go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and A (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 72 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal A and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal A (harness-side) and breakout box terminal 72. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1497 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

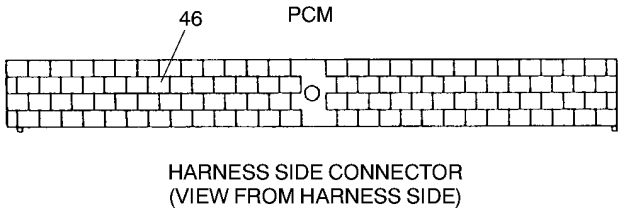
DTC P1498 [FS]

A3U010201083W07

DTC P1498	EGR valve stepping motor coil 3 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 46 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between EGR valve terminal B and PCM terminal 46 • Short to power circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between main relay terminal D and EGR valve terminal D • PCM malfunction







Diagnostic procedure

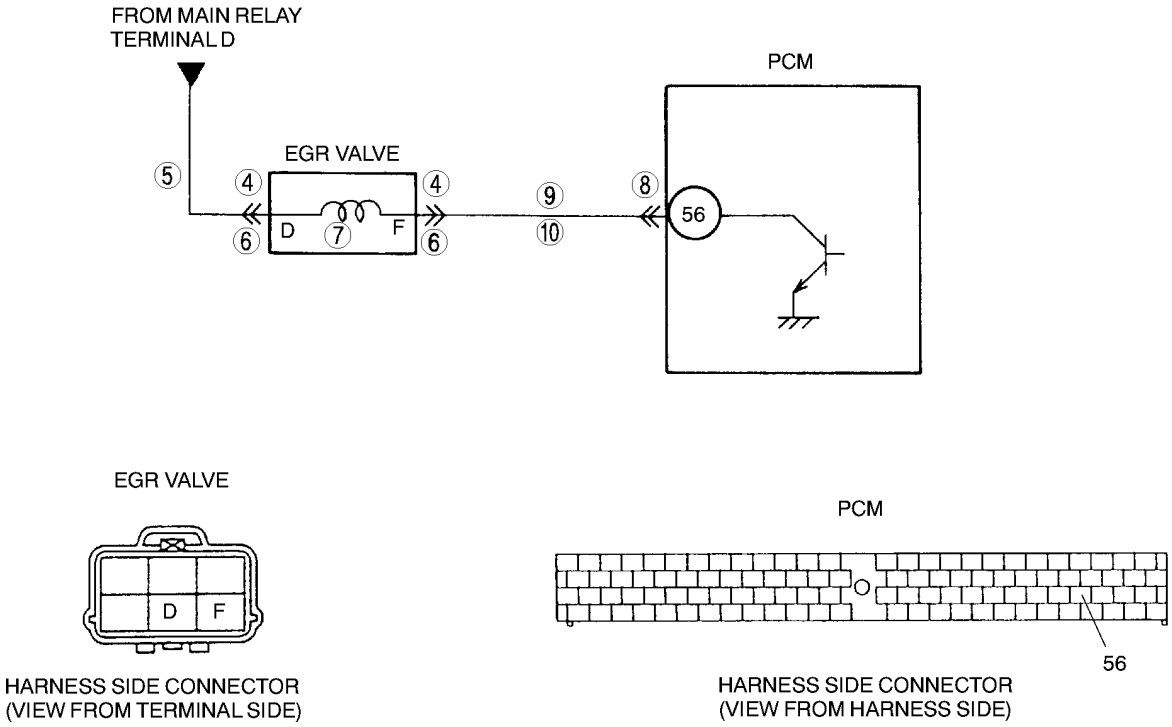
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Is same DTC and P1499 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.

STEP	INSPECTION		ACTION
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 3 and 4. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals D and B (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 46 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check continuity between EGR valve terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal B and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal B (harness-side) and breakout box terminal 46. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1498 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1499 [FS]

A3U010201083W08

DTC P1499	EGR valve stepping motor coil 4 open or short circuit
DETECTION CONDITION	• PCM monitors input voltages from EGR valve coil control circuit just after turning ignition key to ON. If voltage at PCM terminal 56 remains low or high, PCM determines that EGR valve circuit has malfunction. **Diagnostic support note** • This is a diagnostic support DTC (monitored once per key cycle). • MIL does not illuminate. • FREEZE FRAME DATA is not available. • DTC is not stored in PCM memory.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between EGR valve terminal F and PCM terminal 56 • Short to power circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between main relay terminal D and EGR valve terminal D • PCM malfunction



Diagnostic procedure

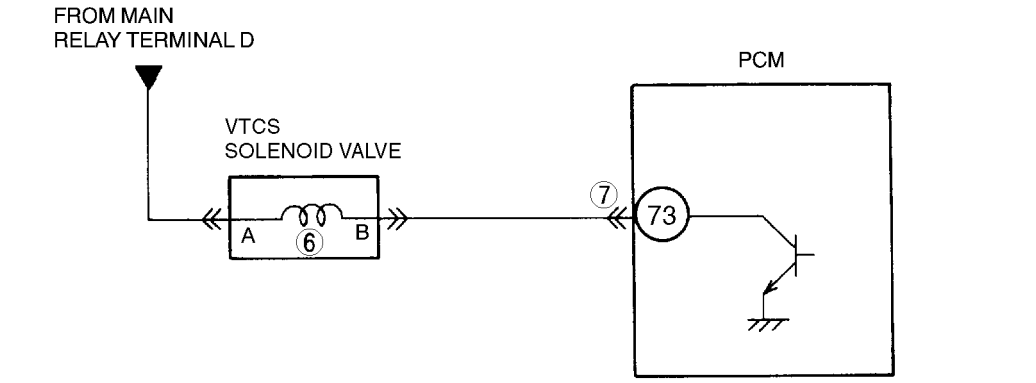
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
3	**CLASSIFY POWER CIRCUIT OR CONTROL CIRCUIT MALFUNCTION** • Are same DTC and P1498 present?	Yes	Malfunction at EGR valve or power circuit. Go to next step.
		No	Malfunction at EGR valve or control circuit. Go to Step 6.

STEP	INSPECTION		ACTION
4	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
5	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR valve terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Inspect EGR valve coils 3 and 4. (See 01–16–15 EGR VALVE INSPECTION.) • If there is a malfunction, replace EGR valve, and then go to Step 11. • If there is no malfunction, go to Step 11.
		No	Repair or replace harness for open circuit, then go to Step 11.
6	**INSPECT EGR VALVE FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect EGR valve connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminal D and F (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 56 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT CONTROL CIRCUIT FOR SHORT** • Check for continuity between EGR valve terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 11.
		No	Measure voltage between EGR valve terminal F and body ground. • If voltage is **B+**, repair or replace harness for short to power, then go to next step. • If voltage is **approx. 0 V**, go to next step.
10	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check for continuity between EGR valve terminal F (harness-side) and breakout box terminal 56. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1499 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to OFF, then ON (Engine OFF). • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1512 [FS]

A3U010201083W09

DTC P1512	Variable tumble control system (VTCS) shutter valve stuck closed
DETECTION CONDITION	• PCM monitors air flow amount is **above 45.2 g/s {6.0 lb/min}** when the following monitoring conditions are met. PCM determines that VTCS shutter valve has closed stuck malfunction. **MONITORING CONDITIONS** — Engine speed is **above 3,000 rpm**. — Engine coolant temperature is **above 70 °C {158 °F}**. — Throttle valve opening angle is **above 75%**. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• ECT sensor malfunction • MAF sensor malfunction • IAT sensor malfunction • EGR boost sensor malfunction • TP sensor malfunction • CKP sensor malfunction • VTCS solenoid valve malfunction • VTCS shutter valve malfunction (stuck closed) • VTCS shutter valve actuator malfunction (stuck closed). • Short to ground circuit between VTCS solenoid valve terminal B and PCM terminal 73 • Short to power circuit between VTCS solenoid valve terminal B and PCM terminal 73 • PCM malfunction



Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK 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	**CHECK RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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.

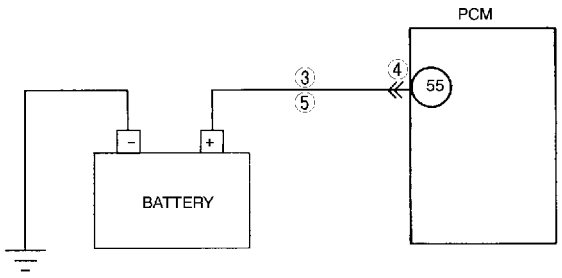
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 45.2 g/s {6.0 lb/min}** • Is pending code of same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
4	**VERIFY STORED OTHER DTCS** • Verify stored DTCs using WDS or equipment. • Is other DTC present except P1512?	Yes	Go to appropriate DTC troubleshooting procedures.
		No	Go to next step.
5	**INSPECT VTCS SHUTTER VALVE ACTUATOR** • Carry out “VTCS operation inspection” (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.) • Is VTCS shutter valve actuator okay?	Yes	Go to next step.
		No	Replace VTCS shutter valve actuator, then go to Step 8.
6	**INSPECT VTCS SOLENOID VALVE** • Carry out “VTCS solenoid valve airflow inspection” (See 01–13B–15 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 8.
7	**CHECK PCM POOR CONNECTION** • Check for poor connection at PCM terminal 73 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1512 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 45.2 g/s {6.0 lb/min}** • 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 “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

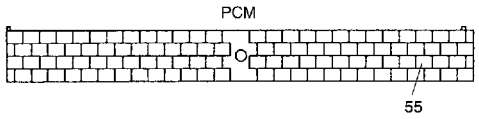
DTC P1562 [FS]

A3U010201083W10

DTC P1562	PCM +BB voltage low
DETECTION CONDITION	• PCM monitors voltage of backup battery positive terminal at PCM terminal 55 after engine is started. If the PCM detected battery positive terminal voltage **below 2.5 V** for **2 seconds**, PCM determines that backup voltage circuit has 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 PCM memory.
POSSIBLE CAUSE	• Open circuit or short to ground in wiring between battery positive terminal and PCM terminal 55 • Poor connection of PCM connector • PCM malfunction

DTC P1562	PCM +BB voltage low





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

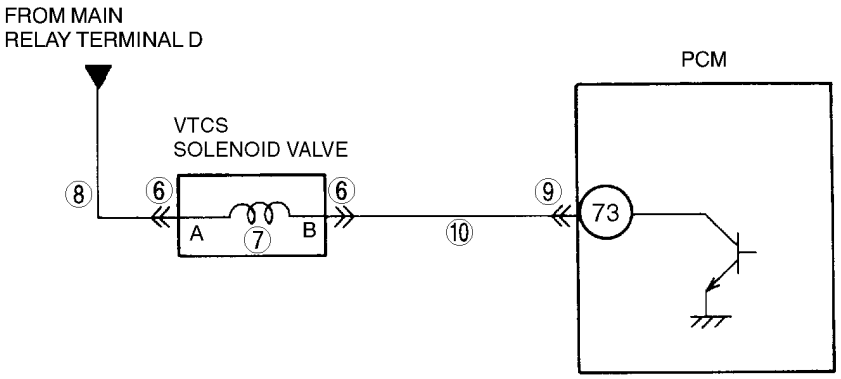
Diagnostic procedure

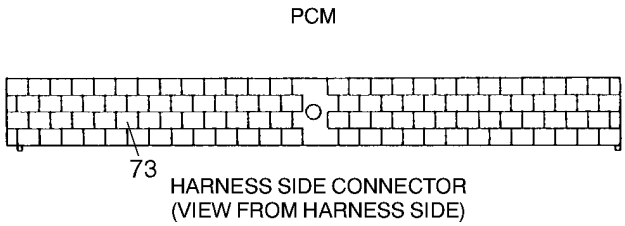
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any 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 MONITOR CIRCUIT FOR SHORT TO GROUND** • Disconnect both battery cables. • Measure resistance between battery positive cable and body ground. • Is resistance more than **500 ohms**?	Yes	Go to next step.
		No	Repair or replace harness between battery positive left terminal and PCM terminal 55 for short to ground, then go to Step 6.
4	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminal 55 (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 6.
		No	Go to next step.
5	**INSPECT MONITOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect battery cables. • Connect breakout box with PCM disconnected. • Check for continuity between battery positive cable 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 P1562 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • 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.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1569 [FS]

A3U010201083W11

DTC P1569	Variable tamble control system (VTCS) solenoid valve circuit low input
DETECTION CONDITION	• PCM monitors input voltages from VTCS solenoid valve. If voltage at PCM terminal 73 is low when VTCS solenoid valve OFF, PCM determines that VTCS solenoid valve has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Poor connection of connectors at PCM and/or VTCS solenoid valve • Short to ground in wiring between VTCS solenoid valve terminal B and PCM terminal 73 • Open circuit in wiring between main relay terminal D and VTCS solenoid valve terminal A • Open circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 73 • VTCS solenoid valve malfunction • PCM malfunction





Diagnostic procedure

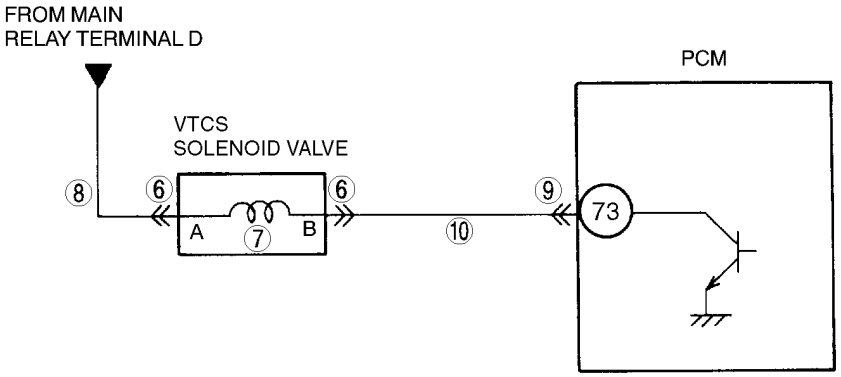
STEP	INSPECTION		ACTION
1	**CHECK FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • 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	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Is same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)

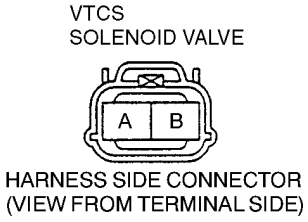
STEP	INSPECTION		ACTION
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect VTCS solenoid valve tube that connects to intake manifold. • Connect vacuum pump to VTCS solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT PASSAGE CONTROL OF VTCS SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect VTCS solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 73 and VTCS solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace VTCS solenoid valve, then go to Step 11.
6	**INSPECT VTCS SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT VTCS SOLENOID VALVE** • Measure resistance between VTCS solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 11.
8	**INSPECT VTCS SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Disconnect VTCS solenoid valve connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between 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 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 73. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT VTCS SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect VTCS solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 73 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open or short to ground circuit, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1569 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Start engine. • Verify that following conditions are met. — ECT: **above 65 °C {149 °F}** — Engine speed: **below 3,250 rpm** • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

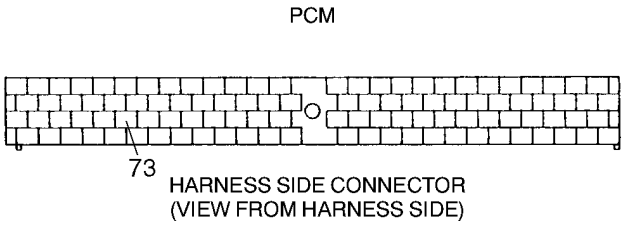
DTC P1570 [FS]

A3U010201083W12

DTC P1570	Variable tumble control system (VTCS) solenoid valve circuit high input
DETECTION CONDITION	• PCM monitors input voltages from VTCS solenoid valve. If voltage at PCM 73 is high when the VTCS solenoid valve ON, PCM determines that VTCS solenoid valve malfunction. **MONITORING CONDITIONS** — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65ºC {149 ºF}**. — Throttle valve opening angle is **below 14% for ATX, 12.50% for MTX [at engine speed 2,500 rpm]**. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above 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	• Poor connection of connectors at PCM and/or VTCS solenoid valve • Short to power circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 73 • Open circuit in wiring between main relay terminal D and VTCS solenoid valve terminal A • Open circuit in wiring between VTCS solenoid valve terminal B and PCM terminal 73 • VTCS solenoid valve malfunction • PCM malfunction







Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK 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 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.

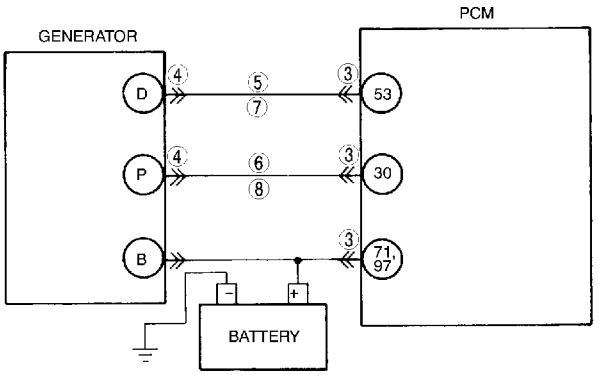
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle valve opening angle is **below 14% for ATX, 12.50% for MTX [at engine speed 2,500 rpm]**. • Is pending code of same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect VTCS solenoid valve tube that connects to intake manifold. • Connect vacuum pump to VTCS solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT PASSAGE CONTROL OF VTCS SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect VTCS solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 73 and VTCS solenoid valve terminal B for short to ground, then go to Step 11.
		No	Replace VTCS solenoid valve, then go to Step 11.
6	**INSPECT POOR CONNECTION OF VTCS SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT VTCS SOLENOID VALVE** • Measure resistance between VTCS solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 11.
8	**INSPECT VTCS SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Disconnect VTCS solenoid valve connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between 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 11.
9	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 73. (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT VTCS SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER** • Disconnect VTCS solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 73 and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power circuit, then go to next step.
		No	Go to next step.

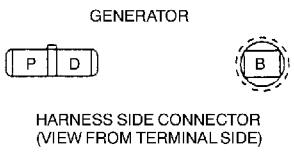
STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P1570 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **above 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle valve opening angle is **below 14% for ATX 12.50% for MTX [at engine speed 2,500 rpm]**. • 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** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

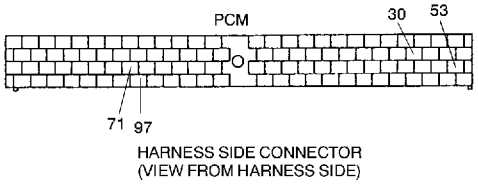
DTC P1631 [FS]

A3U010201083W13

DTC P1631	Generator output voltage signal no electricity
DETECTION CONDITION	• PCM monitors input voltage from generator. If PCM detect generator output voltage **below 8.5 V** or generated current **above 19.5 A** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Open or short to ground circuit between generator terminal P and PCM terminal 30 • Open or short to ground circuit between generator terminal D and PCM terminal 53 • Drive belt is cut off or has come off • Generator malfunction — Rectifier circuit malfunction — Brush abrasion • PCM malfunction







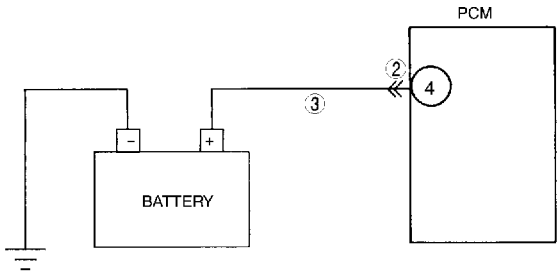
Diagnostic procedure

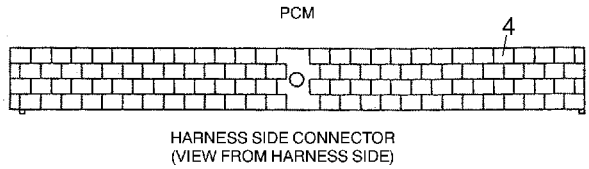
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT DRIVE BELT CONDITION** • Verify that drive belt auto tensioner indicator mark in not exceeding limit. (See 01–10B–3 DRIVE BELT INSPECTION [FS].) • Is front drive belt okay?	Yes	Go to next step.
		No	Replace and/or adjust drive belt, then go to Step 9.
3	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair terminals, then go to Step 9.
		No	Go to next step.
4	**INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION** • Disconnect generator connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair or replace terminals, then go to Step 9.
		No	Go to next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between generator 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.
6	**INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR GROUND** • Check continuity between generator terminal P (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 GENERATOR CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Measure resistance between generator terminal D (harness-side) and breakout box terminal 53. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
8	**INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR OPEN CIRCUIT** • Measure resistance between generator terminal P (harness-side) and breakout box terminal 30. • Is there continuity?	Yes	Repair or replace generator, then go to next step.
		No	Repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1631 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition switch to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1632 [FS]

A3U010201083W14

DTC P1632	Battery voltage monitor signal circuit malfunction
DETECTION CONDITION	• PCM monitors voltage of battery positive terminal at PCM terminal 4. If PCM detects battery positive terminal voltage **below 7.97 V** for **5 seconds**, PCM determines that battery positive voltage circuit has malfunction.
POSSIBLE CAUSE	• Open circuit in wiring between battery positive terminal and PCM terminal 4 • Poor connection of PCM connector • PCM malfunction





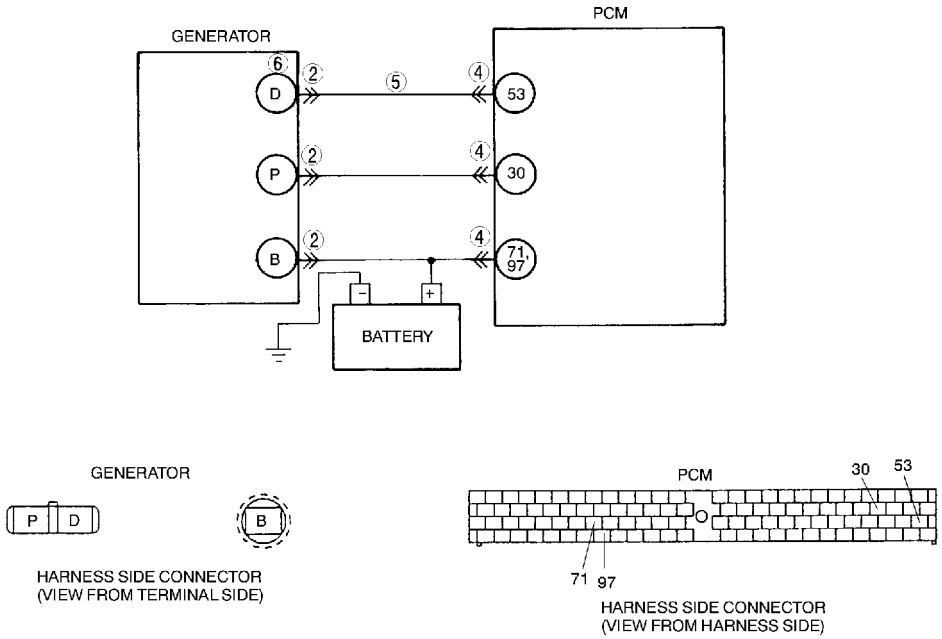
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminals, then go to Step 5.
		No	Go to next step.
3	**INSPECT MONITOR CIRCUIT FOR OPEN CIRCUIT** • Disconnect battery cables. • Check for continuity between Battery positive terminal and PCM terminal 4. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1632 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

DTC P1633 [FS]

A3U010201083W15

DTC P1633	Battery overcharge
DETECTION CONDITION	• PCM monitors input voltage from generator and battery positive terminal. If PCM detects generator output voltage **above 18.47 V** or battery voltage **above 15.94 V** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Short to power circuit between generator connector terminal D and PCM connector terminal 53 • Generator malfunction • PCM malfunction



Diagnostic procedure

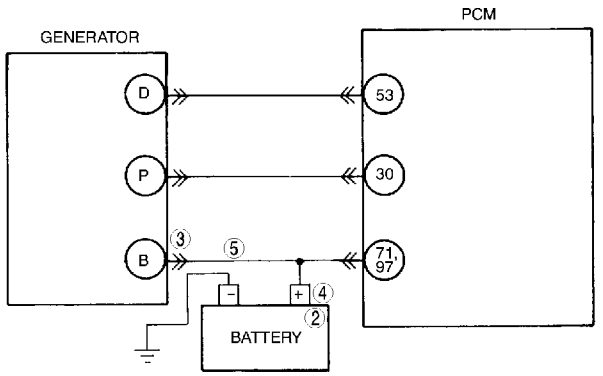
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect generator connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminals, then go to Step 7.
		No	Go to next step.
3	**CLASSIFY GENERATOR MALFUNCTION OR OTHER MALFUNCTION** • Turn ignition key to ON (Engine OFF). • Measure voltage between generator terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Malfunction at generator. Go to Step 6.
4	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace pins, then go to Step 7.
		No	Go to next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between generator terminal D (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 Step 7.

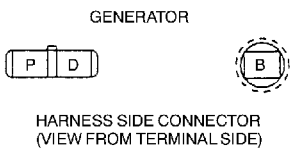
STEP	INSPECTION		ACTION
6	**INSPECT GENERATOR CONTROL TERMINAL FOR SHORT TO POWER** • Measure resistance between generator terminal D (part-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace generator, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P1633 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

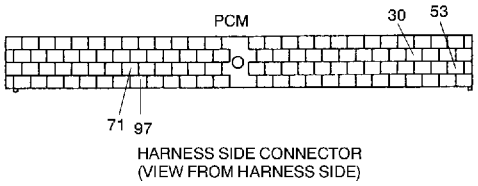
DTC P1634 [FS]

A3U010201083W16

DTC P1634	Generator terminal B circuit open
DETECTION CONDITION	• PCM monitors input voltage from generator and battery positive terminal. If PCM detects generator output voltage **above 16.97 V** and battery voltage **below 10.94 V** for **5 seconds** while engine running, PCM determines that charging system has malfunction.
POSSIBLE CAUSE	• Open circuit between generator terminal B and battery positive terminal • Battery malfunction • PCM malfunction







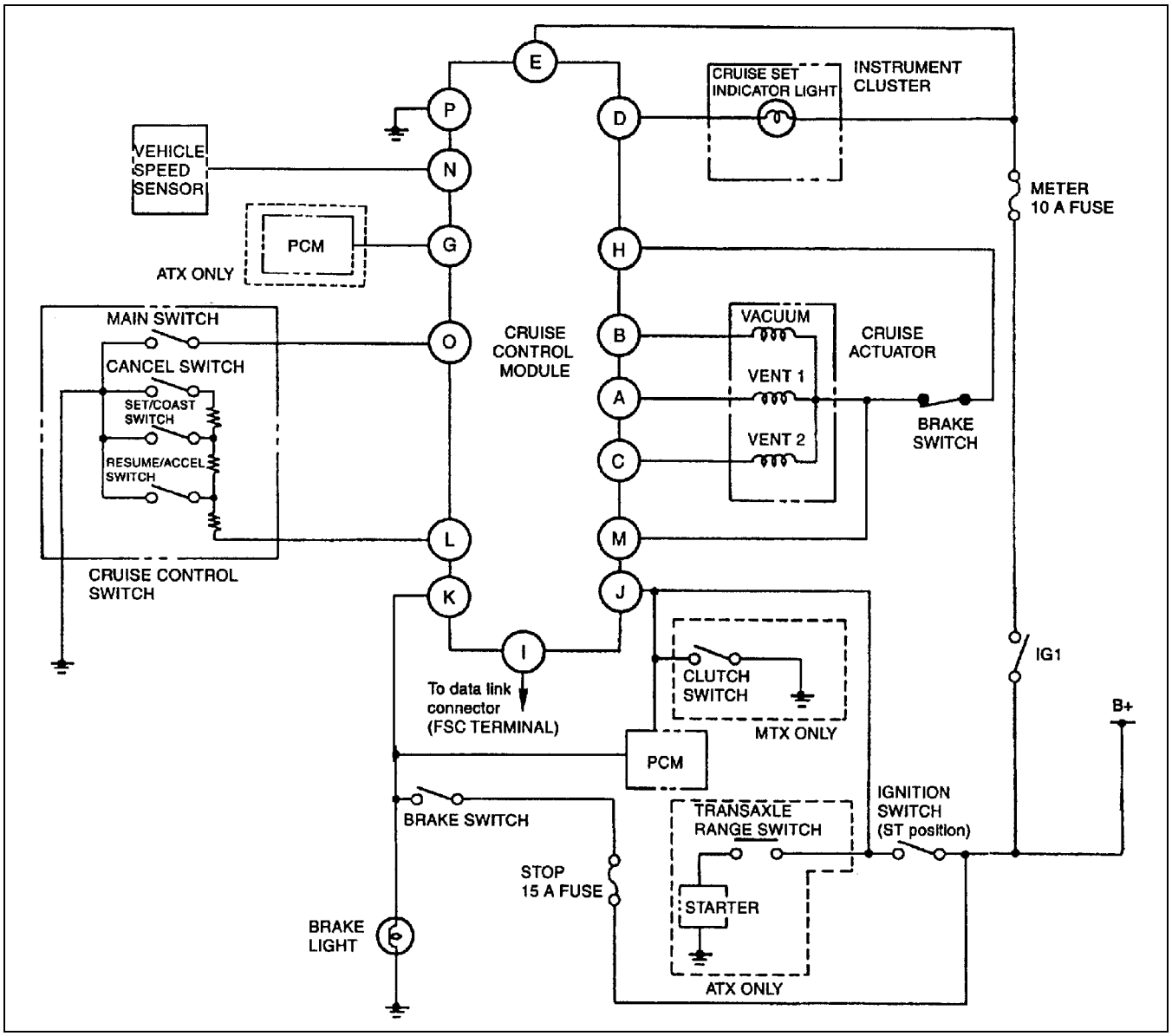
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 BATTERY** • Turn ignition key to OFF. • Inspect battery. (See 01–17–1 BATTERY INSPECTION.) • Is battery okay?	Yes	Replace battery, then go to Step 6.
		No	Go to next step.
3	**INSPECT GENERATOR TERMINAL FOR POOR INSTALLATION** • Turn ignition key to OFF. • Check for looseness of generator terminal B installation nut. • Is nut loose?	Yes	Tighten generator terminal B installation nut, then go to Step 6.
		No	Go to next step.
4	**INSPECT BATTERY POSITIVE TERMINAL FOR POOR INSTALLATION** • Check for looseness of battery positive terminal. • Is terminal loose?	Yes	Connect battery positive terminal correctly, then go to Step 6.
		No	Go to next step.
5	**INSPECT BATTERY CHARGING CIRCUIT** • Start engine. • Disconnect battery positive terminal. • Does engine stall?	Yes	Repair or replace harness between generator terminal B and battery positive terminal, then go to next step.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1634 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equivalent. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	No concern is detected. Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 01–02B–9 AFTER REPAIR PROCEDURE [FS].) • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
		No	Troubleshooting completed.

01–02C ON-BOARD DIAGNOSTIC [CRUISE CONTROL SYSTEM]

CRUISE CONTROL SYSTEM WIRING DIAGRAM

A3U010266350W01



A3U102WY01

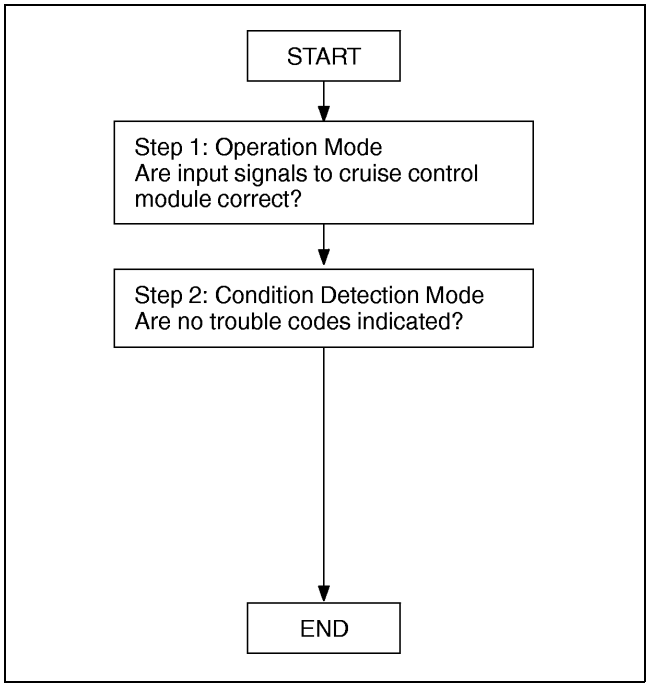
FOREWORD

A3U010266350W02

Outline

- There are two on-board diagnostic functions: Operation Mode, which inspects for and indicates correct operation of the input signals to the control module, and Condition Detection Mode, which indicates troubles in the system.
- The two functions can be done by using either of the following methods:
  1. Verifying the flashing pattern of the cruise set indicator light in the instrument cluster.
  2. Verifying the output of the data link connector using the **SST** (WDS or equivalent).

Inspection Order



X3U101WP0

INSPECTION OF DTCS FOR OPERATION MODE

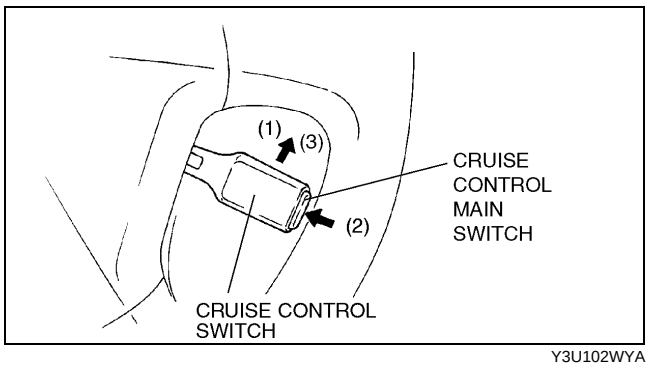
A3U010266350W03

Note

- If an Operation Mode is not indicated, the following may be the cause of the malfunction.
  1. Cruise control switch (RESUME/ACCEL switch)
  2. Cruise control main switch
  3. Cruise control module
  4. Open or short circuit in wiring harness

Using The Cruise Set Indicator Light

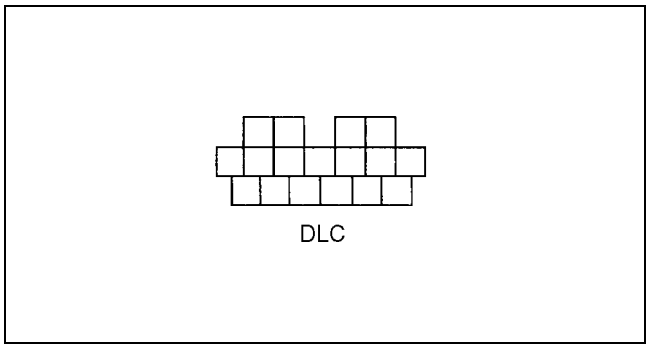
1. Turn the ignition switch to the ON position.
2. Verify that the cruise control main switch is off.
3. Perform the following steps to activate the operation mode.
   (1) Push up the cruise control switch and hold it in the RESUME/ACCEL position.
   (2) Turn on the cruise control main switch.
   (3) Hold the cruise control switch in the RESUME/ACCEL position for **at least 3 seconds**. (The cruise set indicator light will illuminate for **3 seconds**.)
4. Operate each switch as described in the operation code list and note the operation code list pattern.
   - If the cruise set indicator light does not flash, inspect the corresponding system area.
5. The operation mode is canceled by turning the ignition switch to LOCK position or turning off the cruise control main switch.



Y3U102WYA

Using The SST (WDS or equivalent)
DTCs retrieving procedure

1. Hook-up the **SST** to the vehicle. Make sure that ignition key is at LOCK and all accessories are OFF.
2. Turn the ignition key to ON (engine OFF).
3. Retrieve any DTCs by WDS or equivalent.



Z3U0102W401

Operation Code List

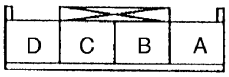
Operation		DTC	Output pattern	Diagnosed circuit	
Turn SET/COAST switch on		21		Cruise control switch (SET/COAST switch)	
Turn RESUME/ACCEL switch on		22		Cruise control switch (RESUME/ACCEL switch)	
Depress brake pedal		31		Brake switch	
ATX	Shift selector lever to P or N range	35		ATX	Transaxle range switch
MTX	Depress clutch pedal			MTX	Clutch switch
Drive vehicle above 40 km/h {25 mph}		37		Vehicle speed sensor	

DTC 21

A3U010266350W04

DTC 21	Cruise control switch (set/coast switch)
DETECTION CONDITION	• Resistance detected between terminal L and ground is other than **approximately 198 ohms**.
POSSIBLE CAUSE	• Cruise control module malfunction • Cruise control switch malfunction

CLOCK SPRING CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

INSPECTION		ACTION
INSPECT SIGNAL LINE OF CRUISE CONTROL SWITCH POSITION • Remove column cover. • Turn ignition switch to ON position. • Turn cruise control main switch on. • Turn SET/COAST switch on. • Is voltage at terminal C of clock spring connector **approximately 2 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
	No	Replace cruise control switch. (See 01–20–7 CRUISE CONTROL SWITCH REMOVAL/ INSTALLATION)

DTC 22

A3U010266350W05

DTC 22	Cruise control switch (resume/accel switch)
DETECTION CONDITION	• Resistance detected between terminal L and ground is other than **68 ohms**.
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

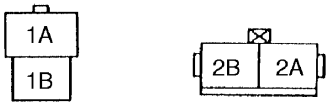
ACTION
Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)

DTC 31

A3U010266350W06

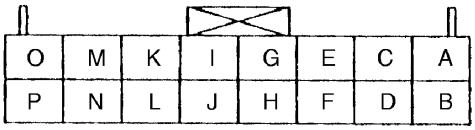
DTC 31	Brake switch
DETECTION CONDITION	• Voltage detected at terminal K is not **approximately 12 V** or voltage detected at terminal M is not **approximately 0 V**.
POSSIBLE CAUSE	• Burnt STOP 15 A fuse • Cruise control module malfunction • Brake switch malfunction • Open circuit in wiring harness between STOP 15 A fuse and brake switch • Open circuit in wiring harness between brake switch and cruise control module

BRAKE SWITCH CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

CRUISE CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

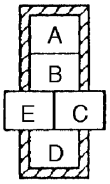
STEP	INSPECTION		ACTION
1	**VERIFY WHICH MALFUNCTION IS, ONE BRAKE SWITCH CIRCUIT OR ANOTHER** • Does brake light illuminate when brake pedal depressed?	Yes	Go to Step 6.
		No	Go to next step.
2	**INSPECT STOP 15 A FUSE FOR FUSION** • Is STOP 15 A fuse okay?	Yes	Go to next step.
		No	Replace fuse after inspecting and repairing wiring harness.
3	**INSPECT WIRING HARNESS BETWEEN STOP 15 A FUSE AND BRAKE SWITCH FOR CONTINUITY** • Depress brake pedal. • Is voltage at terminal 1B of brake switch connector **approximately 12 V**?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT WIRING HARNESS BETWEEN STOP 15 A FUSE AND BRAKE SWITCH FOR CONTINUITY** • Is voltage at terminal 1A of brake switch connector **approximately 12 V**?	Yes	Replace brake switch. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION)
		No	Repair wiring harness. (STOP 15 A fuse—Brake switch)
5	**INSPECT WIRING HARNESS BETWEEN BRAKE SWITCH AND CRUISE CONTROL MODULE FOR CONTINUITY** • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Depress brake pedal. • Is voltage at terminal K of cruise control module connector **approximately 12 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair wiring harness. (Cruise control module—Brake switch)
6	**INSPECT WIRING HARNESS BETWEEN BRAKE SWITCH AND CRUISE CONTROL MODULE FOR CONTINUITY** • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Depress brake pedal. • Is voltage at terminal K of cruise control module connector **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness. (Cruise control module—Brake switch)
7	**INSPECT BRAKE SWITCH** • Turn ignition switch to ON position. • Turn cruise control main switch on. • Depress brake pedal. • Is voltage at terminal M of cruise control module connector **approximately 0 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)
		No	Replace brake switch. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION)

DTC 35

A3U010266350W07

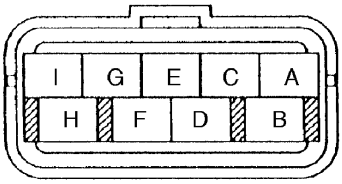
DTC 35	Clutch switch (ATX: transaxle range switch)
DETECTION CONDITION	• Voltage detected at terminal J is not **approximately 0 V**.
POSSIBLE CAUSE	• Cruise control module malfunction • Clutch switch malfunction (ATX: transaxle range switch) • Open circuit in wiring harness between clutch switch (ATX: transaxle range switch) and ground • Open circuit in wiring harness between clutch switch (ATX: transaxle range switch) and cruise control module

CLUTCH SWITCH CONNECTOR



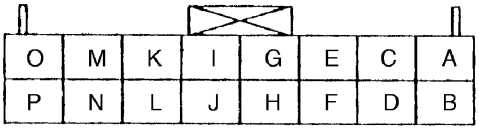
HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

TRANSAXLE RANGE SWITCH CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

CRUISE CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does vehicle has MTX?	Yes	Go to next step.
		No	Go to Step 6.
2	• Inspect clutch switch. (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM]) (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS]) • Is clutch switch okay?	Yes	Go to next step.
		No	Replace clutch switch. (See 05–10–5 CLUTCH PEDAL REMOVAL/ INSTALLATION)
3	**INSPECT WIRING HARNESS BETWEEN CLUTCH SWITCH AND GROUND FOR CONTINUITY** • Disconnect clutch switch connector. • Is there continuity between terminal E of clutch switch connector and ground?	Yes	Go to next step.
		No	Repair wiring harness. (Clutch switch—GND)
4	**INSPECT WIRING HARNESS BETWEEN CLUTCH SWITCH AND CRUISE CONTROL MODULE FOR CONTINUITY** • Turn ignition switch to ON position. • Turn cruise control main switch on. • Keep clutch pedal released. • Is voltage at terminal C of clutch switch connector **approximately 12 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Go to next step.
5	**INSPECT CRUISE CONTROL MODULE** • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Is voltage at terminal J of cruise control module connector **approximately 12 V**?	Yes	Repair wiring harness. (Cruise control module—Clutch switch)
		No	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
6	• Inspect transaxle range switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Is transaxle range switch okay?	Yes	Go to next step.
		No	Replace transaxle range switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION)
7	**INSPECT WIRING HARNESS BETWEEN TRANSAXLE RANGE SWITCH AND GROUND FOR CONTINUITY** • Disconnect transaxle range switch connector. • Is there continuity between terminal B of transaxle range switch connector and ground?	Yes	Go to next step.
		No	Repair wiring harness. (Transaxle range switch—GND)

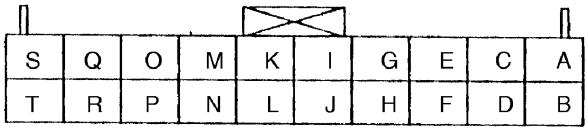
STEP	INSPECTION		ACTION
8	**INSPECT WIRING HARNESS BETWEEN TRANSAXLE RANGE SWITCH AND CRUISE CONTROL MODULE FOR CONTINUITY** • Turn ignition switch to ON position. • Turn cruise control main switch on. • Shift selector lever to D or R range. • Is voltage at terminal H of transaxle range switch connector **approximately 12 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)
		No	Go to next step.
9	**INSPECT CRUISE CONTROL MODULE** • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Is voltage at terminal J of cruise control module connector **approximately 12 V**?	Yes	Repair wiring harness. (Cruise control module—Transaxle range switch)
		No	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)

DTC 37

A3U010266350W08

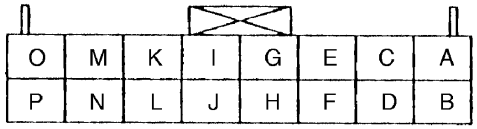
DTC 37	Vehicle speed sensor
DETECTION CONDITION	• Voltage detected at terminal N does not **alternate between 0 V and 5 V**.
POSSIBLE CAUSE	• Cruise control module malfunction • Instrument cluster malfunction • Open circuit in wiring harness between instrument cluster and cruise control module

INSTRUMENT CLUSTER CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

CRUISE CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CRUISE CONTROL MODULE FOR CONTINUITY** • Remove instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Disconnect cruise control module connector. • Is there continuity between terminal N of cruise control module connector and terminal 3T of instrument cluster connector?	Yes	Go to next step.
		No	Repair wiring harness. (Cruise control module—instrument cluster)
2	**INSPECT VEHICLE SPEED SIGNAL** • Turn ignition switch to ON position. • Turn cruise control main switch on. • Rotate front tires. • Does voltage at terminal 3T of instrument cluster connector **alternate between 0 V and 5 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)
		No	Replace instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION)

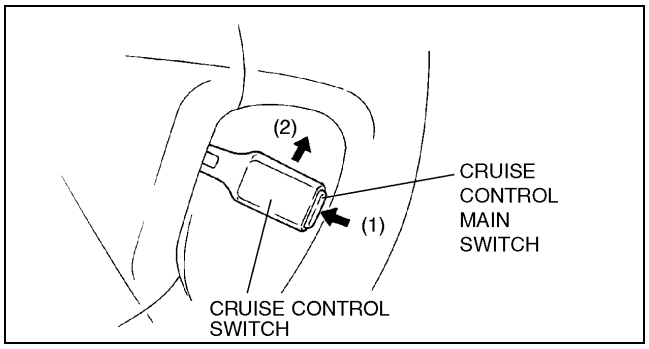
INSPECTION OF DTCS FOR CONDITION DETECTION MODE

A3U010266350W09

Using The Cruise Set Indicator Light

Note
- If the RESUME/ACCEL switch on the cruise control switch is malfunctioning, the cruise set indicator light will not give a correct indication when you inspect the system. Use the **SST** (WDS or equivalent) to determine the cause of the malfunction.

1. Drive the vehicle at **over 16 km/h {10 mph}**.
2. Operate each of the cruise control switches.
3. Stop the vehicle and let it idle.
4. The following steps to activate the detection mode.
   (1) Turn on the cruise control main switch.
   (2) Push up the cruise control switch and hold it in the RESUME/ACCEL position for **at least 3 seconds**. (The cruise set indicator light will illuminate for **3 seconds**.)
   - If a DTC is indicated, inspect the corresponding system area.
5. The condition detection mode is canceled by turning the ignition switch to LOCK position or turning off the cruise control main switch.

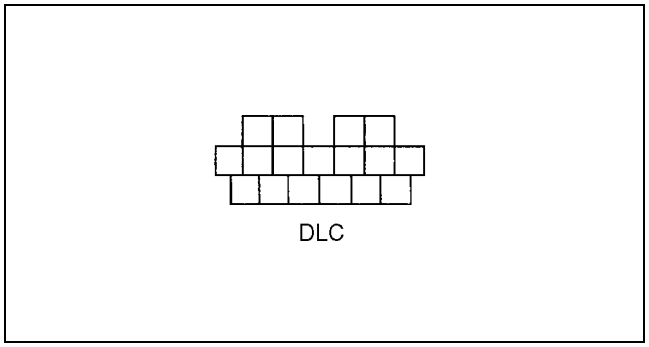


Y3U102WYB

Using The SST (WDS or equivalent)

DTCs retrieving procedure

1. Hook-up the **SST** to the vehicle. Make sure that ignition key is at LOCK and all accessories are OFF.
2. Turn the ignition key to ON (engine OFF).
3. Retrieve any DTCs by WDS or equivalent.



Z3U0102W401

Condition Code List

DTC	Output pattern	Diagnosed circuit
01		Cruise actuator
05		Brake switch
07		Brake switch
11		Cruise control switch (SET/COAST switch)
12		Cruise control switch (RESUME/ACCEL switch)

DTC	Output pattern	Diagnosed circuit
13		Cruise control switch (Ground circuit)
15		Cruise control module

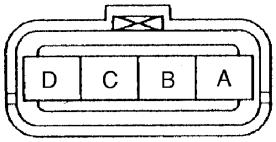
Note
- When two or more DTCs are indicated, inspect the malfunction with the smallest number first.

DTC 01

A3U010266350W10

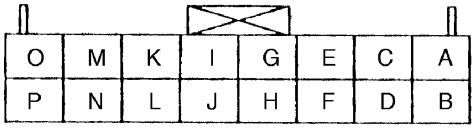
DTC 01	Cruise actuator
DETECTION CONDITION	• Voltages detected at terminal A, B or C are not **approximately 12 V**.
POSSIBLE CAUSE	• Cruise control module malfunction • Cruise actuator malfunction • Open circuit in wiring harness between cruise control module and cruise actuator • Open circuit in wiring harness between cruise actuator and brake switch • Open circuit in wiring harness between cruise control module and brake switch

CRUISE ACTUATOR CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

CRUISE CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN CRUISE CONTROL MODULE AND CRUISE ACTUATOR FOR CONTINUITY** • Are wiring harnesses between cruise control module and cruise actuator okay?	Yes	Go to next step.
		No	Repair wiring harness. (Cruise control module—Cruise actuator)
2	**INSPECT POWER SUPPLY LINE OF CRUISE ACTUATOR** • Disconnect cruise actuator connector. • Turn ignition switch to ON position. • Turn cruise control main switch on. • Is voltage at terminal B of cruise actuator connector **approximately 12 V**?	Yes	Go to Step 6.
		No	Go to next step.
3	**INSPECT WIRING HARNESS BETWEEN BRAKE SWITCH AND CRUISE ACTUATOR FOR CONTINUITY** • Is voltage at terminal 2B of brake switch connector **approximately 12 V**?	Yes	Repair wiring harness. (Cruise actuator—Brake switch)
		No	Go to next step.
4	**INSPECT BRAKE SWITCH** • Is voltage at terminal 2A of brake switch connector **approximately 12 V**?	Yes	Replace brake switch. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION)
		No	Go to next step.
5	**INSPECT CRUISE CONTROL MODULE** • Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Is voltage at terminal H of cruise control module connector **approximately 12 V**?	Yes	Repair wiring harness. (Cruise control module—Brake switch)
		No	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)

STEP	INSPECTION		ACTION
6	**INSPECT CRUISE ACTUATOR** • Connect cruise actuator connector. • Turn ignition switch to ON position. • Turn cruise control main switch on. • Is voltage at terminal D of cruise actuator connector **approximately 12 V**?	Yes	Go to next step.
		No	Replace cruise actuator. (See 01–20–4 CRUISE ACTUATOR REMOVAL/ INSTALLATION)
7	**INSPECT CRUISE ACTUATOR** • Is voltage at terminal A of cruise actuator connector **approximately 12 V**?	Yes	Go to next step.
		No	Replace cruise actuator. (See 01–20–4 CRUISE ACTUATOR REMOVAL/ INSTALLATION)
8	**INSPECT CRUISE ACTUATOR** • Is voltage at terminal C of cruise actuator connector **approximately 12 V**?	Yes	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Replace cruise actuator. (See 01–20–4 CRUISE ACTUATOR REMOVAL/ INSTALLATION)

DTC 05

A3U010266350W11

DTC 05	Brake switch
DETECTION CONDITION	• Voltage detected at terminal K is always **approximately 0 V**.
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

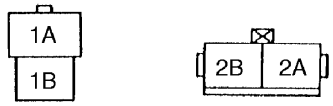
INSPECTION		ACTION
• Was operation mode performed?	Yes	Perform operation mode on-board diagnostic again. Even if no malfunctions are detected in operation mode, if DTC 05 is indicated in condition detection mode on-board diagnostic, replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
	No	Perform operation mode.

DTC 07

A3U010266350W12

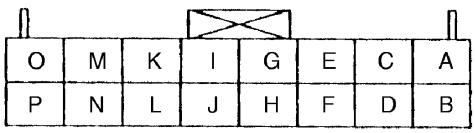
DTC 07	Brake switch
DETECTION CONDITION	• Voltage detected at terminal K or M is always **approximately 12 V**. • Voltage detected at terminal M is always **approximately 0 V**.
POSSIBLE CAUSE	• Cruise control module malfunction • Brake switch malfunction • Open circuit in wiring harness between cruise control module and brake switch

BRAKE SWITCH CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

CRUISE CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Disconnect brake switch connector. • Is there continuity between terminal 1A and 1B of brake switch?	Yes	Replace brake switch. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION)
		No	Go to next step.
2	• Remove passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION) • Turn ignition switch to ON position. • Turn cruise control main switch on. • Depress brake pedal. • Is voltage at terminal M of cruise control module connector **approximately 0 V**?	Yes	Repair wiring harness. (Cruise control module—Brake switch)
		No	Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)

DTC 11

A3U010266350W13

DTC 11	Cruise control switch (set/coast switch)
DETECTION CONDITION	• Resistance detected between terminal L and ground is always **approximately 198 ohms**.
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

INSPECTION		ACTION
• Was operation mode performed?	Yes	Perform operation mode on-board diagnostic again. Even if no malfunctions are detected in operation mode, if DTC 11 is indicated in condition detection mode on-board diagnostic, replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)
	No	Perform operation mode.

DTC 12

A3U010266350W14

DTC 12	Cruise control switch (resume/accel switch)
DETECTION CONDITION	• Resistance detected between terminal L and ground is always **approximately 68 ohms**.
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

INSPECTION		ACTION
• Was operation mode performed?	Yes	Perform operation mode on-board diagnostic again. Even if no malfunctions are detected in operation mode, if DTC 12 is indicated in condition detection mode on-board diagnostic, replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION
	No	Perform operation mode.

DTC 13

A3U010266350W15

DTC 13	Cruise control switch (ground circuit)
DETECTION CONDITION	• Resistance detected between terminal L and ground is always **approximately 0 ohm**.
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

INSPECTION		ACTION
• Was operation mode performed?	Yes	Perform operation mode on-board diagnostic again. Even if no malfunctions are detected in operation mode, if DTC 13 is indicated in condition detection mode on-board diagnostic, replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/ INSTALLATION)
	No	Perform operation mode.

DTC 15

A3U010266350W16

DTC 15	Cruise control module
DETECTION CONDITION	• Malfunction in cruise control module circuit
POSSIBLE CAUSE	• Cruise control module malfunction

Diagnostic procedure

ACTION
Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)

01–03A SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (ZM)]

CONTROL SYSTEM DEVICE AND RELATIONSHIP CHART [ZM]

A3U010318881W38

Engine Control System

× :Applied

Component	Idle air control (IAC)	Fuel injection control	Pressure regulator control(PRC)	Electronic spark advance (ESA) control	Fuel pump control	Front heated oxygen sensor (HO2S) heater control	Rear heated oxygen sensor (HO2S) heater control	Electric fan control	Purge control	EGR control	Variable tumble control system (VTCS)	A/C cut-out control	Generator control
Input													
Brake switch		×		×									
Refrigerant pressure switch, A/C switch, blower fan and A/C amplifier	×	×		×				×					
PSP switch	×	×		×									
DLC in engine compartment (TEN)	×	×	×	×				×					
Neutral switch	×	×	×	×									
Clutch switch	×	×	×	×									
TR switch	×	×	×	×									
CKP sensor	×	×	×	×	×	×	×	×	×	×	×	×	×
CMP sensor		×		×									
VSS	×	×		×						×			×
MAF sensor	×	×		×		×			×	×			
ECT sensor	×	×	×	×		×		×	×	×	×	×	×
IAT sensor	×	×	×	×		×			×	×			×
TP sensor	×	×	×	×		×		×	×	×	×	×	×
EGR boost sensor	×	×							×			×	
Battery positive voltage		×		×		×			×				×
Generator	×			×									×
Front HO2S		×							×				
Rear HO2S		×											
Output													
IAC valve	×												
A/C relay												×	
Cooling fan relay								×					
Condenser fan relay								×					
Fuel pump relay					×								
PRC solenoid vale			×										
Purge solenoid valve									×				
VTCS solenoid valve											×		
EGR valve										×			
HO2S heaters						×							
Ignition coil				×									
Fuel injectors		×											
Generator (Field coil)													×
Generator warning light													×

A3U0103W001

Monitoring System

× :Applied

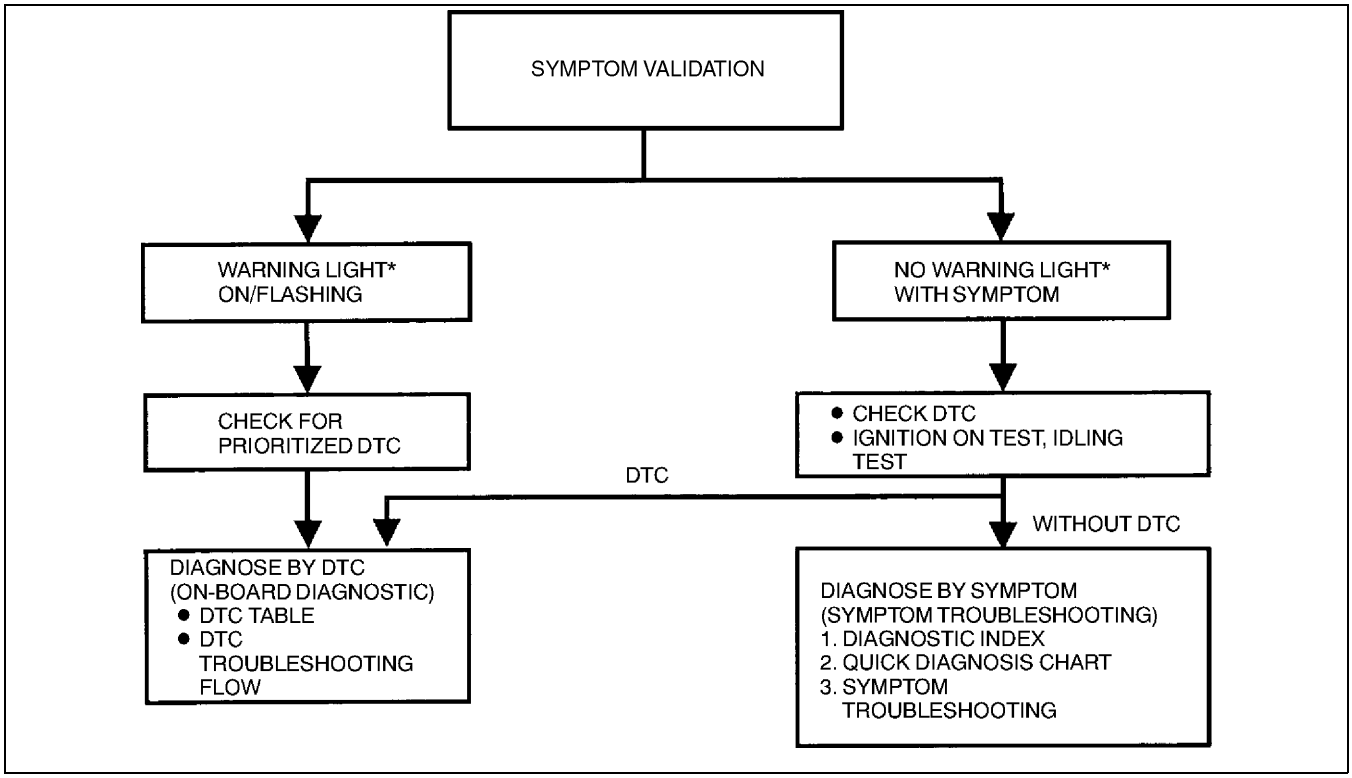
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan and A/C amplifier		×		×			×
PSP switch		×		×			×
CKP sensor	×	×	×	×	×	×	×
CMP sensor	×	×	×	×	×	×	×
VSS	×	×	×	×	×		×
MAF sensor	×	×	×	×	×	×	×
ECT sensor	×	×	×	×	×	×	×
IAT sensor	×	×	×	×	×		×
TP sensor	×	×	×	×	×		×
EGR boost sensor							×
Fuel level sensor			×				
Fuel gauge sender unit			×				
Rear HO2S	×				×	×	
Front HO2S	×			×	×	×	
Output							
DLC-2 in passenger compartment (Terminal KLN)	×	×	×	×	×	×	×
MIL	×	×	×	×	×	×	×
Purge solenoid valve			×	×	×		
EGR valve							×
EGR boost sensor solenoid valve							×
Canister drain cut valve			×				
Fuel injectors				×			

Y3U103WA6

FOREWORD [ZM]

A3U010318881W39

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) 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–15 DTC TABLE [ZM].)
  - — If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].)



Y3U103WA7

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

INTERMITTENT CONCERN TROUBLESHOOTING [ZM]

A3U010318881W40

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.

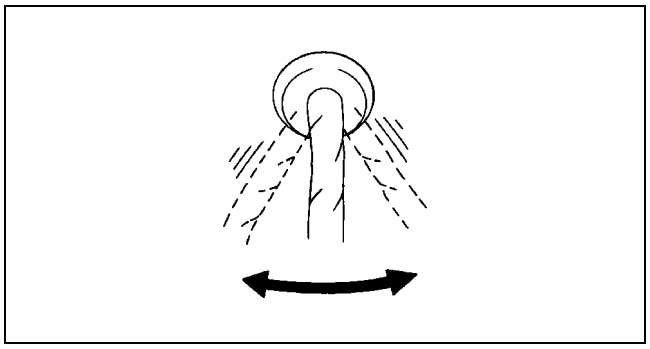
Inspection Method for Switch Connectors or Wires

1. Connect WDS or equivalent 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

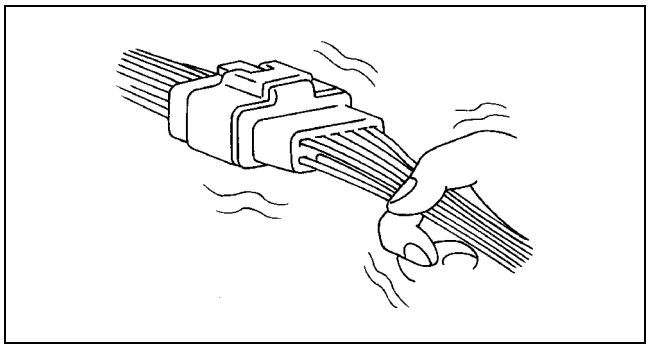
Inspection Method for Sensor Connectors or Wires

1. Connect WDS or equivalent 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 WDS or equivalent 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.

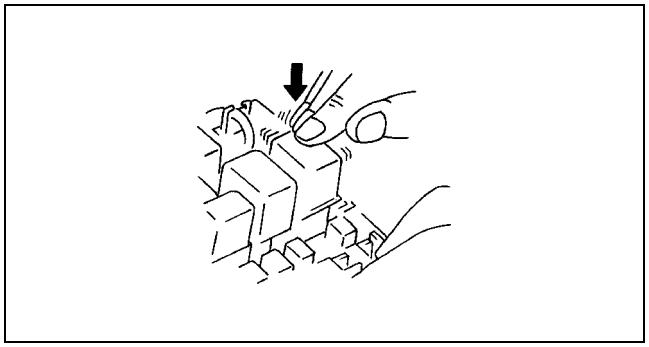
Inspection Method for Actuators or Relays

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

3. Prepare the SIMULATION TEST for actuators or relays that you are inspecting.
4. Vibrate the actuator or relay with your finger for **3 seconds** after SIMULATION TEST is activated.
   - If variable click sound is heard, check for poor connection and/or poorly mounted actuator or relay.

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



YMU103WC2

Water Sprinkling Method

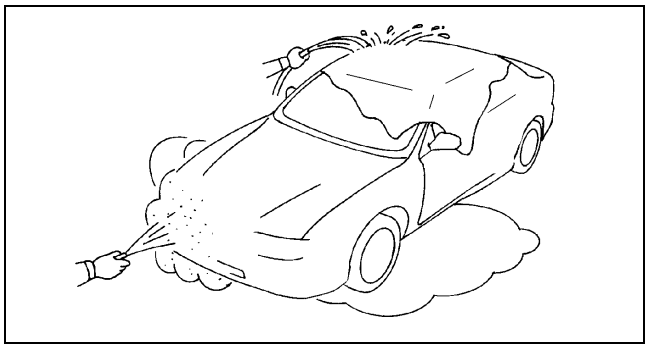
If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

1. Connect WDS or equivalent 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.
   - If you are inspecting the switch, turn it on manually.
4. 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.



Y5U103WA6

SYMPTOM DIAGNOSTIC INDEX [ZM]

A3U010318881W41

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

Diagnostic Index

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melting of main or other fuses		—	(See 01–03A–13 NO.1 MELTING OF MAIN OR OTHER FUSES [ZM].)
2	MIL illuminates		MIL is illuminated incorrectly.	(See 01–03A–14 NO.2 MIL ILLUMINATES [ZM].)
3	Will not crank		Starter does not work.	(See 01–03A–14 NO.3 WILL NOT CRANK [ZM].)
4	Hard start/long crank/erratic start/ erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking time before starting.	(See 01–03A–15 NO.4 HARD TO START/LONG CRANK/ ERRATIC START/ERRATIC CRANK [ZM].)
5	Engine stalls.	After start/at idle	Engine stops unexpectedly at idle and/or after start.	(See 01–03A–18 NO.5 ENGINE STALLS-AFTER START/AT IDLE [ZM].)
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 [ZM].)
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 [ZM].)
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01–03A–25 NO.8 ENGINE RUNS ROUGH/ ROLLING IDLE [ZM].)
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up. Engine runs after ignition key is turned to OFF.	(See 01–03A–27 NO.9 FAST IDLE/RUNS ON [ZM].)
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 [ZM].)
11	Engine stalls/ quits.	Acceleration/ cruise	Engine stops unexpectedly at beginning of acceleration or during acceleration. Engine stops unexpectedly while cruising.	(See 01–03A–29 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [ZM].)
	Engine runs rough	Acceleration/ cruise	Engine speed fluctuates during acceleration or cruising.	
	Misses	Acceleration/ cruise	Engine misses during acceleration or cruising.	
	Buck/jerk	Acceleration/ cruise/ deceleration	Vehicle bucks/jerks during acceleration, cruising, or deceleration.	
	Hesitation/ stumble	Acceleration	Momentary pause at beginning of acceleration, or during acceleration	
	Surges	Acceleration/ cruise	Momentary minor irregularity in engine output	
12	Lack/loss of power	Acceleration/ cruise	Performance is poor under load (e.g. power down when climbing hills).	(See 01–03A–32 NO.12 LACK/ LOSS OF POWER-ACCELERATION/ CRUISE [ZM].)
13	Knocking/pinging	Acceleration/ cruise	Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).	(See 01–03A–34 NO.13 KNOCKING/ PINGING-ACCELERATION/ CRUISE [ZM].)
14	Poor fuel economy		Fuel economy is unsatisfactory.	(See 01–03A–35 NO.14 POOR FUEL ECONOMY [ZM].)
15	Emission compliance		Fails emissions test	(See 01–03A–37 NO.15 EMISSION COMPLIANCE [ZM].)
16	High oil consumption/leakage		Oil consumption is excessive.	(See 01–03A–38 NO.16 HIGH OIL CONSUMPTION/ LEAKAGE [ZM].)

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats.	(See 01–03A–39 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [ZM].)
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature.	(See 01–03A–40 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [ZM].)
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01–03A–41 NO.19 EXHAUST SMOKE [ZM].)
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leakage	(See 01–03A–43 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [ZM].)
21	Engine noise		Engine noise from under hood	(See 01–03A–44 NO.21 ENGINE NOISE [ZM].)
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01–03A–45 NO.22 VIBRATION CONCERNS (ENGINE) [ZM].)
23	A/C does not work sufficiently.		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 SUFFICIENTLY [ZM].)
24	A/C is always ON/A/C compressor runs continuously.		A/C compressor magnetic clutch does not disengage.	(See 01–03A–46 NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM].)
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 CONDITIONS [ZM].)
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01–03A–47 NO.26 EXHAUST SULPHUR SMELL [ZM].)
27	Fuel refill concerns		Fuel tank does not fill smoothly.	(See 01–03A–48 NO.27 FUEL REFILL CONCERNS [ZM].)
28	Fuel filling shut off issues		Fuel does not shut off properly.	(See 01–03A–49 NO.28 FUEL FILLING SHUT OFF ISSUES [ZM].)
29	Intermittent concerns		Symptom occurs randomly and is difficult to diagnose.	(See 01–03A–49 NO.29 INTERMITTENT CONCERNS [ZM].)
30	Constant voltage		Incorrect constant voltage	(See 01–03A–50 NO.30 CONSTANT VOLTAGE [ZM].)
31	Spark plug condition		Incorrect spark plug condition	(See 01–03A–52 NO.31 SPARK PLUG CONDITION [ZM].)
32	ATX concerns	Upshift/downshift/ engagement	ATX concerns not related to engine performance	(See 05–03–7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE.)

SYMPTOM QUICK DIAGNOSIS CHART [ZM]

A3U010318881W42

×: Applied

	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 is seized.	Improper tension or damages drive belts	Improper engine coolant level	Water and anti-freeze mixture is improper.	Cooling system malfunction (Radiator,hoses,overflow system,thermostat,etc.)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed.	Cooling fan or condenser fan seat is improper.	Accelerator cable free play misadjustment	Fuel quality
1	Melting of main or other fuses																						
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE																				

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×: Applied

	Troubleshooting item / Possible factor		Engine overheating	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose, tubes, cracks, gaskets breakage)	IAC valve improper operation	Throttle body malfunction	Tumble swirl control system malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Ignition coil malfunction (e.g. open, short or cracks)	Initial ignition timing misadjustment (CKP & crankshaft pulley misadjustment)	Spark plug malfunction	High-tension leads malfunction (Cracks, open, low resistance)	CKP sensor is damage (e.g. open or short circuits).	Crankshaft pulley is damaged.	Improper gap between CKP sensor and crankshaft pulley	Fuel pump malfunction (Mechanical or electrical)	Pressure regulator malfunction	Fuel hoses restriction or clogging
1	Melting of main or other fuses																		
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE																

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×: Applied

	Troubleshooting item / Possible factor		Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (Including insulator, injector O-ring)	Fuel filters restriction or clogging	PRC solenoid valve improper operation	CMP sensor is damaged (e.g. open or short circuit).	Camshaft is damaged.	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	Evaporative emission control system malfunction	PCV valve malfunction	V-reference supply circuit malfunction	Main relay malfunction (Mechanical or electrical)	ECT sensor malfunction	TR switch misadjustment (ATX)	P/N position switch in TR switch is open, (ATX)	Brake switch and related circuit malfunction
1	Melting of main or other fuses																			
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE																	

Z3U0103W999

×: Applied

Troubleshooting item \ Possible factor			Neutral or clutch switch and related circuit malfunction (MTX)	MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (Including looseness)	Power steering pressure switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal) circuit malfunction	Condenser fan system malfunction	Improper load signal input	Clutch slippage	Automatic transaxle related parts malfunction	VSS and related circuit malfunction	Improper ATF level	Brake dragging	Loose parts	Wheels and tires improper balance	Driveline malfunction	Suspension malfunction
1	Melting of main or other fuses																			
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE																	

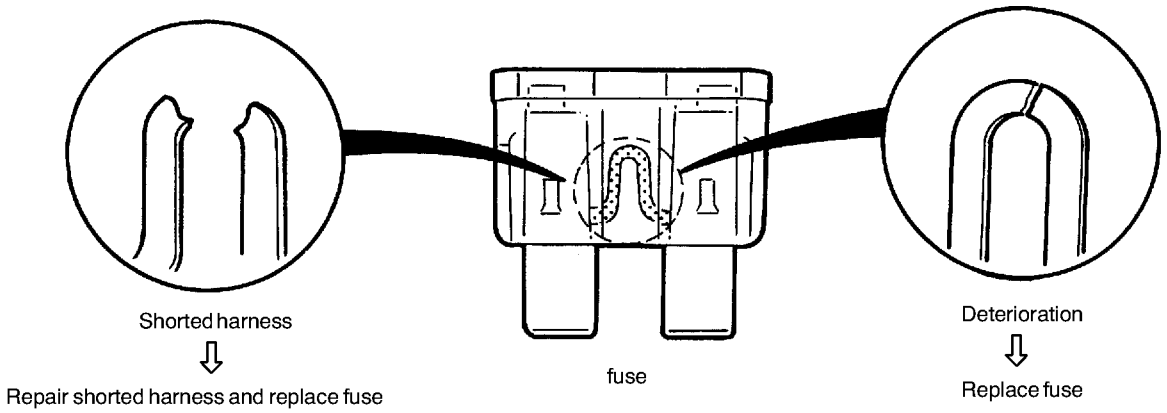
Y3U103WA3

NO.1 MELTING OF MAIN OR OTHER FUSES [ZM]

A3U010318881W43

1	Melting of main or other fuses

[TROUBLESHOOTING HINTS]
Inspect condition of fuse.



Damaged Fuse	Related Wiring Harness
MAIN (100A)	**MAIN fuse** • Generator
IG KEY (60A)	**IG KEY fuse** • Ignition switch
A/C (15A)	**A/C fuse** • A/C relay • Condenser fan relay
A/C (10A)	**A/C relay** • Magnet clutch
AD FAN (30A)	**Condenser fan relay** • Condenser fan motor
INJ (30A)	**INJ fuse** • PCM **Main relay** • PCM • Fuel pump relay • Fuel injectors • Purge solenoid valve • PRC solenoid valve • VTCS solenoid valve • Mass air flow sensor • Vehicle speedometer sensor • EGR valve • EGR boost sensor solenoid valve • CDCV • CMP sensor **Fuel pump relay** • Fuel pump
ENGINE (10A)	**ENGINE fuse** • Ignition coil • Condenser • Heated oxygen sensor • Main relay • Cooling fan relay • Malfunction indicator lamp
METER (10A)	**METER fuse** • Transaxle range switch (ATX) • O/D OFF indicator light (ATX)
COOLING FAN (30A)	**Cooling fan relay** • Cooling fan motor

- If malfunction remains, refer to related Service Bulletins 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.

NO.2 MIL ILLUMINATES [ZM]

A3U010318881W44

2	Mil illuminates
DESCRIPTION	• MIL is illuminated incorrectly.
POSSIBLE CAUSE	• PCM illuminates for emission-related concern (DTC 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		ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Inspect for short to GND circuit between MIL (located on instrument cluster) and PCM terminal 2.
2	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins 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 PCM.		

NO.3 WILL NOT CRANK [ZM]

A3U010318881W45

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	• Inspect for following: — Battery connection — Battery condition — Transaxle is in Park or Neutral. (ATX) — Clutch is fully depressed. (MTX) — Fuses • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. 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 4.
3	• Inspect starting system. (See 01–19–2 STARTER INSPECTION.) • Is starting system okay?	Yes	Inspect for seized/hydrolocked engine, flywheel or drive plate.
		No	Repair or replace components as required.
4	• Do any other electrical accessories work?	Yes	Go to next step.
		No	Inspect charging system. (See 01–17–1 BATTERY INSPECTION.) (See 01–17–3 GENERATOR INSPECTION.)
5	**Note** • Following test should be performed on ATX only. For MTX, go to next step. • Inspect adjustment of transaxle range switch. • Is transaxle range switch adjusted properly?	Yes	Go to next step.
		No	Inspect for open circuit between transaxle range switch and PCM terminal 64 or starter.

STEP	INSPECTION		ACTION
6	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test. **Communication error message is displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open — Open or poor GND circuit (PCM terminal 24, 51, 76, 77 or 103) — Poor connection of vehicle body GND
		No	**No DTC is displayed:** • Inspect following: — START circuit in ignition switch — Open circuit between ignition switch and starter — Starter interlock switch (MTX)
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK [ZM]

A3U010318881W46

4	Hard to start/long crank/erratic start/erratic crank
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before start. • Battery is in normal condition.
POSSIBLE CAUSE	• Spark leakage from high-tension leads • Vacuum leakage • Poor fuel quality • Starting system malfunction • Spark plug malfunction • Air leakage from intake-air system • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Air cleaner restriction • IAC valve malfunction • PCV valve malfunction • Inadequate fuel pressure • Purge solenoid valve malfunction • MAF sensor contamination • Restriction in exhaust system • EGR valve malfunction • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE)** **(See 01–14–5 AFTER REPAIR PROCEDURE)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum leakage — Fuel quality (e.g. 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	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [ZM]".
		No	Go to next step.
4	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
5	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.020—0.59 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Remove PCV valve and inspect PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and chassis GND. (See 01–14–5 AFTER REPAIR PROCEDURE.) • Turn ignition switch on. • Is fuel line pressure correct? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
10	• Is fuel line pressure held after ignition switch is turned off? (See 01–14–28 PRESSURE REGULATOR INSPECTION.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
11	• Disconnect vacuum hose from pressure regulator and plug the 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	Inspect 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 fuel pressure gauge reading decreases as vacuum gauge reading increases?	Yes	Go to next step.
		No	Connect vacuum pump to pressure regulator. Start engine. Verify that fuel pressure gauge reading changes as vacuum changes. • If changes, inspect vacuum line. • If does not 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	Inspect if purge solenoid valve sticks open.
		No	Go to next step.
14	• Inspect for contaminated MAF sensor. • Is there any contamination?	Yes	Replace MAF sensor.
		No	Go to next step.
15	• Is there a restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
16	• Inspect engine condition while tapping EGR valve housing. • Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
17	• Inspect starting system. (See 01–19–2 STARTER INSPECTION.) • Is starting system normal?	Yes	Inspect for loose connectors or poor terminal contact. • If okay, remove EGR valve and visually inspect for mechanically stuck EGR valve.
		No	Repair or replace components as required.
18	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.5 ENGINE STALLS-AFTER START/AT IDLE [ZM]

A3U010318881W47

5	Engine stalls—after start/at idle
DESCRIPTION	• Engine stops unexpectedly.
POSSIBLE CAUSE	• A/C system improper operation • Air leakage from intake-air system parts • Purge solenoid valve malfunction • Improper operation of IAC valve • EGR valve malfunction • No signal from CKP sensor due to sensor, related wire or wrong installation • Vacuum leakage • Low engine compression • Spark leakage from high-tension leads • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Electrical connector disconnection • Open or short circuit in fuel pump and related harness • No battery power supply to PCM or poor GND • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Immobilizer system and/or circuit malfunction • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE)** **(See 01–14–5 AFTER REPAIR PROCEDURE)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Turn ignition switch off. • Disconnect TP sensor connector. • Measure voltage at TP sensor connector VREF terminal with ignition switch on. **Voltage** **4.5—5.5 V** • Is voltage okay?	Yes	Go to next step.
		No	Go to symptom troubleshooting "NO.30 CONSTANT VOLTAGE".

STEP	INSPECTION		ACTION
3	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test. **Communication error message is displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77 or 103) — Poor connection of vehicle body GND
		No	**No DTC is displayed:** • Go to next step.
4	• Attempt to start engine at part throttle. • Does engine run smoothly at part throttle?	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
5	• Connect WDS or equivalent to DLC-2. • Access RPM PID. • Is RPM PID indicating engine speed during cranking of engine?	Yes	Go to next step.
		No	Inspect for following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor and PCM terminal 21 or 22 • Open or short circuit in CKP sensor harnesses • If CKP sensor and harness are okay, go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	• 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 15.
		No	Inspect for following: • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and body GND • Open circuit between ignition switch and ignition coil • Open circuit between ignition coil and PCM terminal 26 or 52
10	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
11	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
12	• Inspect for a restriction in exhaust system. • Is there any restriction?	Yes	Inspect exhaust system.
		No	Go to next step.

STEP	INSPECTION		ACTION
13	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition switch on. • Is fuel line pressure correct with ignition switch on? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
14	• Visually inspect for fuel leakage at fuel injector O-ring and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? (See 01–14–28 PRESSURE REGULATOR INSPECTION.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
15	**Note** • The following test is for stall concerns with A/C on. If other symptoms exist, 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 pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	• If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY". For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
16	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid side. • Plug opening end of vacuum hose. • Start engine. • Is engine stall now eliminated?	Yes	Inspect if purge solenoid valve sticks open. Inspect evaporative emission control system.
		No	Go to next step.
17	• 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.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for cause.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.6 CRANKS NORMALLY BUT WILL NOT START [ZM]

A3U010318881W48

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 is in tank. • Battery is in normal condition.
POSSIBLE CAUSE	• No battery power supply to PCM • Air leakage from intake-air system • Open PCM GND or vehicle body GND • Improper operation of IAC valve • EGR valve malfunction • No signal from CKP sensor due to sensor, related wire or incorrect installation • No signal from CMP sensor due to sensor, related wire or incorrect installation • Low engine compression • Vacuum leakage • Spark leakage from high-tension leads • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Disconnected electrical connector • Open or short circuit in fuel pump and related harness • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from injector • Fuel injector clogging • Purge solenoid valve malfunction • Pressure regulator solenoid (PRC) system malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE)** **(See 01–14–5 AFTER REPAIR PROCEDURE)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum connection — External fuel shut off or accessory (kill switch, alarm etc.) — Fuel quality: proper octane, contamination, winter/summer blend — No air leakage from intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Electrical connections — Fuses — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

STEP	INSPECTION		ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC is displayed:** • Go to next step.
		No	**DTC is displayed:** • Go to appropriate DTC test. **Communication error message is displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77 or 103) — Poor connection of vehicle body GND
3	• Turn ignition switch off. • Disconnect TP sensor connector. • Measure voltage at TP sensor connector VREF terminal with ignition switch on. **Voltage** **4.5—5.5 V** • Is voltage okay?	Yes	Go to next step.
		No	Go to symptom troubleshooting "NO.30 CONSTANT VOLTAGE [ZM]".
4	• Does engine start with throttle closed?	Yes	Go to Step 20.
		No	Go to next step.
5	• Will engine start and run smoothly at part throttle?	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
6	• Connect WDS or equivalent to DLC-2. • Access RPM PID. • Is RPM PID indicating engine speed when cranking engine?	Yes	Go to next step.
		No	Inspect following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor and PCM terminal 21 or 22 • Open or short circuit in CKP sensor harnesses — If CKP sensor and harness are okay, go to next step.
7	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
8	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
9	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
10	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Go to next step.
		No	Inspect for following: • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and GND • Open circuit between ignition switch and ignition coil • Open circuit between ignition coil and PCM terminal 26 or 52
11	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
12	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.

STEP	INSPECTION		ACTION
13	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
14	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition switch on. • Is fuel line pressure correct when ignition switch is cycled on/off five times? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
15	• Visually inspect for fuel leakage at fuel injector O-ring and fuel line. • Service as necessary. • Is fuel line pressure held after ignition switch is turned off? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
16	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
17	• 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.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for causes.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.7 SLOW RETURN TO IDLE [ZM]

A3U010318881W49

7	Slow return to idle
DESCRIPTION	• Engine takes more time than normal to return to idle speed.
POSSIBLE CAUSE	• ECT sensor malfunction • Thermostat is stuck open. • Throttle body malfunction • Air leakage from intake-air system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
2	• Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge on instrument cluster readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.
3	• Is throttle body free of contaminations?	Yes	Inspect for air leakage 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. — If malfunction remains, refer to related Service Bulletins 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.		

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [ZM]

A3U010318881W50

8	Engine runs rough/rolling idle
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. • Idle speed is too slow and engine shakes excessively.
POSSIBLE CAUSE	• Air leakage from intake-air system parts • A/C system improper operation • Spark leakage from high-tension leads • Purge solenoid valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic or no signal from CMP sensor • Low engine compression • Erratic signal from CKP sensor • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Disconnected electrical connectors • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Engine overheating • Vacuum leakage • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — External fuel shut off or accessory (kill switch, alarm etc.) — Fuel quality: proper octane, contamination, winter/summer blend — No air leakage from intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Electrical connections — Fuses — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC is displayed:** • Go to next step.
		No	**DTC is displayed:** • Go to appropriate DTC test.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [ZM]".
		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 switch on. • Measure low side and high side pressures. • Are reading pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM]". For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
5	• Start engine and run it at idle. • Turn steering wheel right to left. • Does engine running rough exist while turning steering wheel right to left?	Yes	Inspect power steering pressure switch operation and wiring harness between power steering pressure switch connector and PCM connector terminal 31.
		No	Go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	• Inspect spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		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	Inspect 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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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. • Inspect PRC solenoid valve and related vacuum hose and harness. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
12	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
13	• Connect WDS or equivalent to DLC-2. • Start engine and run it at idle. • Access LONGFT1 PID. • Measure LONGFT1 PID at idle. • Is PID value **between –25% and +25%**?	Yes	Go to next step.
		No	LONGFT1 PID is out of specification. **Less than specification (too rich):** • Inspect evaporative emission control system. • If system is okay, go to Step 15. **Greater than specification (too lean):** • Inspect for air leakage at intake-air system components. • If system okay, go to next step.

STEP	INSPECTION		ACTION
14	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Start engine. • Does engine condition improve?	Yes	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
15	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
16	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
17	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for causes.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.9 FAST IDLE/RUNS ON [ZM]

A3U010318881W51

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	• ECT sensor malfunction • Air leakage from intake-air system • Throttle body malfunction • Accelerator cable free play misadjustment • Cruise control cable misadjustment

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Start and warm-up engine to normal operating temperature. • Is ECT PID reading **between 82—112 °C {180—234 °F}**?	Yes	Go to next step.
		No	**ECT PID is higher than 112 °C {233.6 °F}:** • Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [ZM]”. **ECT PID is less than 82 °C {180 °F}:** • Go to symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS — RUNS COLD [ZM]”.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is 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	Inspect accelerator cable free play. (See 01–13A–13 ACCELERATOR CABLE INSPECTION/ ADJUSTMENT [ZM].)
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.10 LOW IDLE/STALLS DURING DECELERATION [ZM]

A3U010318881W52

10	Low idle/stalls during deceleration
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.
POSSIBLE CAUSE	• Vacuum leakage • IAC valve malfunction • Air leakage from intake-air system • TP sensor or related circuit malfunction • MAF sensor or related circuit malfunction • Brake switch or related circuit malfunction • Neutral/clutch switch or related circuit malfunction (MTX)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does engine idle rough?	Yes	Go to symptom troubleshooting “NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [ZM]”.
		No	Go to next step.
2	• Inspect for following: — Proper routing and no damage of vacuum lines — IAC valve is connected properly. — No air leakage from intake-air system • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
4	• Does idle speed drop or stall when disconnecting IAC valve?	Yes	Go to next step.
		No	Inspect following: • Circuit from IAC valve to PCM connector terminal 54 or 83 for open and short • IAC valve for sticking — If okay, go to next step.
5	• 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	Inspect evaporative emission control system.
		No	Go to next step.
6	• Connect WDS or equivalent to DLC-2. • Access TP, MAF, VSS PIDs. • Monitor each PID while driving vehicle. • Are PIDs okay?	Yes	Go to symptom troubleshooting “NO.29 INTERMITTENT CONCERNS [ZM]”.
		No	**TP PID:** • Inspect TP sensor. **MAF PID:** • Inspect MAF sensor. **VSS PID:** • Inspect VSS.
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

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

A3U010318881W53

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 acceleration or during acceleration. • Engine stops unexpectedly while cruising. • Engine speed fluctuates during acceleration or cruising. • Engine misses during acceleration or cruising. • Vehicle bucks/jerks during acceleration, cruising or deceleration. • Momentary pause at beginning of acceleration or during acceleration • Momentary minor irregularity in engine output
POSSIBLE CAUSE	• A/C system improper operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Purge solenoid valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, TP sensor and VSS • ATX malfunction • Clutch slippage **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

STEP	INSPECTION		ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [ZM]".
		No	Go to next step.
4	• Connect WDS or equivalent to DLC-2. • Access RPM PID, MAF PID,TP PID, and VSS PID. • Drive vehicle with monitoring PIDs. • Are PIDs within specification?	Yes	Go to next step.
		No	**RPM PID:** • Inspect CKP sensor and related harness: vibration, intermittent open/short circuit. **MAF PID:** • Inspect for open circuit of MAF sensor and related wire harness intermittently. **TP PID:** • Inspect if output signal from TP sensor changes smoothly. **VSS PID:** • Inspect for open circuit of VSS and related wire harness intermittently.
5	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect 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	• Verify 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 any restrictions in the exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
11	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and chassis GND. • Turn ignition switch on. • Is fuel line pressure correct with ignition switch on? **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:** • 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	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.

STEP	INSPECTION		ACTION
13	**Note** • The following test is for engine stalling with A/C on. If other symptoms exist, 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 pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting “NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM]”. For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
14	**Note** • The following test is performed for symptom with cruise control on. If other symptoms exist, go to next step. • Inspect cruise control system. • Is cruise control system okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
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	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
16	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	• Inspect EGR valve. (See 01–16–15 EGR VALVE INSPECTION.) — Is EGR valve okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	• Is engine compression correct?	Yes	Inspect following: • Valve timing • Internal transaxle part (ATX) • Clutch (MTX)
		No	Inspect for cause.
19	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [ZM]

A3U010318881W54

12	Lack/loss of power — acceleration/cruise
DESCRIPTION	• Performance is poor under load (e.g., power down when climbing hills).
POSSIBLE CAUSE	• Improper A/C system operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Tumble swirl control system malfunction • Purge control solenoid malfunction • EGR valve malfunction • Brake dragging • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, TP sensor and VSS • ATX malfunction • Clutch slippage **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Fuel quality: proper octane, contamination, winter/summer blend • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [ZM]".
		No	Go to next step.

STEP	INSPECTION		ACTION
4	• Connect WDS or equivalent to DLC-2. • Access RPM PID, MAF PID, TP PID, and VSS PID. • Drive vehicle with monitoring PIDs. • Are PIDs within specification? (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).)	Yes	Go to next step.
		No	**RPM PID:** • Inspect CKP sensor and related harness for vibration and/or intermittent open/short circuit. **MAF PID:** • Inspect for intermittent open circuit of MAF sensor and related wire harness. **TP PID:** • Inspect if TP sensor output increases smoothly. **VSS PID:** • Inspect for intermittent open circuit of VSS and related wire harness.
5	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is the gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect 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	• Is there restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
10	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition switch on. • Is fuel line pressure correct with ignition switch on? **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:** • 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.
11	• Inspect for tumble swirl control system operation. (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.) • Does tumble swirl control system work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
12	**Note** • Following test is for engine stalling with A/C on concern. If other symptoms exist, 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 pressure within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting “NO.24 A/C IS ALWAYS ON/ A/C COMPRESSOR RUNS CONTINUOUSLY [ZM]”. For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation

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	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
14	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
15	• Inspect EGR valve. • Is EGR valve okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
16	• Is engine compression correct?	Yes	Inspect following: • Valve timing • Internal transaxle components (ATX) • Clutch (MTX) • Brake system for dragging
		No	Inspect for cause.
17	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [ZM]

A3U010318881W55

13	Knocking/pinging — acceleration/cruise
DESCRIPTION	• Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g., hot spot in combustion chamber).
POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction • ECT sensor malfunction • IAT sensor malfunction • Inadequate engine compression • Inadequate fuel pressure **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Verify ECT PID is **less than 116 °C {241 °F}** during driving. • Is ECT PID less than specification?	Yes	Go to next step.
		No	Inspect cooling system for cause of overheating.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Is engine compression correct?	Yes	Go to next step.
		No	Inspect for cause.

STEP	INSPECTION		ACTION
4	• 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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.14 POOR FUEL ECONOMY [ZM]

A3U010318881W56

14	Poor fuel economy
DESCRIPTION	• Fuel economy is unsatisfactory.
POSSIBLE CAUSE	• Contaminated air cleaner element • Tumble swirl control system malfunction • Engine cooling system malfunction • Improper ATX fluid level (ATX) • Weak spark • Poor fuel quality • Erratic or no signal from CMP sensor • Improper coolant level • Inadequate fuel pressure • Spark plug malfunction • PCV valve malfunction • Brake dragging • Improper valve timing due to jumping out of timing belt • Contaminated MAF sensor • Improper engine compression • Exhaust system clogging **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Air cleaner element for contamination — Automatic transaxle fluid level — Fuel quality — Coolant level • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Access ECT PID. • Drive vehicle while monitoring PID. (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) • Is PID within specification?	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operations or thermostat operation.

STEP	INSPECTION		ACTION
4	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect for following: • Spark plugs malfunction • CMP sensor is improperly installed. • Trigger wheel damage on camshaft • Open or short circuit on CMP sensor • Open or short circuit between CMP sensor and PCM terminal 85 Repair or replace malfunctioning parts. • If okay, go to next step.
		No	Inspect following: • High-tension leads • Ignition coil and connector
5	• 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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
6	• Inspect tumble swirl control system operation. (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.) • Does tumble swirl control system work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
7	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
8	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
9	• Is brake system functioning properly?	Yes	Go to next step.
		No	Inspect for cause.
10	• Inspect for contaminated MAF sensor. • Is there any contamination?	Yes	Replace MAF sensor.
		No	Go to next step.
11	• Is engine compression correct?	Yes	Inspect valve timing.
		No	Inspect for cause.
12	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.15 EMISSION COMPLIANCE [ZM]

A3U010318881W57

15	Emission compliance
DESCRIPTION	• Emission compliance test failed.
POSSIBLE CAUSE	• Vacuum lines leakage or blockage • Cooling system malfunction • Spark plug malfunction • Leakage from intake manifold • Erratic or no signal from CMP sensor • Inadequate fuel pressure • PCV valve malfunction or incorrect valve installation • EGR valve malfunction • Exhaust system clogging • Fuel tank ventilation system malfunction • Charcoal canister damage • Excessive carbon is built up in combustion chamber. • Improper engine compression • Improper valve timing **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for following: — Vacuum lines for leakage or blockage — Electrical connections — Proper maintenance schedule followed — Intake-air system and air cleaner element concerns: obstructions, leakage or dirtiness • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to next step.
		No	**No DTC is displayed:** • Go to appropriate DTC test.
3	• Is any other drivability concern present?	Yes	Go to appropriate symptom troubleshooting.
		No	Go to next step.
4	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Warm up engine and run it at idle. • Verify ECT PID is correct. • Is ECT PID correct?	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operation or thermostat operation.
5	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect for following: • Spark plugs malfunction • CMP sensor is improperly installed. • Damage of trigger wheel on camshaft • Open or short circuit on CMP sensor • Open or short circuit between CMP sensor and PCM terminal 85 Repair or replace malfunctioning parts. • If okay, go to next step.
		No	Inspect following: • High-tension leads • Ignition coil and connector

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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
7	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
8	• Inspect for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. Then, go to next step.
9	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Inspect EGR valve.
10	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.16 HIGH OIL CONSUMPTION/LEAKAGE [ZM]

A3U010318881W58

16	High oil consumption/leakage
DESCRIPTION	• Oil consumption is excessive.
POSSIBLE CAUSE	• PCV valve malfunction • Improper dipstick • Improper engine oil viscosity • Engine internal parts 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	• Inspect for following: — External leakage — Proper dipstick — Proper engine oil viscosity • Are all items okay?	Yes	Inspect internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, piston rings.
		No	Service as necessary. Repeat Step 2.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [ZM]

A3U010318881W59

17	Cooling system concerns — overheating
DETECTION CONDITION	• Engine runs at higher than normal temperature/Overheats.
POSSIBLE CAUSE	• Improper coolant level • Blown fuses • Coolant leakage • Excessive A/C system pressure • Improper water/anti-freeze mixture • Fans reverse rotation • Poor radiator condition • Thermostat malfunction • Radiator hoses damage • Condenser fan is inoperative. • Improper or damaged radiator cap • Cooling fan is inoperative. • Coolant overflow system malfunction • Improper tension of drive belt • Drive belt damage

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect following: — Engine coolant level — Coolant leakage — 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	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
3	• Start engine and run it at idle speed. • Turn A/C switch on. • Does A/C compressor engage?	Yes	Go to next step.
		No	Inspect following and repair or replace as necessary: • Refrigerant charging amount • Open circuit between A/C relay and PCM terminal 96 • Seized A/C magnetic clutch • A/C magnetic clutch malfunction — If all items are okay, go to inspect following. • Refrigerant pressure switch operation • Evaporator temperature sensor and A/C amplifier • A/C switch is stuck open. • Open or short circuit between refrigerant pressure switch and PCM terminal 41 • Open circuit of blower motor fan switch and resistor (if blower motor does not operate)

STEP	INSPECTION		ACTION
4	• Start engine and run it at idle speed. • Turn A/C switch on. • Do cooling fan and condenser fan operate?	Yes	Go to next step.
		No	**Cooling fan motor does not operate:** • Inspect for following: — Cooling fan relay is stuck open. — Cooling fan motor malfunction — Cooling fan motor GND open — Open circuit between cooling fan motor and relay — Open circuit between cooling fan relay and PCM terminal 47 — Open battery power circuit for cooing fan relay **Condenser fan motor does not operate:** • Inspect for following: — Condenser fan relay is stuck open. — Condenser fan motor malfunction — Condenser fan motor GND open — Open circuit between condenser fan motor and relay — Open circuit between condenser fan relay and PCM terminal 45 — Open battery power circuit for condenser fan relay
5	• Is drive belt okay?	Yes	Go to next step.
		No	Replace drive belt.
6	• Is there any leakage around heater unit in passenger compartment?	Yes	Inspect and service heater for leakage.
		No	Go to next step.
7	• Is there any leakage at coolant hoses and/or radiator?	Yes	Replace malfunctioning part.
		No	Go to next step.
8	• Cool down the engine. • Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	Engine coolant temperature and thermostat are okay, inspect engine block for leakage or blockage.
		No	Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates overheating but ECT is normal, inspect temperature gauge and heat gauge unit.
9	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins 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 PCM.		

NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [ZM]

A3U010318881W60

18	Cooling system concerns — runs cold
DETECTION CONDITION	• Engine takes excessive period for reaching normal operating temperature.
POSSIBLE CAUSE	• Thermostat malfunction • Condenser fan system malfunction • Cooling fan system malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is customer complaint “Lack of passenger compartment heat” only?	Yes	Inspect A/C and heater system.
		No	Go to next step.
2	• Does engine speed continue at fast idle?	Yes	Go to symptom troubleshooting “NO.9 FAST IDLE/RUNS ON [ZM]”.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	• Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	Inspect cooling fan and condenser fan operation. • If both or either fan operate abnormally, inspect for following: — Cooling fan relay is stuck closed. — Condenser fan relay is stuck closed. — Short to GND between cooling fan relay and PCM terminal 47 — Short to GND between condenser fan relay and PCM terminal 45 — 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	Access ECT PID on WDS or equivalent. Inspect both ECT and temperature gauge on instrument cluster readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins 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 PCM.		

NO.19 EXHAUST SMOKE [ZM]

A3U010318881W61

19	Exhaust smoke
DESCRIPTION	• Blue, black, or white smoke from exhaust system
POSSIBLE CAUSE	**Blue smoke (Burning oil):** • PCV valve malfunction • Engine internal oil leakage **White smoke (Water in combustion):** • Cooling system malfunction (coolant loss) • Engine internal coolant leakage **Black smoke (Rich fuel mixture):** • Air cleaner restriction • Intake-air system is collapsed or restricted. • Fuel return line is restricted. • Excessive fuel pressure • Improper engine compression • Injector fuel leakage • Ignition system malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• What color is smoke coming from exhaust system?	Blue	Burning oil is indicated. Go to next step.
		White	Water in combustion is indicated. Go to Step 3.
		Black	Rich fuel mixture is indicated. Go to Step 4.
2	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Inspect for 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 drivability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Replace PCV valve.
3	• Does cooling system hold pressure?	Yes	Inspect for following: • Cylinder head gasket leakage • Intake manifold gasket leakage • Engine block cracks or porosity — If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Inspect for cause.
4	• Inspect for following: — Air cleaner 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 4.
5	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
7	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect spark plugs and CMP sensor.
		No	Inspect following: • High-tension leads • Ignition coil and connector
8	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [ZM]

A3U010318881W62

20	Fuel odor (in engine compartment)
DESCRIPTION	• Gasoline fuel smell or visible leakage
POSSIBLE CAUSE	• Excessive fuel pressure • Purge solenoid valve malfunction • Fuel tank vent system blockage • Charcoal canister malfunction **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Is fuel line pressure held after ignition switch is turned off? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
2	• Inspect for blockage/restriction or open between engine vacuum port and charcoal canister. • Inspect for blockage in fuel tank vent system. • Is fault indicated?	Yes	Replace vacuum hose.
		No	Go to next step.
3	• Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is solenoid operating properly?	Yes	Go to next step.
		No	Replace purge solenoid valve.
4	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC is displayed:** • Inspect charcoal canister for fuel saturation. • If excess amount of liquid fuel is present, replace charcoal canister.
		No	**DTC is displayed:** • Go to appropriate DTC test.
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.21 ENGINE NOISE [ZM]

A3U010318881W63

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 leakage • Loose spark plug • Air leakage from intake-air system **Rumble or grind noise:** • Improper drive belt tension **Rap or roar sound noise:** • Exhaust system looseness **Other noise:** • Camshaft friction gear noise or MLA noise

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is squeal, click or chirp sound present?	Yes	Inspect engine oil level or drive belts.
		No	Go to next step.
2	• Is rumble or grind sound present?	Yes	Inspect drive belt.
		No	Go to next step.
3	• Is rattle sound present?	Yes	Inspect location of rattle for loose parts.
		No	Go to next step.
4	• Is hiss sound present?	Yes	Inspect for following: • Vacuum leakage • Spark plug looseness • Intake-air system leakage
		No	Go to next step.
5	• Is rap or roar sound present?	Yes	Inspect exhaust system for loose parts.
		No	Go to next step.
6	• Is knock sound present?	Yes	Go to symptom troubleshooting “NO.13 KNOCKING/ PINGING —ACCELERATION/CRUISE[ZM]”.
		No	If noise comes from engine internal, inspect for friction gear or MLA noise.
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.22 VIBRATION CONCERNS (ENGINE) [ZM]

A3U010318881W64

22	Vibration concerns (engine)
DESCRIPTION	• Vibration from under hood or driveline
POSSIBLE CAUSE	• Loose attaching bolts or worn parts • Components malfunction such as worn parts

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect following components for loose attaching bolts or worn parts: — Cooling fan — Drive belt and pulleys — Engine mounts • Are all items okay?	Yes	Inspect following systems: • Wheels • Automatic 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. — If malfunction remains, refer to related Service Bulletins 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.		

NO.23 A/C DOES NOT WORK SUFFICIENTLY [ZM]

A3U010318881W65

23	A/C does not work sufficiently.
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C switch is turned on.
POSSIBLE CAUSE	• Improper refrigerant charging amount • Open A/C magnetic clutch • Open circuit between A/C relay and A/C magnetic clutch • Poor GND of A/C magnetic clutch • Refrigerant pressure switch is stuck open. • A/C relay is stuck open. • Seized A/C compressor • Open circuit between A/C switch and PCM through both refrigerant pressure switch and A/C amplifier

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
2	• Disconnect A/C compressor connector. • Start engine and turn A/C switch on. • Is there correct voltage at terminal of A/C compressor magnetic clutch connector? **Specification** **More than 10.5 V**	Yes	Inspect for GND condition of magnetic clutch on A/C compressor. • If GND condition is okay, inspect for open circuit of magnetic clutch coil.
		No	Go to next step.
3	• Disconnect refrigerant pressure switch connector. • Connect jumper wires between terminals of refrigerant pressure switch connector. • Turn ignition switch on. • Turn A/C switch on and set blower fan at any speed. • Does A/C work?	Yes	Inspect refrigerant pressure switch operation. • If switch is okay, go to next step.
		No	Inspect for following: • A/C switch is stuck open. • Open circuit between refrigerant pressure switch and PCM terminal 41 • Open circuit of blower motor fan switch and resister (if blower motor does not operate) • Evaporator temperature sensor and A/C amplifier
4	• Remove jumper wires from switch connector. • Reconnect connector to refrigerant pressure switch. • Start engine and turn A/C switch on. • Does fan operate?	Yes	Inspect for stuck open A/C relay. Replace as necessary.
		No	Inspect following and repair or replace as necessary: • Refrigerant charging amount • A/C compressor for being seized

STEP	INSPECTION	ACTION
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.	

NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM]

A3U010318881W66

24	**A/C is always on/A/C compressor runs continuously.**
DESCRIPTION	• A/C compressor magnetic clutch does not disengage.
POSSIBLE CAUSE	• Stuck engagement • A/C relay is stuck closed. • Short to GND between A/C switch and PCM • Short to GND circuit between A/C relay and PCM • A/C relay to magnetic clutch circuit shorts to battery power.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.
2	• Start engine and run it at idle. • Turn A/C switch on. • Remove A/C relay. • Does A/C magnetic clutch disengage?	Yes	Inspect for following: • A/C relay is stuck closed. • Short to GND circuit between A/C relay and PCM terminal 96 — If both items are okay, go to next step.
		No	Inspect if circuit between A/C relay and magnetic clutch shorts to battery power circuit. • If circuit is okay, inspect magnetic clutch stuck engagement or clearance.
3	• Disonnect refrigerant pressure switch connector. • Start engine and turn A/C switch on. **Note** • A/C should not work when disconnecting connector. If A/C remains working, short to GND circuit may be present. • Does A/C remain working?	Yes	Inspect for short to GND circuit between refrigerant pressure switch and PCM terminal 41.
		No	Go to next step.
4	• Reconnect refrigerant pressure switch connector. • Turn off A/C switch. **Note** • A/C should not work when turning the A/C switch off. If A/C remains working, short to GND circuit may be present. • Does A/C remain working?	Yes	Inspect following: • Short to GND circuit between A/C switch and A/C amplifier • Short to GND circuit between A/C amplifier and refrigerant pressure switch
		No	Inspect for stuck closed A/C switch.
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [ZM]

A3U010318881W67

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	• TP sensor malfunction • TP sensor misadjustment • TP sensor not securely installed

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does A/C compressor disengage when A/C switch is turned off?	Yes	Go to next step.
		No	Go to symptom troubleshooting “NO.24 A/C IS ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [ZM]”.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Inspect TP sensor for proper adjustment.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms — If malfunction remains, refer to related Service Bulletins 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.		

NO.26 EXHAUST SULPHUR SMELL [ZM]

A3U010318881W68

26	**Exhaust sulphur smell**
DESCRIPTION	• Rotten egg smell (sulphur) from exhaust
POSSIBLE CAUSE	• Electrical connectors are disconnected or connected poorly. • Charcoal canister malfunction • Vacuum lines are disconnected or connected improperly. • Improper fuel pressure **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are any driveability or exhaust smoke concerns present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
2	• Inspect following: — Electrical connections — Vacuum lines • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Connect WDS or equivalent to DLC-2. • Turn ignition switch on. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test.
		No	**No DTC is displayed:** • Go to next step.

STEP	INSPECTION		ACTION
4	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
5	• Inspect charcoal canister for fuel saturation. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. • If fuel tank vent system is okay, since sulfur content can vary in different fuels, suggest trying a different brand. • If fuel tank vent system is not okay, repair or replace malfunctioning parts.
6	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms — If malfunction remains, refer to related Service Bulletins 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.		

NO.27 FUEL REFILL CONCERNS [ZM]

A3U010318881W69

27	Fuel refill concerns
DESCRIPTION	• Fuel tank does not fill smoothly.
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Nonreturn valve malfunction • Pressure control valve malfunction • Improper use of fuel nozzle • Inadequate fuel filling speed **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel-filler pipe. • Make sure nonreturn valve is installed properly. • Inspect nonreturn valve operation. • Is nonreturn valve okay?	Yes	Inspect following: • Improper use of fuel nozzle • Inadequate fuel filling speed • Pressure control valve
		No	**If nonreturn valve is installed improperly:** • Reinstall nonreturn valve to proper position. **If nonreturn valve does not operate properly:** • Replace nonreturn valve.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.28 FUEL FILLING SHUT OFF ISSUES [ZM]

A3U010318881W70

28	Fuel filling shut off issues
DESCRIPTION	• Fuel does not shut off properly.
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Nonreturn valve malfunction • Fuel shut-off valve malfunction • Fuel nozzle malfunction • Fuel nozzle is not inserted correctly. **Warning** **The following troubleshooting flowchart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** **• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel-filler pipe. • Make sure nonreturn valve is installed properly. • Inspect nonreturn valve operation. • Is nonreturn valve okay?	Yes	Inspect for following: • Improper use of fuel nozzle • Fuel nozzle is not inserted correctly. • Inspect fuel shut-off valve
		No	**If nonreturn valve is installed improperly:** • Reinstall nonreturn valve to proper position. **If nonreturn valve does not operate properly:** • Replace nonreturn valve.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.29 INTERMITTENT CONCERNS [ZM]

A3U010318881W71

29	Intermittent concerns
DESCRIPTION	• Symptom occurs randomly and is difficult to diagnose.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Talk to customer. • Retrieve vehicle service history. • Does vehicle have a number of previous repairs and components replaced for a certain symptom?	Yes	Go to next step.
		No	Go to Symptom Index.
2	• Connect WDS or equivalent to DLC-2. — If input is switch-type component, turn on manually. • Turn ignition switch on. • Access PIDs for suspect component. • Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. • Are any PID values out of range, or do they suddenly change and go back into range?	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	• Start engine. • Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. • Are any PID values out of range, or do they suddenly change and go back into range?	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.
4	• Start engine. • Accurately spray water on suspect component wire, component or vacuum line related to possible fault area. • Are any PID values out of range, or suddenly change and go back into range, or was there a noticeable engine misfire/stumble?	Yes	**Fault occurred while spraying on component:** • Replace part and verify repair. **Fault occurred while spraying wiring:** • Inspect each wire for corrosion, bent or loose terminals and poor wire terminal crimps. **Fault occurred while spraying vacuum line:** • Repair vacuum hoses.
		No	Inspect wire and connector at suspect component for corrosion, bent or loose terminals, poor wire terminal crimps and high tension of wire. Repair as necessary.

NO.30 CONSTANT VOLTAGE [ZM]

A3U010318881W72

30	Constant voltage
DESCRIPTION	• Incorrect constant voltage
POSSIBLE CAUSE	• Constant voltage circuit malfunction **Note** • TP sensor, EGR boost sensor and fuel tank pressure sensor use constant voltage.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Disconnect appropriate sensor connector where constant voltage circuit inspection failed. • Turn ignition switch on. • Measure voltage between following appropriate sensor connector terminals: — Constant voltage terminal — GND terminal • Is constant voltage **greater than 6.0 V**?	Yes	Go to Step 13.
		No	Go to next step.
2	• Is voltage across battery terminals **greater than 10.5 V**?	Yes	Go to next step.
		No	Inspect charging system.
3	• Turn ignition switch off. • Leave appropriate sensor connector disconnected. • Measure voltage between battery positive terminal and GND (between PCM and appropriate sensor) circuit at appropriate sensor connector. • Is voltage **greater than 10.5 V** and **within 1.0 V** of battery voltage?	Yes	Go to next step.
		No	Go to Step 8.
4	**Note** • The purpose of this step is to determine if WDS or equivalent is communicating with PCM. • Turn ignition switch on. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	• Turn ignition switch off. • Disconnect TP sensor, EGR boost sensor, fuel tank pressure sensor and PCM connectors. • Turn ignition switch on. • Measure voltage between PCM connector terminals 71/97 and 24/51/76/77/103. • Is voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Repair open circuit between PCM terminal 71/97 and main relay.
6	• Leave TP sensor, EGR boost sensor, fuel tank pressure sensor and PCM connectors disconnected. • Measure resistance between PCM connector terminals 90 and 24/51/76/77/103. • Is resistance **greater than 10,000 ohms**?	Yes	Inspect for constant voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 6.
		No	Repair constant voltage circuit short to GND.
7	• Turn ignition switch off. • Leave TP sensor disconnected. • Disconnect PCM connector. • Measure resistance between PCM connector terminal 90 and constant voltage circuit at appropriate sensor connector. • Is resistance **less than 5.0 ohms**?	Yes	Inspect for constant voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 7.
		No	Repair open constant voltage circuit.
8	**Note** • The purpose of this step is to determine if WDS or equivalent is communicating with PCM. • Reconnect TP sensor connector. • Turn ignition switch on. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to next step.
		No	Go to Step 11.
9	• Are DTCs present for two or more sensors connected to PCM terminal 91? • Sensor connected to PCM terminal 91: — TP sensor (P0122, P0123, P1122, P1123) — EGR boost sensor (P0106, P0107, P0108) — Fuel tank pressure sensor (P0452, P0453) — ECT sensor (P0117, P0118, P0125) — IAT sensor (P0111, P0112, P0113) — HO2S (front) (P0130, P0134) — HO2S (rear) (P0138, P0140)	Yes	Go to next step.
		No	Repair open GND circuit to sensor where constant voltage circuit inspection failed.
10	• Turn ignition switch off. • Disconnect WDS or equivalent from DLC-2. • Disconnect PCM connector. • Measure resistance between GND circuit at appropriate sensor connector and PCM connector terminal 91. • Is resistance **less than 5.0 ohms**?	Yes	Reconnect sensor connector. Go to appropriate DTC test.
		No	Repair open GND circuit.
11	• Turn ignition switch off. • Disconnect PCM connector. • Measure resistance between battery negative terminal and PCM terminals 24/51/76/77/103. • Is each resistance **less than 5.0 ohms**?	Yes	Go to next step.
		No	Repair open GND circuit.

STEP	INSPECTION		ACTION
12	• Turn ignition switch off. • Measure resistance between GND circuit at following sensor connector and GND: — TP sensor — EGR boost sensor — Fuel tank pressure sensor — ECT sensor — IAT sensor — HO2S sensor (front) — HO2S sensor (rear) • Is each resistance **less than 5.0 ohms**?	Yes	GND circuits are okay. Inspect for constant voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 12.
		No	Inspect for open GND circuit.
13	• Turn ignition switch off. • Disconnect TP sensor, EGR boost sensor, fuel tank pressure sensor and PCM connectors. • Turn ignition switch on. • Measure voltage between constant voltage circuit at TP sensor connector and battery negative terminal. • Is voltage **less than 0.5 V**?	Yes	Inspect for constant voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 13.
		No	Repair constant voltage circuit short to power in harness.

NO.31 SPARK PLUG CONDITION [ZM]

A3U010318881W73

31	Spark plug condition
DETECTION CONDITION	• 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** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove all spark plugs. • Inspect each spark plug. • Is condition of spark plugs 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	• Are any of sparks plug wet/covered with carbon from engine oil?	Yes	Working up and down, inspect all areas related to oil.
		No	Go to next step.
3	• Inspect spark plugs for following. — Cracked insulator — Heating value — Air gap — Worn electrode • Are spark plugs 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–8 COMPRESSION INSPECTION [ZM].)	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 part.
6	• Perform fuel line pressure inspection. (See 01–14–28 PRESSURE REGULATOR INSPECTION.) • Is fuel line pressure okay?	Yes	Inspect fuel injector for following: • Open or short in injector • Leakage • Injection volume
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve open. • 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.
7	• Inspect spark plugs for following. — Heating value — Air gap • Are they okay?	Yes	Go to next step.
		No	Replace spark plug.
8	• Remove suspected fuel injector. • Inspect following: — Resistance (See 01–14–24 Resistance Inspection.) — Fuel injection volume (See 01–14–26 Volume Test.) • Are all above items okay?	Yes	Inspect for open circuit between suspected fuel injector connector terminal and PCM connector following terminals: • **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 restrictions?	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.

STEP	INSPECTION		ACTION
11	• Carry out fuel line pressure inspection. • Is fuel line pressure correct? **Fuel line pressure** **210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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 — O2S11 — O2S12 — MAF (See 01–40A–7 PCM Inspection Using the SST (WDS or equivalent).) • Are PIDs okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
13	• Inspect purge solenoid valve. (When engine can be started) • Is purge solenoid valve okay?	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** **210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**	Yes	Inspect following PIDs. • ECT • O2S11 • O2S12 • MAF Inspect PCM GND condition.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve open. • 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.
17	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins 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 PCM.		

ENGINE CONTROL SYSTEM OPERATION INSPECTION [ZM]

A3U010318881W74

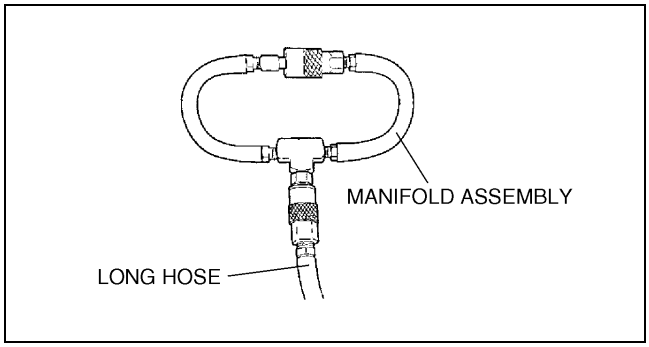
Evaporative System Leak Inspection Using Leak Tester

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.
(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.
(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.



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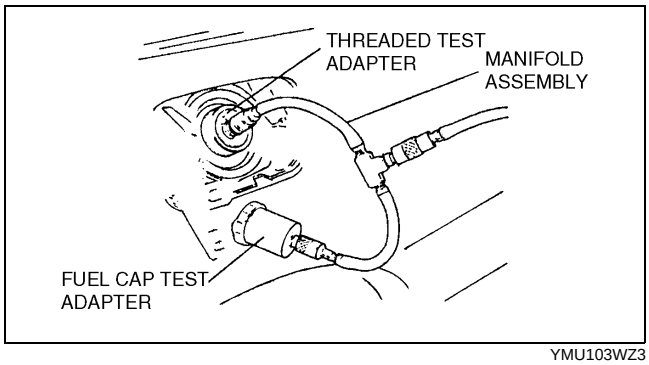
(8) Turn the control valve to TEST position and press the START switch.
(9) **After the 2-minute** countdown (left display) is completed, the right display shows the total pressure loss for that period. A **0.5 inch** of water loss is acceptable on the self-test.
- If the loss is **more than 0.5 inch** 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 WDS or equivalent to DLC-2.
6. Turn the ignition key to ON (engine OFF).
7. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function (mode 08).

Note
- The CDCV is closed for **10 minutes unless** the following any action is done:
  — 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}**.



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8. Turn the control valve to the FILL position.
9. 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.

10. Turn the control valve to the TEST position and press the START switch.
11. **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.

12. Close the gas cylinder valve.
13. Turn the control valve to the FILL position.
14. 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 WDS or equivalent to DLC-2.
4. Turn ignition key to ON (Engine OFF).
5. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function.

   Note
   - The CDCV is closed for **10 minutes unless** the following any action is done:
     — 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}**.

6. Apply 1.7 kPa vacuum and monitor FTP output voltage.
7. Verify that the voltage holds at the specified readings for a minimum of 2 minites.
   - If the voltage does not hold, inspect the fuel tank pressure sensor.
   - If the fuel tank pressure sensor is okay, carry out the “Inspection from charcoal canister to fuel tank”.

Inspection from charcoal canister to fuel tank

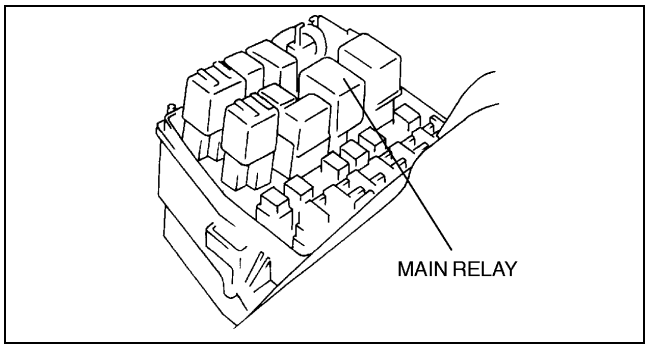
1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply 1.7 kPa vacuum.
5. Verify that the vacuum holds at the specified readings for a minimum of 2 minites.
   - If the vacuum does not hold, inspect the fuel tank, related vacuum hoses and fuel-filler cap.
   - If the the fuel tank, related vacuum hoses and fuel-filler cap are okay, carry out the “Inspection from charcoal canister to fuel tank”.

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 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the catch tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply **3.3 kPa {25 mmHg, 1.0 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of 2 minutes.
   - If the vacuum does not hold, inspect the following:
     — Catch tank for plugging, damages and pinhole using vacuum pump
     — Purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.)
     — Charcoal canister for damage and pinhole (See 01–16–9 CHARCOAL CANISTER INSPECTION.)
     — CDCV for damage and leakage (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION .)
     — Detached, incorrectly installed or cracked hose from charcoal canister to CDCV

Main Relay Operation Inspection

1. Verify that the main relay clicks when the ignition switch is turned to on and off.
   - If there is no operation sound, inspect the following:
     — Main relay
     — Harness and connector between ignition switch and main relay



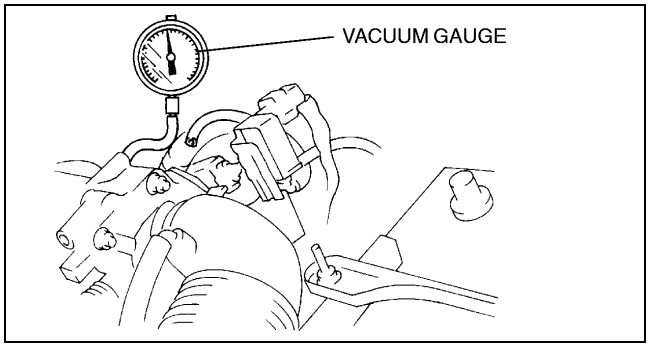
X3U101WCV

Intake Manifold Vacuum Inspection

1. Verify air intake hoses are installed properly.
2. Start the engine and run it at idle.
3. Measure the intake manifold vacuum using a vacuum gauge.
   - If not as specified, inspect the following:
     — Air suction at throttle body, intake manifold and PCV valve installation points
     — Fuel injector insulator
     — Accelerator cable free play
     — Engine compression (See 01–10A–8 COMPRESSION INSPECTION [ZM].)

Specification
More than 60 kPa {450 mmHg, 18 inHg}

Note
- Air suction can be located by engine speed change when lubricant is sprayed on the area where suction is occurring.



X3U101WCW

Idle Air Control (IAC) Inspection
Engine coolant temperature compensation inspection

1. Connect the WDS or equivalent to DLC-2.
2. Select the following PIDs.
   - ECT
   - RPM
3. Verify that the engine is in cold condition, then start the engine.
4. Verify that the engine speed decreases as the engine warms up.
   - If the engine speed does not decrease or decreases slowly, carry out the following:
     — ECT sensor inspection
     — IAC valve inspection

Load compensation inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Connect the WDS or equivalent to DLC-2.
3. Select the following PID.
   - RPM
4. Turn the electrical loads on and verify that the engine speed is within the specification.
   - If not as specified, carry out the following:
     — A/C switch inspection
     — P/S pressure switch inspection
     — IAC valve inspection

Engine speed (rpm)

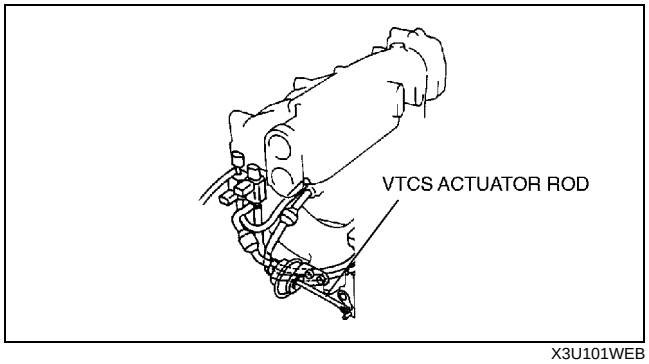
Load condition	Idle-up speed (rpm)*
No load	650—750 (700±50)
Headlight switch is on.	
P/S on	700—800 (750±50)
A/C on	

* : Neutral or P position

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

Variable Tumble Control System (VTCS) Inspection

1. Connect the WDS or equivalent to the DLC-2.
2. Access ECT PID.
3. Verify ECT PID is **65 °C {149 °F}** or less.
4. Start the engine.
5. Verify that the rod of tumble swirl control actuator is pulled.
   - If the rod is not pulled, inspect the following.
     — VTCS shutter valve actuator
     — VTCS delay valve
     — VTCS chamber
     — Vacuum hose
     — Tumble swirl control solenoid valve
     — Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 19)
6. Access RPM PID.
7. Inspect the rod operation under the following condition.
   - If the rod operation is not as specified, inspect the following:
     — Tumble swirl control actuator
     — Vacuum delay valve
     — Vacuum chamber
     — Vacuum hose
     — VTCS solenoid valve
     — Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 19)



X3U101WEB

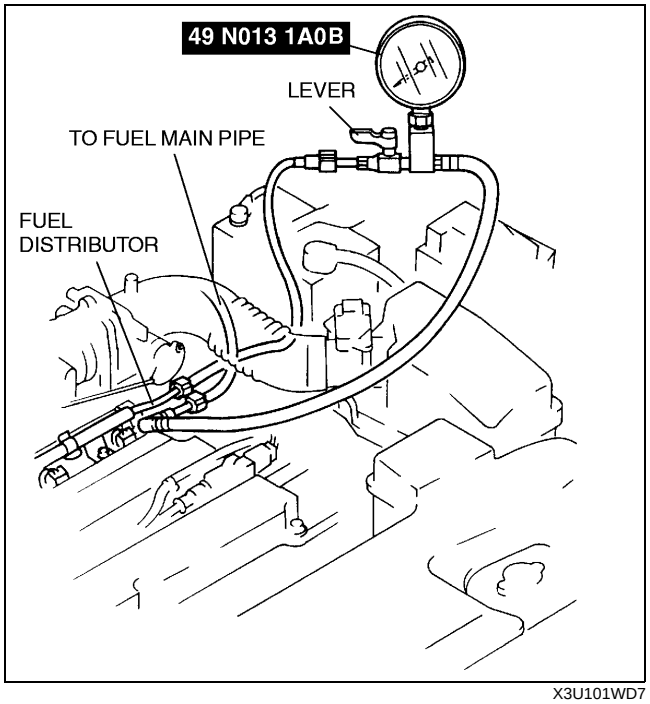
Rod operation

Engine speed (RPM PID) (rpm)	Tumble swirl control actuator
3,000 or less	Operate
3,000 or more	Not operate

Pressure Regulator Control Inspection

Warning
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes.**
- **To prevent this, always complete the "BEFORE REPAIR PROCEDURE". (See 01–14–4 BEFORE REPAIR PROCEDURE.)**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter and fuel distributor.
3. Connect the negative battery cable.
4. Measure the fuel line pressure under the following conditions.



X3U101WD7

Specification

Condition	Fuel pressure (kPa {kgf/cm^2, psi})		
Idling	210—250 {2.1—2.6, 30—36}	210—250 {2.1—2.6, 30—36}	270—310 {2.7—3.2, 39—45}
During 100 sec. of hot start	270—310 {2.7—3.2, 39—45}		
After 100 sec. of hot start	210—250 {2.1—2.6, 30—36}		
Judgment	Normal	Not Normal (Perform Inspection 1)	Not Normal (Perform Inspection 2)

Inspection 1
1. Inspect the following.
   - ECT, IAT, TP PIDs.
   - Pressure regulator.
   - PRC solenoid valve.

Inspection 2
1. Inspect the following.
   - Loose or damage vacuum hose. (Pressure regulator—PRC solenoid valve—intake manifold)
   - PRC solenoid valve.

Fuel Injector Operation Inspection

STEP	INSPECTION		ACTION
1	• While cranking engine, inspect for fuel injector operation sound at each cylinder using a soundscope. • Is operation sound heard?	Yes	Fuel injector operation is okay.
		No	**All cylinders no heard:** Go to next step. **Some cylinders no heard:** Go to Step 3.
2	• Carry out main relay operation inspection. • Is main relay operation normal?	Yes	Inspect following: Fuel injector power system related wiring harness and connectors PCM connectors Fuel injector GND and related wiring harness and connectors
		No	Repair or replace malfunctioning parts.
3	• Change fuel injector connector of not operating fuel injector and operating fuel injector. • Is operation sound heard?	Yes	Go to next step.
		No	Replace fuel injector.
4	• Are wiring harness and connectors of not operating fuel injector okay? (Open or short)	Yes	Inspect PCM terminal voltage of fuel injector signal.
		No	Repair or replace malfunctioning parts.

Spark Test

1. Disconnect the fuel pump relay connector.
2. Verify that each high-tension lead and connector is connected property.
3. Inspect the ignition system in the following procedure.

Warning

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

STEP	INSPECTION		ACTION
1	• Remove high-tension lead from spark plug. • Hold high-tension lead with installed pliers **5—10 mm {0.20—0.39 in}** from GND. • Crank engine and verify there is a strong blue spark. (Inspect each cylinder.)	Yes	Ignition system is okay.
		No	**Some cylinders do not spark:** Go to next step. **All cylinders do not spark:** Go to Step 3.
2	• Is high-tension lead resistance correct?	Yes	Inspect for cracks 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, inspect gap) **Specification** **0.5—1.5 mm {0.020—0.059 in}** — PCM terminal 21/22 voltage **Specification** **Approx. 1.5 V**	Yes	Inspect for open or short in wiring harness and connector of CKP sensor.
		No	Repair or replace malfunctioning parts.

01–03B SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [FS]

A3U010318881W01

Engine Control System

Component	Idle air control (IAC)	Fuel injection control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	Fuel pump control	HO2S heater (front) control	HO2S heater (rear) control	Electric fan control	Purge control	EGR control	VTCS	A/C cut-out control	Generator control
Input													
Brake switch		x		x									
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier	x	x		x				x				x	
PSP switch	x	x		x								x	
DLC in engine compartment (TEN)	x	x	x	x				x					
Neutral switch (MTX)	x	x	x	x									
Clutch switch (MTX)	x	x	x	x									
TR switch (ATX)	x	x	x	x									
CKP sensor	x	x	x	x	x	x	x	x	x	x	x	x	x
CMP sensor	x	x		x									
VSS	x	x		x						x			x
MAF sensor	x	x		x		x	x		x	x			
ECT sensor	x	x	x	x		x	x	x	x	x		x	x
IAT sensor	x	x	x	x		x			x	x			x
TP sensor	x	x	x	x		x		x	x	x		x	x
EGR boost sensor	x	x							x			x	
Battery positive voltage		x		x		x			x				x
Generator	x			x									x
HO2S (front)		x							x				
HO2S (rear)													
Output													
IAC valve	x												
A/C relay												x	
Cooling fan relay								x					
Condencer fan relay								x					
Fuel pump relay					x								
PRC solenoid valve			x										
Purge solenoid valve									x				
VTCS solenoid valve											x		
EGR valve										x			
HO2S heater						x	x						
Ignition coils				x									
Fuel injectors		x											
Generator (field coil)													x
Generator warning light													x

Monitoring System

× :Applied

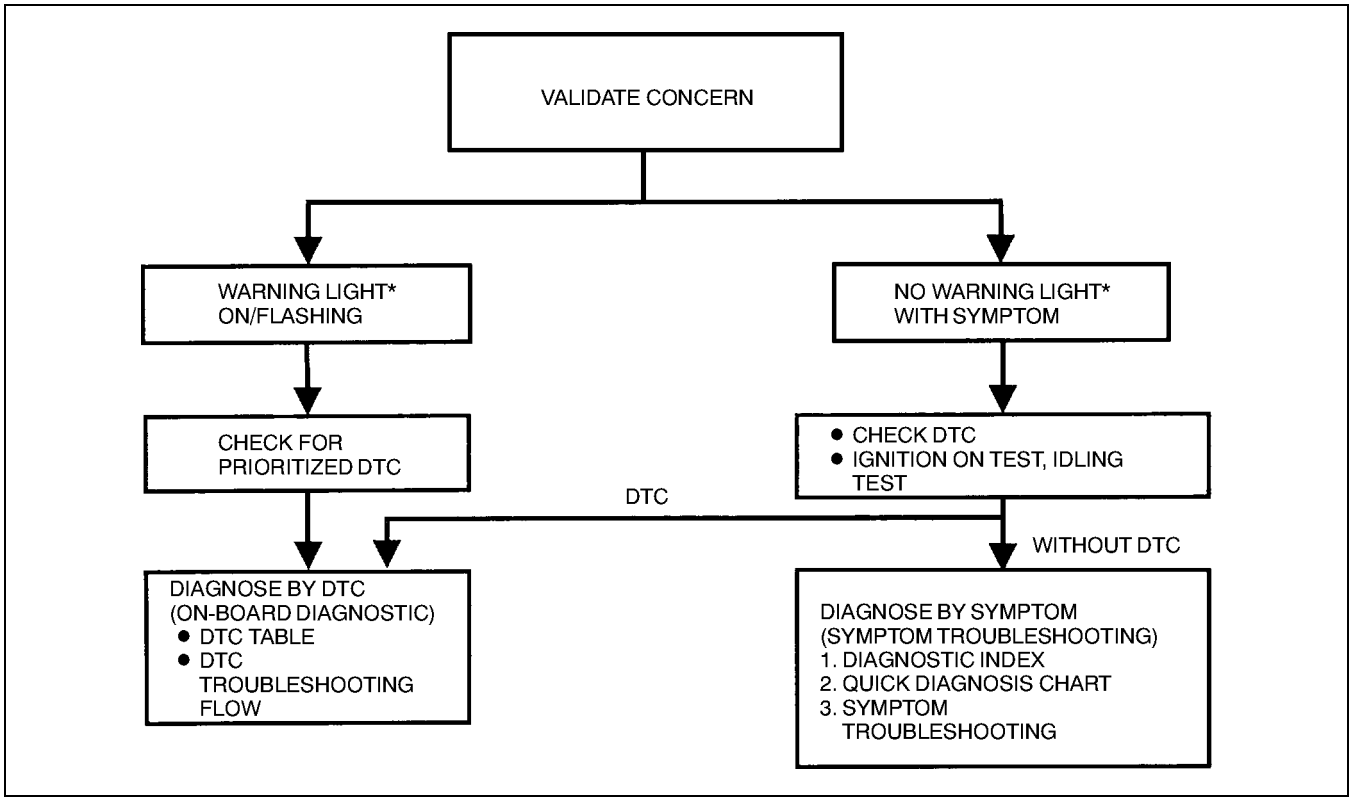
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan and A/C amplifier		×		×			×
PSP switch		×		×			×
CKP sensor	×	×	×	×	×	×	×
CMP sensor	×	×	×	×	×	×	×
VSS	×	×	×	×	×		×
MAF sensor	×	×	×	×	×	×	×
ECT sensor	×	×	×	×	×	×	×
IAT sensor	×	×	×	×	×		×
TP sensor	×	×	×	×	×		×
EGR boost sensor							×
Fuel level sensor			×				
Fuel gauge sender unit			×				
Rear HO2S	×				×	×	
Front HO2S	×			×	×	×	
Output							
DLC-2 in passenger compartment (Terminal KLN)	×	×	×	×	×	×	×
MIL	×	×	×	×	×	×	×
Purge solenoid valve			×	×	×		
EGR valve							×
EGR boost sensor solenoid valve							×
Canister drain cut valve			×				
Fuel injectors				×			

Y3U103WA6

FOREWORD [FS]

A3U010318881W02

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) 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–15 DTC TABLE [FS].)
  - — If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].)



YMU102WBX

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

INTERMITTENT CONCERN TROUBLESHOOTING [FS]

A3U010318881W03

Vibration Method

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

Note

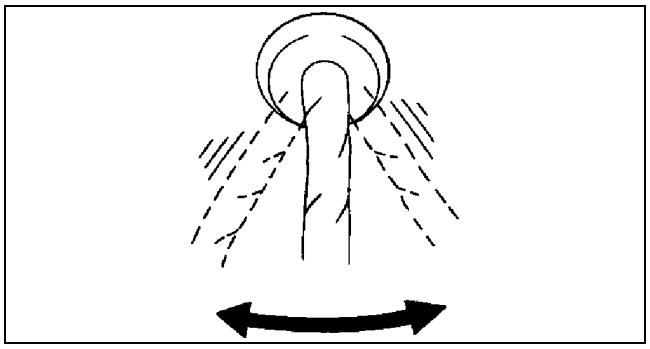
- There are several reasons vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
  - — Connectors not fully seated.
  - — Wire harnesses not having full play.
  - — Wires laying across brackets or moving parts.
  - — Wires routed too close to hot parts.
- 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 fire wall, body panels, etc. are the major areas to be checked.

Inspection Method for Switch Connectors or Wires

1. Connect WDS or equivalent 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.



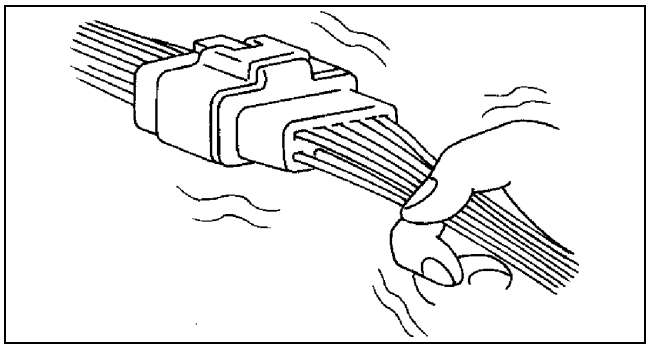
Y3U103WN3

Inspection Method for Sensor Connectors or Wires

1. Connect WDS or equivalent 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.



Y3U103WN4

Inspection Method for Sensors

1. Connect WDS or equivalent 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.

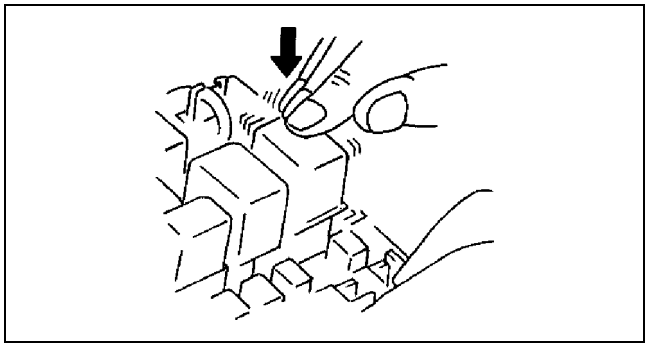
Inspection Method for Actuators or Relays

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

3. Prepare the SIMULATION TEST for actuators or relays that you are inspecting.
4. Vibrate the actuator or relay with your finger for 3 seconds after SIMULATION TEST is activated.
   - If variable click sound is heard, check for poor connection and/or poorly mounted actuator or relay.

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



Y3U103WN5

Water Sprinkling Method

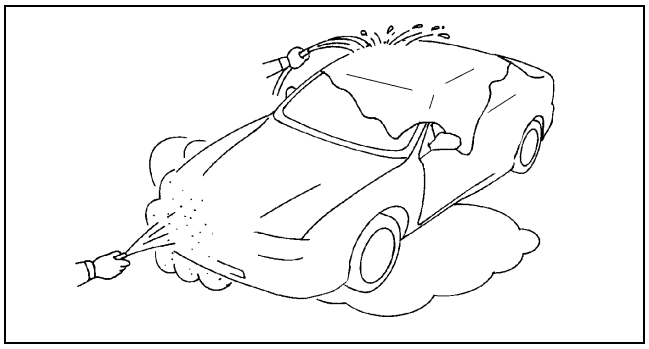
If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

1. Connect WDS or equivalent 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.



Y3U103WTJ

SYMPTOM DIAGNOSTIC INDEX [FS]

A3U010318881W04

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melting of main or other fuses		—	(See 01–03B–13 NO.1 MELTING OF MAIN OR OTHER FUSES [FS])
2	MIL illuminates		MIL is illuminated incorrectly.	(See 01–03B–14 NO.2 MIL ILLUMINATES [FS])
3	Will not crank		Starter does not work.	(See 01–03B–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 time before starting. Battery is in normal condition.	(See 01–03B–15 NO.4 HARD START/LONG CRANK/ ERRATIC START/ERRATIC CRANK [FS])
5	Engine stalls	After start/at idle	Engine stops unexpectedly at idle and/or after start.	(See 01–03B–17 NO.5 ENGINE STALLS-AFTER START/AT IDLE [FS])
6	Cranks normally but will not start		Starter cranks engine at normal speed but engine will not run.	(See 01–03B–20 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 01–03B–22 NO.7 SLOW RETURN TO IDLE [FS])
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01–03B–23 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 key is turned to OFF.	(See 01–03B–26 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 01–03B–26 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 01–03B–28 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 is poor under load (e.g. power down when climbing hills).	(See 01–03B–31 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 (e.g. hot spot in combustion chamber).	(See 01–03B–33 NO.13 KNOCKING/ PINGING-ACCELERATION/ CRUISE [FS])
14	Poor fuel economy		Fuel economy is unsatisfactory.	(See 01–03B–34 NO.14 POOR FUEL ECONOMY [FS])
15	Emission compliance		Fails emissions test	(See 01–03B–36 NO.15 EMISSION COMPLIANCE [FS])
16	High oil consumption/leakage		Oil consumption is excessive.	(See 01–03B–37 NO.16 HIGH OIL CONSUMPTION/ LEAKAGE [FS])

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats.	(See 01–03B–38 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [FS])
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature.	(See 01–03B–40 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [FS])
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01–03B–41 NO.19 EXHAUST SMOKE [FS])
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leakage	(See 01–03B–42 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS])
21	Engine noise		Engine noise from under hood	(See 01–03B–43 NO.21 ENGINE NOISE [FS])
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01–03B–44 NO.22 VIBRATION CONCERNS (ENGINE) [FS])
23	A/C does not work sufficiently.		A/C compressor magnetic clutch does not engage when A/C is turned on.	(See 01–03B–44 NO.23 A/C DOES NOT WORK SUFFICIENTLY [FS])
24	A/C is always ON or A/C compressor runs continuously.		A/C compressor magnetic clutch does not disengage.	(See 01–03B–45 NO.24 A/C IS ALWAYS ON OR 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 01–03B–46 NO.25 A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [FS])
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01–03B–46 NO.26 EXHAUST SULPHUR SMELL [FS])
27	Fuel refill concerns		Fuel tank does not fill smoothly.	(See 01–03B–47 NO.27 FUEL REFILL CONCERNS [FS])
28	Fuel filling shut off issues		Fuel does not shut off properly.	(See 01–03B–48 NO.28 FUEL FILLING SHUT OFF ISSUES [FS])
29	Intermittent concerns		Symptom occurs randomly and is difficult to diagnose.	(See 01–03B–48 NO.29 INTERMITTENT CONCERNS [FS])
30	Reference voltage		Incorrect reference voltage	(See 01–03B–49 NO.30 REFERENCE VOLTAGE [FS])
31	Spark plug condition		Incorrect spark plug condition	(See 01–03B–51 NO.31 SPARK PLUG CONDITION [FS])
32	ATX concerns	Upshift/downshift/ engagement	ATX concerns not related to engine performance	(See 05–03–7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE)

SYMPTOM QUICK DIAGNOSIS CHART [FS]

A3U010318881W05

× : Applied

	Troubleshooting item / Possible factor		Starter motor malfunction(Mechanical or electrical)	Starter circuit including Ignition key 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 is seized.	Improper tension or damages drive belts	Improper engine coolant level	Water and anti-freeze mixture is improper.	Cooling system malfunction (Radiator,hoses,overflow system,thermostat,etc.)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed.	Cooling fan or condenser fan seat is improper.	Accelerator cable free play misadjustment	Fuel quality
1	Melting of main or other fuses																						
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING*																				

Y3U103WN7

Troubleshooting item / Possible factor			Engine overheating	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose, tubes, cracks breakage)	IAC valve improper operation	Throttle body malfunction	VICS malfunction	Tumble swirl control system malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Ignition coil malfunction (e.g. open, short or cracks)	Initial ignition timing misadjustment (CKP & crankshaft pulley misadjustment)	Spark plug malfunction	High-tension leads malfunction (Cracks, open, low resistance)	CKP sensor is damaged (e.g. open or short circuits).	Crankshaft pulley is damaged.	Improper gap between CKP sensor and crankshaft pulley	Fuel pump malfunction (Mechanical or electrical)	Pressure regulator malfunction	Fuel hoses restriction or clogging
1	Melting of main or other fuses																			
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 is always on or 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 05–03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING*																	

Z3U0103W998

× : Applied

	Troubleshooting item / Possible factor		Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (Including insulator, injector O-ring)	Fuel filters restriction or clogging	PRC solenoid valve improper operation	CMP sensor is damaged (e.g. open or short circuit).	Camshaft is damaged.	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	Evaporative emission control system malfunction	PCV valve malfunction	V-reference supply circuit malfunction	Main relay malfunction (Mechanical or electrical)	ECT sensor malfunction	TR switch misadjustment (ATX)	P/N position switch in TR switch is open, (ATX)	Brake switch and related circuit malfunction
1	Melting main or other fuses																			
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING*																	

Y3U103WN9

× : Applied

Troubleshooting item \ Possible factor			Neutral or clutch switch and related circuit malfunction (MTX)	MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (Including looseness)	Power steering pressure switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal) circuit malfunction	Condenser fan system malfunction	Improper load signal input	Clutch slippage	Automatic transaxle related parts malfunction	VSS and related circuit malfunction	Improper ATF level	Brake dragging	Loose parts	Wheels and tires improper balance	Driveline malfunction	Suspension malfunction
1	Melting main or other fuses																			
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 is always on or 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 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING*																	

Y3U103WP0

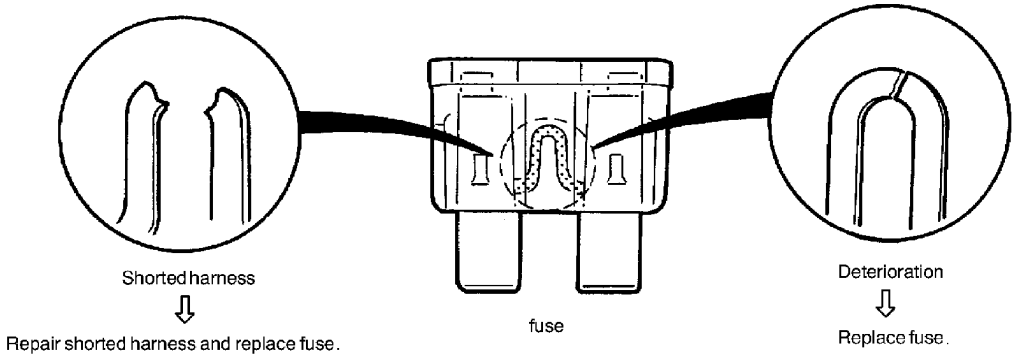
NO.1 MELTING OF MAIN OR OTHER FUSES [FS]

A3U010318881W06

1	Melting of main or other fuses

[TROUBLESHOOTING HINTS]

Inspection condition of fuse.



Damaged Fuse	Related Wiring Harness
MAIN (100A)	**MAIN fuse** • Generator
IG KEY (60A)	**IG KEY fuse** • Ignition key
A/C (15A)	**A/C fuse** • A/C relay • Condenser fan relay
A/C (10A)	**A/C relay** • Magnetic clutch
AD FAN (30A)	**Condenser fan relay** • Condenser fan motor
INJ (30A)	**INJ fuse** • PCM **Main relay** • PCM • Fuel pump relay • Fuel injectors • Purge solenoid valve • PRC solenoid valve • VICS solenoid valve • VTCS solenoid valve • Mass air flow sensor • Vehicle speedometer sensor • EGR valve • EGR check solenoid valve • CDCV **Fuel pump relay** • Fuel pump
ENGINE (10A)	**ENGINE fuse** • Ignition coil • Condenser • Heated oxygen sensor • Main relay • Cooling fan relay • Malfunction indicator lamp
METER (10A)	**METER fuse** • Transaxle range switch (ATX) • O/D OFF indicator light (ATX)
COOLING FAN (30A)	**Cooling fan relay** • Cooling fan motor

- If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis.
  - — If vehicle is repaired, troubleshooting completed.
  - — If vehicle is not repaired or additional diagnostic information is not available, repair PCM.

NO.2 MIL ILLUMINATES [FS]

A3U010318881W07

2	MIL illuminates
DESCRIPTION	MIL is illuminated incorrectly.
POSSIBLE CAUSE	• PCM illuminates for emission-related concern (DTC is stored in PCM) • Short to ground 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 WDS or equivalent to DLC-2. • Retrieve any DTC. • Turn ignition key to ON. • Is "DTC" displayed?	Yes	**No DTC is displayed:** • Inspect for short to ground circuit between MIL (located on instrument cluster) and PCM terminal 2.
		No	**DTC is 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 perform repair or diagnosis. • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM.		

NO.3 WILL NOT CRANK [FS]

A3U010318881W08

3	Will not crank
DESCRIPTION	• Starter does not work.
POSSIBLE CAUSE	• Open starter circuit between ignition key and starter • Transaxle range switch malfunction (ATX) • Transaxle range switch misadjustment (ATX) • Starter interlock switch malfunction (MTX) • Starter malfunction • Seized/hydrolocked engine, flywheel (MTX) or drive plate (ATX)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Battery connection — Battery condition — Transaxle is in Park or Neutral. (ATX) — Clutch is fully depressed. (MTX) — Fuses • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Is clicking sound heard from starter when ignition key is turned to START?	Yes	Go to next step.
		No	Go to Step 4.
3	• Inspect starting system. (See 01–19–2 STARTER INSPECTION.) • Is starting system okay?	Yes	Inspect for seized/hydrolocked engine, flywheel (MTX) or drive plate (ATX).
		No	Repair or replace components as required.
4	• Do any other electrical accessories work?	Yes	Go to next step.
		No	Inspect charging system. (See 01–17–1 BATTERY INSPECTION.) (See 01–17–3 GENERATOR INSPECTION.)
5	**Note** • Following test should be performed on ATX only. For MTX, go to next step. • Inspect adjustment of transaxle range switch. • Is transaxle range switch adjusted properly?	Yes	Go to next step.
		No	Inspect for open circuit between transaxle range switch and PCM terminal 64 or starter.

STEP	INSPECTION	RESULTS	ACTION
6	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Inspect following: — START circuit in ignition key — Open circuit between ignition key and starter — Starter interlock switch (MTX)
		No	**DTC displayed:** • Go to appropriate DTC test. **Communication error message displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77, or 103) — Poor connection of vehicle body GND
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [FS]

A3U010318881W09

4	Hard to start/long crank/erratic start/erratic crank
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before starting. • Battery is in normal condition.
POSSIBLE CAUSE	• Spark leakage from high-tension leads • Vacuum leakage • Poor fuel quality • Starting system malfunction • Spark plug malfunction • Air leakage from intake-air system • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Air cleaner restriction • IAC valve malfunction • PCV valve malfunction • Inadequate fuel pressure • Purge solenoid valve malfunction • MAF sensor contamination • Restriction in exhaust system • EGR valve malfunction • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Vacuum leakage — Fuel quality (e.g. 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.

STEP	INSPECTION	RESULTS	ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.
4	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
5	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.020—0.59 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Remove and inspect PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. (See 01–14–5 AFTER REPAIR PROCEDURE.) • Turn ignition key to ON. • Is fuel line pressure correct? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
10	• Is fuel line pressure held after ignition key is turned to LOCK? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
11	• Disconnect vacuum hose from pressure regulator and plug the 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	Inspect for clogged fuel filter.
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 fuel pressure gauge reading decrease as vacuum gauge reading increases?	Yes	Go to next step.
		No	Connect vacuum pump to pressure regulator. Start engine. Verify that fuel pressure gauge reading changes as vacuum changes. If changes, inspect vacuum line. If does not 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	Inspect if purge solenoid valve is stuck open.
		No	Go to next step.
14	• Inspect MAF sensor for contamination. • Is there any contamination?	Yes	Replace MAF sensor.
		No	Go to next step.
15	• Is there a restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.

STEP	INSPECTION	RESULTS	ACTION
16	• Inspect engine condition while tapping EGR valve housing. • Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
17	• Inspect starting system. (See 01–19–2 STARTER INSPECTION.) • Is starting system normal?	Yes	Inspect for loose connectors or poor terminal contact. If okay, remove EGR valve and visually inspect for mechanically stuck EGR valve.
		No	Repair or replace components as required.
18	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.5 ENGINE STALLS-AFTER START/AT IDLE [FS]

A3U010318881W10

5	Engine stalls—After start/at idle
DESCRIPTION	• Engine stops unexpectedly at idle and/or after start.
POSSIBLE CAUSE	• A/C system improper operation • Air leakage from intake-air system parts • Purge solenoid valve malfunction • Improper operation of IAC valve • EGR valve malfunction • No signal from CKP sensor due to sensor, related wire or wrong installation • Vacuum leakage • Low engine compression • Spark leakage from high-tension leads • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Electrical connector disconnection • Open or short circuit in fuel pump and related harness • No battery power supply to PCM or poor GND • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Immobilizer system and/or circuit malfunction • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Turn ignition key to ON. • Disconnect TP sensor connector. • Measure voltage at TP sensor connector VREF terminal with ignition key on. **Voltage** **4.5—5.5 V** • Is voltage okay?	Yes	Go to next step.
		No	Go to symptom troubleshooting “NO.30 REFERENCE VOLTAGE [FS].”
3	• Connect WDS or equivalent to DLC-2. • Retrieve any DTC. • Turn ignition key to ON. • Is “DTC” displayed?	Yes	**DTC is displayed:** • Go to appropriate DTC test. **Communication error message is displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77 or 103) — Poor connection of vehicle body GND
		No	**No DTC is displayed:** • Go to next step.
4	• Attempt to start engine at part throttle. • Does engine run smoothly at part throttle?	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
5	• Connect WDS or equivalent to DLC-2. • Access RPM PID. • Is RPM PID indicating engine speed during cranking of engine?	Yes	Go to next step.
		No	Inspect for following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor and PCM terminal 21 or 22 • Open or short circuit in CKP sensor harnesses If CKP sensor and harness are okay, go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	• Is strong blue spark visible at each disconnected high-tension lead during engine cranking?	Yes	Go to next step. If symptom occurs with A/C on, go to Step 15.
		No	Inspect for following: • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and body GND • Open circuit between ignition key and ignition coil • Open circuit between ignition coil and PCM terminal 26 or 52

STEP	INSPECTION	RESULTS	ACTION
10	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
11	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
12	• Inspect for a restriction in exhaust system. • Is there any restriction?	Yes	Inspect exhaust system.
		No	Go to next step.
13	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition key to ON. • Is fuel line pressure correct with ignition key on? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
14	• Visually inspect for fuel leakage at fuel injector O-ring and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition key is turned to LOCK? (See 01–14–28 PRESSURE REGULATOR INSPECTION.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
15	**Note** • The following test is for stall concerns with A/C on. If other symptoms exist, 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 pressures. • Are pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
16	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid side. • Plug opening end of vacuum hose. • Start engine. • Is engine stall now eliminated?	Yes	Inspect if purge solenoid valve is stuck open. Inspect evaporative emission control system.
		No	Go to next step.
17	• Is air leakage felt or heard at intake-air system components while racing engine to higher speed?	Yes	Repair or replace faulty part.
		No	Go to next step.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for cause.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.6 CRANKS NORMALLY BUT WILL NOT START [FS]

A3U010318881W11

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 is in tank. • Battery is in normal condition.
POSSIBLE CAUSE	• No battery power supply to PCM • Air leakage from intake-air system • Open PCM GND or vehicle body GND • Improper operation of IAC valve • EGR valve malfunction • No signal from CKP sensor due to sensor, related wire or incorrect installation • No signal from CMP sensor due to sensor, related wire or incorrect installation • Low engine compression • Vacuum leakage • Spark leakage from high-tension leads • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Disconnected electrical connector • Open or short circuit in fuel pump and related harness • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from injector • Fuel injector clogging • Purge solenoid valve malfunction • Pressure regulator solenoid (PRC) system malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Verify following: — Vacuum connection — External fuel shut off or accessory (kill switch, alarm etc.) — Fuel quality: proper octane, contamination, winter/summer blend — No air leakage from intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Electrical connections — Fuses — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

STEP	INSPECTION	RESULTS	ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test. **Communication error message displayed:** • Inspect for following: — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77, or 103) — Poor connection of vehicle body GND
		No	**No DTC displayed:** • Go to next step.
3	• Turn ignition key to LOCK. • Disconnect TP sensor connector. • Measure voltage at TP sensor connector VREF terminal with ignition key on. **Voltage** **4.5—5.5 V** • Is voltage okay?	Yes	Go to next step.
		No	Go to symptom troubleshooting "NO.30 REFERENCE VOLTAGE [FS]."
4	• Does engine start with throttle closed?	Yes	Go to Step 20.
		No	Go to next step.
5	• Will engine start and run smoothly at part throttle?	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
6	• Connect WDS or equivalent to DLC-2. • Access RPM PID. • Is RPM PID indicating engine speed when cranking engine?	Yes	Go to next step.
		No	Inspect for following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor and PCM terminal 21 or 22 • Open or short circuit in CKP sensor harnesses If CKP sensor and harness are okay, go to next step.
7	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
8	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
9	• Inspect for cracks on high-tension leads. • Are there any cracks, on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
10	• Is strong blue spark visible at each disconnected high-tension lead during engine cranking ?	Yes	Go to next step.
		No	Inspect for following: • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and GND • Open circuit between ignition key and ignition coil • Open circuit between ignition coil and PCM terminal 26 or 52
11	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
12	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
13	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.

STEP	INSPECTION	RESULTS	ACTION
14	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition key to ON. • Is fuel line pressure correct when ignition key is cycled on/off five times? **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:** • 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 PRC solenoid valve and related vacuum hose and harness. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
15	• Visually inspect for fuel leakage at fuel injector O-ring and fuel line. • Service as necessary. • Is fuel line pressure held after ignition key is turned to LOCK? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
16	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
17	• 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.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for causes.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.7 SLOW RETURN TO IDLE [FS]

A3U010318881W12

7	**Slow return to idle**
DESCRIPTION	• Engine takes more time than normal to return to idle speed.
POSSIBLE CAUSE	• ECT sensor malfunction • Thermostat is stuck open. • Throttle body malfunction • Air leakage from intake-air system

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
2	• Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	ECT sensor and thermostat are okay. Go to next step.
		No	Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge on instrument cluster readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.

STEP	INSPECTION	RESULTS	ACTION
3	• Is throttle body free of contaminations?	Yes	Inspect for air leakage 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. — If malfunction remains, refer to related Service Bulletins 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.		

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS]

A3U010318881W13

8	Engine runs rough/rolling idle
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. • Idle speed is too slow and engine shakes excessively.
POSSIBLE CAUSE	• Air leakage from intake-air system parts • A/C system improper operation • Spark leakage from high-tension leads • Purge solenoid valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic or no signal from CMP sensor • Low engine compression • Erratic signal from CKP sensor • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Disconnected electrical connectors • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Engine overheating • Vacuum leakage • Pressure regulator control (PRC) system malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — External fuel shut off or accessory (kill switch, alarm etc.) — Fuel quality: proper octane, contamination, winter/summer blend — No air leakage from intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Electrical connections — Fuses — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

STEP	INSPECTION	RESULTS	ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		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. • Connect pressure gauge to A/C low and high pressure side lines. • Start engine and run it at idle. • Turn A/C switch on. • Measure low side and high side pressures. • Are reading pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
5	• Start engine and run it at idle. • Turn steering wheel right to left. • Does engine running rough exist while turning steering wheel right to left?	Yes	Inspect P/S pressure switch operation and wiring harness between P/S pressure switch connector and PCM connector terminal 31.
		No	Go to next step.
6	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads?	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from injector. **Spark plug is grayish white:** • Inspect for clogged fuel injector.
		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	Inspect 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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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. • Inspect PRC solenoid valve and related vacuum hose and harness. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
12	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition key is turned to LOCK? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.

STEP	INSPECTION	RESULTS	ACTION
13	• Connect WDS or equivalent to DLC-2. • Start engine and run it at idle. • Access LONG FT1 PID. • Measure LONG FT1 PID at idle. • Is PID value between -15% and +15%?	Yes	Go to next step.
		No	LONG FT1 PID is out of specification. **Less than specification (too rich):** • Inspect evaporative emission control system. • If system is okay, go to Step 15. **Greater than specification (too lean):** • Inspect for air leakage at intake-air system components. • If system okay, go to next step.
14	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Start engine. • Does engine condition improve?	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
15	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
16	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
17	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	• Inspect 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	Inspect valve timing.
		No	Inspect for causes.
20	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.9 FAST IDLE/RUNS ON [FS]

A3U010318881W14

9	Fast idle/runs on
DESCRIPTION	• Engine speed continues at fast idle after warm-up. • Engine runs after ignition key is turned to OFF.
POSSIBLE CAUSE	• ECT sensor malfunction • Air leakage from intake-air system • Throttle body malfunction • Accelerator cable free play misadjustment • Cruise actuator cable misadjustment

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Start and warm-up engine to normal operating temperature. • Is ECT PID reading between **82—112°C {180—234°F}**?	Yes	Go to next step.
		No	**ECT PID is higher than 112°C {234°F}:** • Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [FS].” **ECT PID is less than 82°C {180°F}:** • Go to symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS - RUNS COLD [FS].”
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • 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	Inspect accelerator cable free play. (See 01–13B–17 ACCELERATOR CABLE INSPECTION [FS].)
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.10 LOW IDLE/STALLS DURING DECELERATION [FS]

A3U010318881W15

10	Low idle/stalls during deceleration
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.
POSSIBLE CAUSE	• Vacuum leakage • IAC valve malfunction • Air leakage from intake-air system • TP sensor or related circuit malfunction • MAF sensor or related circuit malfunction • Brake switch or related circuit malfunction • Neutral/clutch switch or related circuit malfunction (MTX)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Does engine idle rough?	Yes	Go to symptom troubleshooting “NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS].”
		No	Go to next step.
2	• Inspect for following: — Proper routing and no damage of vacuum lines — IAC valve is connected properly. — No air leakage from intake-air system • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.

STEP	INSPECTION	RESULTS	ACTION
4	• Does idle speed drop or stall when disconnecting IAC valve?	Yes	Go to next step.
		No	Inspect following: • Circuit from IAC valve to PCM connector terminal 54 or 83 for open and short • IAC valve for sticking If okay, go to next step.
5	• 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	Inspect evaporative emission control system.
		No	Go to next step.
6	• Connect WDS or equivalent to DLC-2. • Access TP, MAF , VSS PIDs. • Monitor each PID while driving vehicle. • Are PIDs okay?	Yes	Go to symptom troubleshooting “NO.29 INTERMITTENT CONCERNS [FS].”
		No	**TP PID:** Inspect TP sensor. **MAF PID:** Inspect MAF sensor. **VSS PID:** Inspect VSS.
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

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

A3U010318881W16

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 acceleration or during acceleration. • Engine stops unexpectedly while cruising. • Engine speed fluctuates during acceleration or cruising. • Engine misses during acceleration or cruising. • Vehicle bucks/jerks during acceleration, cruising or deceleration. • Momentary pause at beginning of acceleration or during acceleration • Momentary minor irregularity in engine output
POSSIBLE CAUSE	• A/C system improper operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Purge solenoid valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, throttle position sensor and VSS • ATX malfunction • Clutch slippage **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

STEP	INSPECTION	RESULTS	ACTION
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.
4	• Connect WDS or equivalent to DLC-2. • Access RPM PID, MAF PID, TP PID, and VSS PID. • Drive vehicle with monitoring PIDs. • Are PIDs within specification?	Yes	Go to next step.
		No	**RPM PID:** • Inspect CKP sensor and related wiring harness: vibration, intermittent open/short circuit. **MAF PID:** • Inspect for open circuit of MAF sensor and related wiring harness intermittently. **TP PID:** • Inspect if output signal from TP sensor changes smoothly. **VSS PID:** • Inspect for open circuit of VSS and related wiring harness intermittently.
5	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect 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	• Verify 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 any restrictions in the exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
11	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition key to ON. • Is fuel line pressure correct with ignition key at ON? **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:** • 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	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition key is turned to LOCK? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.

STEP	INSPECTION	RESULTS	ACTION
13	**Note** • The following test is for engine stalling with A/C on. If other symptoms exist, 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 pressures. • Are pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation
14	**Note** • The following test is performed for symptom with cruise control on. If other symptoms exist, go to next step. • Inspect cruise control system. • Is cruise control system okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
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	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
16	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	• Inspect EGR valve. • Is EGR valve okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	• Is engine compression correct?	Yes	Inspect following: • Valve timing • Internal transaxle part (ATX) • Clutch (MTX)
		No	Inspect for cause.
19	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [FS]

A3U010318881W17

12	Lack/loss of power — Acceleration/cruise
DESCRIPTION	• Performance is poor under load (e.g. power down when climbing hills).
POSSIBLE CAUSE	• Improper A/C system operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • VICS malfunction • Tumble swirl control system malfunction • Purge control solenoid malfunction • EGR valve malfunction • Brake dragging • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, TP sensor and VSS • ATX malfunction • Clutch slippage **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Fuel quality: proper octane, contamination, winter/summer blend • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
3	• Is engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.

STEP	INSPECTION	RESULTS	ACTION
4	• Connect WDS or equivalent to DLC-2. • Access RPM PID, MAF PID, TP PID, and VSS PID. • Drive vehicle while monitoring PIDs. • Are PIDs within specification?	Yes	Go to next step.
		No	**RPM PID:** • Inspect CKP sensor and related wiring harness for vibration and/or intermittent open/short circuit. **MAF PID:** • Inspect for intermittent open circuit of MAF sensor and related wiring harness. **TP PID:** • Inspect if TP sensor output increases smoothly. **VSS PID:** • Inspect for intermittent open circuit of VSS and related wiring harness.
5	• Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	• Measure gap between CKP sensor and teeth of crankshaft pulley. **Gap** **0.5—1.5 mm {0.020—0.059 in}** • Is the gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Inspect condition of spark plugs. • Is spark plug wet, covered with carbon or grayish white?	Yes	**Spark plug is wet or covered with carbon:** • Inspect for fuel leakage from fuel injector. **Spark plug is grayish white:** • Inspect 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	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
10	• Install fuel pressure gauge between fuel filter and fuel distributor. • Connect jumper wire between F/P terminal at DLC in engine compartment and GND. • Turn ignition key to ON. • Is fuel line pressure correct with ignition key on? **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:** • 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.
11	• Inspect for VICS operation. (See 01–03B–57 VICS Operation Inspection.) • Does VICS work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
12	• Inspect for tumble swirl control system operation. (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.) • Does tumble swirl control system work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
13	**Note** • Following test is for engine stalling with A/C on concern. If other symptoms exist, 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 pressures. • Are the pressures within specifications? (See 07–10–3 REFRIGERANT PRESSURE CHECK.)	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]”. For other symptoms, inspect following: • Refrigerant charging amount • Condenser fan operation

STEP	INSPECTION	RESULTS	ACTION
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	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
15	• Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
16	• Inspect EGR valve. • Is EGR valve okay?	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	• Is engine compression correct?	Yes	Inspect following: • Valve timing • Internal transaxle components (ATX) • Clutch (MTX) • Brake system for dragging
		No	Inspect for cause.
18	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [FS]

A3U010318881W18

13	Knocking/pinging — Acceleration/cruise
DESCRIPTION	• Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).
POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction • ECT sensor malfunction • IAT sensor malfunction • Inadequate engine compression • Inadequate fuel pressure **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Verify ECT PID is **less than 116°C {241°F}** during driving. • Is ECT PID less than specification?	Yes	Go to next step.
		No	Inspect cooling system for cause of overheating.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key on. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.
3	• Is engine compression correct?	Yes	Go to next step.
		No	Inspect for cause.

STEP	INSPECTION	RESULTS	ACTION
4	• 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—250 kPa {2.1—2.6 kgf/cm^2, 39—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.
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.14 POOR FUEL ECONOMY [FS]

A3U010318881W19

14	Poor fuel economy
DESCRIPTION	• Fuel economy is unsatisfactory.
POSSIBLE CAUSE	• Contaminated air cleaner element • VICS malfunction • Tumble swirl control system malfunction • Engine cooling system malfunction • Improper automatic transaxle fluid level (ATX) • Weak spark • Poor fuel quality • Erratic or no signal from CMP sensor • Improper coolant level • Inadequate fuel pressure • Spark plug malfunction • PCV valve malfunction • Brake dragging • Improper valve timing due to jumping out of timing belt • Contaminated MAF sensor • Improper engine compression • Exhaust system clogging **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Air cleaner element for contamination — Automatic transaxle fluid level — Fuel quality — Coolant level • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.
3	• Access ECT PID. • Drive vehicle while monitoring PID. • Is PID within specification?	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operations or thermostat operation.

STEP	INSPECTION	RESULTS	ACTION
4	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect for following: • Spark plugs malfunction • CMP sensor is improperly installed. • Trigger wheel damage on camshaft • Open or short circuit on CMP sensor • Open or short circuit between CMP sensor and PCM terminal 85 or 86 Repair or replace malfunctioning parts. If okay, go to next step.
		No	Inspect following: • High-tension leads • Ignition coil and connector
5	• 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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
6	• Inspect VICS operation. (See 01–03B–57 VICS Operation Inspection.) • Does VICS work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
7	• Inspect tumble swirl control system operation. (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.) • Does tumble swirl control system work properly?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
8	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Go to next step.
10	• Is brake system functioning properly?	Yes	Go to next step.
		No	Inspect for cause.
11	• Inspect MAF sensor for contamination. • Is there any contamination?	Yes	Replace MAF sensor.
		No	Go to next step.
12	• Is engine compression correct?	Yes	Inspect valve timing.
		No	Inspect for cause.
13	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.15 EMISSION COMPLIANCE [FS]

A3U010318881W20

15	Emission compliance
DESCRIPTION	• Fails emissions test
POSSIBLE CAUSE	• Vacuum lines leakage or blockage • Cooling system malfunction • Spark plug malfunction • Leakage from intake manifold • Erratic or no signal from CMP sensor • Inadequate fuel pressure • PCV valve malfunction or incorrect valve installation • EGR valve malfunction • Exhaust system clogging • Fuel tank ventilation system malfunction • Charcoal canister damage • Excessive carbon is built up in combustion chamber. • Improper engine compression • Improper valve timing **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** **• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Vacuum lines for leakage or blockage — Electrical connections — Proper maintenance schedule followed — Intake-air system and air cleaner element concerns: obstructions, leakage or dirtiness • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.
3	• Is any other drivability concern present?	Yes	Go to appropriate symptom troubleshooting.
		No	Go to next step.
4	• Connect WDS or equivalent to DLC-2. • Access ECT PID. • Warm up engine and run it at idle. • Verify ECT PID is correct. • Is ECT PID correct?	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operation or thermostat operation.
5	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect for following: • Spark plugs malfunction • CMP sensor is improperly installed. • Damage of trigger wheel on camshaft • Open or short circuit on CMP sensor • Open or short circuit between CMP sensor and PCM terminal 85 or 86 Repair or replace malfunctioning parts. If okay, go to next step.
		No	Inspect following: • High-tension leads • Ignition coil and connector

STEP	INSPECTION	RESULTS	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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
7	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
8	• Inspect for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. Then, go to next step.
9	• Is there any restriction in exhaust system?	Yes	Inspect exhaust system.
		No	Inspect EGR valve.
10	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.16 HIGH OIL CONSUMPTION/LEAKAGE [FS]

A3U010318881W21

16	High oil consumption/leakage
DESCRIPTION	• Oil consumption is excessive.
POSSIBLE CAUSE	• PCV valve malfunction • Improper dipstick • Improper engine oil viscosity • Engine internal parts malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
2	• Inspect for following: — External leakage — Proper dipstick — Proper engine oil viscosity • Are all items okay?	Yes	Inspect internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, and piston rings.
		No	Service as necessary. Repeat Step 2.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [FS]

A3U010318881W22

17	Cooling system concerns — Overheating
DESCRIPTION	• Engine runs at higher than normal temperature/overheats.
POSSIBLE CAUSE	• Improper coolant level • Blown fuses • Coolant leakage • Excessive A/C system pressure • Improper water/anti-freeze mixture • Fans reverse rotation • Poor radiator condition • Thermostat malfunction • Radiator hoses damage • Condenser fan is inoperative. • Improper or damaged radiator cap • Cooling fan is inoperative. • Coolant overflow system malfunction • Improper tension of drive belt • Drive belt damage

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect for following: — Engine coolant level — Coolant leakage — 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	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
3	• Start engine and run it at idle speed. • Turn A/C switch on. • Does A/C compressor engage?	Yes	Go to next step.
		No	Inspect for following and repair or replace as necessary: • Refrigerant charging amount • Open circuit between A/C relay and PCM terminal 96 • Seized A/C magnetic clutch • A/C magnetic clutch malfunction If all items are okay, inspect following: • Refrigerant pressure switch operation • Evaporator temperature sensor and A/C amplifier • A/C switch is stuck open. • Open or short circuit between refrigerant pressure switch and PCM terminal 41 • Open circuit of blower motor fan switch and resistor (if blower motor does not operate)

STEP	INSPECTION	RESULTS	ACTION
4	• Start engine and run it at idle speed. • Turn A/C switch on. • Do cooling fan and condenser fan operate?	Yes	Go to next step.
		No	**Cooling fan motor does not operate:** • Inspect for following: — Cooling fan relay is stuck open. — Cooling fan motor malfunction — Cooling fan motor GND open — Open circuit between cooling fan motor and relay — Open circuit between cooling fan relay and PCM terminal 47 — Open battery power circuit for cooing fan relay **Condenser fan motor does not operate:** • Inspect for following: — Condenser fan relay is stuck open. — Condenser fan motor malfunction — Condenser fan motor GND open — Open circuit between condenser fan motor and relay — Open circuit between condenser fan relay and PCM terminal 45 — Open battery power circuit for condenser fan relay
5	• Is drive belt okay?	Yes	Go to next step.
		No	Replace drive belt.
6	• Is there any leakage around heater unit in passenger compartment?	Yes	Inspect and service heater for leakage.
		No	Go to next step.
7	• Is there any leakage at coolant hoses and/or radiator?	Yes	Replace malfunctioning part.
		No	Go to next step.
8	• Cool down the engine. • Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	Engine coolant temperature and thermostat are okay. Inspect engine block for leakage or blockage.
		No	Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates overheating but ECT is normal, inspect temperature gauge and heat gauge unit.
9	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [FS]

A3U010318881W23

18	Cooling system concerns — Runs cold
DESCRIPTION	• Engine does not reach normal operating temperature.
POSSIBLE CAUSE	• Thermostat malfunction • Condenser fan system malfunction • Cooling fan system malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Is customer complaint “Lack of passenger compartment heat” only?	Yes	Inspect A/C and heater system.
		No	Go to next step.
2	• Does engine speed continue at fast idle?	Yes	Go to symptom troubleshooting “NO.9 FAST IDLE/ RUNS ON [FS].”
		No	Go to next step.
3	• Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01–12–7 THERMOSTAT INSPECTION.) • Is thermostat okay?	Yes	Inspect cooling fan and condenser fan operation. • If both or either fan operate abnormally, inspect for following: — Cooling fan relay is stuck closed. — Condenser fan relay is stuck closed. — Short to GND between cooling fan relay and PCM terminal 47 — Short to GND between condenser fan relay and PCM terminal 45 — 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	Access ECT PID on WDS or equivalent. Inspect both ECT and temperature gauge on instrument cluster readings. • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.19 EXHAUST SMOKE [FS]

A3U010318881W24

19	Exhaust smoke
DESCRIPTION	• Blue, black, or white smoke from exhaust system
POSSIBLE CAUSE	**Blue smoke (Burning oil):** • PCV valve malfunction • Engine internal oil leakage **White smoke (Water in combustion):** • Cooling system malfunction (coolant loss) • Engine internal coolant leakage **Black smoke (Rich fuel mixture):** • Air cleaner restriction • Intake-air system is collapsed or restricted. • Fuel return line is restricted. • Excessive fuel pressure • Improper engine compression • Injector fuel leakage • Ignition system malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• What color is smoke coming from exhaust system?	Blue	Burning oil is indicated. Go to next step.
		White	Water in combustion is indicated. Go to Step 3.
		Black	Rich fuel mixture is indicated. Go to Step 4.
2	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Inspect for 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 drivability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Replace PCV valve.
3	• Does cooling system hold pressure?	Yes	Inspect for following: • Cylinder head gasket leakage • Intake manifold gasket leakage • Engine block cracks or porosity If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Inspect for cause.
4	• Inspect for following: — Air cleaner 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 4.
5	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Go to next step.
		No	**DTC displayed:** • Go to appropriate DTC test.

STEP	INSPECTION	RESULTS	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—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
7	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Inspect spark plugs and CMP sensor.
		No	Inspect following: • High-tension leads • Ignition coil and connector
8	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS]

A3U010318881W25

20	Fuel odor (in engine compartment)
DESCRIPTION	• Gasoline fuel smell or visible leakage
POSSIBLE CAUSE	• Excessive fuel pressure • Purge solenoid valve malfunction • Fuel tank vent system blockage • Charcoal canister malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. • Service as necessary. • Is fuel line pressure held after ignition key is turned to LOCK? (See 01–14–28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. • If condition is okay, inspect fuel injector. • If condition is not okay, replace pressure regulator.
2	• Inspect for blockage/restriction or open between engine vacuum port and charcoal canister. • Inspect for blockage in fuel tank vent system. • Is fault indicated?	Yes	Replace vacuum hose.
		No	Go to next step.
3	• Inspect purge solenoid valve. (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.) • Is solenoid operating properly?	Yes	Go to next step.
		No	Replace purge solenoid valve.
4	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed?	Yes	**No DTC displayed:** • Inspect charcoal canister for fuel saturation. — If excess amount of liquid fuel is present, replace charcoal canister.
		No	**DTC displayed:** • Go to appropriate DTC test.

STEP	INSPECTION	RESULTS	ACTION
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.21 ENGINE NOISE [FS]

A3U010318881W26

21	Engine noise
DESCRIPTION	• Engine noise from under hood or driveline
POSSIBLE CAUSE	**Squeal, click or chirp noise:** • Improper engine oil level • Improper drive belt tension **Rattle sound noise:** • Loose parts **Hiss sound noise:** • Vacuum leakage • Loose spark plug • Air leakage from intake-air system **Rumble or grind noise:** • Improper drive belt tension **Rap or roar sound noise:** • Exhaust system looseness **Other noise:** • Camshaft friction gear noise or MLA noise

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Is squeal, click or chirp sound present?	Yes	Inspect engine oil level or drive belts.
		No	Go to next step.
2	• Is rumble or grind sound present?	Yes	Inspect drive belts.
		No	Go to next step.
3	• Is rattle sound present?	Yes	Inspect location of rattle for loose parts.
		No	Go to next step.
4	• Is hiss sound present?	Yes	Inspect for following: • Vacuum leakage • Spark plug looseness • Intake-air system leakage
		No	Go to next step.
5	• Is rap or roar sound present?	Yes	Inspect exhaust system for loose parts.
		No	Go to next step.
6	• Is knock sound present?	Yes	Go to symptom troubleshooting “NO.13 KNOCKING/ PINGING — ACCELERATION/CRUISE [FS].”
		No	If noise comes from engine internal, inspect for friction gear or MLA noise.
7	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.22 VIBRATION CONCERNS (ENGINE) [FS]

A3U010318881W27

22	Vibration concerns (engine)
DESCRIPTION	• Vibration from under hood or driveline
POSSIBLE CAUSE	• Loose attaching bolts or worn parts • Components malfunction such as worn parts

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Inspect following components for loose attaching bolts or worn parts: — Cooling fan — Drive belt and pulleys — Engine mounts • Are all items okay?	Yes	Inspect following systems: • Wheels • Automatic 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. — If malfunction remains, refer to related Service Bulletins 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.		

NO.23 A/C DOES NOT WORK SUFFICIENTLY [FS]

A3U010318881W28

23	A/C does not work sufficiently
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C switch is turned on.
POSSIBLE CAUSE	• Improper refrigerant charging amount • Open A/C magnetic clutch • Open circuit between A/C relay and A/C magnetic clutch • Poor GND of A/C magnetic clutch • Refrigerant pressure switch is stuck open. • A/C relay is stuck open. • Seized A/C compressor • Open circuit between A/C switch and PCM through both refrigerant pressure switch and A/C amplifier

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
2	• Disconnect A/C compressor connector. • Start engine and turn A/C switch to ON. • Is there correct voltage at terminal of A/C compressor magnetic clutch connector? **Specification** **More than 10.5 V**	Yes	Inspect for GND condition of magnetic clutch on A/C compressor. If GND condition is okay, inspect for open circuit of magnetic clutch coil.
		No	Go to next step.
3	• Disconnect refrigerant pressure switch connector. • Connect jumper wires between terminals of refrigerant pressure switch connector. • Turn ignition key to ON. • Turn A/C switch on and set blower fan at any speed. • Does A/C work?	Yes	Inspect refrigerant pressure switch operation. • If switch is okay, go to next step.
		No	Inspect for following: • A/C switch is stuck open. • Open circuit between refrigerant pressure switch and PCM terminal 41 • Open circuit of blower motor fan switch and resistor (if blower motor does not operate) • Evaporator temperature sensor and A/C amplifier
4	• Remove jumper wires from switch connector. • Reconnect connector to refrigerant pressure switch. • Start engine and turn A/C switch on. • Does fan operate?	Yes	Inspect for stuck open A/C relay. Replace as necessary.
		No	Inspect following and repair or replace as necessary: • Refrigerant charging amount • A/C compressor for being seized

STEP	INSPECTION	RESULTS	ACTION
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]

A3U010318881W29

24	A/C is always on or A/C compressor runs continuously
DESCRIPTION	• A/C compressor magnetic clutch does not disengage.
POSSIBLE CAUSE	• Stuck engagement • A/C relay is stuck closed. • Short to GND between A/C switch and PCM • Short to GND circuit between A/C relay and PCM • A/C relay to magnetic clutch circuit shorts to battery power

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.
2	• Start engine and run it at idle. • Turn A/C switch on. • Remove A/C relay. • Does A/C magnetic clutch disengage?	Yes	Inspect for following: • A/C relay is stuck closed. • Short to GND circuit between A/C relay and PCM terminal 96 If both items are okay, go to next step.
		No	Inspect if circuit between A/C relay and magnetic clutch shorts to battery power circuit. • If circuit is okay, inspect magnetic clutch stuck engagement or clearance.
3	• Disconnect refrigerant pressure switch connector. • Start engine and turn A/C switch on. **Note** • A/C should not work when disconnecting connector. If A/C remains working, short to GND circuit may be present. • Does A/C reading remain working?	Yes	Inspect for short to GND circuit between refrigerant pressure switch and PCM terminal 41.
		No	Go to next step.
4	• Reconnect refrigerant pressure switch connector. • Turn off A/C switch. **Note** • A/C should not work when turning the A/C switch off. If A/C remains working, short to GND circuit may be present. • Does A/C reading remain working?	Yes	Inspect following: • Short to GND circuit between A/C switch and A/C amplifier • Short to GND circuit between A/C amplifier and refrigerant pressure switch
		No	Inspect if A/C switch is stuck closed.
5	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

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

A3U010318881W30

25	A/C is not cut off under wide open throttle conditions
DESCRIPTION	• A/C compressor magnetic clutch does not disengage under wide open throttle.
POSSIBLE CAUSE	• TP sensor malfunction • TP sensor misadjustment • TP sensor not securely installed

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Does A/C compressor disengage when A/C switch is turned off?	Yes	Go to next step.
		No	Go to symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS].”
2	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Inspect TP sensor for proper adjustment.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.26 EXHAUST SULPHUR SMELL [FS]

A3U010318881W31

26	Exhaust sulphur smell
DESCRIPTION	• Rotten egg smell (sulphur) from exhaust
POSSIBLE CAUSE	• Electrical connectors are disconnected or connected poorly • Charcoal canister malfunction • Vacuum lines are disconnected or connected improperly. • Improper fuel pressure **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Are any driveability or exhaust smoke concerns present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
2	• Inspect following: — Electrical connections — Vacuum lines • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed?	Yes	**DTC displayed:** • Go to appropriate DTC test.
		No	**No DTC displayed:** • Go to next step.

STEP	INSPECTION	RESULTS	ACTION
4	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 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.
5	• Inspect charcoal canister for fuel saturation. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. • If fuel tank vent system is okay, since sulfur content can vary in different fuels, suggest trying a different brand. • If fuel tank vent system is not okay, repair or replace malfunctioning parts.
6	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.27 FUEL REFILL CONCERNS [FS]

A3U010318881W32

27	Fuel refill concerns
DESCRIPTION	• Fuel tank does not fill smoothly.
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Nonreturn valve malfunction • Pressure control valve malfunction • Improper use of fuel nozzle • Inadequate fuel filling speed **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Retrieve DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel-filler pipe. • Make sure nonreturn valve is installed properly. • Inspect nonreturn valve operation. • Is nonreturn valve okay?	Yes	Inspect following: • Improper use of fuel nozzle • Inadequate fuel filling speed • Pressure control valve
		No	**If nonreturn valve is installed improperly:** • Reinstall nonreturn valve to proper position. **If nonreturn valve does not operate properly:** • Replace non return valve.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.28 FUEL FILLING SHUT OFF ISSUES [FS]

A3U010318881W33

28	Fuel filling shut off issues
DESCRIPTION	• Fuel does not shut off properly.
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Nonreturn valve malfunction • Fuel shut-off valve malfunction • Fuel nozzle malfunction • Fuel nozzle is not inserted correctly. **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** **• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Retrieve DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel-filler pipe. • Make sure nonreturn valve is installed properly. • Inspect nonreturn valve operation. • Is nonreturn valve okay?	Yes	Inspect for following: • Improper use of fuel nozzle • Fuel nozzle is not inserted correctly. • Inspect fuel shut-off valve
		No	**If nonreturn valve installed improperly:** • Reinstall nonreturn valve to proper position. **If nonreturn valve does not operate properly:** • Replace nonreturn valve.
3	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins 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.		

NO.29 INTERMITTENT CONCERNS [FS]

A3U010318881W34

29	Intermittent concerns
DESCRIPTION	• Symptom occurs randomly and is difficult to diagnose.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Talk to customer. • Retrieve vehicle service history. • Does vehicle have a number of previous repairs and components replaced for a certain symptom?	Yes	Go to next step.
		No	Go to Symptom Index.
2	• Connect WDS or equivalent to DLC-2. • If input is switch-type component, turn on manually. • Turn ignition key to ON. • Access PIDs for suspect component. • Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. • Are any PID values out of range, or do they suddenly change and go back into range?	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.

STEP	INSPECTION	RESULTS	ACTION
3	• Start engine. • Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. • Are any PID values out of range, or do they suddenly change and go back into range?	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.
4	• Start engine. • Accurately spray water on suspect component wire, component or vacuum line related to possible fault area. • Are any PID values out of range, or suddenly change and go back into range, or was there a noticeable engine misfire/stumble?	Yes	**Fault occurred while spraying on component:** • Replace part and verify repair. **Fault occurred while spraying wiring:** • Inspect each wire for corrosion, bent or loose terminals and poor wire terminal crimps. **Fault occurred while spraying vacuum line:** • Repair vacuum hoses.
		No	Inspect wire and connector at suspect component for corrosion, bent or loose terminals, poor wire terminal crimps and high tension of wire. Repair as necessary.

NO.30 REFERENCE VOLTAGE [FS]

A3U010318881W35

30	Reference voltage
DESCRIPTION	• Incorrect reference voltage
POSSIBLE CAUSE	• Reference voltage circuit malfunction **Note** • TP sensor, EGR boost sensor and fuel tank pressure sensor use reference voltage.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Disconnect appropriate sensor connector when reference voltage circuit inspection failed. • Turn ignition key to ON. • Measure voltage between following appropriate sensor connector terminals: — Reference voltage terminal — GND terminal • Is reference voltage **greater than 6.0 V**?	Yes	Go to Step 13.
		No	Go to next step.
2	• Is voltage across battery terminals **greater than 10.5 V**?	Yes	Go to next step.
		No	Inspect charging system.
3	• Turn ignition key to LOCK. • Leave appropriate sensor connector disconnected. • Measure voltage between battery positive terminal and GND (between PCM and appropriate sensor) circuit at appropriate sensor connector. • Is voltage **greater than 10.5 V** and **within 1.0 V** of battery voltage?	Yes	Go to next step.
		No	Go to Step 8.
4	**Note** • The purpose of this step is to determine if WDS or equivalent is communicating with PCM. • Turn ignition key to ON. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to Step 7.
		No	Go to next step.
5	• Turn ignition key to LOCK. • Disconnect TP sensor, EGR boost sensor, FTP sensor and PCM connectors. • Turn ignition key to ON. • Measure voltage between PCM connector terminals 71/97 and 24/51/76/77/103. • Is voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Repair open circuit between PCM terminal 71/97 and main relay.

STEP	INSPECTION	RESULTS	ACTION
6	• Leave TP sensor, EGR boost sensor, FTP sensor and PCM connectors disconnected. • Measure resistance between PCM connector terminals 90 and 24/51/76/77/103. • Is resistance **greater than 10,000 ohms**?	Yes	Inspect for reference voltage at suspect sensor connector again. If malfunction remains, refer to related Service Bulletins 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 and repeat Step 6.
		No	Repair constant voltage circuit short to GND.
7	• Turn ignition key to LOCK. • Leave TP sensor disconnected. • Disconnect PCM connector. • Measure resistance between PCM connector terminal 90 and constant voltage circuit at appropriate sensor connector. • Is resistance **less than 5.0 ohms**?	Yes	Inspect for reference voltage at suspect sensor connector again. If malfunction remains, refer to related Service Bulletins 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 and repeat Step 7.
		No	Repair open constant voltage circuit.
8	**Note** • The purpose of this step is to determine if WDS or equivalent is communicating with PCM. • Reconnect TP sensor connector. • Turn ignition key to ON. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to next step.
		No	Go to Step 11.
9	• Are DTCs present for two or more sensors connected to PCM terminal 91? • Sensor connected to PCM terminal 91: — TP sensor (P0122, P0123, P1122, P1123) — EGR boost sensor (P0106, P0107, P0108) — FTP sensor (P0452, P0453) — ECT sensor (P0117, P0118, P0125) — IAT sensor (P0111, P0112, P0113) — HO2S (front) (P0130, P0134) — HO2S (rear) (P0138, P0140)	Yes	Go to next step.
		No	Repair open GND circuit to sensor where reference voltage circuit inspection failed.
10	• Turn ignition key to LOCK. • Disconnect WDS or equivalent from DLC-2. • Disconnect PCM connector. • Measure resistance between GND circuit at appropriate sensor connector and PCM connector terminal 91. • Is resistance **less than 5.0 ohms**?	Yes	Reconnect sensor connector. Go to appropriate DTC test.
		No	Repair open GND circuit.
11	• Turn ignition key to LOCK. • Disconnect PCM connector. • Measure resistance between battery negative terminal and PCM terminals 24/51/76/77/103. • Is each resistance **less than 5.0 ohms**?	Yes	Go to next step.
		No	Repair open GND circuit.
12	• Turn ignition key to LOCK. • Measure resistance between GND circuit at following sensor connector and GND: — TP sensor — EGR boost sensor — FTP sensor — ECT sensor — IAT sensor — HO2S sensor (front) — HO2S sensor (rear) • Is each resistance **less than 5.0 ohms**?	Yes	GND circuits are okay. Inspect for reference voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 12.
		No	Inspect for open GND circuit.

STEP	INSPECTION	RESULTS	ACTION
13	• Turn ignition key to LOCK. • Disconnect TP sensor, EGR boost sensor, fuel tank pressure sensor and PCM connectors. • Turn ignition key on. • Measure voltage between reference voltage circuit at TP sensor connector and battery negative terminal. • Is voltage **less than 0.5 V**?	Yes	Inspect for reference voltage at suspect sensor connector again. • If malfunction remains, refer to related Service Bulletins 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 and repeat Step 13.
		No	Repair constant voltage circuit short to power in harness.

NO.31 SPARK PLUG CONDITION [FS]

A3U010318881W36

31	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** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures.** **Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01–14–4 BEFORE REPAIR PROCEDURE.)** **(See 01–14–5 AFTER REPAIR PROCEDURE.)**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Remove all spark plugs. • Inspect each spark plug. • Is condition of spark plugs 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	• Are any of spark plug wet/covered with carbon from engine oil?	Yes	Working up and down, inspect all areas related to oil.
		No	Go to next step.

STEP	INSPECTION	RESULTS	ACTION
3	• Inspect spark plug for following. — Cracked insulator — Heating value — Air gap — Worn electrode • Are spark plugs 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–8 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 part.
6	• Perform fuel line pressure inspection. (See 01–14–28 PRESSURE REGULATOR INSPECTION.) • Is fuel line pressure okay?	Yes	Inspect fuel injector for following: • Open or short in injector • Leakage • Injection volume
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect open for 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 plugs for following. — Heating value — Air gap • Are they okay?	Yes	Go to next step.
		No	Replace spark plug.
8	• Remove suspected fuel injector. • Inspect following: — Resistance (See 01–14–24 Resistance Inspection.) — Fuel injection volume (See 01–14–24 FUEL INJECTOR INSPECTION.) • Are all above items okay?	Yes	Inspect for open circuit between suspected fuel injector connector terminal and PCM connector following terminals: • **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 restrictions?	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 open for 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.
12	• Inspect following PIDs. — ECT — O2S11 — O2S12 — MAF • Are PIDs okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
13	• Inspect purge solenoid valve. (When the engine can be started) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.

STEP	INSPECTION	RESULTS	ACTION
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 • O2S11 • O2S12 • MAF Inspect PCM GND condition.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect open for 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 perform repair or diagnosis. • If vehicle is repaired, troubleshooting is completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM.		

ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS]

A3U010318881W37

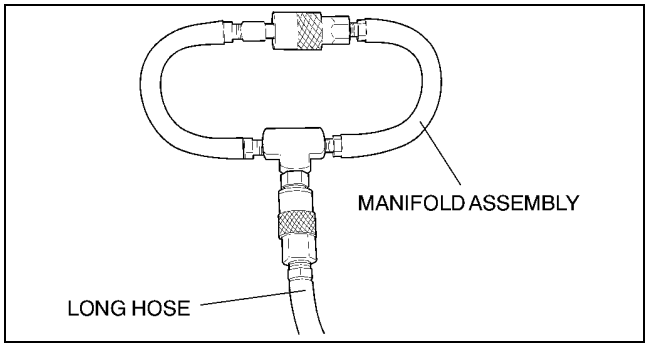
Evaporative System Leak Inspection Using Leak Tester

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.
(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.
(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.



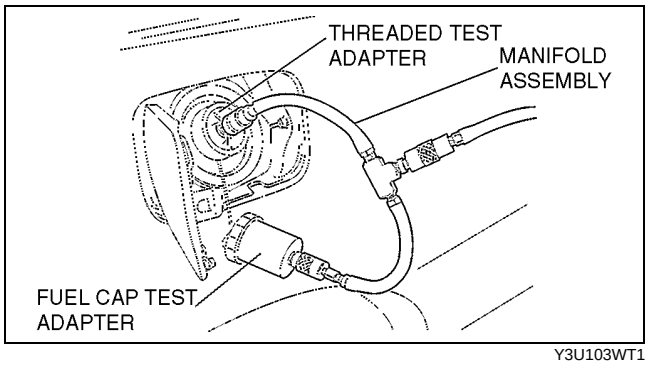
Y3U103WT0

(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 WDS or equivalent to DLC-2.
6. Turn the ignition key to ON (engine OFF).
7. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTOROL function.

Note
- The CDCV is closed for **10 minutes unless** the following any action is done:
  - — 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}**.



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8. Turn the control valve to the FILL position.
9. 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.

10. Turn the control valve to the TEST position and press the START switch.
11. 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.

12. Close the gas cylinder valve.
13. Turn the control valve to the FILL position.
14. 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 WDS or equivalent to DLC-2.
4. Turn ignition key to ON (Engine OFF).
5. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function.

   Note
   - The CDCV is closed for **10 minutes unless** the following any action is done:
     — 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}**.

6. Apply 1.7 kPa vacuum and monitor FTP output voltage.
7. Verify that the voltage holds at the specified readings for a minimum of 2 minites.
   - If the voltage does not hold, inspect the fuel tank pressure sensor.
   - If the fuel tank pressure sensor is okay, carry out the “Inspection from charcoal canister to fuel tank”.

Inspection from charcoal canister to fuel tank

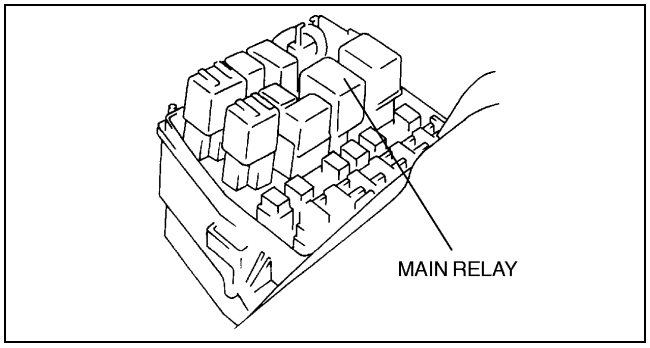
1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply 1.7 kPa vacuum.
5. Verify that the vacuum holds at the specified readings for a minimum of 2 minites.
   - If the vacuum does not hold, inspect the fuel tank, related vacuum hoses and fuel-filler cap.
   - If the the fuel tank, related vacuum hoses and fuel-filler cap are okay, carry out the “Inspection from charcoal canister to fuel tank”.

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 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the catch tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply **3.3 kPa {25 mmHg, 1.0 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of 2 minutes.
   - If the vacuum does not hold, inspect the following:
     — Catch tank for plugging, damages and pinhole using vacuum pump
     — Purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION.)
     — Charcoal canister for damage and pinhole (See 01–16–9 CHARCOAL CANISTER INSPECTION.)
     — CDCV for damage and leakage (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION .)
     — Detached, incorrectly installed or cracked hose from charcoal canister to CDCV

Main Relay Operation Inspection

1. Verify that the main relay clicks when the ignition key is turned to ON and LOCK.
2. If there is no operation sound, inspect the following:
   - Main relay
   - Harness and connector between ignition key and main relay



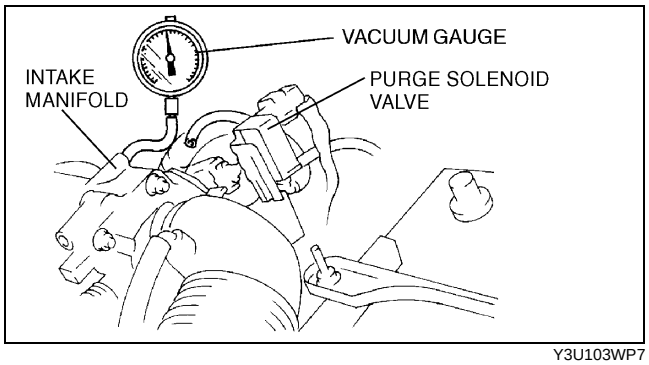
Y3U103WP6

Intake Manifold Vacuum Inspection

1. Verify air intake hoses are installed properly.
2. Start the engine and run it at idle.
3. Measure the intake manifold vacuum using a vacuum gauge.
   - If not as specified, inspect the following:
     — Air suction at throttle body, intake manifold and PCV valve installation points
     — Fuel injector insulator
     — Accelerator cable free play
     — Engine compression (See 01–10B–8 COMPRESSION INSPECTION [FS].)

Specification
More than 60 kPa {450 mmHg, 18 inHg}

Note
- Air suction can be located by engine speed change when lubricant is sprayed on the area where suction is occurring.



Y3U103WP7

Idle Air Control (IAC) Inspection
Engine coolant temperature compensation inspection

1. Connect the WDS or equivalent to DLC-2.
2. Select the following PIDs.
   - ECT
   - RPM
3. Verify that the engine is in cold condition, then start the engine.
4. Verify that the engine speed decreases as the engine warms up.
   - If the engine speed does not decrease or decreases slowly, carry out the following:
     — ECT sensor inspection
     — IAC valve inspection

Load compensation inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Connect the WDS or equivalent to DLC-2.
3. Select the following PID.
   - RPM
4. Turn the electrical loads on and verify that the engine speed is within the specification.
   - If not as specified, carry out the following:
     — A/C switch inspection
     — P/S pressure switch inspection
     — IAC valve inspection

Engine speed (rpm)

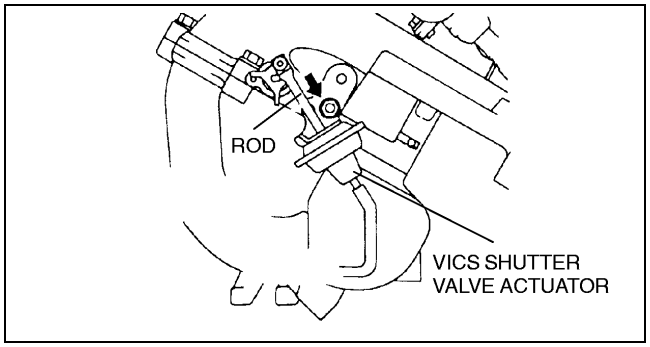
Load condition	Idle-up speed (rpm)*
No load	650—750 (700±50)
Headlight switch is on.	
P/S on	700—800 (750±50)
A/C on	

* : Neutral or P position

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

VICS Operation Inspection

1. Start the engine.
2. Verify that the rod of VICS shutter valve actuator is pulled.
   - If the rod is pulled, proceed to next step .
   - If the rod is not pulled, inspect as follows.
     — Loose or damaged vacuum hose and vacuum chamber
     — Shutter valve actuator (See 01–13B–11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS].)
     — VICS solenoid valve inspection (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS].)
3. Inspect the rod operation under the following condition.
   - If the rod operation is not as specified, inspect as follows.
     — Shutter valve actuator (See 01–13B–11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS]
     — VICS solenoid valve inspection (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS].)



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Note

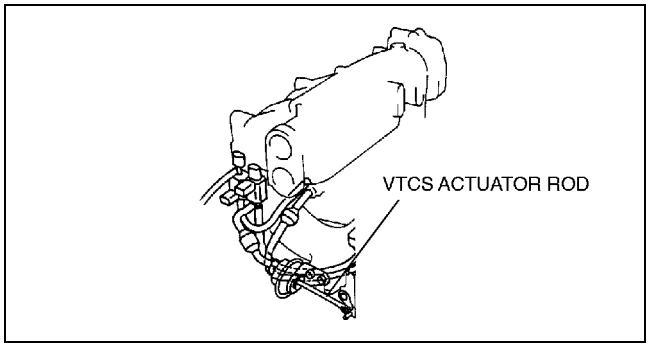
- The shutter valve actuator rod extends for five seconds after the engine is started.

Rod operation

Engine speed (rpm)	5,250	
Shutter valve actuator	Not operate	Operate

Variable Tumble Control System (VTCS) Inspection

1. Connect the WDS or equivalent to the DLC-2.
2. Access ECT PID.
3. Verify ECT PID is **65 °C {149 °F}** or less.
4. Start the engine.
5. Verify that the rod of tumble swirl control actuator is pulled.
   - If the rod is not pulled, inspect the following.
     — VTCS shutter valve actuator
     — VTCS delay valve
     — VTCS chamber
     — Vacuum hose
     — Tumble swirl control solenoid valve
     — Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 73)
6. Access RPM PID.
7. Inspect the rod operation under the following condition.
   - If the rod operation is not as specified, inspect the following:
     — Tumble swirl control actuator
     — Vacuum delay valve
     — Vacuum chamber
     — Vacuum hose
     — VTCS solenoid valve
     — Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 73)



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Rod operation

Engine speed (RPM PID) (rpm)	Tumble swirl control actuator
3,000 or less	Operate
3,000 or more	Not operate

Pressure Regulator Control Inspection

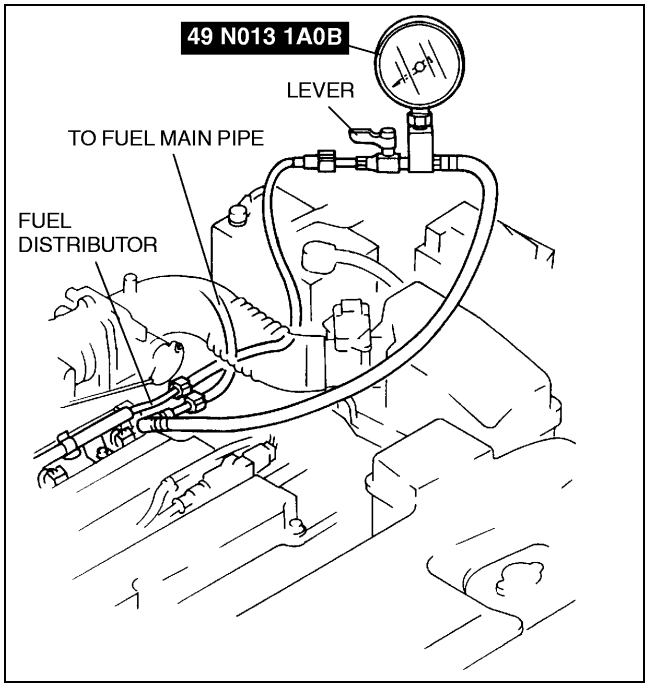
Warning

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes.**
- **To prevent this, always complete the "Before Repair Procedure." (See 01–14–4 BEFORE REPAIR PROCEDURE.)**

1. Disconnect the negative battery cable.
2. Connect a fuel **SST** between the fuel filter and fuel distributor.
3. Connect the negative battery cable.
4. Measure the fuel line pressure under the following conditions.

Specification

Condition	Fuel pressure (kPa {kgf/cm^2, psi})		
Idling	210—250 {2.1—2.6, 30—36}	210—250 {2.1—2.6, 30—36}	270—310 {2.7—3.2, 39—45}
During 100 sec. of hot start	270—310 {2.7—3.2, 39—45}		
After 100 sec. of hot start	210—250 {2.1—2.6, 30—36}		
Judgment	Normal	Not Normal (Perform Inspection 1)	Not Normal (Perform Inspection 2)



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Inspection 1

1. Inspect the following.
   - ECT, IAT, TP PIDs.
   - Pressure regulator
   - PRC solenoid valve

Inspection 2

1. Inspect the following.
   - Loose or damage vacuum hose (Pressure regulator —PRC solenoid valve— intake manifold)
   - PRC solenoid valve

Fuel Injector Operation Inspection

STEP	INSPECTION	RESULTS	ACTION
1	While cranking engine, inspect for fuel injector operation sound at each cylinder using a soundscope. Is operation sound heard?	Yes	Fuel injector operation is okay.
		No	**All cylinders no heard:** Go to next step. **Some cylinders no heard:** Go to Step 3.
2	Carry out main relay operation inspection. Is main relay operation normal?	Yes	Inspect following: • Fuel injector power system related wiring harness and connectors • PCM connectors • Fuel injector GND and related wiring harness and connectors
		No	Repair or replace malfunctioning parts.
3	Change fuel injector connector of not operating fuel injector and operating fuel injector. Is operation sound heard?	Yes	Go to next step.
		No	Replace fuel injector.
4	Are wiring harness and connectors of not operating fuel injector okay? (Open or short)	Yes	Inspect PCM terminal voltage of fuel injector signal.
		No	Repair or replace malfunctioning parts.

Spark Test

1. Disconnect the fuel pump relay connector.
2. Verify that each high-tension lead and connector is connected properly.
3. Inspect the ignition system in the following procedure.

Warning

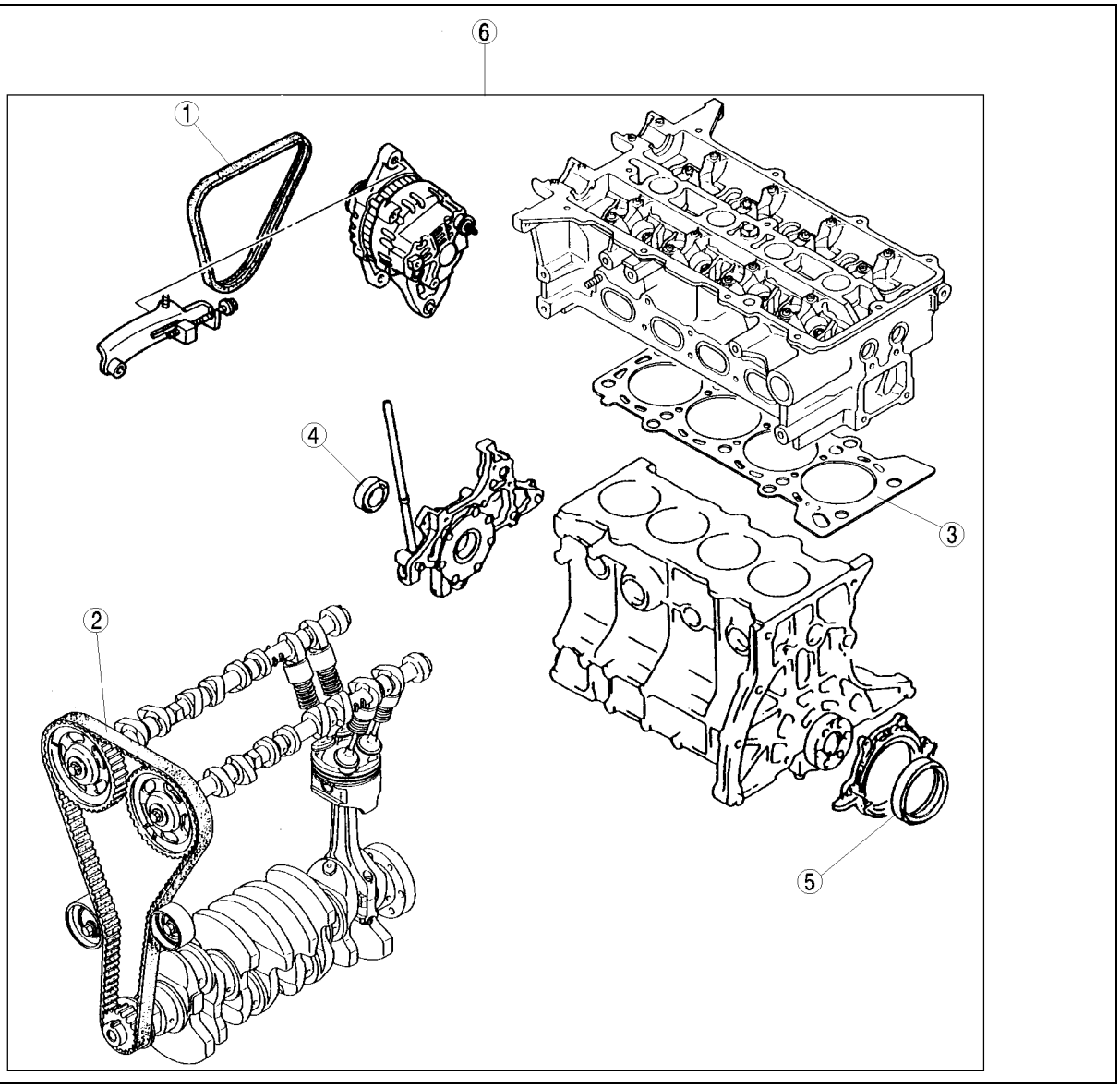
- **High voltage in the ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the following spark test.**

STEP	INSPECTION	RESULTS	ACTION
1	• Remove high-tension lead from spark plug. • Hold high-tension lead with installed pliers **5—10 mm {0.20—0.39 in}** from GND. • Crank engine and verify there is a strong blue spark. (Inspect each cylinder.)	Yes	Ignition system is okay.
		No	**Some cylinders do not spark:** Go to next step. **All cylinders do not spark:** Go to Step 3.
2	• Is high-tension lead resistance correct?	Yes	Inspect for cracks 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, inspect gap) **Specification** **0.5—1.5 mm {0.020—0.059 in}** — PCM terminal 21/22 voltage **Specification** **Approx. 1.5 V**	Yes	Inspect for open or short in wiring harness and connector of CKP sensor.
		No	Repair or replace malfunctioning parts.

01–10A MECHANICAL [ZM]

MECHANICAL LOCATION INDEX [ZM]

A3U011001002W02



Z3U0110W101

1	Drive belt (See 01–10A–3 DRIVE BELT INSPECTION [ZM]) (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM])
2	Timing belt (See 01–10A–9 TIMING BELT REMOVAL/ INSTALLATION [ZM])
3	Cylinder head gasket (See 01–10A–13 CYLINDER HEAD GASKET REPLACEMENT [ZM])

4	Front oil seal (See 01–10A–18 FRONT OIL SEAL REPLACEMENT [ZM])
5	Rear oil seal (See 01–10A–19 REAR OIL SEAL REPLACEMENT [ZM])
6	Engine (See 01–10A–20 ENGINE REMOVAL/ INSTALLATION [ZM]) (See 01–10A–24 ENGINE DISASSEMBLY/ ASSEMBLY [ZM])

DRIVE BELT INSPECTION [ZM]

A3U011015800W03

Drive Belt Deflection Inspection

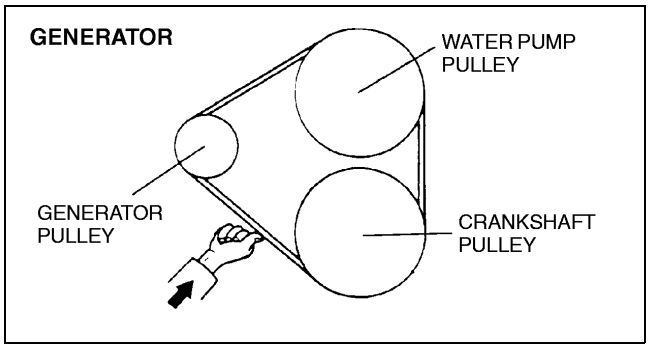
Note
- Inspect the drive belt deflection when the engine is cold, or **at least 30 min** after the engine has been stopped.

1. Apply moderate pressure **98 N {10 kgf, 22 lbf}** midway between the specified pulleys.
   - If the deflection exceeds the limit, adjust it. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)

Deflection

mm {in}

Drive belt	Limit
Generator	8.0 {0.31}
P/S, P/S+A/C	11.5 {0.45}



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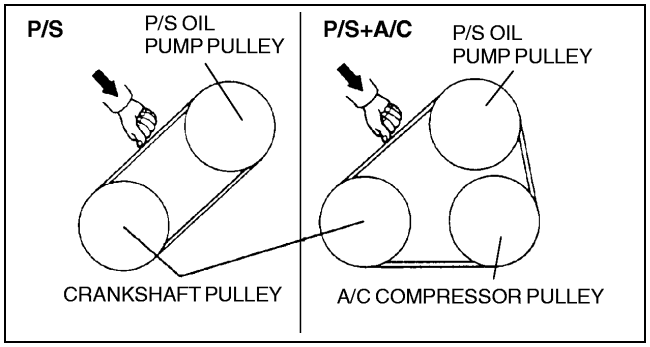


X3U110WA1

Drive Belt Tension Inspection

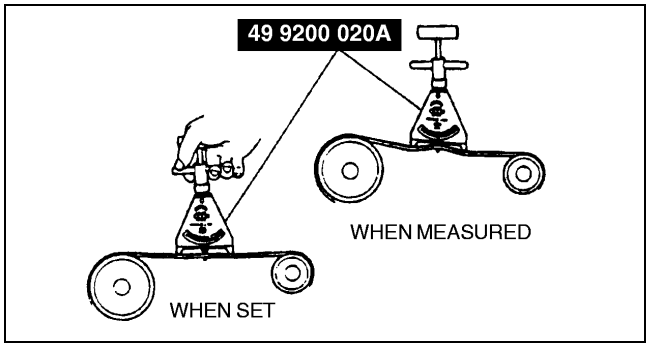
Note
- Belt tension can be inspected in place of belt deflection. Inspect the drive belt tension when the engine is cold, or **at least 30 min** after the engine has been stopped.

1. Using the **SST**, inspect the belt tension between any two pulleys.
   - If the tension exceeds the limit, adjust it. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)

Tension

N {kgf, lbf}

Drive belt	Limit
Generator	340 {35, 77}
P/S, P/S+A/C	250{25, 55}



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DRIVE BELT ADJUSTMENT [ZM]

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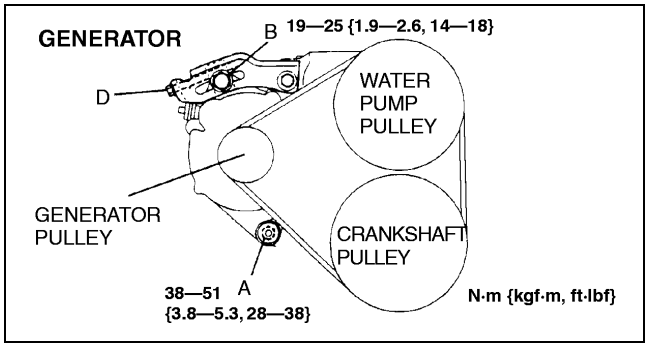
1. Loosen mounting bolt A, B, and C.



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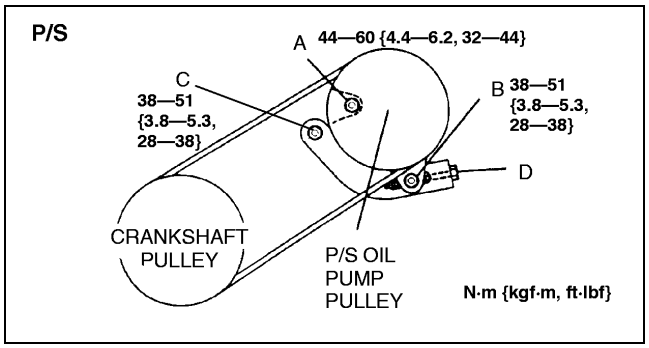

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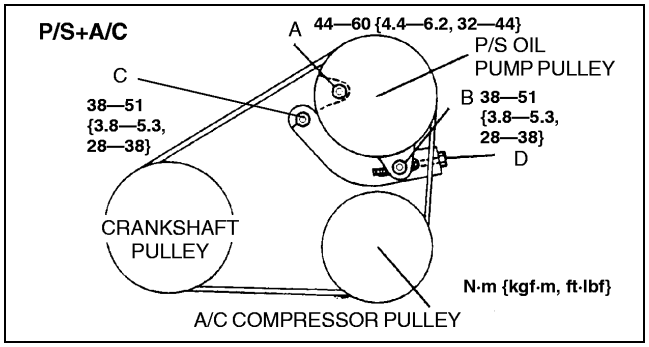
2. Adjust the belt deflection or tension by turning the adjusting bolt D.

Caution

- **If the belt is replaced with a new one or the belt has been on a running engine for less than 5 minutes, adjust deflection or tension to "New" specification. Then warm up the engine, allow it to cool, and adjust deflection or tension to "Used" specification.**
- **If the belt has been on a running engine for more than 5 minutes, adjust deflection or tension to "Used" specification.**

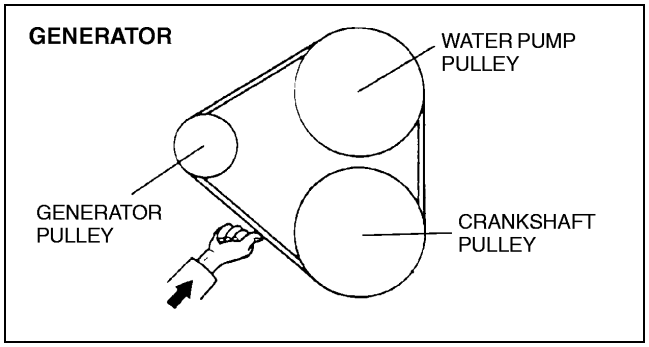


X3U110WA5

Deflection

mm {in}

Drive belt	New	Used
Generator	5.5—7.0 {0.22—0.27}	6.0—7.5 {0.24—0.29}
P/S, P/S+A/C	7.0—8.0 {0.28—0.31}	9.0—10.0 {0.36—0.39}



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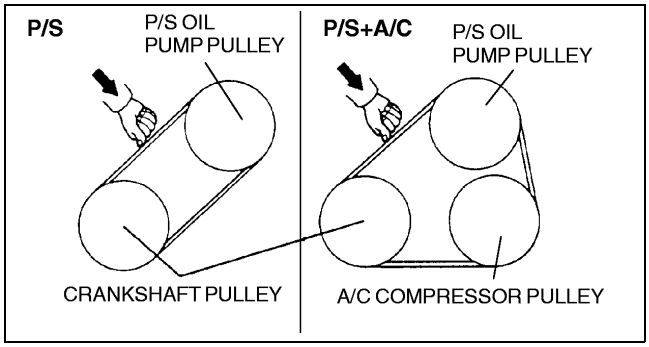
Tension

N {kgf, lbf}

Drive belt	New	Used
Generator	500—740 {50—76, 110—160}	500—700 {50—72, 110—150}
P/S, P/S+A/C	590—680 {60—70, 140—150}	430—490 {43—50, 95—110}



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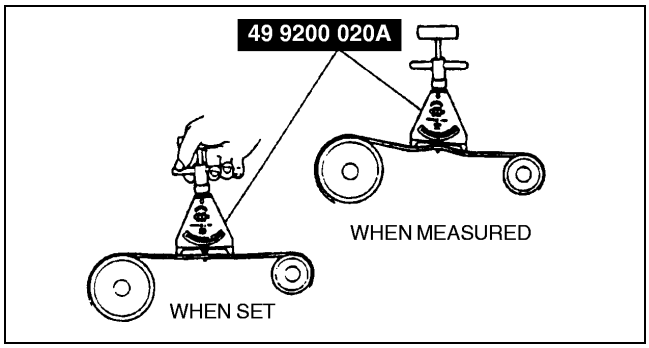
3. Tighten mounting bolt A, B, and C.
4. Inspect the belt deflection or tension.
   - If not within “Used” specification, repeat from Step 1.



X3U110WA2

VALVE CLEARANCE INSPECTION [ZM]

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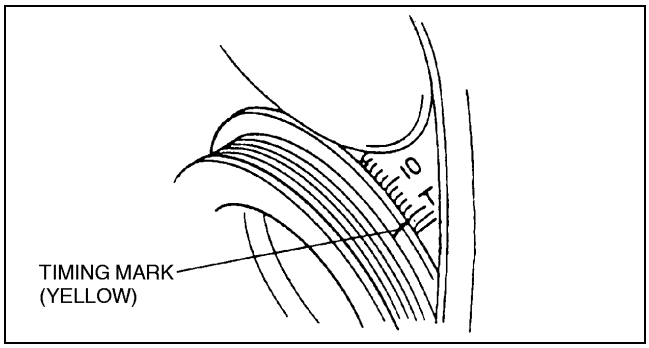
1. Remove the cylinder head cover. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].)
2. Verify that the engine is cold.
3. Measure the valve clearance.
   (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.



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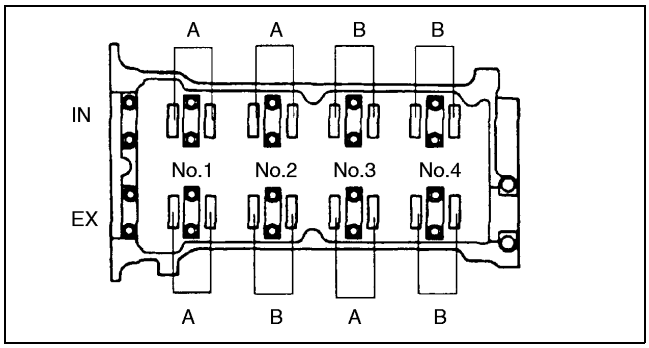
   (2) Measure the valve clearance at A in the figure.



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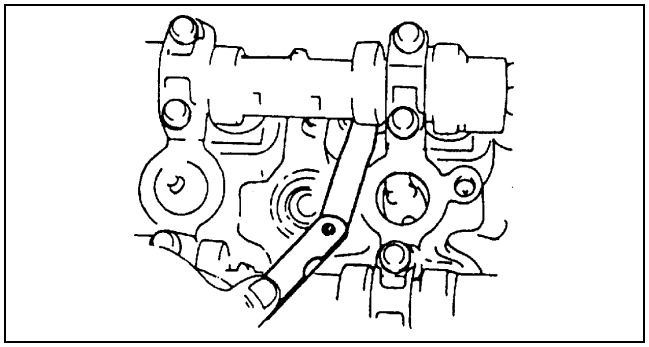
- If the valve clearance exceeds the standard, replace the adjustment shim. (See 01–10A–6 VALVE CLEARANCE ADJUSTMENT [ZM].)


X3U110WA8

Standard [Engine cold]
IN: 0.25—0.31 mm {0.010—0.012 in} (0.28±0.03 mm {0.011±0.001 in})
EX: 0.25—0.31 mm {0.010—0.012 in} (0.28±0.03 mm {0.011±0.001 in})

(3) Turn the crankshaft **360°** clockwise so that the No.4 piston is at TDC of the compression stroke.
(4) Measure the valve clearance at B in the figure.
- If the valve clearance exceeds the standard, replace the adjustment shim. (See 01–10A–6 VALVE CLEARANCE ADJUSTMENT [ZM].)

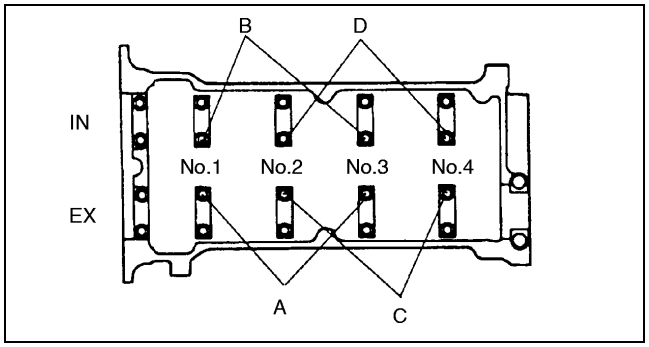
Standard [Engine cold]
IN: 0.25—0.31 mm {0.010—0.012 in} (0.28±0.03 mm {0.011±0.001 in})
EX: 0.25—0.31 mm {0.010—0.012 in} (0.28±0.03 mm {0.011±0.001 in})

4. Install the cylinder head cover. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].)

VALVE CLEARANCE ADJUSTMENT [ZM]

A3U011012010W04

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 as necessary.

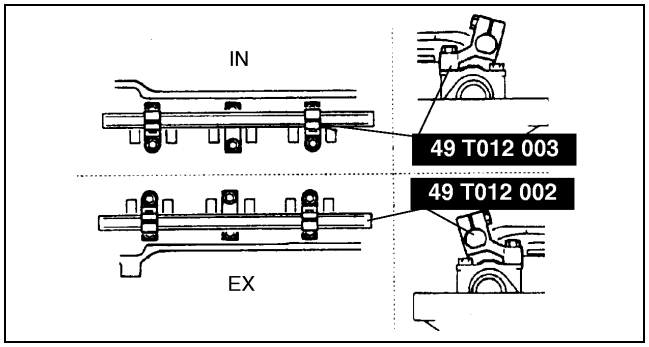


X3U110WA9

Note
- Remove only one pair of cap bolts at a time.
- Reinstall the cap bolts before removing the next pair.
  - — A: For EX side No.1, 2, 3 cylinder adjustment shim removal.
  - — B: For IN side No.1, 2, 3 cylinder adjustment shim removal.
  - — C: For EX side No.2, 3, 4 cylinder adjustment shim removal.
  - — D: For IN side No.2, 3, 4 cylinder adjustment shim removal.

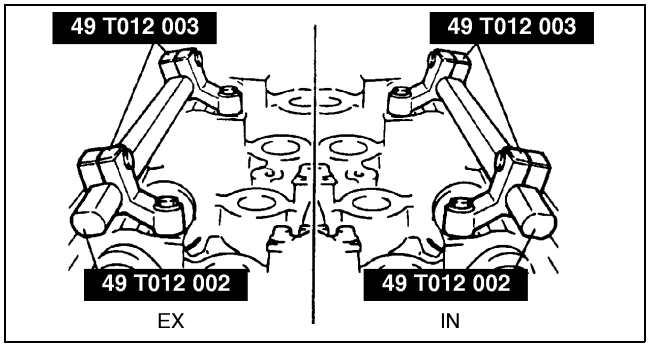
- For EX side No.2, 3 cylinder adjustment shim removal, remove either bolt A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove either bolt B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.



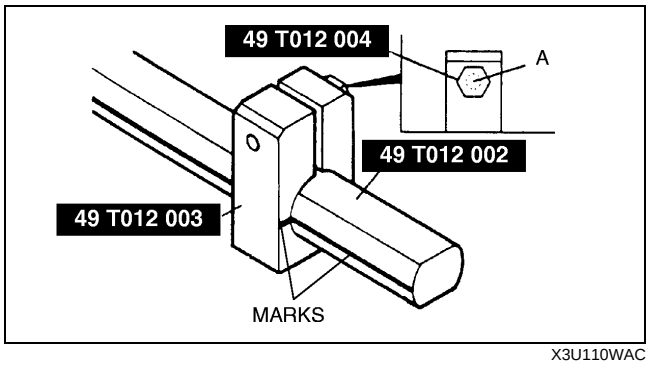
X3U110WAA

Tightening torque
11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}



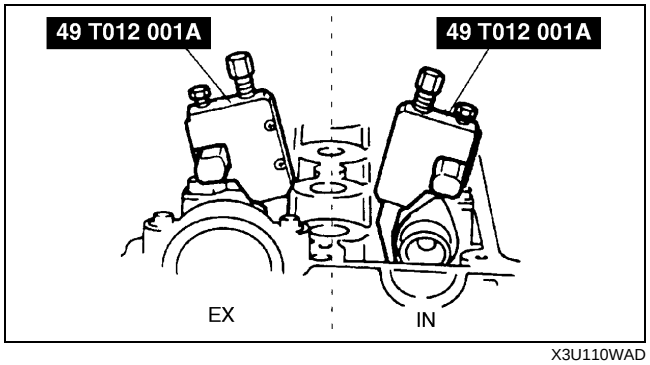
X3U110WAB

4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts A to secure the **SST** (shaft).



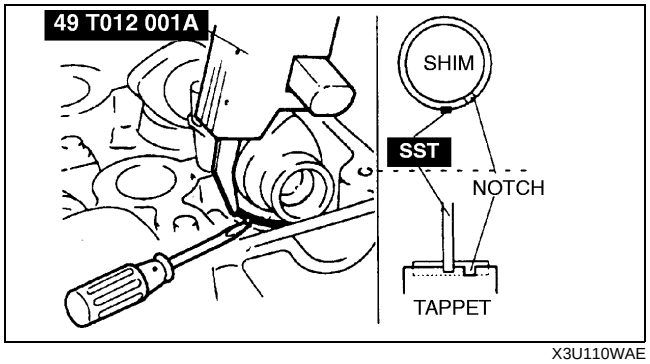
X3U110WAC

6. Face the **SST** (body) toward the center of the cylinder head, and mount it on the **SST** (shaft) at the point of the adjustment shim to be replaced.



X3U110WAD

7. Face the notch of the tappet so that a fine screwdriver can be inserted.
8. Set the **SST** on the tappet by its notch.

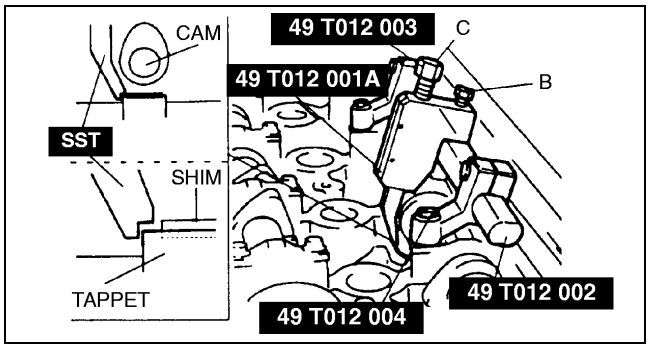


X3U110WAE

9. Tighten bolt B to secure the **SST** (body).

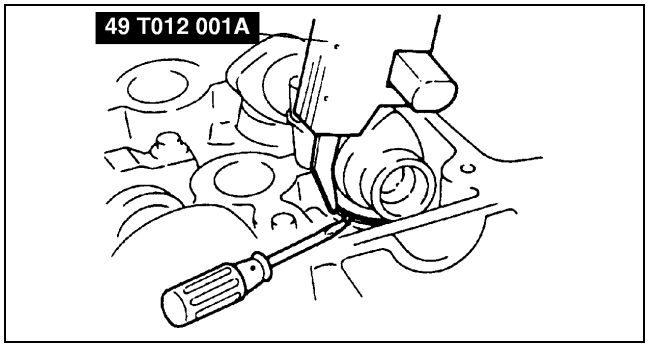
Caution
- **Cylinder head can be damaged when the tappet is pressed down.**

10. Tighten bolt C, and press down the tappet.



X3U110WAF

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.



X3U110WAG

New adjustment shim
= Removed shim thickness + Measured valve clearance - Standard valve clearance (0.28 mm {0.011 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. Inspect the valve clearance. (See 01–10A–5 VALVE CLEARANCE INSPECTION [ZM].)

COMPRESSION INSPECTION [ZM]

A3U011002000W05

Warning
- **When the engine and the oil are hot, they can cause severe burns. Be careful not to burn yourself during removal/installation of each component.**

1. Verify that the battery is fully charged.
   - Recharge it if necessary. (See 01–17–1 Battery.)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool off for **about 10 min**.
4. Perform “Fuel Line Safety Procedure”. Leave the fuel pump relay removed. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
5. Remove the ignition coils. (See 01–18–1 IGNITION COIL REMOVAL/INSTALLATION.)
6. Remove the spark plugs.
7. Connect a compression gauge into the No.1 spark plug hole.
8. Fully depress the accelerator pedal and crank the engine.
9. Note the maximum gauge reading.
10. Inspect each cylinder as below.
    - 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 reinspect the compression.
      — If the compression increases, the piston, the piston rings, or cylinder wall may be worn and overhaul is required.
      — If the compression stays low, a valve may be stuck or improperly seated and overhaul is required.
      — If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head distorted and overhaul is required.

Compression

kPa {kgf/cm^2, psi} [rpm]

Item	Engine type
	ZM
Standard	1,373 {14.0, 199} [300]
Minimum	981 {10.0, 142} [300]
Maximum difference between cylinders	196 {2.0, 28}

1. Disconnect the compression gauge.
2. Install the spark plugs.

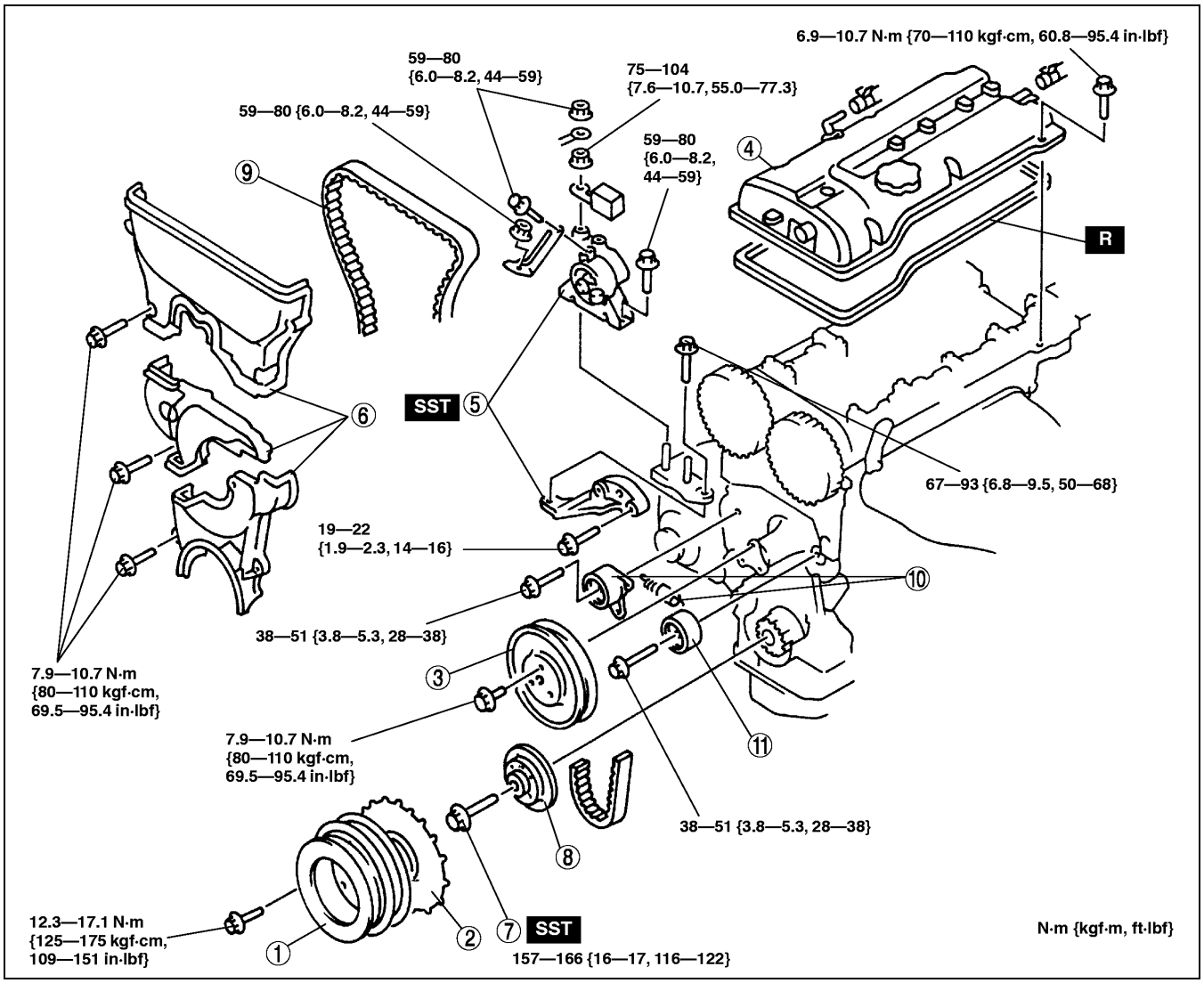
Tightening torque
15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

3. Install the ignition coils.
4. Install the fuel pump relay.

TIMING BELT REMOVAL/INSTALLATION [ZM]

A3U011012040W02

1. Disconnect the negative battery cable.
2. Remove the CMP sensor. (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION [ZM].)
3. Remove the ignition coils. (See 01–18–1 IGNITION COIL REMOVAL/INSTALLATION.)
4. Remove the drive belt. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Inspect the air gap. (See 01–40A–32 Air Gap Inspection.)
8. Adjust the drive belt deflection/tension. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)
9. Start the engine and:
   (1) Inspect the pulleys and drive belt for runout and contact.
   (2) Inspect the ignition timing. (See 01–10A–25 Ignition Timing Inspection.)



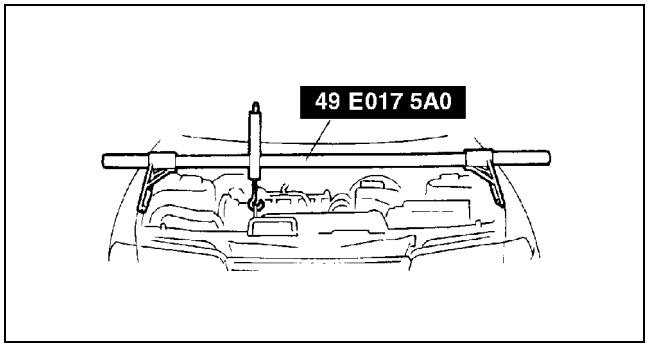
X3U110WAH

1	Crankshaft pulley
2	Plate
3	Water pump pulley
4	Cylinder head cover (See 01–10A–13 Cylinder Head Cover Installation Note)
5	No.3 engine mount (See 01–10A–10 No.3 Engine Mount Removal Note) (See 01–10A–13 No.3 Engine Mount Installation Note)
6	Timing belt cover

7	Pulley lock bolt (See 01–10A–10 Pulley Lock Bolt Removal/ Installation Note)
8	Pulley boss
9	Timing belt (See 01–10A–10 Timing Belt Removal Note) (See 01–10A–11 Timing Belt Installation Note)
10	Tensioner, tensioner spring (See 01–10A–11 Tensioner, Tensioner Spring Installation Note)
11	Idler

No.3 Engine Mount Removal Note

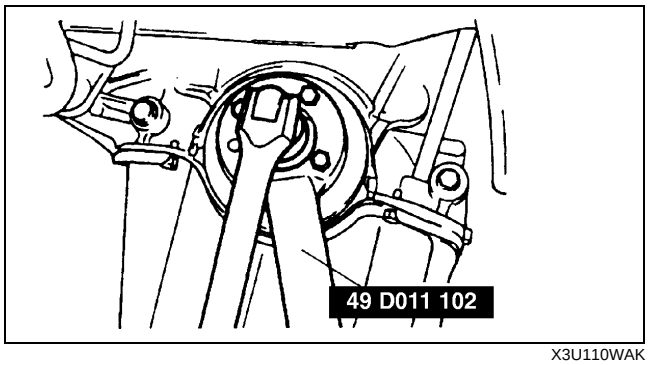
1. Suspend the engine using the **SST**.



Z3U110WAJ

Pulley Lock Bolt Removal/Installation Note

1. Remove the crankshaft using the **SST**.



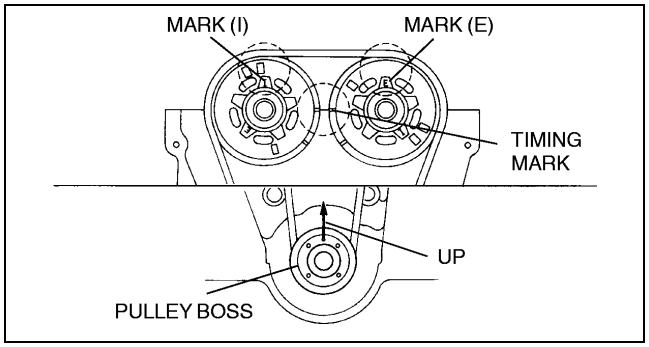
X3U110WAK

Timing Belt Removal Note

1. Install the pulley boss and pulley lock bolt.
2. Turn the crankshaft clockwise and align the timing marks.

Note

- Face the marks (I) and (E) of the camshaft pulley straight up, then align the timing marks with the horizontal surface on the cylinder head.
- The pulley boss position pin on the crankshaft should be facing straight up.

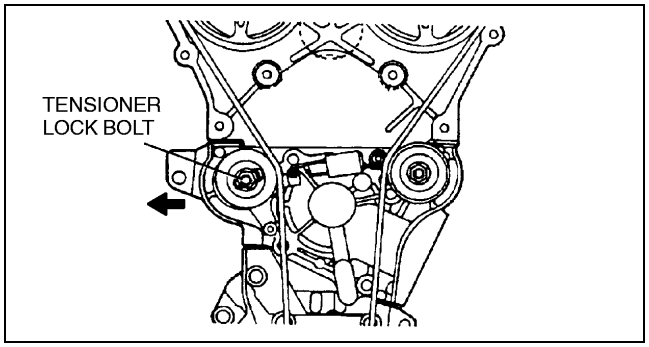


X3U110WAL

3. Loosen the tensioner lock bolt.
4. Push the tensioner in the direction of the arrow and hand-tighten the lock bolt.

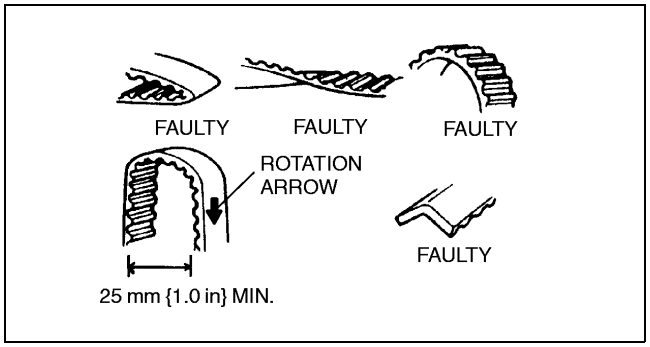
Caution

- **Forcefully twisting is the timing belt turning it inside out, or allowing oil or grease on it will damage the belt and shorten its life.**



X3U110WAM

Note
- Mark the timing belt rotation on the belt for proper reinstallation.



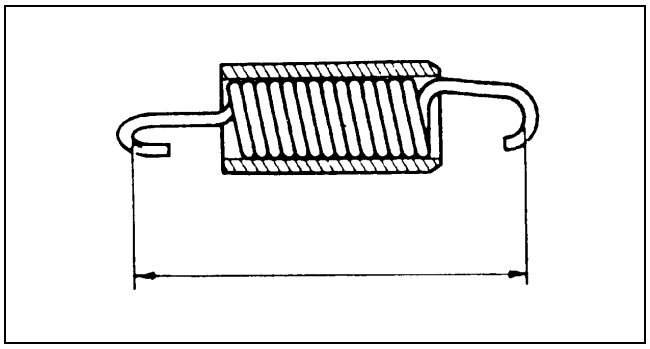
X3U110WAN

Tensioner, Tensioner Spring Installation Note

1. Measure the tensioner spring free length.
   - If not as specified, replace the tensioner spring.

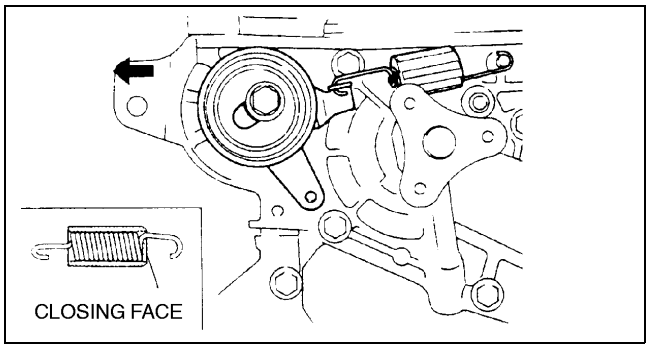
   Free length
   61.8 mm {2.43 in}

2. Install the tensioner.



X3U110WAP

3. Install the tensioner spring with the damper rubber closing face on the right side.
4. Temporarily secure the tensioner with the spring fully extended.

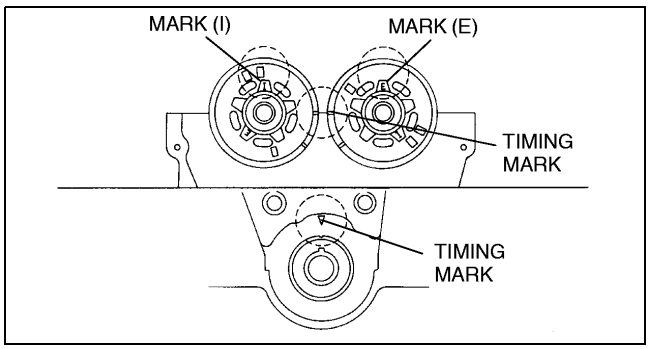


X3U110WAQ

Timing Belt Installation Note

1. Verify that the timing belt pulley mark and camshaft pulley marks are aligned with the timing marks as shown.

   Note
   - Face the marks (I) and (E) of the camshaft pulley straight up, then align the timing marks with the horizontal surface on the cylinder head.

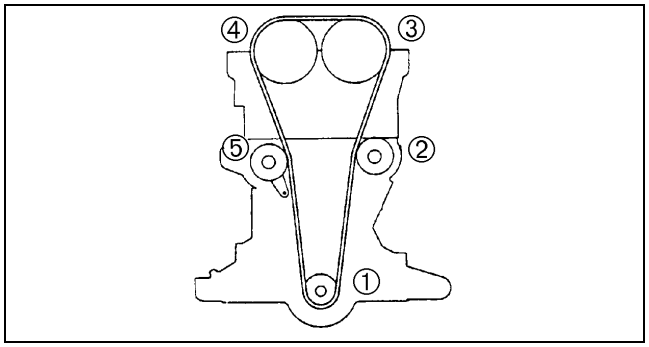


X3U110WAR

2. Install the timing belt in the order shown to prevent looseness.

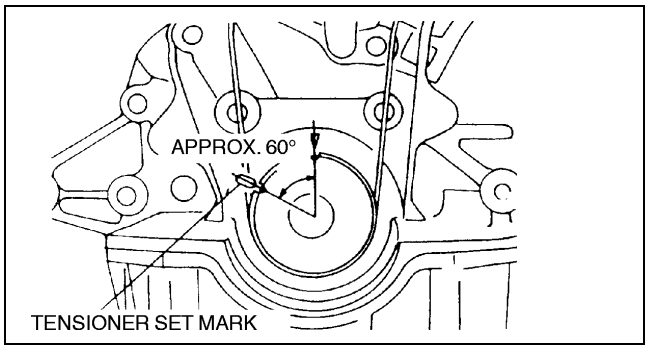
Caution
- **Be sure not to apply tension other than that of the tensioner spring.**

3. Install the pulley boss and pulley lock bolt.
4. Loosen the tensioner lock bolt to apply tension to timing belt.



X3U110WAS

5. Turn the crankshaft clockwise **1 and 5/6 times**, and align the timing belt pulley mark with the tensioner set mark.



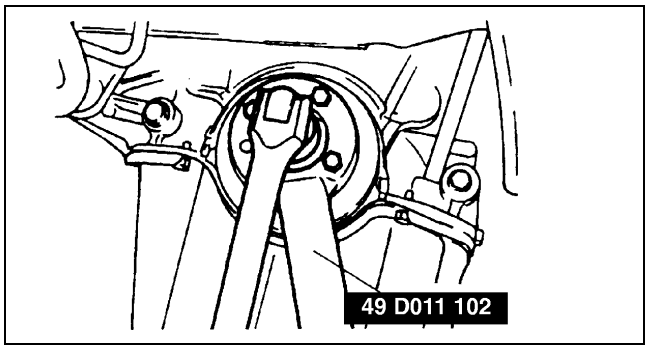
X3U110WAT

6. Hold the crankshaft using the **SST**, and remove the pulley lock bolt and the pulley boss.
7. Verify that the timing belt pulley mark is aligned with the tensioner set mark.

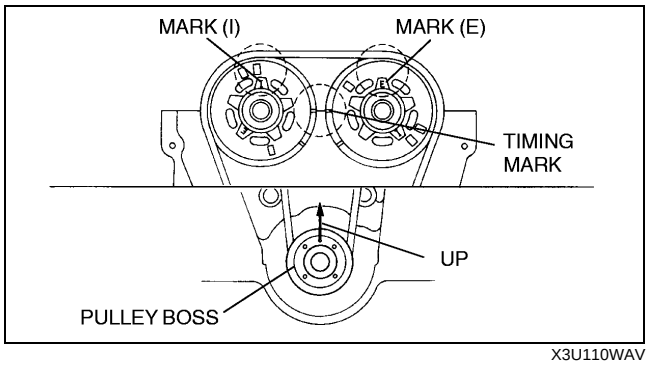
Caution
- **Prevent the tensioner from moving with the tensioner lock bolt as it is turned.**

8. Tighten the tensioner lock bolt.
9. Install the pulley boss and the pulley lock bolt.
10. Turn the crankshaft **2 and 1/6 times**, and face the pin on the pulley boss straight up.
11. Verify that the camshaft pulley marks are aligned with the timing marks as shown.
    - If not, repeat from **Timing Belt Removal Note** and reinstall the timing belt. (See 01–10A–10 Timing Belt Removal Note.)

Note
- Timing is normal if: the pulley boss position pin and the camshaft pulley marks (I) and (E) are facing straight up. the timing marks are aligned to the horizontal surface on cylinder head.



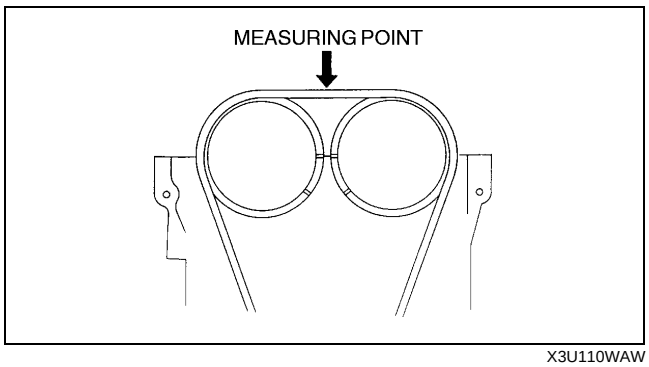
X3U110WAU



X3U110WAV

12. Inspect the timing belt deflection at the point indicated by applying moderate pressure **98 N {10 kgf, 22 lbf}**.
    - If not as specified, remove the timing belt and repeat from Step 1.

Timing belt deflection
6.0—7.5 mm {0.24—0.29 in}



X3U110WAW

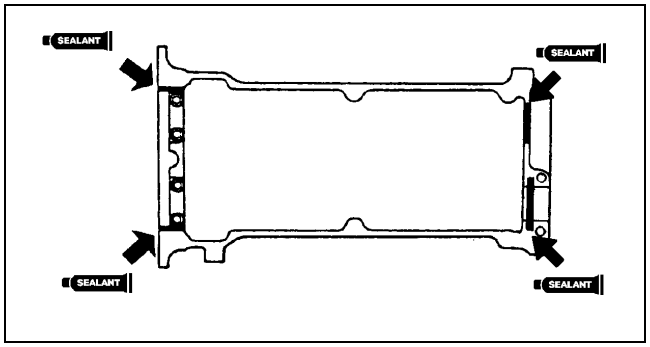
No.3 Engine Mount Installation Note

1. Install the No.3 engine mount. (See 01–10A–22 No.3 Engine Mount Installation Note.)
2. Remove the **SST** (engine support).

Cylinder Head Cover Installation Note

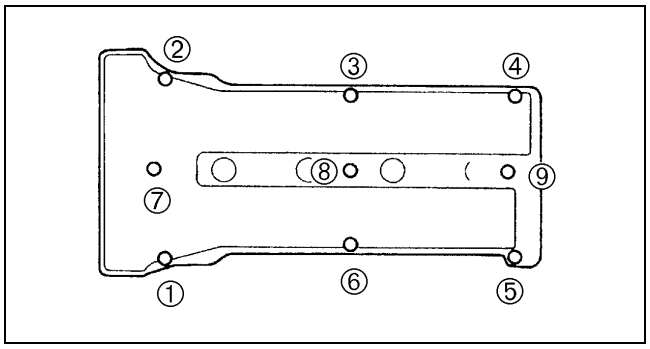
1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install the cylinder head cover gasket into the cylinder head cover.
3. Apply silicone sealant to the cylinder head as shown.

   Thickness
   3.0—4.0 mm {0.12—0.15 in}



X3U110WAX

4. Tighten the cylinder head cover bolts a few turns in the order shown.



X3U110WAY

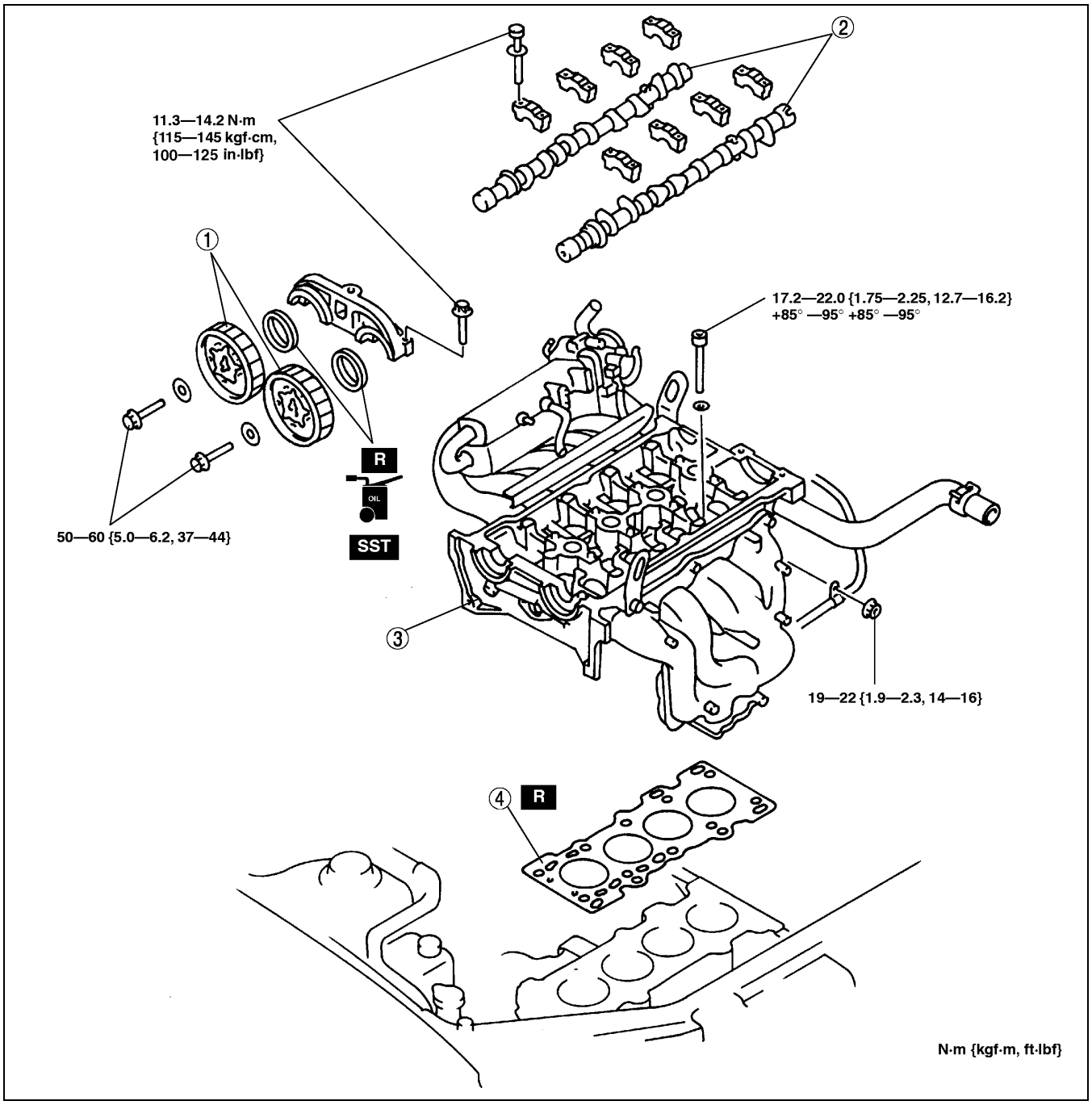
CYLINDER HEAD GASKET REPLACEMENT [ZM]

A3U011010271W02

Warning

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

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the timing belt. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].)
4. Remove the front pipe, exhaust manifold insulator, and EGR pipe. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
5. Remove the air cleaner, and fresh-air duct.
6. Disconnect the accelerator cable, and bracket.
7. Disconnect the vacuum hose, and engine harness connector.
8. Disconnect the plastic fuel hoses. (See 01–14–11 Plastic Fuel Hose Removal Note.) (See 01–14–12 Plastic Fuel Hose Installation Note.)
9. Remove the intake manifold bracket.
10. Remove the heater hoses.
11. Remove in the order indicated in the table.
12. Install in the reverse order of removal.
13. Inspect for fuel leakage.
14. Inspect the compression. (See 01–10A–8 COMPRESSION INSPECTION [ZM].)
15. Start the engine and
    (1) Inspect the pulleys and drive belt for runout and contact.
    (2) Inspect the ignition timing. (See 01–10A–25 Ignition Timing Inspection.)
    (3) Inspect the idle speed. (See 01–10A–26 Idle Speed Adjustment.)



Y3U110WA0

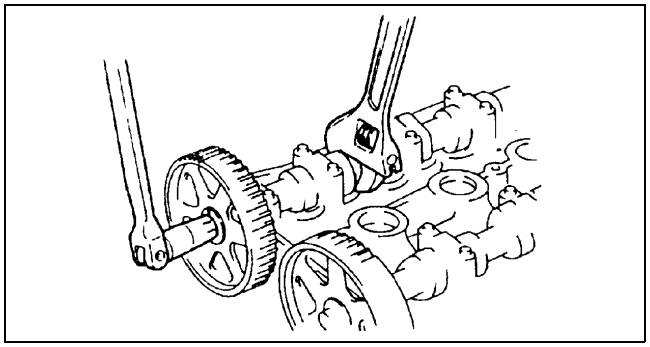
1	Camshaft pulley (See 01–10A–14 Camshaft Pulley Removal Note) (See 01–10A–17 Camshaft Pulley Installation Note)
2	Camshaft (See 01–10A–15 Camshaft Removal Note) (See 01–10A–16 Camshaft Installation Note)

3	Cylinder head (See 01–10A–15 Cylinder Head Removal Note) (See 01–10A–15 Cylinder Head Installation Note)
4	Cylinder head gasket

Camshaft Pulley Removal Note

1. Temporarily install the No.3 engine mount.
2. Remove the **SST** (engine support).

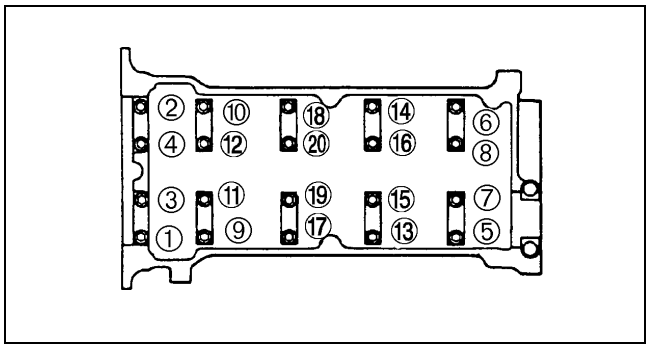
3. Hold the camshaft using a wrench on the cast hexagon as shown.



X3U110WB0

Camshaft Removal Note

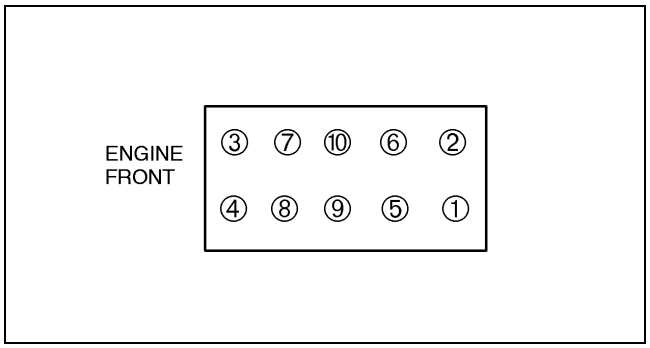
1. Loosen the camshaft cap bolts a few turns in the order shown.
2. Remove the camshaft cap.



X3U110WB1

Cylinder Head Removal Note

1. Loosen the cylinder head bolts a few turns in the order shown.

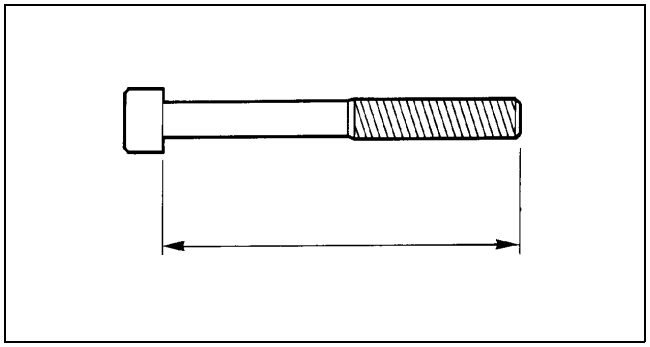


X3U110WB2

Cylinder Head Installation Note

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

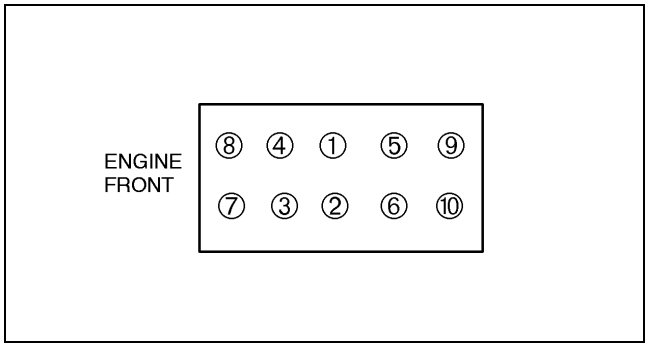
   Standard length
   99.2—99.8 mm {3.91—3.92 in}
   Maximum length
   100.5 mm {3.956 in}



X3U110WB3

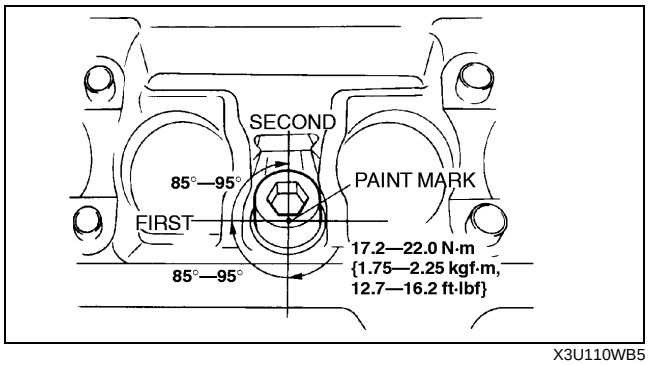
2. Tighten the cylinder head bolts a few turns in the order shown.

Tightening torque
17.2—22.0 N·m {1.75—2.25 kgf·m, 12.7—16.2 ft·lbf}



X3U110WB4

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.



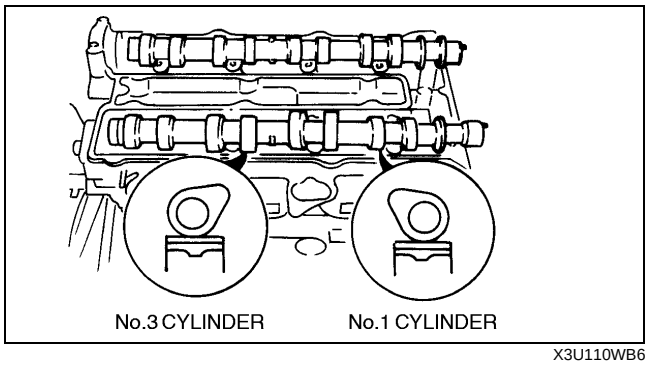
X3U110WB5

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 a burr on the thrust receiving area of the cylinder head journal. To avoid this, the following procedure must be observed.**

1. Assemble camshaft onto the cylinder head, facing the cam noses at No.1 and No.3 cylinders as shown.

Note
- Keep the camshaft sliding surface free of sealant to prevent engine damage.

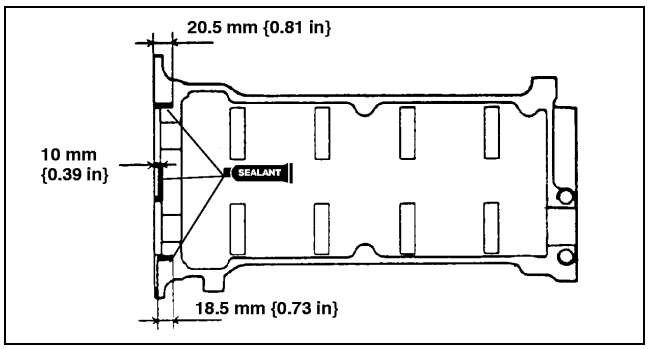


X3U110WB6

2. Apply silicone sealant to the areas shown.

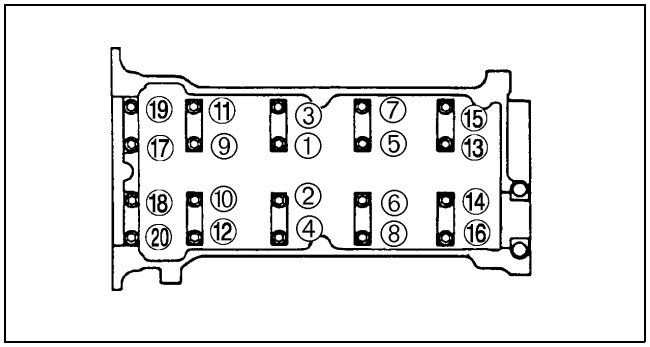
Thickness
1.0 mm {0.04 in}

3. Apply engine oil to the camshaft and the cylinder head journals.
4. Install the camshaft caps to the positions from which they were removed.



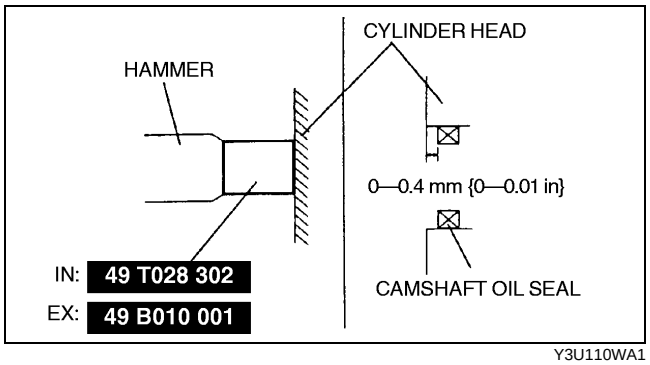
X3U110WB7

5. Hand tighten the camshaft cap bolts marked 5, 7, 2, and 4.
6. Tighten the camshaft cap bolts a few turns in the order shown.
7. Verify that the camshaft settles horizontally when 2 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.



X3U110WB8

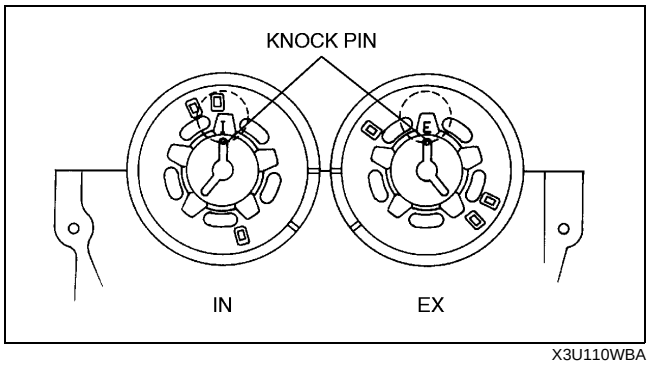
10. Tap the oil seals in evenly using the **SST** and a hammer.



Y3U110WA1

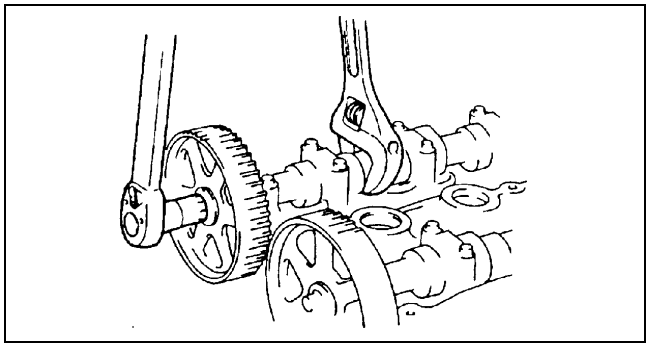
Camshaft Pulley Installation Note

1. Install the camshaft pulleys with the “I” mark (intake side) or “E” mark (exhaust side) straight up.



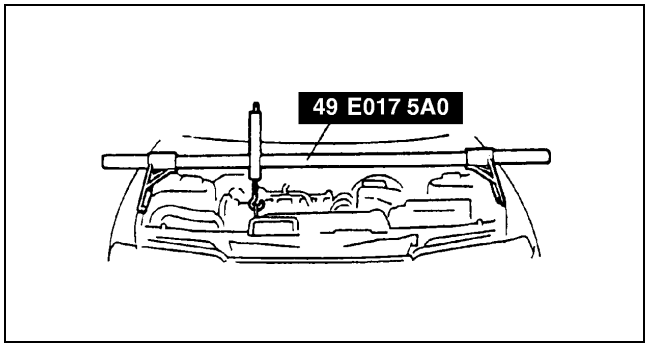
X3U110WBA

2. Hold the camshaft using a wrench on the cast hexagon as shown.



X3U110WBB

3. Suspend the engine using the **SST**.
4. Remove the No.3 engine mount.

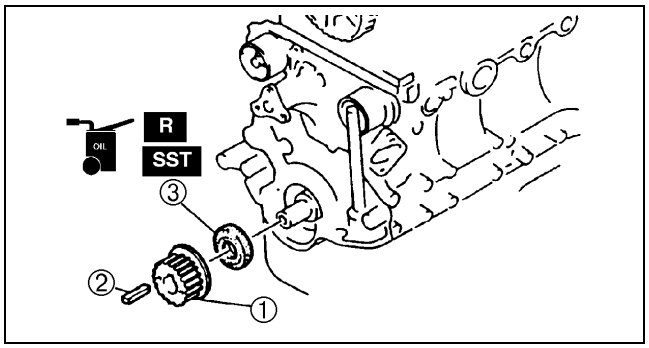


Z3U110WBC

FRONT OIL SEAL REPLACEMENT [ZM]

A3U011010602W02

1. Disconnect the negative battery cable.
2. Remove the timing belt. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].)
3. Remove in the order indicated in the table.



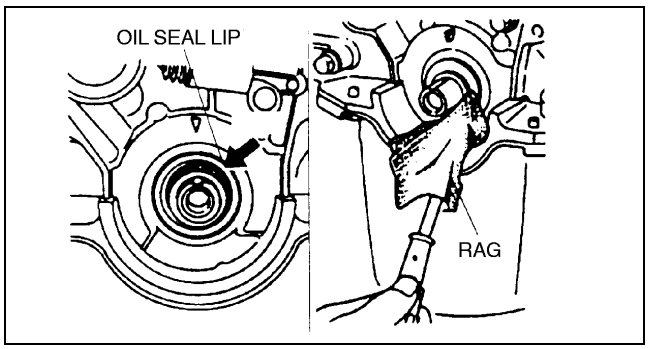
X3U110WBD

1	Timing belt pulley
2	Key
3	Front oil seal (See 01–10A–18 Front Oil Seal Removal Note) (See 01–10A–18 Front Oil Seal Installation Note)

4. Install in the reverse order of removal.

Front Oil Seal Removal Note

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

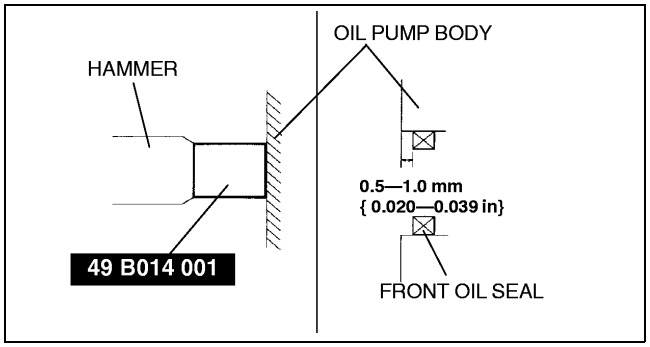


X3U110WBE

Front Oil Seal Installation Note

1. Apply clean engine oil to the 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.



X3U110WBF

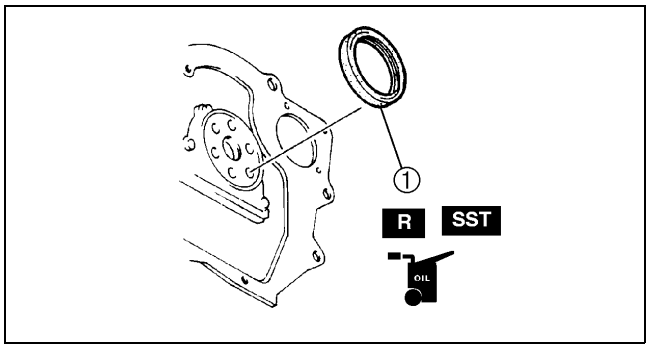
REAR OIL SEAL REPLACEMENT [ZM]

A3U011011399W02

1. Remove the flywheel. (MTX) (See 05–10–11 CLUTCH UNIT REMOVAL/INSTALLATION.)
2. Remove the drive plate. (ATX) (See 05–17–46 DRIVE PLATE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Rear oil seal (See 01–10A–19 Rear Oil Seal Removal Note) (See 01–10A–19 Rear Oil Seal Installation Note)

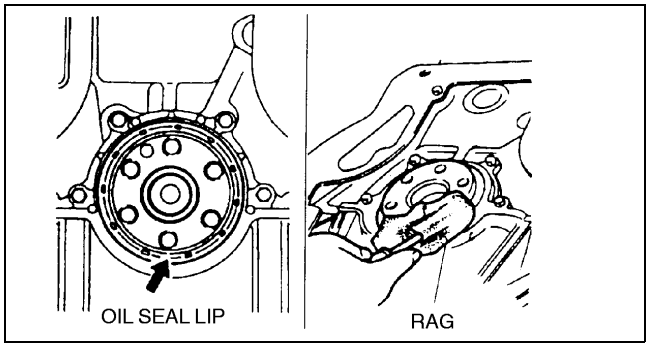
4. Install in the reverse order of removal.



X3U110WBG

Rear Oil Seal Removal Note

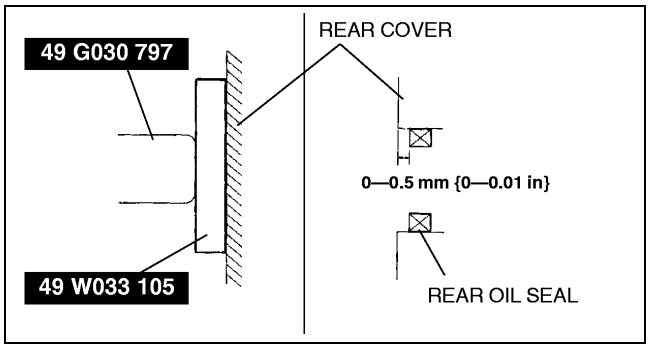
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



X3U110WBH

Rear Oil Seal Installation Note

1. Apply clean engine oil to the new oil seal lip.
2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly using the **SSTs**.



Y3U110WA2

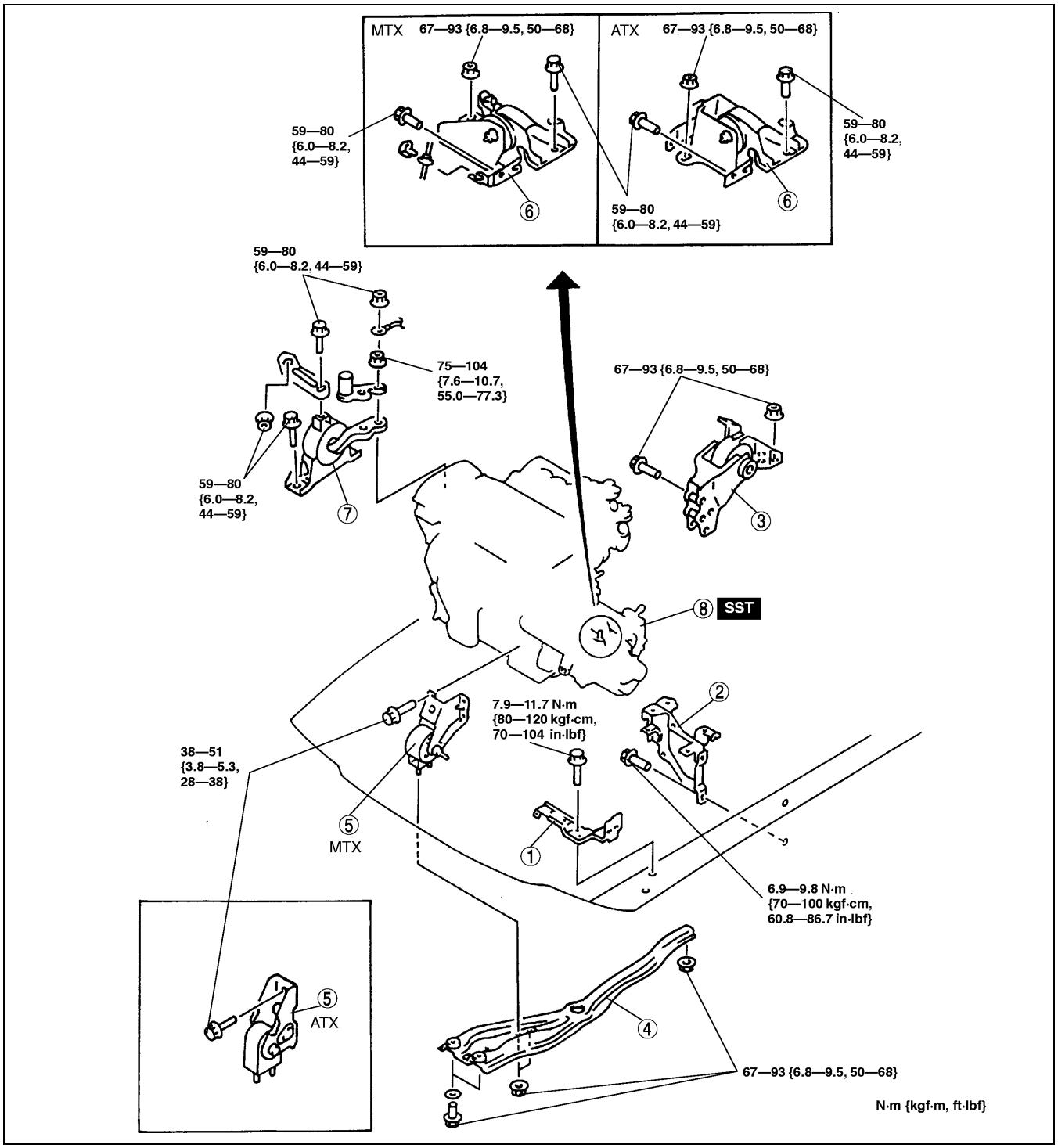
ENGINE REMOVAL/INSTALLATION [ZM]

A3U011002000W06

Warning

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

1. Remove the battery.
2. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the air cleaner, air hose, and resonance chamber.
4. Remove the front pipe.
5. Disconnect the accelerator cable, bracket, heater hoses, vacuum hoses.
6. Remove the radiator. (See 01–12–4 RADIATOR REMOVAL/INSTALLATION.)
7. Remove the drive belt. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)
8. Disconnect the plastic fuel hoses. (See 01–14–11 Plastic Fuel Hose Removal Note.) (See 01–14–12 Plastic Fuel Hose Installation Note.)
9. Disconnect the rods, cables, and clutch release cylinder related to the manual transaxle. (MTX) (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R].)
10. Disconnect the rods, cables, and oil pipe related to the automatic transaxle. (ATX) (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
11. Remove the drive shaft. (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
12. 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.
13. Remove the A/C compressor with the pipe still connected. Position the A/C compressor so that it is out of the way.
14. Remove in the order indicated in the table.
15. Install in the reverse order of removal.
16. Adjust the drive belt deflection/tension. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)
17. Start the engine and:
    (1) Inspect for the engine oil, engine coolant, transaxle oil, ATF and fuel leakage.
    (2) Verify the ignition timing, idle speed and idle mixture. (See 01–10A–25 ENGINE TUNE-UP [ZM].)
18. Perform a road test.



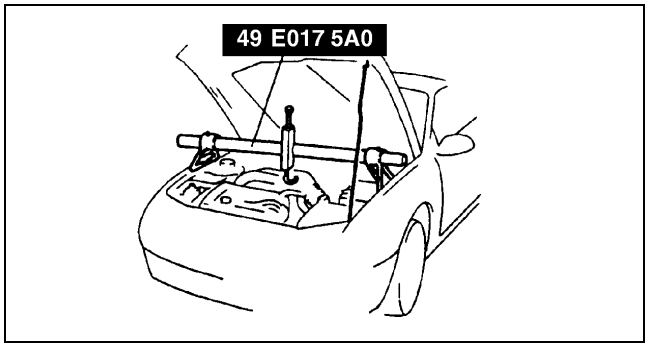
Y3U110WA3

1	Air cleaner bracket
2	Battery carrier bracket
3	No.1 engine mount (See 01–10A–22 No.1 Engine Mount Removal Note) (See 01–10A–23 No.1 Engine Mount Installation Note)
4	Engine mount member (See 01–10A–22 Engine Mount Member Removal Note) (See 01–10A–23 Engine Mount Member Installation Note)

5	No.2 engine mount (See 01–10A–23 No.2 Engine Mount Installation Note)
6	No.4 engine mount (See 01–10A–22 No.4 Engine Mount Removal Note) (See 01–10A–22 No.4 Engine Mount Installation Note)
7	No.3 engine mount (See 01–10A–22 No.3 Engine Mount Installation Note)
8	Engine, transaxle

No.1 Engine Mount Removal Note

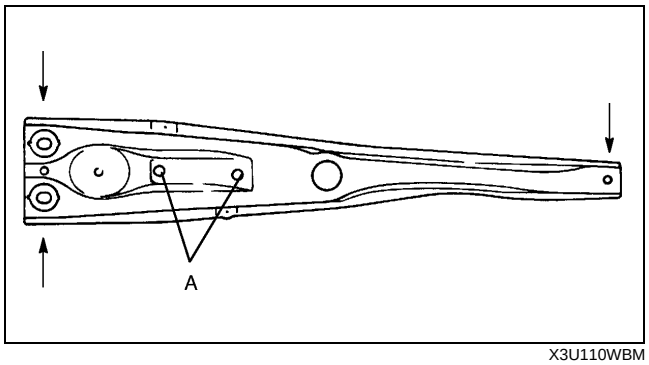
1. Suspend the engine using the **SST**.



Z3U110WBL

Engine Mount Member Removal Note

1. Remove the No.2 engine mount nut A.
2. Remove the engine mount member bolt and nut.



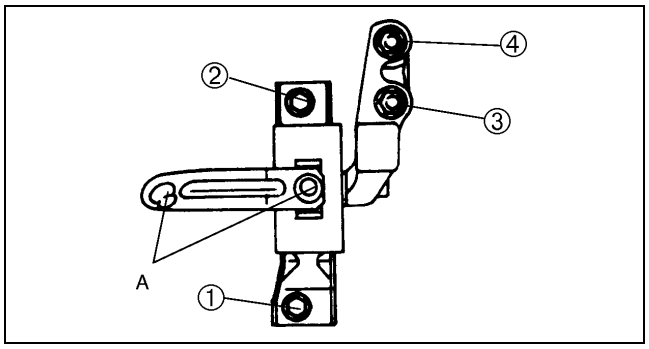
X3U110WBM

No.4 Engine Mount Removal Note

1. Remove the **SST** (engine support) and securely support it with the chain block.

No.3 Engine Mount Installation Note

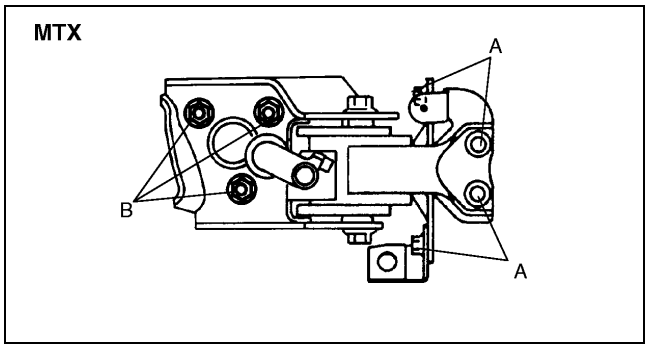
1. Tighten the No.3 engine mount bolt and nut in the order shown.
2. Tighten the No.3 engine mount stay bolt and nut A.



X3U110WBN

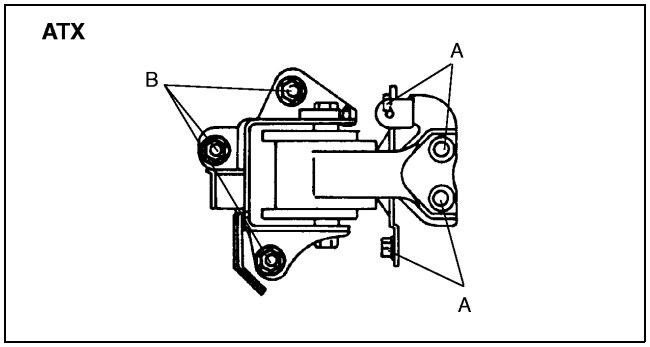
No.4 Engine Mount Installation Note

1. Tighten the No.4 engine mount bolt A.



X3U110WBP

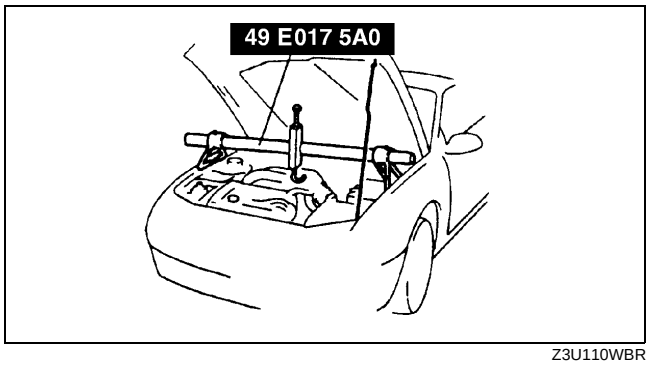
2. Tighten the No.4 engine mount nut B.



X3U110WBQ

No.2 Engine Mount Installation Note

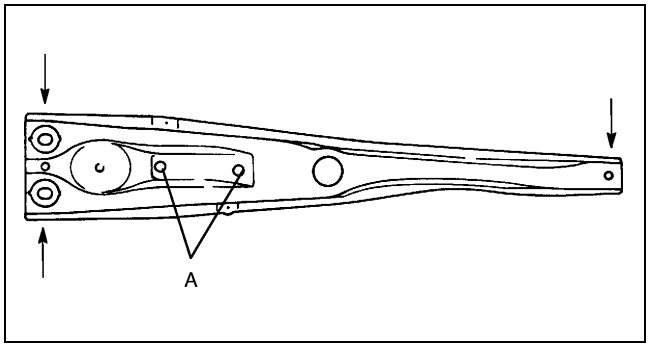
1. Remove the chain block.
2. Suspend the engine using the **SST**.



Z3U110WBR

Engine Mount Member Installation Note

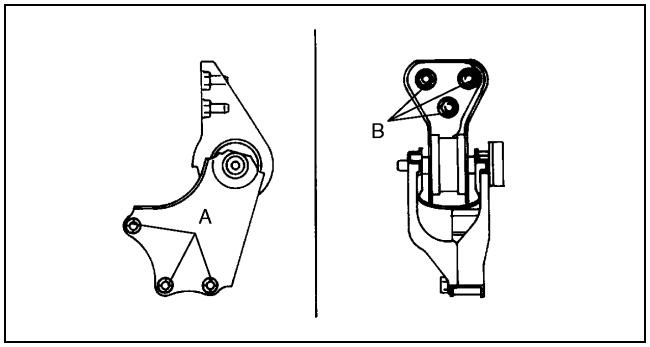
1. Tighten the No.2 engine mount nut A.
2. Tighten the engine mount member bolt and nut.



X3U110WBS

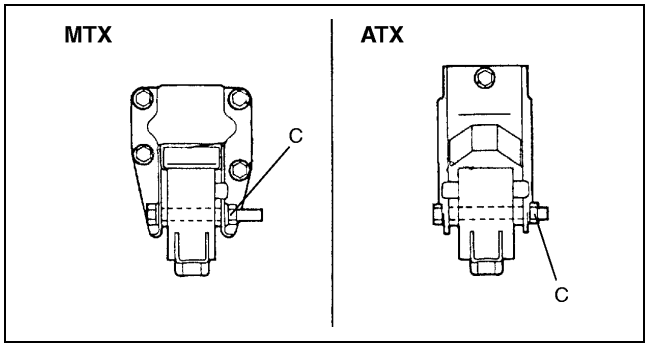
No.1 Engine Mount Installation Note

1. Tighten the No.1 engine mount bolt A.
2. Tighten the No.1 engine mount nut B.



X3U110WBT

3. Loosen the No.2 engine mount bolt C.
4. Retighten the No.2 engine mount nut C.

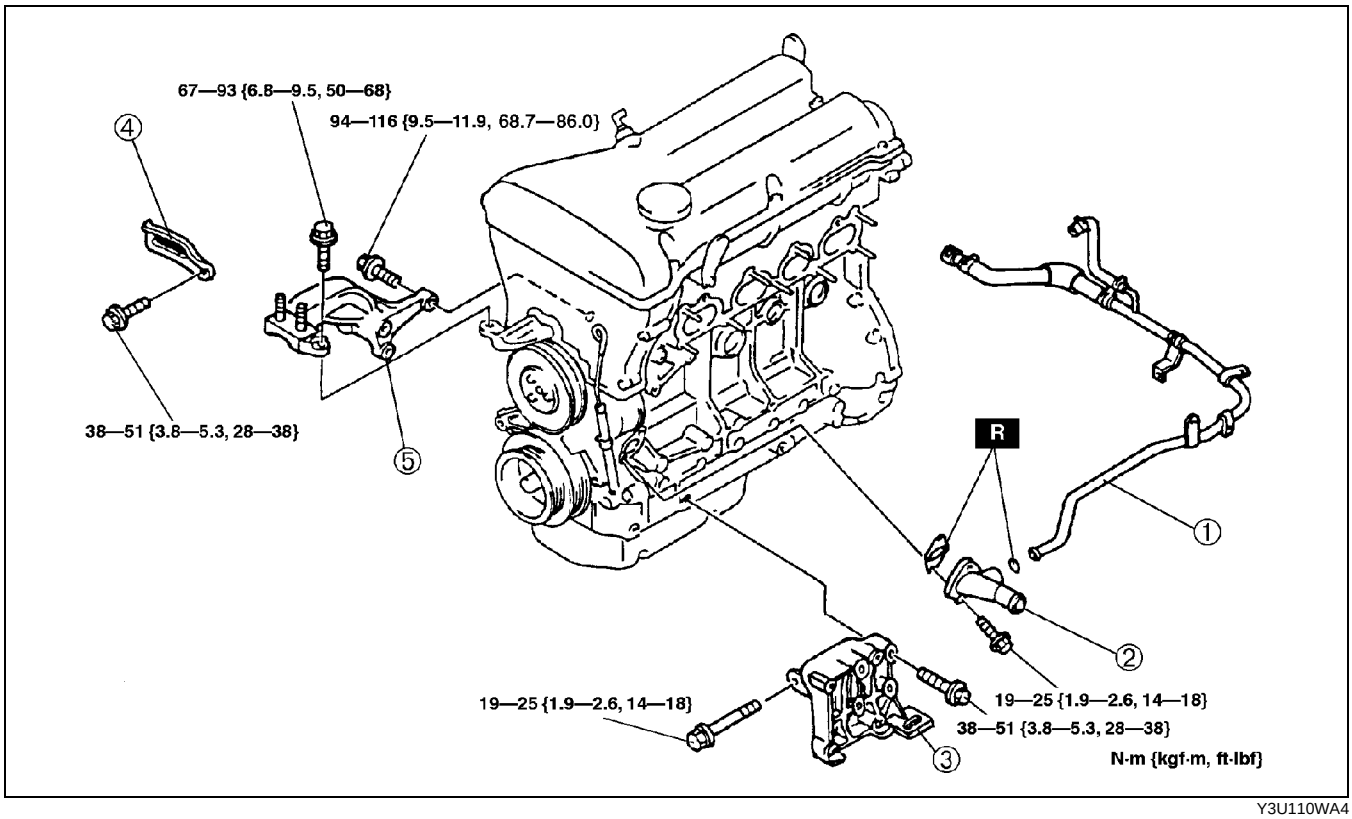


X3U110WBU

ENGINE DISASSEMBLY/ASSEMBLY [ZM]

A3U011002000W07

1. Disconnect the engine and transaxle. (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/ INSTALLATION [F25M-R].) (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R].)
2. Remove the integrated stiffener. (See 01–11–8 Integrated Stiffener Installation Note.)
3. Remove the CKP sensor. (See 01–40A–34 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION [ZM].)
4. Remove the oil pressure switch. (See 01–11–2 OIL PRESSURE INSPECTION.)
5. Remove the intake-air system. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].)
6. Remove the exhaust system. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
7. Remove the oil filter. (See 01–11–3 OIL FILTER REPLACEMENT.)
8. Remove the ignition coils.
9. Remove the generator.
10. Disassemble in the order indicated in the table.
11. Assemble in the reverse order of disassembly.
12. Inspect the air gap. (See 01–40A–32 Air Gap Inspection.)



Y3U110WA4

1	Water bypass pipe
2	Water inlet pipe
3	A/C compressor bracket (with A/C compressor)

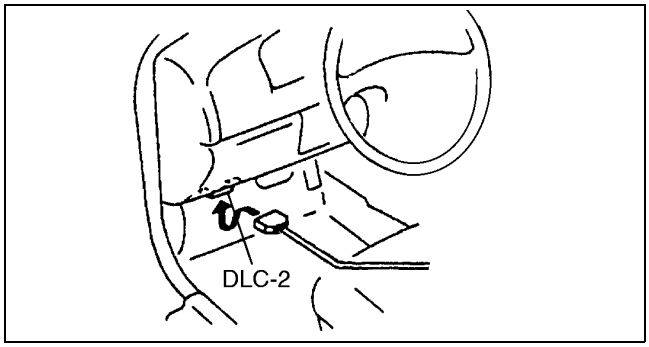
4	Generator strap
5	No.3 engine bracket

ENGINE TUNE-UP [ZM]

A3U011002000W08

Engine Tune-up Preparation

1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into neutral.
3. Turn off all electrical loads.
   - Headlight switch
   - Fan switch
   - Rear window defroster switch
   - A/C switch
4. Verify that the steering wheel is at straight ahead position.
5. Connect the **SSTs** (WDS or equivalent) to the DLC-2.
6. Access RPM PID.
7. Wait until the electrical fan stops.



Z3U110WA5

Ignition Timing Inspection

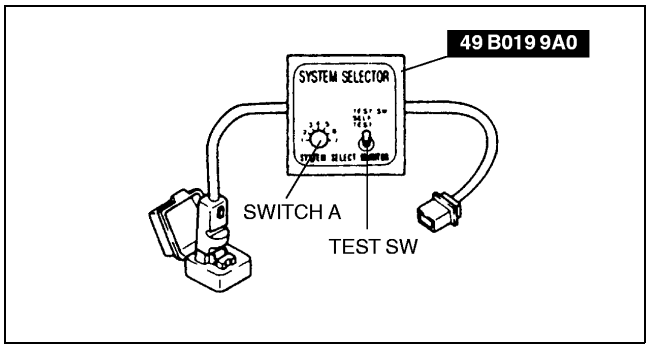
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
   - If not as specified, adjust the idle speed. (See 01–10A–26 Idle Speed Adjustment.)

   Specification
   650—750 (700±50) rpm

3. Connect the timing light to the high-tension lead of the No.1 cylinder.
4. Verify that the timing mark (yellow) on the crankshaft pulley is within the specification.
   - If not as specified, inspect the following.
     — CMP sensor
     — CKP sensor
     — TP sensor
     — ECT sensor
     — Neutral switch (MTX)
     — Clutch switch (MTX)
     — TR switch (ATX)
   - If the devices are normal, replace the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)

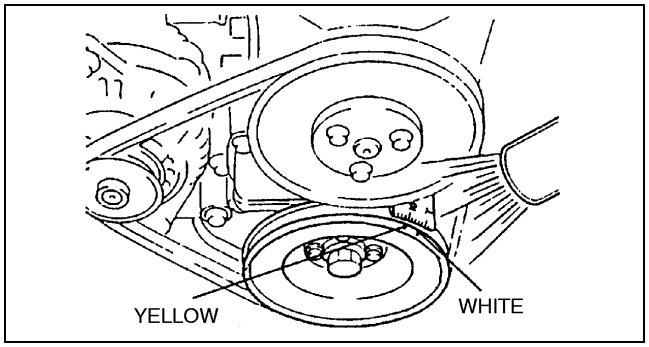
   Ignition timing
   BTDC 9°—11° (10°±1°) (TIMING MARK [YELLOW])

5. Connect the **SST** (System selector) to the DLC.
6. Set switch A to position 1.
7. Set the test switch to SELF TEST.



X3U110WC0

8. Verify that the timing mark (yellow) on the crankshaft pulley is within the specification.
   - If not as specified, inspect the following.
     — CMP sensor
     — CKP sensor
     — TP sensor
     — ECT sensor
     — Neutral switch (MTX)
     — Clutch switch (MTX)
     — TR switch (ATX)
   - If the devices are normal, replace the PCM. (See 01–40A–7 PCM REMOVAL/ INSTALLATION [ZM].)



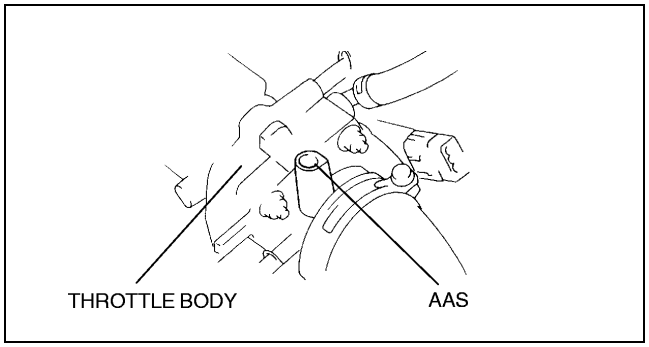
X3U110WBY

Specification
BTDC 6°—18°

Idle Speed Adjustment
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
   - If not as specified, adjust the idle speed by turning the AAS.

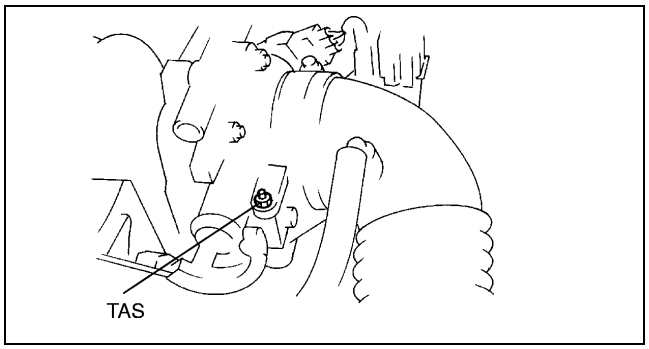
Specification
650—750 (700±50) rpm

Caution
- **The TAS is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.**



X3U110WBZ

3. Connect the **SST** (System selector) to the DLC.
4. Set switch A to position 1.
5. Set the test switch to SELF TEST.
6. Press **CLEAR** to clear previously selected items.
7. Disconnect the **SSTs**.



X3U110WC1

Idle-up Speed Inspection
1. Perform “Engine Tune-up Preparation”.
2. Connect the **SST** (System selector) to the DLC.
3. Set switch A to position 1.
4. Set the test switch to SELF TEST.
5. Verify that the idle speed is normal. (See 01–10A–26 Idle Speed Adjustment.)
6. Verify that the RPM PID is within the specification.
   - If not as specified with all load conditions, inspect the IAC valve.
   - If not as specified with some load condition, inspect the related input switches, harnesses, and connectors.

Specification

Load condition	Idle-up speed (rpm)*1
E/L ON*2	650—750
P/S operating*3	700—800
A/C ON*4	700—800

*1 : Excludes temporary idle speed drop just after the electrical loads (E/L) are turned on.

*2 : Headlight is on, Fan switch is above 1st, Cooling fan is operating, Rear window defroster is on.
*3 : Steering wheel is fully turned.
*4 : A/C switch and fan switch are on.

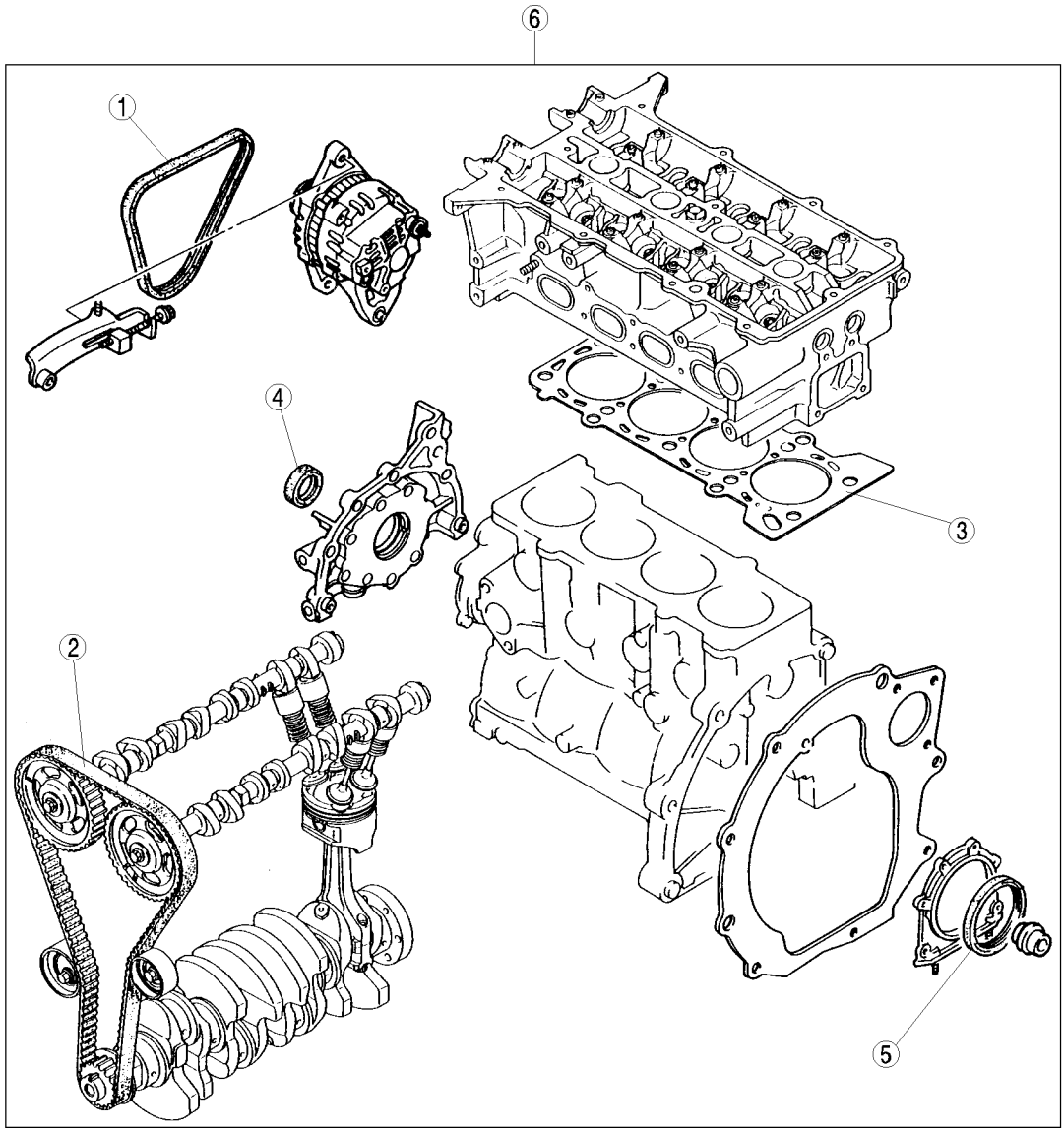
Idle Mixture Inspection

1. Perform “Engine Tune-up Preparation”.
2. Verify that the idle speed and ignition timing are within the specification. (See 01–10A–25 Ignition Timing Inspection.)(See 01–10A–26 Idle Speed Adjustment.)
3. Turn the test mode to OFF.
4. Warm up the engine by holding the engine speed at **2,500—3,000 rpm** for **approx. 3 min**.
5. Insert an exhaust gas analyzer to the tailpipe.
6. Verify that the CO and HC concentrations are within the regulation.
   - If not within the regulation, inspect the following:
     — On-board diagnostic system (See 01–02A–15 DTC TABLE [ZM].)
     — HO2S (See 01–40A–36 HEATED OXYGEN SENSOR (HO2S) INSPECTION [ZM].)
     — Intake manifold vacuum (See 01–03A–57 Intake Manifold Vacuum Inspection.)
     — Fuel line pressure (See 01–14–6 FUEL PRESSURE INSPECTION.)
     — Ignition timing control
       - If the systems and devices are normal, replace the TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)

01–10B MECHANICAL [FS]

MECHANICAL LOCATION INDEX [FS]

A3U011001002W01



Z3U0110W100

1	Drive belt (See 01–10B–3 DRIVE BELT INSPECTION [FS]) (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS])
2	Timing belt (See 01–10B–8 TIMING BELT REMOVAL/ INSTALLATION [FS])
3	Cylinder head gasket (See 01–10B–14 CYLINDER HEAD GASKET REPLACEMENT [FS])

4	Front oil seal (See 01–10B–19 FRONT OIL SEAL REPLACEMENT [FS])
5	Rear oil seal (See 01–10B–20 REAR OIL SEAL REPLACEMENT [FS])
6	Engine (See 01–10B–21 ENGINE REMOVAL/ INSTALLATION [FS]) (See 01–10B–24 ENGINE DISASSEMBLY/ ASSEMBLY [FS])

DRIVE BELT INSPECTION [FS]

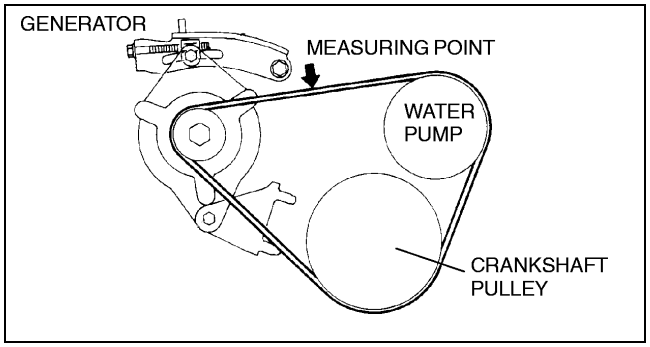
A3U011015800W01

Inspect the drive belt tension or deflection, as necessary.

Drive Belt Deflection Inspection

Note
- Inspect the drive belt deflection when the engine is cold, or **at least 30 min** after the engine has stopped.

1. Apply moderate pressure **98 N {10 kgf, 22 lbf}** midway between the specified pulleys.



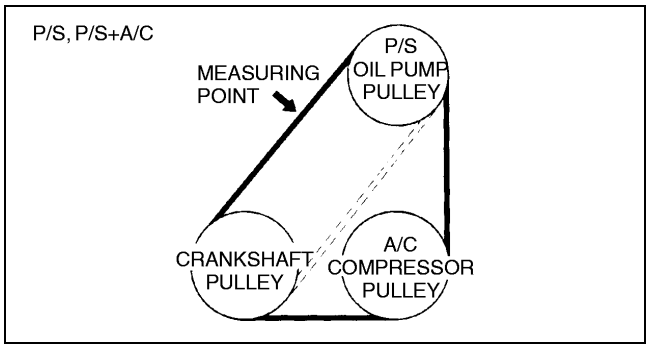
X3U110WF0

- If the deflection is not within the specification, adjust it. (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)

Deflection

mm {in}

Drive belt	Limit
Generator	10.0 {0.39}
P/S, P/S+A/C	11.0 {0.43}



X3U110WF1

Drive Belt Tension Inspection

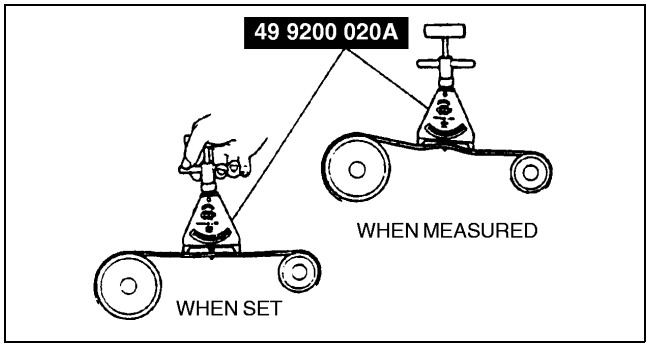
Note
- Belt tension can be inspected in place of belt deflection. Inspect the drive belt tension when the engine is cold, or **at least 30 min** after the engine has been stopped.

1. Using the **SST**, inspect the belt tension between any two pulleys.
   - If the tension is not within the specification, adjust it. (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)

Tension

N {kgf, lbf}

Drive belt	Limit
Generator	390 {40, 88}
P/S, P/S+A/C	390 {40, 88}

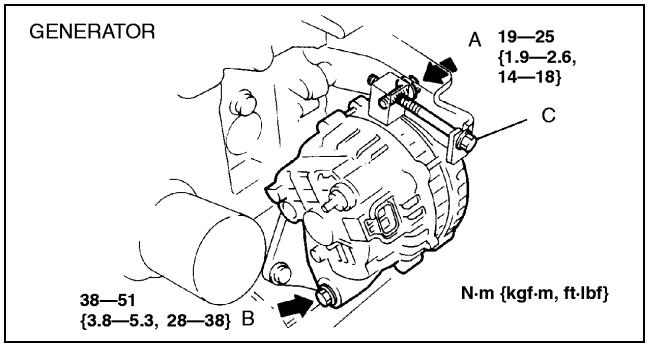


X3U110WF2

DRIVE BELT ADJUSTMENT [FS]

A3U011015800W02

1. Loosen mounting bolt A and B.

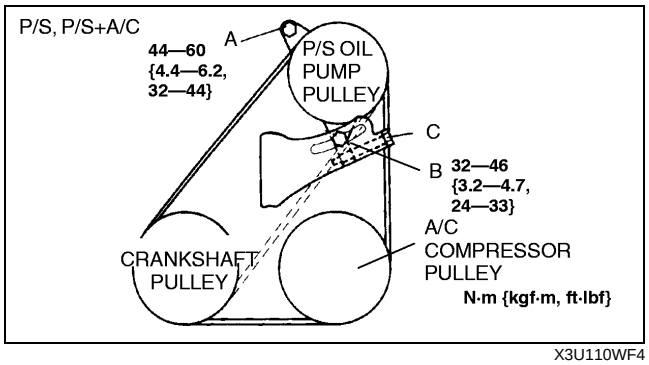


X3U110WF3

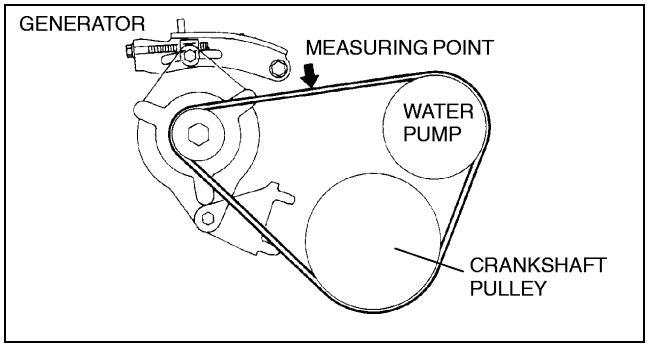
2. Adjust the belt deflection or tension by turning the adjusting bolt C.

Caution

- **If the belt is replaced with a new one or the belt has been on a running engine for less than 5 minutes, adjust deflection or tension to "New" specification.**
- **If the belt has been on a running engine for more than 5 minutes, adjust deflection or tension to "Used" specification.**



X3U110WF4

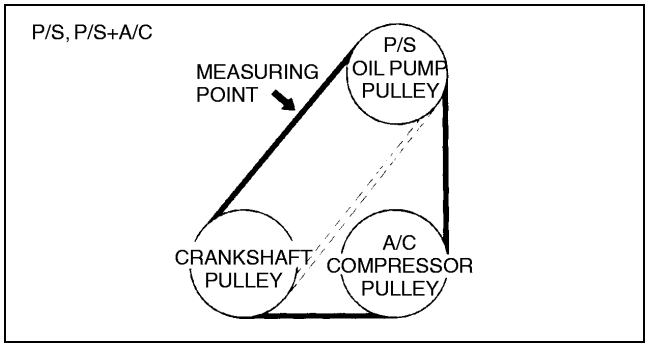


X3U110WF0

Deflection

mm {in}

Drive belt	New	Used
Generator	6.5—7.5 {0.26—0.29}	7.0—9.0 {0.28—0.35}
P/S, P/S+A/C	7.5—9.0 {0.30—0.35}	8.0—9.5 {0.32—0.37}

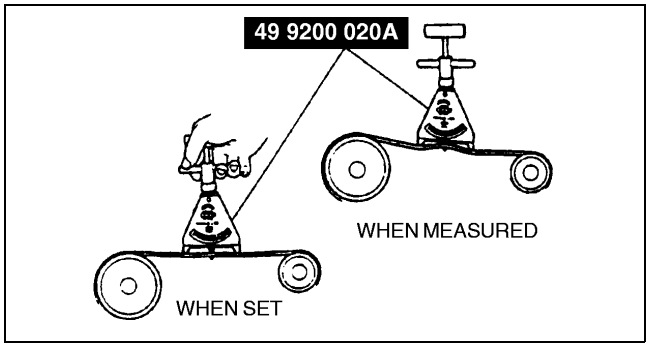


X3U110WF1

Tension

N {kgf, lbf}

Drive belt	New	Used
Generator	690—830 {70—85, 160—180}	500—680 {50—70, 110—150}
P/S, P/S+A/C	590—780 {60—80, 140—170}	500—680 {50—70, 110—150}



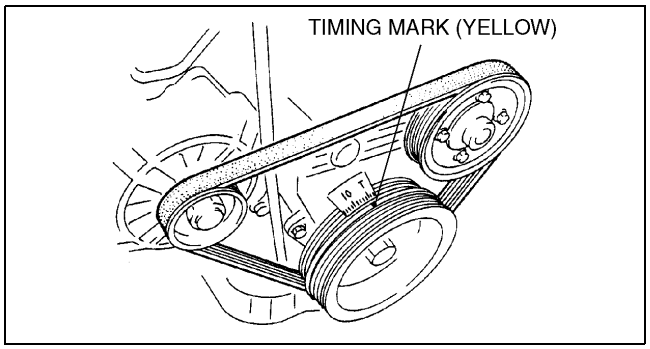
X3U110WF2

3. Tighten mounting bolt A and B.
4. Inspect the belt deflection or tension.
   - If not as specified, repeat from Step 1.

VALVE CLEARANCE INSPECTION [FS]

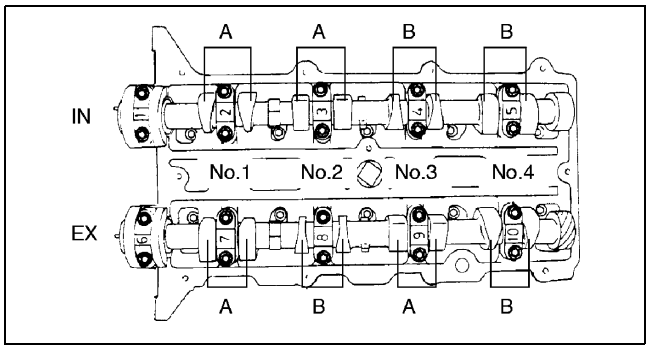
A3U011012010W01

1. Remove the cylinder head cover. (See 01–10B–10 Cylinder Head Cover Removal Note.)
2. Verify that the engine is in cold condition.
3. Measure the valve clearance.
   (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.



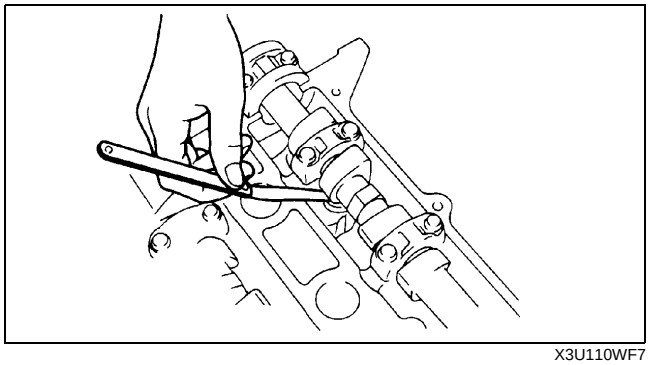
Y3U110WAC

   (2) Measure the valve clearance at A in the figure.



X3U110WF6

   - If the valve clearance exceeds the standard, replace the adjustment shim. (See 01–10B–6 VALVE CLEARANCE ADJUSTMENT [FS].)



X3U110WF7

Standard [Engine cold]
IN: 0.225—0.295 mm {0.0089—0.0116 in} (0.26±0.035 mm {0.010±0.001 in})
EX: 0.225—0.295 mm {0.0089—0.0116 in} (0.26±0.035 mm {0.010±0.001 in})

   (3) Turn the crankshaft **360°** clockwise so that the No.4 piston is at TDC of the compression stroke.
   (4) Measure the valve clearance at B in the figure.
   - If the valve clearance exceeds the standard, replace the adjustment shim. (See 01–10B–6 VALVE CLEARANCE ADJUSTMENT [FS].)

Standard [Engine cold]
IN: 0.225—0.295 mm {0.0089—0.0116 in} (0.26±0.035 mm {0.010±0.001 in})
EX: 0.225—0.295 mm {0.0089—0.0116 in} (0.26±0.035 mm {0.010±0.001 in})

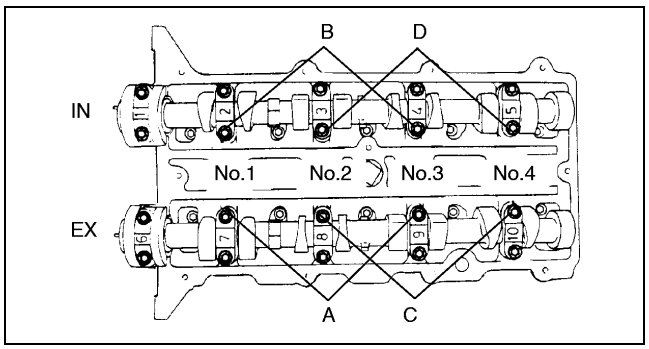
4. Install the cylinder head cover. (See 01–10B–13 Cylinder Head Cover Installation Note.)

VALVE CLEARANCE ADJUSTMENT [FS]

A3U011012010W02

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 as necessary.

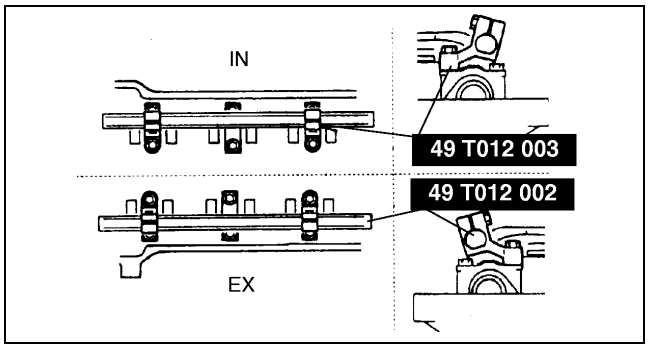


X3U110WF8

Note
- Remove only one pair of cap bolts at a time.
- Reinstall the cap bolts before removing the next pair.
  - — A: For EX side No.1, 2, 3 cylinder adjustment shim removal.
  - — B: For IN side No.1, 2, 3 cylinder adjustment shim removal.
  - — C: For EX side No.2, 3, 4 cylinder adjustment shim removal.
  - — D: For IN side No.2, 3, 4 cylinder adjustment shim removal.

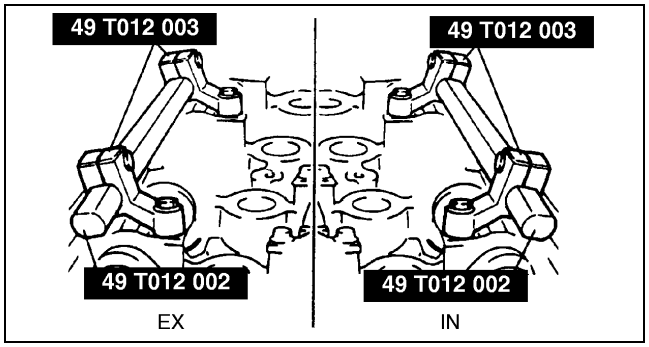
Note
- For EX side No.2, 3 cylinder adjustment shim removal, remove bolts either A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove bolts either B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.



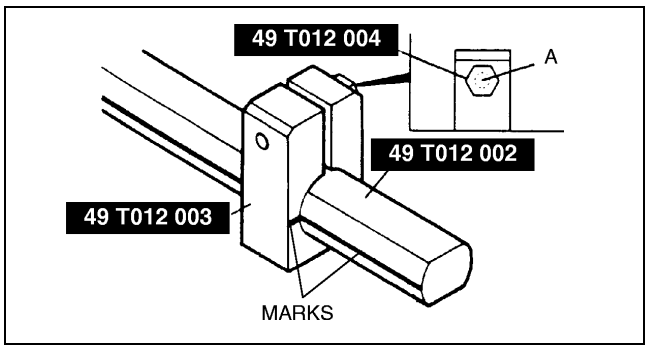
X3U110WF9

Tightening torque
11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}



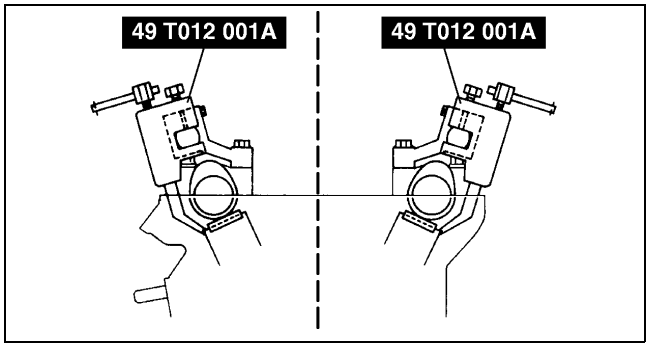
X3U110WFA

4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts A to secure the **SST** (shaft).



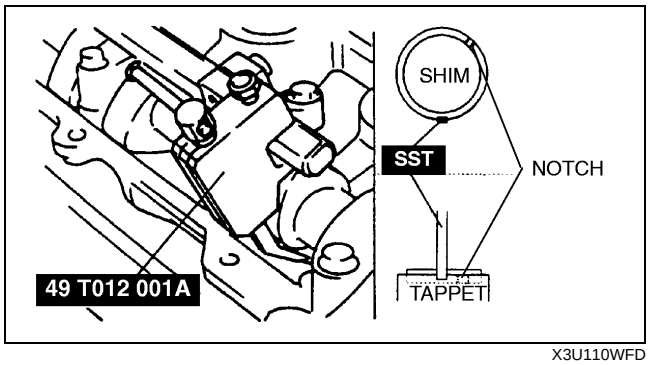
X3U110WFB

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.



X3U110WFC

7. Face the notch of the tappet so that a fine screwdriver can be inserted.
8. Set the **SST** on the tappet by its notch.

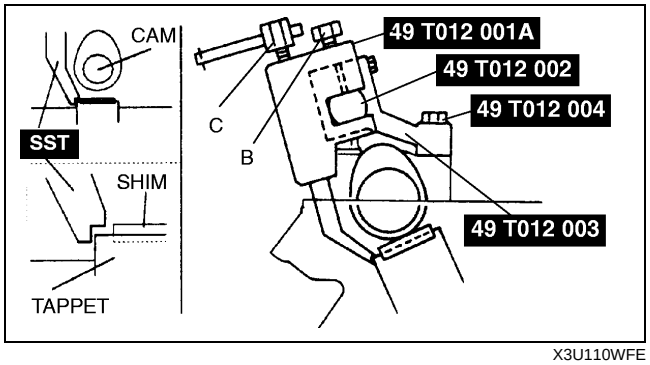


X3U110WFD

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.

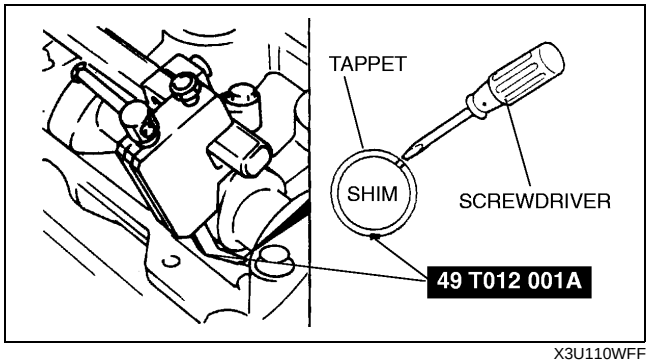


X3U110WFE

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.



X3U110WFF

    Tightening torque
    11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}

17. Verify the valve clearance. (See 01–10B–5 VALVE CLEARANCE INSPECTION [FS].)

COMPRESSION INSPECTION [FS]

A3U011002000W01

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

1. Verify that the battery is fully charged.
   - Recharge it if necessary. (See 01–17–1 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 min**.
4. Perform “Fuel Line Safety Procedures”. Leave the fuel pump relay removed. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
5. Remove the ignition coils. (See 01–18–1 IGNITION COIL REMOVAL/INSTALLATION.)
6. Remove the spark plugs.
7. Connect a compression gauge into the No.1 spark plug hole.
8. Fully depress the accelerator pedal and crank the engine.
9. Note the maximum gauge reading.
10. Inspect each cylinder as 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 recheck the compression.
      — If the compression increases, the piston, the piston rings, or cylinder wall may be worn and overhaul is required.
      — If the compression stays low, a valve may be stuck or improperly seated and overhaul is required.
      — If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head distorted and overhaul is required.

Compression

kPa {kgf/cm^2, psi} [rpm]

Item	Engine type
	FS
Standard	1,177 {12.0, 171} [300]
Minimum	824 {8.4, 119} [300]
Maximum difference between cylinders	196 {2.0, 28}

1. Disconnect the compression gauge.
2. Install the spark plugs.

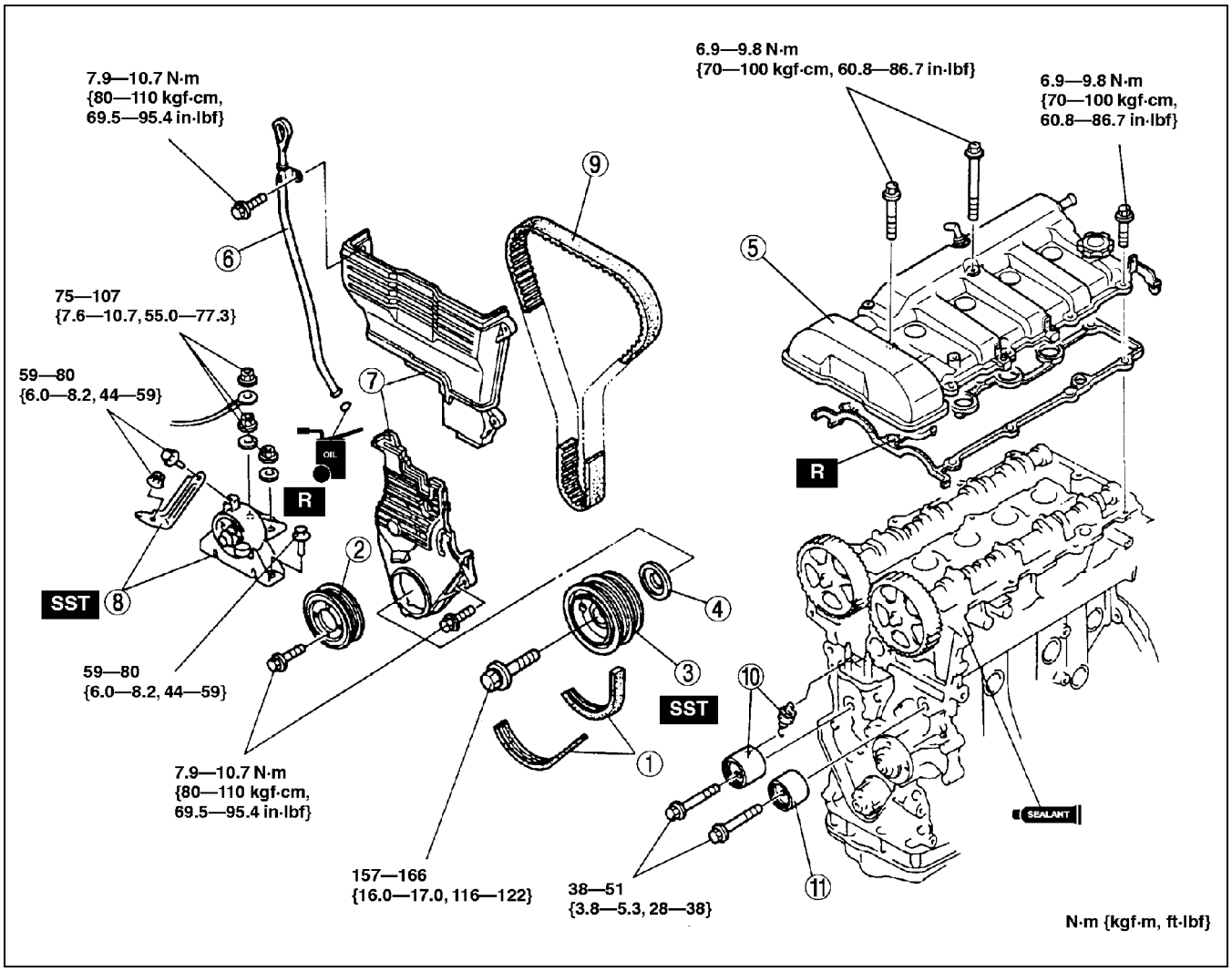
Tightening torque
15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

3. Connect the ignition coil connector.
4. Install the fuel pump relay.

TIMING BELT REMOVAL/INSTALLATION [FS]

A3U011012040W01

1. Disconnect the negative battery cable.
2. Remove the CMP sensor and CKP sensor. (See 01–40B–34 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [FS].) (See 01–40B–34 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION [FS].)
3. Remove the ignition coils. (See 01–18–1 IGNITION COIL REMOVAL/INSTALLATION.)
4. Remove the spark plug.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Inspect the air gap. (See 01–40B–32 Air Gap Inspection.)
8. Adjust the drive belt deflection/tension. (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)
9. Start the engine and:
   (1) Inspect the pulleys and drive belt for runout and contact.
   (2) Inspect the ignition timing. (See 01–10B–25 Ignition Timing Inspection.)



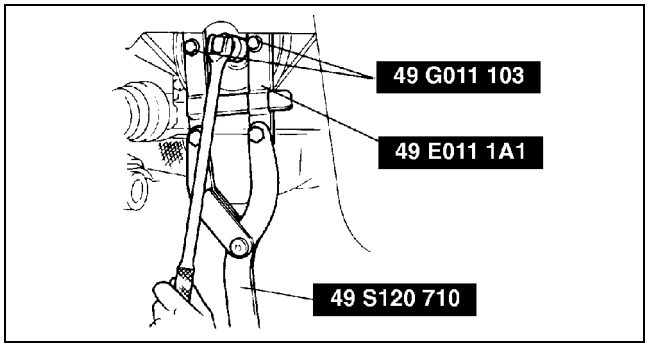
Y3U110WAD

1	Drive belt (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS])
2	Water pump pulley (See 01–10B–14 Water Pump Pulley Installation Note)
3	Crankshaft pulley (See 01–10B–10 Crankshaft Pulley Removal Note) (See 01–10B–14 Crankshaft Pulley Installation Note)
4	Guide plate
5	Cylinder head cover (See 01–10B–10 Cylinder Head Cover Removal Note) (See 01–10B–13 Cylinder Head Cover Installation Note)
6	Dipstick and pipe

7	Timing belt cover
8	No.3 Engine mount rubber (See 01–10B–10 No.3 Engine Mount Rubber Removal Note)
9	Timing belt (See 01–10B–10 Timing Belt Removal Note) (See 01–10B–12 Timing Belt Installation Note)
10	Tensioner, tensioner spring (See 01–10B–11 Tensioner, Tensioner Spring Installation Note)
11	Idler

Crankshaft Pulley Removal Note

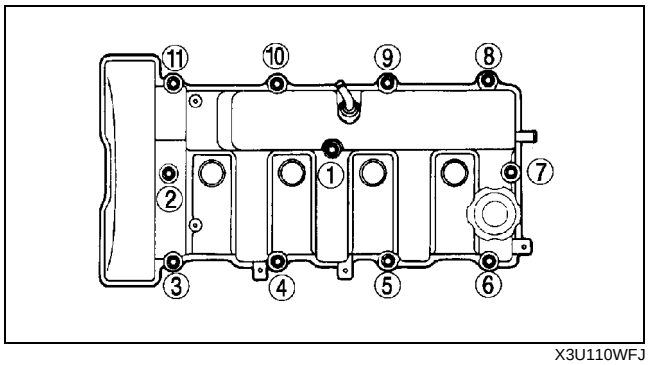
1. Remove the crankshaft using the **SST**.



X3U110WFH

Cylinder Head Cover Removal Note

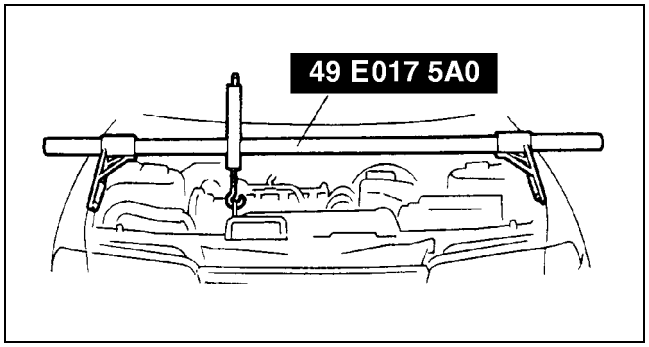
1. Remove the cylinder head cover bolts a few turns in the order shown.



X3U110WFJ

No.3 Engine Mount Rubber Removal Note

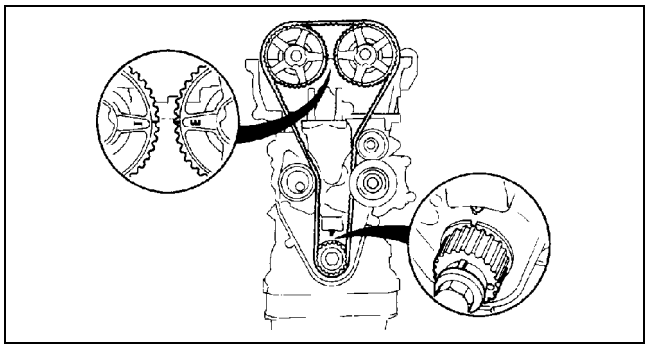
1. Suspend the engine using the **SST**.



Z3U110WFK

Timing Belt Removal Note

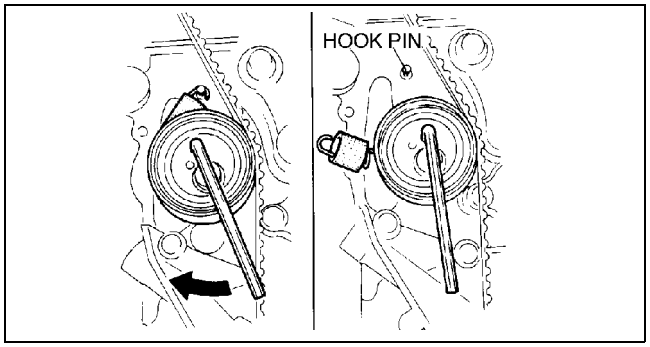
1. Install the pulley lock bolt.
2. Turn the crankshaft clockwise and align the timing marks.



X3U110WFL

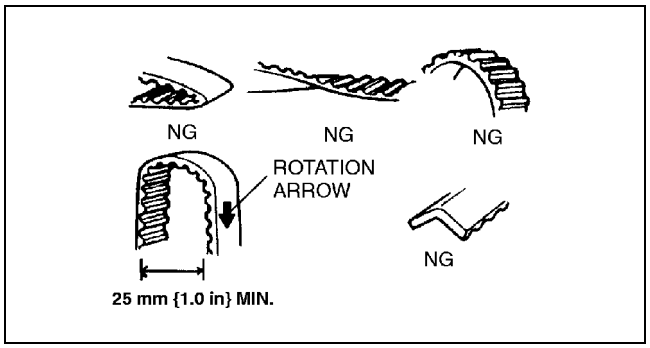
3. Turn the tensioner clockwise using an Allen wrench.
4. Disconnect the tensioner spring from the hook pin.

Caution
- **Forcefully twisting the timing belt turning it inside out, or allowing oil or grease on it will damage the belt and shorten its life.**



X3U110WFM

Note
- Mark the timing belt rotation on the belt for proper reinstallation.



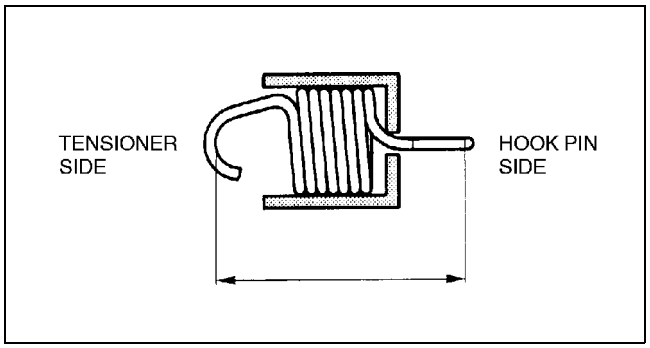
X3U110WFN

Tensioner, Tensioner Spring Installation Note

1. Measure the tensioner spring free length.
   - If not within the specification, replace the tensioner spring.

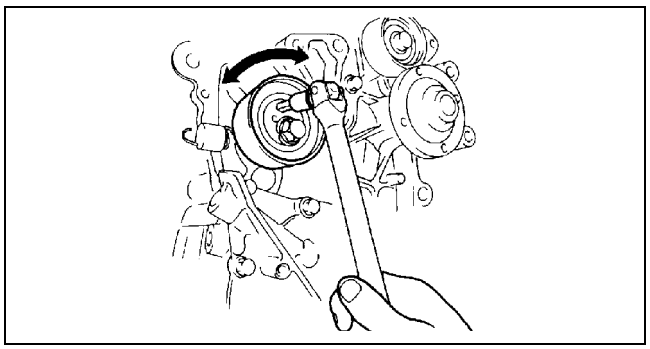
Free length
36.6 mm {1.44 in}

2. Install the tensioner.



X3U110WFP

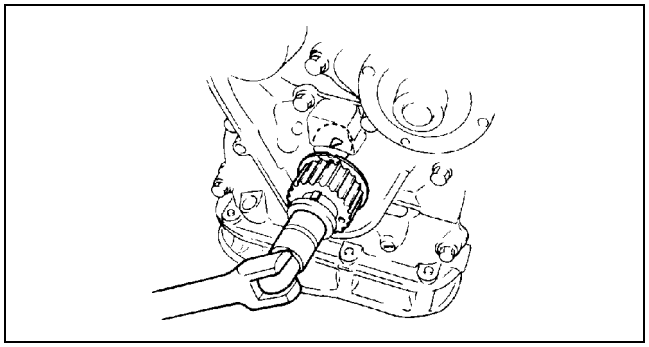
3. Rotate the tensioner.
   - If tensioner rotates with no resistance or does not rotate, replace the tensioner.



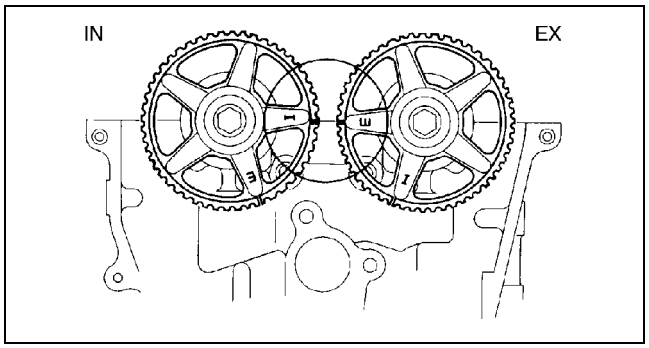
X3U110WFQ

Timing Belt Installation Note

1. Verify that the timing belt pulley mark and camshaft pulley marks are aligned with the timing marks as shown.

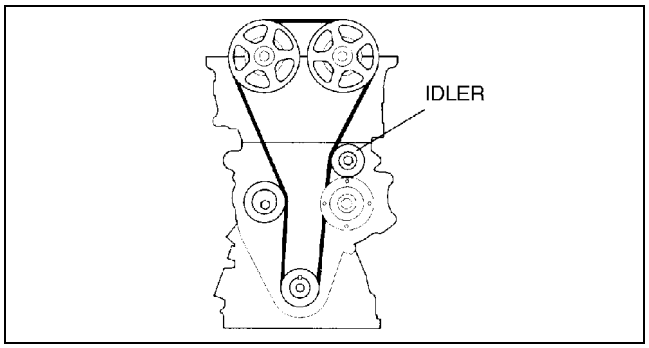


X3U110WFR



X3U110WFS

2. Install the timing belt so that there is no looseness at the idler side.

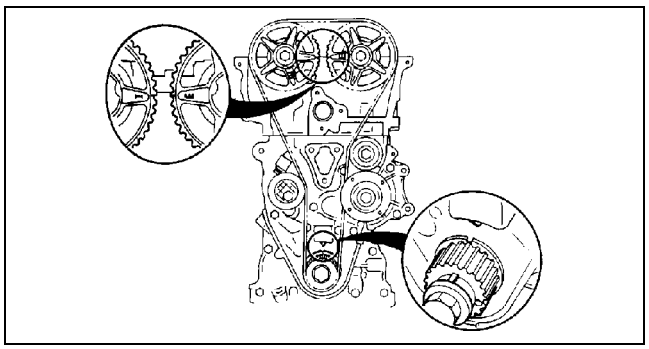


X3U110WFT

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.

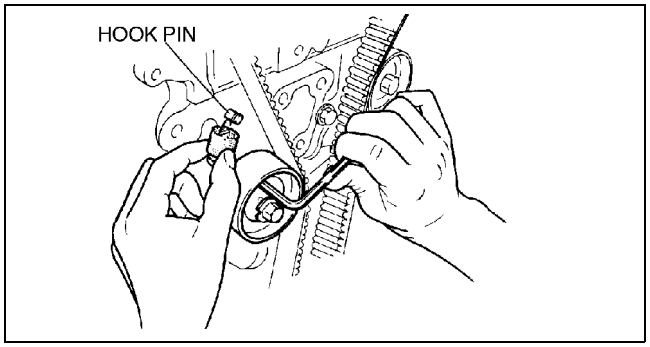
   Caution
   - **Be sure not to apply tension other than that of the tensioner spring.**

5. Turn the tensioner clockwise using an Allen wrench.



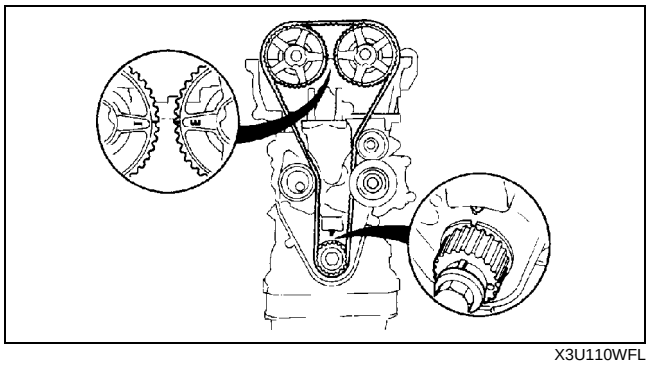
X3U110WFU

6. Connect the tensioner to the hook pin.



X3U110WFV

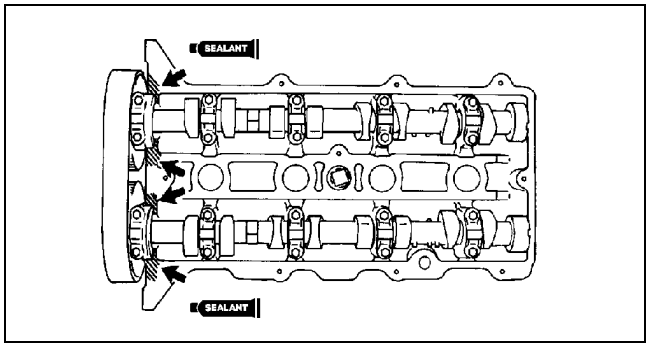
7. Turn the crankshaft clockwise twice, and verify that all timing marks are aligned.
   - If not aligned, repeat from Step 1.



X3U110WFL

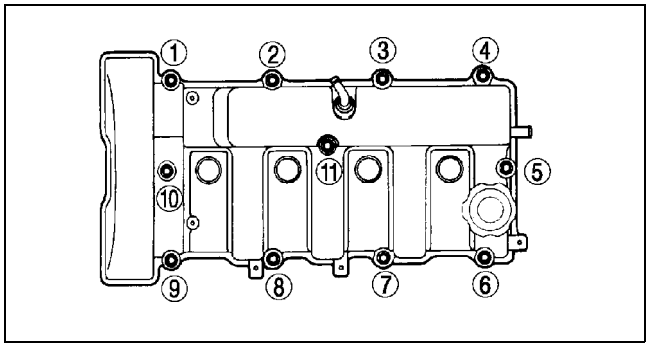
Cylinder Head Cover Installation Note

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.



Z3U110WFW

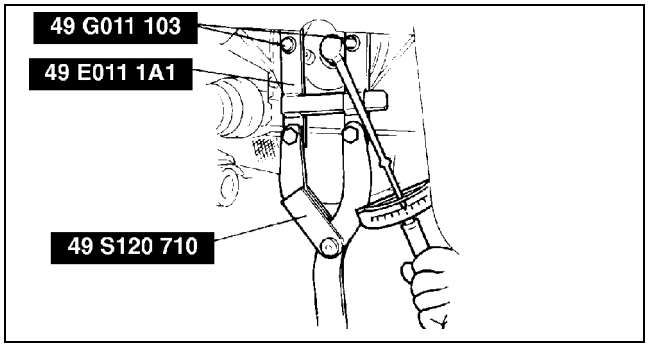
4. Tighten the cylinder head cover bolts a few turns in the order shown.



X3U110WFX

Crankshaft Pulley Installation Note

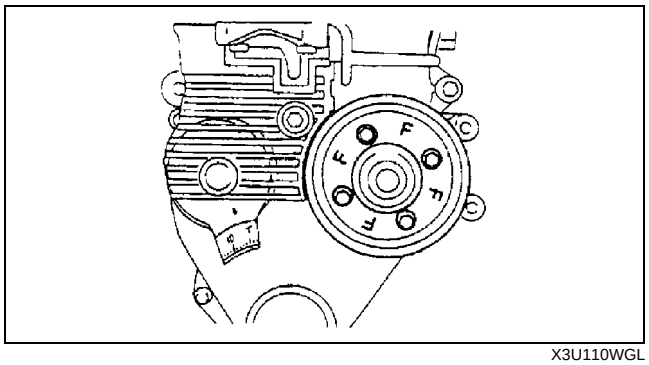
1. Install the crankshaft using the **SST**.



X3U110WFY

Water Pump Pulley Installation Note

1. Install the water pump pulley by facing the “F” marks outward.



X3U110WGL

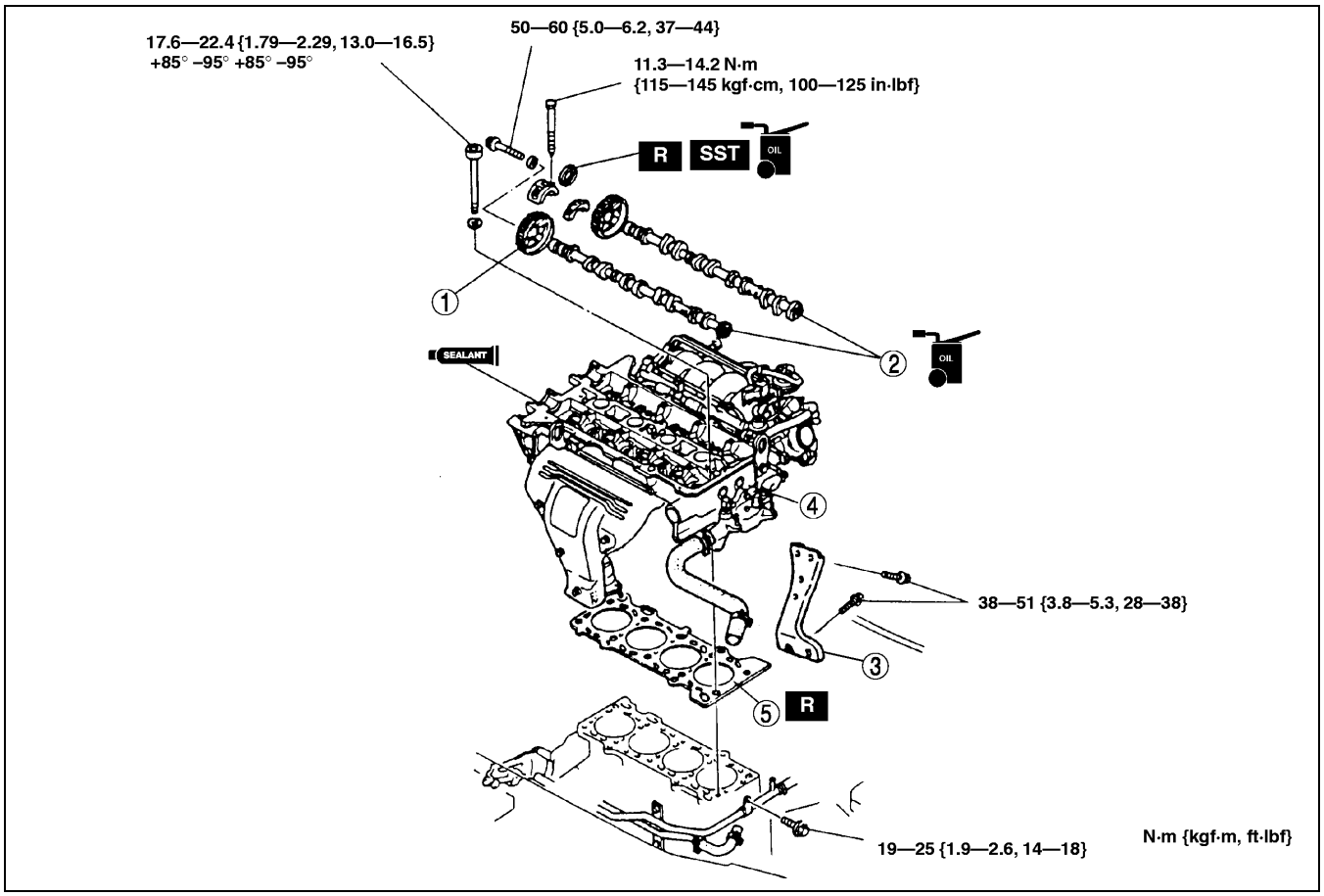
CYLINDER HEAD GASKET REPLACEMENT [FS]

A3U011010271W01

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 01–14–4 BEFORE REPAIR PROCEDURE.)**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the timing belt. (See 01–10B–8 TIMING BELT REMOVAL/INSTALLATION [FS].)
4. Remove the front pipe. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
5. Remove the air cleaner.
6. Remove the P/S oil pump and bracket with the oil hose still connected.
7. Remove the accelerator cable. (See 01–13B–17 ACCELERATOR CABLE ADJUSTMENT [FS].)
8. Disconnect the fuel hose. (See 01–14–4 BEFORE REPAIR PROCEDURE.) (See 01–14–4 BEFORE REPAIR PROCEDURE.)
9. Remove in the order indicated in table.
10. Install in the reverse order of removal.
11. Inspect the engine oil level. (See 01–11–2 ENGINE OIL INSPECTION.)
12. Inspect for the engine oil, engine coolant, and fuel leakage.
13. Inspect the compression. (See 01–10B–8 COMPRESSION INSPECTION [FS].)
14. Start the engine and:
    (1) Inspect the pulleys and the drive belt for runout and contact.
    (2) Inspect the ignition timing. (See 01–10B–25 Ignition Timing Inspection.)
    (3) Inspect the idle speed. (See 01–10B–26 Idle Speed Adjustment.)

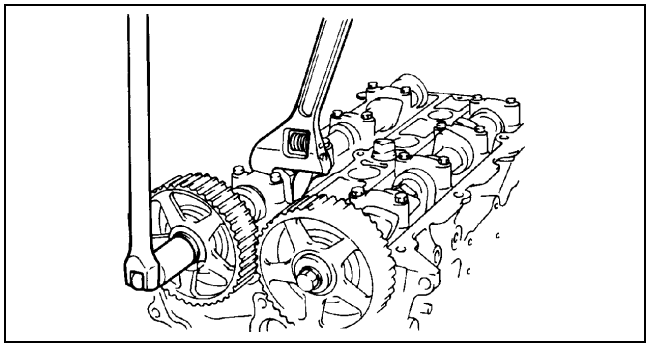


Y3U110WA6

1	Camshaft pulley (See 01–10B–15 Camshaft Pulley Removal Note) (See 01–10B–18 Camshaft Pulley Installation Note)
2	Camshaft (See 01–10B–16 Camshaft Removal Note) (See 01–10B–17 Camshaft Installation Note)
3	Intake manifold bracket
4	Cylinder head (See 01–10B–16 Cylinder Head Removal Note) (See 01–10B–16 Cylinder Head Installation Note)
5	Cylinder head gasket

Camshaft Pulley Removal Note

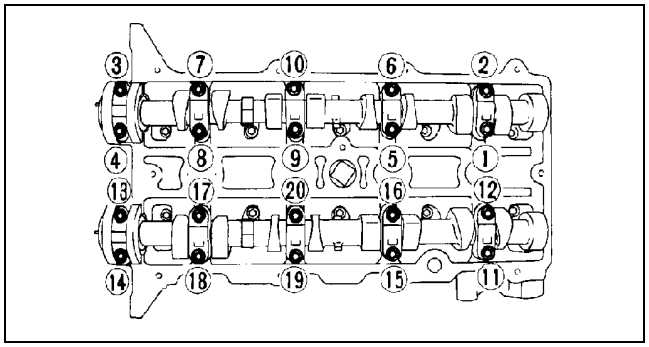
1. Hold the camshaft using a wrench on the cast hexagon as shown.



X3U110WG0

Camshaft Removal Note

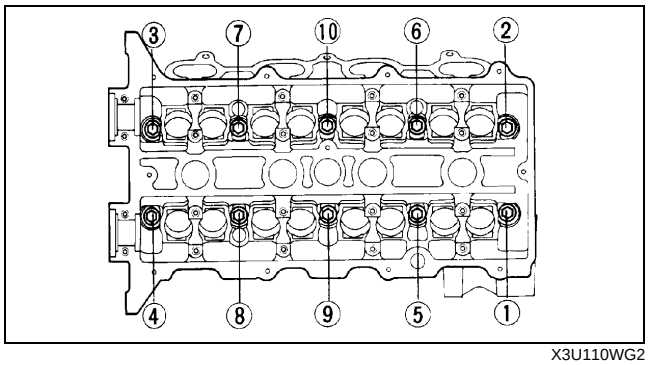
1. Loosen the camshaft cap bolts a few turns in the order shown.



Z3U110WG1

Cylinder Head Removal Note

1. Loloosen the cylinder head bolts a few turns in the order shown.

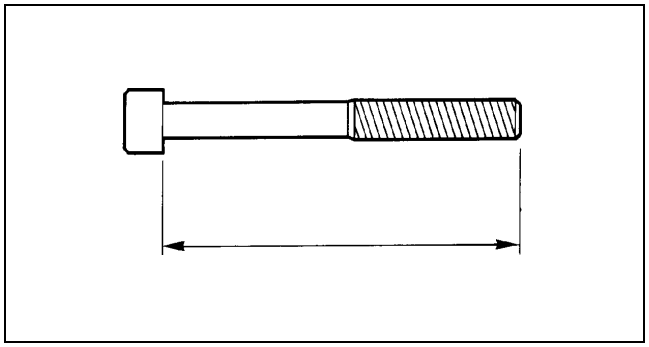


X3U110WG2

Cylinder Head Installation Note

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

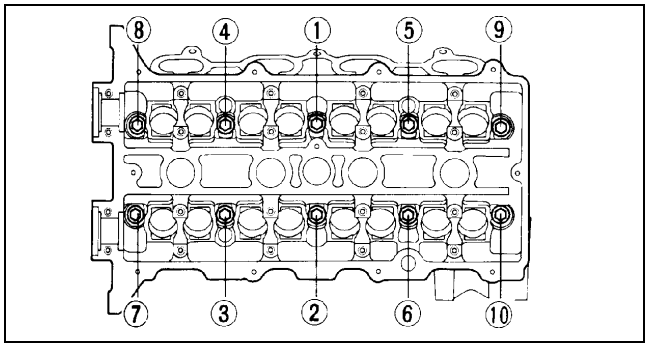
   Standard length
   104.2—104.8 mm {4.103—4.125 in}
   Maximum length
   105.5 mm {4.153 in}



X3U110WG3

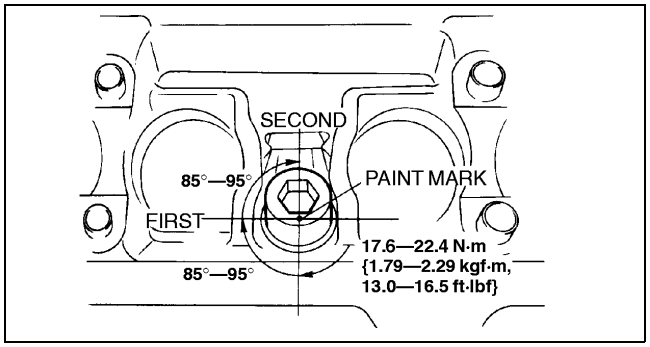
2. Tighten the cylinder head bolts a few turns in the order shown.

   Tightening torque
   17.5—22.5 N·m {1.79—2.29 kgf·m, 13.0—16.5 ft·lbf}



X3U110WG4

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.



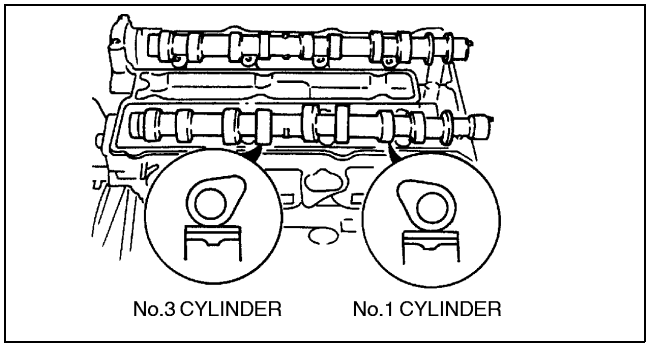
Y3U110WA7

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 camshaft onto the cylinder head, facing the cam noses at No.1 and No.3 cylinders as shown.



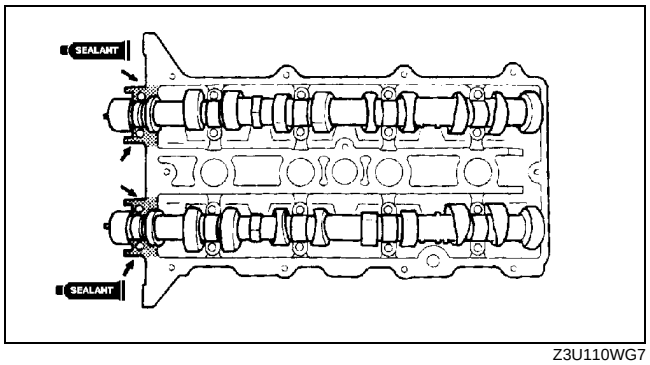
X3U110WG6

2. Apply silicone sealant to the areas shown.

Note

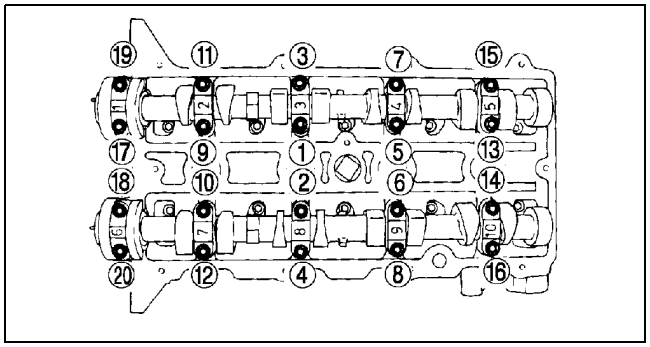
- Keep the camshaft sliding surface free of sealant to prevent engine damage.

3. Apply engine oil to the camshaft and the cylinder head journals.
4. Install the camshaft caps to the positions from which they were removed.



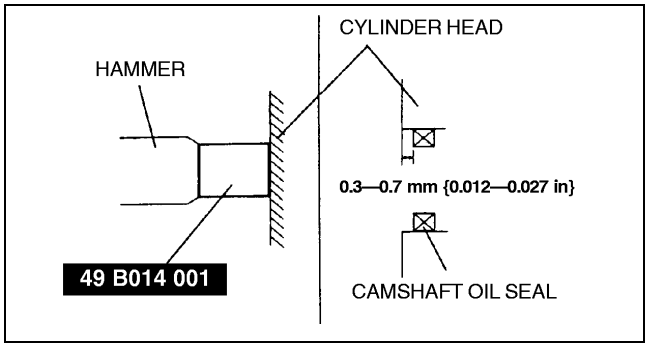
Z3U110WG7

5. Hand tighten the camshaft cap bolts marked 5, 7, 2, and 4.
6. Tighten the camshaft cap bolts a few turns in the order shown.
7. Verify that the camshaft settles horizontally when 2 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.



Z3U110WG8

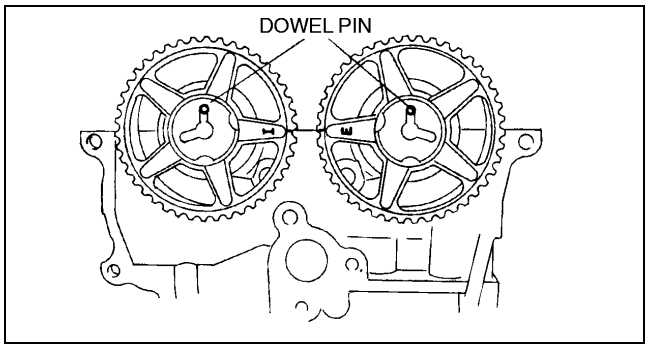
10. Tap the oil seals in evenly using the **SST** and a hammer.



X3U110WG9

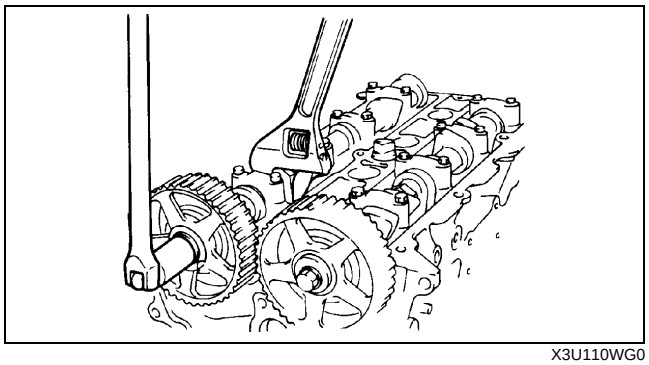
Camshaft Pulley Installation Note

1. Install the camshaft pulleys, positioning the dowel pins as shown.



X3U110WGA

2. Hold the camshaft using a wrench on the cast hexagon as shown.


X3U110WG0

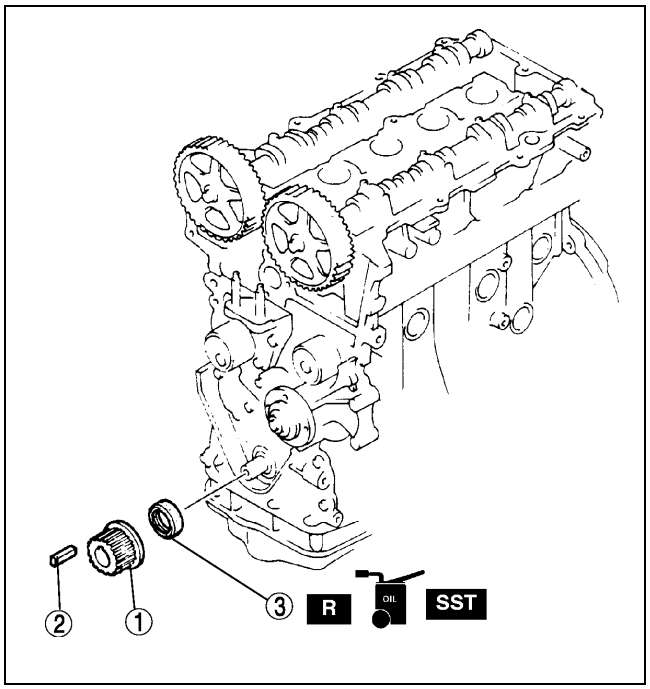
FRONT OIL SEAL REPLACEMENT [FS]

A3U011010602W01

1. Disconnect the negative battery cable.
2. Remove the timing belt. (See 01–10B–8 TIMING BELT REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.

1	Timing belt pulley
2	Key
3	Front oil seal (See 01–10B–19 Front Oil Seal Removal Note) (See 01–10B–19 Front Oil Seal Installation Note)

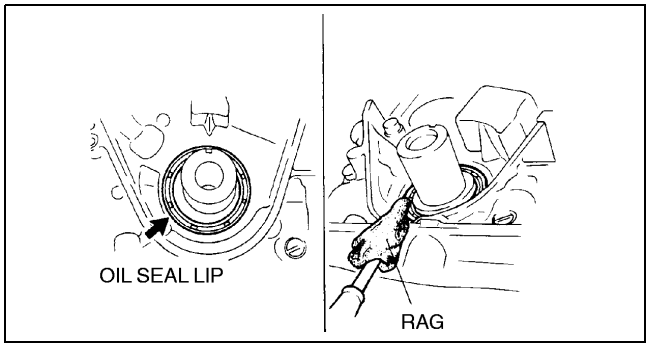
4. Install in the reverse order of removal.



X3U110WGB

Front Oil Seal Removal Note

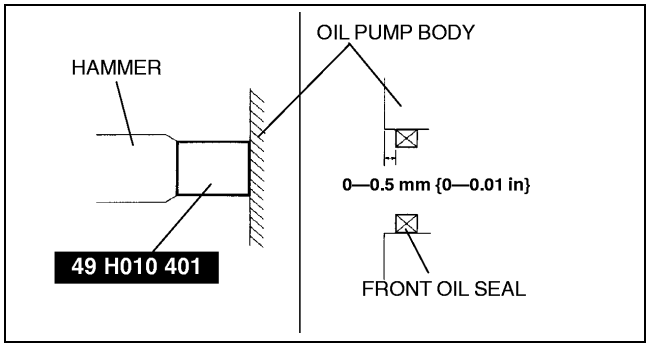
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



X3U110WGC

Front Oil Seal Installation Note

1. Apply clean engine oil to the 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.



Y3U110WA8

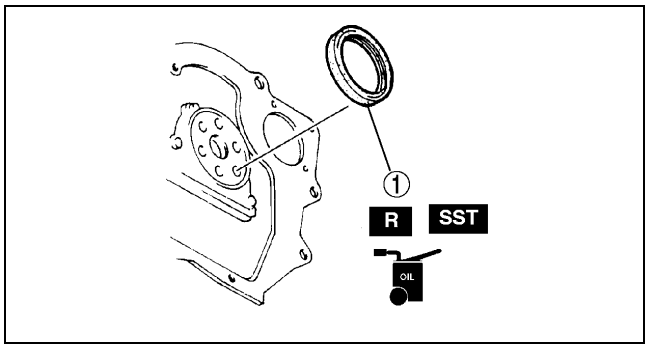
REAR OIL SEAL REPLACEMENT [FS]

A3U011011399W01

1. Remove the flywheel. (MTX) (See 05–10–11 CLUTCH UNIT REMOVAL/INSTALLATION.)
2. Remove the drive plate. (ATX) (See 05–17–46 DRIVE PLATE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Rear oil seal (See 01–10B–20 Rear Oil Seal Removal Note) (See 01–10B–20 Rear Oil Seal Installation Note)

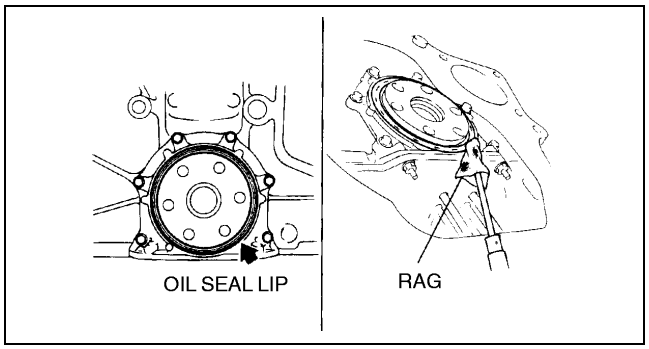
4. Install in the reverse order of removal.



X3U110WGE

Rear Oil Seal Removal Note

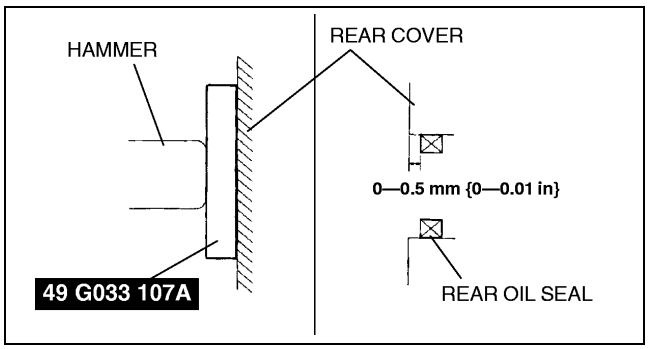
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



X3U110WGF

Rear Oil Seal Installation Note

1. Apply clean engine oil to the 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.



Y3U110WA9

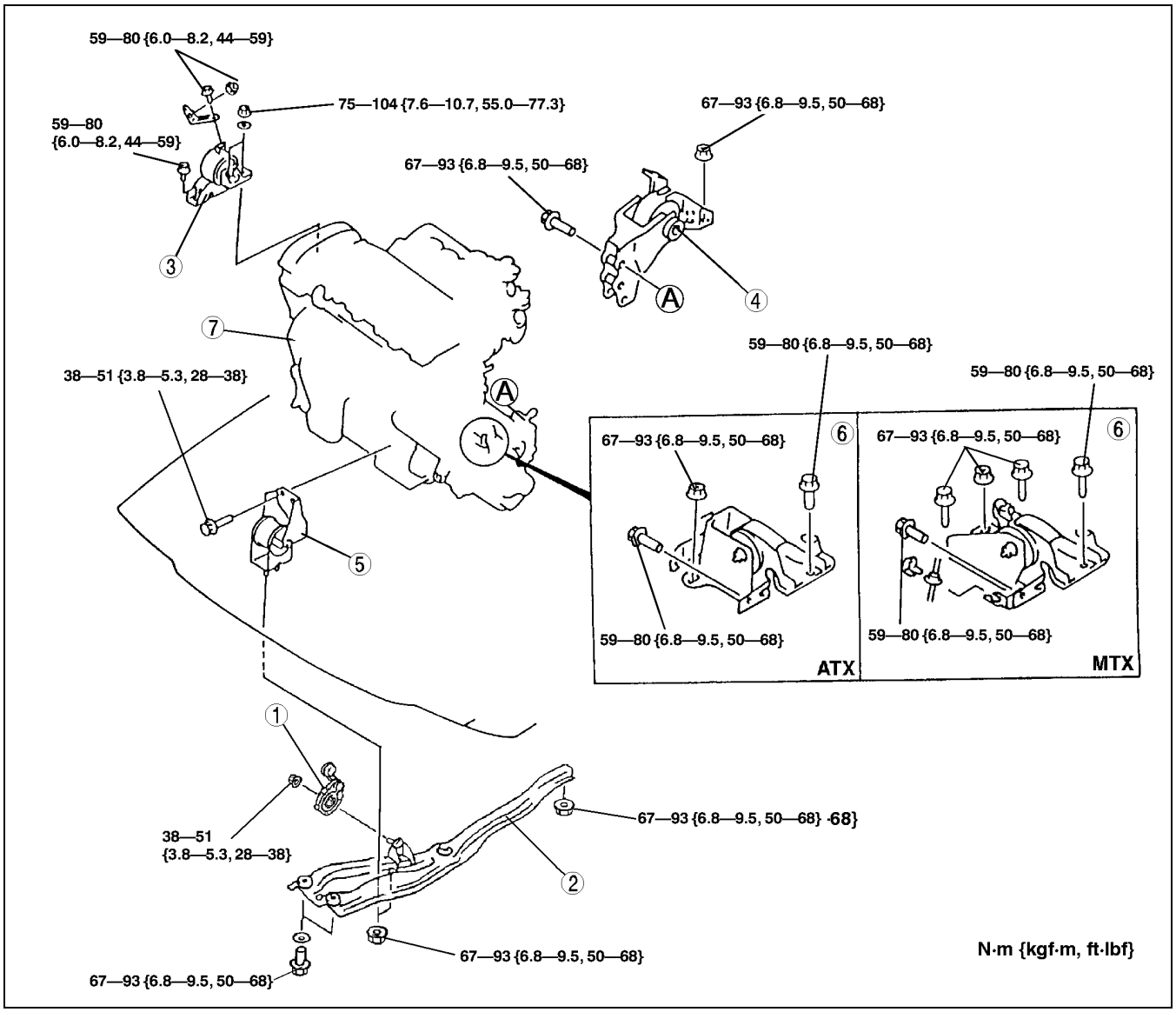
ENGINE REMOVAL/INSTALLATION [FS]

A3U011002000W02

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".**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the radiator. (See 01–12–4 RADIATOR REMOVAL/INSTALLATION.)
4. Remove the air cleaner.
5. Remove the accelerator cable. (See 01–13B–17 ACCELERATOR CABLE INSPECTION [FS].) (See 01–13B–17 ACCELERATOR CABLE ADJUSTMENT [FS].)
6. Disconnect the fuel hose. (See 01–14–4 BEFORE REPAIR PROCEDURE.) (See 01–14–5 AFTER REPAIR PROCEDURE.)
7. Remove the front pipe. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
8. Remove the rods, cables and pipes related to the transaxle.
9. Remove the battery.
10. Remove the fuse box.
11. 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.
12. Remove the A/C compressor with the pipe still connected. position the A/C compressor so that it is out of the way.
13. Remove the drive shaft. (See 03–13–9 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) Inspect the ignition timing, idle speed and idle mixture. (See 01–10B–25 Ignition Timing Inspection.) (See 01–10B–26 Idle Speed Adjustment.) (See 01–10B–26 Idle Mixture Inspection.)
17. Perform a road test.

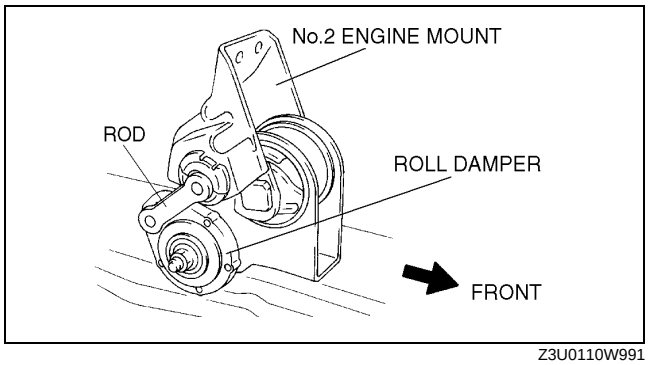


Z3U0110W997

1	Roll damper
2	Engine mount member
3	No.3 Engine mount (See 01–10B–23 No.3, No.4 Engine Mount Installation Note)
4	No.1 Engine mount
5	No.2 Engine mount
6	No.4 Engine mount (See 01–10B–23 No.3, No.4 Engine Mount Installation Note)
7	Engine, transaxle

Roll damper Installation Note

1. Assemble the rod and roll damper as shown in the figure.

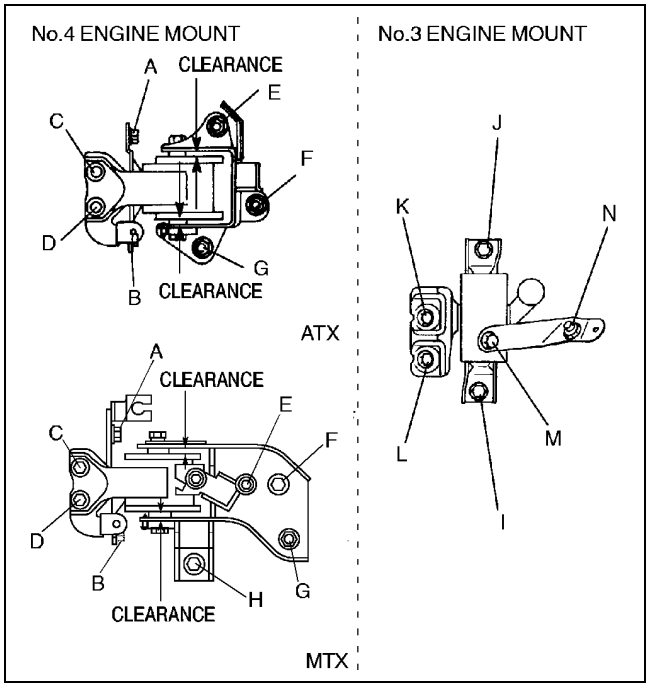


Z3U0110W991

No.3, No.4 Engine Mount Installation Note

1. Hand tighten the No.3 and No.4 engine mount rubber bolts and nuts (A—M).
2. Tighten the No.4 engine mount rubber bolts and nuts (A—H).
3. Tighten the No.3 engine mount rubber bolts and nuts (I—N)
4. Measure the No.4 engine mount rubber clearance.
   - If not within the specification, repeat from step 1.

Standard clearance
3.0—4.0 mm {0.12—0.15 in}

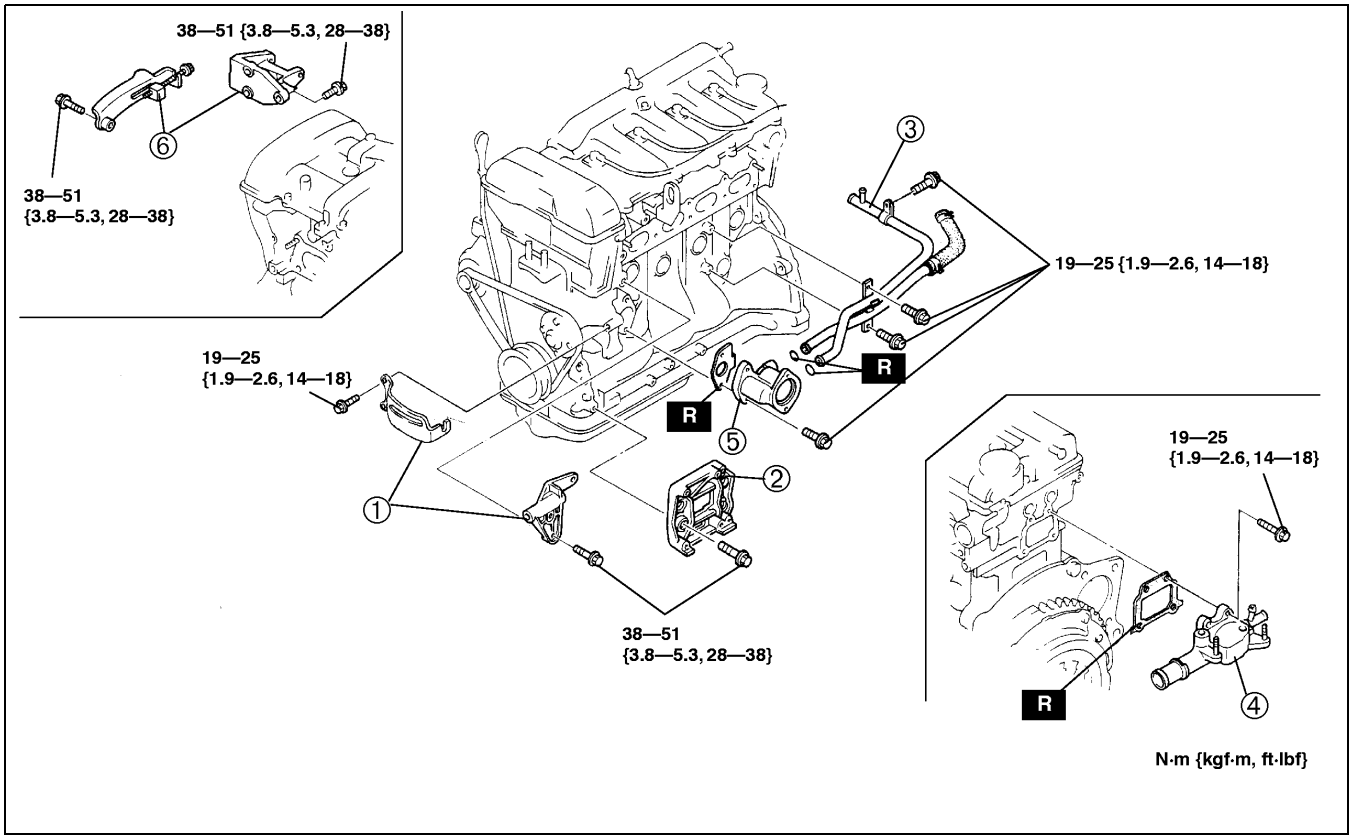


Z3U0110W996

ENGINE DISASSEMBLY/ASSEMBLY [FS]

A3U011002000W03

1. Disconnect the engine and transaxle. (See 05–15B–4 MANUAL TRANSAXLE (MTX) REMOVAL/ INSTALLATION [G15M-R].) (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
2. Remove the intake-air system. (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the exhaust system. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
4. Remove the oil filter. (See 01–11–3 OIL FILTER REPLACEMENT.)
5. Remove the thermostat. (See 01–12–5 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.



X3U110WGK

1	P/S oil pump bracket
2	A/C compressor bracket
3	Water bypass pipe

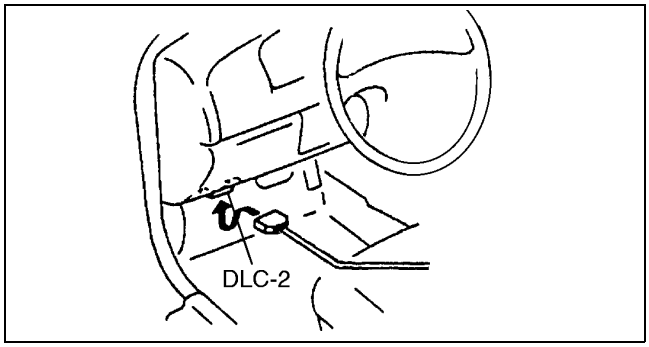
4	Water outlet
5	Thermostat housing
6	Generator bracket

ENGINE TUNE-UP [FS]

A3U011002000W04

Engine Tune-up Preparation

1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into neutral.
3. Turn off all electrical loads.
   - Headlight switch
   - Fan switch
   - Rear window defroster switch
   - A/C switch
4. Verify that the steering wheel is at straight ahead position.
5. Connect the **SSTs** (WDS or equivalent) to the DLC-2.
6. Access RPM PID.
7. Wait until the electrical fan stops.



Z3U110WA5

Ignition Timing Inspection

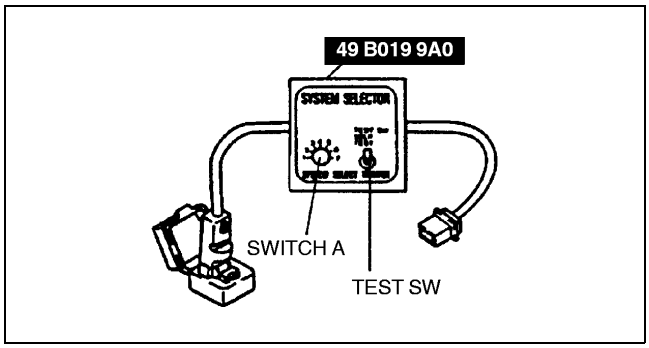
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
   - If not as specified, adjust the idle speed. (See 01–10B–26 Idle Speed Adjustment.)

   Specification
   650—750 (700±50) rpm

3. Connect the timing light to the high-tension lead of the No.1 cylinder.
4. Verify that the timing mark (yellow) on the crankshaft pulley is within the specification.
   - If not as specified, inspect following.
     — CMP sensor
     — CKP sensor
     — TP sensor
     — ECT sensor
     — Neutral switch (MTX)
     — Clutch switch (MTX)
     — TR switch (ATX)
   - If the devices are normal, replace the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)

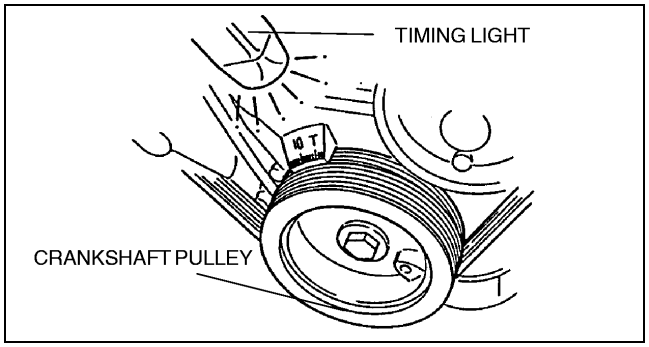
   Ignition timing
   BTDC 9°—11° (10°±1°) (TIMING MARK [YELLOW])

5. Connect the **SST** (System selector) to the DLC.
6. Set switch A to position 1.
7. Set the test switch to SELF TEST.



X3U110WGQ

8. Verify that the timing mark (yellow) on the crankshaft pulley is within the specification.
   - If not as specified, inspect the following.
     — CMP sensor
     — CKP sensor
     — TP sensor
     — ECT sensor
     — Neutral switch (MTX)
     — Clutch switch (MTX)
     — TR switch (ATX)
   - If the devices are normal, replace the PCM. (See 01–40B–7 PCM REMOVAL/ INSTALLATION [FS].)



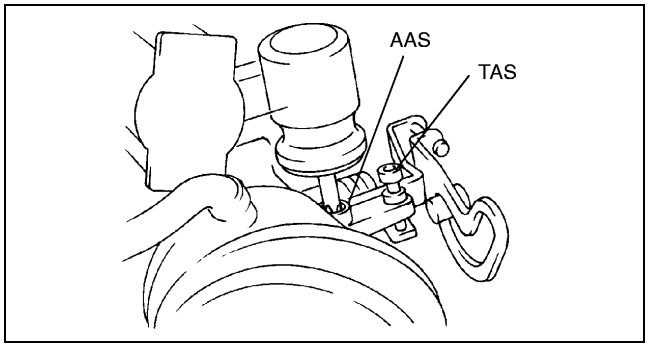
X3U110WGN

Specification
BTDC 6°—18°

Idle Speed Adjustment
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
   - If not as specified, adjust the idle speed by turning the AAS.

Specification
650—750 (700±50) rpm

Caution
- **The TAS is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.**



X3U110WGP

3. Connect the **SST** (System selector) to the DLC.
4. Set switch A to position 1.
5. Set the test switch to SELF TEST.
6. Press **CLEAR** to clear previously selected items.
7. Disconnect the **SSTs**.

Idle-up Speed Inspection
1. Perform “Engine Tune-up Preparation”.
2. Connect the **SST** (System selector) to the DLC.
3. Set switch A to position 1.
4. Set the test switch to SELF TEST.
5. Verify that the idle speed is normal. (See 01–10B–26 Idle Speed Adjustment.)
6. Verify that the RPM PID is within the specification.
   - If not as specified with all load conditions, inspect the IAC valve.
   - If not as specified with some load condition, inspect the related input switches, harnesses, and connectors.

Specification

Load condition	Idle-up speed (rpm)*1
E/L ON*2	650—750
P/S operating*3	700—800
A/C ON*4	700—800

*1 : Excludes temporary idle speed drop just after the electrical loads (E/L) are turned on.
*2 : Headlight is on, Fan switch is above 1st, Cooling fan is operating, Rear window defroster is on.
*3 : Steering wheel is fully turned.
*4 : A/C switch and fan switch are on.

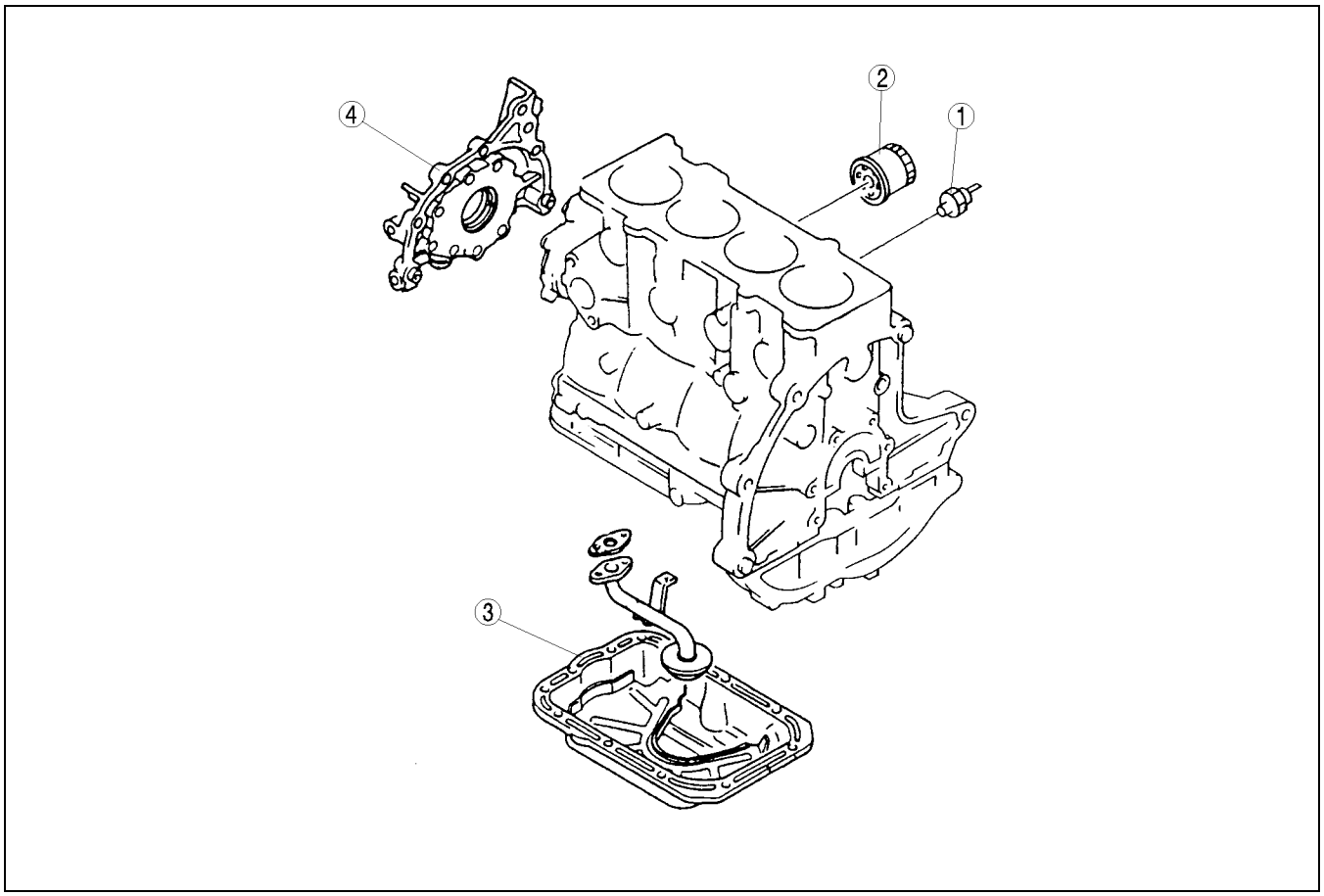
Idle Mixture Inspection
1. Perform “Engine Tune-up Preparation”.
2. Verify that the idle speed and ignition timing are within the specification. (See 01–10B–25 Ignition Timing Inspection.) (See 01–10B–26 Idle Speed Adjustment.)
3. Turn the test mode off.
4. Warm up the engine by holding the engine speed at **2,500—3,000 rpm** for **approx. 3 min**.
5. Insert an exhaust gas analyzer to the tailpipe.

6. Verify that the CO and HC concentrations are within the specified limits.
   - If not within the specified limits, inspect the following:
     — On-board diagnostic system (See 01–02B–15 DTC TABLE [FS].)
     — HO2S (See 01–40B–37 HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS].)
     — Intake manifold vacuum (See 01–03B–56 Intake Manifold Vacuum Inspection.)
     — Fuel line pressure (See 01–14–6 FUEL PRESSURE INSPECTION.)
     — Ignition timing control
       - If the systems and devices are normal, replace the TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)

01–11 LUBRICATION

LUBRICATION LOCATION INDEX

A3U011101003W01



Z3U0111W100

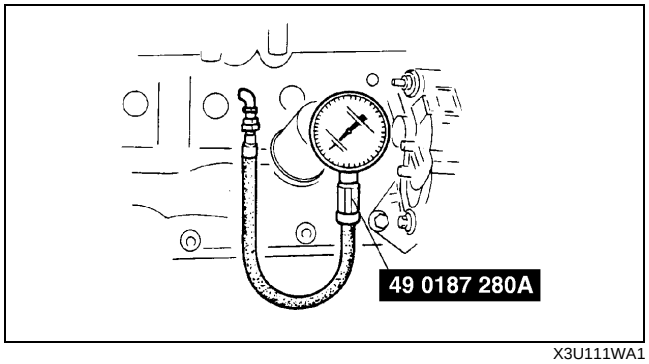
1	Oil pressure switch (See 01–11–2 OIL PRESSURE INSPECTION)
2	Oil filter (See 01–11–3 OIL FILTER REPLACEMENT)
3	Oil pan (See 01–11–4 OIL PAN REMOVAL/ INSTALLATION)
4	Oil pump (See 01–11–10 OIL PUMP REMOVAL/ INSTALLATION) (See 01–11–14 OIL PUMP DISASSEMBLY/ ASSEMBLY) (See 01–11–15 OIL PUMP INSPECTION)

OIL PRESSURE INSPECTION

A3U011102000W01

Warning
- **Continuous exposure with USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this work.**
- **When the engine and the oil are hot, they can cause severe burns. Turn off the engine and wait until it and oil are cool.**

1. Remove the intake manifold bracket. (FS model)
2. Remove the oil pressure switch. (ZM model)
3. Screw the **SST** into the oil pressure switch installation hole.
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 the cause and repair or replace as necessary.



X3U111WA1

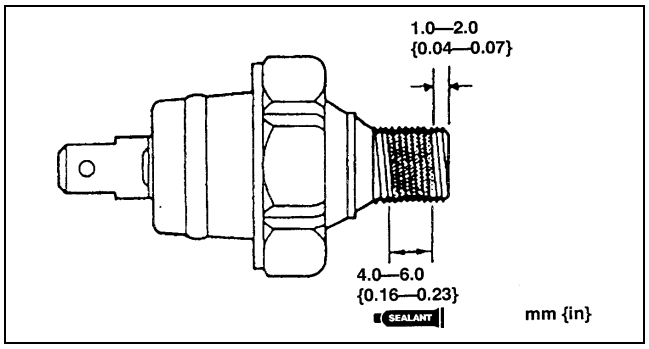
Note
- The oil pressure can vary with oil viscosity and temperature.

Oil pressure
ZM: 300—390 kPa {3.0—4.0 kgf/cm^2, 43—56 psi} [3,000 rpm]
FS: 400—490 kPa {4.0—5.0 kgf/cm^2, 57—71 psi} [3,000 rpm]

6. Stop the engine and wait until it is cool.
7. Remove the **SST**.
8. Apply silicone sealant to the oil pressure switch threads as shown.
9. Install the oil pressure switch.

Tightening torque
12—17 N·m {1.2—1.8 kgf·m, 9—13 ft·lbf}

10. Install the intake manifold bracket. (FS model)
11. Start the engine and inspect for oil leakage.

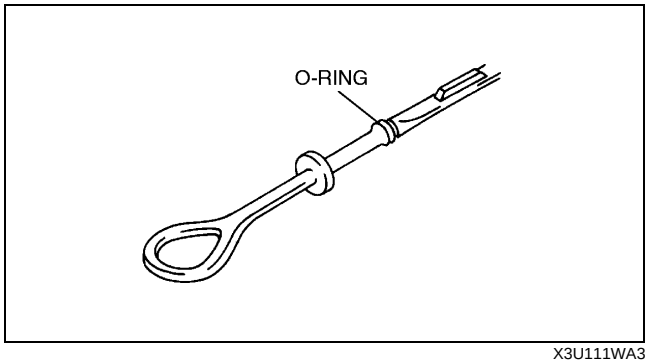


Y3U111WA0

ENGINE OIL INSPECTION

A3U011114001W01

1. Position the vehicle on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for **5 min**.
4. Remove the dipstick and inspect for oil level and condition. Verify that the oil level is within the F and L marks on the dipstick.
   - Add or replace oil if necessary.
5. Verify that the dipstick O-ring is installed as shown, then reinstall the dipstick.



X3U111WA3

ENGINE OIL REPLACEMENT

A3U011114001W02

Warning
- **When the engine and the engine oil are hot, they 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 with USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this work.**

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 with new washer.

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.
   - Add oil if necessary. (See 01–11–2 ENGINE OIL INSPECTION.)

Note
- The actual oil level may vary from the specified capacity in some cases.

Oil capacity

L {US qt, Imp qt}

Item	Engine	
	ZM	FS
Oil replacement*	3.0 {3.2, 2.6}	3.3 {3.5, 2.9}
Oil and oil filter replacement*	3.2 {3.4, 2.8}	3.5 {3.7, 3.1}
Total (dry engine)*	3.4 {3.6, 3.0}	3.7 {3.9, 3.3}

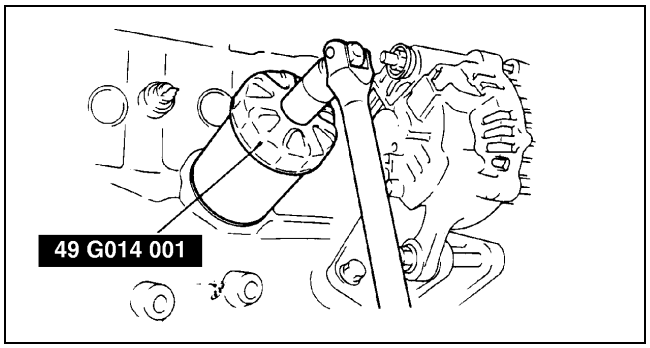
* : Approximate quantity

Engine oil grade
API service SG (Energy Conserving II), SH (Energy Conserving II) or ILSAC (GF-I) SJ or ISLAC (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

A3U011114300W01

1. Remove the oil filter using the **SST**.
2. Use a clean rag to wipe off the mounting surface on the oil filter body.
3. Tighten the filter according to the installation direction on the side of it or packing box using the **SST**.
4. Start the engine and inspect for oil leakage.
5. Inspect the oil level.
   - Add oil if necessary. (See 01–11–2 ENGINE OIL INSPECTION.)

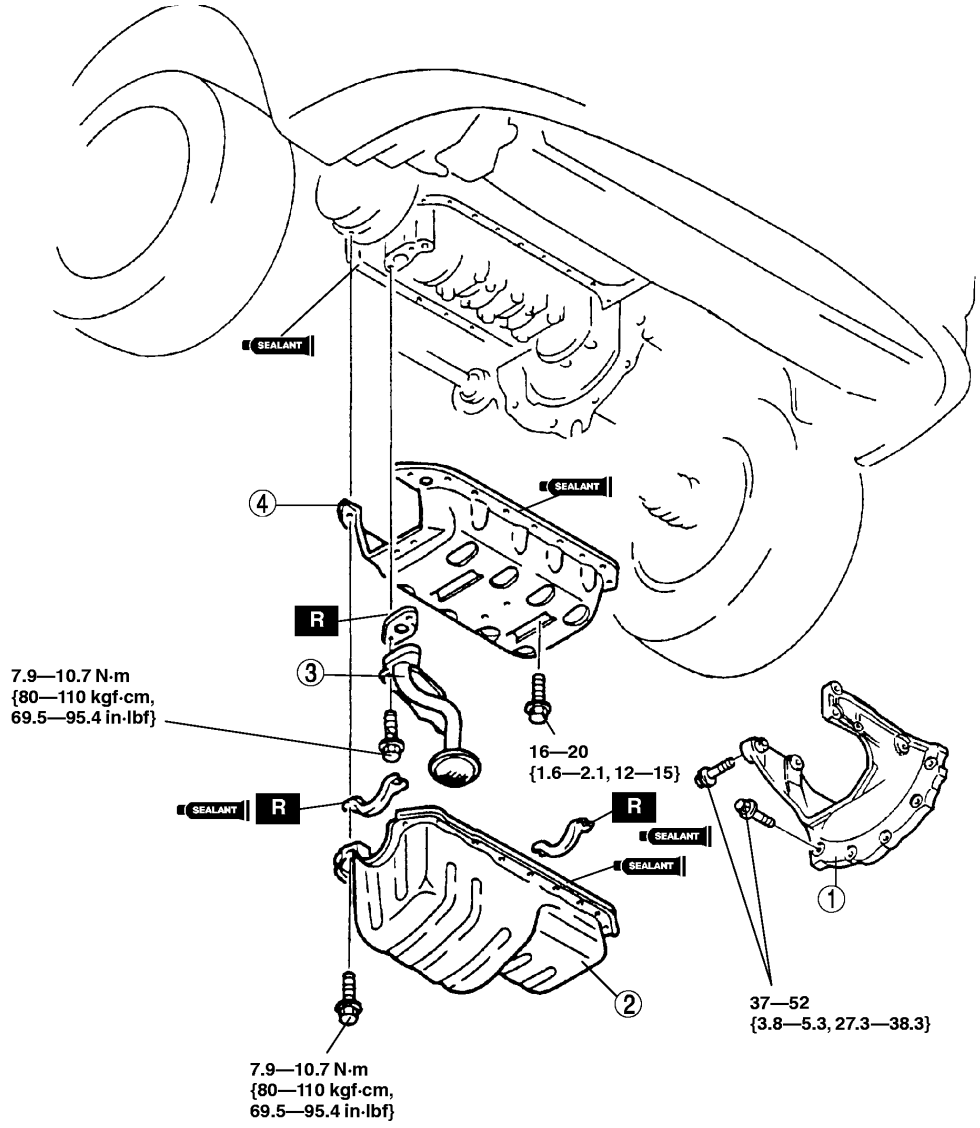


X3U111WA4

OIL PAN REMOVAL/INSTALLATION

A3U011110040W01

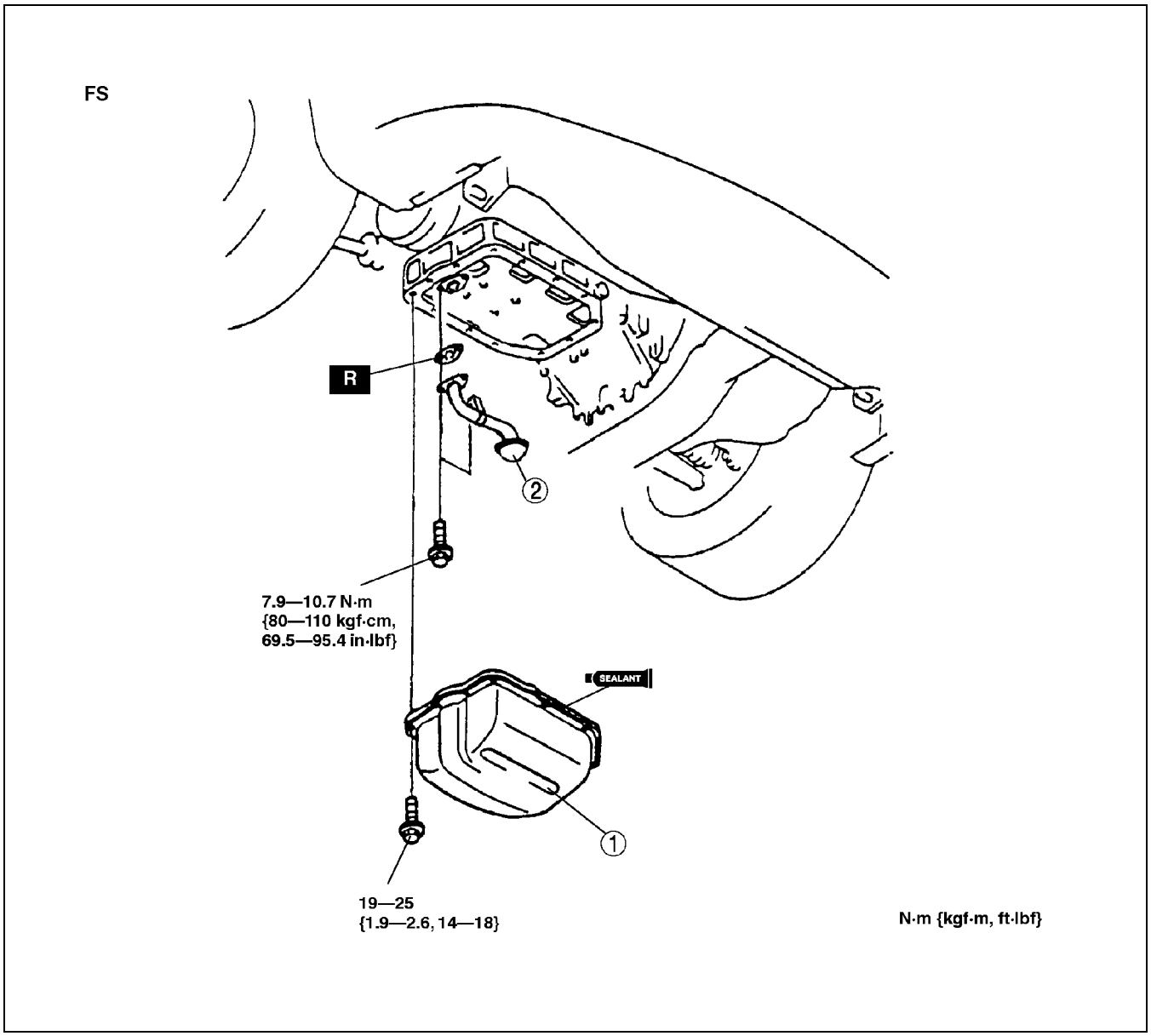
1. Disconnect the negative battery cable.
2. Drain the engine oil. (See 01–11–3 ENGINE OIL REPLACEMENT.)
3. Remove the front pipe.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Start the engine and inspect for engine oil leakage.



X3U111WA6

1	Integrated stiffener (See 01–11–8 Integrated Stiffener Installation Note)
2	Oil pan (See 01–11–5 Oil Pan Removal Note) (See 01–11–7 Oil Pan Installation Note)

3	Oil strainer
4	MBSP (Main bearing support plate) (See 01–11–6 MBSP (Main bearing support plate) Removal Note) (See 01–11–6 MBSP (Main bearing support plate) Installation Note)



Z3U0111W0999

1	Oil pan (See 01–11–5 Oil Pan Removal Note) (See 01–11–7 Oil Pan Installation Note)

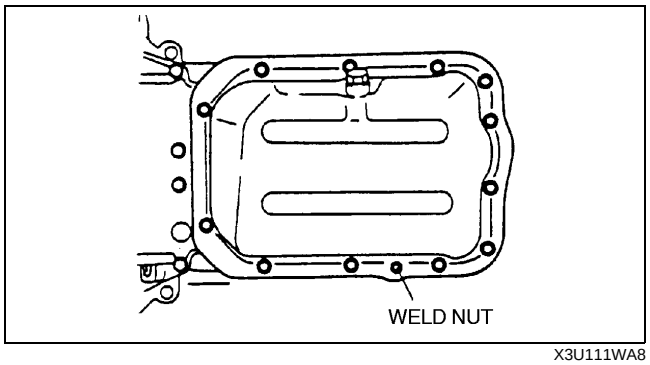
2	Oil strainer (See 01–11–7 Oil Strainer Installation Note)

Oil Pan Removal Note

1. Remove the oil pan mounting bolts.
2. Screw in a oil pan bolt in a weld nut hole to make a small gap between the oil pan upper block and the oil pan. (FS model)

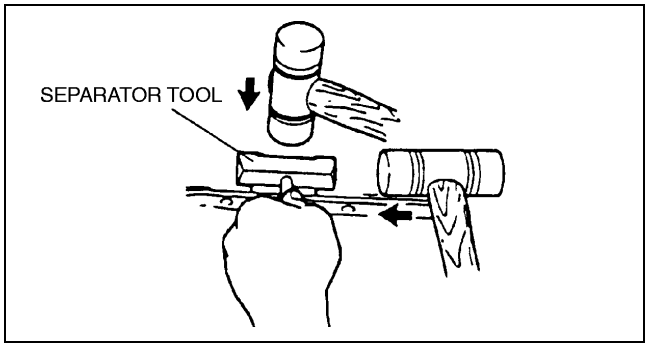
Caution

- **Pry tools can easily scratch the cylinder block and MBSP contact surfaces. Prying off the MBSP can also easily bend the MBSP flange. (ZM model)**



X3U111WA8

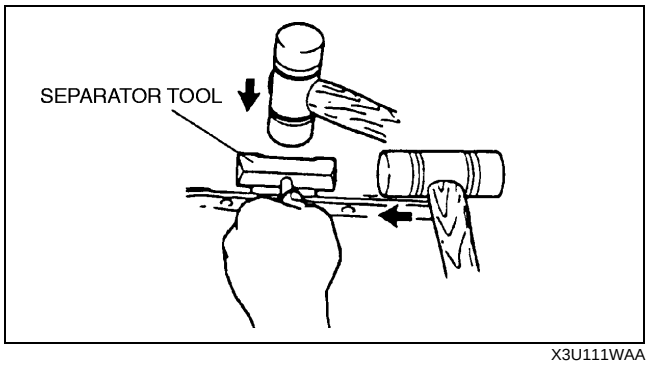
3. Remove the oil pan using a separator tool.



X3U111WA9

MBSP (Main bearing support plate) Removal Note ZM

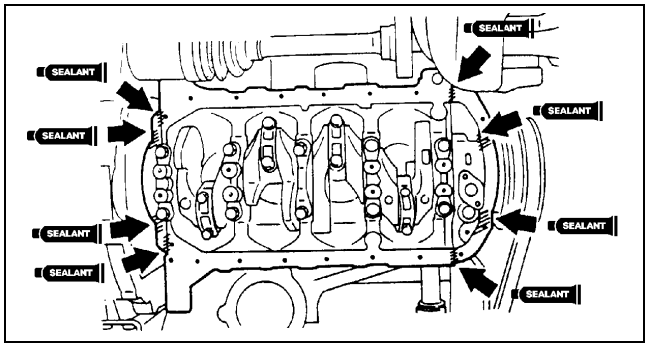
1. Using a separator tool, separate the MBSP.



X3U111WAA

MBSP (Main bearing support plate) Installation Note ZM

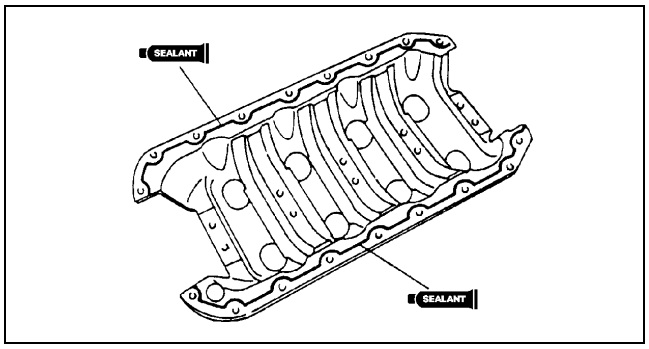
1. Apply silicon sealant to the shaded areas as shown.



X3U111WAB

2. Apply silicone sealant to the MBSP along the inside of the bolt holes.

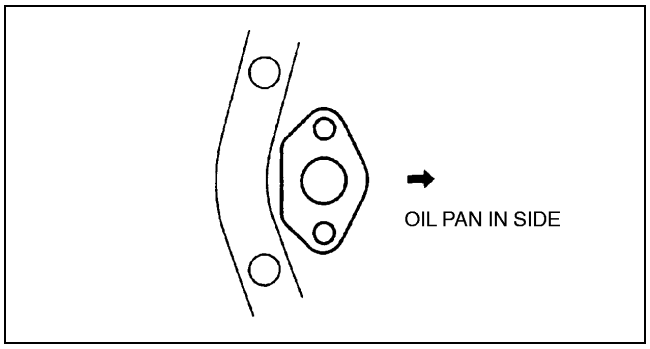
   Thickness
   2.5—3.5 mm {0.099—0.137 in}



X3U111WAC

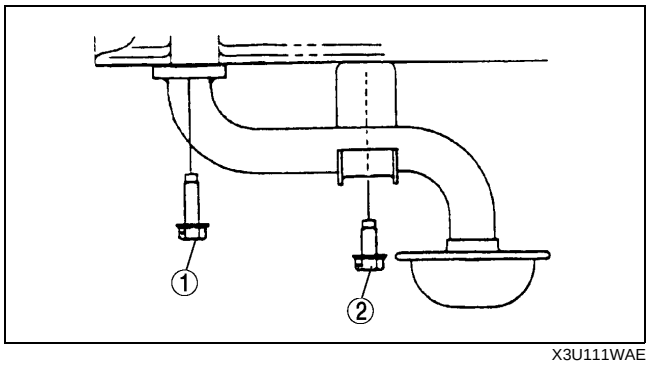
Oil Strainer Installation Note
FS

1. Install the oil strainer gasket as shown.



X3U111WAD

2. Tighten the bolts in the order shown.

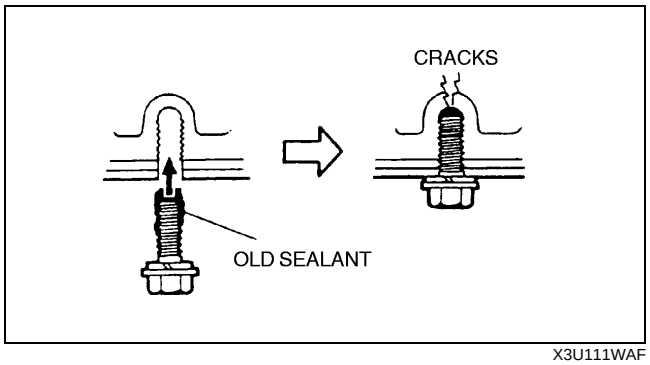


X3U111WAE

Oil Pan Installation Note

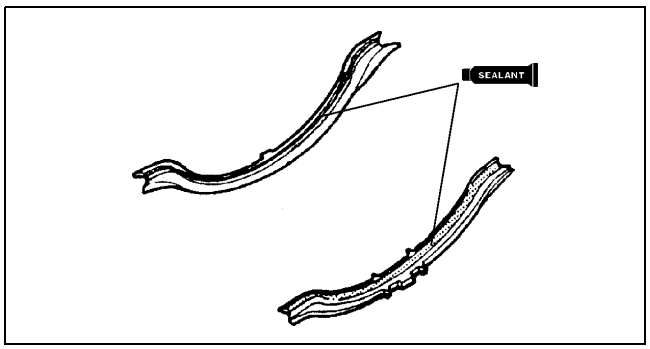
Caution

- **If the bolts are reused, remove the old sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause bolt hole damage.**



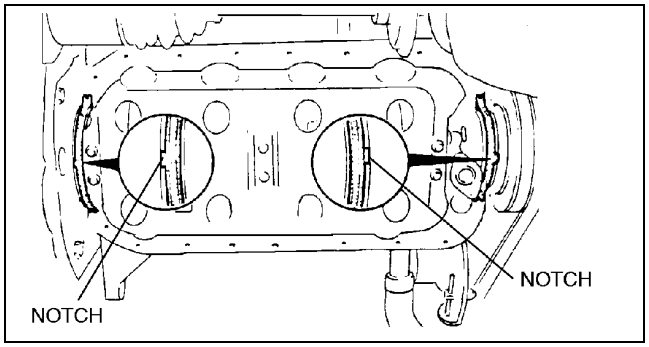
X3U111WAF

1. Apply silicone sealant to the contact surfaces of new oil pan gaskets as shown. (ZM model)



X3U111WAG

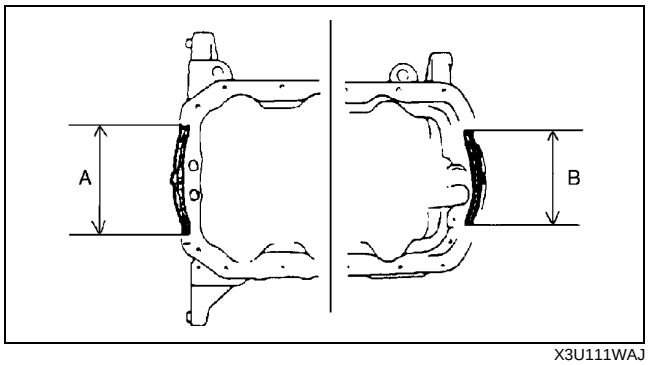
2. Install the new gaskets onto the oil pump body and the rear cover with the projections in the notches as shown. (ZM model)



X3U111WAH

3. Apply silicone sealant onto the area of oil pan gasket indicated by A and B. (ZM model)

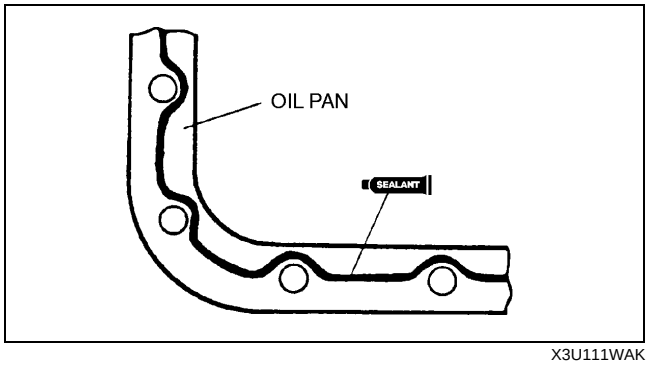
Thickness
2.0 mm {0.079 in}



X3U111WAJ

4. Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.

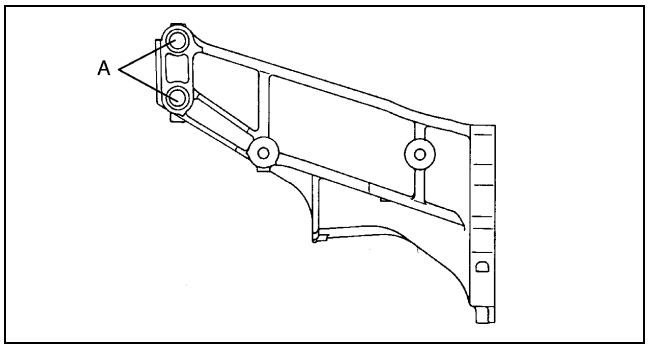
Thickness
ZM: 2.5—3.5 mm {0.099—0.137 in}
FS: 2.0—3.0 mm {0.079—0.118 in}



X3U111WAK

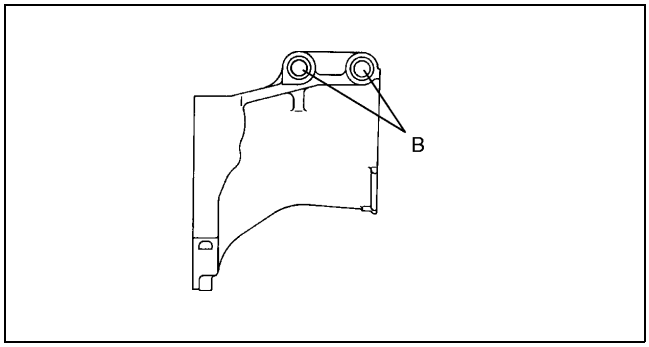
Integrated Stiffener Installation Note
ZM

1. Hand-tighten the lock bolt A.



X3U111WAL

2. Hand-tighten the lock bolt B.



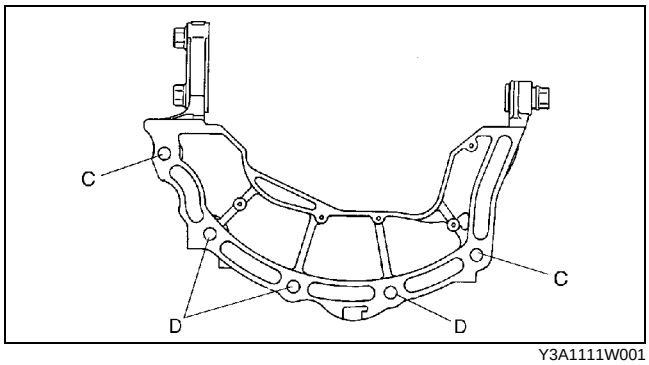
X3U111WAM

3. Tighten the lock bolt C.

Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}

4. Tighten the lock bolt D.

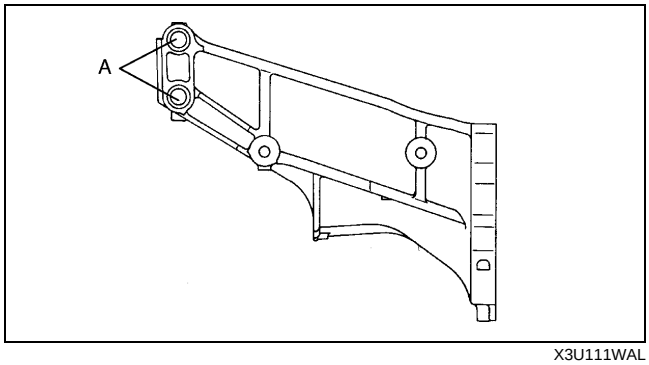
Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}



Y3A1111W001

5. Tighten the lock bolt A .

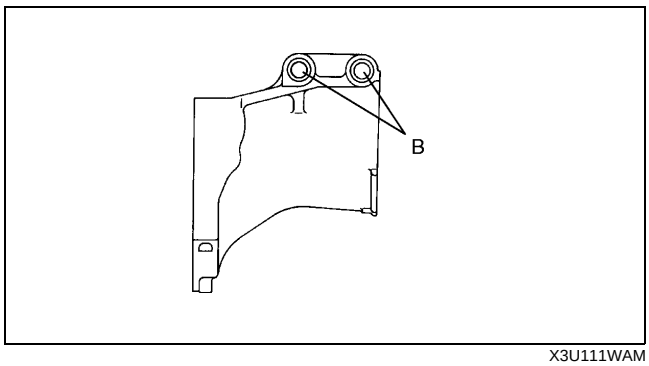
Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}



X3U111WAL

6. Tighten the lock bolt B.

Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}



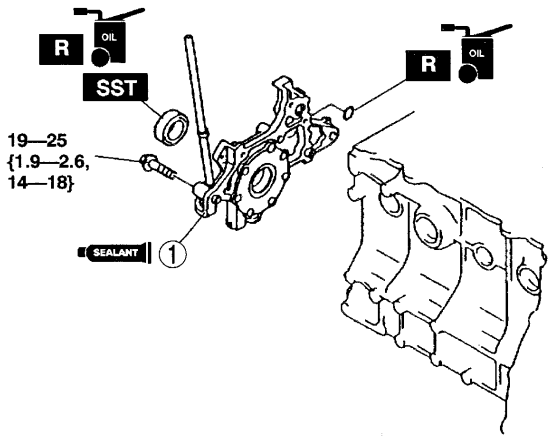
X3U111WAM

OIL PUMP REMOVAL/INSTALLATION

A3U011119220W01

1. Remove the timing belt. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].) (See 01–10B–8 TIMING BELT REMOVAL/INSTALLATION [FS].)
2. Remove the timing belt pulley.
3. Remove the oil pan. (See 01–11–4 OIL PAN REMOVAL/INSTALLATION.)
4. Remove the A/C compressor with the pipe still connected.
5. Remove the A/C compressor bracket.
6. Remove the generator. (ZM)
7. Remove the transaxle (FS) (See 05–15B–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [G15M-R].) (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.

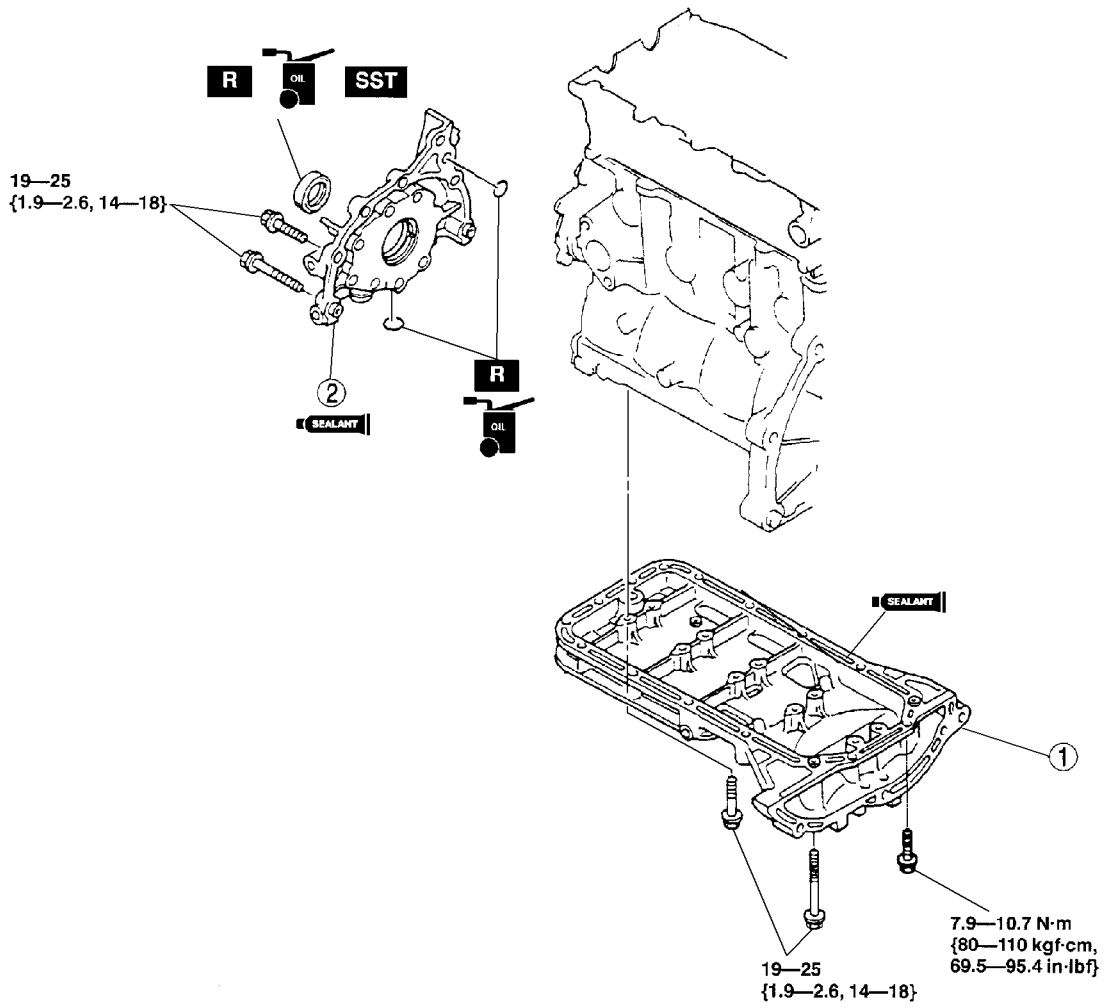
ZM



Y3U111WA1

1	Oil pump (See 01–11–12 Oil Pump Removal Note) (See 01–11–12 Oil Pump Installation Note)

FS



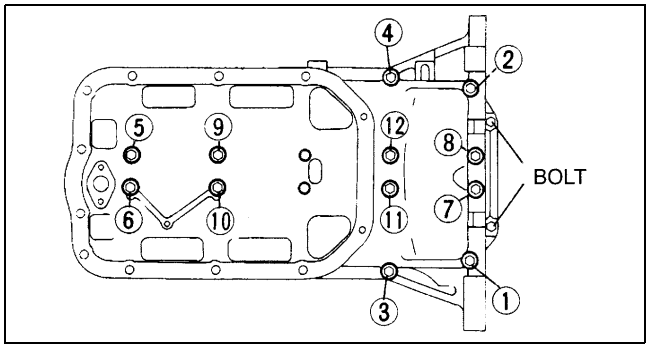
Z3U0111W998

1	Oil pan upper block (See 01–11–11 Oil Pan Upper Block Removal Note) (See 01–11–13 Oil Pan Upper Block Installation Note)

2	Oil pump (See 01–11–12 Oil Pump Removal Note) (See 01–11–12 Oil Pump Installation Note)

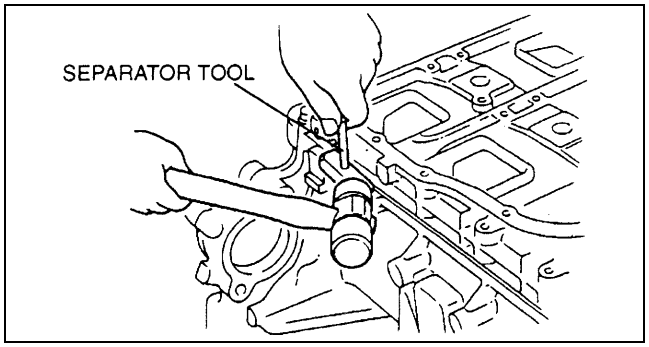
Oil Pan Upper Block Removal Note

1. Remove the two bolts at the rear of the cylinder block.
2. Loosen the oil pan upper block bolts in 2 or 3 steps in the order shown.



Y3U111WA3

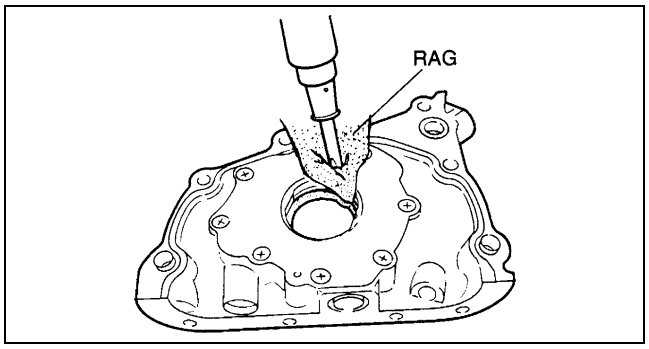
3. Remove the oil pan upper block using the separator tool.



Y3U111WA4

Oil Pump Removal Note

1. Remove the front oil seal using a screwdriver protected with a rag.

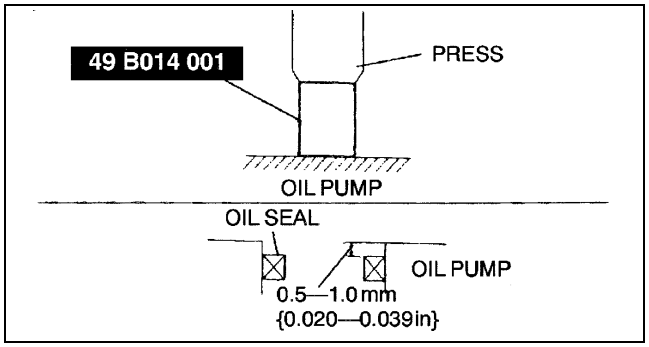


Y3U111WA5

Oil Pump Installation Note

ZM

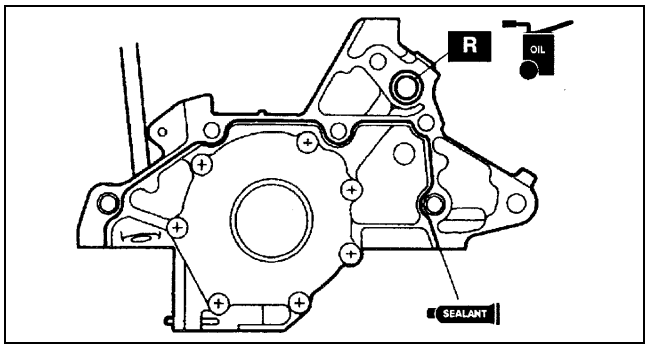
1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal evenly using the **SST**.



Y3U111WA6

4. Apply silicone sealant to the oil pump as shown.

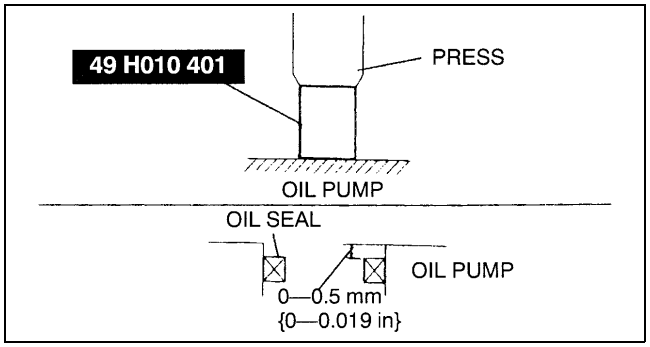
   Thickness
   1.0—2.0 mm {0.040—0.078 in}



Y3U111WA7

FS

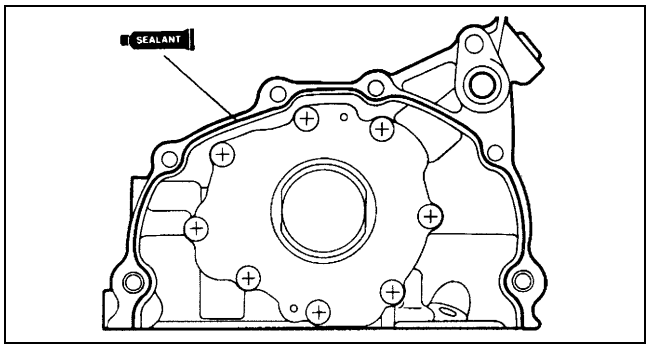
1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal evenly using the **SST**.



Y3U111WA8

4. Apply silicone sealant to the oil pump as shown.

   Thickness
   1.0—2.0 mm {0.040—0.078 in}



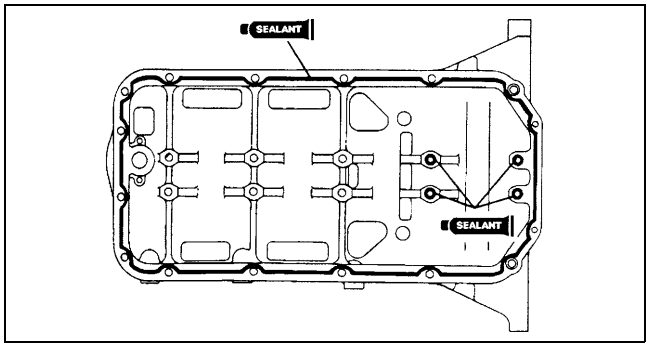
Y3U111WA9

Oil Pan Upper Block Installation Note

1. Apply silicone sealant to the oil pan upper block as shown.

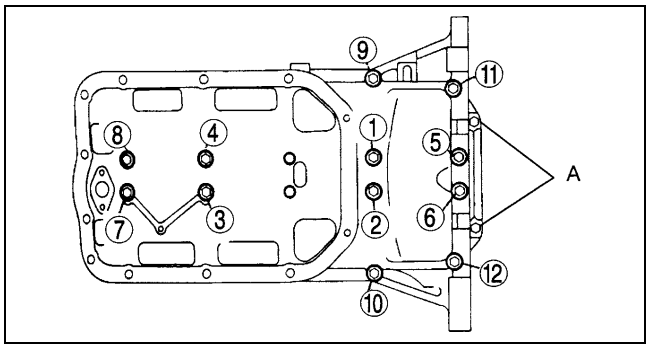
   Thickness
   2.0—3.0 mm {0.08—0.11 in}

2. Tighten the bolts A.



Y3U111WAA

3. Tighten the oil pan upper block bolts in 2 or 3 steps in the order shown.



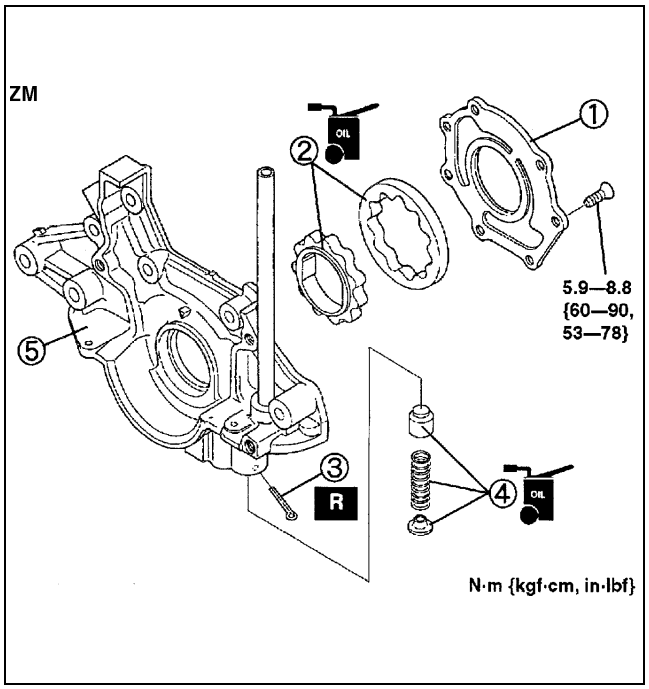
Y3U111WAB

OIL PUMP DISASSEMBLY/ASSEMBLY

A3U011119220W02

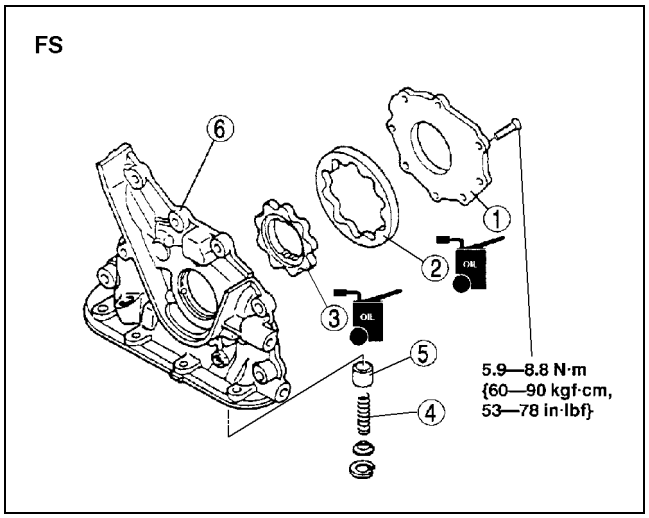
1. Remove the oil pump. (See 01–11–10 OIL PUMP REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

1	Oil pump cover
2	Inner rotor, Outer rotor (See 01–11–15 Inner Rotor, Outer Rotor Assembly Note)
3	Cotter pin (See 01–11–14 Cotter Pin Assembly Note)
4	Plunger
5	Oil pump body



Y3U111WAC

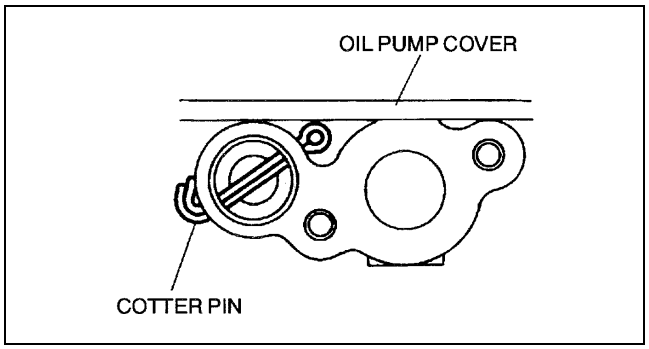
1	Oil pump cover
2	Outer rotor
3	Inner rotor
4	Pressure spring
5	Control plunger
6	Oil pump body



Z3U0111W997

Cotter Pin Assembly Note

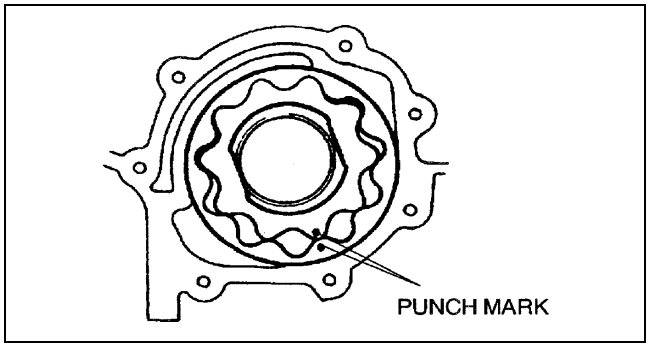
1. Bend the cotter pin so that its tip does not project from the oil pump cover mounting surface.



Y3U111WAE

Inner Rotor, Outer Rotor Assembly Note

1. Match the punch marks on the inner and outer rotor before installing the inner and outer rotor.



Y3U111WAF

OIL PUMP INSPECTION

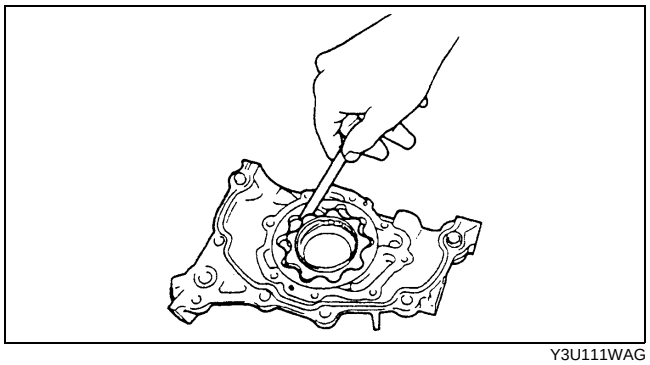
A3U011119220W03

Rotor Clearance Inspection

1. Measure the following clearance.
   - Replace the rotor and/or pump body if necessary.

ZM

Standard tip clearance
0.02—0.18 mm {0.0008—0.0070 in}
Maximum tip clearance
0.22 mm {0.0087 in}



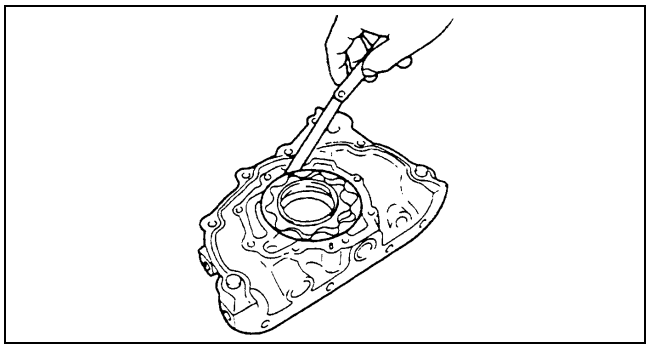
Y3U111WAG

FS

Standard tip clearance
0.130—0.206 mm {0.00512—0.00811 in}
Maximum tip clearance
0.30 mm {0.012 in}

ZM

Standard tip clearance
0.09—0.18 mm {0.0036—0.0070 in}
Maximum tip clearance
0.22 mm {0.0087 in}



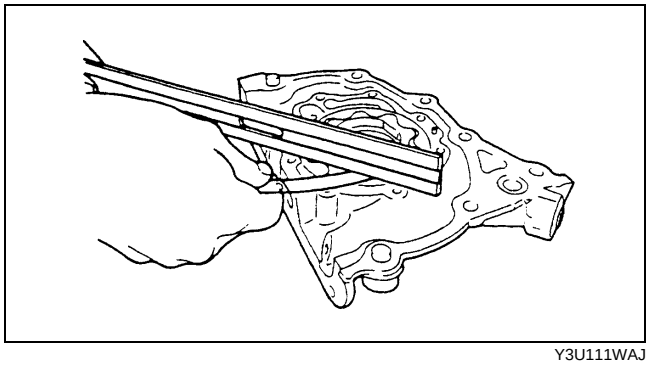
Y3U111WAH

FS

Standard tip clearance
0.113—0.186 mm {0.00445—0.00732 in}
Maximum tip clearance
0.22 mm {0.0087 in}

ZM

Standard tip clearance
0.03—0.11 mm {0.0012—0.0043 in}
Maximum tip clearance
0.14 mm {0.0055 in}



Y3U111WAJ

FS

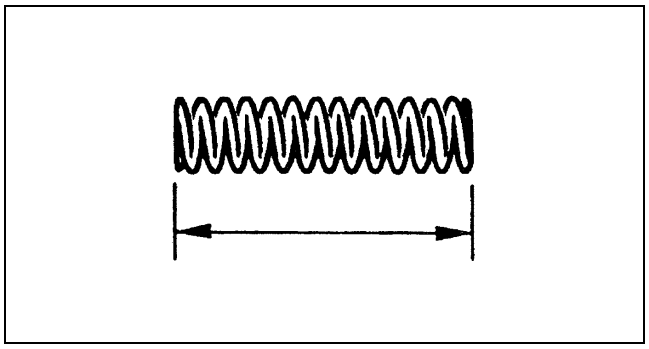
Standard tip clearance
0.035—0.095 mm {0.0014—0.0037 in}
Maximum tip clearance
0.14 mm {0.0055 in}

Pressure Spring Inspection

ZM

1. Measure the free length of the pressure spring.
   - Replace the pressure spring if necessary.

   Free length
   45.94 mm {1.809 in}

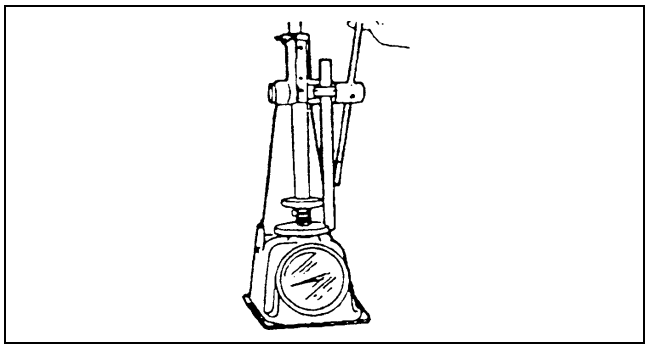


Y3U111WAK

FS

1. Apply pressing force to the pressure spring and check the spring height.
   - Replace the plunger spring if necessary.

   Pressing force
   97.7—107.4 N {9.96—10.96 kgf, 21.92—24.11 lbf}
   Standard height
   33.50 mm {1.319 in}

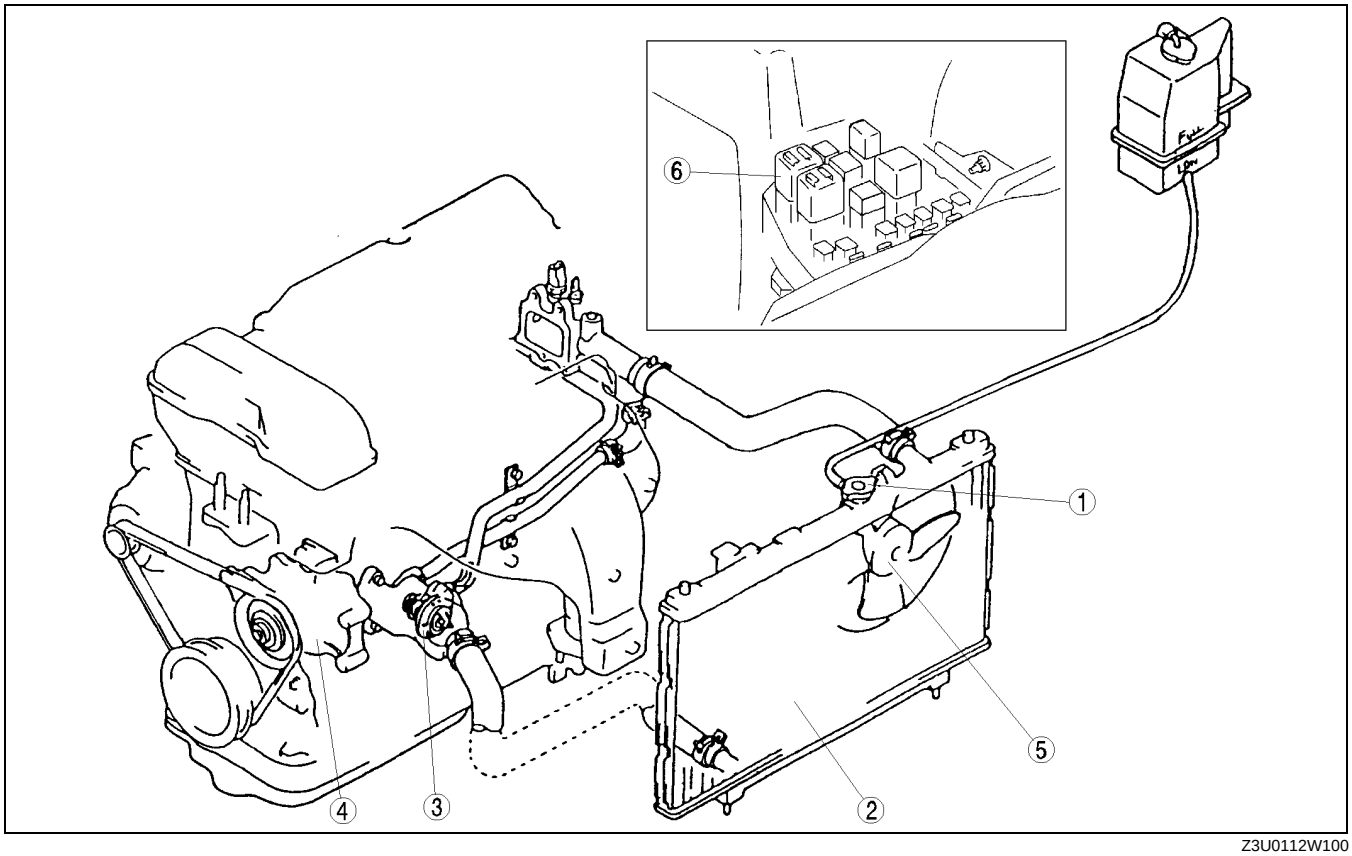


Y3U111WAL

01–12 COOLING SYSTEM

COOLING SYSTEM LOCATION INDEX

A3U011201004W01



Z3U0112W100

1	Radiator cap (See 01–12–4 RADIATOR CAP INSPECTION)
2	Radiator (See 01–12–4 RADIATOR REMOVAL/INSTALLATION)
3	Thermostat (See 01–12–5 THERMOSTAT REMOVAL/INSTALLATION) (See 01–12–7 THERMOSTAT INSPECTION)

4	Water pump (See 01–12–8 WATER PUMP REMOVAL/INSTALLATION)
5	Cooling fan motor (See 01–12–9 COOLING FAN MOTOR INSPECTION) (See 01–12–9 COOLING FAN MOTOR REMOVAL/INSTALLATION)
6	Cooling fan relay (See 09–21–5 RELAY INSPECTION)

COOLING SYSTEM SERVICE WARNINGS

A3U011201004W02

Warning

- **Never remove the radiator cap or the coolant filler cap. Do not loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. 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 are sure all the pressure is gone, press down on the cap while still using the 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 coolant are cool before draining the engine coolant.**

ENGINE COOLANT LEVEL INSPECTION

A3U011215001W01

1. Remove the radiator cap.
2. Verify that the coolant level is near the radiator filler neck.
3. Verify that the coolant level in the coolant reservoir is between the FULL and LOW marks.
   - Add coolant if necessary.

ENGINE COOLANT PROTECTION INSPECTION

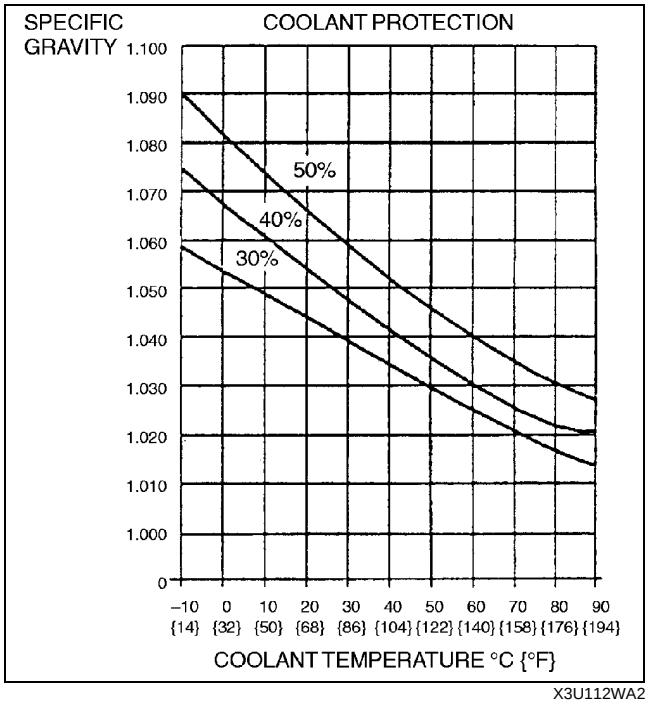
A3U011215001W02

1. Measure the coolant temperature and specific gravity with a thermometer and a hydrometer.

Caution

- **The engine has aluminum parts that can be damaged by alcohol or methanol antifreeze. Do not use alcohol or methanol in the cooling system. Use only ethylene-glycol-based coolant.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**

2. Determine the coolant protection by referring to the graph shown.
   - If the coolant protection is not correct, add water or coolant.



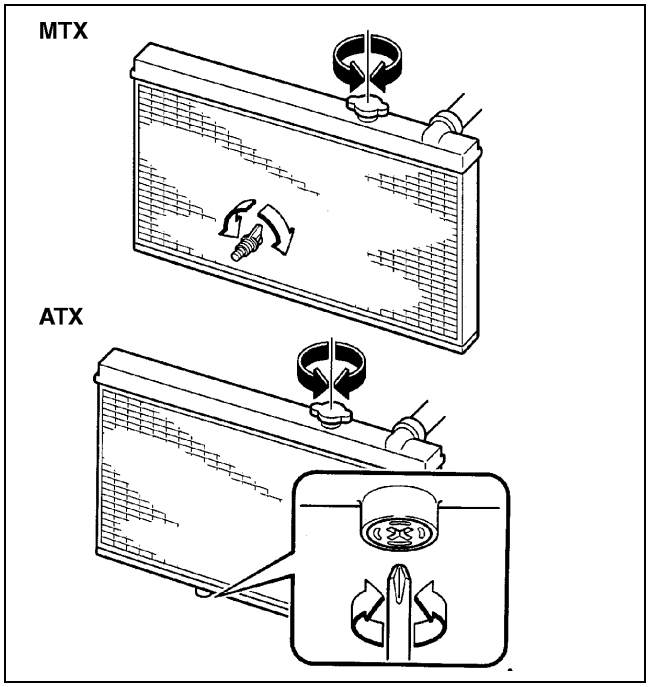
X3U112WA2

ENGINE COOLANT REPLACEMENT

A3U011215001W03

1. Drain the coolant in the coolant reservoir.
2. Remove the radiator cap 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. Let the system drain completely.
6. Tighten the radiator drain plug.

Caution
- **The engine has aluminum parts that can be damaged by alcohol or methanol antifreeze. Do not use alcohol or methanol in the cooling system. Use only ethylene-glycol-based coolant.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**
- **Engine coolant will damage paint. Rinse it off quickly.**



X3U112WA1

7. Referring to the following chart, select proper volume percentage of the water and coolant. Slowly pour the coolant into the radiator up to the coolant filler port.

Filling pace
1.0 L {1.1 US qt, 0.9 Imp qt}/min. [max]

Antifreeze solution mixture percentage

Coolant protection	Volume percentage		Gravity at 20 °C {68 °F}
	Water	Coolant	
Above –16 °C {4 °F}	65	35	1.054
Above –26 °C {–15 °F}	55	45	1.066
Above –40 °C {–40 °F}	45	55	1.078

8. Pour coolant into the reservoir up to the FULL mark on the coolant reservoir.
9. Fully install the radiator cap.

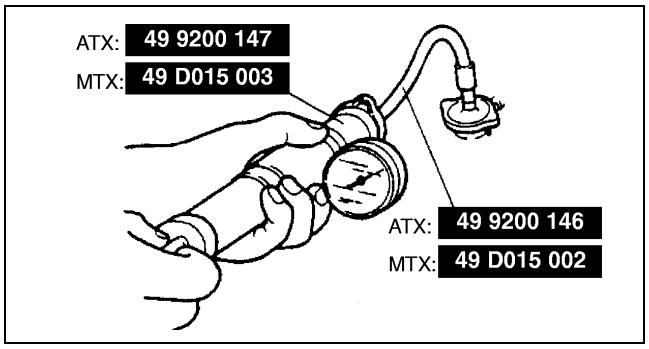
Caution
- **If the coolant temperature becomes too high, stop the engine to prevent it from overheating.**

10. Start the engine and let it idle for **approx. 10 min**.
11. After engine warms up, perform the following steps:
    (1) Run the engine at **2,500 rpm** for **5 min**.
    (2) Run the engine at **3,000 rpm** for **5 s**: then return to idling. Repeat this several times.
12. Stop the engine and wait until it is cool.
13. Inspect the coolant level. If it is low, repeat Step 7—12.
14. Verify there is no leakage.

ENGINE COOLANT LEAKAGE INSPECTION

A3U011215001W04

1. Inspect the coolant level.
2. Remove the radiator cap.
3. Connect a radiator cap tester and the **SST** to the radiator filler neck.



X3U112WA3

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}

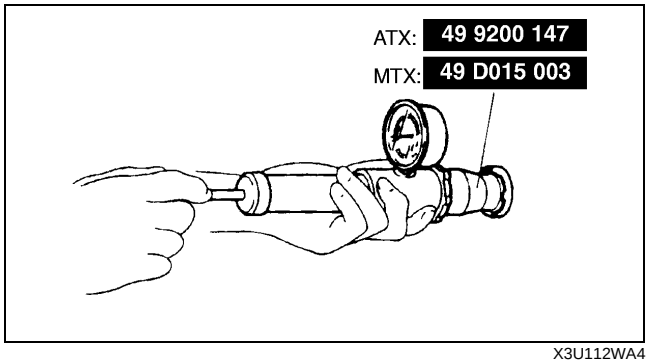
5. Verify that the pressure is held.
   - If not, inspect the system for coolant leakage.

RADIATOR CAP INSPECTION

A3U011215201W01

Warning
- **Never remove the radiator cap while the engine is running, or when the engine and radiator are hot. 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 while still using the cloth, turn it, and remove it.**

1. Attach the radiator cap to a radiator cap tester with the **SST**. Apply pressure gradually.
2. Verify that the pressure becomes stable within the specification.
   - If the pressure is held for **10 s**, the radiator cap is normal.



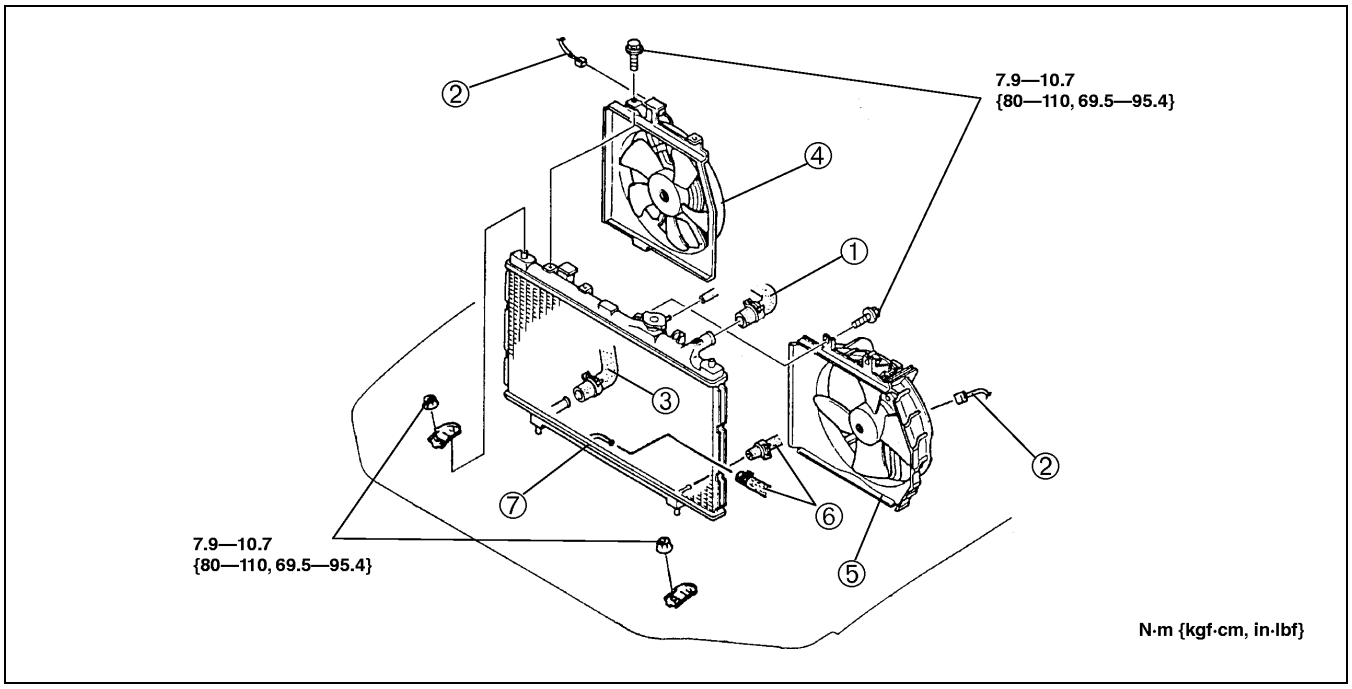
X3U112WA4

Pressure
94—122 kPa {0.95—1.25 kgf/cm^2, 13.5—17.7 psi}

RADIATOR REMOVAL/INSTALLATION

A3U011215200W01

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the fresh air duct.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



X3U112WA5

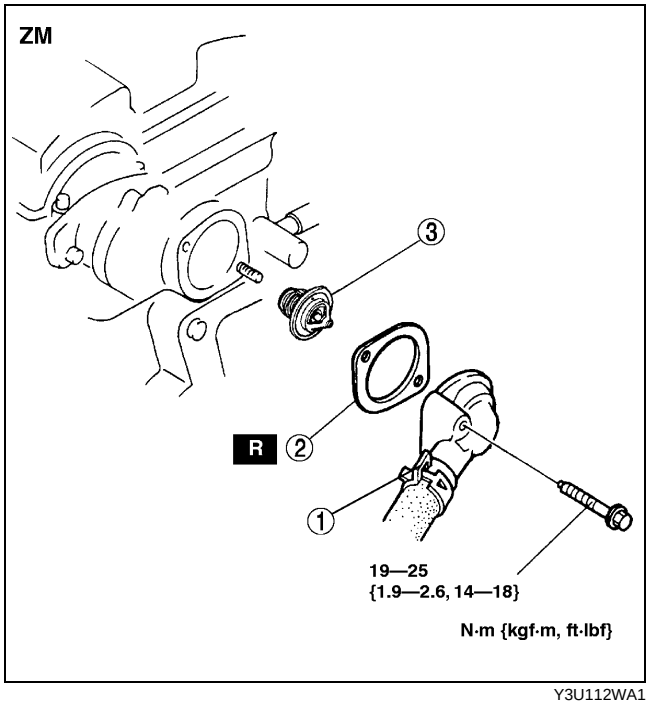
1	Upper radiator hose
2	Cooling fan motor connector, condenser fan motor connector
3	Lower radiator hose
4	Condenser fan
5	Cooling fan
6	Oil hose (ATX) (See 05–17–41 OIL COOLER REMOVAL/ INSTALLATION)
7	Radiator

THERMOSTAT REMOVAL/INSTALLATION

A3U011215171W01

1. Disconnect the negative battery cable.
2. Remove the fresh air duct.
3. Remove the air cleaner. (ZM model)
4. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
5. Remove in the order indicated in the table.

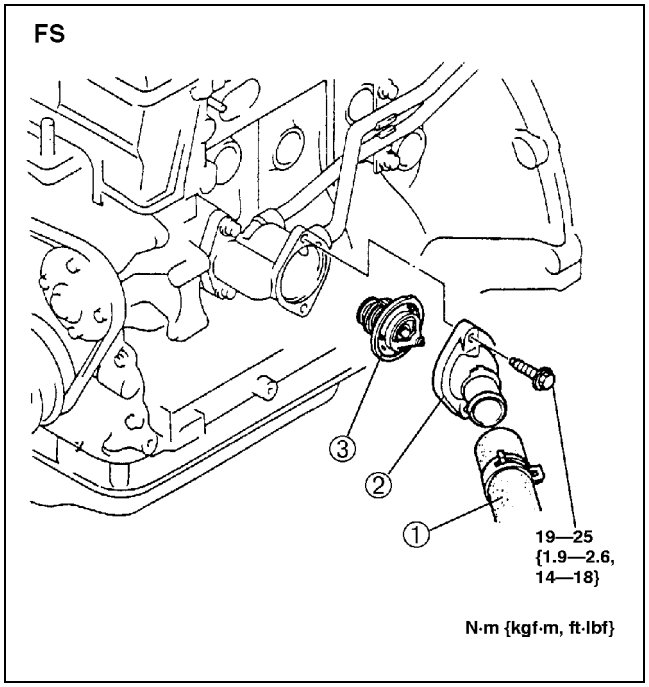
1	Thermostat cover
2	Thermostat cover gasket (See 01–12–7 Thermostat Cover Gasket Installation Note)
3	Thermostat (See 01–12–6 Thermostat Installation Note)



Y3U112WA1

1	Lower radiator hose
2	Thermostat cover
3	Thermostat (See 01–12–6 Thermostat Installation Note)

6. Install in the reverse order of removal.

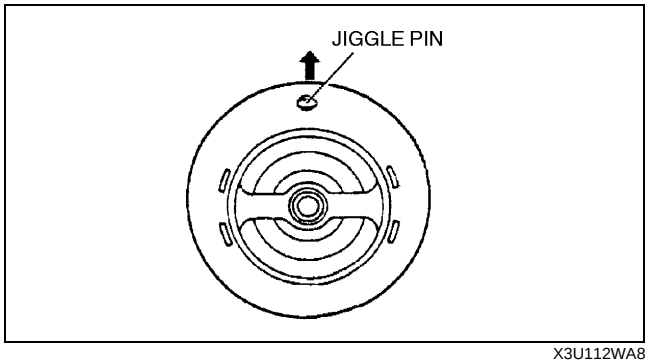


Z3U0112W999

Thermostat Installation Note

ZM

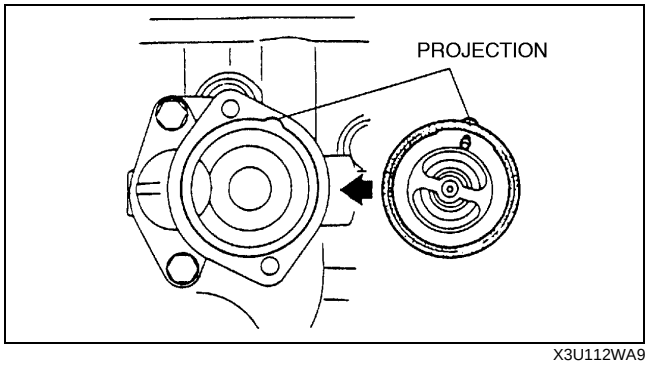
1. Install the thermostat into the cylinder head with the jiggle pin at the top.



X3U112WA8

FS

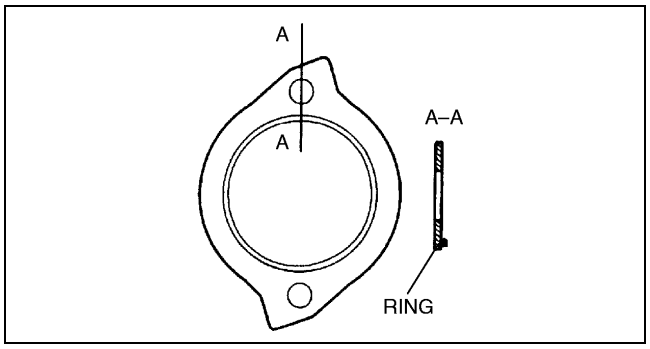
1. Install the thermostat into the thermostat case with the jiggle pin and projection at the top.
2. Install the thermostat into the thermostat case, aligning the projection on the gasket to the thermostat case.



X3U112WA9

Thermostat Cover Gasket Installation Note
ZM

1. Install a new gasket with the seal ring side facing the cylinder head.



X3U112WAA

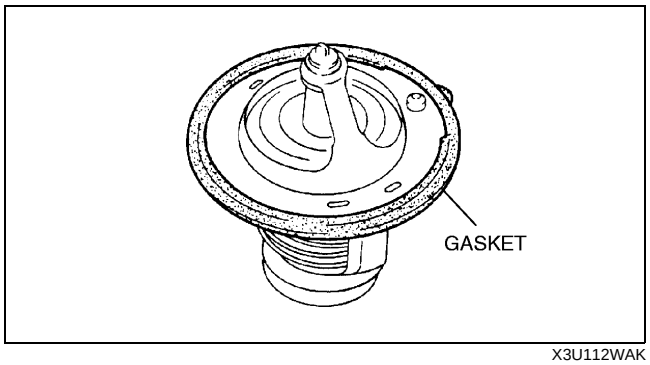
THERMOSTAT INSPECTION

A3U011215171W02

1. If the gasket of the thermostat is damaged, replace the thermostat assembly. (FS model)
2. Visually check that the thermostat valve is closed.
3. Place the thermostat and a thermometer in water.

Warning

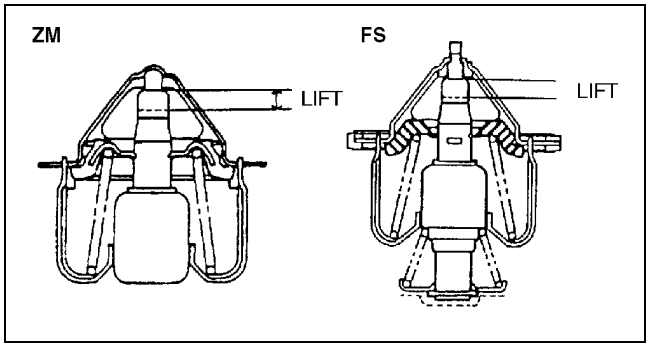
- **During inspection, the thermostat and water are extremely hot and they can cause severe burns. Do not touch the thermostat and water directly.**



X3U112WAK

4. Heat the water and check the following.
   - If not as specified, replace the thermostat.

Item	Engine	
	ZM	FS
Initial-opening temperature (°C {°F})	83.5—88.0 {183—190}	80—84 {176—183}
Full-open temperature (°C {°F})	100 {212}	95 {203}
Full-open lift (mm {in})	8.5 {0.33} min.	



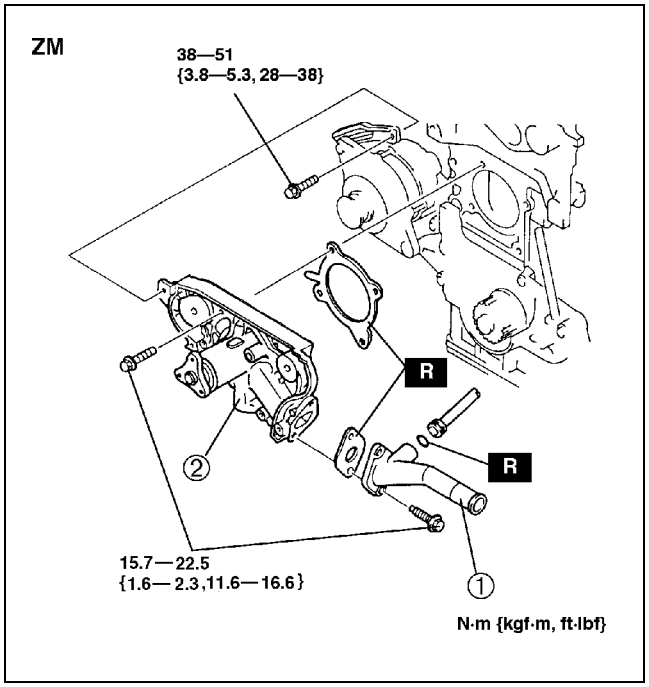
Z3U0112W998

WATER PUMP REMOVAL/INSTALLATION

A3U011215010W01

1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Remove the fresh air duct and air cleaner. (ZM model)
3. Remove the exhaust manifold insulator. (ZM model)
4. Remove the timing belt. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].) (See 01–10B–8 TIMING BELT REMOVAL/INSTALLATION [FS].)
5. 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. (ZM model)
6. Remove the A/C compressor and A/C compressor bracket with the pipe still connected. Position the A/C compressor so that it is out of the way. (ZM model)
7. Remove in the order indicated in the table.

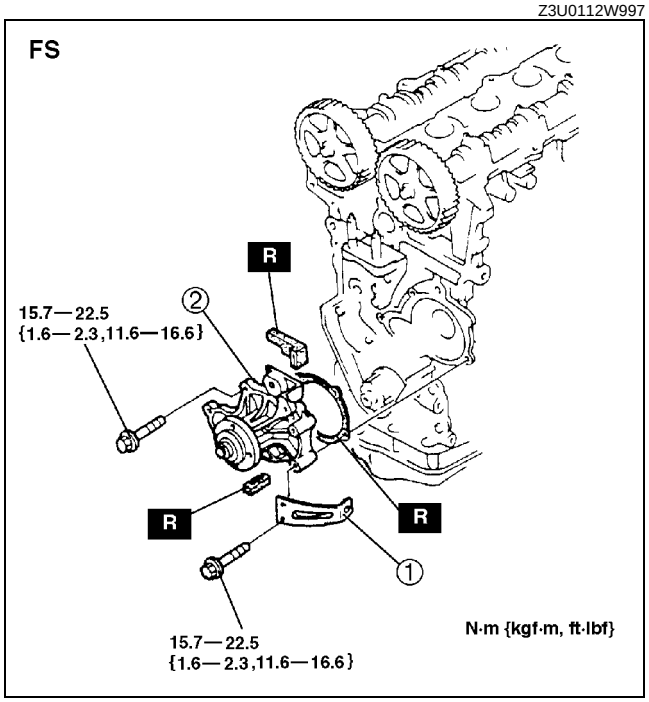
1	Water inlet pipe
2	Water pump (See 01–12–9 Water Pump Installation Note)



Z3U0112W997

1	P/S oil pump adjuster
2	Water pump

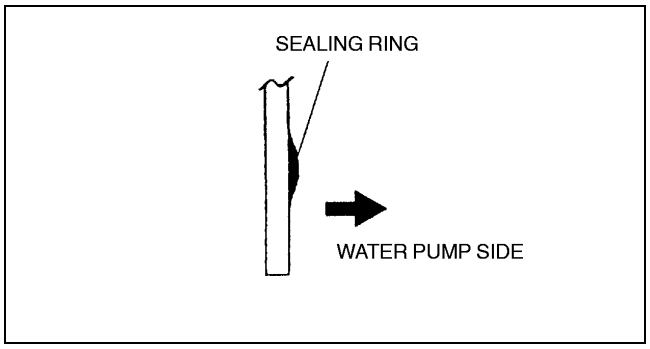
8. Install in the reverse order of removal.



Z3U0112W996

Water Pump Installation Note
ZM

1. Install a new gasket with the sealing ring facing the water pump.



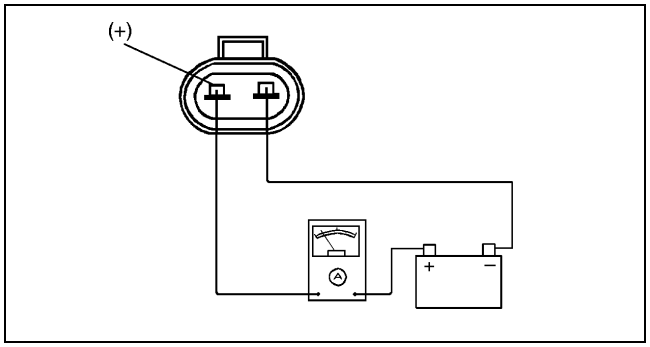
X3U112WAD

COOLING FAN MOTOR INSPECTION

A3U011215025W01

1. Verify that the battery is fully charged. (See 01–17–1 Battery.)
2. Connect B+ and an ammeter to the cooling fan motor connector.
3. Verify that the cooling fan motor operates smoothly at the standard current draw.
   - If not as specified, replace the cooling fan motor.

Item		Transaxle	
		MTX	ATX
Current	(A)	2.4—4.4	5.2—7.2



X3U112WAF

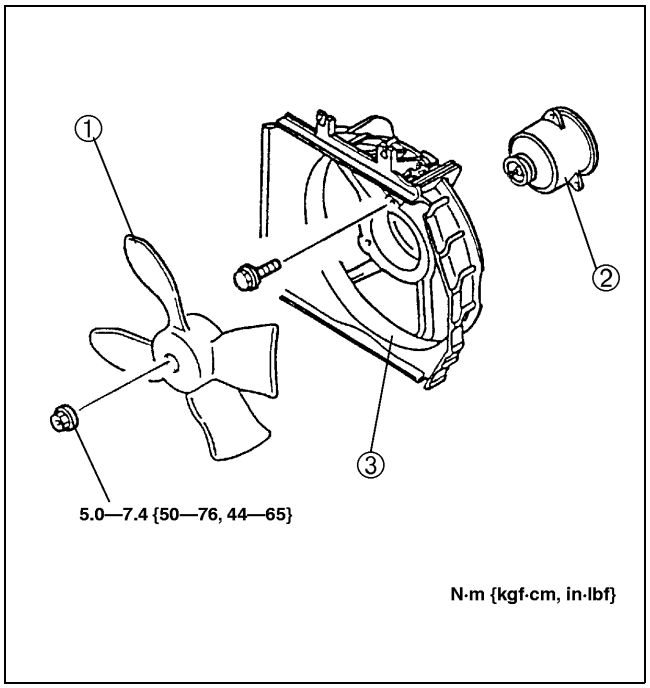
COOLING FAN MOTOR REMOVAL/INSTALLATION

A3U011215025W02

1. Remove the cooling fan. (See 01–12–4 RADIATOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	Cooling fan blade
2	Cooling fan motor
3	Radiator cowling

3. Install in the reverse order of removal.

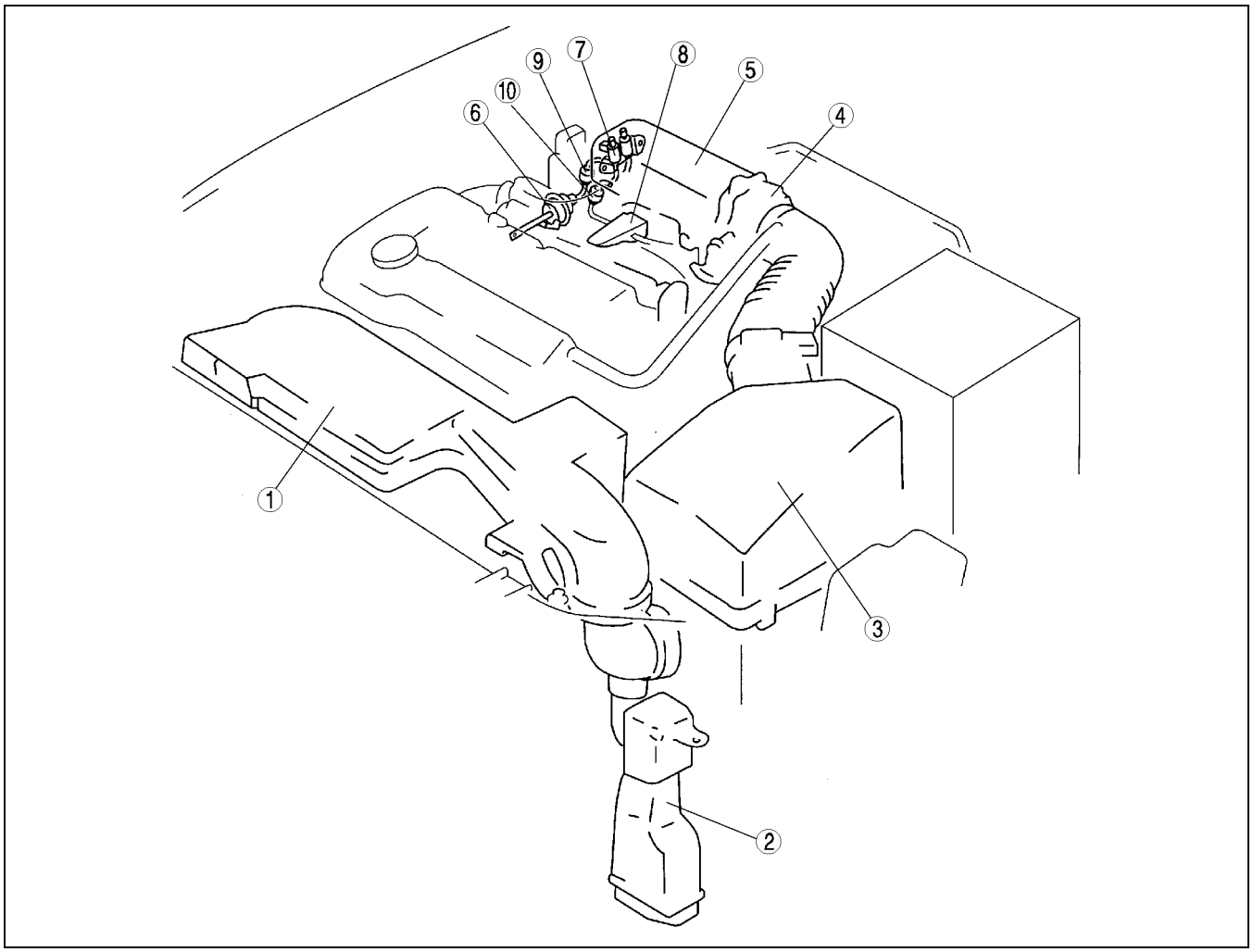


X3U112WAG

01–13A INTAKE-AIR SYSTEM [ZM]

INTAKE-AIR SYSTEM LOCATION INDEX [ZM]

A3U011301005W03

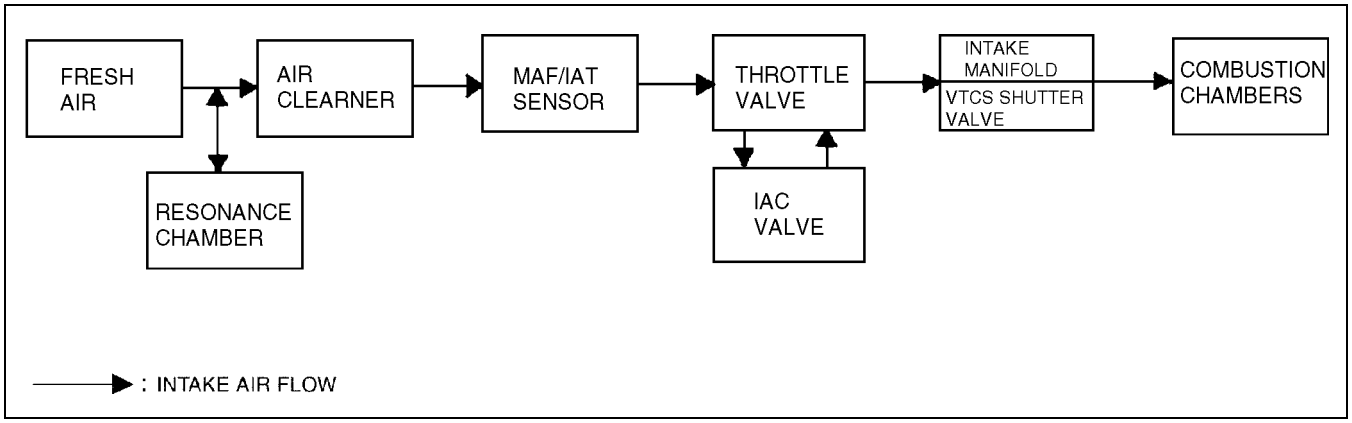


Z3U0113W001

1	Fresh-air duct (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM])
2	Resonance chamber (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM])
3	Air cleaner (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM])
4	Throttle body (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM])
5	Intake manifold (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM])
6	VTCS shutter valve actuator (See 01–13A–9 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [ZM]) (See 01–13A–10 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [ZM])
7	VTCS solenoid valve (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM]) (See 01–13A–11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [ZM])
8	VTCS vacuum chamber
9	VTCS delay valve (See 01–13A–10 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/ INSTALLATION [ZM]) (See 01–13A–11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE INSPECTION [ZM])
10	VTCS check valve (one-way) (See 01–13A–8 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [ZM]) (See 01–13A–8 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [ZM])

INTAKE-AIR SYSTEM FLOW DIAGRAM [ZM]

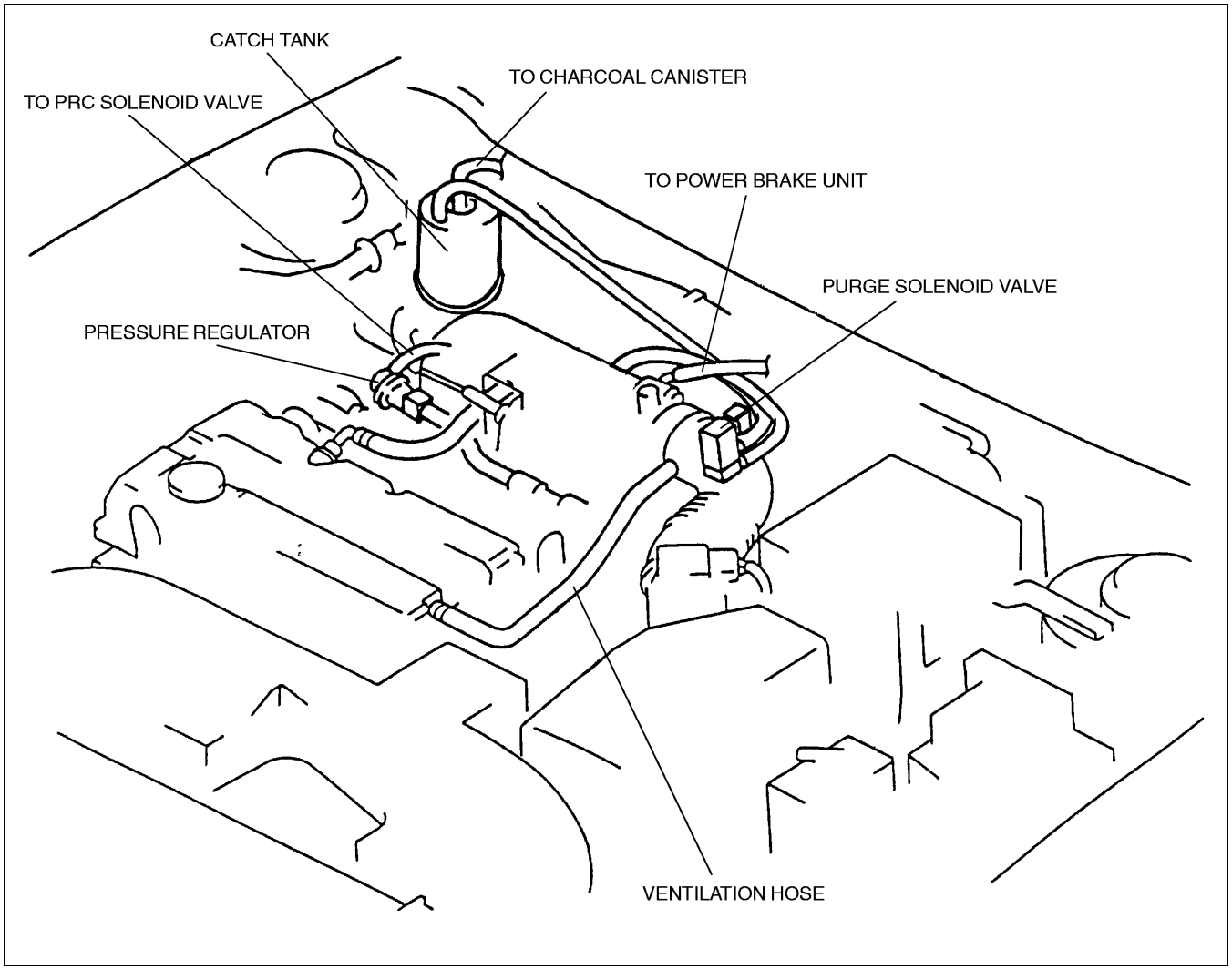
A3U011301005W04



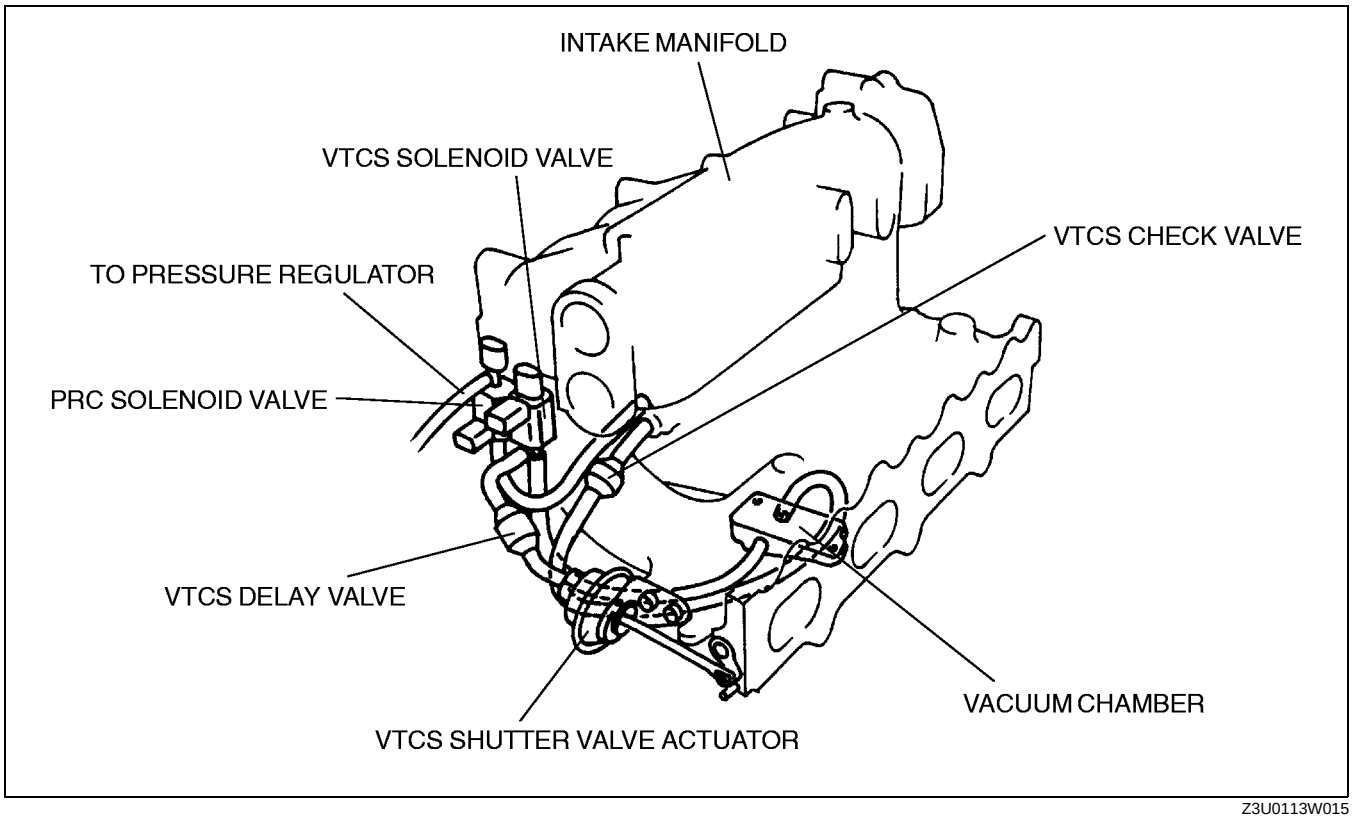
Z3U0113W002

VACUUM HOSE ROUTING DIAGRAM [ZM]

A3U011320030W02



Y3U113WA5



Z3U0113W015

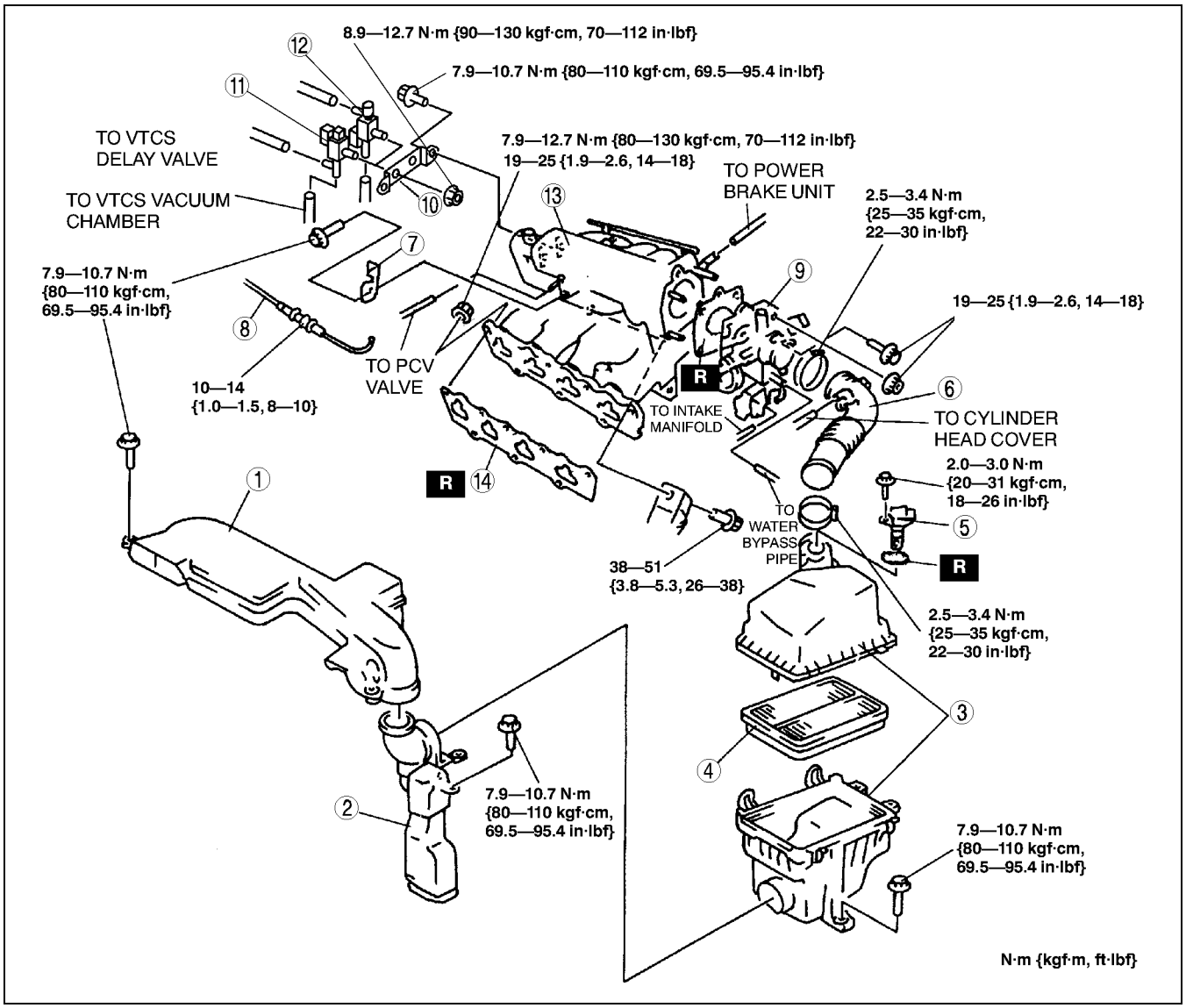
INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM]

A3U011313000W02

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

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Z3U0113W003

1	Fresh-air duct
2	Resonance chamber
3	Air cleaner
4	Air cleaner element
5	MAF sensor (Integrated with IAT sensor)
6	Air hose
7	Accelerator cable bracket
8	Accelerator cable (See 01–13A–6 Accelerator Cable Installation Note)

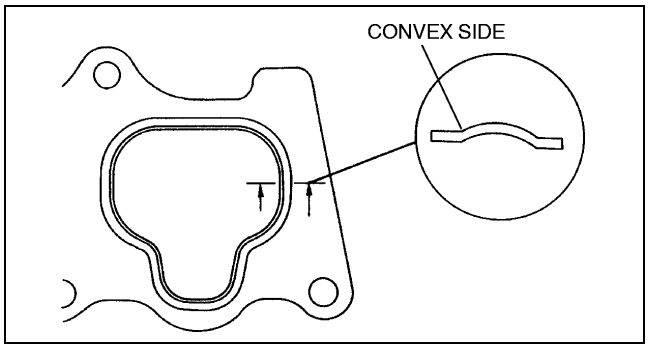
9	Throttle body (See 01–13A–6 Throttle Body Removal Note) (See 01–13A–6 Throttle Body Installation Note)
10	VTCS solenoid valve bracket
11	VTCS solenoid valve
12	PRC solenoid valve
13	Intake manifold (See 01–13A–6 Intake Manifold Removal Note)

14	Intake manifold gasket (See 01–13A–6 Intake Manifold Gasket Installation Note)

Throttle Body Removal Note
- Drain the engine coolant from the radiator. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

Intake Manifold Removal Note
- Remove the fuel injector before removing the throttle body. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)

Intake Manifold Gasket Installation Note
- To install the intake manifold gasket, make sure that the convex side of the gasket is facing the intake manifold side.



X3U113WA2

Throttle Body Installation Note
- Refill the radiator with engine coolant after installing the throttle body. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

Accelerator Cable Installation Note
- Carry out the “ACCELERATOR CABLE INSPECTION/ADJUSTMENT” procedure after installing the accelerator cable. (See 01–13A–13 ACCELERATOR CABLE INSPECTION/ADJUSTMENT [ZM].)

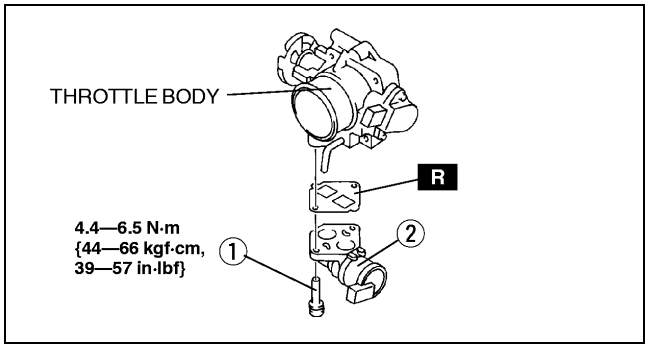
IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [ZM]

A3U011320661W03

1. Disconnect the negative battery cable.
2. Remove the air hose and throttle body. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].)
3. Disconnect the IAC valve connector.
4. Remove in the order indicated in the table.

1	Bolt
2	IAC valve

5. Install in the reverse order of removal.



Y3U113WA2

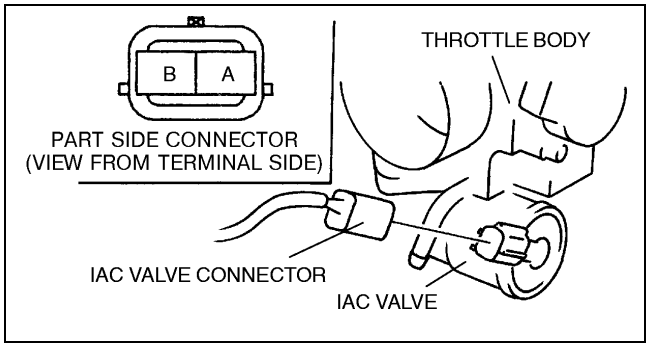
IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM]

A3U011320661W04

Resistance Inspection

Note
- Perform the following test only as directed.

1. Carry out the “Idle Air Control (IAC) Inspection”. (See 01–03A–57 Idle Air Control (IAC) Inspection.)
   - If not as specified, perform the further inspection for the IAC valve.
2. Disconnect the negative battery cable.
3. Disconnect the IAC valve connector.
4. Measure the resistance between the IAC valve terminals using an ohmmeter.
   - If not as specified, replace the IAC valve. (See 01–13A–6 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [ZM].)
   - If as specified, but PID value is failed, carry out the “Circuit Open/Short Inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If the above open or short circuit is okay, replace IAC valve.



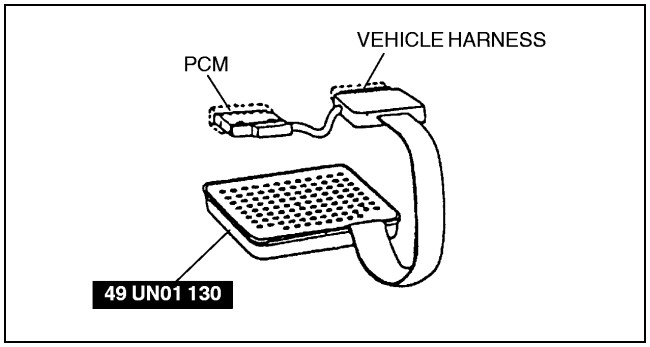
Y3U113WA3

Resistance
7.7—9.3 ohms [23 °C {73 °F}]

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



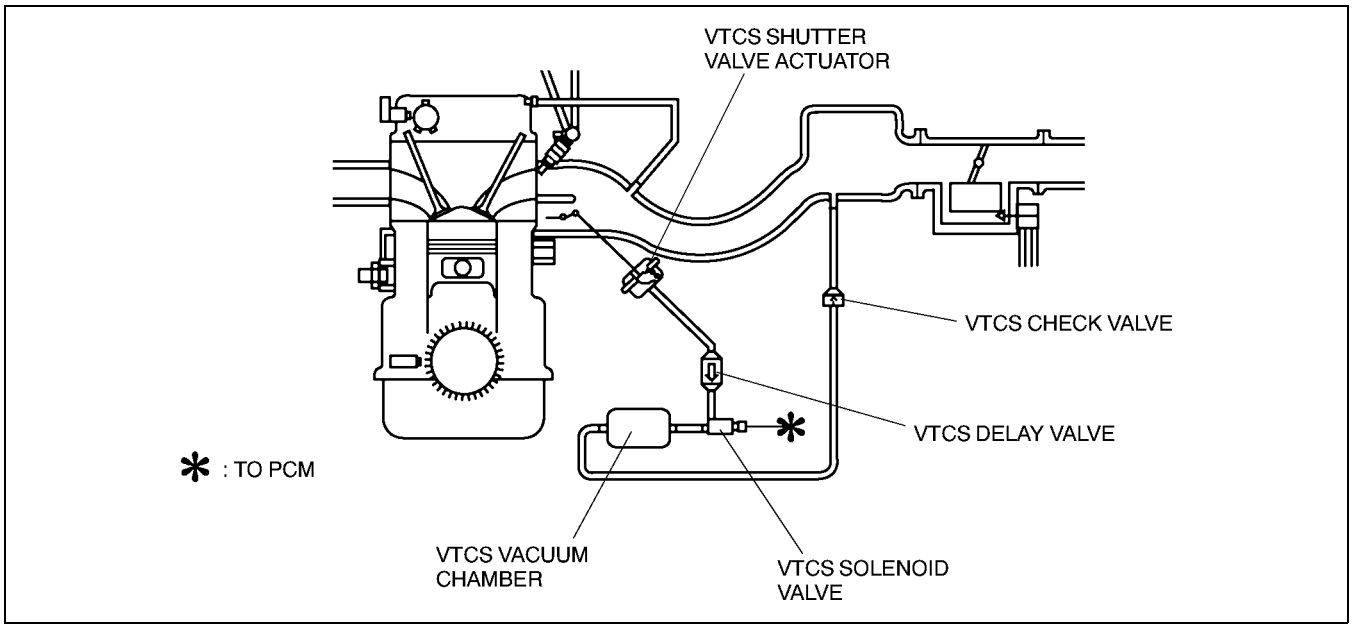
X3U113WAJ

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (IAC valve connector terminal A and PCM connector terminal 54)
   - GND circuit (IAC valve connector terminal B and PCM connector terminal 83)

   Short circuit
   - Power circuit (IAC valve connector terminal A and PCM connector terminal 54 to GND)
   - GND circuit (IAC valve connector terminal B and PCM connector terminal 83 to GND)
5. Reconnect the IAC valve connector.
6. Reconnect the negative battery cable.

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DIAGRAM [ZM]

A3U011313012W02



Z3U0113W004

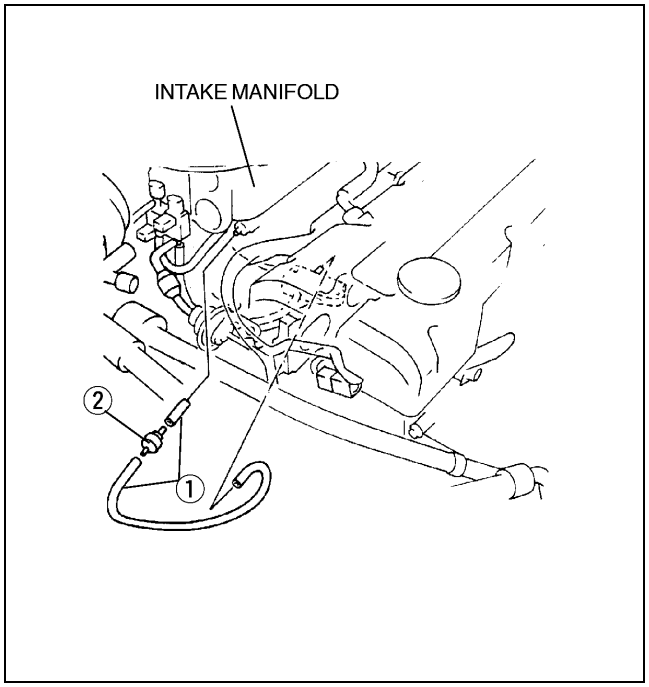
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [ZM]

A3U011342913W01

1. Disconnect the negative battery cable.
2. Remove the air hose, throttle body and intake manifold. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [ZM].)
3. Remove in the order indicated in the table.

1	Vacuum hose
2	VTCS check valve (one-way)

4. Install in the reverse order of removal.

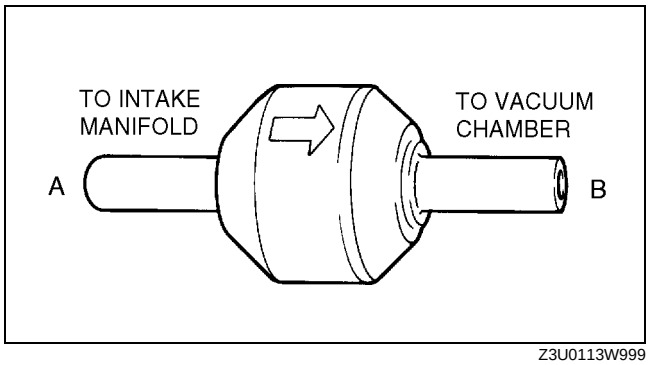


X3U113WA5

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) INSPECTION [ZM]

A3U011342913W02

1. Remove the VTCS check valve (one-way). (See 01–13A–8 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [ZM].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the VTCS check valve (one-way).
3. Blow through port B and verify that the air does not flow from port A.
   - If not as specified, replace the VTCS check valve (one-way).



Z3U0113W999

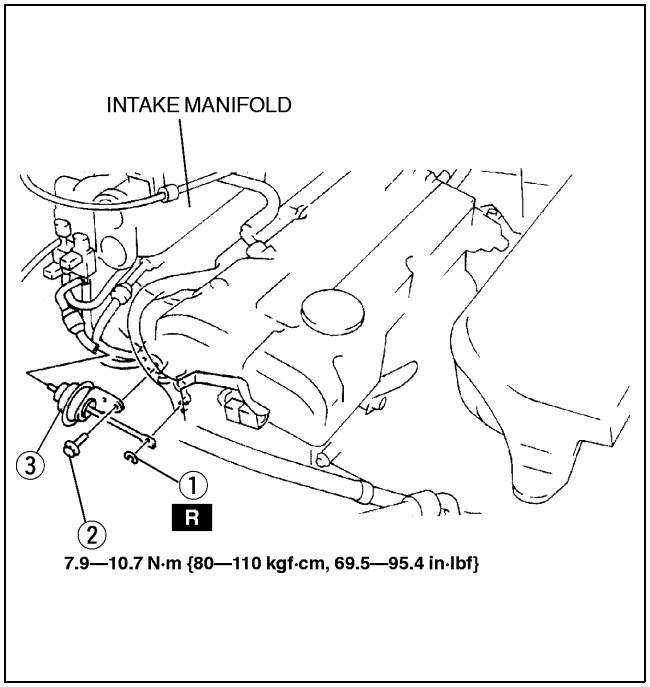
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [ZM]

A3U011320153W03

1. Disconnect the negative battery cable.
2. Remove the air hose, throttle body and intake manifold. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].)
3. Remove in the order indicated in the table.

1	E-ring
2	Bolt
3	VTCS shutter valve actuator

4. Install in the reverse order of removal.



Y3U113WA6

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [ZM]

A3U011320153W04

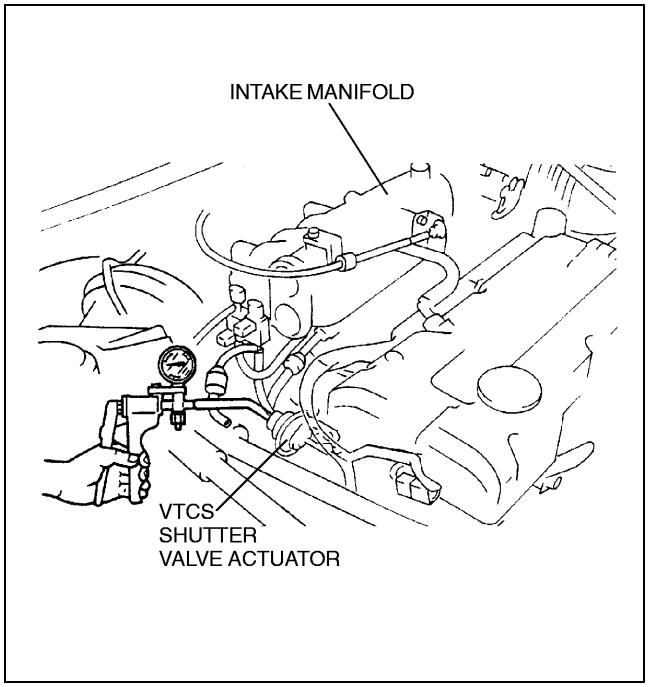
Operating Inspection

Note
- Perform the following test only as directed.

1. Carry out the “VTCS Operation Inspection”. (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.)
   - If not as specified, perform the further inspection for the VTCS shutter valve actuator.
2. Disconnect the vacuum hose from the VTCS shutter valve actuator.
3. Connect a vacuum pump to the VTCS shutter valve actuator.
4. 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–9 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/ INSTALLATION [ZM].)
   - If as specified, but “VTCS Operation Inspection” is failed, inspect the vacuum hoses for improper routing, kinks or leakage, and inspect the following:

Pressure (kPa {mmHg, inHg})	Rod movement
Above –1.2 {–9.0, –0.35}	Not pulled
–3.6— –27.9 {–28— –209, –1.1— –8.2	Start to move
Below –27.9 {–209, –8.2}	Fully pulled

5. Disconnect the vacuum pump to the VTCS shutter valve actuator.
6. Reconnect the vacuum hose from the VTCS shutter valve actuator.



X3U113WA8

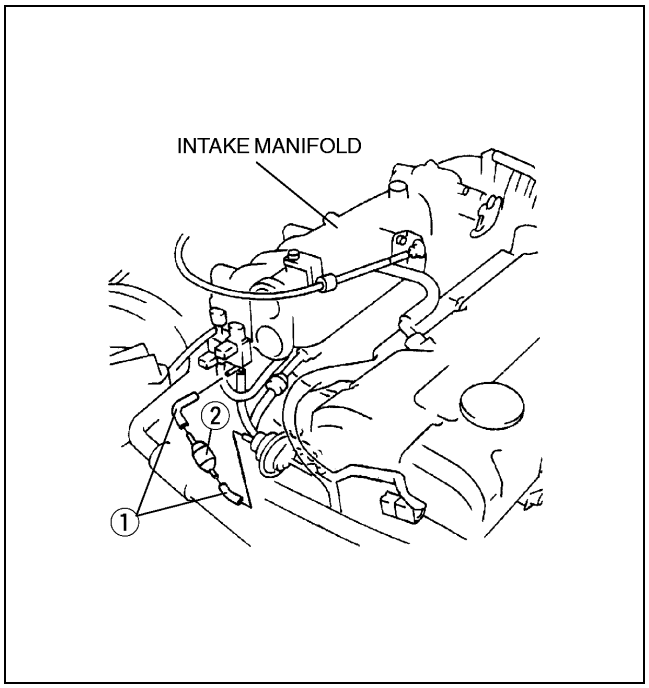
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [ZM]

A3U011318800W03

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Vacuum hose
2	VTCS delay valve

3. Install in the reverse order of removal.

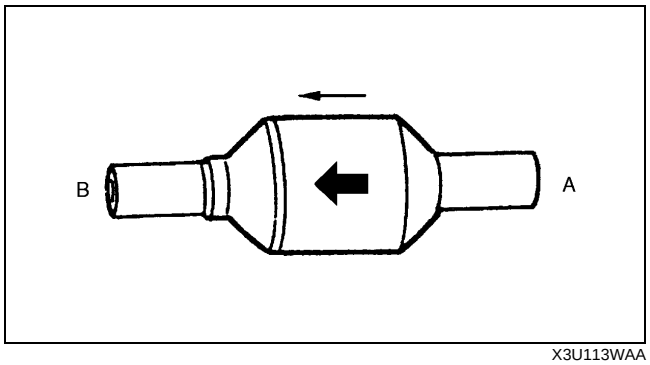


X3U113WA9

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE INSPECTION [ZM]

A3U011318800W04

1. Remove the VTCS delay valve. (See 01–13A–10 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [ZM].)
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.



X3U113WAA

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [ZM]

A3U011318745W02

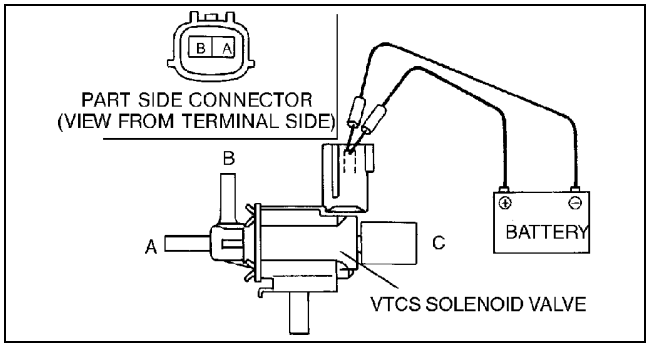
Simulation Test

1. Carry out the “VTCS Operation Inspection”. (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.)
   - If not as specified, perform the further inspection for the VTCS solenoid valve.

Airflow Inspection

Note
- Perform the following test only as directed.

1. Remove the VTCS solenoid valve.
2. Inspect airflow each port under the following condition.
   - If as specified, replace the VTCS solenoid valve.
   - If as specified but the “VTCS Operation Inspection” is failed, inspect evaporative hoses for improper routing, kinks or leakage, and “Circuit Open/Short Inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If the above open or short circuit is okay, replace VTCS solenoid valve.



Y3U113WA4

○—○ : Continuity ○═○ : Airflow

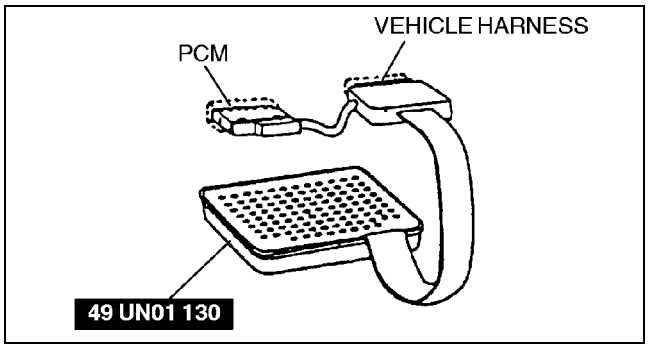
Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

X3U113WAI

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

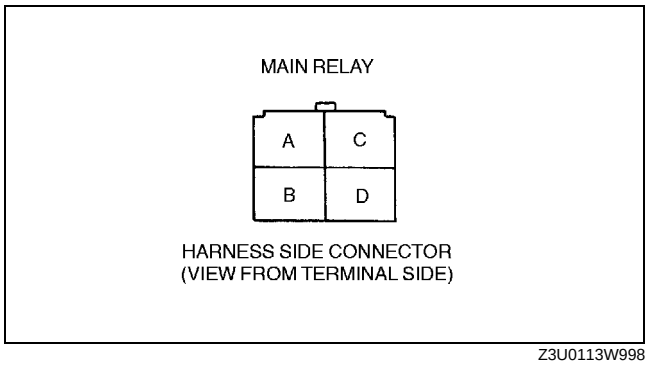
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U113WAC

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector)
   - Control circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 19)

   Short circuit
   - Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
   - Control circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 19 to GND)



Z3U0113W998

5. Reconnect the VTCS solenoid valve connector.
6. Reconnect the negative battery cable.

ACCELERATOR CABLE REMOVAL/INSTALLATION [ZM]

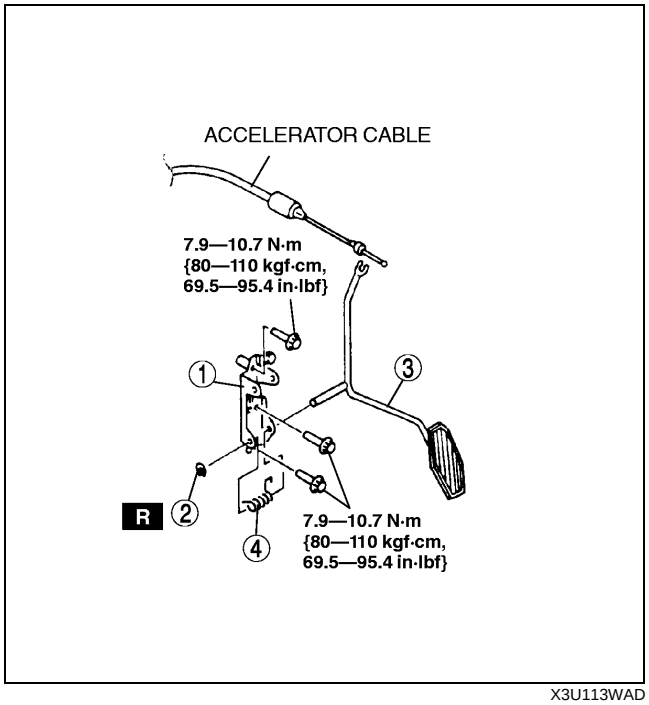
A3U011341660W04

Note
- Accelerator removal and installation on cruise control system–equipped vehicles is not possible.

1. Remove in the order indicated in the table.

1	Retainer
2	E-ring
3	Accelerator pedal (See 01–13A–13 Accelerator Pedal Installation Note)
4	Return spring

2. Install in the reverse order of removal.



X3U113WAD

Accelerator Pedal Installation Note

1. Set the accelerator pedal securely, taking care not to bend the accelerator cable.

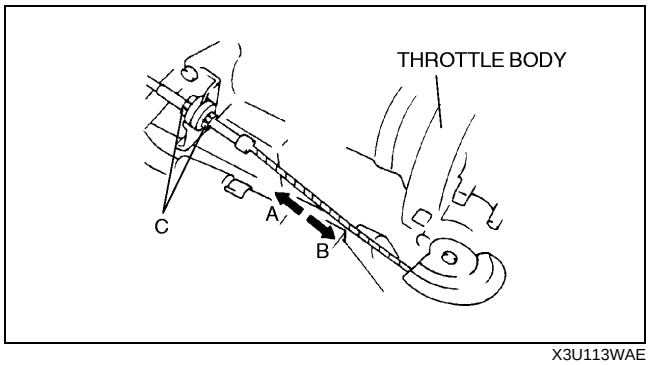
ACCELERATOR CABLE INSPECTION/ADJUSTMENT [ZM]

A3U011341660W05

1. Verify that the throttle valve is fully closed.
2. Pull the accelerator cable in A and B directions, and measure the free play.
   - If not as specified, adjust by turning locknuts C.

Free Play
1—3 mm {0.04—0.11 in}

Tightening torque
10—14 N·m {1.0—1.5 kgf·m, 8—10 ft·lbf}

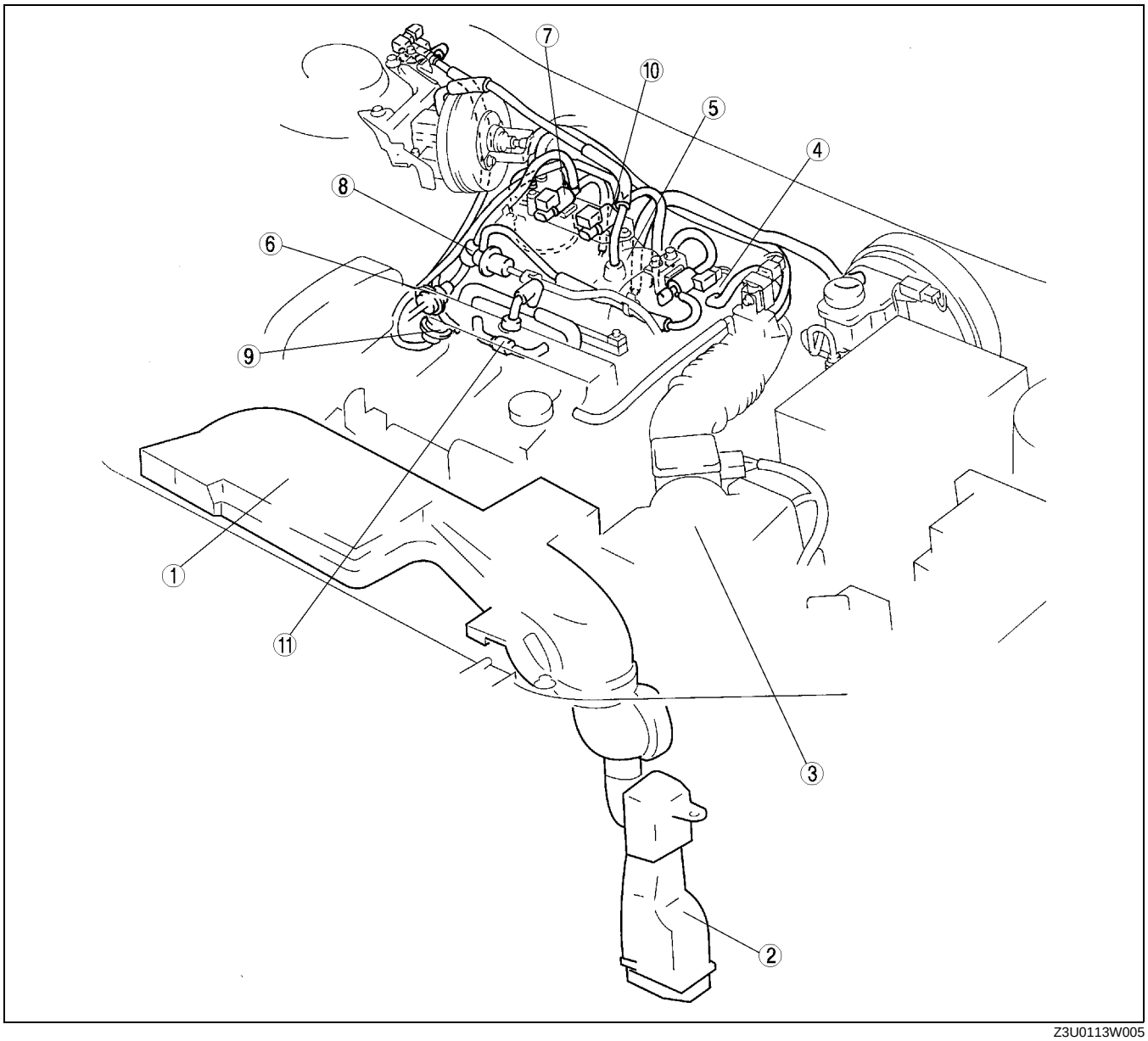


X3U113WAE

01–13B INTAKE-AIR SYSTEM [FS]

INTAKE-AIR SYSTEM LOCATION INDEX [FS]

A3U011301005W01



Z3U0113W005

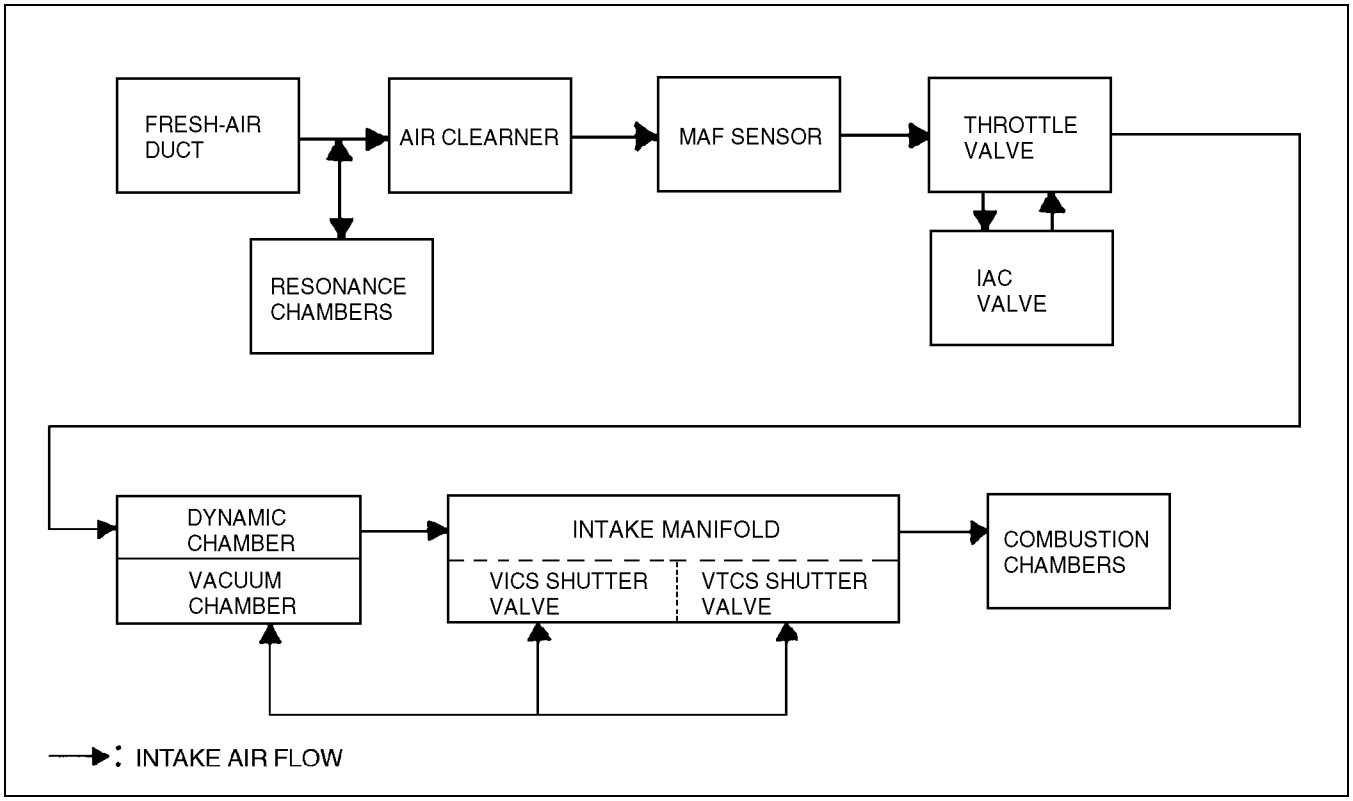
1	Fresh-air duct (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
2	Resonance chamber (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
3	Air cleaner (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
4	Throttle body (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
5	Intake manifold (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])

6	VTCS shutter valve actuator (See 01–13B–13 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]) (See 01–13B–14 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [FS])
7	VTCS solenoid valve (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS]) (See 01–13B–15 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS])
8	VTCS delay valve (See 01–13B–14 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/ INSTALLATION [FS]) (See 01–13B–15 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE INSPECTION [FS])

9	VICS shutter valve actuator (See 01–13B–11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]) (See 01–13B–11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS])
10	VICS solenoid valve (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS]) (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS])
11	Vacuum chamber check valve (See 01–13B–9 VACUUM CHAMBER CHECK VALVE REMOVAL/INSTALLATION [FS]) (See 01–13B–9 VACUUM CHAMBER CHECK VALVE INSPECTION [FS])

INTAKE-AIR SYSTEM FLOW DIAGRAM [FS]

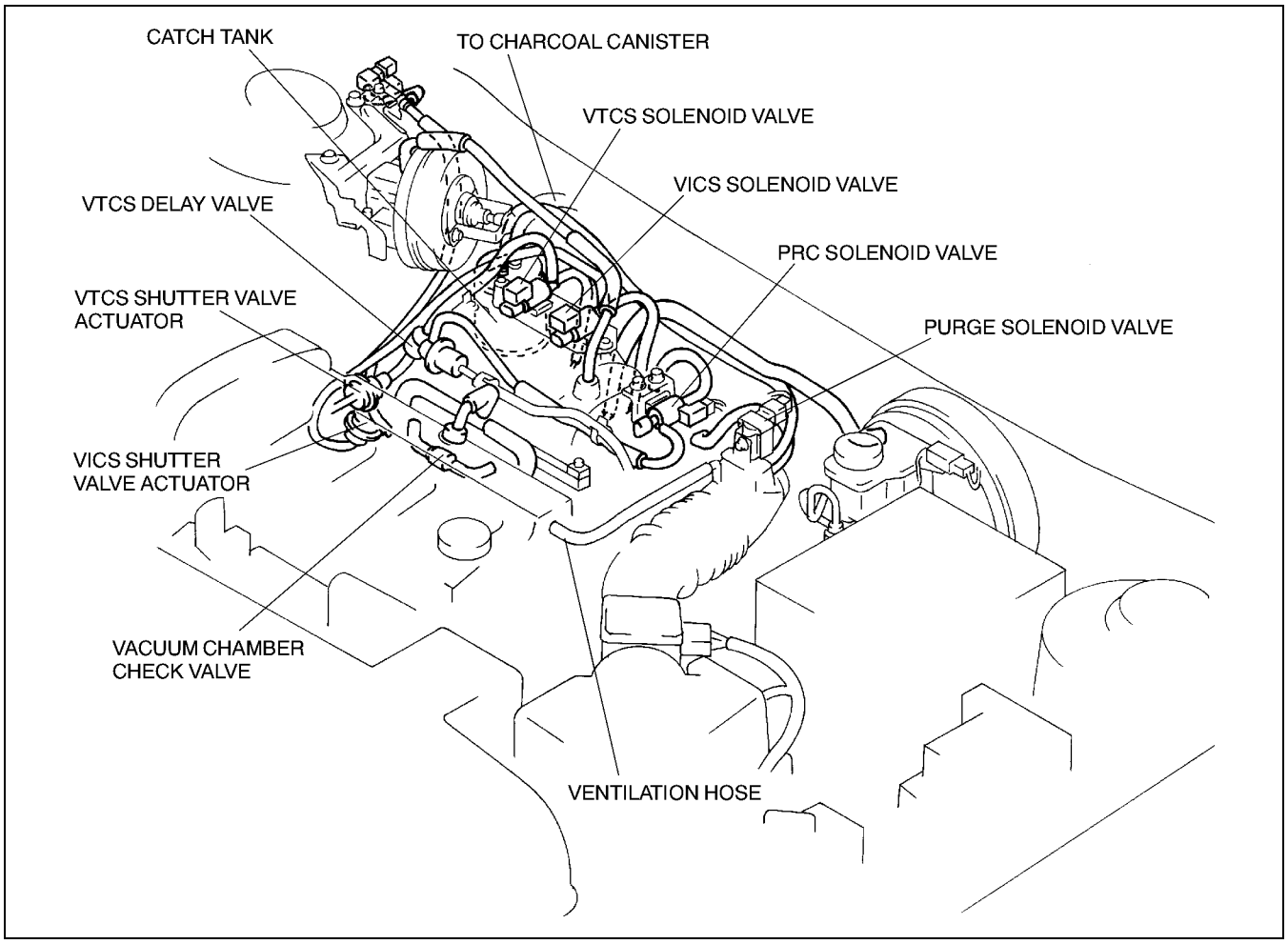
A3U011301005W02



Z3U0113W006

VACUUM HOSE ROUTING DIAGRAM [FS]

A3U011320030W01



Z3U0113W007

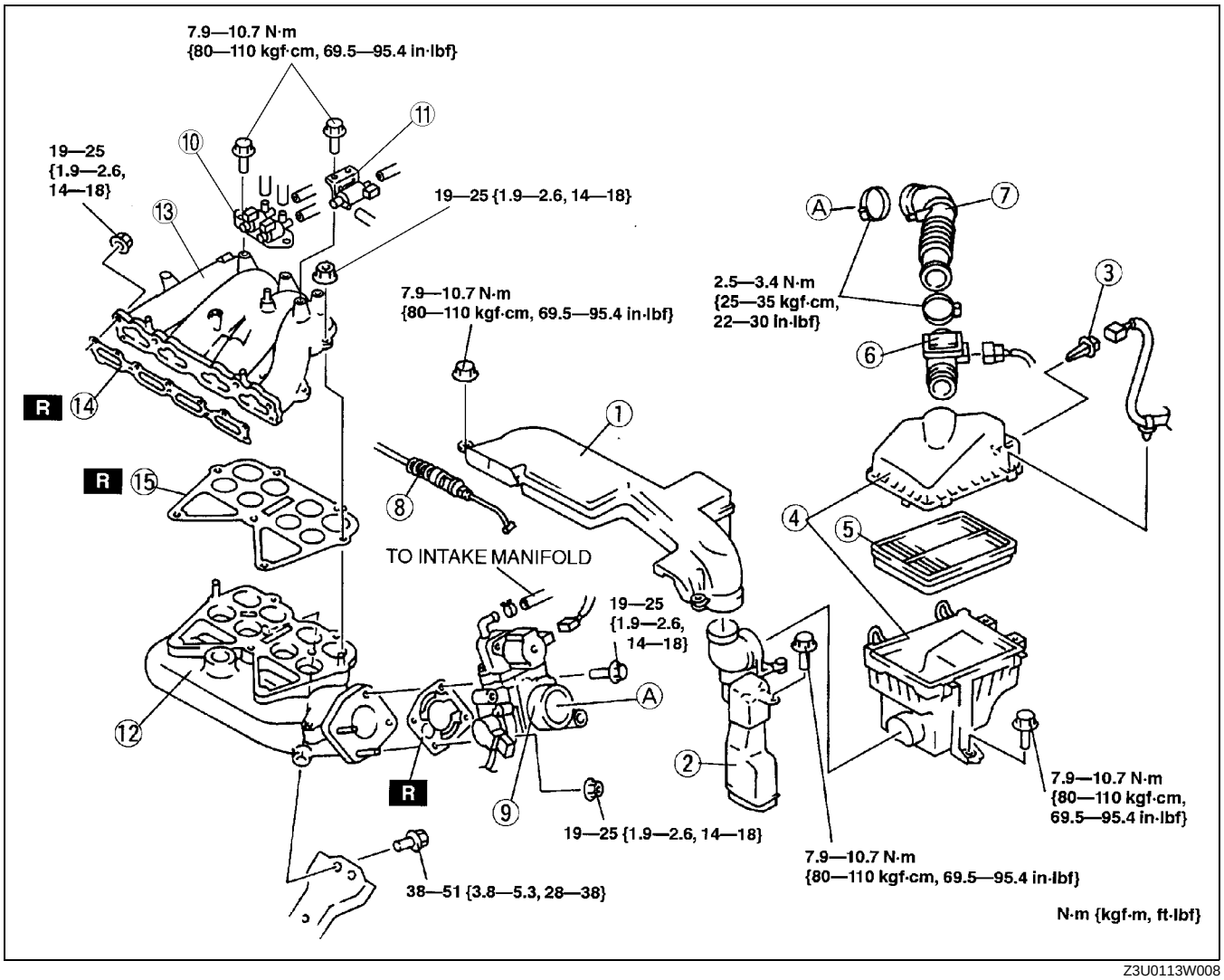
INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS]

A3U011313000W01

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

1. Disconnect the battery negative cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Z3U0113W008

1	Fresh-air duct
2	Resonance chamber
3	IAT sensor
4	Air cleaner
5	Air cleaner element
6	MAF sensor
7	Air hose
8	Accelerator cable (See 01–13B–7 Accelerator Cable Installation Note)
9	Throttle body (See 01–13B–7 Throttle Body Removal Note) (See 01–13B–7 Throttle Body Installation Note)

10	Solenoid valve bracket
11	PRC solenoid valve
12	Dynamic chamber
13	Intake manifold (See 01–13B–7 Intake Manifold Removal Note)
14	Intake manifold gasket (See 01–13B–7 Intake Manifold Gasket Installation Note)
15	Dynamic chamber gasket (See 01–13B–7 Dynamic Chamber Gasket Installation Note)

Throttle Body Removal Note

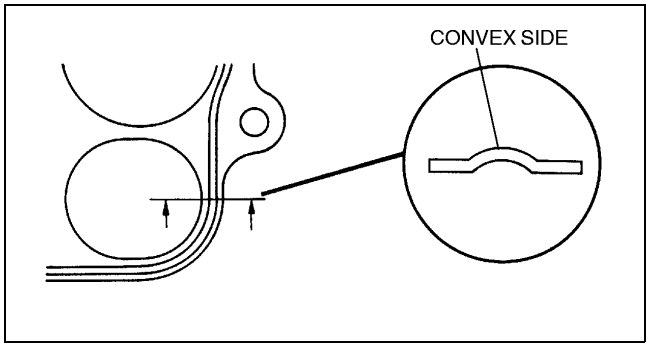
1. Drain the engine coolant from the radiator before removing the throttle body. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

Intake Manifold Removal Note

1. Remove the fuel injector before removing the intake manifold. (See 01–14–21 FUEL INJECTOR REMOVAL/ INSTALLATION.)

Dynamic Chamber Gasket Installation Note

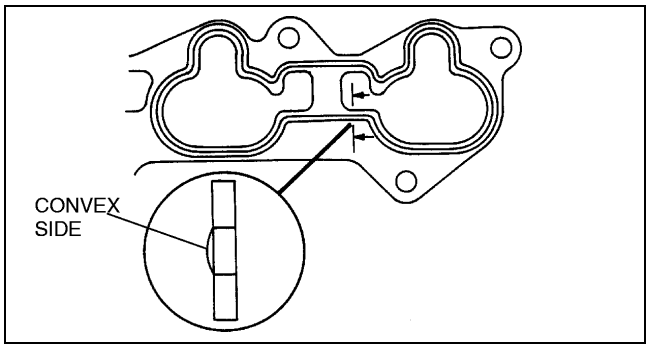
1. To install the dynamic chamber gasket, make sure that the convex side of the gasket is facing the intake manifold side.



X3U113WDE

Intake Manifold Gasket Installation Note

1. To install the intake manifold gasket, make sure that the convex side of the gasket is facing the intake manifold side.



X3U113WD4

Throttle Body Installation Note

1. Refill the radiator withengine coolant after installing the throttle body. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

Accelerator Cable Installation Note

1. Carry out the “ACCELERATOR CABLE INSPECTION/ADJUSTMENT” procedure after installing the accelerator cable. (See 01–13B–17 ACCELERATOR CABLE INSPECTION [FS].) (See 01–13B–17 ACCELERATOR CABLE ADJUSTMENT [FS].)

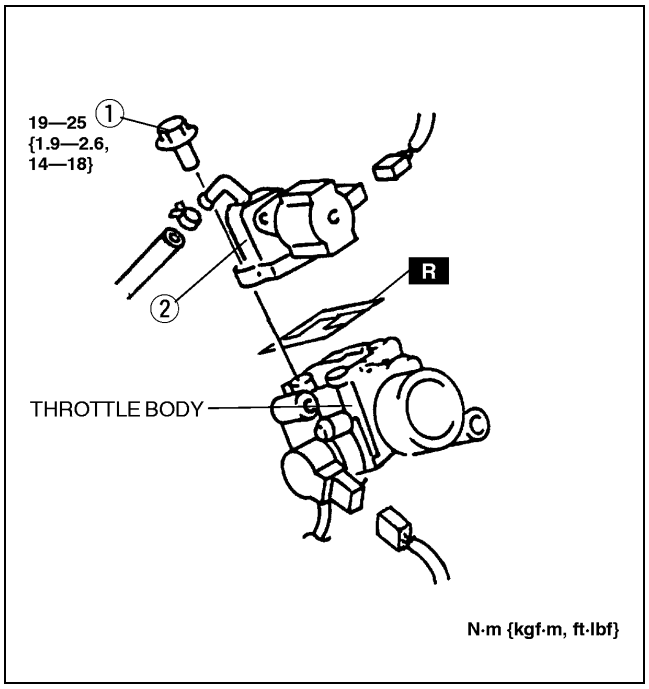
IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [FS]

A3U011320661W01

1. Disconnect the battery negative cable.
2. Remove the air hose and throttle body. (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Disconnect the IAC valve connector.
4. Remove in the order indicated in the table.

1	Bolt
2	IAC valve

5. Install in the reverse order of removal.



X3U113WD5

IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS]

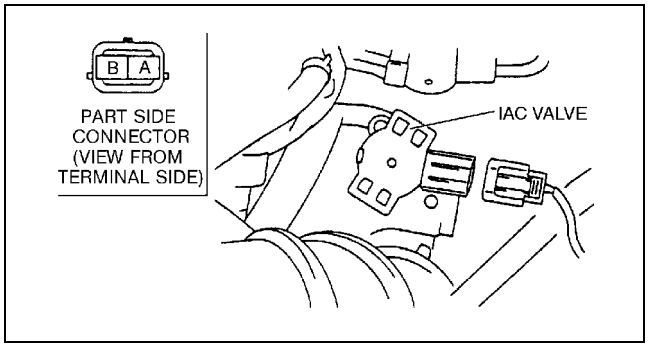
A3U011320661W02

Resistance Inspection

Note
- Perform the following test only as directed.

1. Carry out the “Idle Air Control (IAC) Inspection”. (See 01–03B–56 Idle Air Control (IAC) Inspection.)
   - If not as specified, perform the further inspection for the IAC valve.
2. Disconnect the battery negative cable.
3. Disconnect the IAC valve connector.
4. Measure the resistance between the IAC valve terminals using an ohmmeter.
   - If not as specified, replace the IAC valve. (See 01–13B–8 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [FS].)
   - If as specified, but PID value failed, carry out the “Circuit Open/Short inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If there is no open or short circuit, replace IAC valve.

Resistance
7.7—9.3 ohms [23 °C {73 °F}]

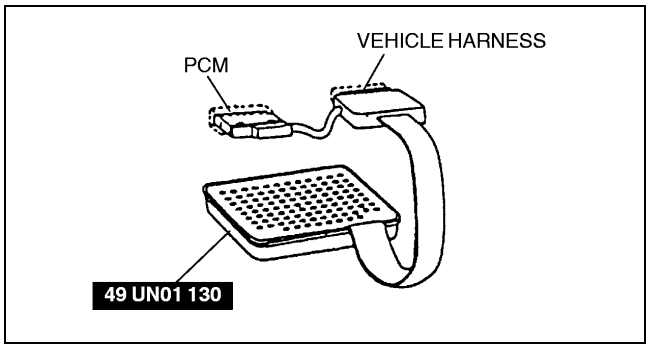


Z3U0113W997

Circuit Open/Short Inspection

1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U113WDG

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (IAC valve connector terminal A and PCM connector terminal 54)
   - GND circuit (IAC valve connector terminal B and PCM connector terminal 83)

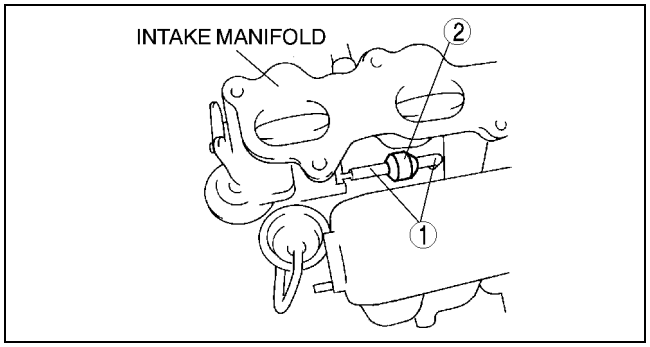
   Short circuit
   - Power circuit (IAC valve connector terminal A and PCM connector terminal 54 to GND)
   - GND circuit (IAC valve connector terminal B and PCM connector terminal 83 to GND)
5. Reconnect the IAC valve connector.
6. Reconnect the battery negative cable.

VACUUM CHAMBER CHECK VALVE REMOVAL/INSTALLATION [FS]

A3U011342910W01

1. Disconnect the battery negative cable.
2. Remove the air hose, throttle body and intake manifold. (See 01–13B–6 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	Vacuum chamber check valve

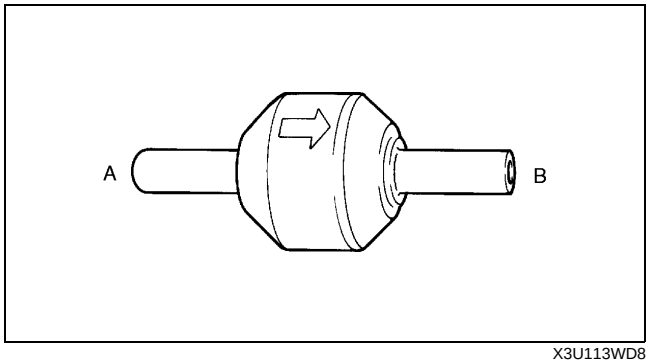


Z3U0113W009

VACUUM CHAMBER CHECK VALVE INSPECTION [FS]

A3U011342910W02

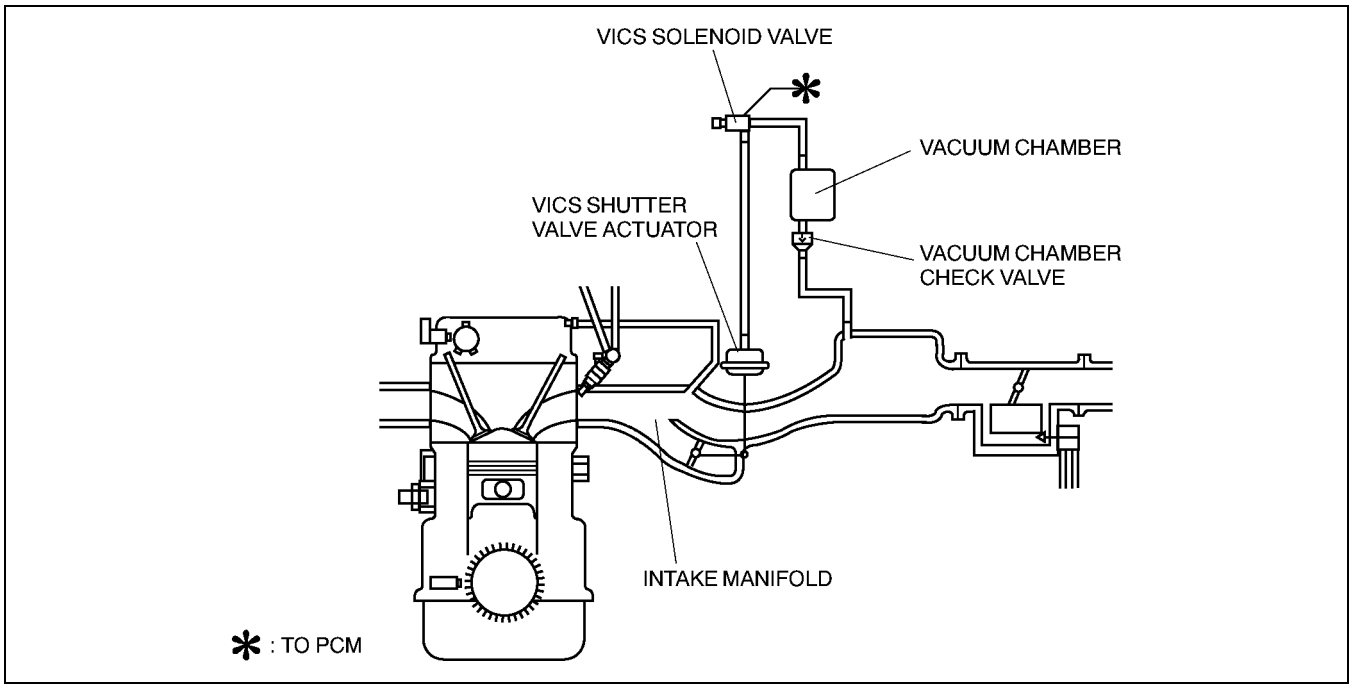
1. Remove the vacuum chamber check valve. (See 01–13B–9 VACUUM CHAMBER CHECK VALVE REMOVAL/INSTALLATION [FS].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the vacuum chamber check valve.
3. Blow through port B and verify that the air does not flow from port A.
   - If not as specified, replace the vacuum chamber check valve.



X3U113WD8

VARIABLE INERTIA CHARGING SYSTEM (VICS) DIAGRAM [FS]

A3U011313011W01



Z3U0113W010

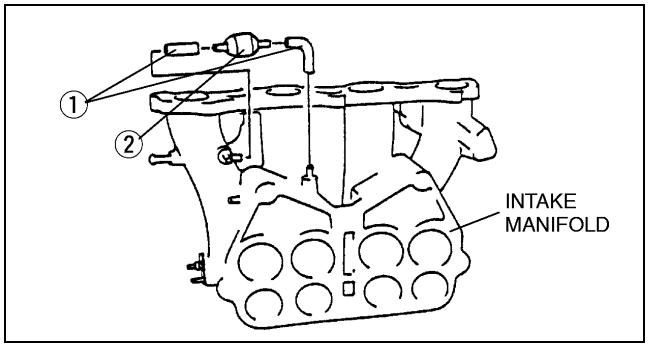
VARIABLE INERTIA CHARGING SYSTEM (VICS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [FS]

A3U011313995W01

1. Disconnect the negative battery cable.
2. Remove the air hose, throttle body and intake manifold. (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.

1	Vacuum hose
2	VICS check valve (one-way)

4. Install in the reverse order of removal.

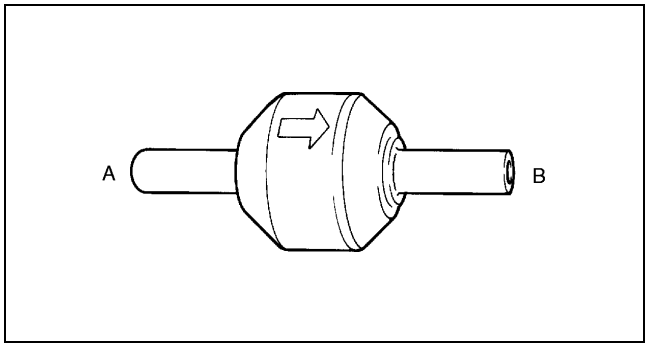


X3U113WD7

VARIABLE INERTIA CHARGING SYSTEM (VICS) CHECK VALVE (ONE-WAY) INSPECTION [FS]

A3U011313995W02

1. Remove the VICS check valve (one-way). (See 01–13B–10 VARIABLE INERTIA CHARGING SYSTEM (VICS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [FS].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the VICS check valve (one-way).
3. Blow through port B and verify that the air does not flow from port A.
   - If not as specified, replace the VICS check valve (one-way).



X3U113WD8

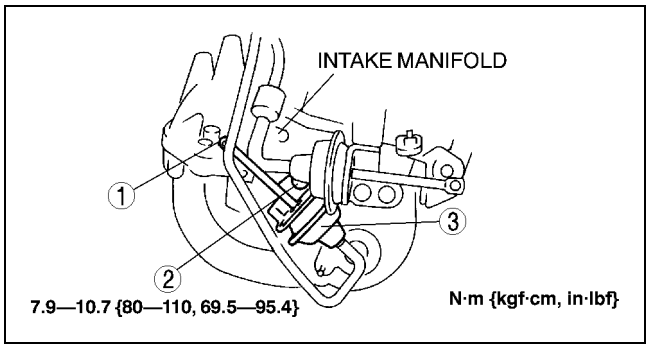
VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]

A3U011320152W01

1. Disconnect the battery negative cable.
2. Remove in the order indicated in the table.

1	E ring
2	Bolt
3	VICS shutter valve actuator

3. Install in the reverse order of removal.



Z3U0113W011

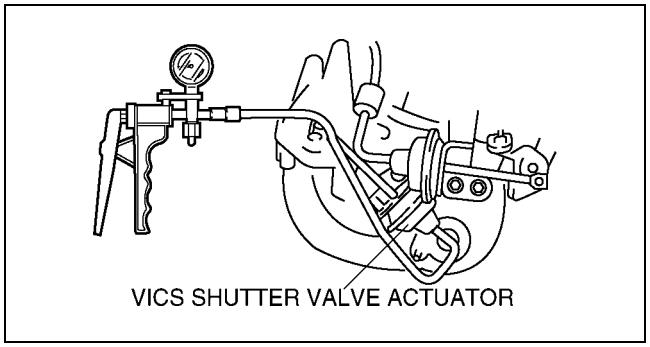
VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS]

A3U011320152W02

Operating Inspection

Note
- Perform the following test only as directed.

1. Carry out the “VICS Operation Inspection”. (See 01–03B–57 VICS Operation Inspection.)
   - If not as specified, perform the further inspection for the VICS shutter valve actuator.
2. Disconnect the vacuum hose from the VICS shutter valve actuator.
3. Connect a vacuum pump to the VICS shutter valve actuator.
4. Apply pressure slowly and inspect the rod movement of the VICS shutter valve actuator under the following condition.
   - If not as specified, replace the VICS shutter valve actuator. (See 01–13B–11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR REMOVAL/ INSTALLATION [FS].)
   - If as specified, but “VICS Operation Inspection” failed, inspect the vacuum hoses for proper routing, kinks or leakage.



Z3U0113W017

Pressure (kPa {mmHg, inHg})	Rod movement
Above –2.7 {–20, –0.80}	Not pulled
–8.0— –35.3 {–61— –264, –2.4— –10.4}	Starts to move
Below –35.3 {–265, –10.4}	Fully pulled

5. Disconnect the vacuum pump from the VICS shutter valve actuator.
6. Reconnect the vacuum hose to the VICS shutter valve actuator.

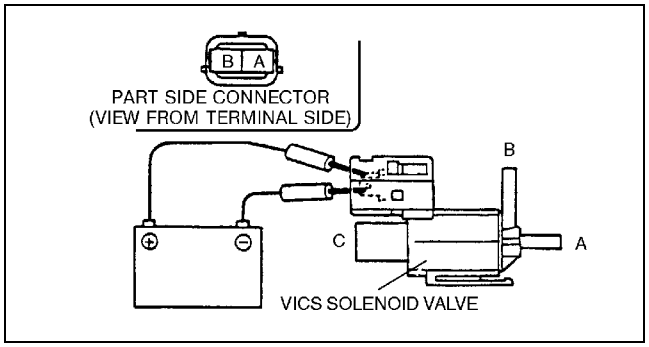
VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS]

A3U011318740W01

Airflow Inspection

Note
- Perform the following test only as directed.

1. Carry out the “VICS Operation Inspection”. (See 01–03B–57 VICS Operation Inspection.)
   - If not as specified, perform the further inspection for the VICS solenoid valve.
2. Disconnect the battery negative cable.
3. Remove the VICS solenoid valve.
4. Inspect for airflow between each port under the following condition.
   - If not as specified, replace the VICS solenoid valve.
   - If as specified but the “VICS Operation Inspection” failed, carry out the “Circuit Open/ Short Inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If there is no open or short circuit, replace VICS solenoid valve.



Y3U113WAB

○—○ : Continuity ○═○ : Airflow

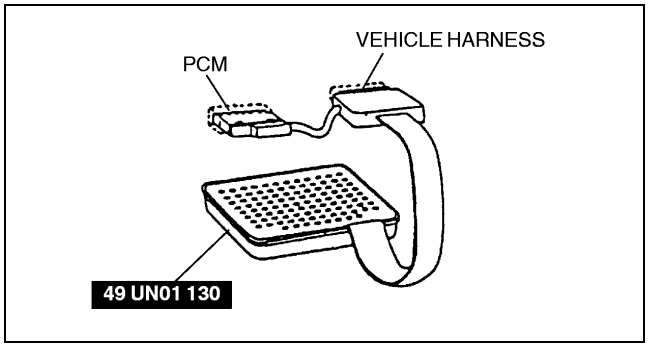
Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

X3U113WDF

Circuit Open/Short Inspection

1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



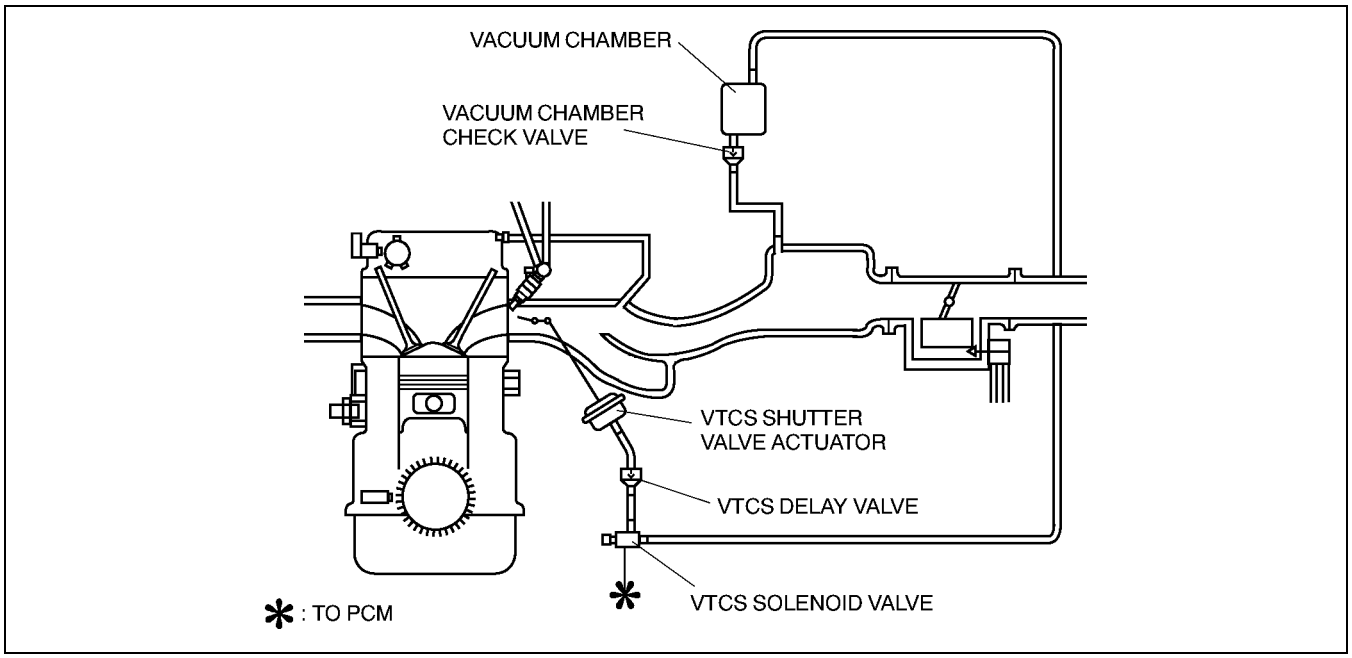
X3U113WDG

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (VICS solenoid valve connector terminal A and main relay connector terminal D)
   - Control circuit (VICS solenoid valve connector terminal B and PCM connector terminal 19)

   Short circuit
   - Power circuit (VICS solenoid valve connector terminal A and main relay connector terminal D to GND)
   - Control circuit (VICS solenoid valve connector terminal B and PCM connector terminal 19 to GND)
5. Reconnect the VICS solenoid valve connector.
6. Reconnect the battery negative cable.

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DIAGRAM [FS]

A3U011313012W01



Z3U0113W012

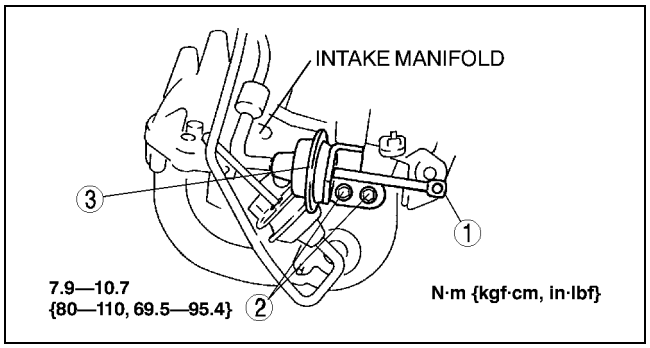
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]

A3U011320153W01

1. Disconnect the battery negative cable.
2. Remove the air hose, throttle body and intake manifold. (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.

1	E-ring
2	Bolts
3	VTCS shutter valve actuator

4. Install in the reverse order of removal.



Z3U0113W013

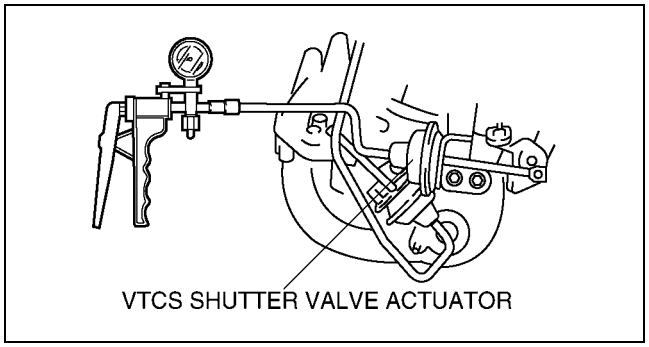
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [FS]

A3U011320153W02

Operating Inspection

Note
- Perform the following test only as directed.

1. Carry out the “VTCS Operation Inspection”. (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.)
   - If not as specified, perform the further inspection for the VTCS shutter valve actuator inspection.
2. Disconnect the vacuum hose from the VTCS shutter valve actuator.
3. Connect a vacuum pump to the VTCS shutter valve actuator.
4. 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 01–13B–13 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/ INSTALLATION [FS].)
   - If as specified, but “VTCS Operation Inspection” is failed, inspect the vacuum hoses for improper routing, kinks or leakage.



Z3U0113W014

Pressure (kPa {mmHg, inHg})	Rod movement
Above –2.7 {–2.0, –0.80}	Not pulled
–8.0— –35.3 {–61— –264, –2.4— –10.4}	Starts to move
Below –35.3 {–26.5, –10.4}	Fully pulled

5. Disconnect the vacuum pump from the VTCS shutter valve actuator.
6. Reconnect the vacuum hose to the VTCS shutter valve actuator.

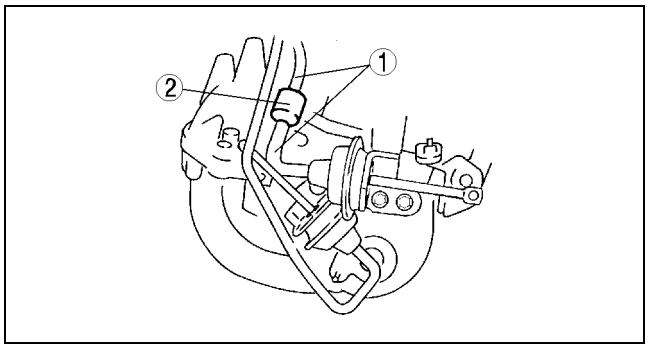
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [FS]

A3U011318800W01

1. Disconnect the battery negative cable.
2. Remove in the order indicated in the table.

1	Vacuum hose
2	VTCS delay valve

3. Install in the reverse order of removal.

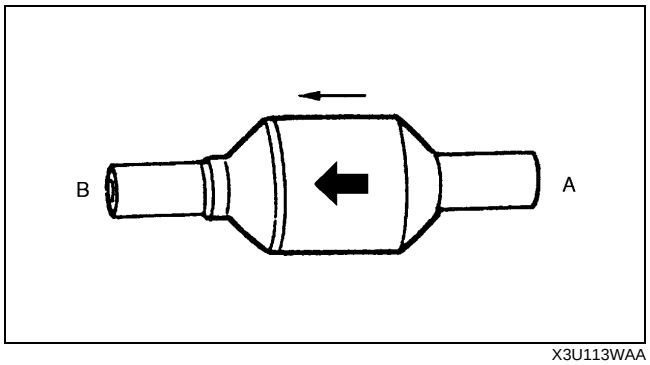


Z3U0113W016

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE INSPECTION [FS]

A3U011318800W02

1. Remove the VTCS delay valve. (See 01–13B–14 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.



X3U113WAA

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS]

A3U011318745W01

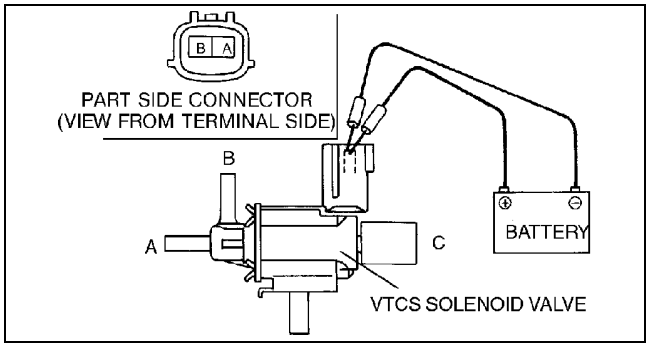
Simulation Test

1. Carry out the “VTCS Operation Inspection”. (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.)
   - If not as specified, perform the further inspection for the VTCS solenoid valve.

Airflow Inspection

Note
- Perform the following test only as directed.

1. Remove the VTCS solenoid valve.
2. Inspect for airflow each port under the following condition.
   - If as specified, replace the VTCS solenoid valve.
   - If as specified but the “VTCS Operation Inspection” is failed, inspect evaporative hoses for improper routing, kinks or leakage, and inspect “Circuit Open/Short Inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If the above open or short circuit is okay, replace VTCS solenoid valve.



Y3U113WA4

○—○ : Continuity ○═○ : Airflow

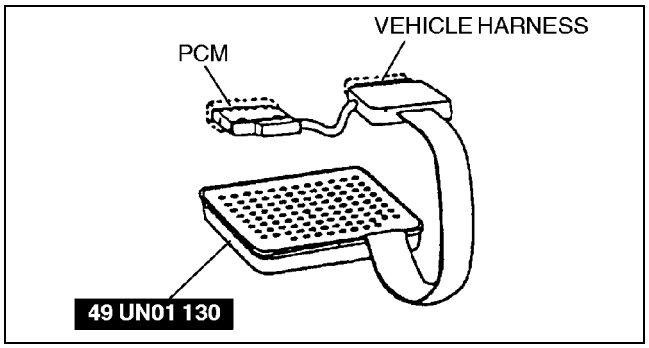
Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

X3U113WAI

Circuit Open/Short Inspection

1. Disconnect the PCM connector.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

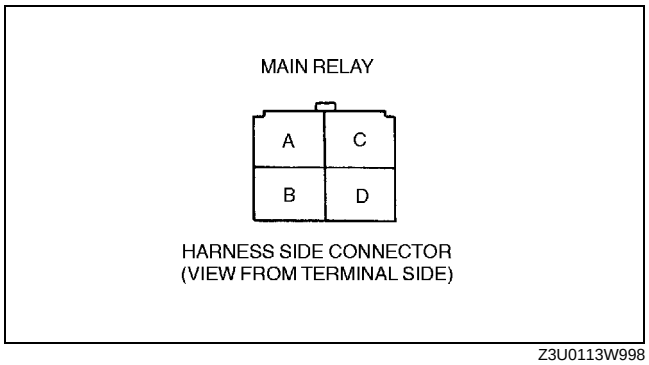
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U113WAC

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D)
   - Control circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 19)

   Short circuit
   - Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D to GND)
   - Control circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 19 to GND)



Z3U0113W998

5. Reconnect the VTCS solenoid valve connector.
6. Reconnect the battery negative cable.

ACCELERATOR CABLE REMOVAL/INSTALLATION [FS]

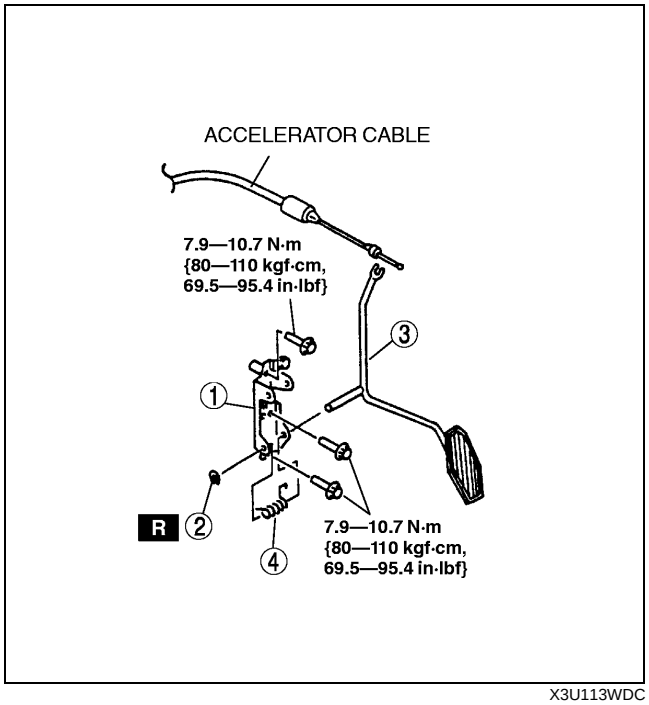
A3U011341660W01

Note
- Accelerator removal and installation on cruise control system–equipped vehicles is not possible.

1. Remove in the order indicated in the table.

1	Retainer
2	E ring
3	Accelerator pedal (See 01–13B–17 Accelerator Pedal Installation Note)
4	Return spring

2. Install in the reverse order of removal.



X3U113WDC

Accelerator Pedal Installation Note

1. Set the accelerator pedal securely, be sure not to bend the accelerator cable.

ACCELERATOR CABLE INSPECTION [FS]

A3U011341660W02

1. Verify that the throttle valve is fully closed.

Note

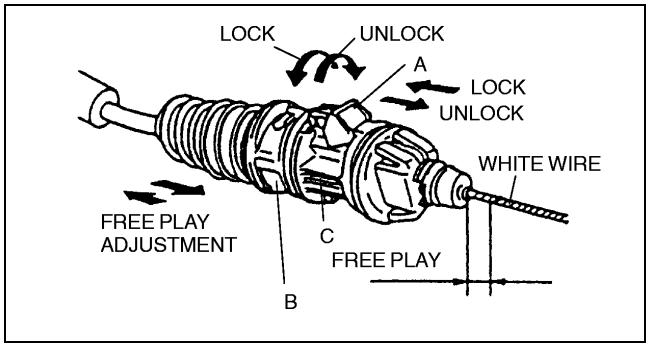
- To measure cable free play, push the cable into the housing and put a white mark on the cable at the end of the housing, then pull it out and measure distance from the white mark to the end of the cable housing.

2. Measure the free play of accelerator cable.
   - If not as specified, adjust the accelerator cable. (See 01–13B–17 ACCELERATOR CABLE ADJUSTMENT [FS].)

Free Play
1—3 mm {0.04—0.11 in}

ACCELERATOR CABLE ADJUSTMENT [FS]

A3U011341660W03



X3U113WDD

1. Move the white locking tab A to the unlock position.
2. Turn stopper B to the unlock position.

Note

- If the stopper B will not be unlocked, it may be necessary to carefully bend the tab C out using a suitable tool.

3. To adjust the free play, push or pull the accelerator cable housing directly behind the spring.
4. Turn the stopper B to the lock position.

Free Play
1—3 mm {0.04—0.11 in}

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. Verify correct accelerator operation.

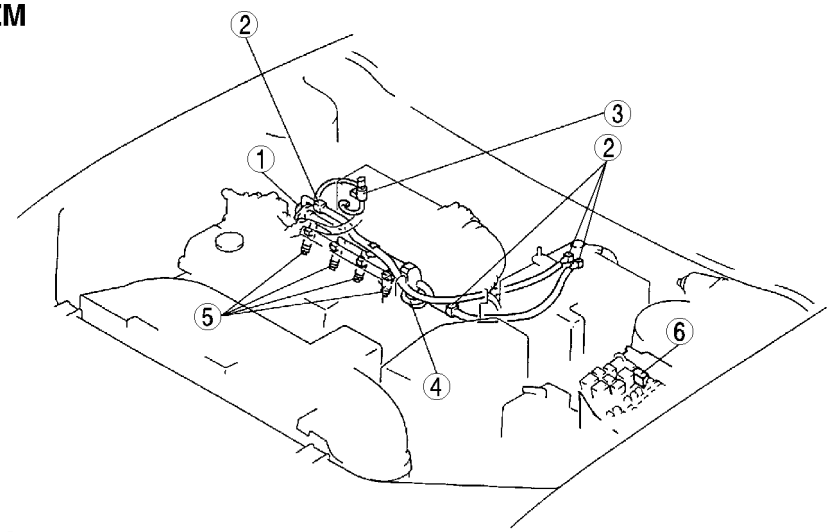
01–14 FUEL SYSTEM

FUEL SYSTEM LOCATION INDEX

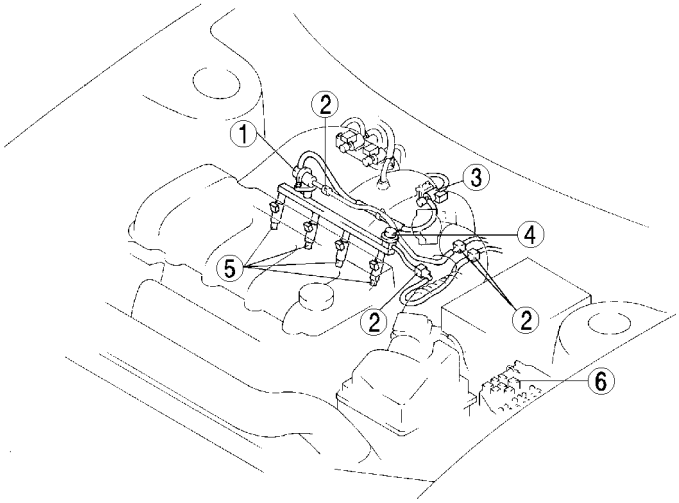
A3U011401006W01

Engine Room Side

ZM



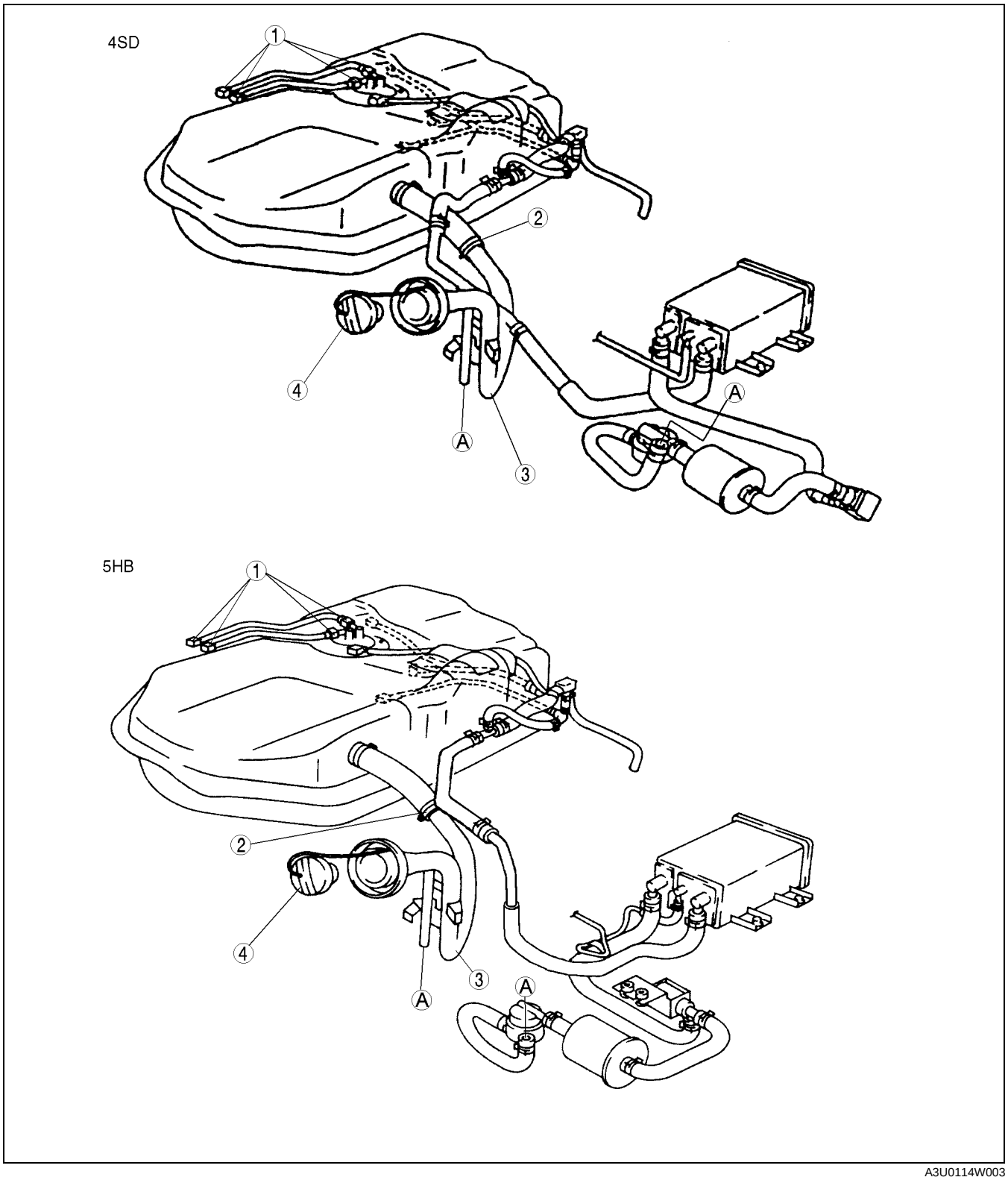
FS



Z3U0114W985

1	Pressure regulator (See 01–14–27 PRESSURE REGULATOR REMOVAL/INSTALLATION) (See 01–14–28 PRESSURE REGULATOR INSPECTION)
2	Quick release connector (See 01–14–22 Plastic Fuel Hose Removal Note) (See 01–14–23 Plastic Fuel Hose Installation Note)
3	PRC solenoid valve (See 01–14–31 PRC SOLENOID VALVE REMOVAL/INSTALLATION) (See 01–14–31 PRC SOLENOID VALVE INSPECTION)

4	Pulsation damper (See 01–14–30 PULSATION DAMPER REMOVAL/INSTALLATION) (See 01–14–31 PULSATION DAMPER INSPECTION)
5	Fuel injector (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION) (See 01–14–24 FUEL INJECTOR INSPECTION)
6	Fuel pump relay (See 09–21–5 RELAY INSPECTION)



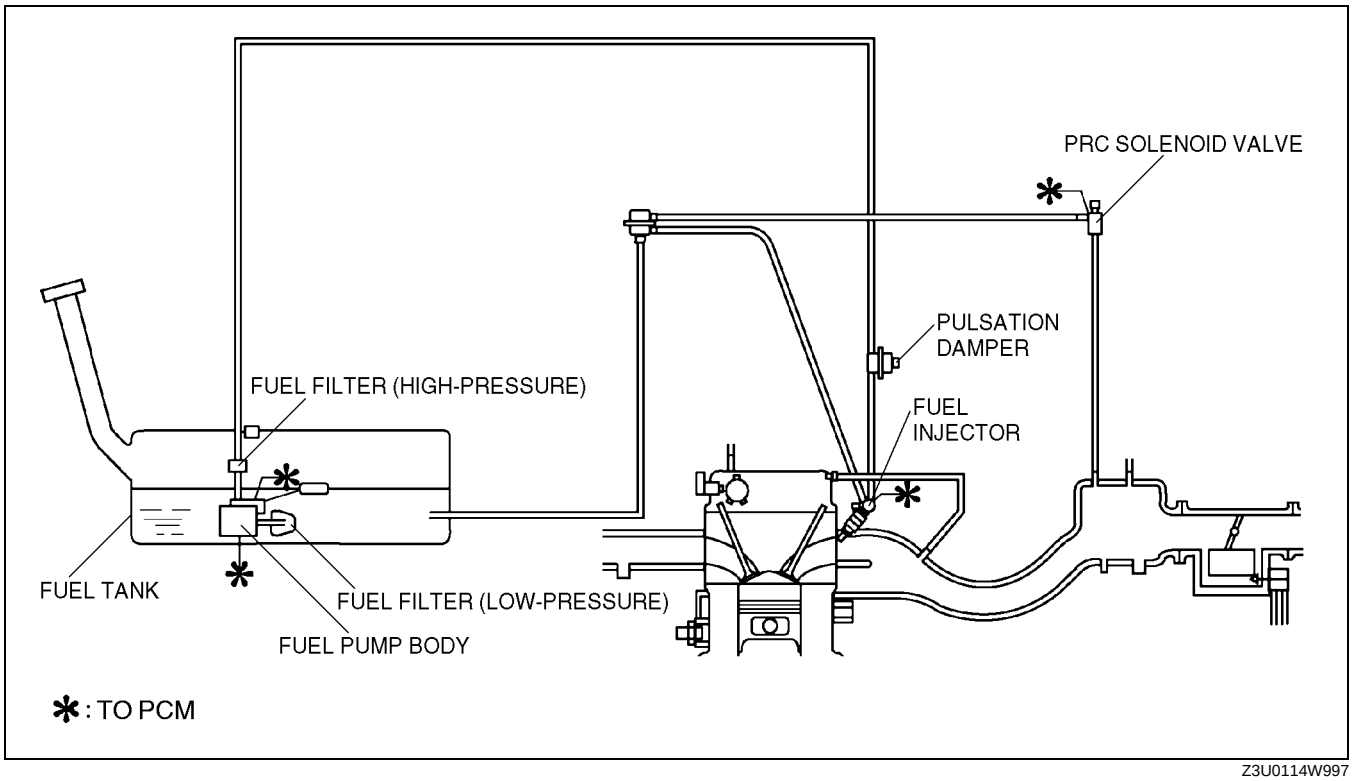
A3U0114W003

1	Quick release connector (See 01–14–22 Plastic Fuel Hose Removal Note) (See 01–14–23 Plastic Fuel Hose Installation Note)
2	Nonreturn valve (See 01–14–11 Nonreturn Valve Installation Note)

3	Fuel-filler pipe
4	Fuel-filler cap (See 01–16–13 FUEL-FILLER CAP INSPECTION)

FUEL SYSTEM DIAGRAM

A3U011401006W02



Z3U0114W997

BEFORE REPAIR PROCEDURE

A3U011401006W03

Warning

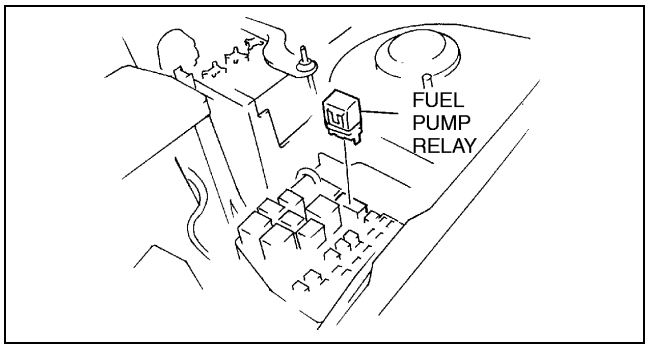
- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this,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

Fuel Line Safety Procedure

Note

- Fuel in the fuel system is under high pressure even when the engine is not running.

1. Remove the fuel-filler cap and release the pressure in the fuel tank.
2. Remove the fuel pump relay.
3. Start the engine.
4. After the engine stalls, crank the engine several times.
5. Turn the ignition switch off.
6. Install the fuel pump relay.



X3U114WA0

AFTER REPAIR PROCEDURE

A3U011401006W04

Warning

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. When installing the fuel hose, observe "Fuel Leakage Inspection" described below.**

Fuel Leakage Inspection

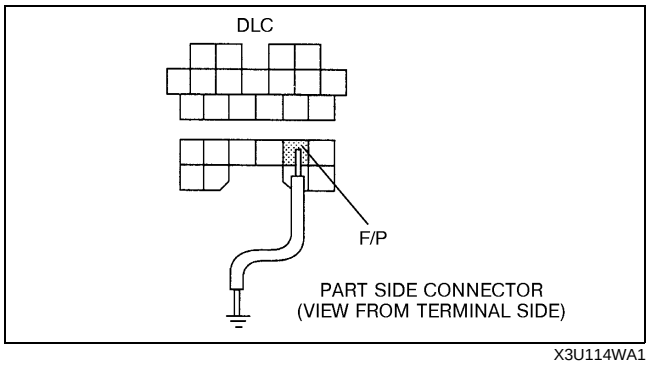
Warning

- **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.**

Caution

- **Connecting the wrong DLC terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

1. Short the DLC terminal F/P to the body GND using a jumper wire.
2. Turn the ignition switch to ON to operate the fuel pump.
3. Pressurize the system this way for **at least 5 min** to be sure of no leakage.
   - If there is fuel leakage, inspect the fuel hoses, hose clamps, and fuel pipe sealing surface and replace if necessary.
4. After repairing, assemble the system and repeat Steps 1 to 3.



X3U114WA1

FUEL PRESSURE INSPECTION

A3U011401006W05

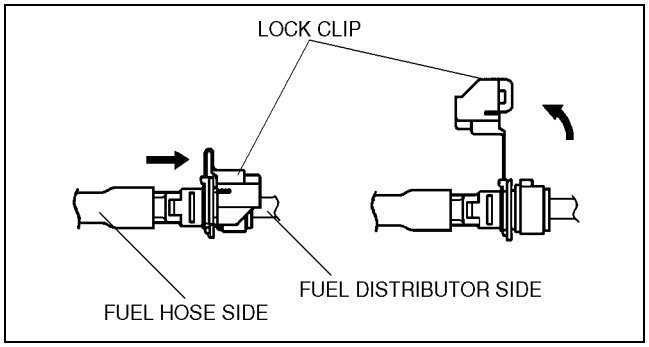
Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE". (See 01–14–4 BEFORE REPAIR PROCEDURE.)**

Caution

- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign materials.**

1. Disconnect the battery negative cable.
2. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push apart the lock clip and unlock it.

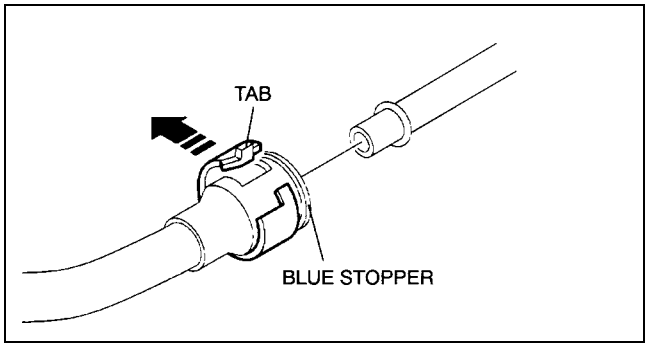


Y3E3912W201

   (2) Lift the tab on the blue locking coupler until the fuel line can be released.
   (3) Pull the fuel hose straight back.

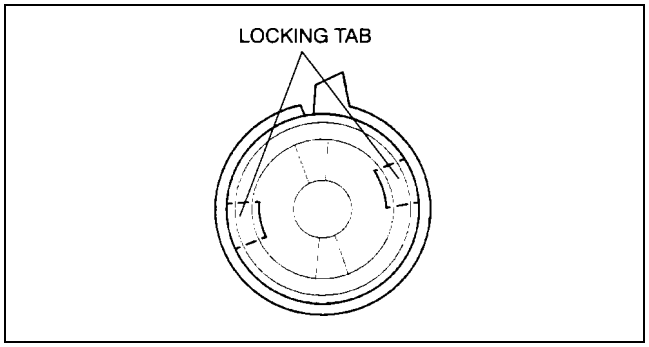
Note

- The blue stopper may be removed from the quick connector. Be sure not to loose it. Reinstall it to the quick release connector before reconnecting the fuel line.



Z3U0114W986

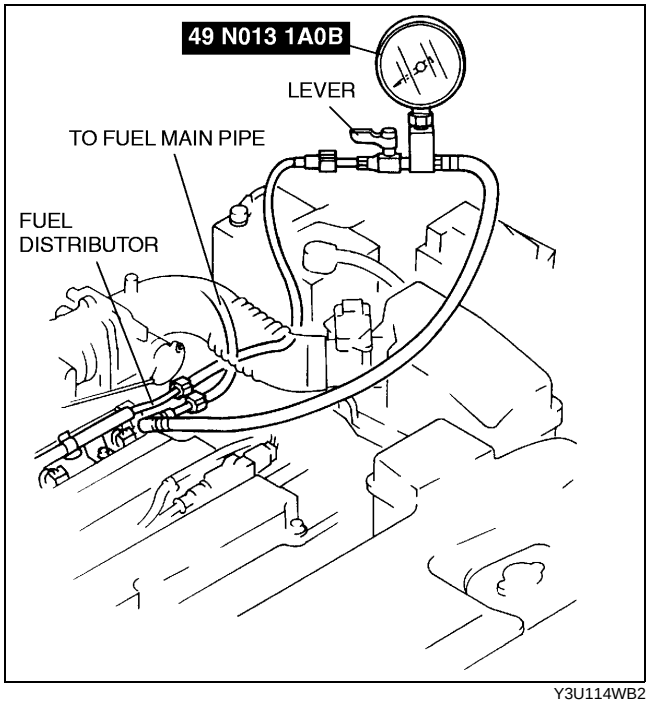
- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



Z3U0114W993

3. Push the **SST** quick release connector into the fuel distributor and fuel main hose into the **SST** until a click is heard.

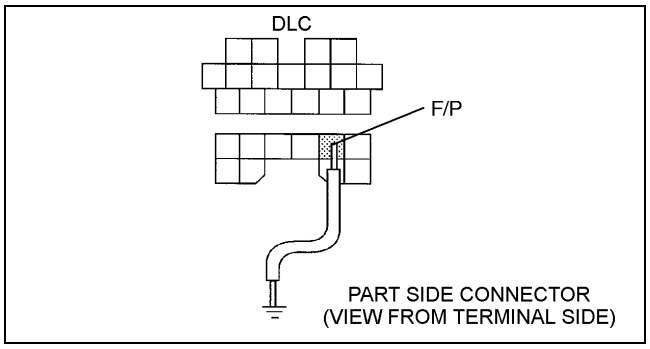
4. Turn the lever on the **SST** as shown.



Y3U114WB2

5. Connect the battery negative cable.

Caution
- **Connecting to the wrong DLC terminal may possibly cause a malfunction. Carefully connect to the specified terminal only.**



Y3U114WA1

6. Short the DLC terminal F/P to the body GND using a jumper wire.
7. Turn the ignition switch to ON and measure the fuel line pressure.
   - If the pressure is higher than specified, inspect the fuel pump maximum pressure. If specified, inspect fuel return hose or the pressure regulator is clogged.
   - If the pressure is lower than specified, proceed to Step (1).

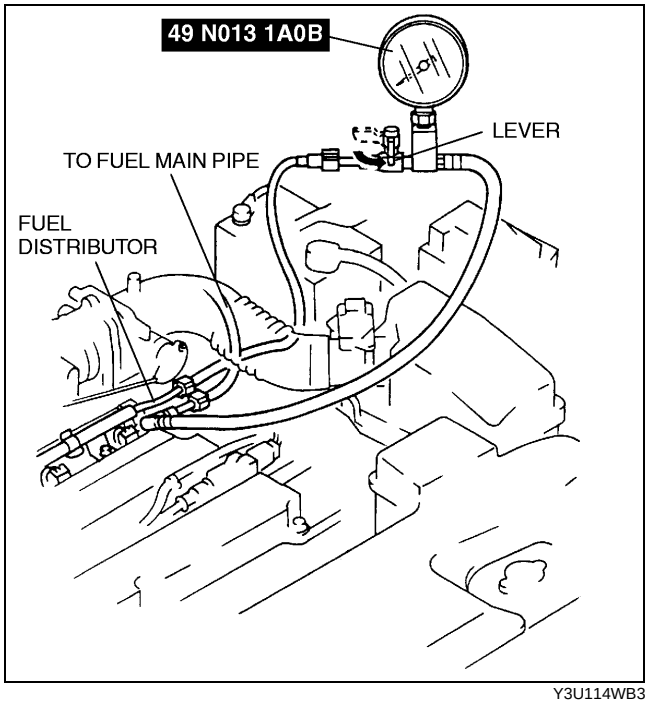
Fuel line pressure
270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

(1) Inspect change in the fuel line pressure while turning the lever as shown.
   - If the fuel line pressure quickly increases, inspect the pressure regulator.
   - If fuel line pressure gradually increases, inspect the fuel pump maximum pressure.
   - If the fuel pump maximum pressure is normal, inspect for clogging between the fuel pump and the pressure regulator.

8. Turn off the ignition switch and disconnect the jumper wire
9. Observe the fuel pressure **after 5 min**.
   - If the fuel hold pressure is lower than specified, proceed to sptep (1).

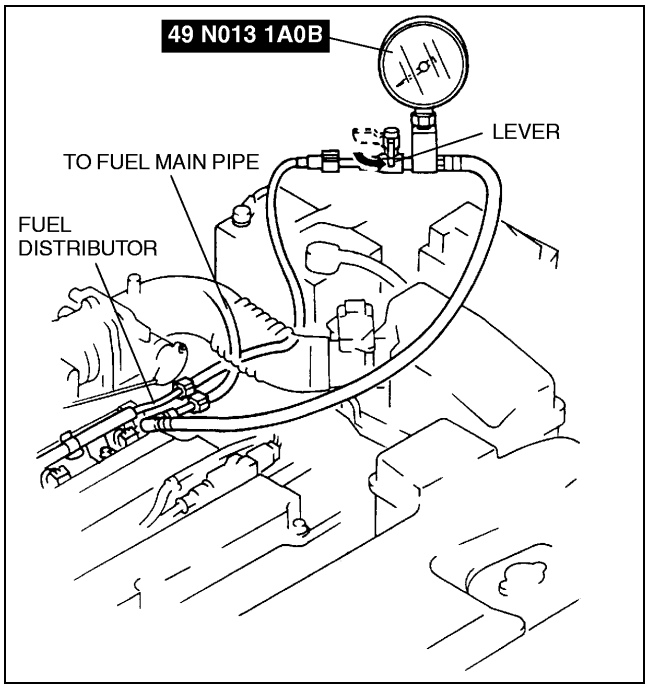
   Fuel hold pressure
   More than 150 kPa {1.5 kgf/cm^2, 22 psi}

   (1) Inspect changes in the fule line pressure while turning the lever as shown.
   - If the fuel line pressure holds, replace the pressure regulator. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)
   - If the fuel line pressure does not hold, inspect the fuel leaks from the fuel line and the fuel injector.



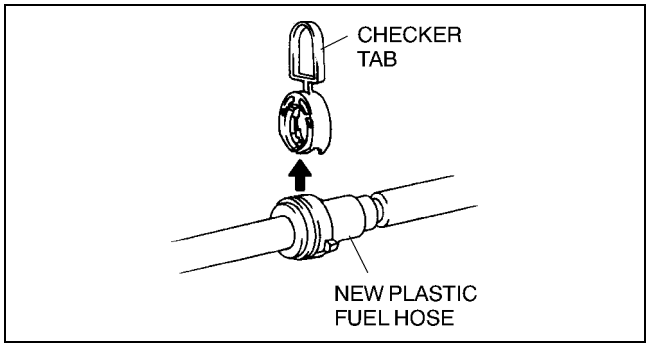
Y3U114WB3

10. Disconnect the **SST**.



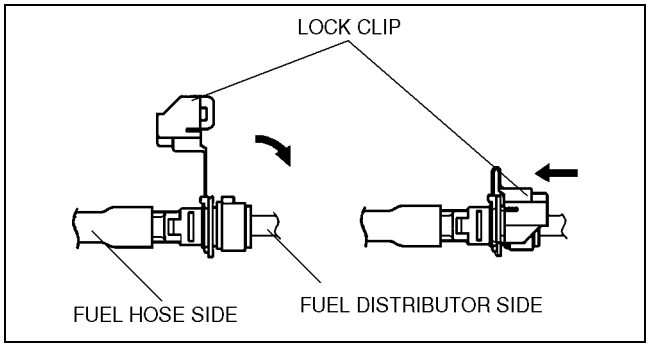
Y3U114WB3

Note
- A checker tab is integrated with the quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the fuel pipe.



YMU114WA8

11. Inspect the plastic fuel hose and fuel pipe sealing surface for damage and deformation, and replace if necessary.
    - If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.
12. Reconnect the fuel main hose to the fuel distributor until a click is heard.
13. Pull the quick release connector by hand and verify that it is installed securely.
14. Attach the lock clip to the quick release connector in the direction of the fuel distributor and lock it, as shown in the figure.



Y3E3912W202

FUEL TANK REMOVAL/INSTALLATION

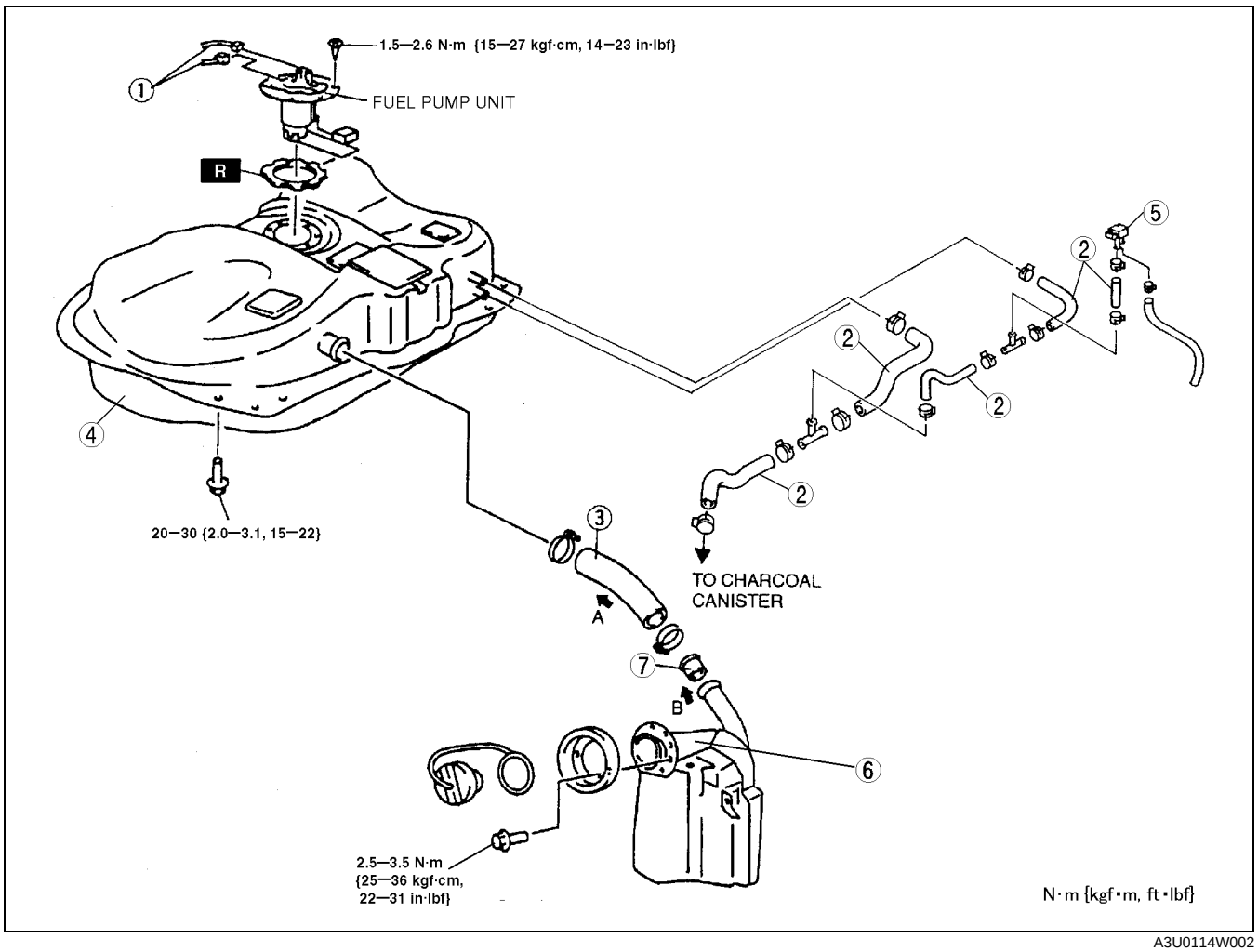
A3U011442110W01

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.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.**

Caution
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

1. Level the vehicle.
2. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
3. Disconnect the negative battery cable.
4. Remove the rear seat cushion. (See 09–13–5 REAR SEAT REMOVAL/INSTALLATION.)
5. Remove the service hole cover.
6. Remove the fuel pump unit.
7. Siphon the fuel from the fuel tank.
8. Remove the presilencer. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
9. Remove in the order indicated in the table.
10. Install in the reverse order of removal.

11. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)



A3U0114W002

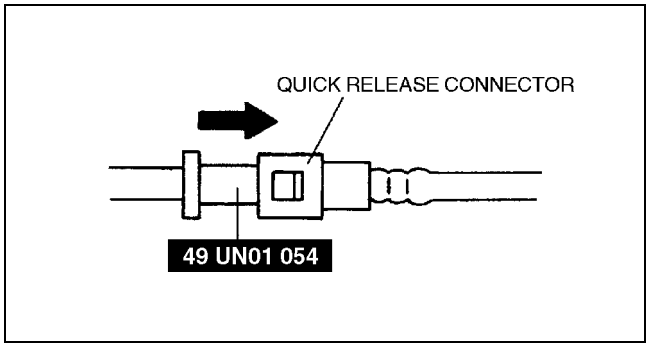
1	Plastic fuel hose (See 01–14–11 Plastic Fuel Hose Removal Note.) (See 01–14–12 Plastic Fuel Hose Installation Note.)
2	Evaporative hose (See 01–14–12 Evaporative Hose Installation Note.)
3	Joint hose (See 01–14–12 Joint Hose Installation Note.)

4	Fuel tank
5	Fuel tank pressure sensor
6	Fuel-filler pipe
7	Nonreturn valve (See 01–14–11 Nonreturn Valve Installation Note.)

Plastic Fuel Hose Removal Note

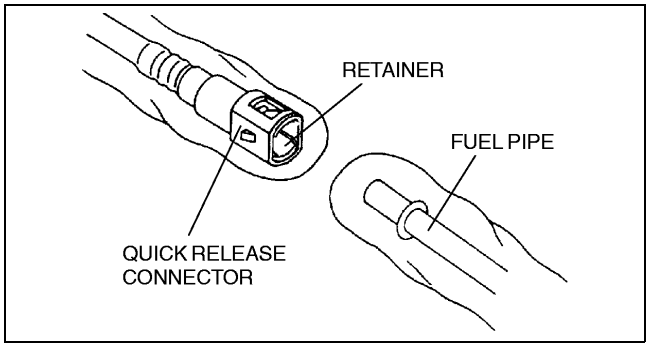
Caution
- **The retainer must be replaced if removed from the fuel pipe without using the SST. Otherwise, effectiveness of the retainer will be reduced.**

1. Inspect that the quick release connector joint area is free of foreign material.
2. Clean as necessary.
3. Set the **SST** as shown and push into the quick release connector to disconnect the plastic fuel hose.



A3U0114W004

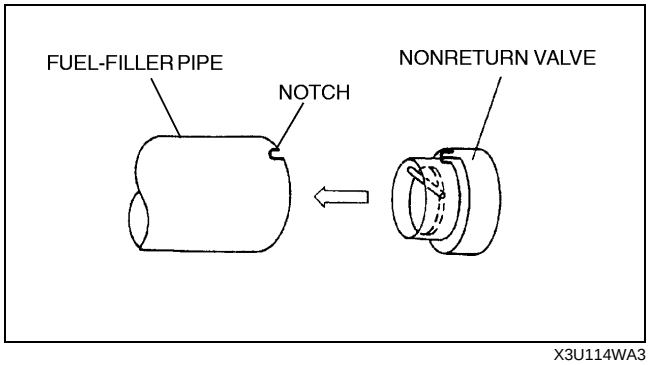
4. Cover the disconnected quick release connector and fuel pipe to prevent them from being scratched or contaminated with foreign material.



X5U114WC6

Nonreturn Valve Installation Note

1. Align the nonreturn valve with the notch in the fuel-filler pipe as shown, then install.

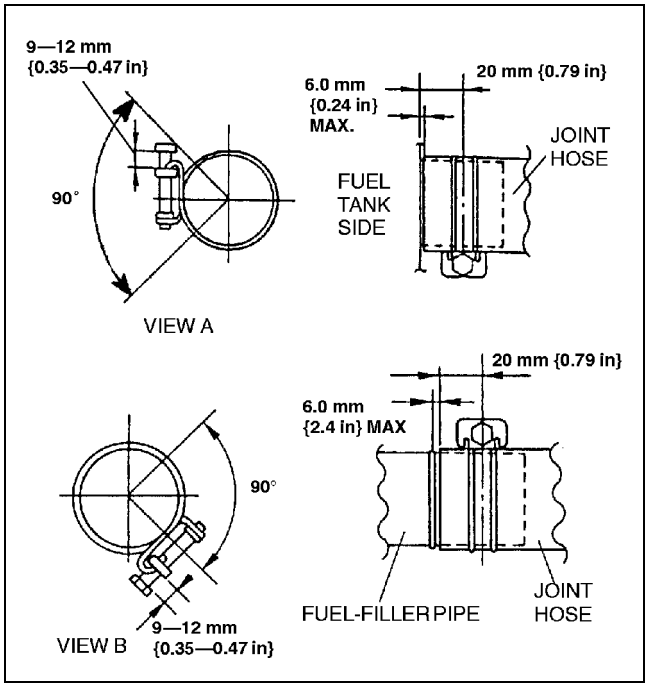


X3U114WA3

Joint Hose Installation Note

1. Fit the joint hose onto the respective fittings within the specification, and install clamps as shown.

   Specification
   35—40 mm {1.4—1.5 in}

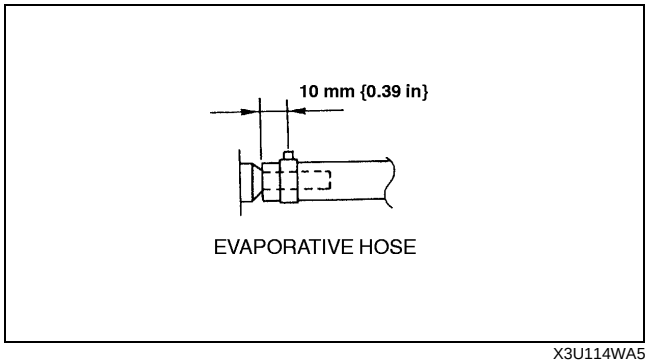


A3U0114W001

Evaporative Hose Installation Note

1. Fit evaporative hose onto the respective fittings within the specification, and install clamps as shown.

   Specification
   10 mm {0.39 in}



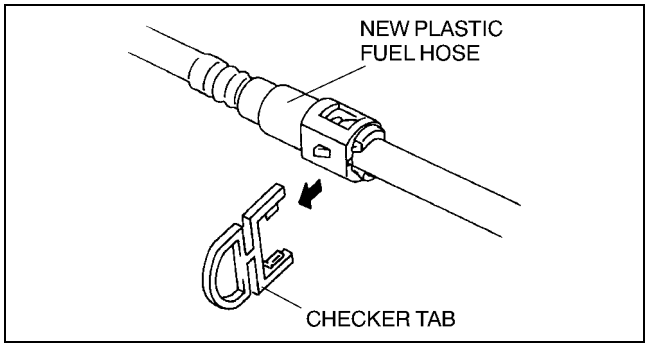
X3U114WA5

Plastic Fuel Hose Installation Note

Note

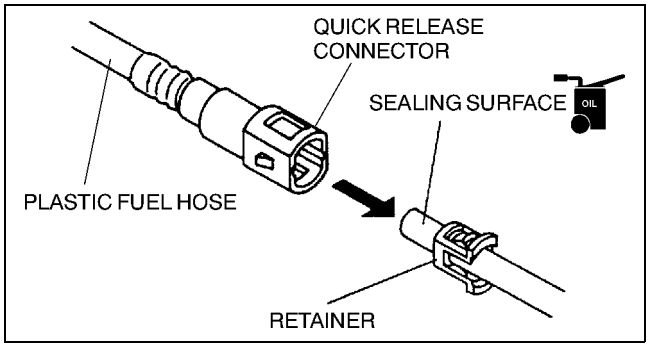
- A checker tab is integrated with quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the fuel pipe.

1. When the retainer is not removed, perform the following procedure.
   (1) Inspect the fuel pump unit sealing surface for damage and deformation, and replace if necessary.
      - If the quick release connector O-ring is damaged, replace the plastic fuel hose.
   (2) Apply a small amount of clean engine oil to the sealing surface of the fuel pump unit.



YMU114WF0

(3) Align the fuel pipe on the fuel pump unit and quick release connector so that the tabs of the retainer are correctly fitted into the quick release connector. Push the quick release connector straight into the retainer until a click is heard.
(4) Lightly pull and push the quick release connector a few times by hand and verify that it can move **2.0—3.0 mm {0.08—0.11 in}** and it is connected securely.
- If quick release connector does not move at all, verify that O-ring is not damaged and slipped, and reconnect the quick release connector.



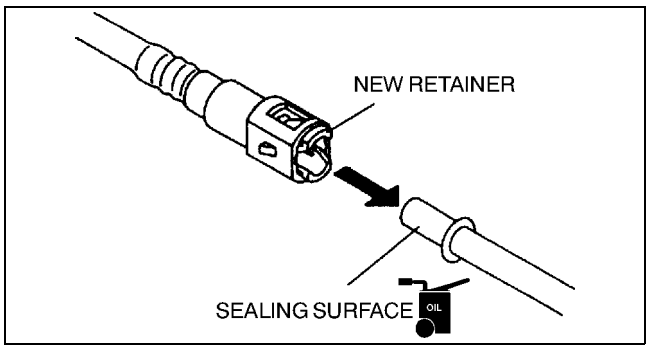
YMU114WAN

2. When the retainer is removed, perform the following procedure.

Note
- Use the designated genuine retainer only.

(1) Inspect the plastic fuel hose and fuel pump unit sealing surface for damage and deformation, and replace if necessary.
- If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.

(2) Install a new retainer onto the quick release connector. Visually inspect that the tabs of the retainer are securely fitted into the quick release connector.
(3) Slightly apply clean engine oil to the sealing surface of the fuel pump unit.
(4) Push the quick release connector straight into the fuel pump unit until a click is heard.
(5) Lightly pull and push the quick release connector a few times by hand and verify that it can move **2.0—3.0 mm {0.08—0.11 in}** and it is connected securely.
- If quick release connector does not move at all, verify that O-ring is not damaged and slipped, and reconnect the quick release connector.



YMU114WAP

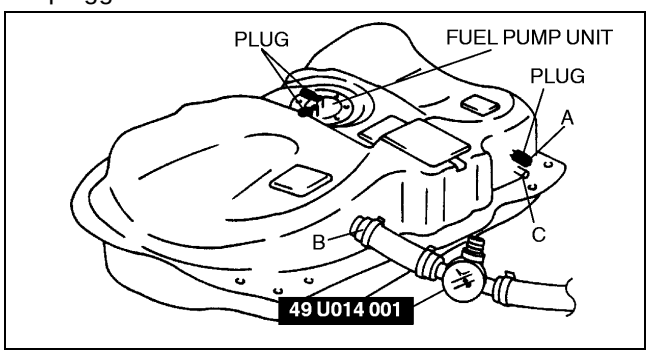
FUEL TANK INSPECTION

A3U011442110W02

Note
- This inspection is for the 2 rollover valves integrated in the fuel tank. The evaporative gas check valve (two-way) is integrated with each rollover valve.

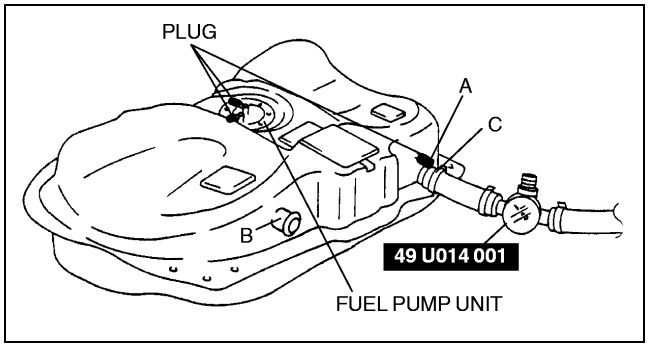
1. Remove the fuel tank. (See 01–14–9 FUEL TANK REMOVAL/INSTALLATION.)
2. Connect the **SST** to an air compressor.
3. Plug the fuel main pipe and fuel return pipe of the fuel pump unit.
4. Connect the **SST** to port B and plug port A.
5. Level the fuel tank.
6. Apply pressure of **+5.9 kPa {+44 mmHg, +1.7 inHg}** to port B and verify that there is airflow from port C.
- If there is no airflow, replace the fuel tank.
- If there is airflow, connect the **SST** to port C with port A plugged.

7. Apply pressure of **+2.0 kPa {+15 mmHg, +0.59 inHg}** to port C and verify that there is airflow from port B.
- If there is no airflow, replace the fuel tank.
- If there is airflow, connect the **SST** to port B and turn the fuel tank upside-down.

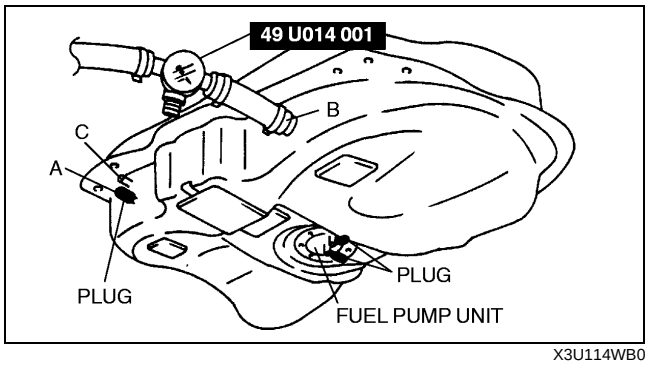


X3U114WA8

8. Apply pressure of **+0.99 kPa {+7.4 mmHg, 0.29 inHg}** to port B and verify that there is no airflow from port C.
   - If there is airflow, replace the fuel tank.



X3U114WA9



X3U114WB0

FUEL SHUT-OFF VALVE INSPECTION

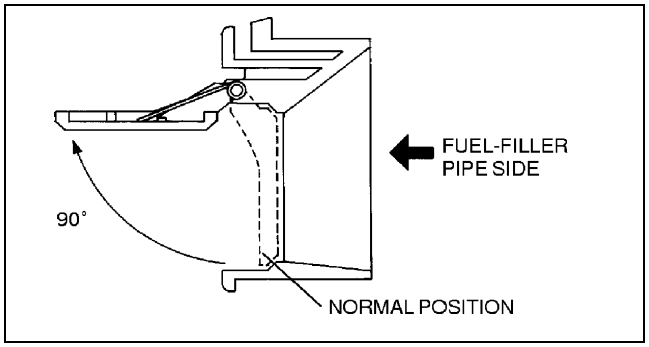
A3U011442990W01

Note
- The fuel shut-off valve is located in the fuel tank.
- Carry out the “FUEL TANK INSPECTION”. (See 01–14–13 FUEL TANK INSPECTION.)

NONRETURN VALVE INSPECTION

A3U011442270W01

1. Remove the nonreturn valve. (See 01–14–9 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.



X3U114WP1

FUEL PUMP UNIT REMOVAL/INSTALLATION

A3U011413350W01

1. Remove and install the fuel pump unit. (See 01–14–9 FUEL TANK REMOVAL/INSTALLATION.)

FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY

A3U011413350W02

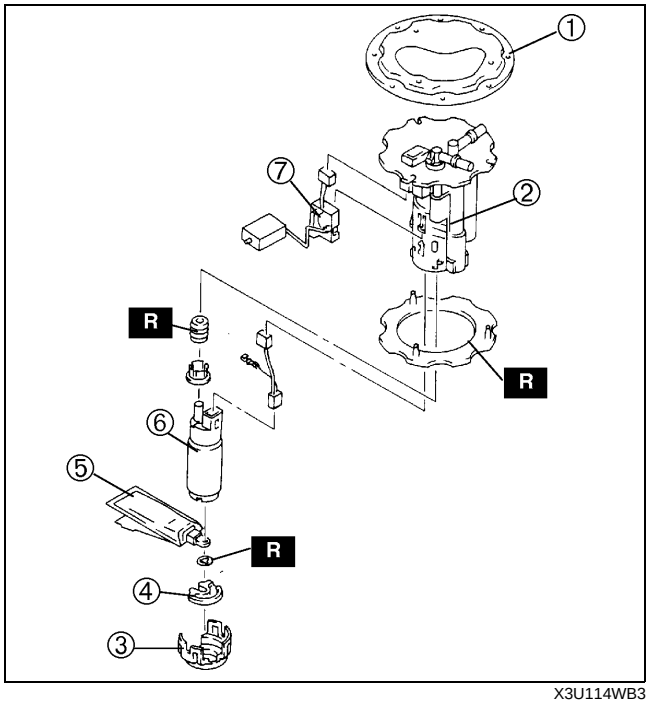
Warning

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.**

1. Disassemble in the order indicated in the table.

1	Fuel pump unit cover
2	Fuel filter (high-pressure)
3	Spacer
4	Rubber mount
5	Fuel filter (low-pressure)
6	Fuel pump body
7	Fuel gauge sender unit

2. Assemble in the reverse order of disassembly.



X3U114WB3

FUEL PUMP UNIT INSPECTION

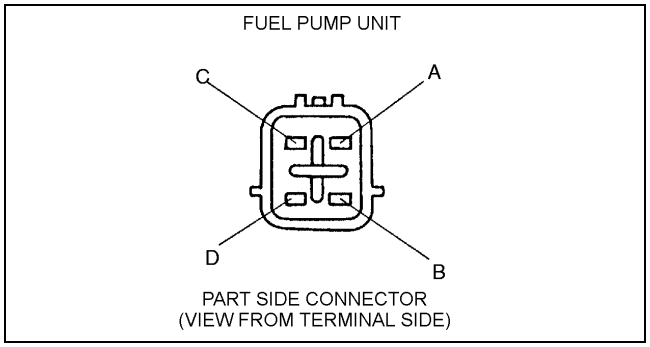
A3U011413350W03

Continuity Inspection

Note

- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion. (See 09–13–5 REAR SEAT REMOVAL/INSTALLATION.)
3. Remove the service hole cover.
4. Disconnect the fuel pump unit connector.
5. Inspect for continuity between fuel pump unit connector terminals B and D.
   - If there is no continuity, replace the fuel pump body.
   - If as specified, carry out the “Circuit Open/Short Inspection”.

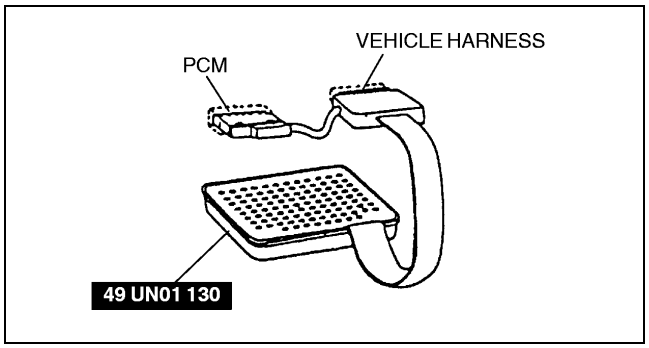


Y3U114WA6

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

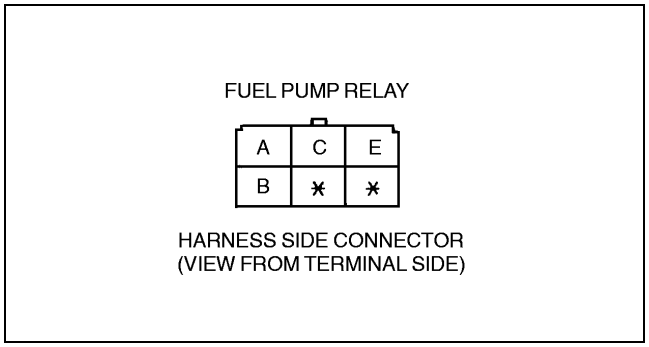
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U114WB7

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - GND circuit (Fuel pump unit connector terminal D and body GND)
   - Power circuit (Fuel pump relay connector terminal C and fuel pump unit connector terminal B through common connector)

   Short circuit
   - Fuel pump relay connector terminal C and fuel pump unit connector terminal B through common connector to GND
5. Repair or replace faulty areas.
6. Reconnect the fuel pump unit connector.
7. Install the service hole cover.
8. Install the rear seat cushion.
9. Reconnect the negative battery cable.



X3U114WB5

Fuel Pump Maximum Pressure Inspection

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.**

Caution

- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

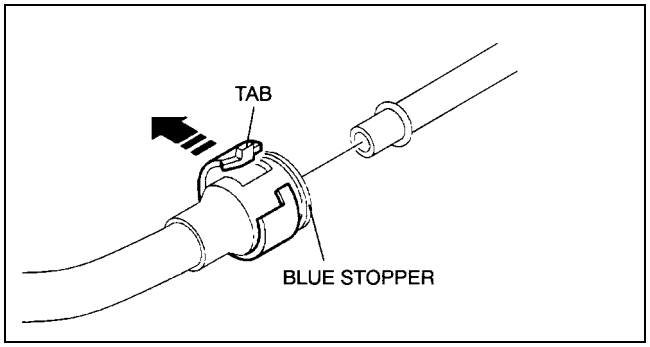
Note

- Perform the following test only when directed.

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push the tab on the orange locking coupler 90° until it stops.
   (2) Pull the fuel hose straight back.

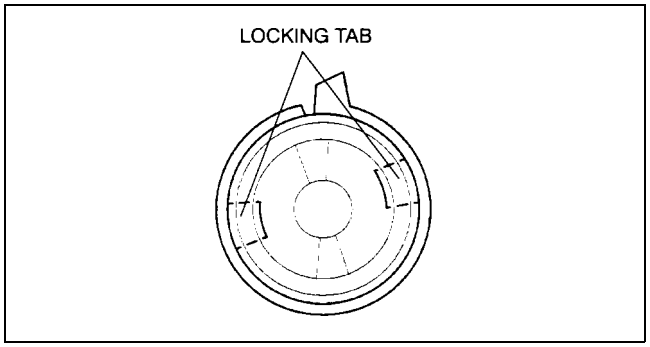
Note

- The blue stopper may be removed from the quick connector. Take care not to lose it. Reinstall it to the quick release connector before reconnecting the fuel line.



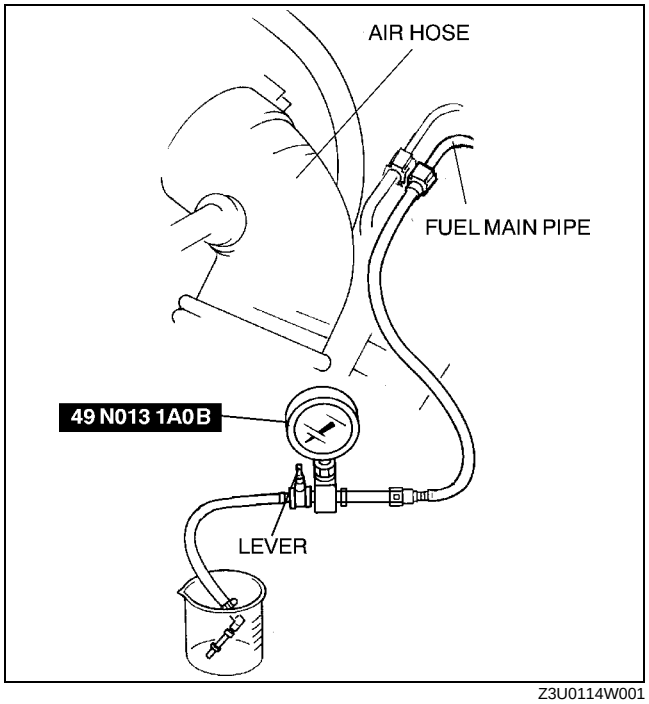
Z3U0114W986

- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



Z3U0114W993

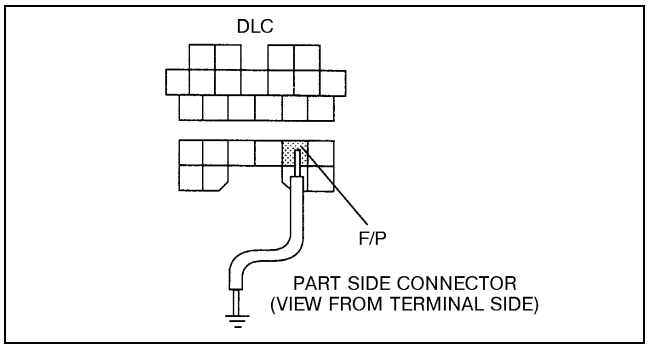
4. Turn the lever to plug the **SST** outlet.
5. Push the **SST** quick release connector into the fuel main pipe until a click is heard.
6. Set the fuel hose into a container to avoid fuel spills.



Z3U0114W001

7. Connect the negative battery cable.

Caution
- **Connecting to the wrong DLC terminal may possibly cause a malfunction. Carefully connect to the specified terminal only.**



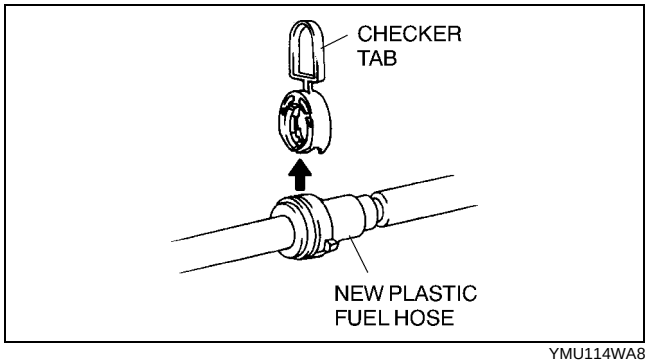
Y3U114WA7

8. Short the DLC terminal F/P to the body GND using a jumper wire.
9. Turn the ignition switch to ON to operate the fuel pump body.
10. Measure the fuel pump maximum pressure.
    - If not as specified, inspect the following:
      — Fuel pump relay
      — Fuel filters (low-pressure, high-pressure) for clogging
      — Fuel line for clogging or leakage

Fuel pump maximum pressure
450—630 kPa {4.5—6.5 kgf/cm^2, 64—92 psi}

11. Turn the ignition switch off and disconnect the jumper wire.
12. Disconnect the **SST**.

Note
- A checker tab is integrated with the quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the fuel pipe.



YMU114WA8

13. Inspect the plastic fuel hose and fuel pipe sealing surface for damage and deformation, and replace if necessary.
    - If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.
14. Reconnect the fuel main hose to the fuel main pipe until a click is heard.
15. Pull the quick release connector by hand and verify that it is installed securely.
16. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)

Fuel Pump Hold Pressure Inspection

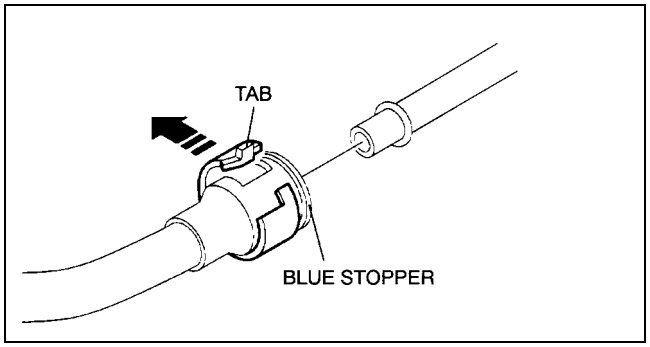
Warning
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

Caution
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

Note
- Perform the following test only when directed.

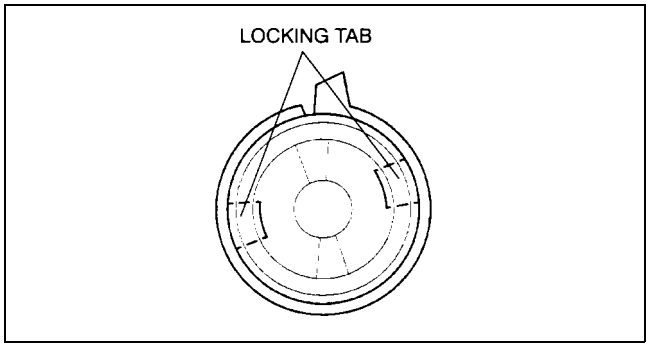
1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push the tab on the orange locking coupler 90° until it stops.
   (2) Pull the fuel hose straight back.

Note
- The blue stopper may be removed from the quick connector. Take care not to lose it. Reinstall it to the quick release connector before reconnecting the fuel line.



Z3U0114W986

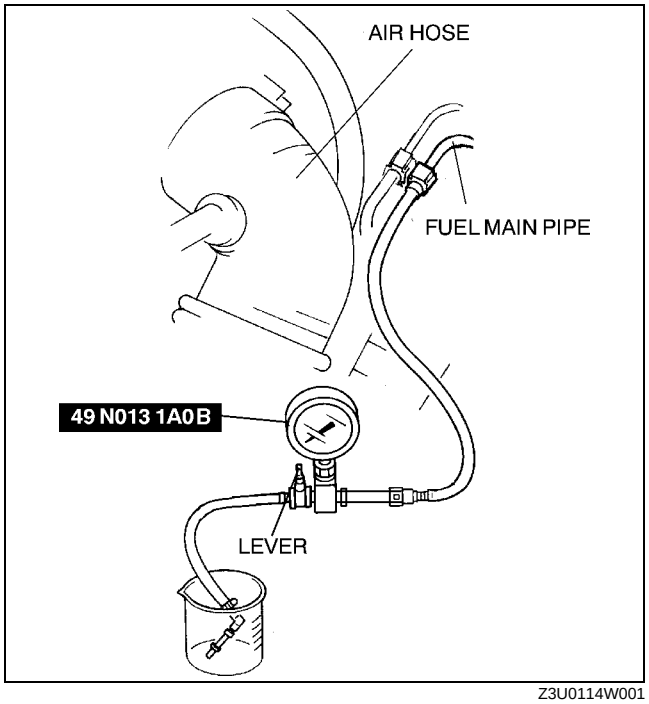
- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



Z3U0114W993

4. Turn the lever as shown to plug the **SST** outlet.
5. Push the **SST** quick release connector into the fuel main pipe until a click is heard.

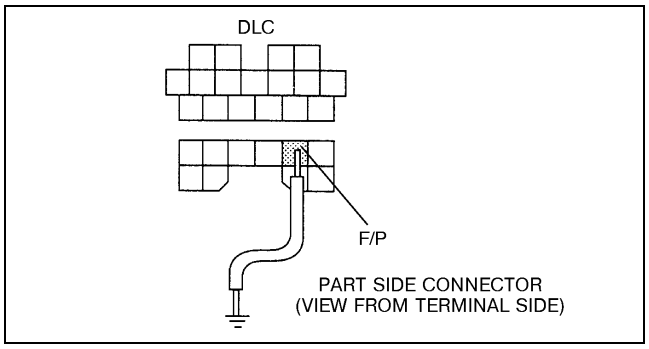
6. Set the fuel hose into a container to avoid fuel spills.



Z3U0114W001

7. Connect the negative battery cable.

Caution
- **Connecting to the wrong DLC terminal may possibly cause a malfunction. Carefully connect to the specified terminal only.**



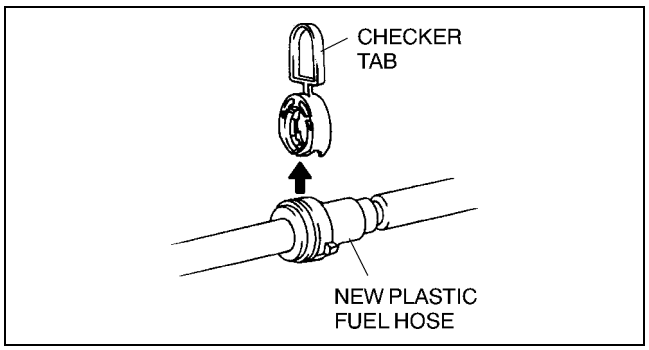
Y3U114WA8

8. Short the DLC terminal F/P to the body GND using a jumper wire.
9. Turn the ignition switch to ON for **10 s** to operate the fuel pump body.
10. Turn the ignition switch off.
11. Measure the fuel pump hold pressure **after 5 min**.
    - If not as specified, carry out the “PRESSURE REGULATOR INSPECTION”, “FUEL INJECTOR INSPECTION”. (See 01–14–28 PRESSURE REGULATOR INSPECTION.) (See 01–14–24 FUEL INJECTOR INSPECTION.) Verify that there is no fuel leakage from the quick release connector joint areas.
    - If all items above are okay, replace the fuel pump body. (See 01–14–15 FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY.)

Fuel pump hold pressure
More than 340 kPa {3.5 kgf/cm^2, 50 psi}

12. Disconnect the jumper wire.
13. Disconnect the **SST**.

Note
- A checker tab is integrated with the quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the fuel pipe.



YMU114WA8

14. Inspect the plastic fuel hose and fuel pipe sealing surface for damage and deformation, and replace if necessary.
    - If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.

15. Reconnect the fuel main hose to the fuel main pipe until a click is heard.
16. Pull the quick release connector by hand and verify that it is installed securely.
17. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)

FUEL FILTER (HIGH-PRESSURE) REMOVAL/INSTALLATION

A3U011434801W01

1. Remove and install the fuel filter (high-pressure). (See 01–14–15 FUEL PUMP UNIT DISASSEMBLY/ ASSEMBLY.)

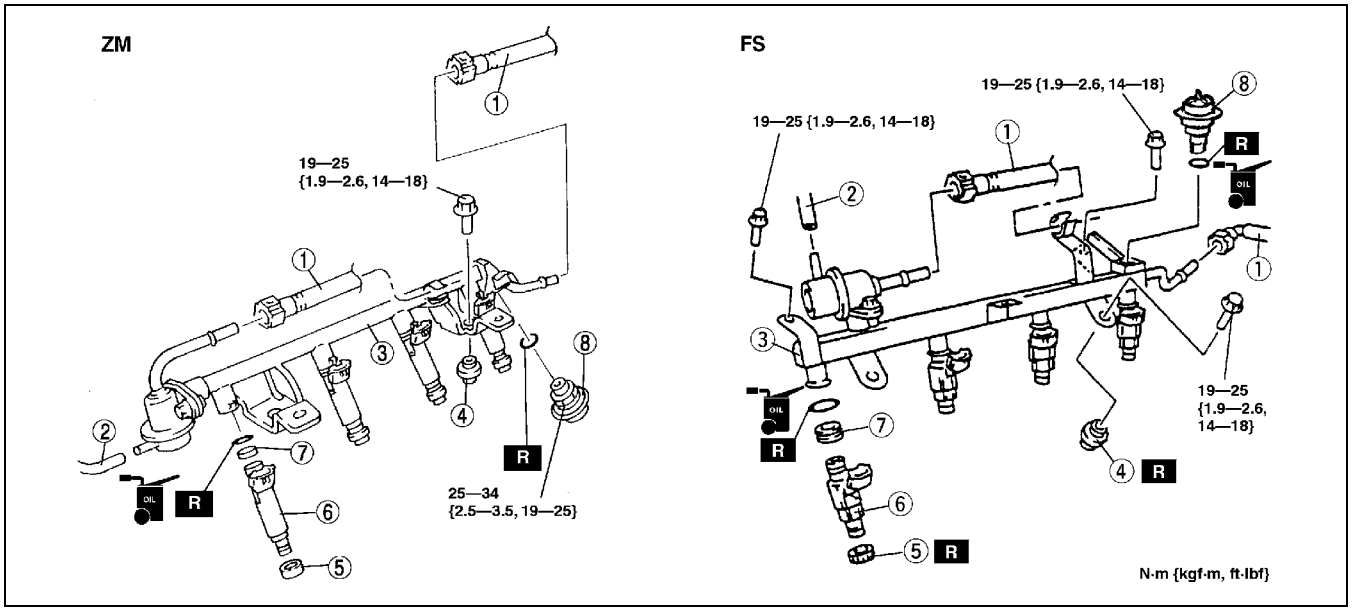
FUEL INJECTOR REMOVAL/INSTALLATION

A3U011413250W01

Caution

- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.
3. Remove the accelerator cable bracket. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
4. Disconnect the fuel injector connectors and remove the harness from the fuel distributor.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)



Z3U0114W995

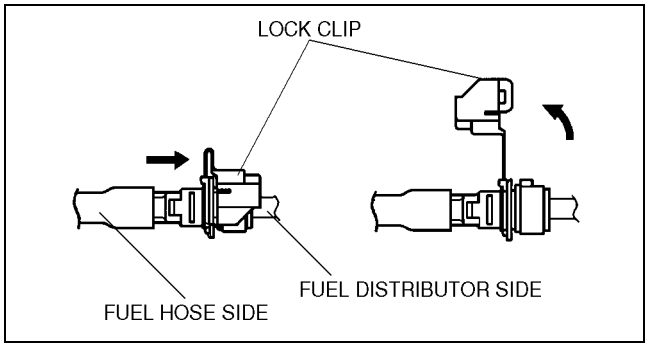
1	Plastic fuel hose (See 01–14–22 Plastic Fuel Hose Removal Note) (See 01–14–23 Plastic Fuel Hose Installation Note)
2	Vacuum hose
3	Fuel distributor
4	Fuel distributor insulator

5	Fuel injector insulator
6	Fuel injector (See 01–14–23 Fuel Injector Installation Note (FS only))
7	Grommet
8	Pulsation damper

Plastic Fuel Hose Removal Note

Caution
- **The quick release connector may be damaged when the tab is bent excessively. Do not expand the tab over the stopper.**

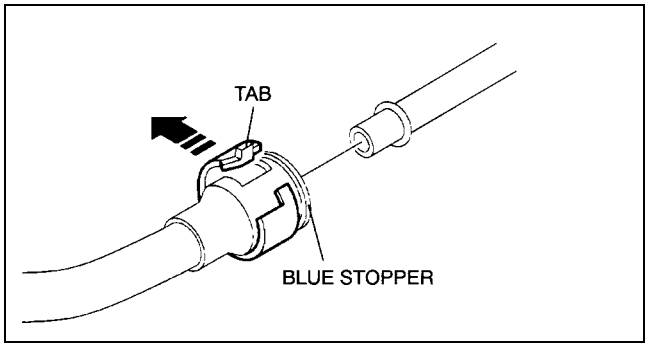
1. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push apart the lock clip and unlock it.



Y3E3912W201

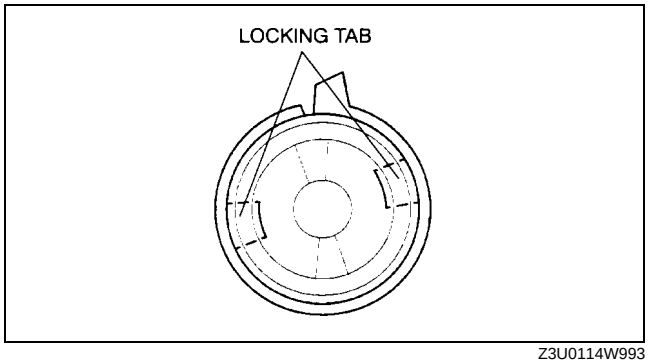
   (2) Lift the tab on the blue locking coupler until the fuel line can be released.
   (3) Pull the fuel hose straight back.

Note
- The blue stopper may be removed from the quick connector. Take care not to lose it. Reinstall it to the quick release connector before reconnecting the fuel line.



Z3U0114W986

- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



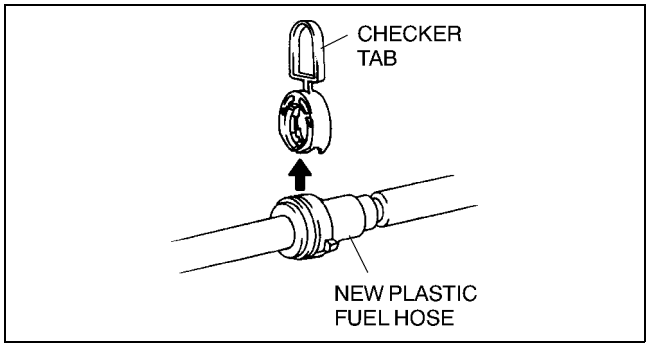
Z3U0114W993

2. Cover the disconnected quick release connector and pulsation damper with vinyl sheet or the like to prevent it from being scratched or contaminated with foreign materials.

Plastic Fuel Hose Installation Note

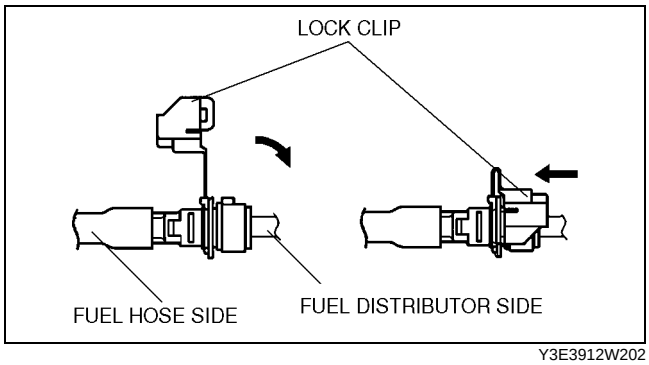
Note

- A checker tab is integrated with the quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the pulsation damper.



YMU114WA8

1. Inspect the plastic fuel hose and pulsation damper sealing surface for damage and deformation, and replace if necessary.
   - If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.
2. Apply a small amount of clean engine oil to the sealing surface of the pulsation damper.
3. Push the quick release connector straight into the pulsation damper until a click is heard.
4. Lightly pull and push the quick release connector a few times by hand and verify that it can move **2.0—3.0 mm {0.08—0.11 in}** and it is connected securely.
   - If quick release connector does not move at all, verify that O-ring is not damaged and slipped, and reconnect the quick release connector.
5. Attach the lock clip to the quick release connector in the direction of the fuel distributor and lock it, as shown in the figure.



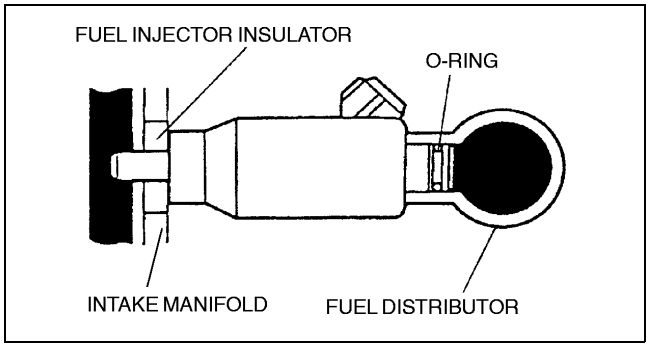
Y3E3912W202

Fuel Injector Installation Note (FS only)

1. Install each fuel injector as indicated in the table.

Cylinder number	Fuel injector body color
No.1, No.2 cylinder	Green
No.3, No.4 cylinder	Purple

2. Use new fuel injector O-rings.
3. Apply a small amount of engine oil to the O-rings and install them on the fuel distributor.
4. Verify that the O-rings and the fuel injector sealing surfaces are free of foreign material. Clean with gasoline if necessary.
5. Align the fuel injector notch with the fuel distributor and install the fuel injectors on the fuel distributor with a light twisting motion so that the O-rings will not be folded.



X3U114WC6

FUEL INJECTOR INSPECTION

A3U011413250W02

Simulation Test

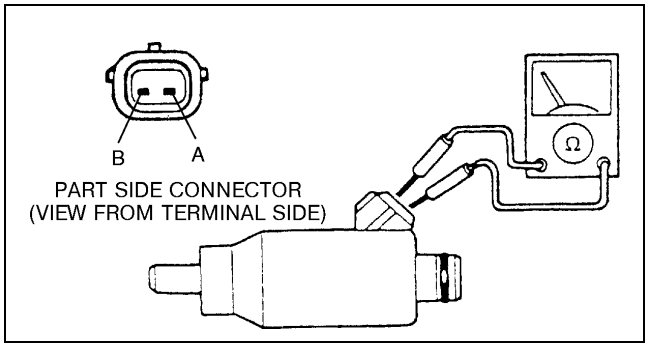
1. Carry out the “Fuel Injector Operation Inspection”. (See 01–03A–60 Fuel Injector Operation Inspection.) (See 01–03B–59 Fuel Injector Operation Inspection.)
   - If not as specified, perform the further inspection for the fuel injectors.

Resistance Inspection

Note
- Perform the following test only when directed.

1. Turn the ignition switch off.
2. Disconnect the battery negative cable.
3. Disconnect the fuel injector connectors.
4. Measure the resistance of the fuel injector using an ohmmeter.
   - If not as specified, replace the fuel injector. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)
   - If as specified but “Simulation Test” is failed, carry out the “Circuit Open/Short Inspection”.

Resistance [20 °C {68 °F}]
ZM: Approx.13.8 ohms
FS: 14.2—14.8 ohms

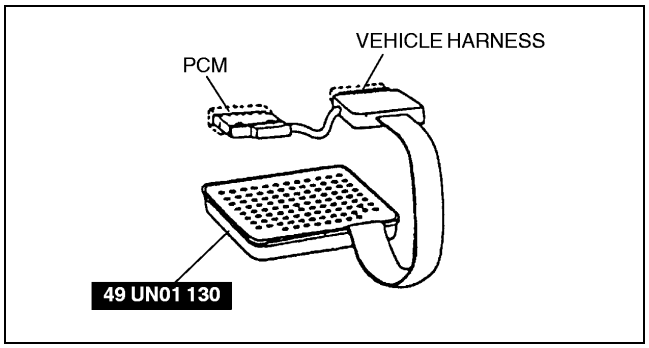


Y3U114WA9

Circuit Open/Short Inspection

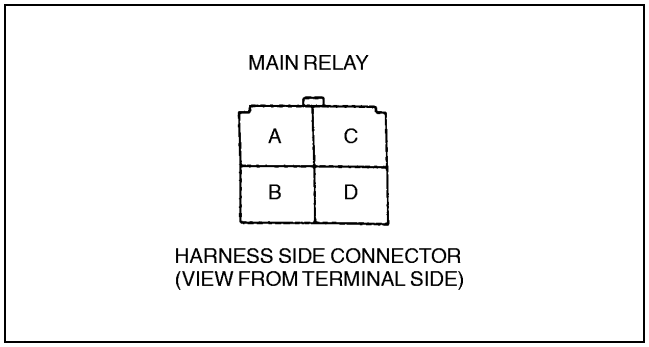
1. Disconnect the PCM connector.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U114WB8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.



X3U114WC8

Open circuit
- GND circuit (No.1 cylinder fuel injector connector terminal B and PCM connector terminal 75)
- GND circuit (No.2 cylinder fuel injector connector terminal B and PCM connector terminal 101)
- GND circuit (No.3 cylinder fuel injector connector terminal B and PCM connector terminal 74)
- GND circuit (No.4 cylinder fuel injector connector terminal B and PCM connector terminal 100)
- Power circuit (No.1 cylinder fuel injector connector terminal A and main relay connector terminal D through common connector)
- Power circuit (No.2 cylinder fuel injector connector terminal A and main relay connector terminal D through common connector)
- Power circuit (No.3 cylinder fuel injector connector terminal A and main relay connector terminal D through common connector)
- Power circuit (No.4 cylinder fuel injector connector terminal A and main relay connector terminal D through common connector)

Short circuit
- No.1 cylinder fuel injector connector terminal B and PCM connector terminal 75 to GND
- No.2 cylinder fuel injector connector terminal B and PCM connector terminal 101 to GND
- No.3 cylinder fuel injector connector terminal B and PCM connector terminal 74 to GND
- No.4 cylinder fuel injector connector terminal B and PCM connector terminal 100 to GND

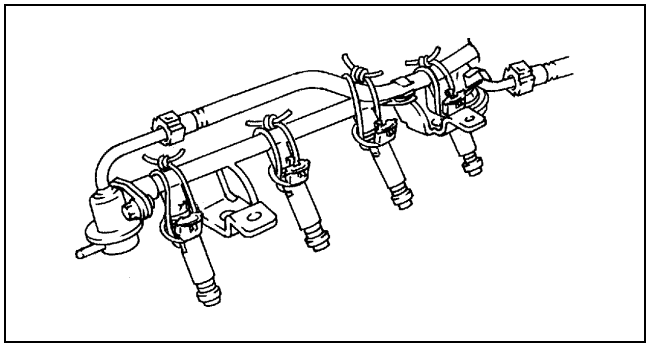
5. Repair or replace faulty areas.
6. Reconnect the fuel injector connectors.
7. Reconnect the battery negative cable.

Fuel Leakage Test

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 test only when directed.

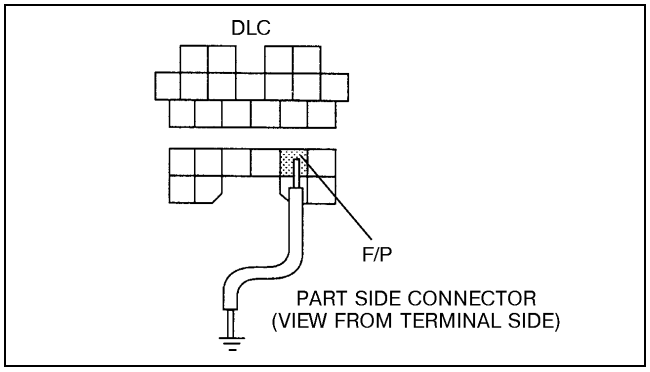
1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.
3. Remove the fuel injectors together with the fuel distributor. (See 01–14–21 FUEL INJECTOR REMOVAL/ INSTALLATION.)
4. Fasten the fuel injectors firmly to the fuel distributor with wires.



X3U114WC9

5. Connect the battery negative cable.

Caution
- **Connecting to the wrong DLC terminal may possibly cause a malfunction. Carefully connect to the specified terminal only.**

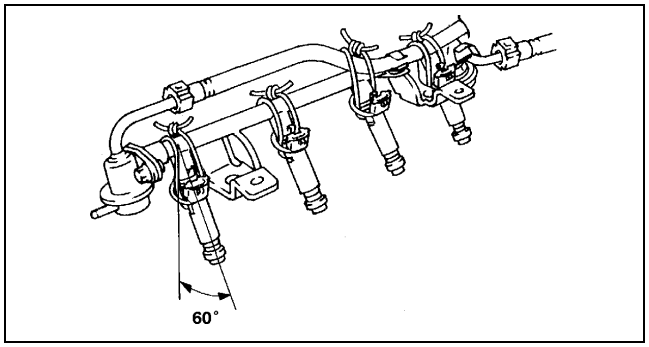


Y3U114WAA

6. Short the DLC terminal F/P to the body GND using a jumper wire.
7. Turn the ignition switch to ON to operate the fuel pump body.
8. Tilt the fuel injectors **approx. 60 degrees** and verify that fuel leakage from the fuel injector nozzles is within the specification.
   - If not as specified, replace the fuel injector.

Fuel leakage
Less than 1 drop/2 min

9. Turn the ignition switch off and remove the jumper wire.
10. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)



X3U114WD0

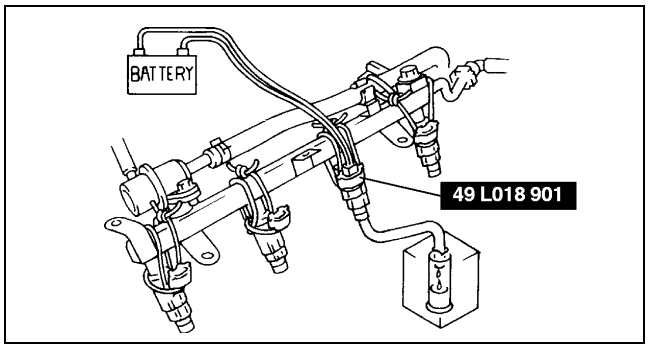
Volume Test

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 test only when directed.
- If you have an after market fuel injector tester or **SST** (49 L018 901), perform this inspection.
- If there is no an after market fuel injector tester available, 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 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.

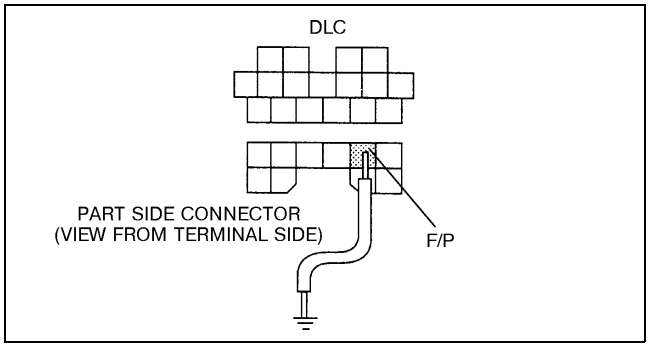
Using the SST
1. Remove the fuel injectors together with the fuel distributor with connected to fuel hose. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.
2. Fasten the fuel injectors firmly to the fuel distributor with wires.
3. Connect the fuel injector to the **SST** or the fuel injector tester as shown in the figure.



X3U114WJ4

4. Connect the battery negative cable.

Caution
- **Connecting to the wrong DLC terminal may possibly cause a malfunction. Carefully connect to the specified terminal only.**



Y3U114WAW

5. Short the DLC terminal F/P to body GND using a jumper wire.
6. Turn the ignition switch to ON.
7. Measure the injection volume of each fuel injector using a graduated container.
   - If not as specified, replace the fuel injector.

Injection volume
ZM: 38.1—40.4 ml {38.1—40.4 cc, 1.29—1.36 fl oz}/15 s
FS: 68—75 ml {68—75 cc, 2.30—2.53 fl oz}/15 s

8. Turn the ignition switch to LOCK.
9. Disconnect the battery negative cable.
10. Disconnect the **SST** or the fuel injector tester from the fuel injector.
11. Disconnect the jumper wire.
12. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)

Using a Fuel Injector Tester
1. Remove the fuel injectors. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)
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
ZM: 38.1—40.4 ml {38.1—40.4 cc, 1.29—1.36 fl oz}/15 s
FS: 68—75 ml {68—75 cc, 2.3—2.5 fl oz}/15 s

4. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)

PRESSURE REGULATOR REMOVAL/INSTALLATION

A3U011413280W01

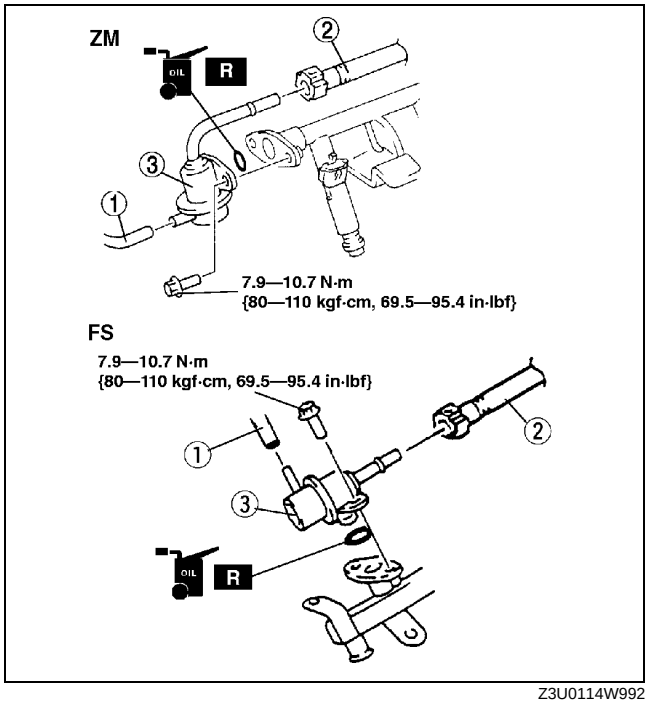
Caution
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.

3. Remove in the order indicated in the table.

1	Vacuum hose
2	Plastic fuel hose (See 01–14–22 Plastic Fuel Hose Removal Note) (See 01–14–23 Plastic Fuel Hose Installation Note)
3	Pressure regulator

4. Install in the reverse order of removal.
5. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)



Z3U0114W992

PRESSURE REGULATOR INSPECTION

A3U011413280W02

Caution

- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

Simulation Test

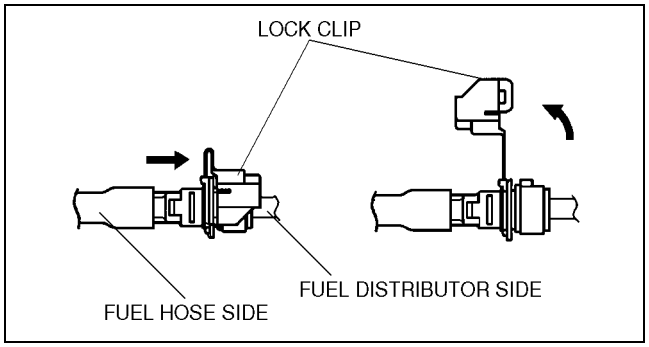
1. Carry out the “FUEL PRESSURE INSPECTION”. (See 01–14–6 FUEL PRESSURE INSPECTION.)
   - If not as specified, perform the further inspection for the pressure regulator.

Operation Inspection

Note

- Perform the following test only when directed.

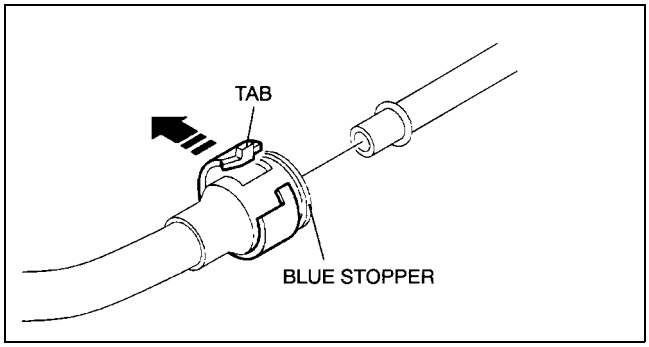
1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.
3. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push apart the lock clip and unlock it.



Y3E3912W201

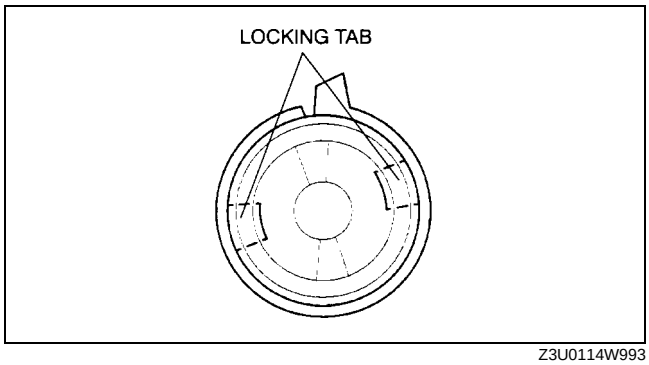
(2) Lift the tab on the blue locking coupler until the fuel line can be released.
(3) Pull the fuel hose straight back.

Note
- The blue stopper may be removed from the quick connector. Take care not to lose it. Reinstall it to the quick release connector before reconnecting the fuel line.



Z3U0114W986

- The orange locking coupler has two internal locking tabs which retain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.

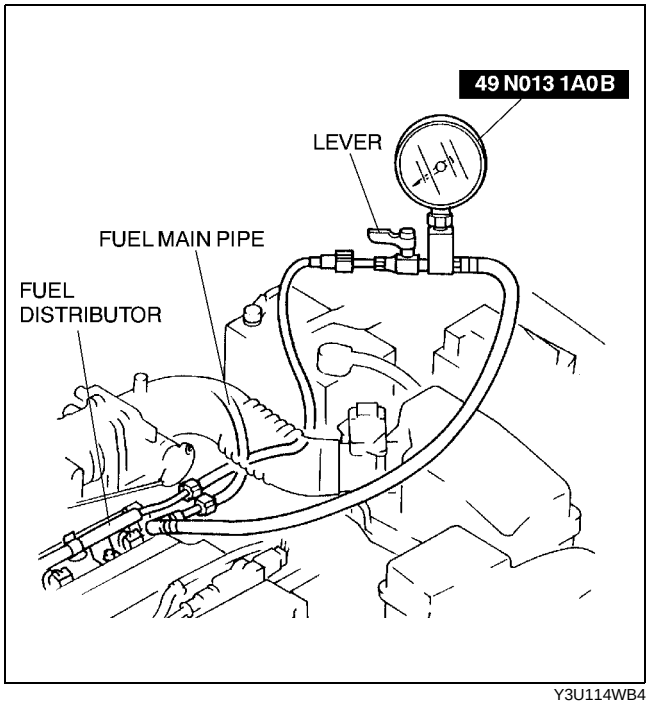


Z3U0114W993

4. Push the **SST** quick release connector into the fuel distributor and fuel main hose into the **SST** until a click is heard.

5. Turn the lever on the **SST** as shown.
6. Connect the battery negative cable.
7. Start the engine and let it idle.
8. Measure the fuel line pressure **after approx. 2 min**.

Fuel line pressure
210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}

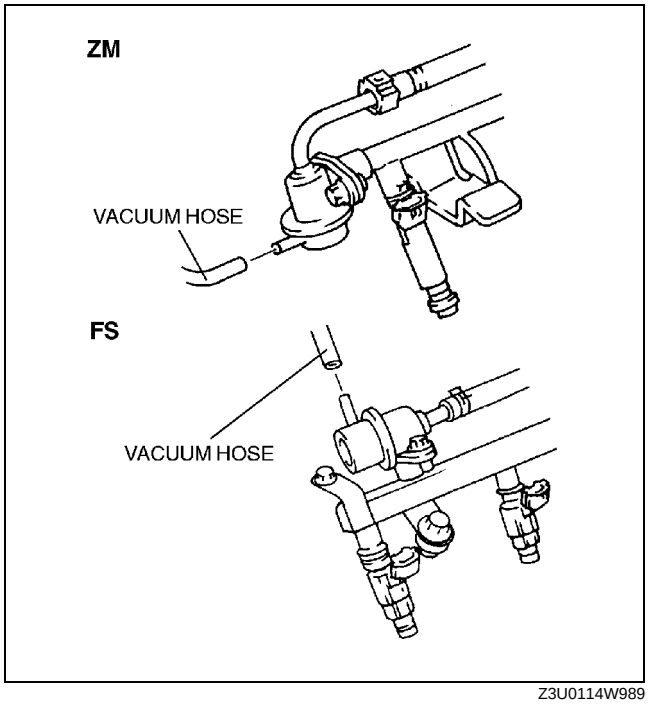


Y3U114WB4

9. Disconnect the vacuum hose from the pressure regulator and measure the fuel line pressure.

   Fuel line pressure
   270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

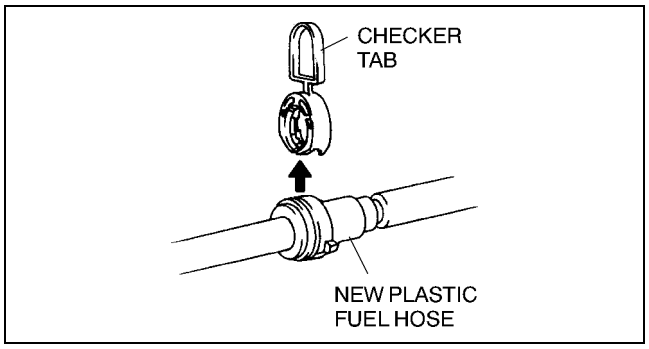
10. Turn the ignition switch off.



Z3U0114W989

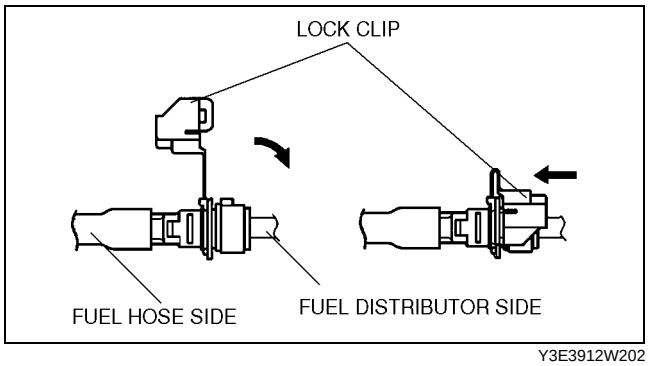
11. Disconnect the **SST**.

    Note
    - A checker tab is integrated with the quick release connector for new plastic fuel hoses. The checker tab will be released from the quick release connector after it is completely engaged with the fuel pipe.



YMU114WA8

12. Inspect the plastic fuel hose and pulsation damper sealing surface for damage and deformation, and replace if necessary.
    - If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.
13. Apply a small amount of clean engine oil to the sealing surface of the pulsation damper.
14. Reconnect the plastic fuel hose straight to the pulsation damper until a click is heard.
15. Lightly pull and push the quick release connector a few times by hand and verify that it can move **2.0—3.0 mm {0.08—0.11 in}** and it is connected securely.
    - If quick release connector does not move at all, verify that O-ring is not damaged and slipped, and reconnect the quick release connector.
16. Attach the lock clip to the quick release connector in the direction of the fuel distributor and lock it, as shown in the figure.
17. Complete the “AFTER REPAIR PROCEDURE”. (See 01–14–5 AFTER REPAIR PROCEDURE.)



Y3E3912W202

PULSATION DAMPER REMOVAL/INSTALLATION

A3U011420180W01

1. Remove and install the pulsation damper. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)

PULSATION DAMPER INSPECTION

A3U011420180W02

1. Remove the pulsation damper. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.)
2. Visually inspect the pulsation damper for damage and cracks. Also inspect that there is no extreme rust which will cause fuel leakage.
   - If either is observed, replace the pulsation damper.

PRC SOLENOID VALVE REMOVAL/INSTALLATION

A3U011418740W01

1. Remove and install the PRC solenoid valve.
   - Remove the PRC solenoid valve from the intake manifold. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].)

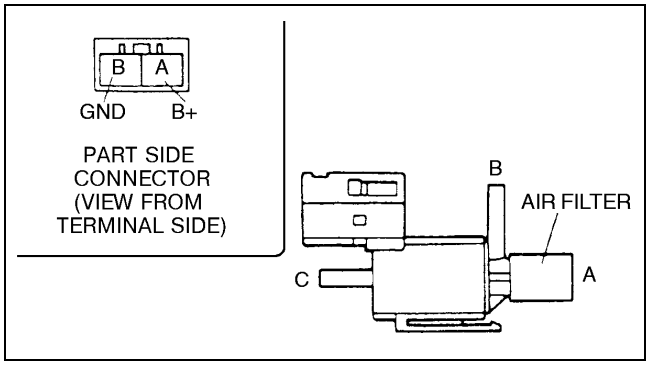
PRC SOLENOID VALVE INSPECTION

A3U011418740W02

Airflow Inspection

Note
- Perform the following test only as directed.

1. Carry out the “Pressure Regulator Control Inspection”. (See 01–03A–59 Pressure Regulator Control Inspection.) (See 01–03B–58 Pressure Regulator Control Inspection.)
   - If not as specified, perform the further inspection for the PRC solenoid valve.
2. Disconnect the negative battery cable.
3. Remove the PRC solenoid valve.
4. Inspect airflow between each port under the following conditions.
   - If not as specified, replace the PRC solenoid valve.
   - If as specified but the “Pressure Regulator Control Inspection” failed, carry out the “Circuit Open/Short Inspection”.
     — If there is an open or short circuit, repair or replace wiring harnesses.
     — If there is no open or short circuit, replace PRC solenoid valve.



Y3U114WAC

○—○ : Continuity ○═○ : Airflow

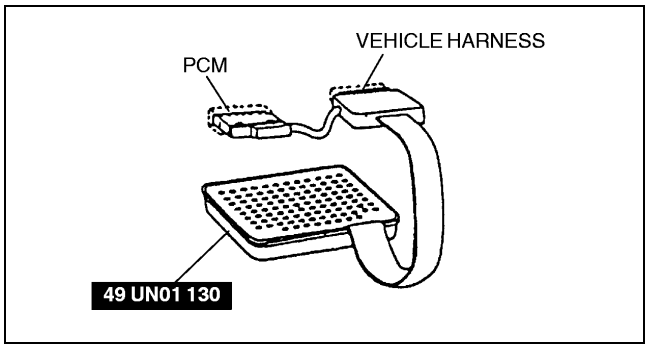
Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

X3U114WE8

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U114WB9

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (PRC solenoid valve connector terminal A and main relay connector terminal D through common connector)
   - GND circuit (PRC solenoid valve connector terminal B and PCM connector terminal 95)

   Short circuit
   - Power circuit (PRC solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
   - GND circuit (PRC solenoid valve connector terminal B and PCM connector terminal 95 to GND)
5. Reconnect the PRC solenoid valve connector.
6. Reconnect the negative battery cable.

01–15 EXHAUST SYSTEM

EXHAUST SYSTEM INSPECTION

A3U011540000W01

1. Start the engine and inspect each exhaust system component for exhaust gas leakage.
   - If leakage is found, repair or replace if necessary.

EXHAUST SYSTEM REMOVAL/INSTALLATION

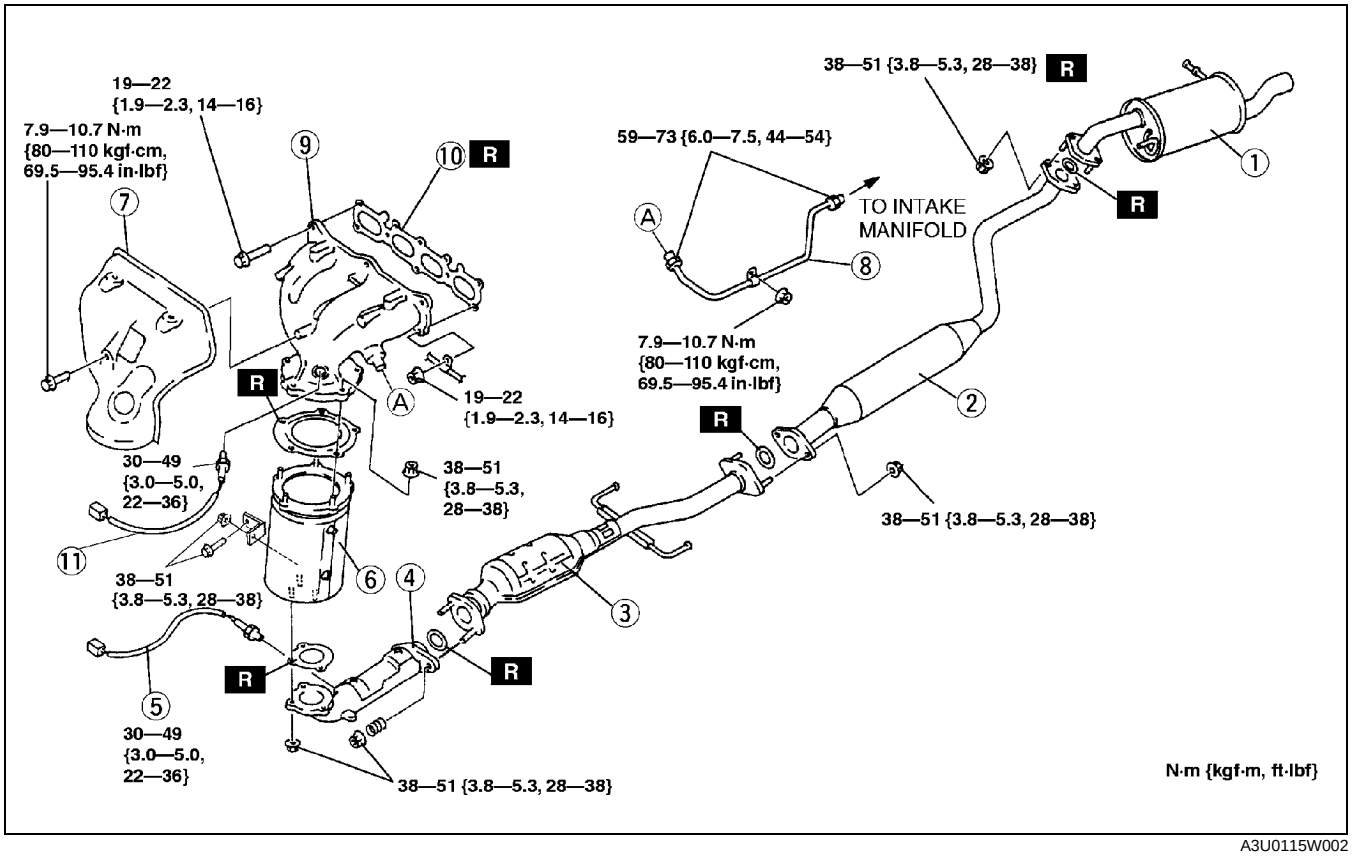
A3U011540000W02

Warning

- **Hot engine and exhaust system can cause serious burn. Turn off the engine and wait until it and the exhaust system are cool before removing the exhaust system.**

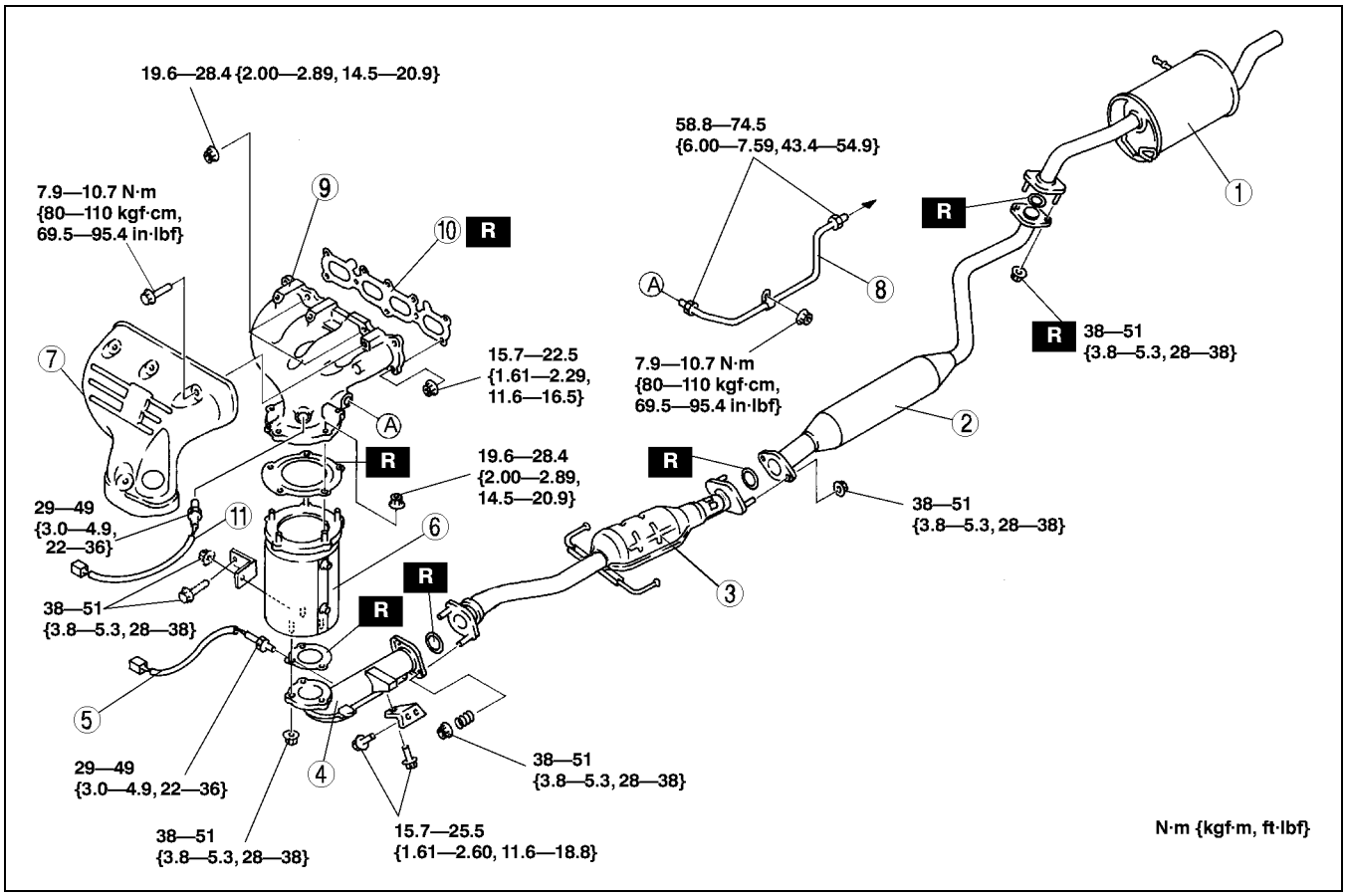
1. Disconnect the battery negative cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

ZM



A3U0115W002

FS



A3U0115W001

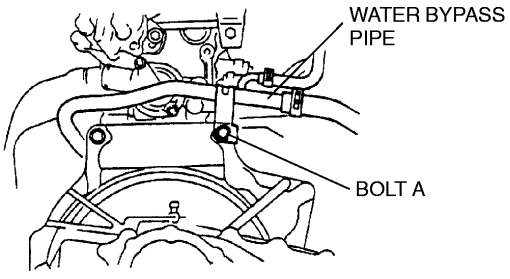
1	Main silencer
2	Presilencer
3	TWC
4	Front pipe
5	HO2S (rear)
6	WU-TWC
7	Exhaust manifold insulator

8	EGR pipe
9	Exhaust manifold (See 01–15–2 Exhaust Manifold Removal Note)
10	Exhaust manifold gasket (See 01–15–3 Exhaust Manifold Gasket Installation Note)
11	HO2S (Front)

Exhaust Manifold Removal Note

1. Remove the air cleaner and air hose.
2. Remove bolt A on the water bypass pipe before removing the exhaust manifold.

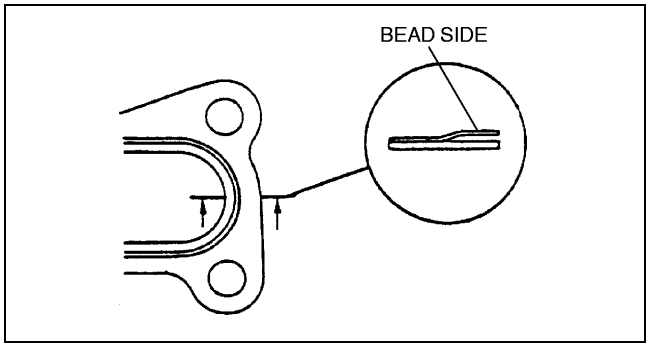
Tightening torque
64—89 N·m {6.5—9.1 kgf·m, 48—65 ft·lbf}



X3U115WA2

Exhaust Manifold Gasket Installation Note

1. To install the exhaust manifold gasket, make sure that the bead side of the gasket is facing the exhaust manifold side.



X3U115WA3

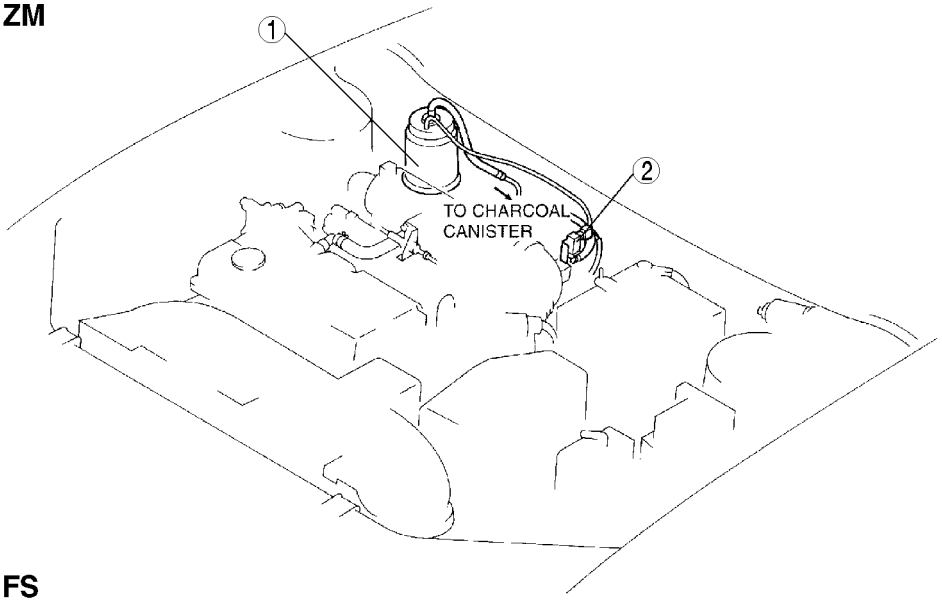
01–16 EMISSION SYSTEM

EMISSION SYSTEM LOCATION INDEX

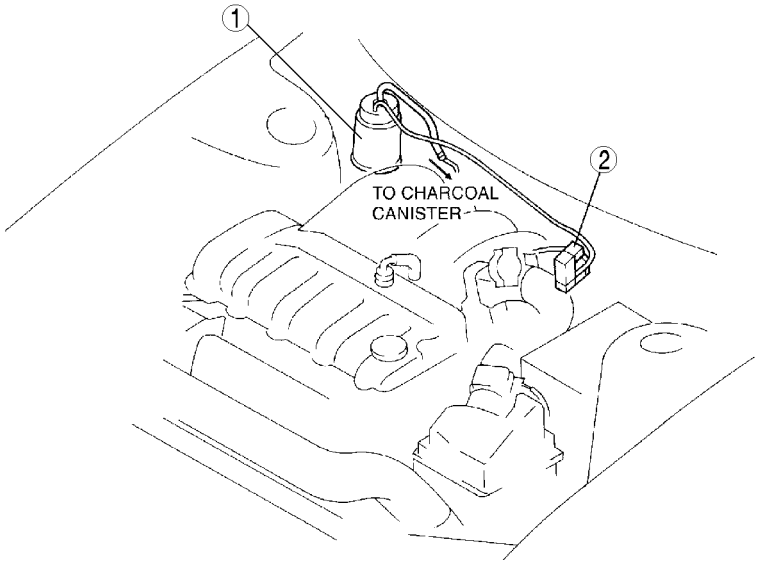
A3U011601074W01

Evaporative Emission (EVAP) Control System
Engine room side

ZM



FS

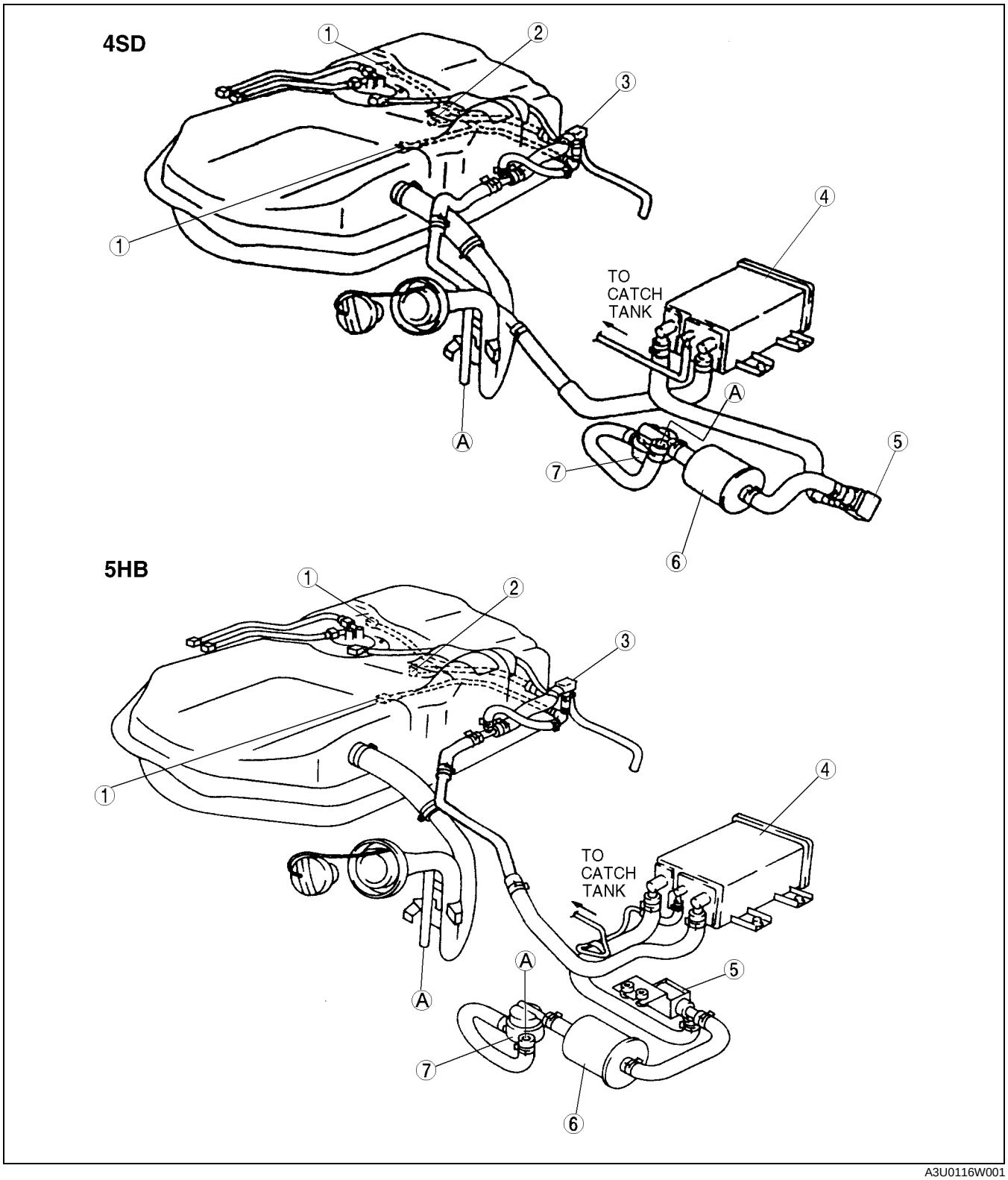


Z3U0116W996

1	Catch tank (See 01–16–11 CATCH TANK INSPECTION)

2	Purge solenoid valve (See 01–16–11 PURGE SOLENOID VALVE REMOVAL/INSTALLATION) (See 01–16–12 PURGE SOLENOID VALVE INSPECTION)

Fuel tank



A3U0116W001

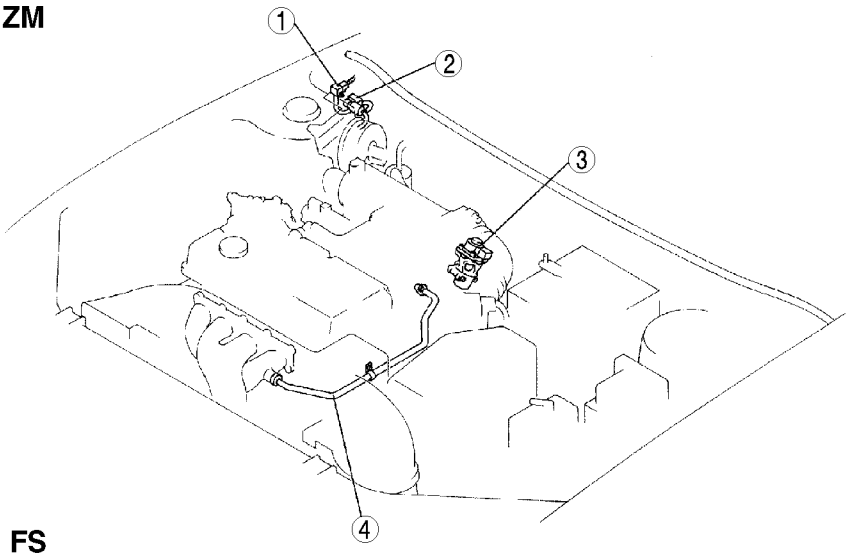
1	Rollover valve (See 01–14–13 FUEL TANK INSPECTION)
2	Fuel shut-off valve (See 01–14–13 FUEL TANK INSPECTION)
3	Fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM]) (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS])

4	Charcoal canister (See 01–16–9 CHARCOAL CANISTER INSPECTION)
5	Canister drain cut valve (CDCV) (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)
6	Air filter (See 01–16–9 AIR FILTER INSPECTION)

7	Evaporative gas check valve (two-way) (See 01–16–8 EVAPORATIVE GAS CHECK VALVE (TWO-WAY) INSPECTION)

EGR System

ZM



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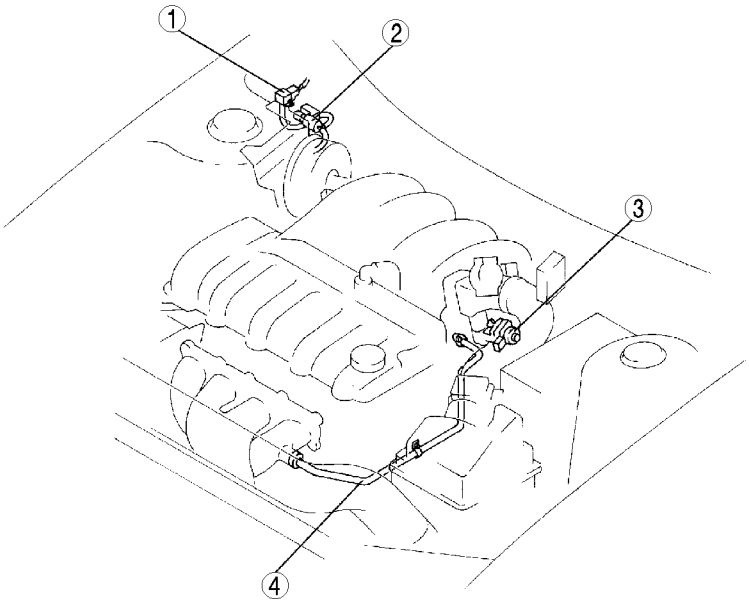


Z3U0116W995

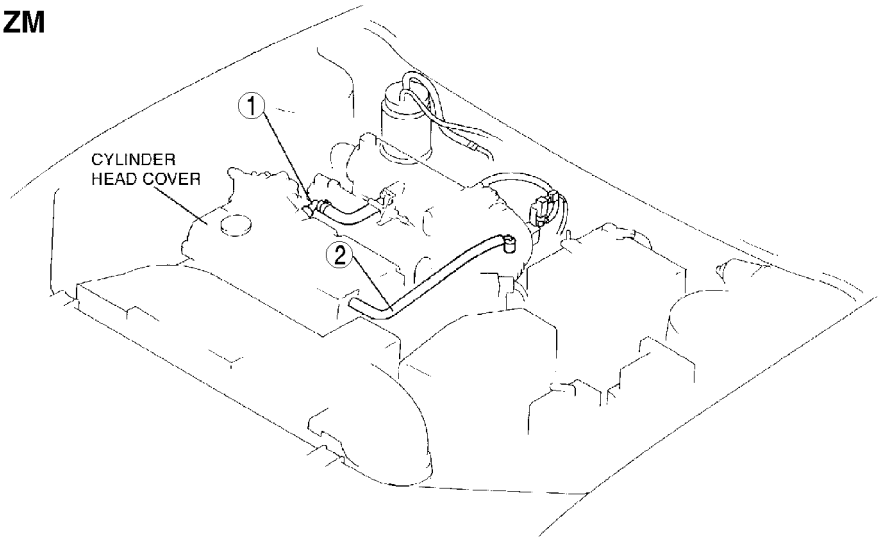
1	EGR boost sensor (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM]) (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS])

2	EGR boost sensor solenoid valve (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION)
3	EGR valve (See 01–16–15 EGR VALVE REMOVAL/INSTALLATION) (See 01–16–15 EGR VALVE INSPECTION)

4	EGR pipe

Positive Crankcase Ventilation (PCV) System

ZM



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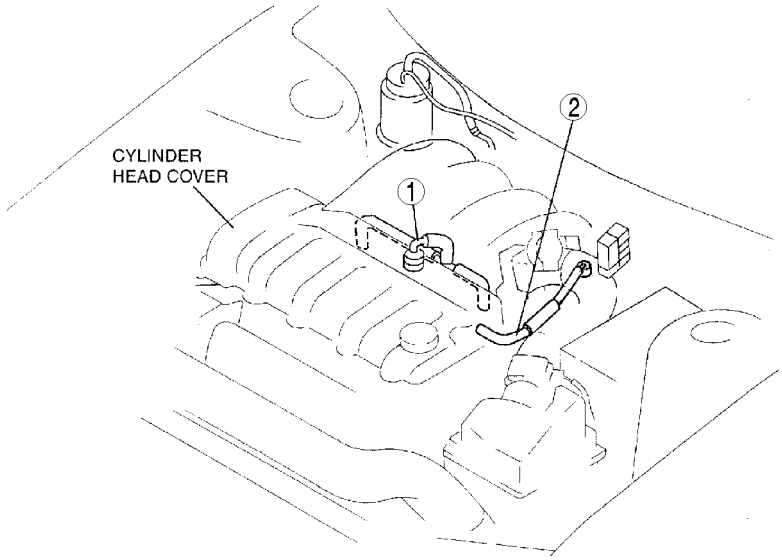
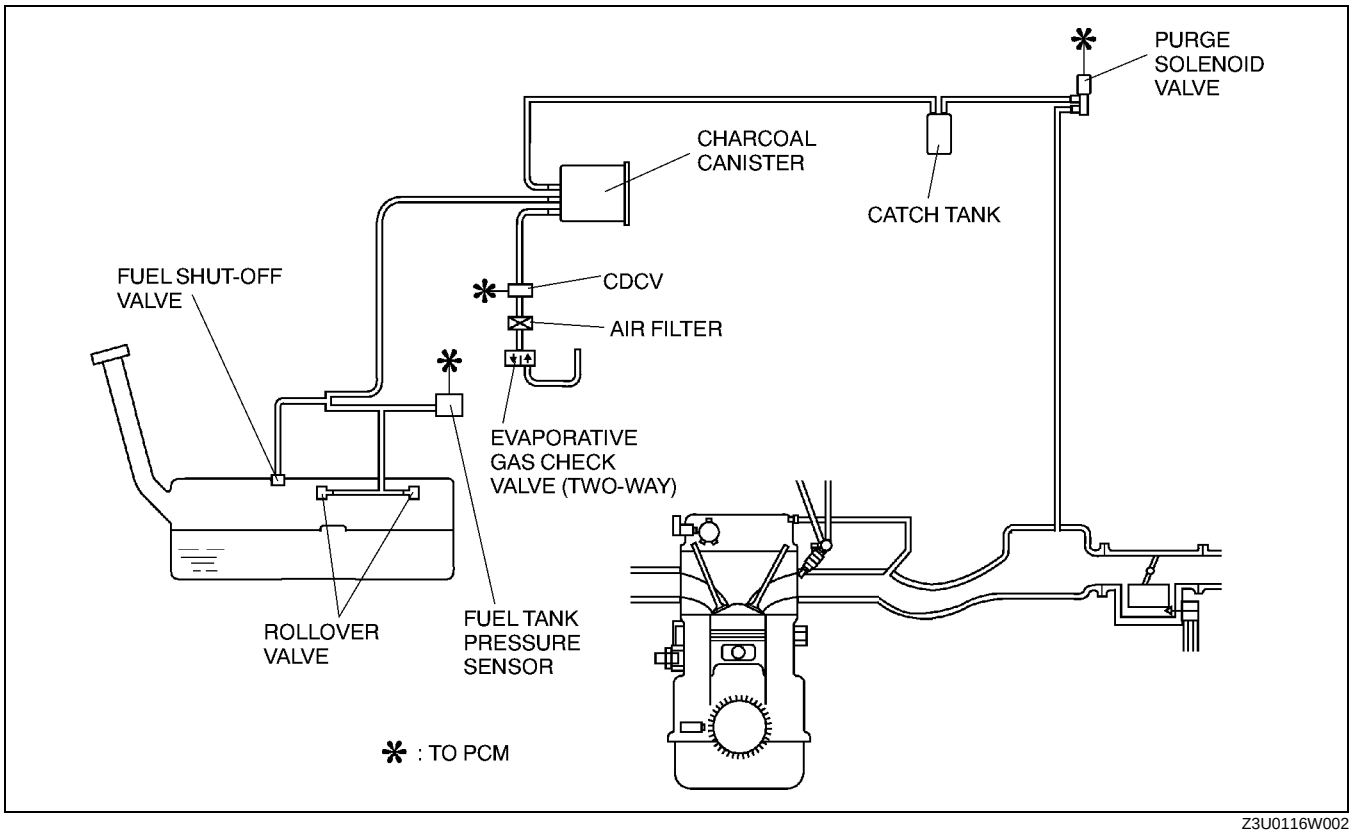


Z3U0116W994

1	PCV valve (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION)
2	Ventilation hose

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM DIAGRAM

A3U011601074W02



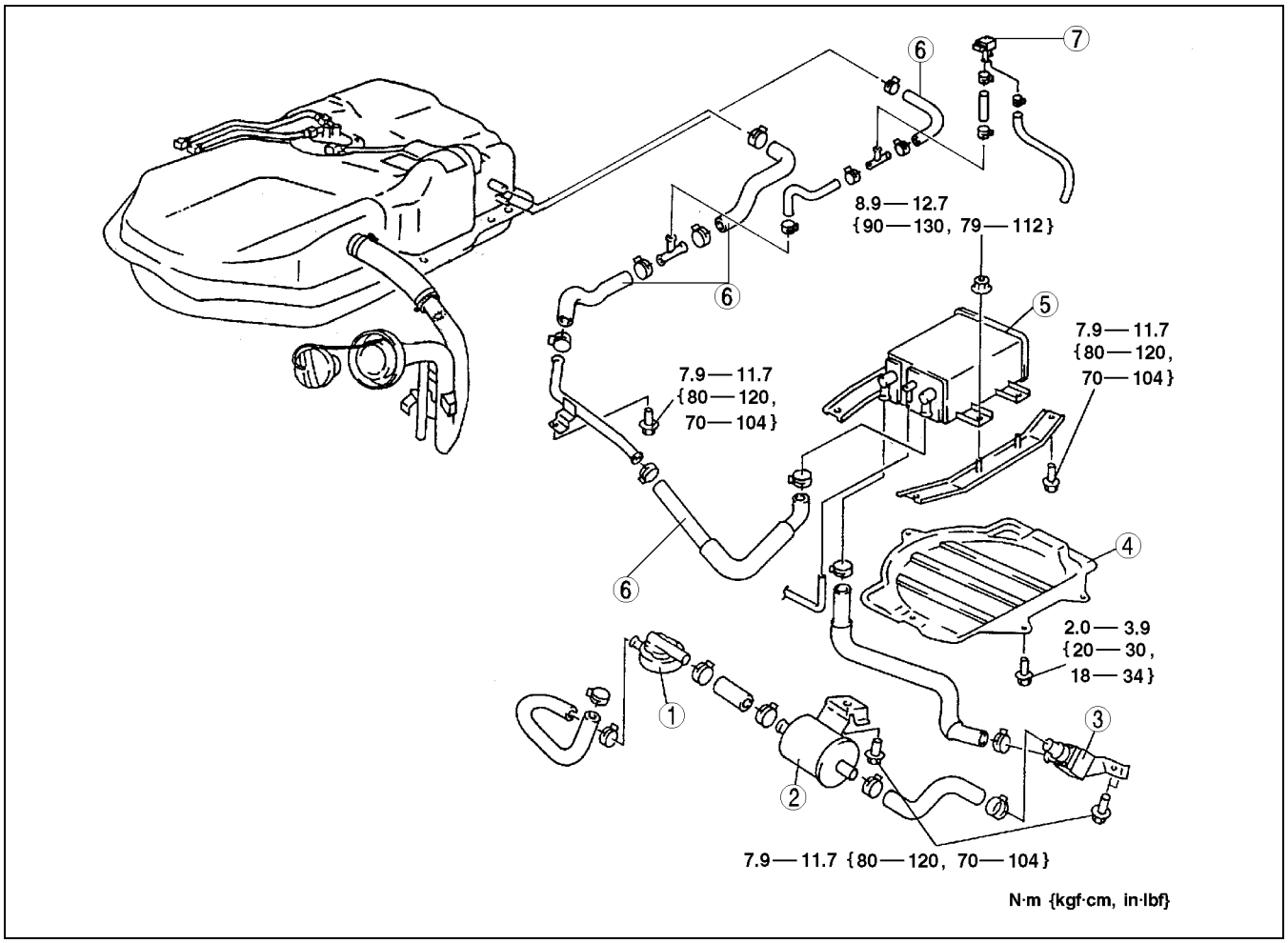
Z3U0116W002

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/ INSTALLATION

A3U011601074W03

1. Raise the rear of the vehicle and support it with safety stands.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

4SD

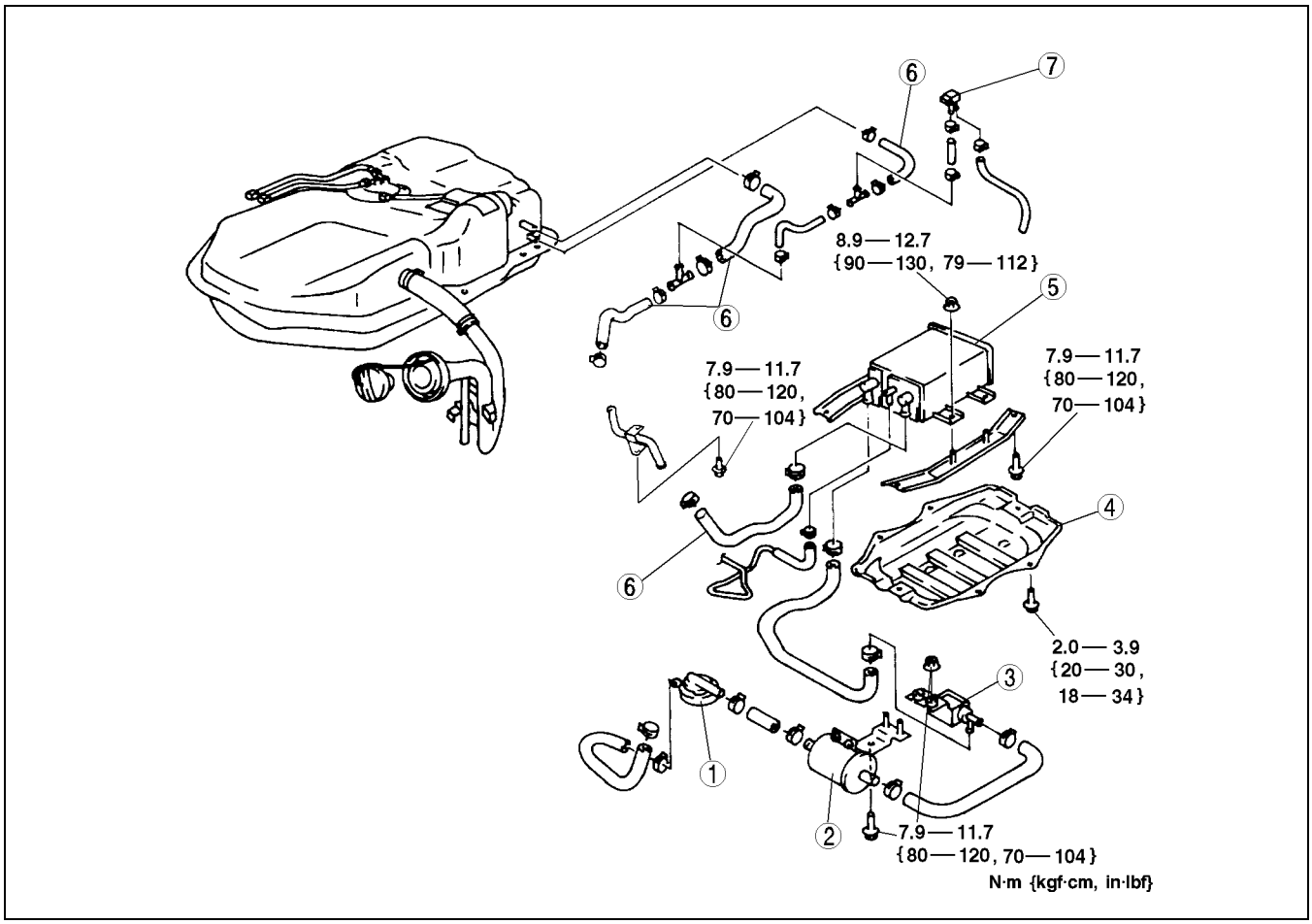


A3U0116W003

1	Evaporative gas check valve (two-way)
2	Air filter
3	CDCV
4	Charcoal canister insulator

5	Charcoal canister
6	Evaporative hose
7	Fuel tank pressure sensor

5HB



A3U0116W002

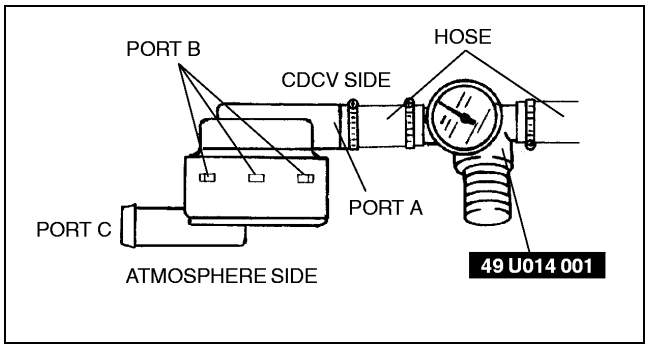
1	Evaporative gas check valve (two-way)
2	Air filter
3	CDCV
4	Charcoal canister insulator

5	Charcoal canister
6	Evaporative hose
7	Fuel tank pressure sensor

EVAPORATIVE GAS CHECK VALVE (TWO-WAY) INSPECTION

A3U011642914W01

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.
4. Verify that there is airflow from port B when pressure of **+0.99 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 **+0.99 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).

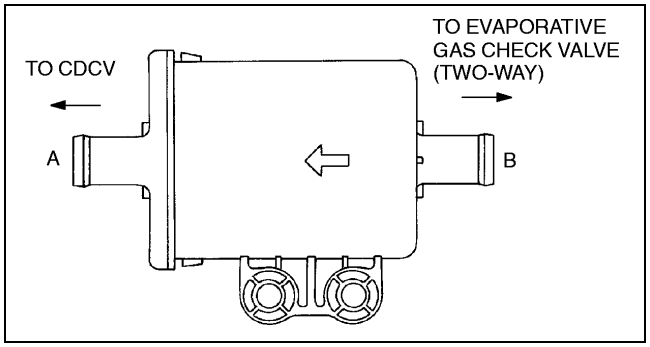


X3U116WB9

AIR FILTER INSPECTION

A3U011613988W01

1. Remove the air filter.
2. Blow from port A and verify that there is airflow from port B.
   - If not as specified, replace the air filter.
3. Blow from port B and verify that there is airflow from port A.
   - If not as specified, replace the air filter.



X3U116WA1

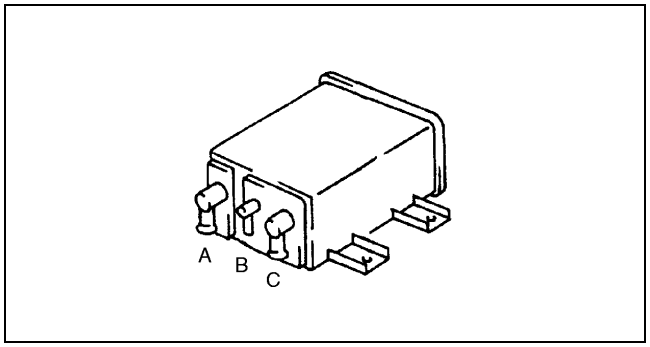
CHARCOAL CANISTER INSPECTION

A3U011613970W01

Caution

- **Do not apply the pressure more than 20 kPa {0.2 kgf/cm^2, 2.8 psi} to the charcoal canister, or the charcoal canister will be damaged.**

1. Remove the charcoal canister. (See 01–16–7 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)
2. Plug ports A and C, then blow air into port B.
3. Verify that there is no air leakage from the case.
   - If not as specified, replace the charcoal canister.



X3U116WA6

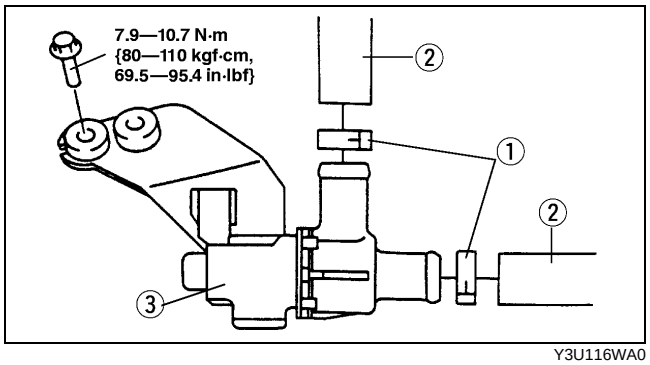
CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION

A3U011618743W01

1. Disconnect the negative battery cable.
2. Raise the rear of the vehicle and support it with safety stands.
3. Remove in the order indicated in the table.

1	Clamp
2	Evaporative hose (See 01–16–9 Evaporative Hose Installation Note)
3	CDCV

4. Install in the reverse order of removal.



Y3U116WA0

Evaporative Hose Installation Note

1. Install the evaporative hose until it contacts the stopper.

CANISTER DRAIN CUT VALVE (CDCV) INSPECTION

A3U011618743W02

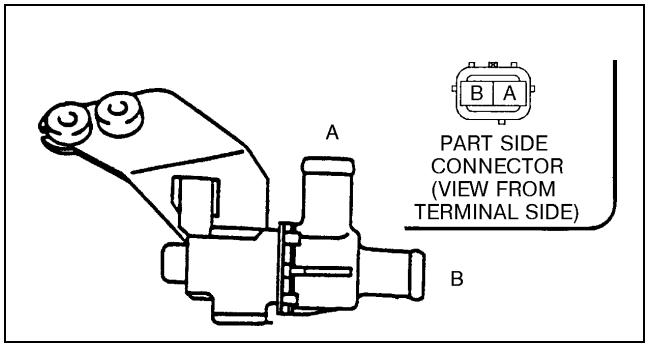
Simulation Test

1. Carry out the “Evaporative Emission Control System Inspection”. (See 01–03A–56 Evaporative System Leak Inspection Using Vacuum Pump.) (See 01–03B–55 Evaporative System Leak Inspection Using Vacuum Pump.)
   - If not as specified, perform the following inspection for the CDCV.

Airflow Inspection

Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the CDCV. (See 01–16–9 CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/ INSTALLATION.)
3. Inspect airflow between the ports under the following conditions.
   - If not as specified, replace the CDCV.
   - If as specified but the “Simulation Test” is failed, inspect evaporative hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.



Y3U116WA1

○—○ : Continuity ○═○ : Airflow

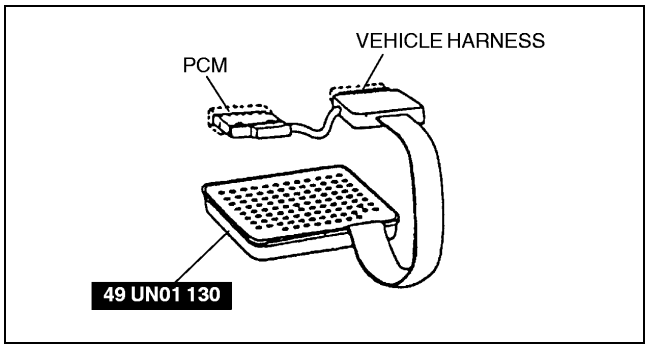
Step	Terminal		Port	
	A	B	A	B
1	○—○		○═○	
2	B+	GND		

X3U116WCA

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

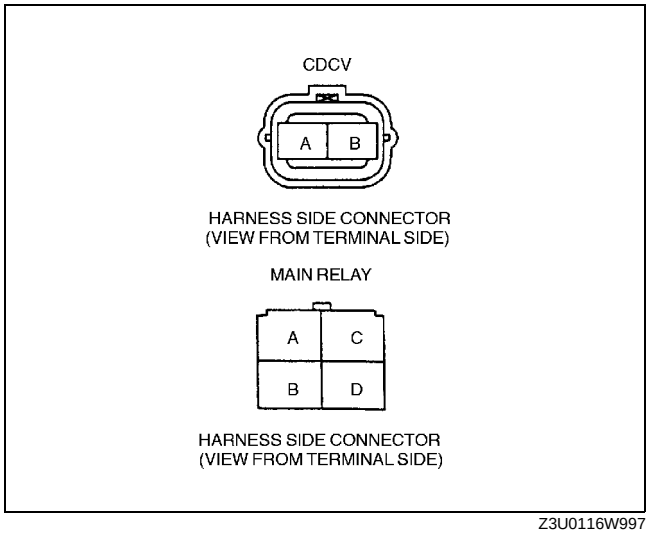
Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U116WAG

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - GND circuit (CDCV connector terminal B and PCM connector terminal 18 through common connector)
   - Power circuit (CDCV connector terminal A and main relay connector terminal D)

   Short circuit
   - GND circuit (CDCV connector terminal B and PCM connector terminal 18 through common connector to GND)
   - Power circuit (CDCV connector terminal A and main relay connector terminal D to GND)
5. Install the CDCV.
6. Connect the negative battery cable.

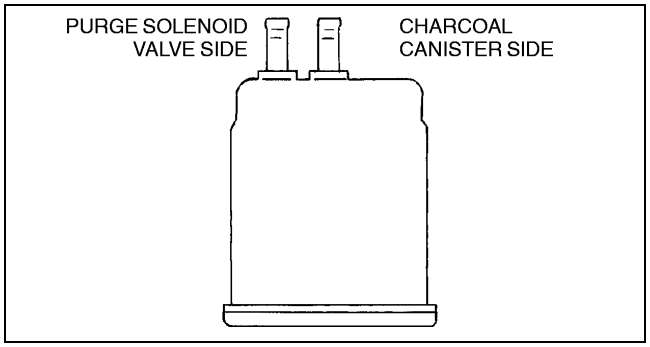


Z3U0116W997

CATCH TANK INSPECTION

A3U011613978W01

1. Remove the catch tank.
2. Plug the purge solenoid valve side port of the catch tank.
3. Blow from the charcoal canister side port and verify that there is no air leakage from the case.
   - If not as specified, replace the catch tank.



X3U116WB0

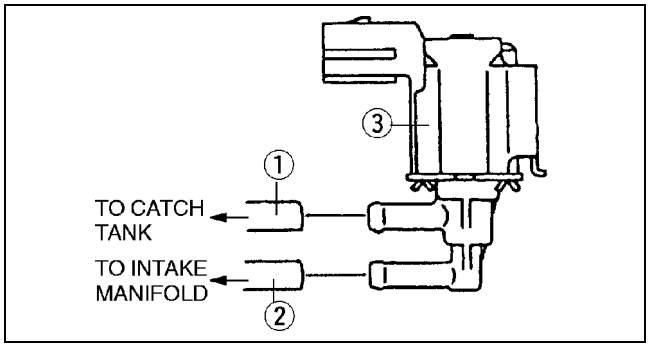
PURGE SOLENOID VALVE REMOVAL/INSTALLATION

A3U011618740W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Evaporative hose (See 01–16–11 Evaporative Hose Installation Note)
2	Vacuum hose (See 01–16–11 Vacuum Hose Installation Note)
3	Purge solenoid valve

3. Install in the reverse order of removal.



Z3U0116W993

Vacuum Hose Installation Note

1. Install the vacuum hose until it contacts the stopper.

Evaporative Hose Installation Note

1. Attach the evaporative hose until it contacts the stopper.

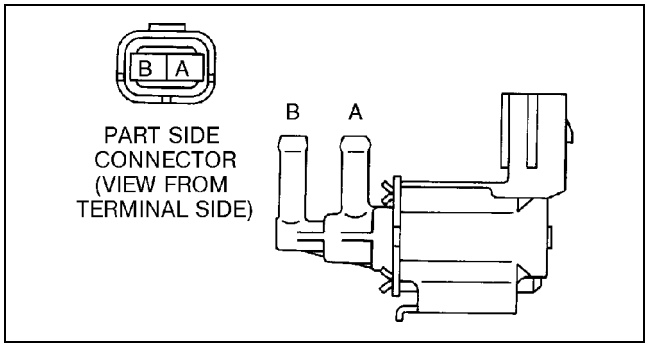
PURGE SOLENOID VALVE INSPECTION

A3U011618740W02

Airflow Inspection

Note
- Perform the following test only when directed.

1. Remove the purge solenoid valve. (See 01–16–11 PURGE SOLENOID VALVE REMOVAL/ INSTALLATION.)
2. Inspect airflow between the ports under the following conditions.
   - If not as specified, replace the purge solenoid valve.
   - If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.



Z3U0116W992

○—○ : Continuity ○═○ : Airflow

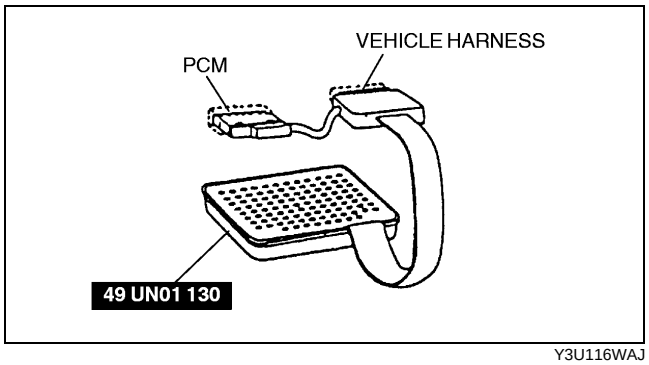
Step	Terminal		Port	
	A	B	A	B
1	○—○			
2	B+	GND	○═○	

X3U116WC1

Circuit Open/Short Inspection

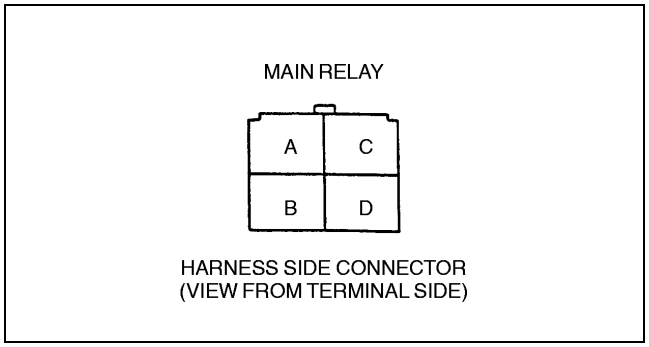
1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U116WAJ

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - Power circuit (purge solenoid valve connector terminal A and main relay connector terminal D through common connector)
   - Control circuit (purge solenoid valve connector terminal B and PCM connector terminal 67 through common connector)



X3U116WC0

Short circuit
- Power circuit (purge solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
- Control circuit (purge solenoid valve connector terminal B and PCM connector terminal 67 through common connector to GND)

5. Install the purge solenoid valve.
6. Connect the negative battery cable.

FUEL-FILLER CAP INSPECTION

A3U011642250W01

leakage inspection

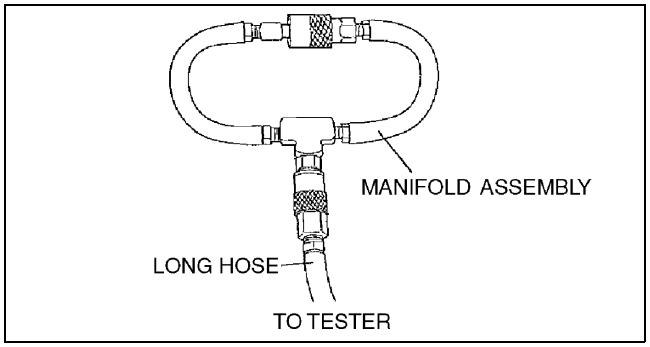
1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test.

Note
- If the tester does not work correctly during self-test, see 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.
(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads **10 to 12 psi** (preset at factory).
- If not, see 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, perform one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).



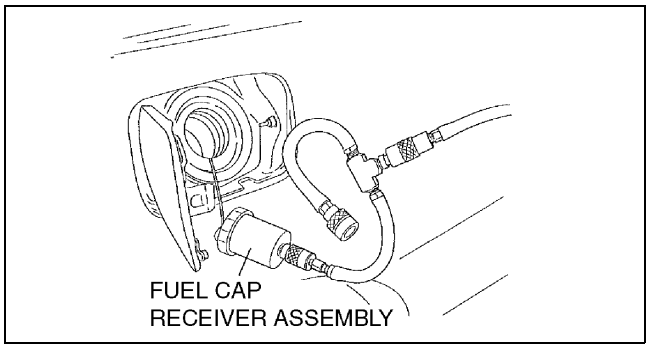
YMU116WZ1

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.

4. Turn the control valve to the FILL position.
5. Wait (**maximum 20 s**) 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.

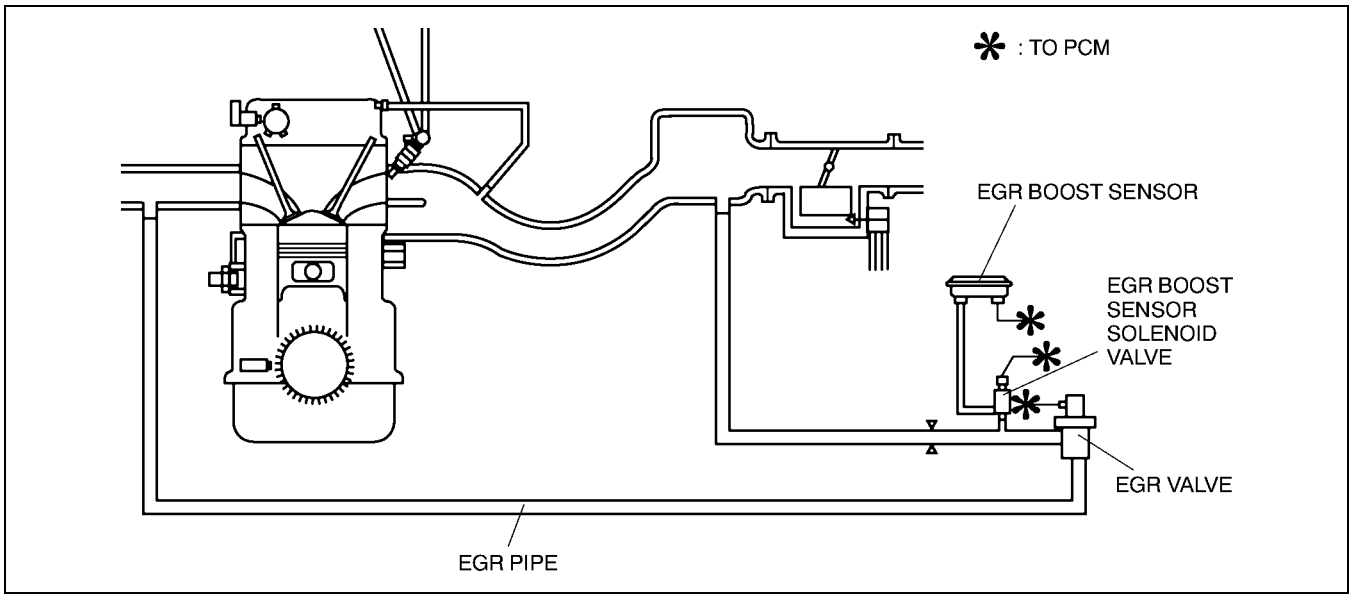


YMU116WZ2

EGR SYSTEM DIAGRAM

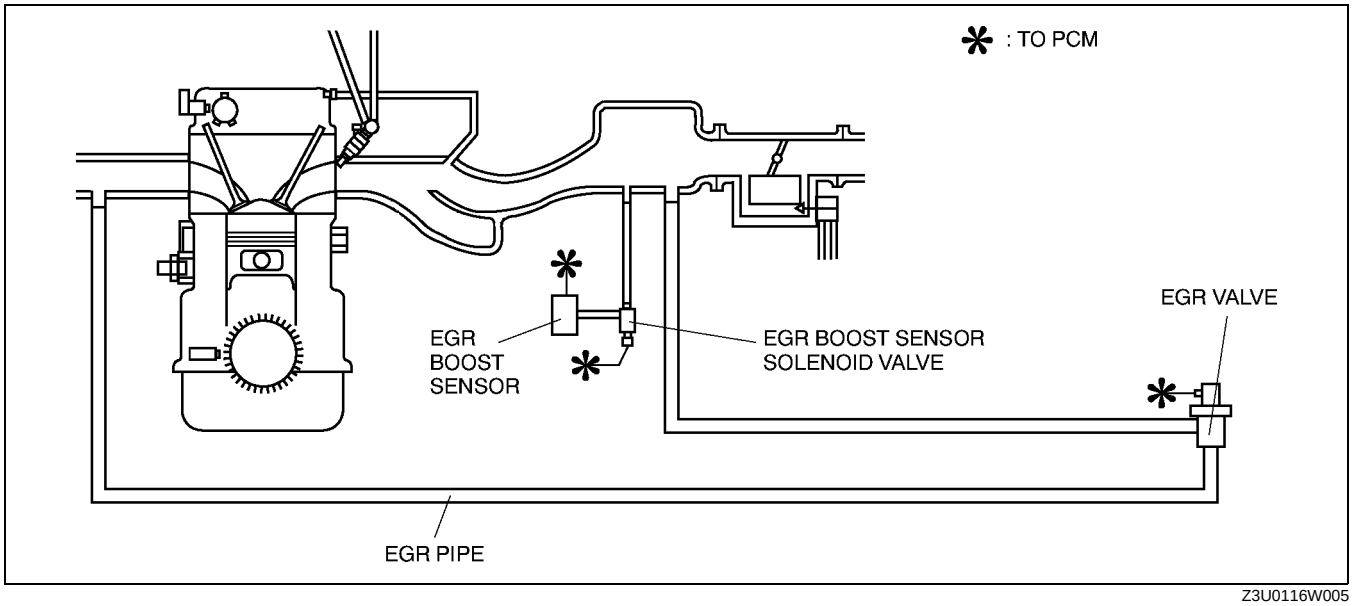
A3U011620000W01

ZM



Z3U0116W004

FS



Z3U0116W005

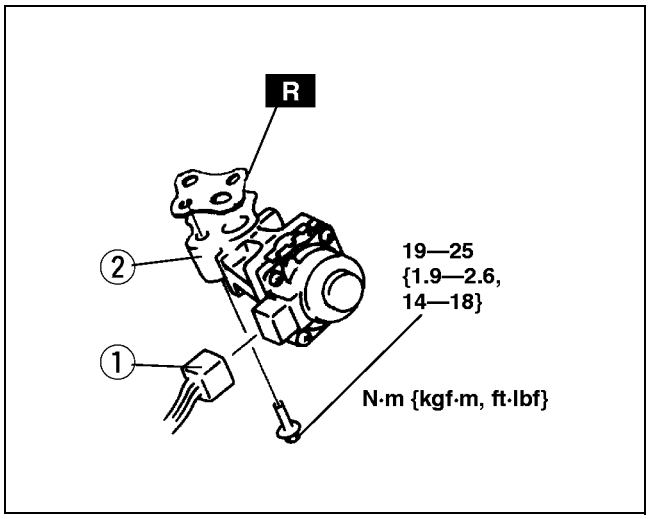
EGR VALVE REMOVAL/INSTALLATION

A3U011620300W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	EGR valve connector
2	EGR valve

4. Connect the negative battery cable.



Z3U0116W007

EGR VALVE INSPECTION

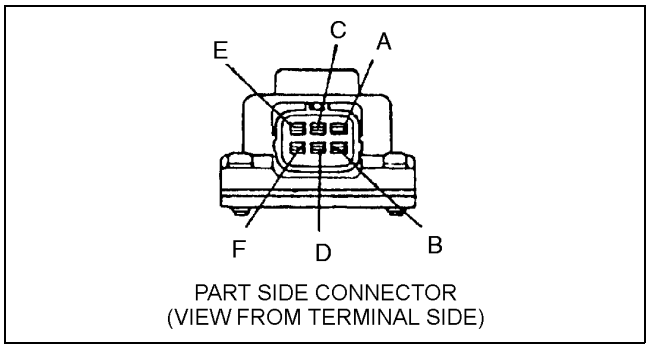
A3U011620300W02

Resistance Inspection

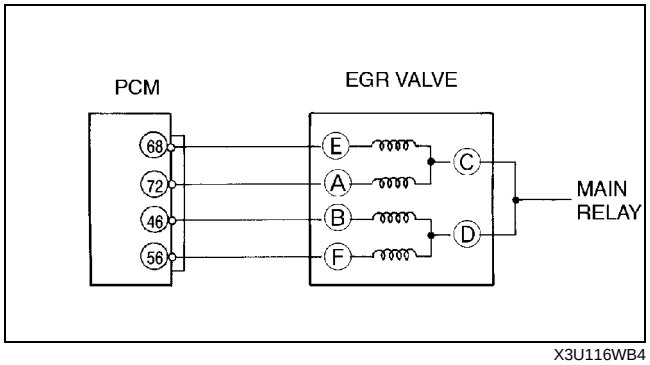
Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Inspect resistance of the EGR valve coils.
   - If not as specified, replace the EGR valve.
   - If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.

Terminals	Resistance (ohm)
C—E C—A D—B D—F	20—24



Y3U116WA8

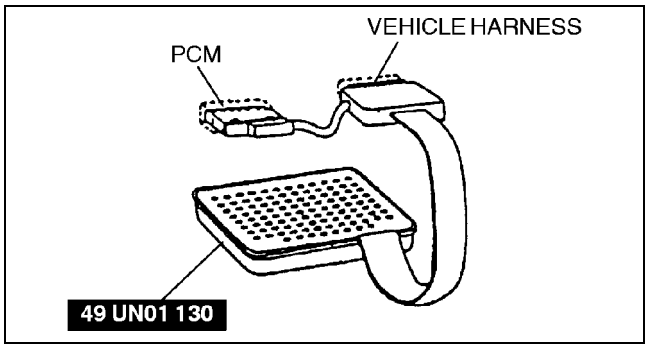


X3U116WB4

Circuit Open/Short Inspection

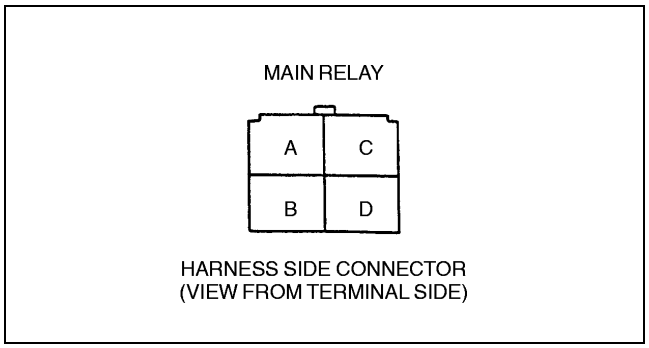
1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U116WAK

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.



X3U116WB5

   Open circuit
   - Control circuit (EGR valve connector terminal E and PCM connector terminal 68)
   - Control circuit (EGR valve connector terminal A and PCM connector terminal 72)
   - Control circuit (EGR valve connector terminal B and PCM connector terminal 46)
   - Control circuit (EGR valve connector terminal F and PCM connector terminal 56)
   - Power circuit (EGR valve connector terminal C or D and main relay connector terminal D through common connector)

   Short circuit
   - Control circuit (EGR valve connector terminal E and PCM connector terminal 68 to GND)
   - Control circuit (EGR valve connector terminal A and PCM connector terminal 72 to GND)
   - Control circuit (EGR valve connector terminal B and PCM connector terminal 46 to GND)
   - Control circuit (EGR valve connector terminal F and PCM connector terminal 56 to GND)
   - Power circuit (EGR valve connector terminal C or D and main relay connector terminal D through common connector to GND)
5. Remove the EGR valve, and inspect for any damage or clogging. Replace the EGR valve if not as specified.
6. Connect the negative battery cable.

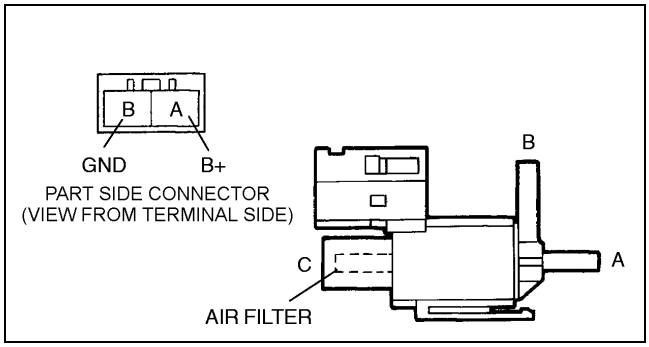
EGR BOOST SENSOR SOLENOID VALVE INSPECTION

A3U011618744W01

Airflow Inspection

Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the EGR boost sensor solenoid valve.
3. Inspect airflow between each port under the following conditions.
   - If not as specified, replace the EGR boost sensor solenoid valve.
   - If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.



Y3U116WA3

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

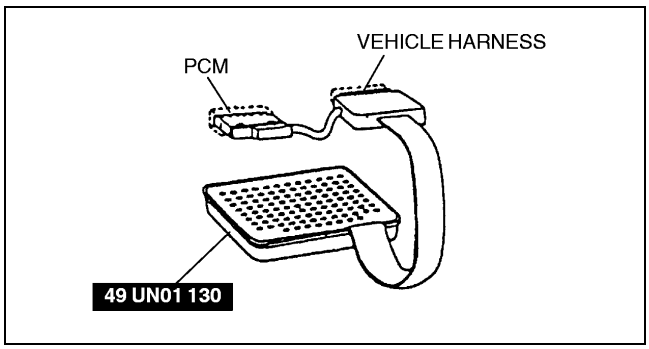
X3U116WCB

4. Connect the negative battery cable.

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

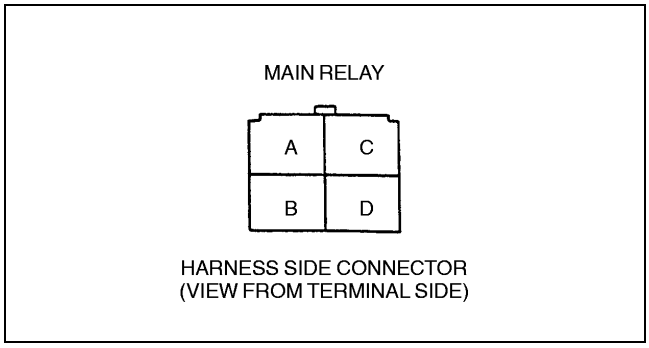
Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



Y3U116WAH

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.

Open circuit
- Power circuit (EGR boost sensor solenoid valve connector terminal A and main relay connector terminal D through common connector)
- Control circuit (EGR boost sensor solenoid valve connector terminal B and PCM connector terminal 98)



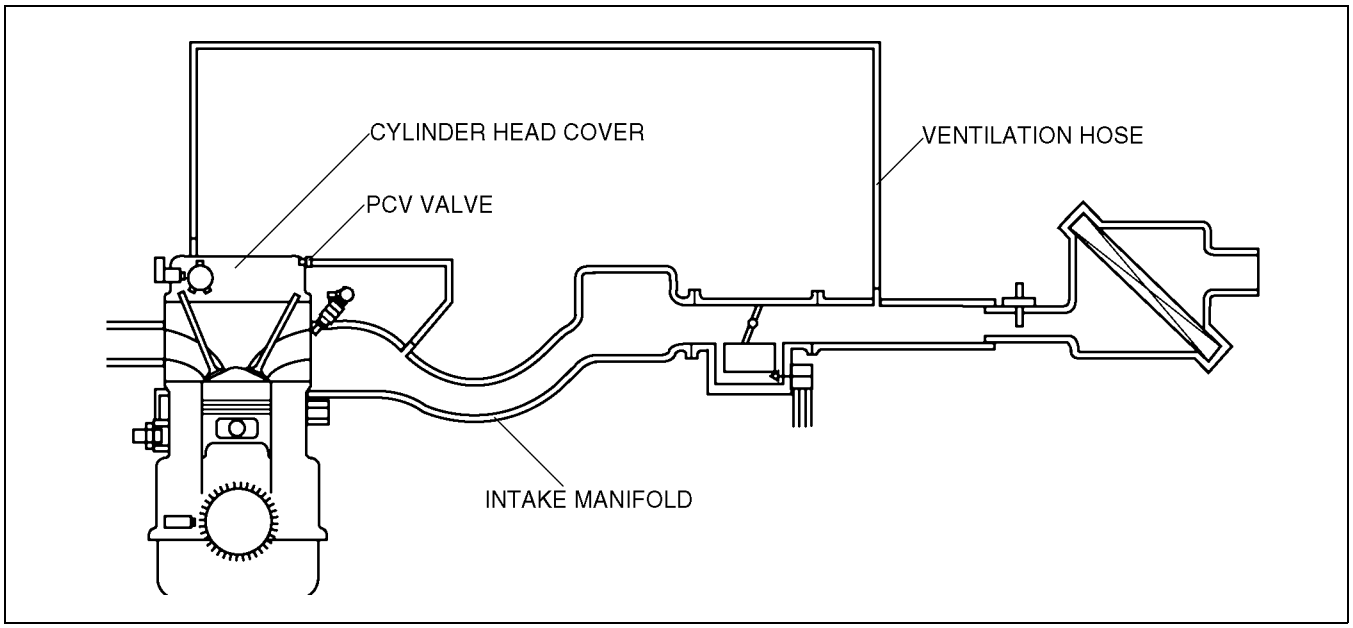
X3U116WB7

Short circuit
- Power circuit (EGR boost sensor solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
- Control circuit (EGR boost sensor solenoid valve connector terminal B and PCM connector terminal 98 to GND)

5. Install the EGR boost sensor solenoid valve.
6. Connect the negative battery cable.

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM FLOW DIAGRAM

A3U011613890W01



Z3U0116W006

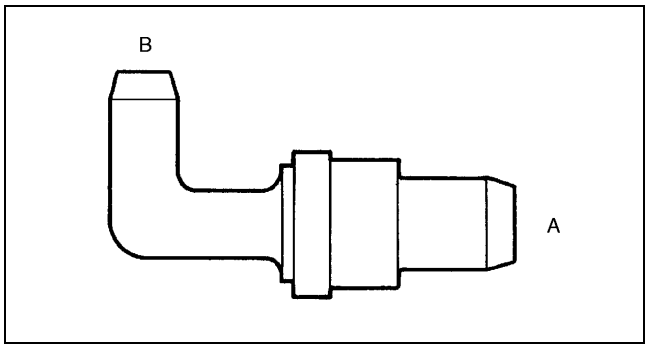
POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION

A3U011613890W02

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 from port A	Yes
Air applied from port B	No



X3U116WB8

WARM UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION

A3U011620505W01

Note
- Make sure that no HO2S DTC has been detected. If detected, this inspection cannot be used for WU-TWC inspection.

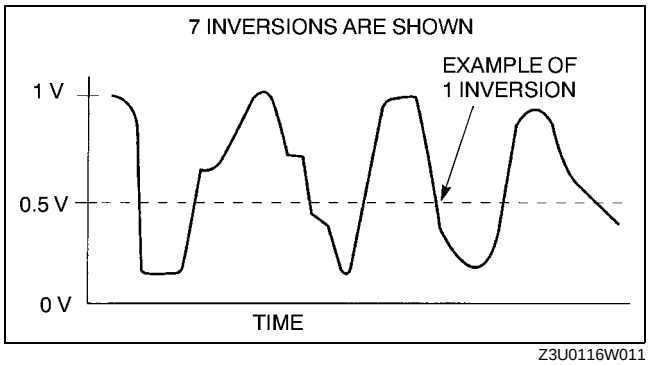
1. Connect the WDS or equivalent and monitor PIDs as following.
   - Monitor the WU-TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.
2. Begin to monitor the appropriate PIDs.
3. Drive the vehicle for **10 min** at **65—96 km/h {40—60 mph}** to ensure the WU-TWC reaches operating temperature.
4. Stop the vehicle and leave in a safe place.
5. Let the engine at idle.
6. Record PIDs for **1 min**.
7. Select the appropriate PIDs and read the graph.
8. Count the number of times (inversions) that the upstream HO2S graph line actually crosses the **0.5 V** line.
9. Count the number of times (inversions) 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.

10. Using the following equation, calculate the value of ratio.

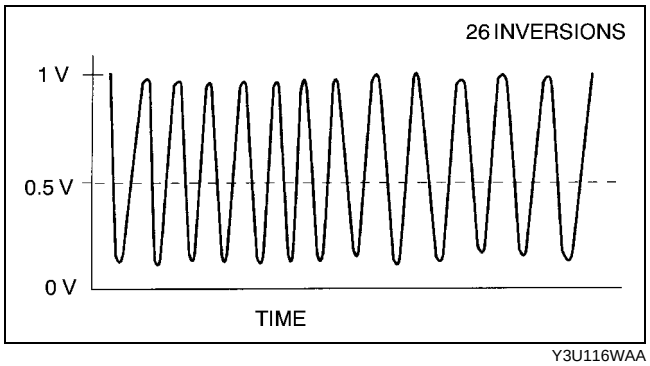
Equation
RATIO = Upstream HO2S inversion ÷ downstream HO2S inversion

- 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.



Z3U0116W011

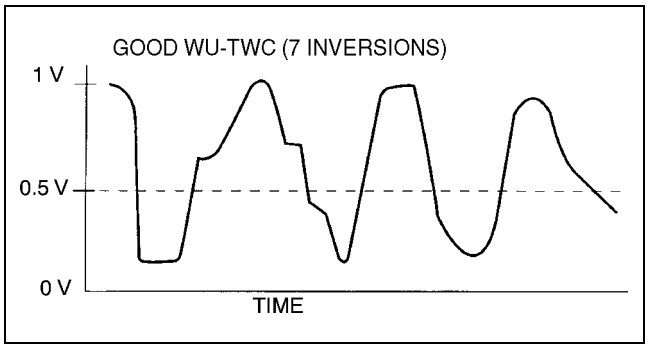
Upstream HO2S graphline example



Y3U116WAA

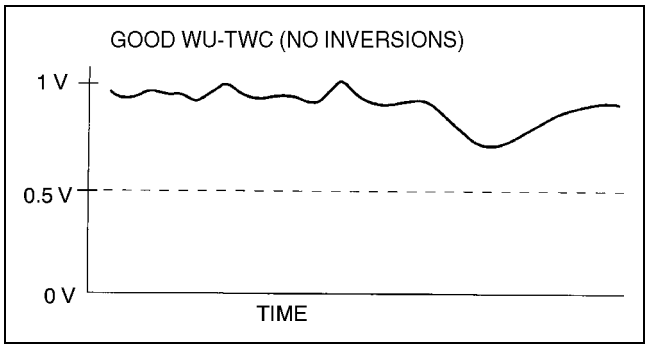
Downstream HO2S graphline example 1

Equation
RATIO = 26 inversions (upstream HO2S inversions) ÷ 7 inversions (downstream HO2S inversions) = 3.7 (good WU-TWC)



Z3U0116W008

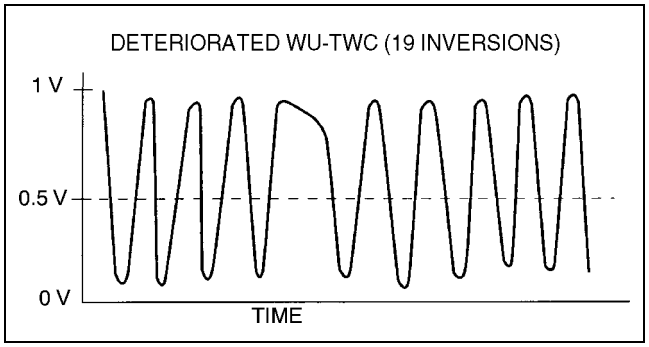
Downstream HO2S graphline example 2



Z3U0116W009

Downstream HO2S graphline example 3

Equation
RATIO = 26 inversions (upper stream HO2S inversions) ÷ 19 inversions (downstream HO2S inversions) = 1.4 (deteriorated WU-TWC)



Z3U0116W010

01–17 CHARGING SYSTEM

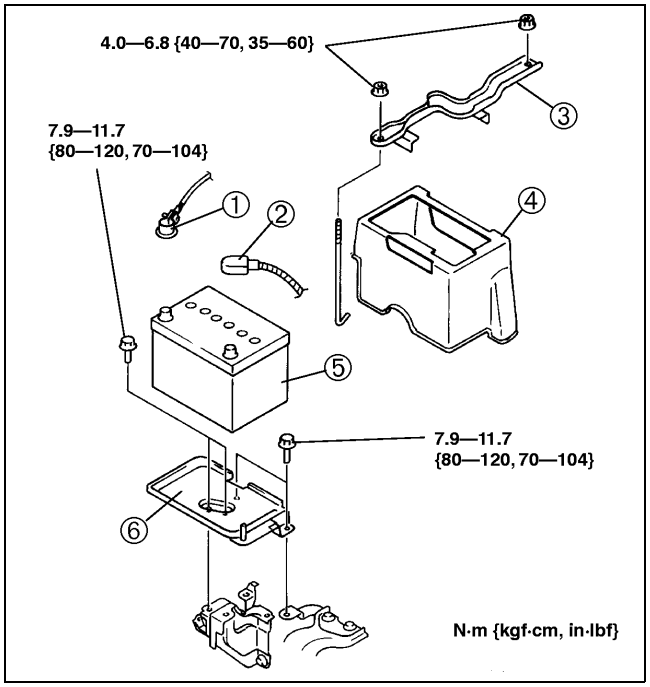
BATTERY REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.

1	Negative battery cable
2	Positive battery cable
3	Battery clamp
4	Battery box
5	Battery
6	Battery tray

2. Install in the reverse order of removal.

A3U011718520W01



X3U117WA0

BATTERY INSPECTION

A3U011718520W02

Battery

- Inspect the battery in the following procedure.

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 recheck voltage.	Above 12.4 V	Go to next step.
		Below 12.4 V	Replace battery.
3	Apply load test (see load test chart) to battery using a battery load tester and record battery voltage after **15 seconds**. Is voltage more than specification?	Yes	Battery is okay.
		No	Replace battery.

Load test chart

Battery	Load (A)
50D20L	150
75D23L	195

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 off 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.

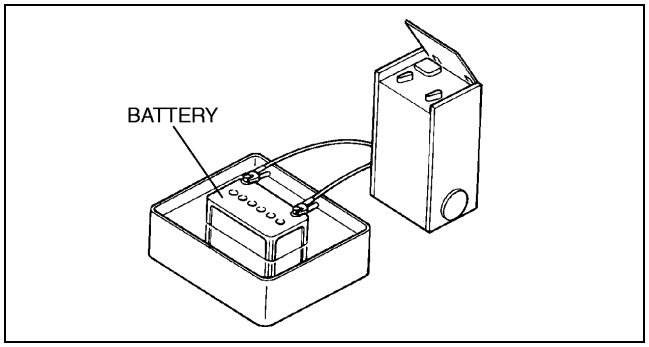
BATTERY RECHARGING

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.
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.)
50D20L (40)	4.0—5.0	25
75D23L (52)	5.5—6.5	35



X3U117WA1

4. After the battery has been recharged, 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

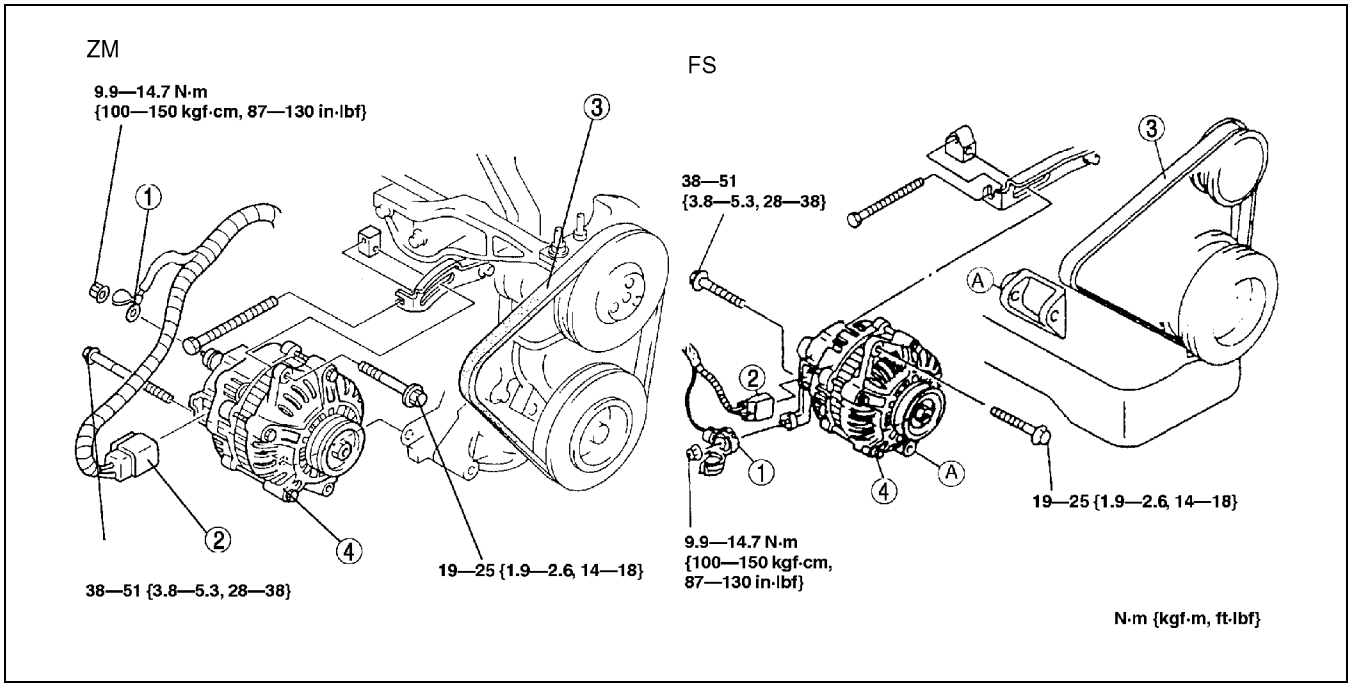
GENERATOR REMOVAL/INSTALLATION

A3U011718300W01

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 in the order indicated in the table.
3. Install in the reverse order of removal.



Z3U0117W001

1	Terminal B wire
2	Connector
3	Drive belt (generator) (See 01–17–3 Drive Belt Installation Note)
4	Generator

Drive Belt Installation Note

- Install the drive belt and adjust the drive belt deflection or tension. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].) (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)

GENERATOR INSPECTION

A3U011718300W02

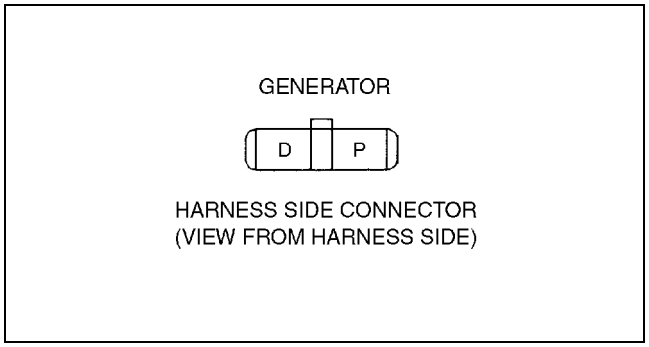
Generator Warning Light

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–3 DRIVE BELT INSPECTION [ZM].) (See 01–10B–3 DRIVE BELT INSPECTION [FS].)
   - Adjust if necessary.
3. Turn the ignition switch to ON and verify that the generator warning light comes on.
   - If not, inspect generator warning light, wiring harnesses between the battery, generator warning light, and PCM terminal 42. When the generator warning light and the wiring harnesses are okay, replace the PCM.
4. Verify that the generator warning light goes out after the engine is started.
   - If not, inspect if any of the following DTCs are displayed: P0112, P0113, P1631, P1632, P1633, P1634. (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM].) (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS].)

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–3 DRIVE BELT INSPECTION [ZM].) (See 01–10B–3 DRIVE BELT INSPECTION [FS].)
   - Adjust if necessary.
3. Turn off all electrical loads.
4. Turn the ignition switch to start the engine and verify that the generator turns smoothly without any noise while the engine is running.
5. Measure the voltage at the terminals indicated in the table.
   - If not as specified, repair or replace the generator as necessary.



Y3U117WA2

Standard voltage

Terminal	Ignition switch ON(V)		Idle (V)[20 °C {68 °F}]	
	ZM	FS	ZM	FS
B	B+		13—15	
P	Approx. 1		Approx.3—8	
D	Approx.0		*	

* : Turn the following electrical loads on and verify that the voltage reading increases.

- Headlights
- Blower motor
- Rear window defroster

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–3 DRIVE BELT INSPECTION [ZM].) (See 01–10B–3 DRIVE BELT INSPECTION [FS].)
   - Adjust if necessary.
3. Disconnect the negative battery cable.
4. Connect ammeter, capable of reading **120 A** or above, between generator terminal B and the wiring harness.
5. Connect the negative battery cable.
6. Turn off all electrical loads.
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, repair or replace the generator as necessary.

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)	
	ZM	FS
1,000	0—60*	0—59*
2,000	0—68*	0—77*

* : Must not be **0 A**.

01–18 IGNITION SYSTEM

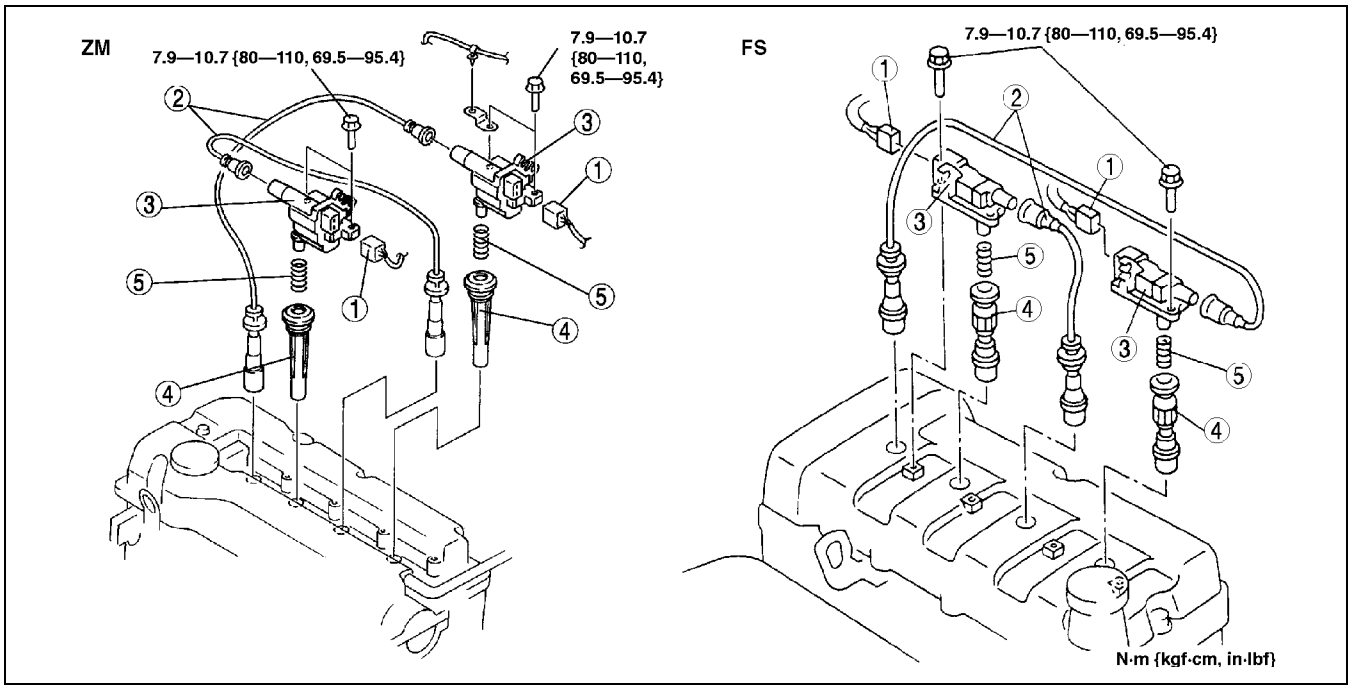
IGNITION COIL REMOVAL/INSTALLATION

A3U011818100W01

Caution

- **Disconnecting the ignition coil and plug cap can tear the plug cap off and cause damage to the connecting part. Disconnect the ignition coil and plug cap only when each component needs to be replaced, and be careful not to tear and damage them.**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Z3U0118W001

1	Connector
2	High-tension lead (See 01–18–3 HIGH-TENSION LEAD REMOVAL/ INSTALLATION)
3	Ignition coil
4	Plug cap
5	Spring

IGNITION COIL INSPECTION

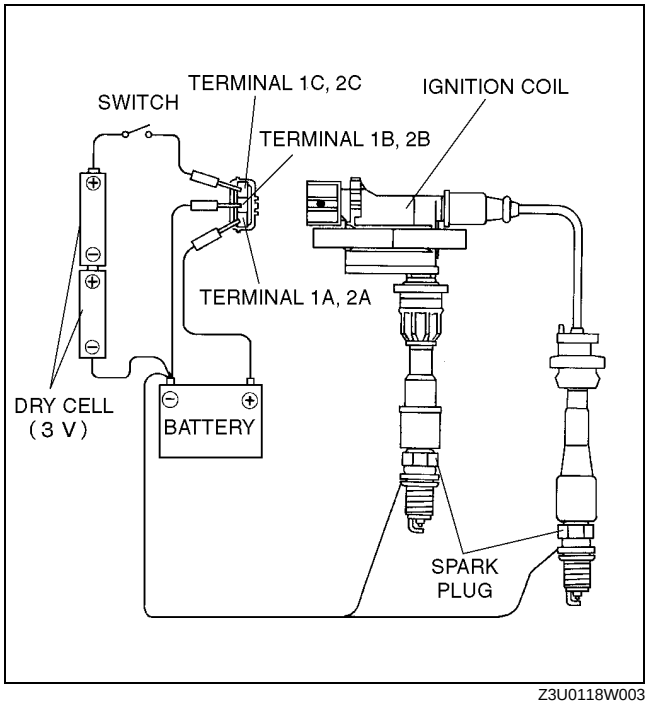
A3U011818100W02

Igniter

- Carry out spark test. (See 01–03A–60 Spark Test.) (See 01–03B–59 Spark Test.)

Ignition Coil Operation Inspection

1. Remove ignition coils, high-tension leads, and spark plugs.
2. Connect the ignition coil, high-tension lead, spark plug, and the battery as shown in the figure.



Z3U0118W003

Caution

- **When connecting the ignition coil, be sure to attach as a female terminal to each terminal. Otherwise, coil terminals may come into contact and the ignition coil could be damaged.**

Note

- Use the high-tension lead and spark plug that function properly.

3. Verify that the spark plug produces a strong, pale spark when change the switch off to on.

Warning

- **Do not hold the spark plug, high-tension lead, or ignition coil while inspecting the ignition coil. You may be subjected to a strong shock.**

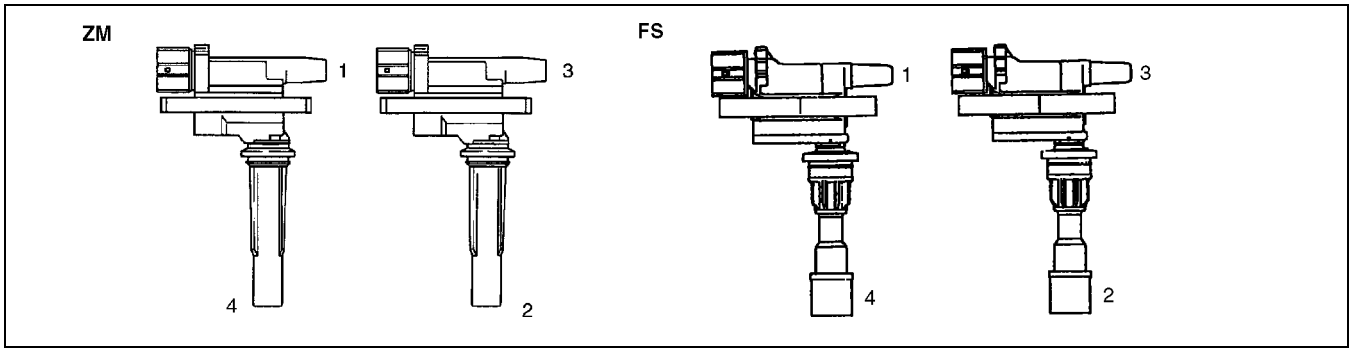
Note

- No.1 and No.4 cylinders and No.2 and No.3 cylinder are ignited simultaneously.

Secondary Coil Winding

1. Remove the ignition coil.
2. Measure the resistance from lead hole 1 to 4, and lead hole 2 to 3 using an ohmmeter.
   - If not as specified, replace the ignition coil.

Specification
ZM 8.0—12.0 kilohms
FS 7.2—10.8 kilohms

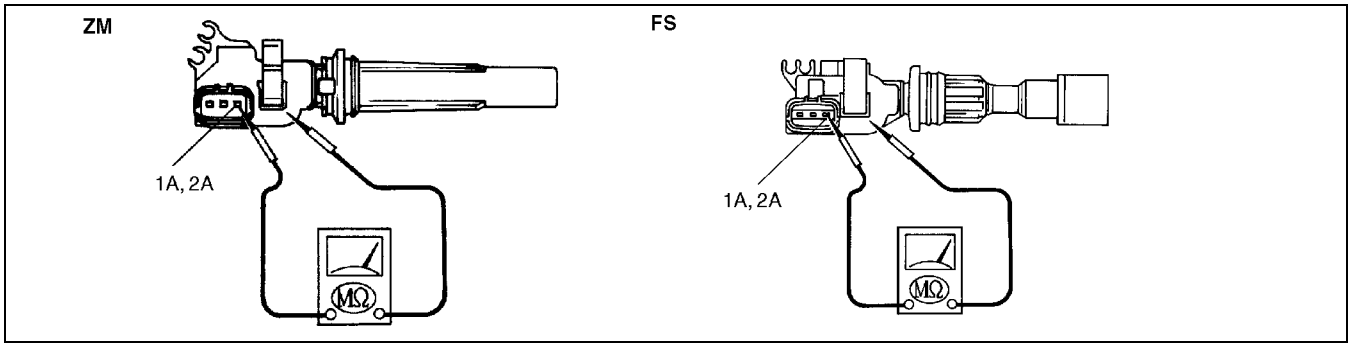


Z3U0118W004

Insulation Resistance of Case

1. Disconnect the high-tension lead. (See 01–18–3 HIGH-TENSION LEAD REMOVAL/INSTALLATION.)
2. Disconnect the ignition coil connector.
3. Measure the insulation resistance from terminal 1A to ignition coil case, and terminal 2A to ignition coil case using an ohmmeter.
   - If not as specified, replace the ignition coil.

Specification
Above 10 megohms



Z3U0118W006

HIGH-TENSION LEAD REMOVAL/INSTALLATION

A3U011818140W01

Caution
- **The high-tension leads must be reinstalled to their original positions. Incorrect installation can damage the leads and cause power loss, and negatively affect the electronic components.**

HIGH-TENSION LEAD INSPECTION

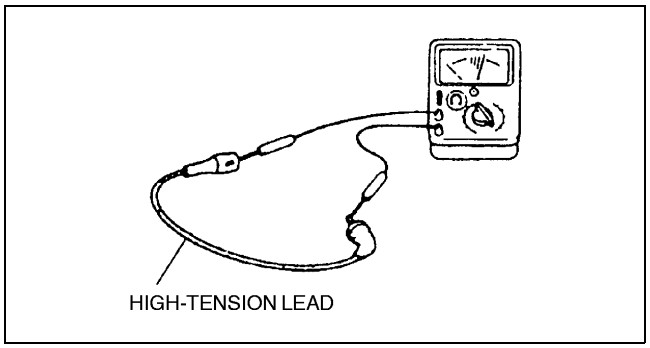
A3U011818140W02

1. Measure the resistance of the high-tension leads using an ohmmeter.
   - If not as specified, replace the high-tension leads.

Specification

(kilohm)

High-tension lead	Engine type	
	ZM	FS
No.1 lead	3.3—7.8	5.6—12.1
No.3 lead	2.9—6.9	1.9—4.0



X3U118WA8

01–19 STARTING SYSTEM

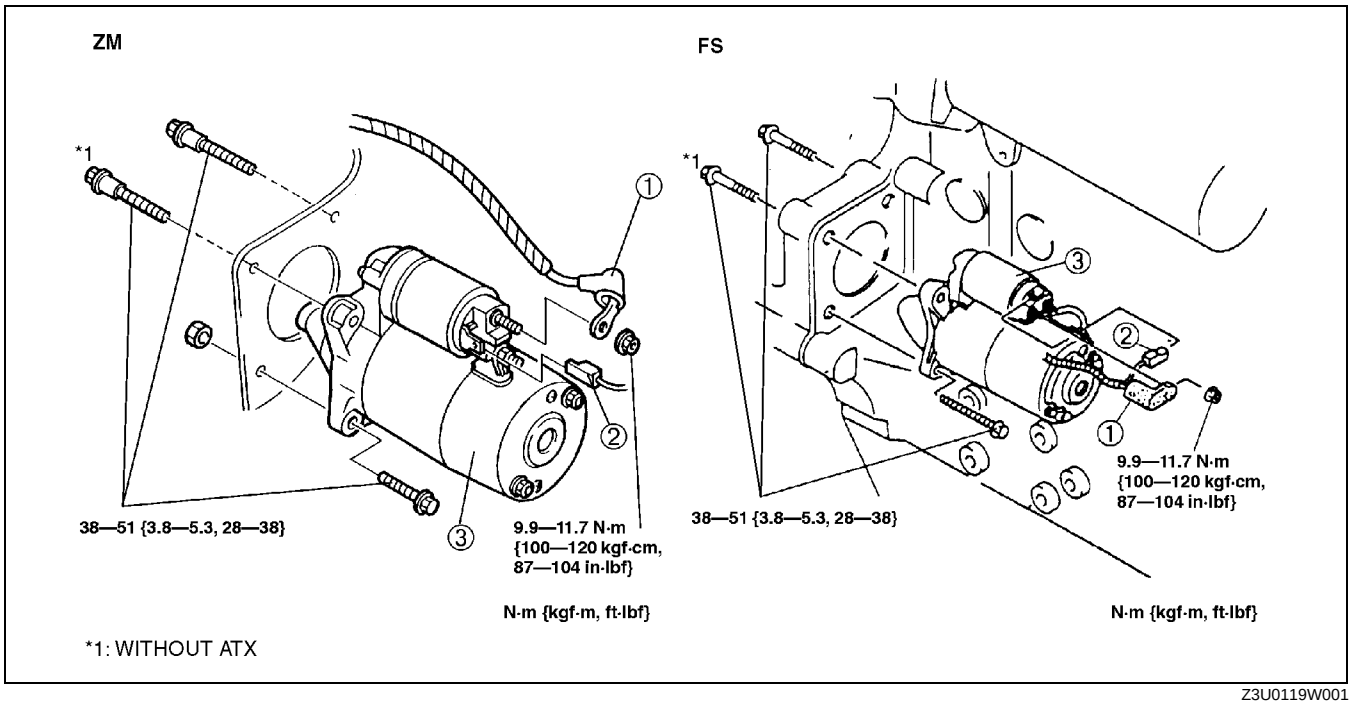
STARTER REMOVAL/INSTALLATION

A3U011918400W01

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. Disconnect the negative battery cable.
2. Remove the battery.
3. Remove the intake manifold bracket.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



Z3U0119W001

1	Terminal B wire
2	Terminal S wire
3	Starter

STARTER INSPECTION

A3U011918400W02

On-Vehicle Inspection

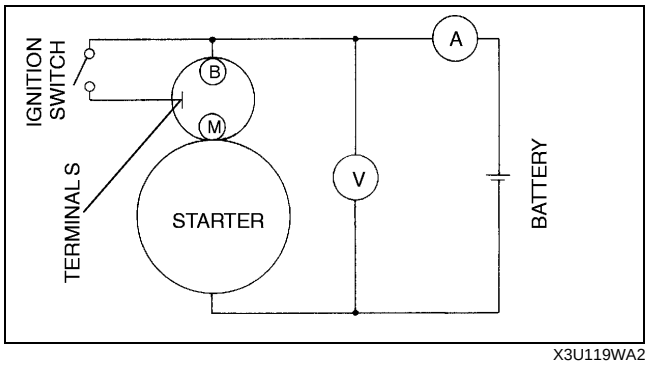
1. Verify that the battery is fully charged.
2. Crank the engine and verify that the starter rotates smoothly without any noise.
3. Measure the voltage at terminals S and B when the ignition switch is at START position.
   - If the voltage is within the specification, remove the starter and inspect the 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.
3. Operate the starter and verify that it rotates smoothly.
4. Measure the voltage and current while the starter is operating.
   - If not as specified, repair or replace the starter as necessary.

Specification
Voltage: 11 V
Current: below 90 A



X3U119WA2

STARTER INTERLOCK SWITCH INSPECTION (MTX)

A3U011943440W01

On-vehicle Inspection

1. With the clutch pedal not depressed, verify that the engine does not start.
2. With the clutch pedal fully depressed, verify that the engine starts.

- If the above cannot be verified, carry out continuity inspection.

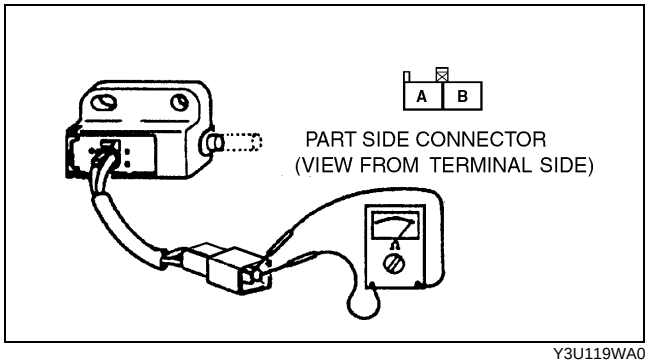
Continuity Inspection

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.

○—○ : Continuity

Condition	Terminal	
	A	B
Clutch pedal not depressed		
Clutch pedal depressed	○	○

X3U119WA3

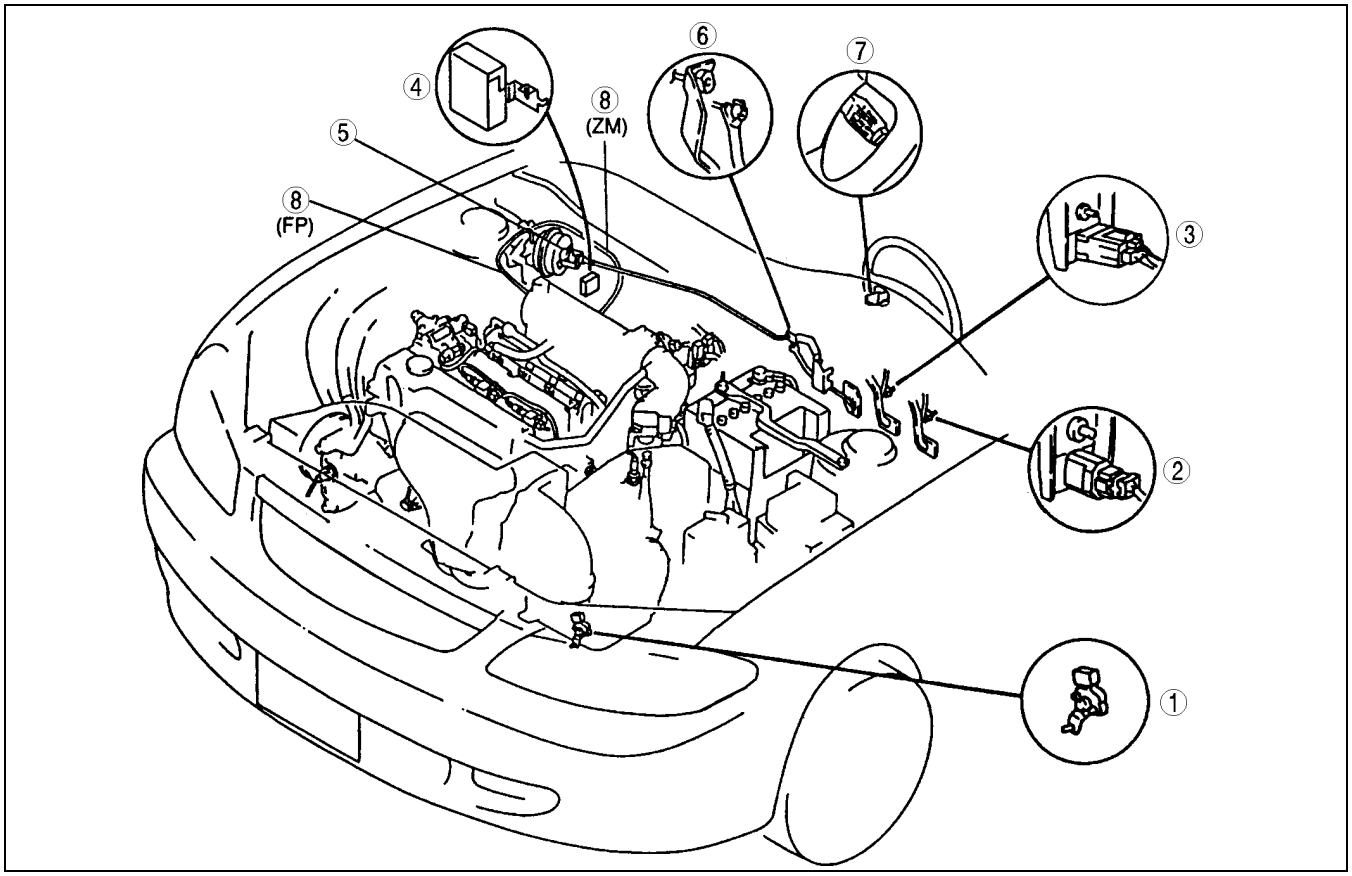


Y3U119WA0

01–20 CRUISE CONTROL SYSTEM

LOCATION INDEX

A3U012001011W01



Z3U0120W001

1	Transmission range (TR) switch (ATX) (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION) (See 05–17–23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT)
2	Clutch switch (MTX) (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS]) (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM])
3	Brake switch (See 04–11–5 BRAKE SWITCH INSPECTION)
4	Cruise control module (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION) (See 01–20–2 CRUISE CONTROL MODULE INSPECTION)

5	Cruise actuator (See 01–20–4 CRUISE ACTUATOR REMOVAL/INSTALLATION) (See 01–20–4 CRUISE ACTUATOR INSPECTION)
6	Actuator cable (See 01–20–5 ACTUATOR CABLE REMOVAL) (See 01–20–5 ACTUATOR CABLE INSTALLATION)
7	Cruise control switch (See 01–20–7 CRUISE CONTROL SWITCH REMOVAL/INSTALLATION) (See 01–20–8 CRUISE CONTROL SWITCH INSPECTION)
8	Vacuum hose

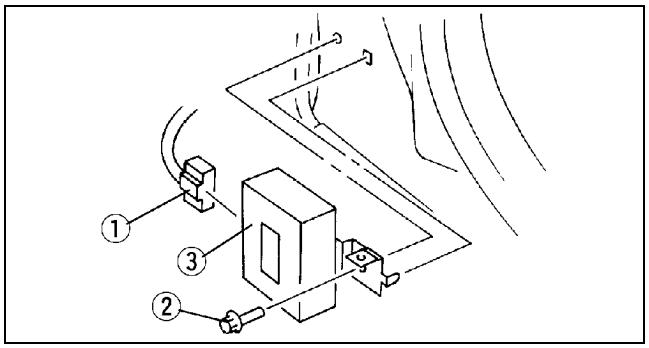
CRUISE CONTROL MODULE REMOVAL/INSTALLATION

A3U012066320W01

1. Disconnect the negative battery cable.
2. Remove the passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	Cruise control module

4. Install in the reverse order of removal.



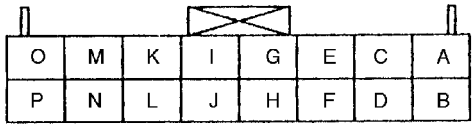
X3U120WA0

CRUISE CONTROL MODULE INSPECTION

A3U012066320W02

1. Remove the passenger-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
2. Remove the cruise control module without disconnecting the connector.
3. Measure the voltage at the cruise control module terminals as indicated below.
4. Disconnect the cruise control module connector before inspecting for continuity at terminal P.
   - If not as specified, inspect the parts listed under “Action.”
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the cruise control module.

Terminal Voltage List (Reference)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y3U120WA0

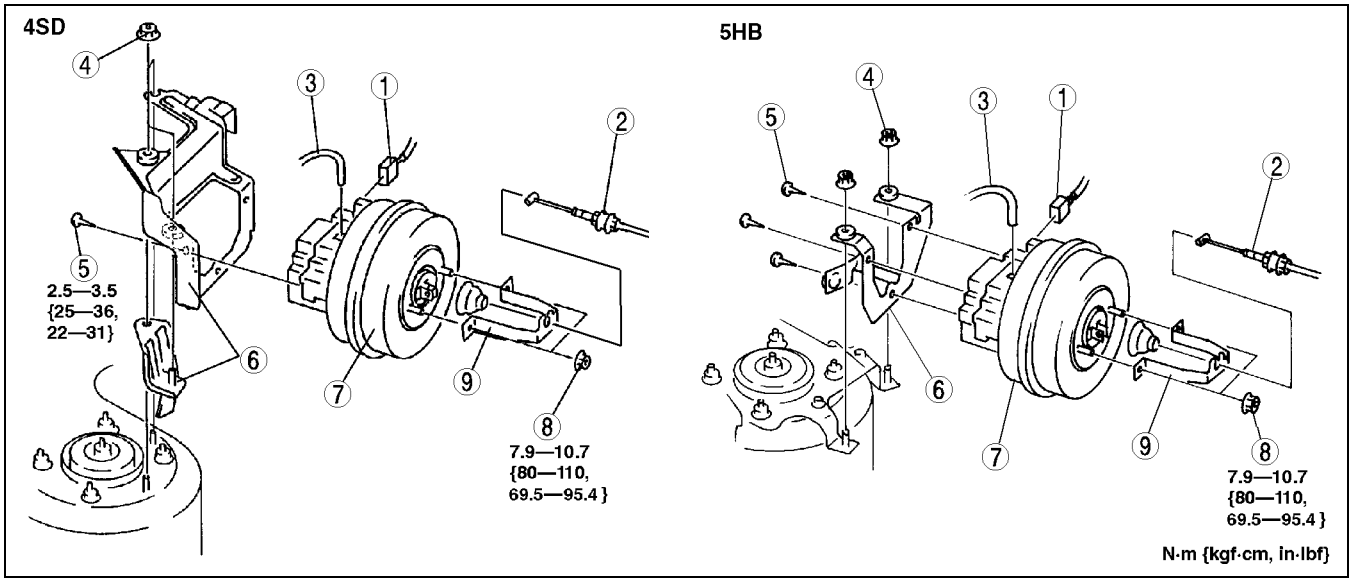
Terminal	Signal	Connected to	Test condition		Voltage (V) /Continuity	Action
A	Cruise actuator control	Cruise actuator (Vent 1)	Ignition switch at ON position	Cruise control main switch at ON position	B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect cruise actuator (See 01–20–4 CRUISE ACTUATOR INSPECTION) • Inspect related harness
				Other	Below 1.0	
B	Cruise actuator control	Cruise actuator (Vacuum)	Ignition switch at ON position	Cruise control main switch at ON position	B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect cruise actuator (See 01–20–4 CRUISE ACTUATOR INSPECTION) • Inspect related harness
				Other	Below 1.0	
C	Cruise actuator control	Cruise actuator (Vent 2)	Ignition switch at ON position	Cruise control main switch at ON position	B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect cruise actuator (See 01–20–4 CRUISE ACTUATOR INSPECTION) • Inspect related harness
				Other	Below 1.0	
D	Cruise set indicator light output	Cruise set indicator light	Ignition switch at ON position		B+	• Inspect METER 10 A fuse • Inspect instrument cluster (See 09–22–4 INSTRUMENT CLUSTER INSPECTION) • Inspect related harness
			Ignition switch at LOCK or ACC position		Below 1.0	

Terminal	Signal		Connected to	Test condition		Voltage (V) /Continuity	Action
E	IG1		METER 10 A fuse	Ignition switch at ON position		B+	• Inspect METER 10 A fuse • Inspect related harness
				Ignition switch at LOCK or ACC position		Below 1.0	
F	—		—	—		—	—
G	O/D off		PCM	Ignition switch at ON position		B+	• Inspect PCM (See 01–40A–7 PCM INSPECTION [ZM]) (See 01–40B–7 PCM INSPECTION [FS]) • Inspect related harness
				Ignition switch at LOCK or ACC position		Below 1.0	
H	Cruise actuator power supply		Brake switch	Ignition switch at ON position	Cruise control main switch at ON position	B+	—
					Cruise control main switch at OFF position	Below 1.0	
I	Test		Data link connector	—		—	—
J	ATX	Selector lever position	Transaxle range switch	Ignition switch at ON position and cruise control main switch at ON position	Selector lever at N or P range	Below 1.0	• Inspect transaxle range switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
					Other	B+	
	MTX	Clutch switch on/off	Clutch switch	Ignition switch at ON position and cruise control main switch at ON position	Depress clutch pedal	Below 1.0	• Inspect clutch switch (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM]) (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS]) • Inspect related harness
					Other	B+	
K	Brake switch on/off		Brake switch	Depress brake pedal		B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect related harness
				Other		Below 1.0	
L	Cruise control switch position		Cruise control switch	Ignition switch at ON position and cruise control main switch at ON position	SET/COAST switch hold at on	Approx. 1.5	• Inspect cruise control switch (See 01–20–8 CRUISE CONTROL SWITCH INSPECTION) • Inspect related harness
					RESUME/ACCEL switch hold at on	Approx. 0.5	
					CANCEL switch hold at on	Approx. 3	
					Other	Approx. 5	
M	Brake switch on/off		Brake switch	Ignition switch at ON position and cruise control main switch at ON position	Depress brake pedal	Below 1.0	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect related harness
					Other	B+	
N	Vehicle speed		Vehicle speed sensor	Ignition switch at ON position and cruise control main switch at ON position	Rear tires rotating	Alternates below 1.0 and 5	• Inspect METER 10 A fuse • Inspect instrument cluster (See 09–22–4 INSTRUMENT CLUSTER INSPECTION) • Inspect related harness
					Other	Below 1.0 or 5	
O	Cruise control main switch input		Cruise control switch	Ignition switch at ON position	Cruise control main switch at ON position	Below 1.0	• Inspect cruise control switch (See 01–20–8 CRUISE CONTROL SWITCH INSPECTION) • Inspect related harness
					Other	B+	
P	Cruise control module ground		GND	Constant: inspect for continuity to ground		Yes	• Inspect related harness

CRUISE ACTUATOR REMOVAL/INSTALLATION

A3U012066310W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



A3U0120W101

1	Cruise actuator connector
2	Actuator cable (See 01–20–5 ACTUATOR CABLE REMOVAL) (See 01–20–5 ACTUATOR CABLE INSTALLATION)
3	Vacuum hose

4	Nut
5	Screw
6	Bracket
7	Cruise actuator
8	Nut
9	Bracket

CRUISE ACTUATOR INSPECTION

A3U012066310W02

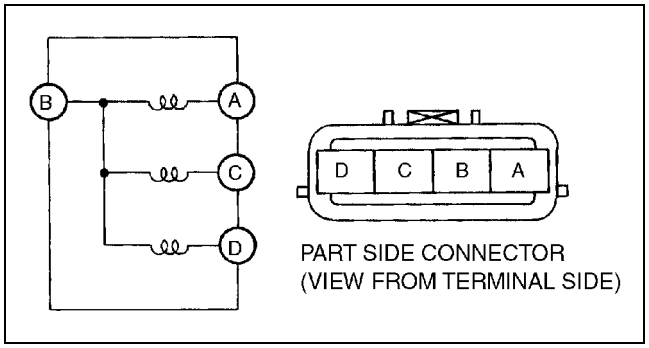
1. Disconnect the negative battery cable.
2. Disconnect the cruise actuator connector.
3. Measure the resistance between the cruise actuator terminals using an ohmmeter.

: Resistance

Step	Terminal			
	A	B	C	D
1	○—WW—○			R_1
2		○—WW—○		R_2
3		○	—WW—	○ R_3

R_1: Approx. 55 ohms R_2: Approx. 21 ohms
R_3: Approx. 55 ohms

Z3U0120W003



Y3U120WA2

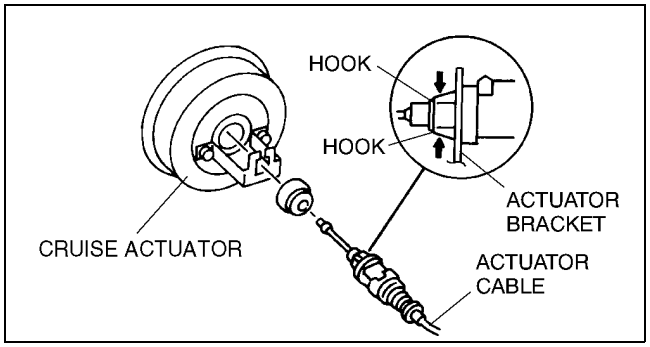
4. Disconnect the actuator cable from the accelerator pedal.
5. Allow the engine to idle.
6. Connect B+ and a ground to the terminals as shown and confirm the operation of the actuator cable.
   - If not as specified, replace the cruise actuator.

Step	Terminal connection				Operation of actuator cable
	A	B	C	D	
1	Ground	B+	Ground	Ground	Pull
2	Ground	B+	—	Ground	Hold
3	—	B+	—	Ground	Extend
4	—	—	—	—	Released

ACTUATOR CABLE REMOVAL

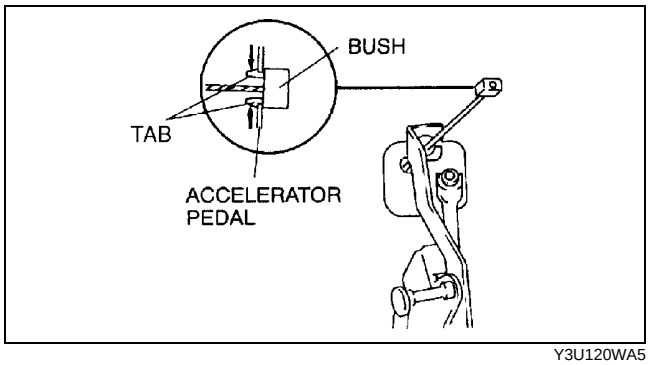
1. Loosen the nut, and remove the actuator cable.

A3U012066311W01



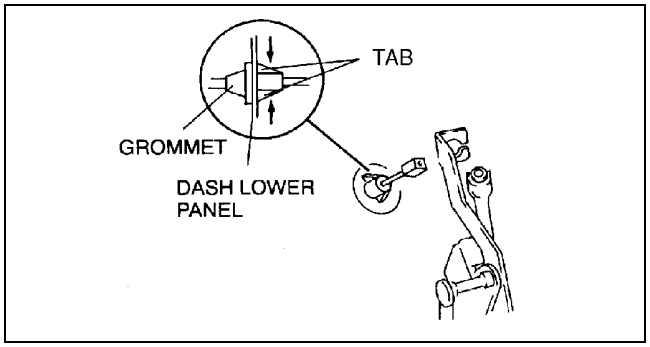
Z3U0120W004

2. Press the tabs of the bush, and remove it from the accelerator pedal.



Y3U120WA5

3. Press the tabs of the grommet, and remove it from the dash lower panel.
4. Push the actuator cable through the dash lower panel to remove it.

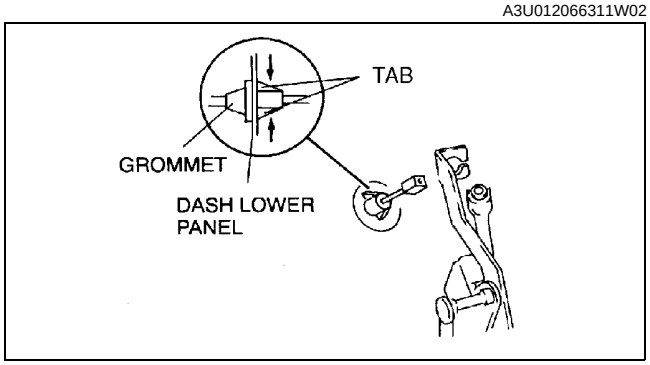


Y3U120WA6

ACTUATOR CABLE INSTALLATION

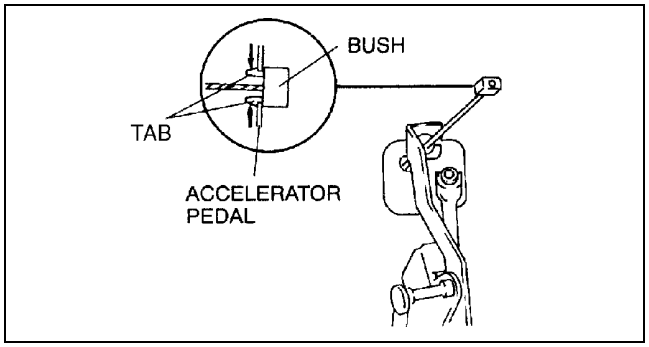
1. Install the grommet to the dash lower panel.

A3U012066311W02



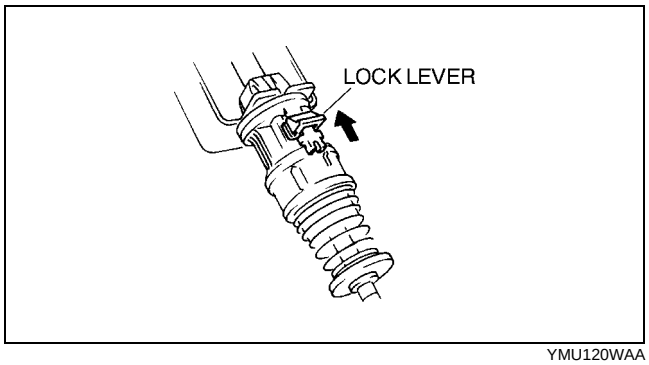
Y3U120WA6

2. Install the actuator cable to the accelerator pedal.



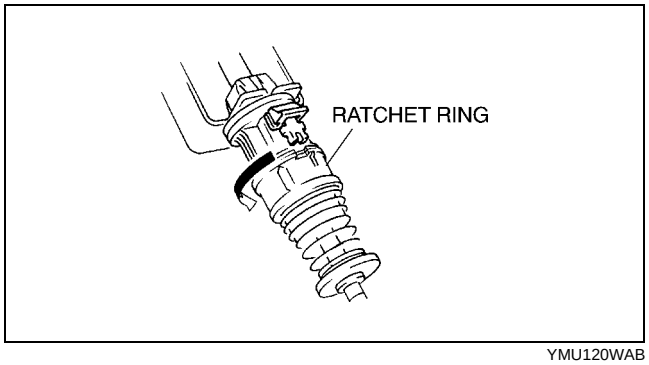
Y3U120WA5

3. Slide the lock lever in the direction shown by the arrow to unlock the adjuster.



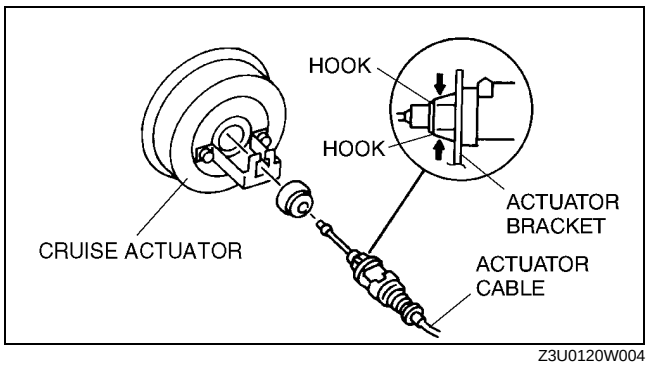
YMU120WAA

4. Turn the ratchet ring to release lock in the direction shown by the arrow.



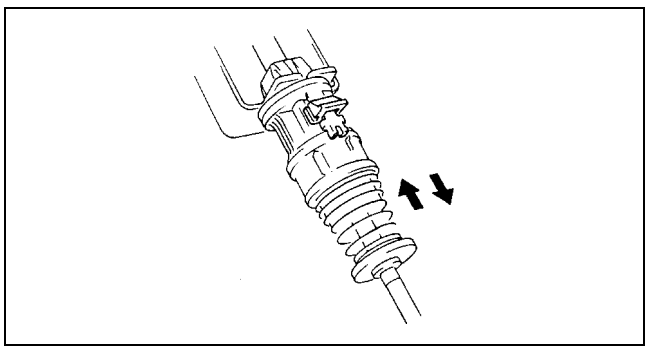
YMU120WAB

5. Insert the grommet into the actuator bracket.

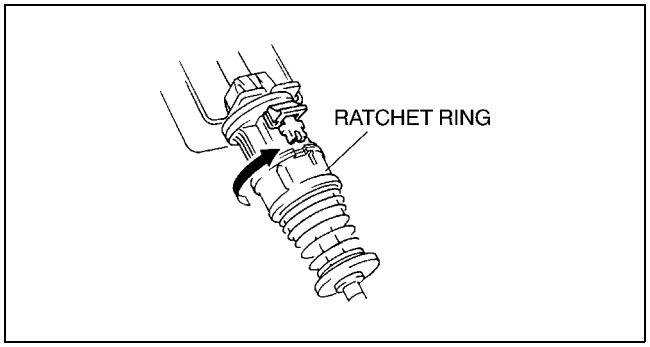


Z3U0120W004

6. To adjust the free play, push or pull the actuator cable directly behind the spring **two times**.

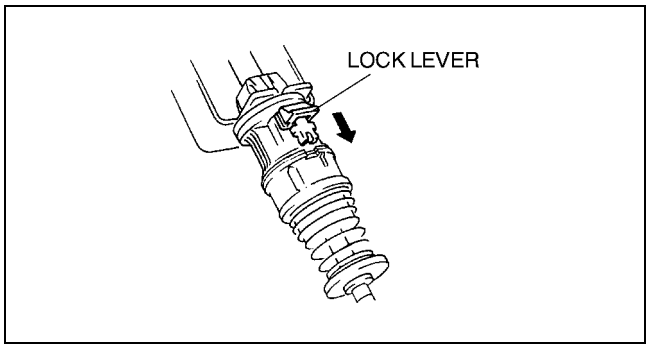

YMU120WAJ

7. Turn the ratchet ring in the direction shown by the arrow to lock it.



YMU120WAC

8. Slide the lock lever in the direction shown by the arrow to lock the adjuster.



YMU120WAD

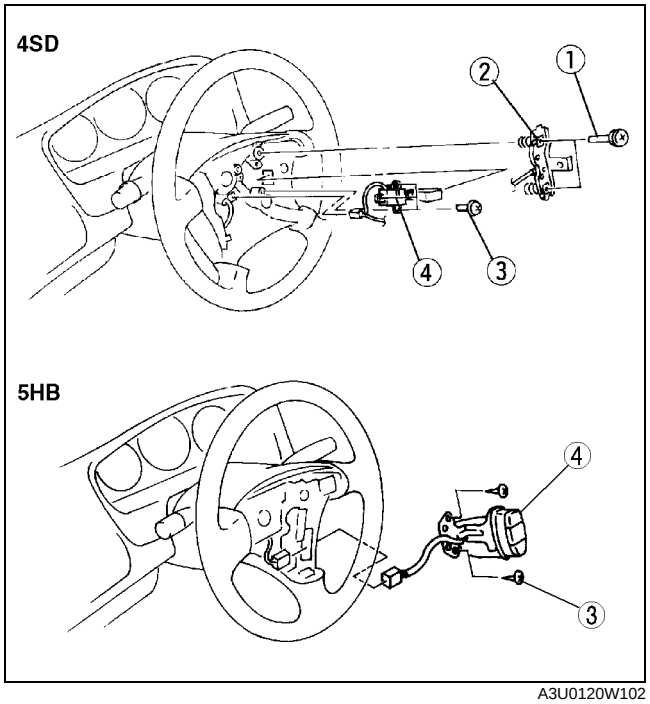
CRUISE CONTROL SWITCH REMOVAL/INSTALLATION

A3U012066341W01

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Disconnect the cruise control switch connector.
4. Remove in the order indicated in the table.

1	Screw (4SD)
2	Horn button contact (4SD)
3	Screw
4	Cruise control switch

5. Install in the reverse order of removal.



A3U0120W102

CRUISE CONTROL SWITCH INSPECTION

A3U012066341W02

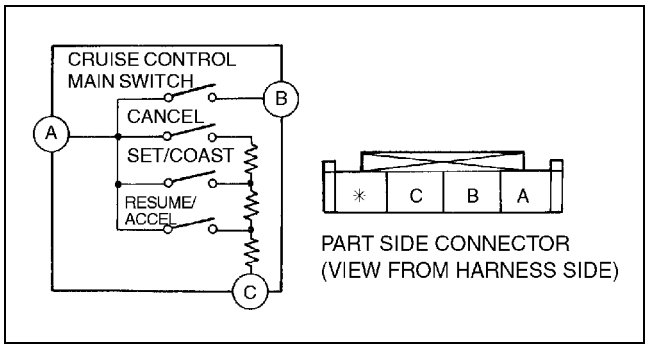
1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Disconnect the cruise control switch connector.
4. Measure the resistance and inspect for continuity between the cruise control switch terminals using an ohmmeter.

○—○ : Continuity ○-W-○ : Resistance

Switch position	Terminal		
	A	B	C
Cruise control main switch at ON position	○	○	
RESUME/ACCEL switch hold at on	○	-W-	○ R_1
SET/COAST switch hold at on	○	-W-	○ R_2
CANCEL switch hold at on	○	-W-	○ R_3
Other			

R_1 : Approx. 68 ohms R_2: Approx. 198 ohms
R_3: Approx. 418 ohms

Z3U0120W005



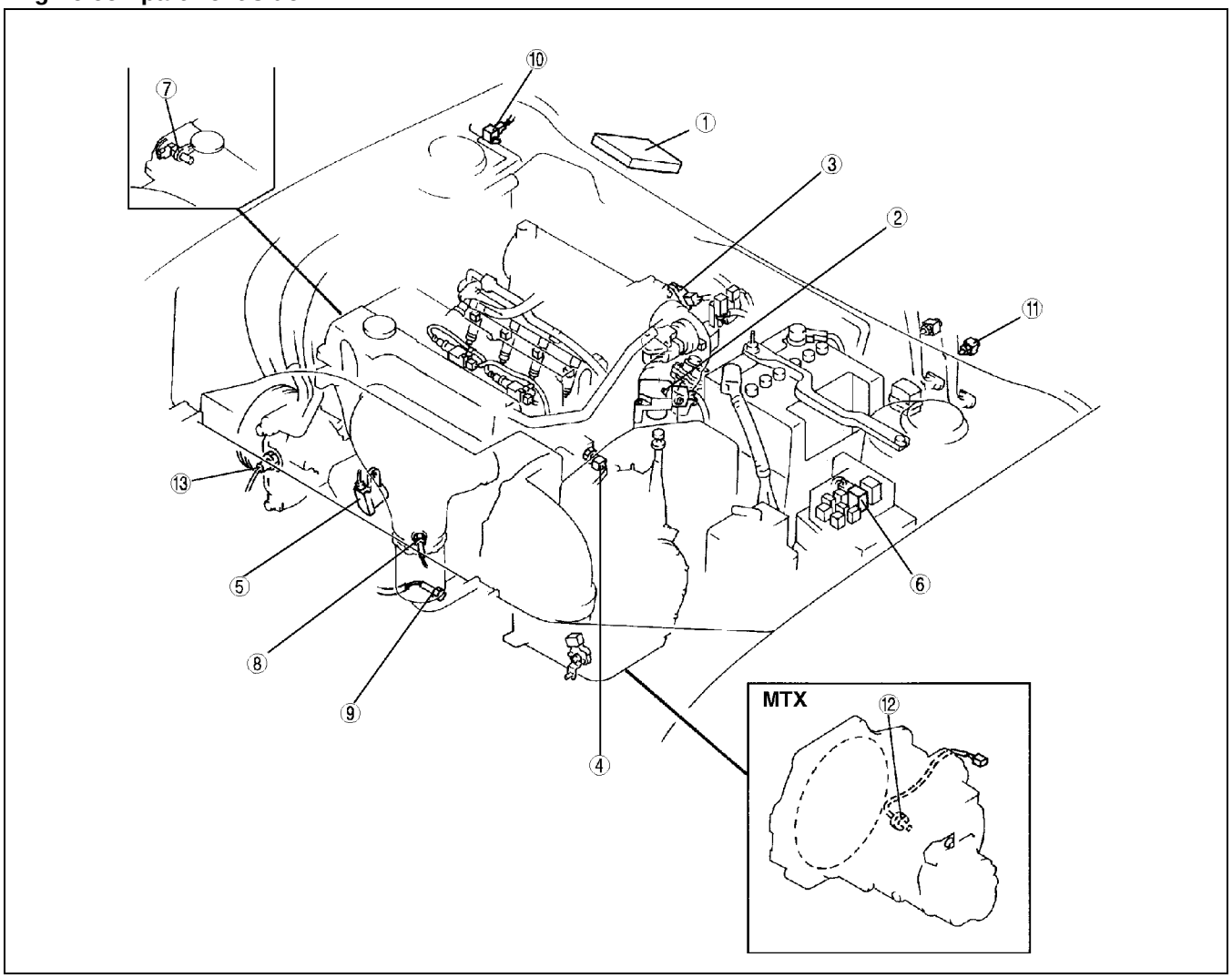
Y3U120WA4

01–40A CONTROL SYSTEM [ZM]

CONTROL SYSTEM COMPONENT LOCATION INDEX [ZM]

A3U014018881W05

Engine compartment side



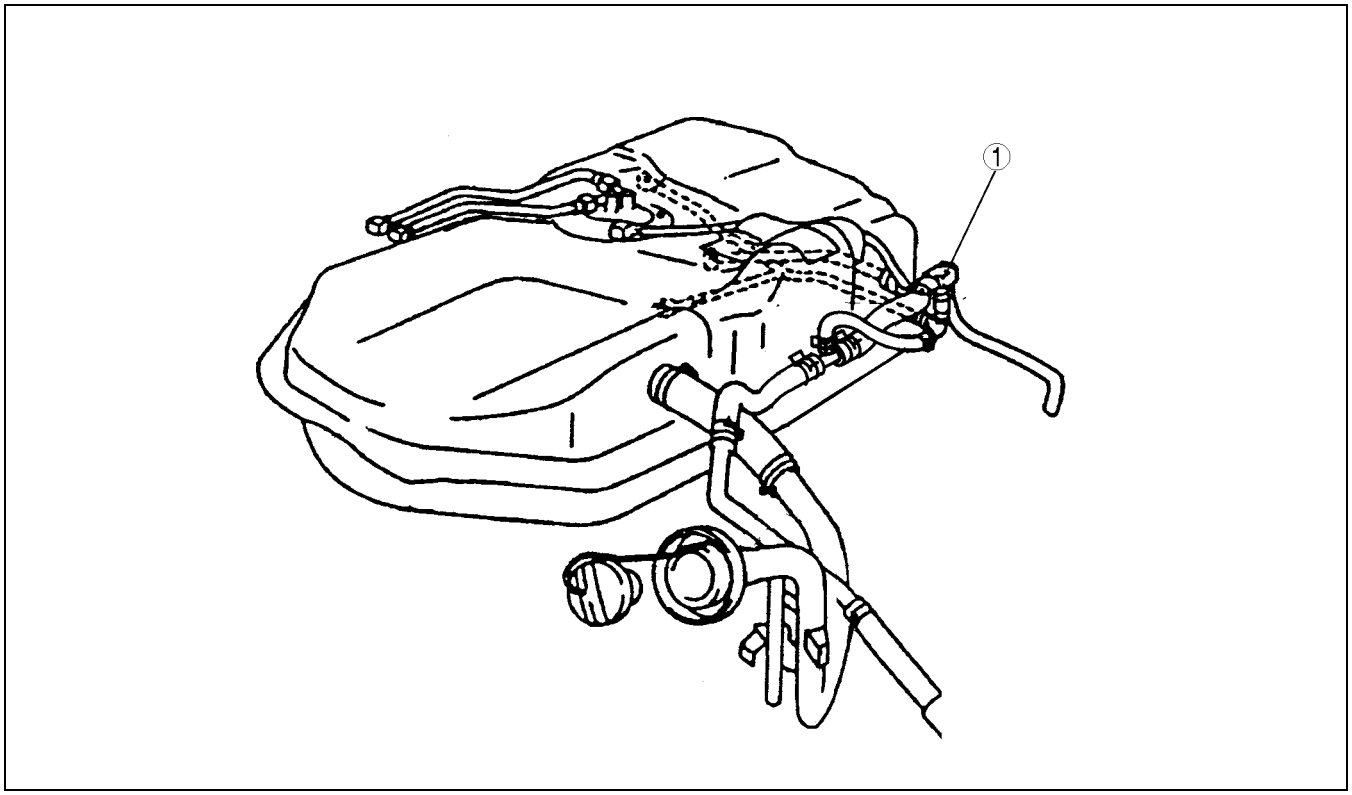
Z3U0140W001

1	PCM (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM]) (See 01–40A–7 PCM INSPECTION [ZM])
2	Mass air flow (MAF)/intake air temperature (IAT) sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM])
3	Throttle position (TP) sensor (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM]) (See 01–40A–30 THROTTLE POSITION (TP) SENSOR REMOVAL/INSTALLATION [ZM])
4	Engine coolant temperature (ECT) sensor (See 01–40A–30 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [ZM]) (See 01–40A–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [ZM])
5	Crankshaft position (CKP) sensor (See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM]) (See 01–40A–34 CRANKSHAFT POSITION (CKP) SENSOR ADJUSTMENT [ZM]) (See 01–40A–34 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [ZM])
6	Main relay (See 09–21–5 RELAY INSPECTION)
7	Camshaft position (CMP) sensor (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [ZM]) (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM])
8	Heated oxygen sensor (front) (See 01–40A–36 HEATED OXYGEN SENSOR (HO2S) INSPECTION [ZM])
9	Heated oxygen sensor (rear) (See 01–40A–36 HEATED OXYGEN SENSOR (HO2S) INSPECTION [ZM])
10	EGR boost sensor (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM])
11	Clutch switch (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM])

12	Neutral switch (See 01–40A–42 NEUTRAL SWITCH INSPECTION [ZM]

13	Power steering pressure (PSP) switch (See 01–40A–43 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [ZM])

Fuel tank side

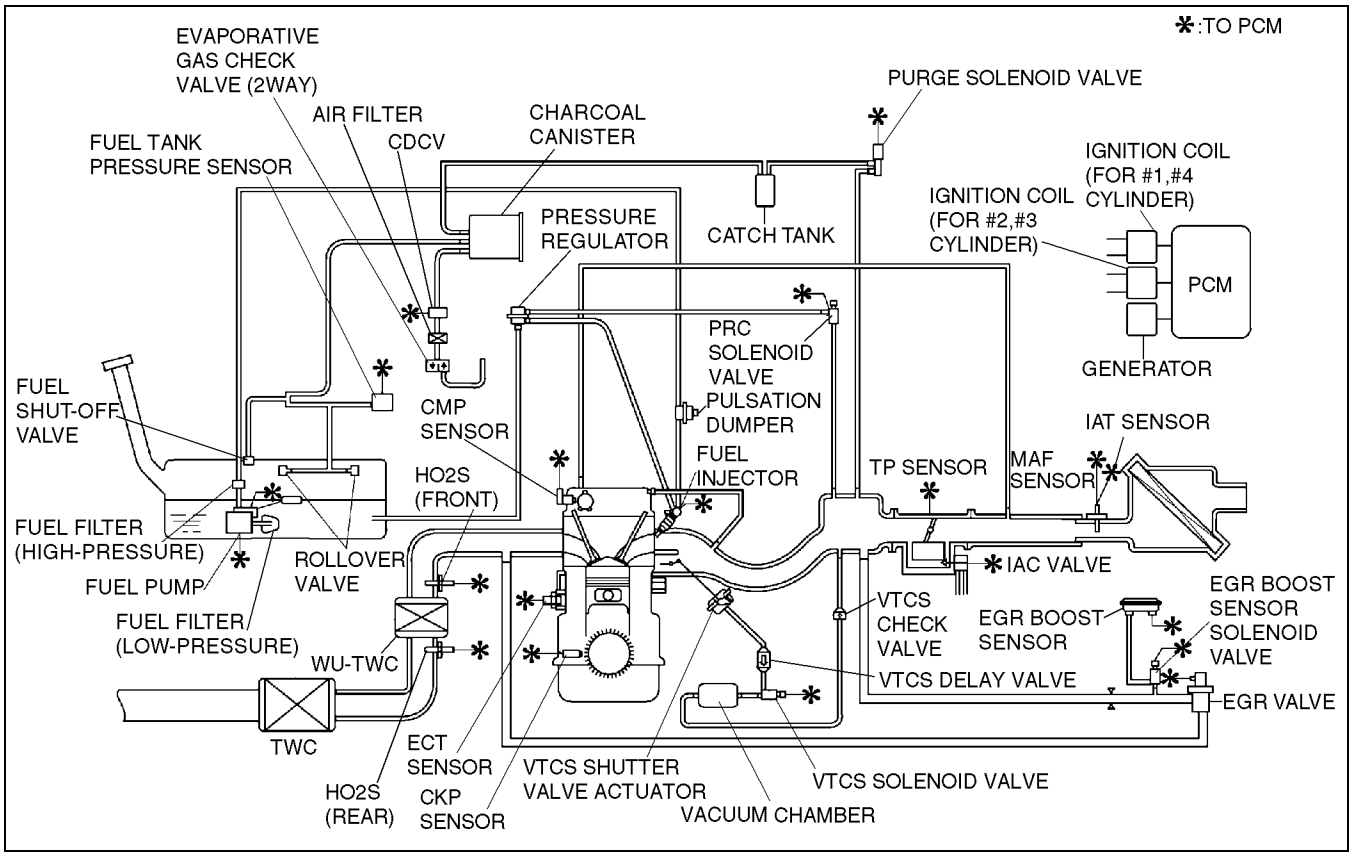


Z3U0140W002

1	Fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])

CONTROL SYSTEM DIAGRAM [ZM]

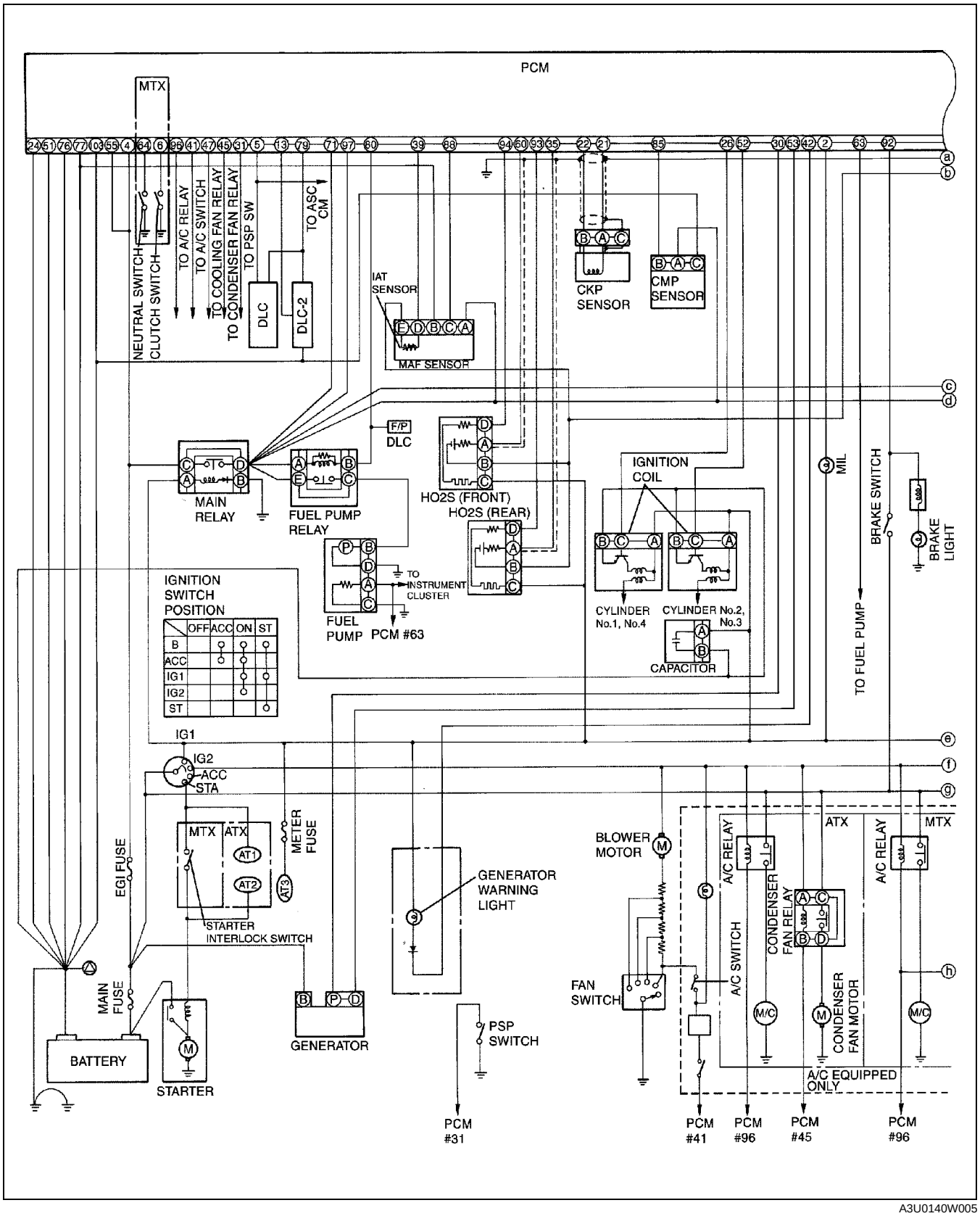
A3U014018881W06



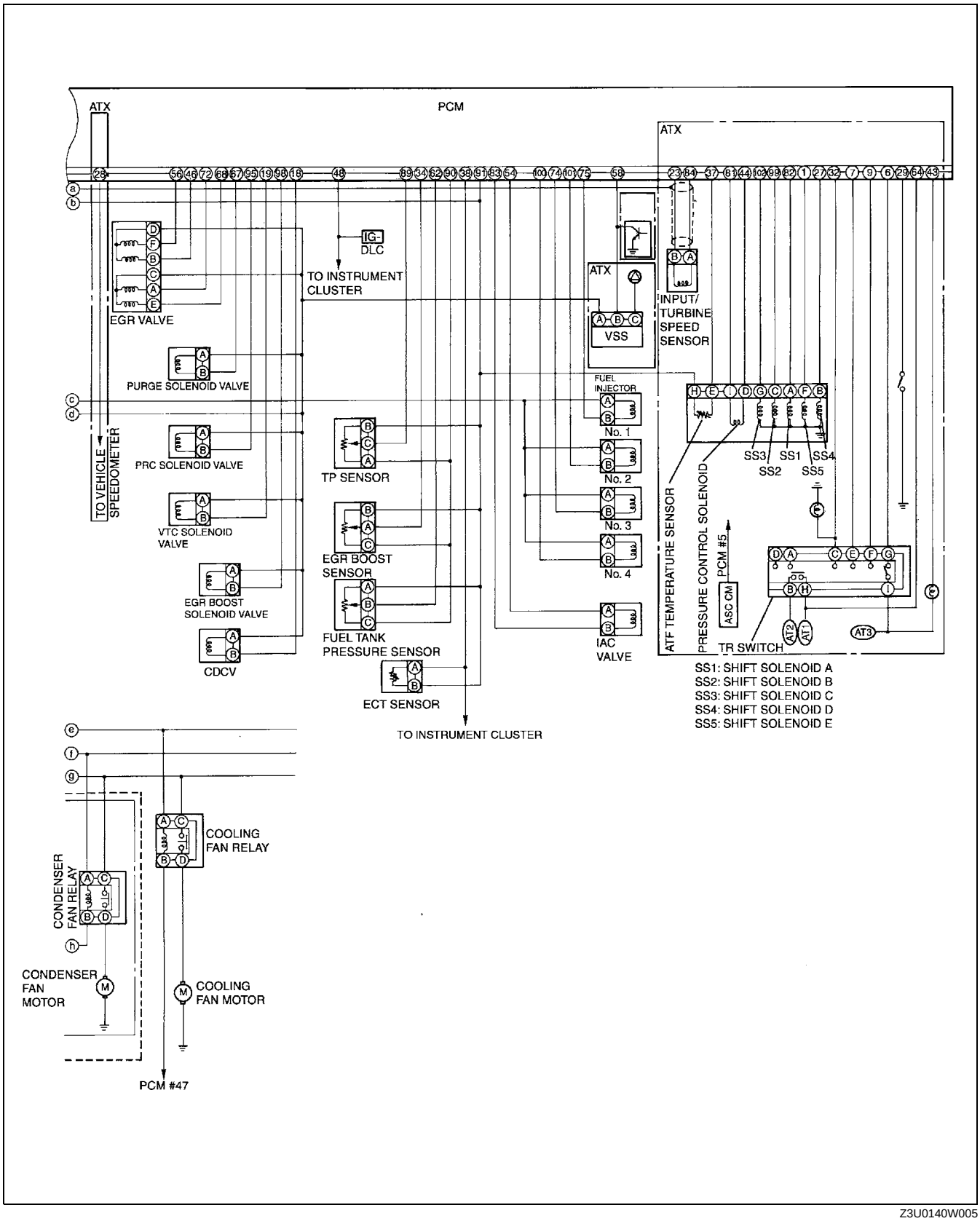
Z3U0140W003

CONTROL SYSTEM WIRING DIAGRAM [ZM]

A3U014018881W07



A3U0140W005



Z3U0140W005

PCM REMOVAL/INSTALLATION [ZM]

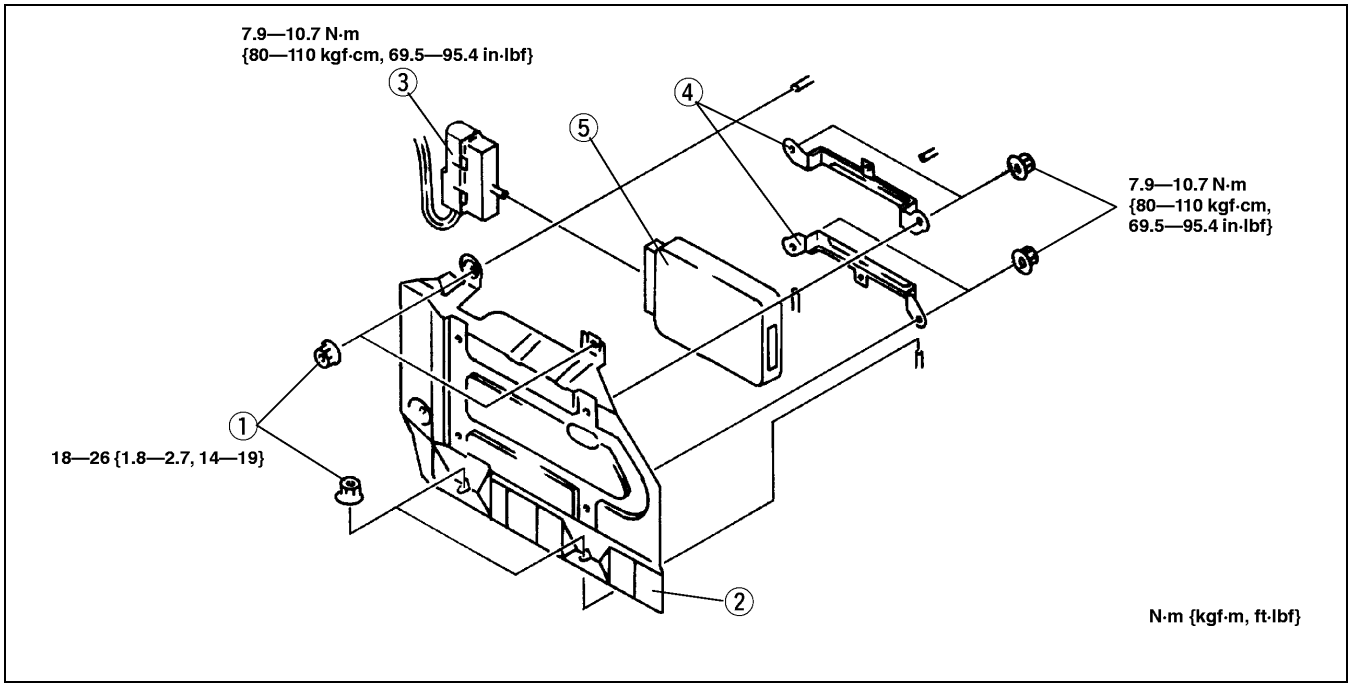
A3U014018880W03

1. Disconnect the negative battery cable.
2. Remove the front passenger side scuff plate.
3. Remove the front passenger side trims.
4. Partially peel off the floor covering from the front of the passenger's side.

Warning

- **The edge of the PCM plate is sharp. Be careful not to cut yourself when handling the PCM plate.**

5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.



X3U140WA1

1	Nut
2	PCM panel
3	PCM connector

4	Bracket
5	PCM

PCM INSPECTION [ZM]

A3U014018880W04

Caution

- **The PCM terminal voltages vary with change in measuring conditions and vehicle conditions. Always complete the inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, a wrong diagnosis will fail.**

PCM Inspection Using the SST (WDS or equivalent)

Note

- PIDs for the following parts are not available on this model. Go to the appropriate part inspection page.
  - — CMP sensor (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM].)
  - — Main relay (See 09–21–5 RELAY INSPECTION.)

1. Connect the WDS or equivalent to the DLC-2. (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM].)
2. Turn the ignition switch to ON.
3. Measure the value.
   - If the value is not within the specification, follow the instruction in action column.

PID/DATA MONITOR table (Reference)

Monitor item (Definition)	Unit/ Condition		Condition/Specification (Reference)	Action	PCM terminal
ACCS (A/C relay)	ON/OFF		A/C operating: ON Ignition switch ON: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW Inspect A/C relay (See 09–21–5 RELAY INSPECTION)	96
ACSW (A/C switch)	ON/OFF		A/C switch and fan switch ON: ON A/C switch OFF: OFF	Inspect A/C switch (See 07–40–11 CLIMATE CONTROL UNIT INSPECTION)	41
ALTF (Generator field coil control duty value)	%		Ignition switch ON: 0% Idle: 0—100% Generator operating → E/L ON: Duty value rise	Inspect following PIDs: IAT, RPM, VPWR, B+2, ALTT V Inspect generator (See 01–17–3 GENERATOR INSPECTION)	53
ALTT V (Generator output voltage)	V		Ignition switch ON: 0 V Idle: 14—16 V	Inspect following PIDs: IAT, RPM, VPWR, B+2, ALTF Inspect generator (See 01–17–3 GENERATOR INSPECTION)	30
ARPMDES (Target engine speed)	rpm		Idle (No load): 650—750 rpm	Perform “On-Board Diagnostic Test” (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM])	—
BARO (Barometric pressure)	kPa	inHg	Below 400 m {0.25 mile} above sea level: 99—103 kPa {29—30 inHg}	Inspect EGR boost sensor (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM])	34
	V		Below 400 m {0.25 mile} above sea level: 4.1—4.3 V	Inspect EGR boost sensor (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM])	34
BOO (Brake switch)	ON/OFF		Brake pedal depressed: ON Brake pedal released: OFF	Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION)	92
B+2 (PCM back-up positive voltage)	V		Constant: B+	Inspect battery (See 01–17–1 BATTERY INSPECTION)	4
CDCV (Canister drain cut valve)	ON/OFF		Ignition switch ON: OFF Idle: OFF	Inspect CDCV (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	18
CHRGLP (Generator warning light)	ON/OFF		Ignition switch ON: ON Idle: OFF	Inspect generator warning light	42
CPP*2 (Clutch switch)	ON/OFF		Clutch pedal depressed: ON Clutch pedal released: OFF	Inspect clutch switch (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM])	6
ECT (Engine coolant temperature)	°C	°F	ECT 20 °C {68 °F}: 20 °C {68 °F} ECT 60 °C {140 °F}: 60 °C {140 °F}	Inspect ECT sensor (See 01–40A–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [ZM])	38
	V		ECT 20 °C {68 °F}: 2.9—3.1 V After warm up: 0.2—1.0 V	Inspect ECT sensor (See 01–40A–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [ZM])	38
EGRCHK (EGR boost sensor solenoid valve)	ON/OFF		Ignition switch ON: OFF Idle: OFF	Inspect EGR boost sensor solenoid valve (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION)	98
EVAPCP (Purge solenoid valve duty value)	%		Ignition switch ON: 0% Idle: 0%	Inspect following PIDs: IAT, RPM, ECT, MAF, TP, BARO, O2S11, VPWR Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION)	67
FAN2 (Condenser fan control)	ON/OFF		A/C operated: ON Others: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW, TEST Inspect condenser fan relay (See 09–21–5 RELAY INSPECTION)	45

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
FAN3 (Cooling fan control)	ON/OFF	Cooling fan operating (ECT above 97 °C {207 °F}) or terminal TEN grounded and throttle valve open or A/C relay on: ON Others: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW, TEST Inspect cooling fan relay (See 09–21–5 RELAY INSPECTION)	47
FP (Fuel pump relay)	ON/OFF	Ignition switch ON: OFF Idle: ON Cranking: ON	Inspect following PID: RPM Inspect fuel pump relay (See 09–21–5 RELAY INSPECTION)	80
FPRC (PRC solenoid valve)	ON/OFF	Ignition switch ON: OFF Idle: OFF After hot start: ON	Inspect PRC solenoid valve (See 01–14–31 PRC SOLENOID VALVE INSPECTION)	95
FTL V (Fuel tank level signal voltage)	V	Idle condition • Fuel tank full: 1.0—1.5 V • Fuel tank empty: 4.4—4.8 V • Fuel tank half: 2.8—3.4 V **Note** • The voltages above will be measured when the battery positive voltage is between 12V and 14 V.	Inspect fuel gauge sender unit (See 09–22–4 Fuel Gauge)	63
FTP (Fuel tank pressure)	kPa / inHg	Ignition switch ON: 0—1.0 kPa {0—0.3 inHg} Idle: 0—1.0 kPa {0—0.3 inHg} **Note** • The pressure and output voltage varies according to the fuel temperature.	Inspect fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])	62
	V	Ignition switch ON: 2.5—2.8 V Idle: 2.5—2.8 V Fuel tank pressure 0 kPa {0 mmHg, 0 inHg}: 2.5 V Fuel tank pressure 1 kPa {7.5 mmHg, 0.3 inHg}: 2.8 V **Note** • The pressure and output voltage vary according to the fuel temperature.	Inspect fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])	62
FTP1SV	kPa	Perform “DTC INSPECTION”. (See 01–02A–15 DTC TABLE [ZM])		—
FTP2SV	kPa			
FUELPW1 (Fuel injection duration)	ms	Ignition switch ON: 0 msec Idle: 2.5—4.0 msec	Inspect following PIDs: MAF, IAT, RPM, TP, ECT, PNP, CPP, O2S11, PSP, BOO, ACSW, VPWR Inspect CMP sensor (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM])	74, 75, 100, 101
GEAR (Gear position)	1/2/3/4	1GR: 1 2GR: 2 3GR: 3 4GR: 4	Inspect following PIDs: SSA/SS1, SSB/SS2, SSC/SS3, SSD/SS4, SSE/SS5	1, 27, 82, 99, 102
HTR11 (HO2S heater (Front))	ON/OFF	Ignition switch ON (engine stopped): OFF Approx. 15 seconds after engine start with ECT 20—30 °C {68—86°F}: ON Others: ON ⇔ OFF	Inspect following PIDs: ECT, MAF Inspect HO2S heater (See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection)	94
HTR12 (HO2S heater (Rear))	ON/OFF	ECT above 70 °C {158 °F}: ON HO2S (Rear) heater is malfunctioning: OFF	Inspect following PIDs: ECT, MAF Inspect HO2S heater (See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection)	93

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
IAC (IAC valve)	%	Ignition switch ON: 0% Idle: 25—35%	Inspect following PIDs: IAT, RPM, ECT, MAF, TP, PNP, CPP, PSP, ACSW, TEST Inspect IAC valve (See 01–13A–7 IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM])	54, 83
IAT (Intake air temperature)	°C / °F	IAT 20 °C {68 °F}: 20 °C {68 °F}	Inspect IAT sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM])	39
	V	IAT 20 °C {68 °F}: 2.3—2.4 V IAT 30 °C {86 °F}: 1.7—1.9 V	Inspect IAT sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM])	39
IMRC (VTCS solenoid valve)	ON/OFF	ECT above 65 °C {149 °F} while idling: OFF ECT below 65 °C {149 °F} and engine speed at 1,500 rpm: ON	Inspect following PIDs: ECT, RPM, TP Inspect VTCS solenoid valve (See 01–13A–11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [ZM])	19
LOAD (Load)	%	Idle: 13—20% (MTX), 14—22% (ATX) Engine speed at 2,500 rpm: 11—17% (MTX), 13—19% (ATX)	Perform “On-Board Diagnostic Test” (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM])	—
LONGFT1 (Long fuel trim)	%	Idle: –5—5%	Perform “On-Board Diagnostic Test” (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM])	—
LPS*1 (Pressure control solenoid)	A	Change current value according to throttle opening angle	Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION)	44, 81
MAF (Intake MAF)	g/s	Idle:1.6—2.2 g/s (MTX), 1.6—2.4 g/s (ATX) Engine speed at 2,500 rpm: 5.1—6.5 g/s (MTX), 5.6—7.2 g/s (ATX)	Inspect MAF sensor (See 01–40A–26 MAF Sensor Inspection)	88
	V	Ignition switch ON: 0.6—2.0 V Idle: 0.8—2.2 V	Inspect MAF sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM])	88
MIL (Malfunction indicator light)	ON/OFF	Ignition switch ON: ON DTC output: ON No DTC output: OFF	Inspect MIL	2
MODE1 (Readiness Function Code)	ON/OFF	RFC exists: ON No RFC: OFF	—	—
O2S11 (HO2S (Front))	V	Ignition switch ON: 0—1.0 V After warm up: 0—1.0 V Acceleration: 0.5—1.0 V Deceleration: 0—0.5 V	Inspect HO2S (See 01–40A–36 HO2S (Front and Rear) Voltage Inspection)	60
O2S12 (HO2S (Rear))	V	Ignition switch ON: 0—1.0 V Idle (After warm up): 0—1.0 V Idle (Engine cold): 0—0.5 V Accelerate: 0.5—1.0 V Decelerate: 0—0.5 V	Inspect HO2S (See 01–40A–36 HO2S (Front and Rear) Voltage Inspection)	35
PNP*1 (TR switch)	ON/OFF	P or N range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	64
PNP*2 (Neutral switch)	ON/OFF	Shift position at neutral: ON Others: OFF	Inspect neutral switch (See 01–40A–42 NEUTRAL SWITCH INSPECTION [ZM])	64
PSP (PSP switch)	ON/OFF	Steering wheel is at straight ahead position: OFF Steering wheel is fully turned: ON	Inspect PSP switch (See 01–40A–43 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [ZM])	31

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
RPM (Engine speed)	rpm	Idle: 650—750 rpm	Inspect CKP sensor (See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM])	21, 22
SEGRP (EGR valve (stepping motor) position)	step	Ignition switch ON: 0 step Idle: 0 step Cranking: 0—60 steps	Inspect following PIDs: ECT, TP Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION)	46, 56, 68, 72
SHRTFT1 (Short fuel trim)	%	Idle: -10—10%	Perform “On-Board Diagnostic Test” (See 01–02A–8 ON-BOARD DIAGNOSTIC TEST [ZM])	—
SPARKADV (Ignition timing)	BTDC	Idle: BTDC 6—18° Idle (Terminal TEN ground): BTDC 9—11°	Inspect following PIDs: MAF, IAT, RPM, TP, ECT, PSP, PNP, CPP, ACSW, TEST Perform Engine tune-up. (See 01–10A–25 ENGINE TUNE-UP [ZM])	26, 52
SSA/SS1*1 (Shift solenoid A)	%	Fourth gear: 100% Others: 0%	Inspect shift solenoid A (See 05–17–28 SOLENOID VALVES INSPECTION)	82
SSB/SS2*1 (Shift solenoid B)	%	First gear: 100% Others: 0%	Inspect shift solenoid B (See 05–17–28 SOLENOID VALVES INSPECTION)	99
SSC/SS3*1 (Shift solenoid C)	%	First gear: 100% Second gear: 100% N position: ON Others: 0%	Inspect shift solenoid C (See 05–17–28 SOLENOID VALVES INSPECTION)	102
SSD/SS4*1 (Shift solenoid D)	ON/OFF	P or N position: ON 1 range: ON Others: OFF	Inspect shift solenoid D (See 05–17–28 SOLENOID VALVES INSPECTION)	27
SSE/SS5*1 (Shift solenoid E)	ON/OFF	TCC operating: ON 1 range: ON Others: OFF	Inspect shift solenoid E (See 05–17–28 SOLENOID VALVES INSPECTION)	1
TCIL (O/D OFF indicator light)	ON/OFF	O/D OFF mode: ON Others: OFF	Inspect O/D OFF indicator light	43
TCS (O/D OFF switch)	ON/OFF	O/D OFF switch pressed: ON Others: OFF	Inspect O/D OFF switch (See 05–17–19 O/D OFF SWITCH INSPECTION)	29
TEST (TEN terminal (DLC))	ON/OFF	Open terminal TEN: OFF Short terminal TEN: ON	Inspect DLC TEN terminal and PCM connector terminal 5	5
TFT*1 (Transaxle fluid temperature)	°C / °F	TFT 20 °C {68 °F}: 20 °C {68 °F} TFT 130 °C {266 °F}: 130 °C {266 °F}	Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)	37
TFTV*1 (TFT sensor signal voltage)	V	TFT 20 °C {68 °F}: 3.4—3.6 V TFT 130 °C {266 °F}: 0.4—0.5 V	Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)	37
TPOD*1 (TP)	%	CTP: 0% WOT: 100%	Inspect TP sensor (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM])	89
TP (TP sensor signal voltage)	V	CTP: 0.1—1.1 V WOT: 3.0—4.6 V	Inspect TP sensor (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM])	89
TRL1 (TR switch [1range])	ON/OFF	1 range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	7
TROD*1 (TR switch [D range])	ON/OFF	D range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	6

Monitor item (Definition)	Unit/ Condition		Condition/Specification (Reference)	Action	PCM terminal
TRR*1 (TR switch [R position])	ON/OFF		R position: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	32
TRD*1 (TR switch [2range])	ON/OFF		2 range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	9
TSS*1 (Input/turbine speed signal)	rpm		Ignition switch ON: 0 rpm Idle: 650—750 rpm	Inspect input/turbine speed sensor (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	23, 84
VPWR (Battery positive voltage)	V		Ignition switch ON: B+	Inspect main relay (See 09–21–5 RELAY INSPECTION Inspect battery) (See 01–17–1 BATTERY INSPECTION)	71, 97
VSS (Vehicle speed)	km/h	mph	Vehicle speed 20 km/h {12.5 mph}: 20 km/h {12.5 mph} Vehicle speed 40 km/h {25 mph}: 40km/h {25 mph}	Inspect VSS MTX: (See 09–22–4 Speedometer) ATX: (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX])	58

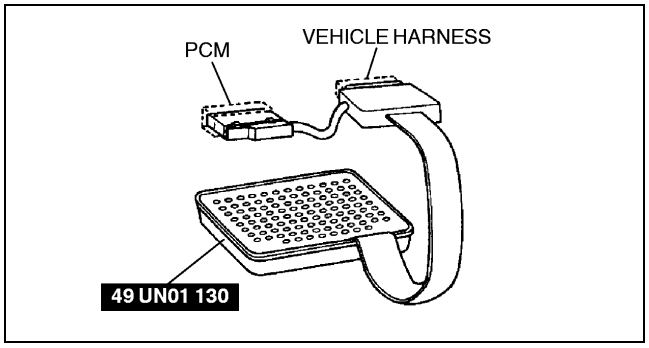
*1 : ATX only
*2 : MTX only

PCM Inspection Using the SST (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.
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, inspect the related system(s), wiring harnesses and connector(s) referring to the action column in the terminal voltage table.



X3U140WA2

Terminal voltage table (Reference)

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
1*1	Shift solenoid E control	Shift solenoid E	Idle (P position)	Below 1.0	• Inspect shift solenoid E (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
			1 range (1GR)	B+	
2	MIL control	MIL (in instrument cluster)	Ignition switch ON	Below 1.0	• Inspect MIL • Inspect related harness
			Idle	B+	
3	—	—	—	—	—
4	B+ monitor	Battery	Under any condition	B+	• Inspect battery (See 01–17–1 BATTERY INSPECTION) • Inspect EGI fuse • Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
5	Diagnostic test mode	DLC terminal TEN	Ignition switch ON	Open terminal TEN	B+	• Inspect related harness
				Short to ground terminal TEN	Below 1.0	
6	Clutch operation (MTX)	Clutch switch	Clutch pedal depressed		Below 1.0	• Inspect clutch switch (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM]) • Inspect related harness
			Clutch pedal released		B+	
	D range (ATX)	TR switch (terminal G)	Ignition switch ON	Selector lever is at D range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other than D range	Below 1.0	
7*1	1 range	TR switch (terminal E)	Ignition switch ON	Selector lever is at 1 range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then 1 range	Below 1.0	
8	—	—	—		—	—
9*1	2 range	TR switch (terminal F)	Ignition switch ON	Selector lever is at 2 range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then 2 range	Below 1.0	
10	—	—	—		—	—
11	—	—	—		—	—
12	—	—	—		—	—
13	EPROM flashing	DLC-2 terminal FEPS	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible.			• Inspect related harness
14	—	—	—		—	—
15	—	—	—		—	—
16	—	—	—		—	—
17	—	—	—		—	—
18	CDCV control	CDCV	Ignition switch ON		B+	• Inspect CDCV (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION) • Inspect related harness
			Diagnosis executed (while on-board device control is carrying out)		Below 1.0	
19	VTCS control	VTCS solenoid valve	ECT above 65 °C {149 °F} while idling		B+	• Inspect VTCS solenoid valve (See 01–13A–11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [ZM]) • Inspect related harness
			ECT below 65 °C {149 °F} and engine speed at 1,500 rpm		Below 1.0	
20	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
21	NE (+)	CKP sensor	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect CKP sensor (See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM]) • Inspect related harness
22	NE (–)	CKP sensor	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect CKP sensor (See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM]) • Inspect related harness
23*1	Input/turbine speed (–)	Input/turbine speed sensor	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION) • Inspect related harness
24	GND	GND	Under any condition		Below 1.0	• Inspect related harness
25	—	—	—		—	—
26	IGT1	Ignition coil (No. 1, 4 cylinders)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect ignition coil (See 01–18–2 IGNITION COIL INSPECTION) • Inspect related harness
27*1	Shift solenoid D control	Shift solenoid D	Idle	Selector lever is at P, N position and 1 range	B+	• Inspect shift solenoid D (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
				Others	Below 1.0	
28*1	Vehicle speed output	Speedometer (in instrument cluster)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect speedometer (See 09–22–4 Speedometer) • Inspect related harness
29*1	O/D OFF signal	O/D OFF switch	Ignition switch ON	O/D OFF switch pushed	Below 1.0	• Inspect O/D OFF switch (See 05–17–19 O/D OFF SWITCH INSPECTION) • Inspect related harness
				O/D OFF switch released	B+	
30	Generator output voltage	Generator (terminal P)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect generator (See 01–17–3 GENERATOR INSPECTION) • Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
31	PSP	PSP switch	Ignition switch ON		B+	• Inspect PSP switch (See 01–40A–43 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [ZM]) • Inspect power steering system • Inspect related harness
			Idle	Steering wheel at straight ahead position	B+	
				While turning steering wheel	Below 1.0	
32*1	R position	TR switch (terminal C)	Ignition switch ON	Selector lever is at R position	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then R position	Below 1.0	
33	—	—	—		—	—
34	BARO/EGR boost	EGR boost sensor	Ignition switch ON (Barometric pressure at 102 kPa {765 mmHg, 30 inHg})		Approx. 4.0	• Inspect EGR boost sensor (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM]) • Inspect related harness
35	Catalytic converter efficiency	HO2S (Rear)	Ignition switch ON		Below 1.0	• Inspect HO2S (Rear) (See 01–40A–36 HO2S (Front and Rear) Voltage Inspection) • Inspect related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
36	—	—	—		—	—
37*1	TFT	TFT sensor	Ignition switch ON	TFT 20 °C {68 °F}	3—4	• Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION) • Inspect related harness
				TFT 130 °C {266 °F}	0.2—0.7	
38	ECT	ECT sensor	Ignition switch ON	ECT 20 °C {68 °F}	2.9—3.1	• Inspect ECT sensor (See 01–40A–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [ZM]) • Inspect related harness
				After warm up	0.2—1.0	
39	IAT	IAT sensor (integrated with MAF sensor)	Ignition switch ON	IAT 20 °C {68 °F}	2.3—2.4	• Inspect IAT sensor (See 01–40A–27 IAT Sensor Resistance Inspection) • Inspect related harness
				IAT 30 °C {86 °F}	1.7—1.9	
40	—	—	—		—	—
41	A/C on signal	Refrigerant pressure switch	Idle	A/C switch and fan switch on	Below 1.0	• Inspect A/C switch (See 07–40–9 REFRIGERANT PRESSURE SWITCH INSPECTION) • Inspect related harness
				A/C switch off	B+	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
42	Generator warning light control	Generator warning light (in instrument cluster)	Ignition switch ON		Below 1.0	• Inspect generator warning light • Inspect related harness
			Idle		B+	
43*1	O/D OFF indicator light signal	O/D OFF indicator light	Ignition switch ON	O/D OFF indicator light illuminates	Below 1.0	• Inspect O/D OFF indicator light • Inspect related harness
				O/D OFF indicator light does not illuminate	B+	
44*1	Pressure control solenoid control (+)	Pressure control solenoid	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
45	Condenser fan control	Condenser fan relay	Ignition switch ON		B+	• Inspect condenser fan relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Idle	Condenser fan operating	Below 1.0	
				Others	B+	
46	EGR valve #3 coil control	EGR valve (terminal B)	Ignition switch ON		B+	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		B+	
47	Cooling fan control	Cooling fan relay	Ignition switch ON		B+	• Inspect cooling fan relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Idle	Cooling fan operating	Below 1.0	
				Others	B+	
48	Engine speed	Tachometer (in instrument cluster), DLC terminal IG–	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect tachometer (See 09–22–4 Tachometer) • Inspect related harness
49	—	—	—		—	—
50	—	—	—		—	—
51	GND	GND	Under any condition		Below 1.0	• Inspect related harness
52	IGT2	Ignition coil (No. 2, 3 cylinders)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect ignition coil (See 01–18–2 IGNITION COIL INSPECTION) • Inspect related harness
53	Generator field coil control	Generator (terminal D)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect generator (See 01–17–3 GENERATOR INSPECTION) • Inspect related harness
54	IAC (+)	IAC valve	Ignition switch ON		B+	• Inspect IAC valve (See 01–13A–7 IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM]) • Inspect related harness
			Idle (After warm up and E/L off)		B+	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
55	Back-up power supply	Battery (positive terminal)	Under any condition		B+	• Inspect battery (See 01–17–1 BATTERY INSPECTION) • Inspect EGI fuse • Inspect related harness
56	EGR valve #4 coil control	EGR valve (terminal F)	Ignition switch ON		Below 1.0	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		Below 1.0	
57	—	—	—		—	—
58	Vehicle speed	Speedometer (MTX)	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect VSS (See 09–22–4 Speedometer) • Inspect related harness
		VSS (ATX)				• Inspect VSS (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX]) • Inspect related harness
59	—	—	—		—	—
60	HO2S (Front)	HO2S (Front)	Ignition switch ON		0—1.0	• Inspect HO2S (Front) (See 01–40A–36 HO2S (Front and Rear) Voltage Inspection) • Inspect related harness
			Idle	After warm up	0—1.0	
			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}	Approx. 2.5	• Inspect fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM]) • Inspect related harness
				Fuel tank pressure 1 kPa {7.5 mmHg, 0.3 inHg}	Approx. 2.8	
63	Fuel tank level	Fuel gauge sender unit	Full fuel		0.2—0.5	• Inspect fuel gauge sender unit (See 09–22–4 Fuel Gauge) • Inspect related harness
			Half fuel		2.0—2.8	
			Empty fuel		3.4—4.4	
64	Neutral position (MTX)	Neutral switch	Shift lever is at neutral position		Below 1.0	• Inspect neutral switch (See 01–40A–42 NEUTRAL SWITCH INSPECTION [ZM]) • Inspect related harness
			Shift lever is not at neutral position		B+	
	Load/no load signal (ATX)	TR switch (terminal H)	Ignition switch ON	Selector lever is at P or N position	Below 1.0	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Others	B+	
65	—	—	—		—	—
66	—	—	—		—	—

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
67	Purge control	Purge solenoid valve	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))		• Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION) • Inspect related harness
68	EGR valve #1 coil control	EGR valve (terminal E)	Ignition switch ON	Below 1.0	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle	Below 1.0	
69	—	—	—	—	—
70	—	—	—	—	—
71	Power supply	Main relay	Ignition switch ON	B+	• Inspect main relay (See 09–21–5 RELAY INSPECTION) • Inspect EGI fuse • Inspect related harness
			Ignition switch off	Below 1.0	
72	EGR valve #2 coil control	EGR valve (terminal A)	Ignition switch ON	B+	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle	B+	
73	—	—	—	—	—
74	Fuel injection (#3)	Fuel injector No.3	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))		• Inspect fuel injector No.3 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
75	Fuel injection (#1)	Fuel injector No.1	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))		• Inspect fuel injector No.1 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
76	GND	GND	Under any condition	Below 1.0	• Inspect related harness
77	GND	GND	Under any condition	Below 1.0	• Inspect related harness
78	—	—	—	—	—
79	K-LINE (serial communication)	DLC terminal KLN	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible.		• Inspect related harness
80	Fuel pump control	Fuel pump relay	Ignition switch ON	B+	• Inspect fuel pump relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Cranking	Below 1.0	
			Idle	Below 1.0	
81*1	Pressure control solenoid (–) control	Pressure control solenoid	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))		• Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
82*[1]	Shift solenoid A control	Shift solenoid A	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect shift solenoid A (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
83	IAC (-)	IAC valve	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect IAC valve (See 01–13A–7 IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM]) • Inspect related harness
84*[1]	Input/turbine speed (+)	Input/turbine speed sensor	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION) • Inspect related harness
85	SGC	CMP sensor	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect CMP sensor (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM]) • Inspect related harness
86	—	—	—		—	—
87	—	—	—		—	—
88	MAF	MAF sensor	Ignition switch ON		0.9—2.0	• Inspect MAF sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM]) • Inspect related harness
			Idle		1.7—2.4	
89	Throttle position	TP sensor	Ignition switch ON	CTP	0.1—1.1	• Inspect TP sensor (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM]) • Inspect related harness
				WOT	3.0—4.6	
90	Constant voltage (Vref)	TP sensor, EGR boost sensor, Fuel tank pressure sensor	Ignition switch ON		Approx. 5.0	• Inspect related harness
91	Sensor GND	ECT sensor, IAT sensor, EGR boost sensor, Fuel tank pressure sensor, TP sensor, HO2S (Front, Rear), TFT sensor	Under any condition		Below 1.0	• Inspect related harness
92	Brake	Brake switch	Brake pedal depressed		B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect related harness
			Brake pedal released		Below 1.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
93	HO2S (Rear) heater control	HO2S (Rear)	Idle	ECT above 70°C {158 °F}	Below 1.0	• Inspect HO2S (Rear) (See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection) • Inspect related harness
				HO2S (Rear) is malfunctioning	B+	
94	HO2S (Front) heater control	HO2S (Front)	Ignition switch ON (engine stopped)		B+	• Inspect HO2S (Front) heater. (See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection) • Inspect related harness
			Approx. 15 seconds after engine start with ECT 20—30°C {68—86 °F}		Below 1.0	
			Others		Below 1.0 ⇔ B+	
95	PRC	PRC solenoid valve	Ignition switch ON		B+	• Inspect PRC solenoid valve (See 01–14–31 PRC SOLENOID VALVE INSPECTION) • Inspect related harness
			After hot start		Below 1.0	
96	A/C control	A/C relay	Idle	A/C switch and fan switch on	Below 1.0	• Inspect A/C relay (See 09–21–5 RELAY INSPECTION) • Inspect related) harness
				A/C switch off	B+	
97	Power supply	Main relay	Ignition switch ON		B+	• Inspect main relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Ignition switch off		Below 1.0	
98	EGR boost sensor switching control	EGR boost solenoid valve	Ignition switch ON		B+	• Inspect EGR boost solenoid valve (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION) • Inspect related harness
			Idle		B+	
99*1	Shift solenoid B control	Shift solenoid B	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect shift solenoid B (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
100	Fuel injection (#4)	Fuel injector No.4	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect fuel injector No.4 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
101	Fuel injection (#2)	Fuel injector No.2	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))			• Inspect fuel injector No.2 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
102*1	Shift solenoid C Control	Shift solenoid C	• Inspect using the wave profile. (See 01–40A–21 Inspection Using An Oscilloscope (Reference))		• Inspect shift solenoid C (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
103	GND	GND	Under any condition	Below 1.0	• Inspect related harness
104	—	—	—	—	—

*1 : ATX only

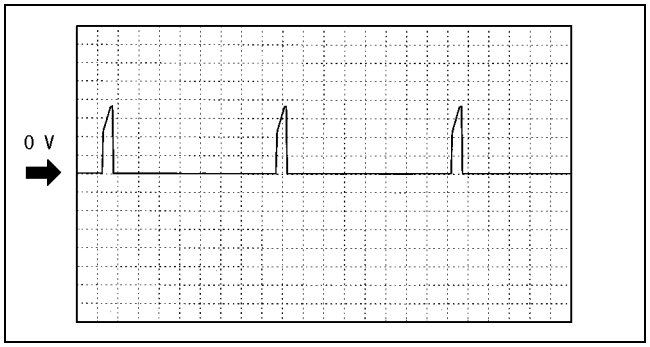
Inspection Using An Oscilloscope (Reference)
Ne signal

- PCM terminal: 21(+)-22(-)
- Oscilloscope setting: 2 V/DIV(Y), 2ms/DIV(X), AC range
- Vehicle condition: idle after warm up

Z3U0140W006

IGT signal

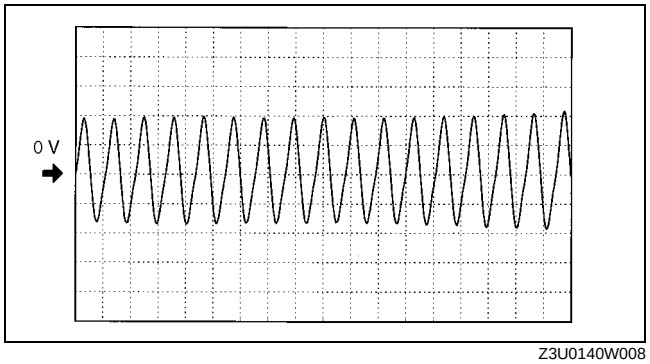
- PCM terminal:
  — IGT1: 26(+)-103(-)
  — IGT2: 52(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 10ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W007

Input/turbine speed signal

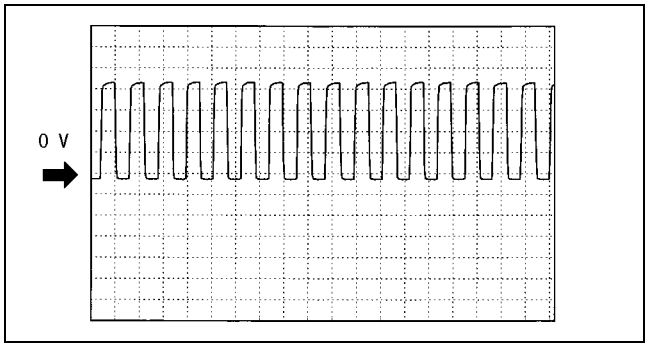
- PCM terminal: 84(+)-23(-)
- Oscilloscope setting: 0.4 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W008

Generator output voltage signal

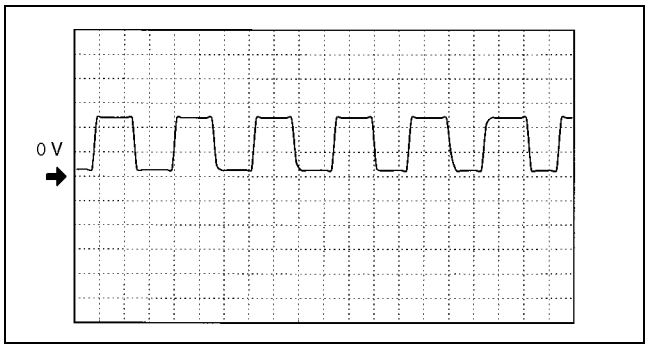
- PCM terminal: 30(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W009

Pressure control solenoid control signal
CTP

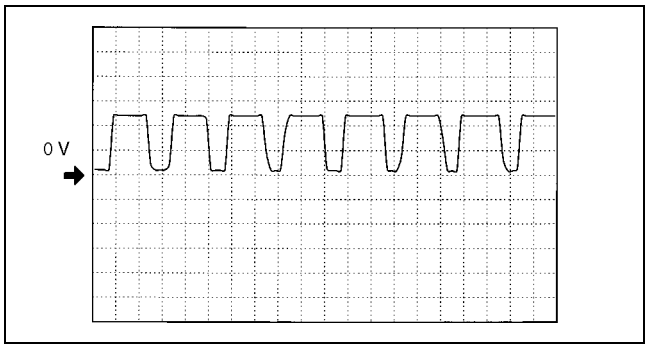
- PCM terminal: 80(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and closed throttle position.



Z3U0140W010

WOT

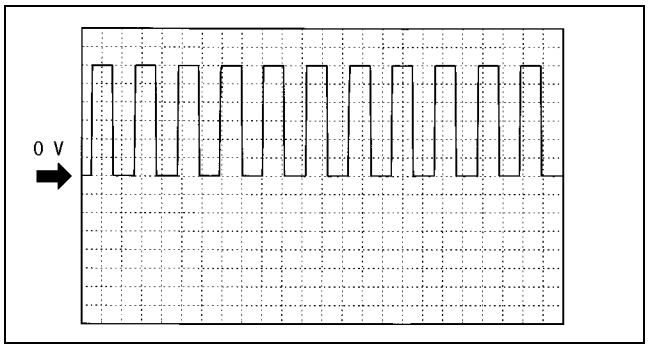
- PCM terminal: 81(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and wide open throttle



Z3U0140W019

Engine speed signal

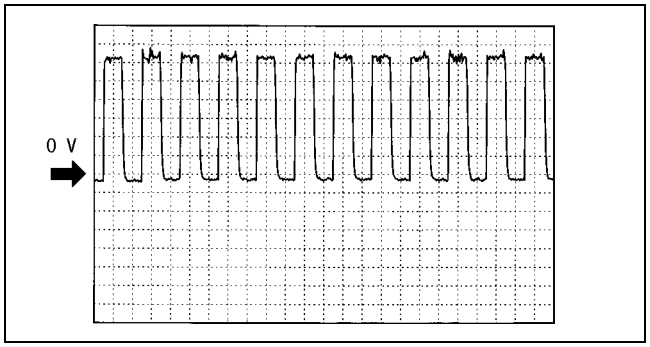
- PCM terminal: 48(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W011

Generator field coil control signal

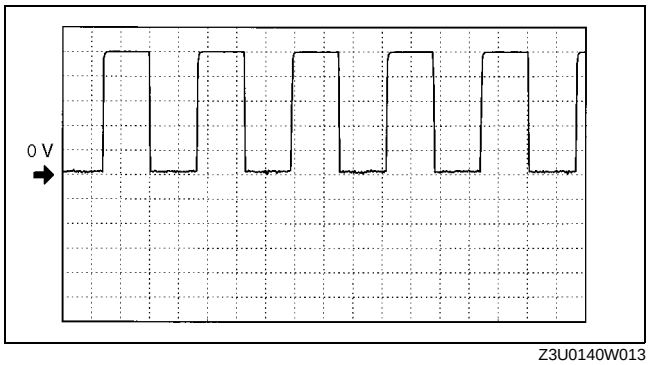
- PCM terminal: 53(+)-103(-)
- Oscilloscope setting: 0.2 V/DIV(Y), 2ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W012

Vehicle speed signal

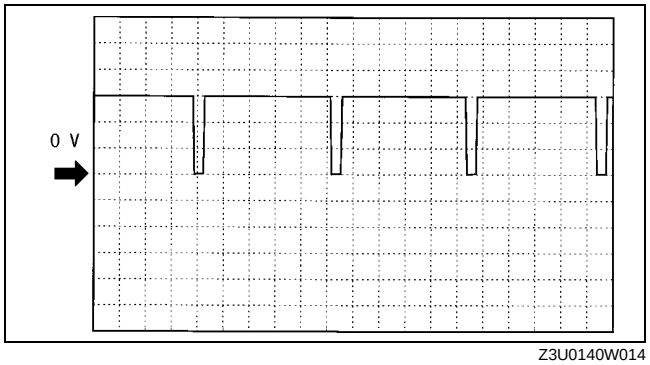
- PCM terminal: 58(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: drive the vehicle with 32 km/h [20 mph]



Z3U0140W013

Purge control signal

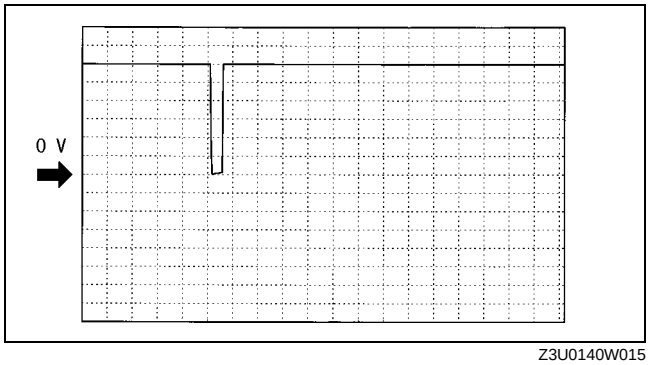
- PCM terminal: 67(+)-103(-)
- Oscilloscope setting: 4 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W014

Fuel injection signal

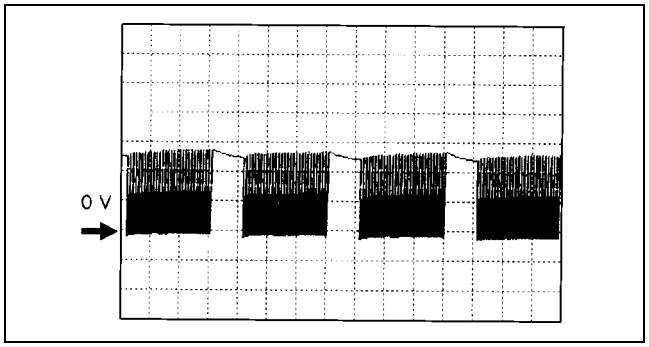
- PCM terminal
  - — No.1:75(+)-103(-)
  - — No.2:101(+)-103(-)
  - — No.3:74(+)-103(-)
  - — No.4:100(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W015

Shift solenoid A control

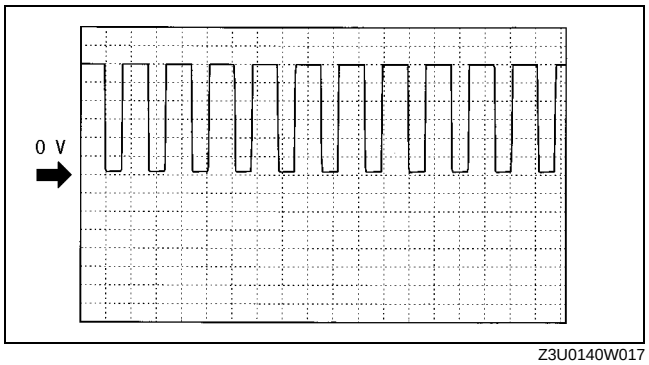
- PCM terminal: 82(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: drive in the 4th gear



Z3U0140W016

IAC signal

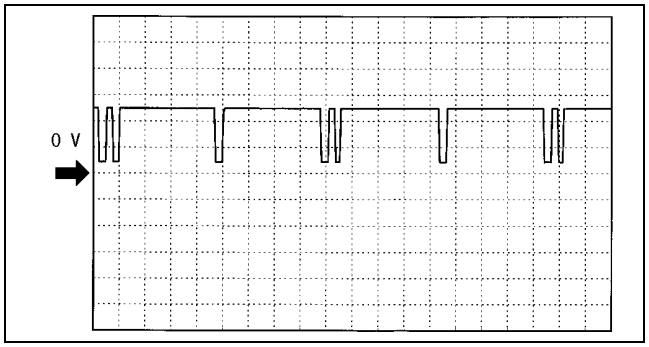
- PCM terminal: 83(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 0.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W017

SGC signal

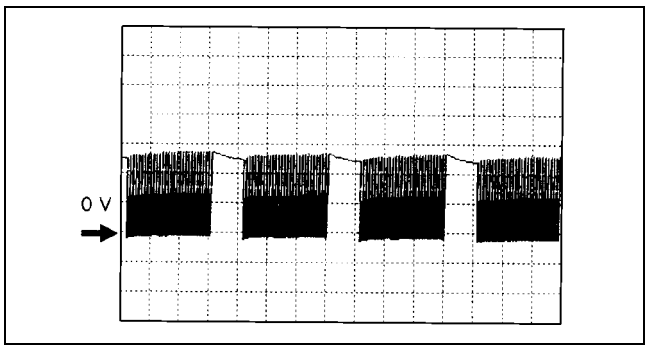
- PCM terminal: 85(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W018

Shift solenoid B control signal

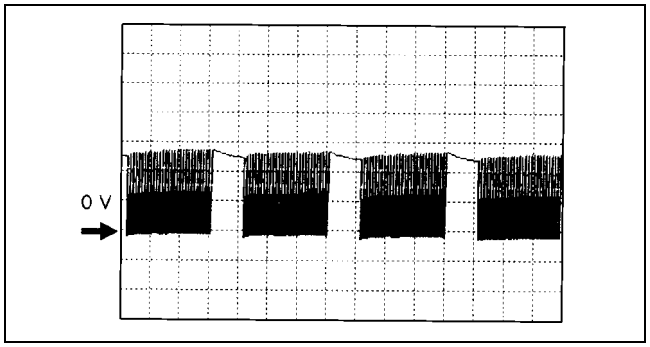
- PCM terminal: 99(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5ms/DIV(X), DC range
- Vehicle condition: Drive in D range, 1st gear



Z3U0140W016

Shift solenoid C control signal

- PCM terminal: 102(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: Drive in 1st or 2nd gear



Z3U0140W016

INSPECTION USING AN OSCILLOSCOPE (REFERENCE) [ZM]

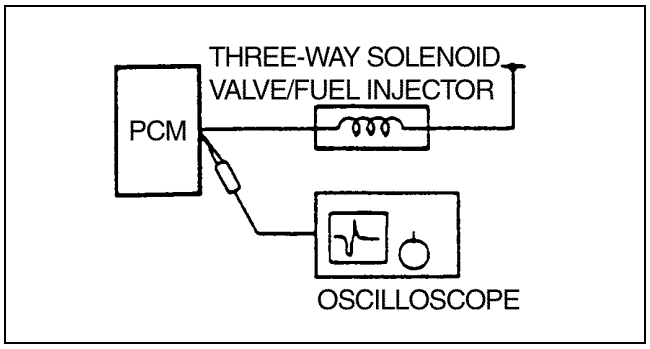
A3U014018881W08

Note

- "INSPECTION USING AN OSCILLOSCOPE (REFERENCE)" is a general inspection for the following output devices.
  - — Fuel injector
  - — Purge solenoid valve
  - — PRC solenoid valve
  - — VTCS solenoid valve
  - — EGR boost sensor solenoid valve

Purpose

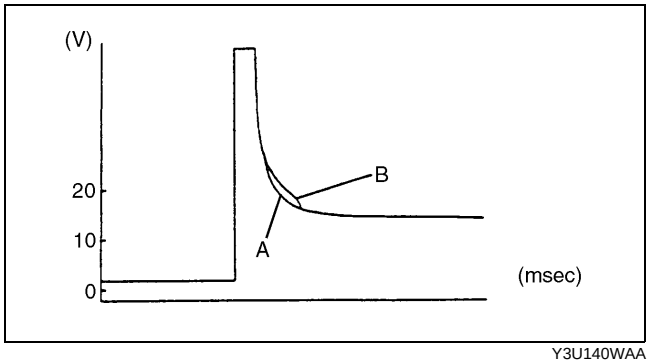
1. The use of oscilloscope makes the inspection of a part such as a stuck solenoid value possible without actually removing parts.



YLU140WBT

When normal

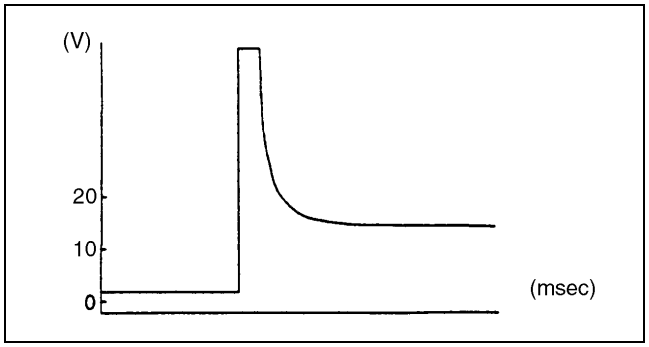
1. Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



Y3U140WAA

When plunger stuck

1. When the plunger is stuck, pulse convergence is smooth because no induced electromotive voltage B is generated.



YLU140WBV

MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM]

A3U014013200W01

Note

- Perform the following test only when directed.

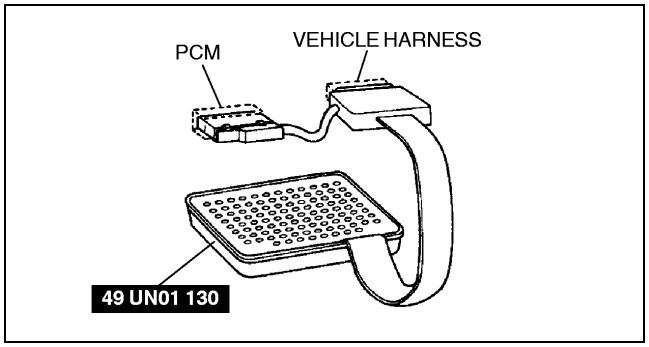
MAF Sensor Inspection

1. Visually inspect for damage, cracks, terminal bends and terminal rust on the MAF sensor.
   - If any of the above are found, replace the MAF sensor.
   - If the MAF sensor PID value or PCM terminal 88 voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

Circuit Open/Short Inspection

1. Disconnect the PCM connector. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



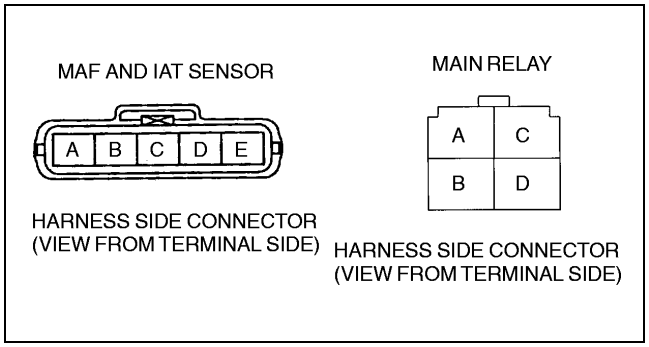
X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the MAF sensor.

   Open circuit
   - MAF signal circuit (MAF sensor connector terminal C and PCM connector terminal 88)
   - Power circuit (MAF sensor connector terminal A and main relay terminal D through common connector)
   - GND circuit (MAF sensor connector terminal B and PCM connector terminal 77 through common connector)

   Short circuit
   - MAF signal circuit (MAF sensor connector terminal C and PCM connector terminal 88 to GND)
   - Power circuit (MAF sensor connector terminal A and main relay terminal D through common connector to GND)
5. Reconnect the MAF sensor connector.

   Note
   - The scan tool shows the MAF rate and load value.



X3U140WA3

Specification

	Intake MAF (g/s)		Engine load calculated value (%)	
	MTX	ATX	MTX	ATX
Idle*1	1.6—2.2	1.6—2.4	13.0—20.0	14.0—22.0
Engine speed 2,500 rpm*2	5.1—6.5	5.6—7.2	11.0—17.0	13.0—19.0

*1 : 650—750 rpm
*2 : No load, neutral or P position

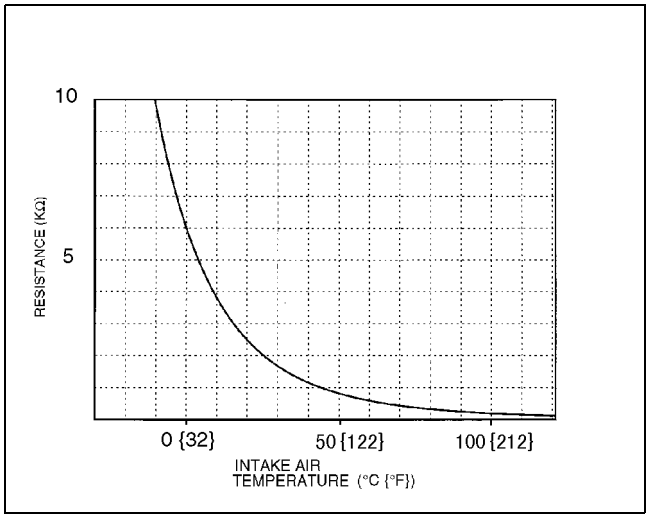
IAT Sensor Resistance Inspection

1. Disconnect the MAF sensor connector.
2. Measure the resistance between MAF sensor terminals D and E using an ohmmeter.
   - If not as specified, replace the MAF sensor.
   - If IAT sensor is okay, but PID value or PCM terminal 39 voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

Specification

Ambient temperature (°C {°F})	Resistance (kilohm)
10 {50}	3.1—4.4
20 {68}	2.2—2.7
30 {86}	1.4—1.9

IAT sensoir signal characteristic (reference)

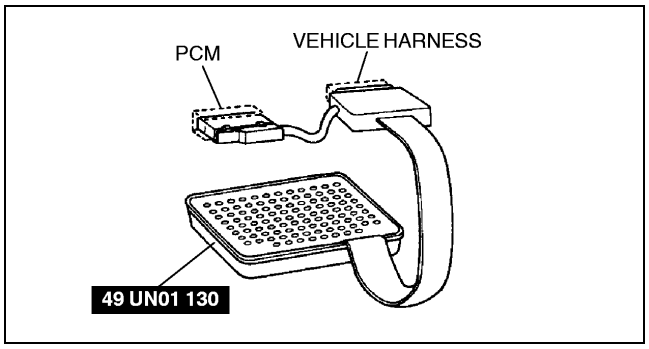


Z3U0140W021

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

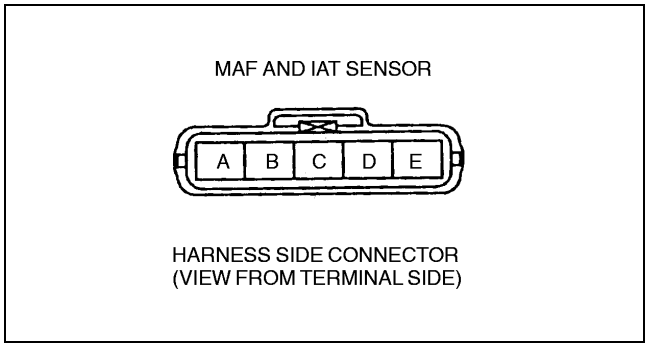


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the MAF sensor.

   Open circuit
   - IAT signal circuit (MAF sensor connector terminal D and PCM connector terminal 39)
   - GND circuit (MAF sensor connector terminal E and PCM connector terminal 91 through common connector)

   Short circuit
   - IAT signal circuit (MAF sensor connector terminal D and PCM connector terminal 39 to GND)
5. Reconnect the sensor connector.



X3U140WA4

THROTTLE POSITION (TP) SENSOR INSPECTION [ZM]

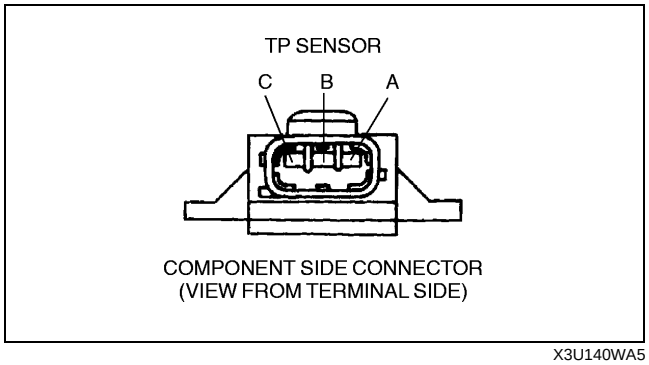
A3U014018910W02

Note
- The TP sensor on this type of vehicle is a maintenance-free type.
- Perform the following test only when directed.

Resistance Inspection

1. Verify that the throttle valve is at CTP.
2. Inspect accelerator cable free play. (See 01–13A–13 ACCELERATOR CABLE INSPECTION/ADJUSTMENT [ZM].)
3. Measure the resistance between TP sensor terminals A and C using an ohmmeter.
   - If not as specified, replace the TP sensor.
   - If as specified, but PID value or PCM terminal 89 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

   Specification
   2.5—6 kilohms

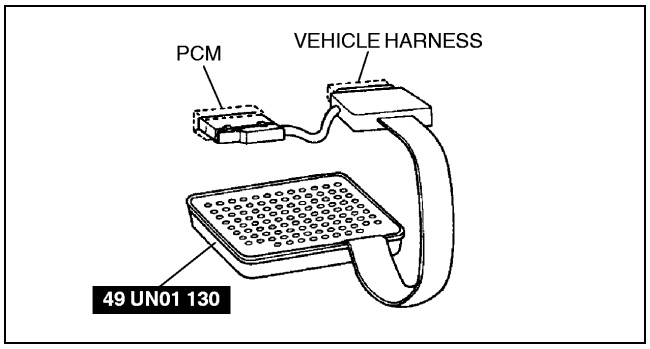


X3U140WA5

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

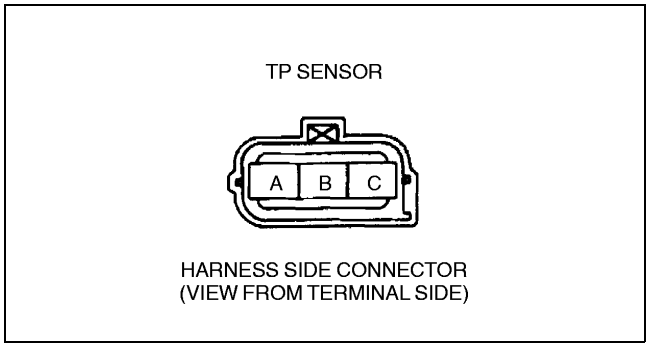


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the TP sensor.

   Open circuit
   - Constant voltage circuit (TP sensor connector terminal A and PCM connector terminal 90)
   - TP signal circuit (TP sensor connector terminal C and PCM connector terminal 89)
   - GND circuit (TP sensor connector terminal B and PCM connector terminal 91)

   Short circuit
   - Constant voltage circuit (TP sensor connector terminal A and PCM connector terminal 90 to GND)
   - TP signal circuit (TP sensor connector terminal C and PCM connector terminal 89 to GND)
5. Reconnect the TP sensor connector.



X3U140WA6

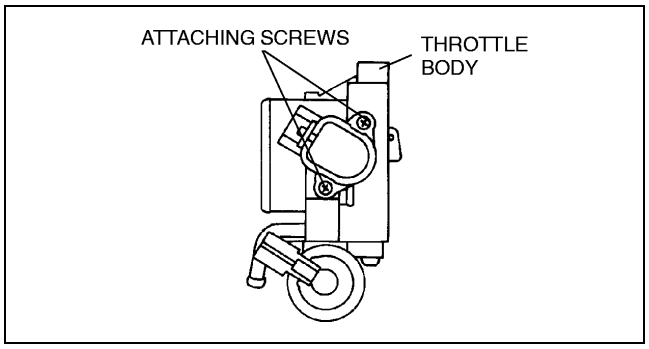
THROTTLE POSITION (TP) SENSOR REMOVAL/INSTALLATION [ZM]

A3U014018910W03

1. Disconnect the TP sensor connector.
2. Remove the TP sensor screws.
3. Remove the TP sensor from the throttle body.
4. Verify that the throttle valve is fully closed.
5. Install the TP sensor to the throttle body.
6. Tighten the TP sensor screws.

Tightening torque
1.6—2.3 N·m {16—24 kgf·cm, 14—20 in·lbf}

7. Verify that the throttle valve moves smoothly.
8. Reconnect the TP sensor connector.



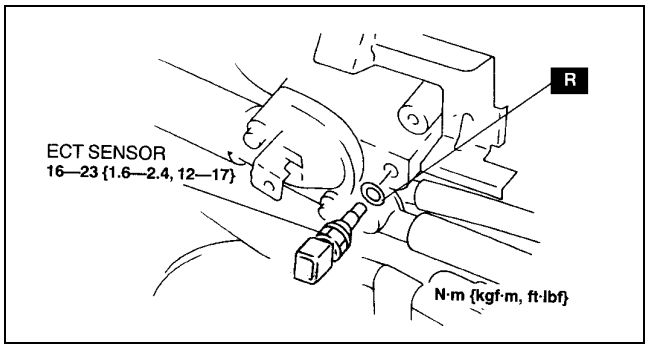
X3U140WA7

ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [ZM]

A3U014018840W03

Warning
- **When the engine is hot, it can badly burn. Turn off the engine and wait until it is cool before removing or installing the ECT sensor.**

1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Disconnect the ECT sensor connector.
3. Remove the ECT sensor.
4. Replace the gasket.
5. Install in the reverse order of removal.
6. Refill the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)



Y3U140WA1

ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [ZM]

A3U014018840W04

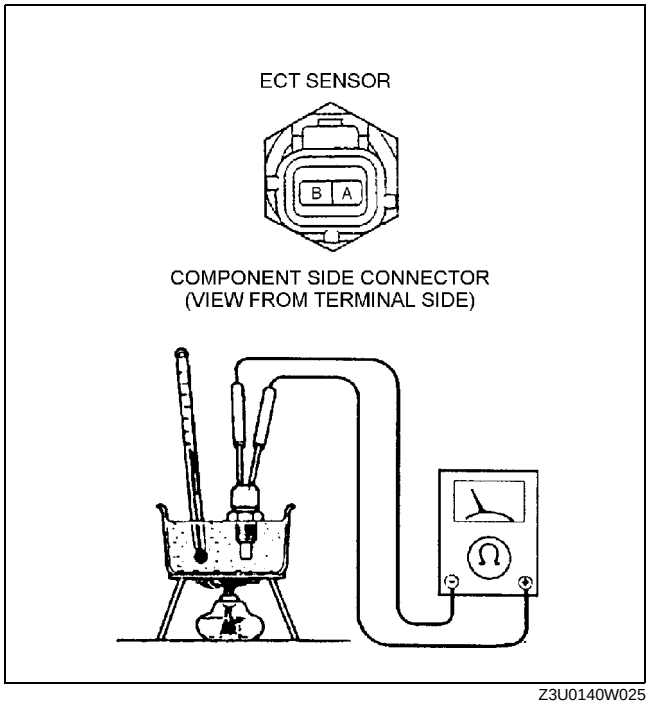
Note
- Perform the following test only when directed.

ECT Sensor Resistance Inspection

1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Remove the ECT sensor.
3. Place the ECT sensor in water with a thermometer, and heat the water gradually.
4. Measure the resistance between the ECT sensor terminals A and B using an ohmmeter.
   - If not as specified, replace the ECT sensor.
   - If the ECT sensor is okay, but PID value or PCM terminal 38 voltage are out of specification, carry out the “Circuit Open/ Short Inspection”.

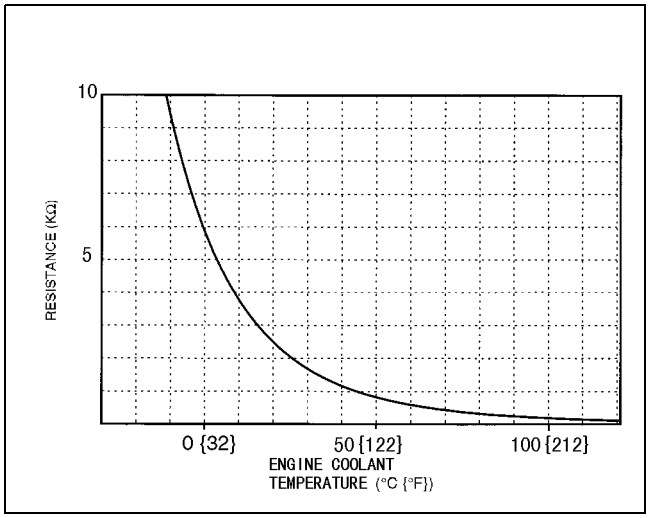
Specification

Water temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.2—2.6
80 {176}	0.29—0.34



Z3U0140W025

ECT sensor signal characteristic (reference)

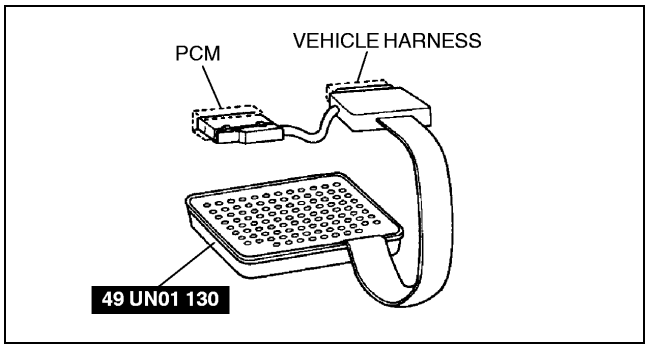


Z3U0140W022

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   16—23 N·m
   {1.6—2.4 kgf·m, 12—17 ft·lbf}

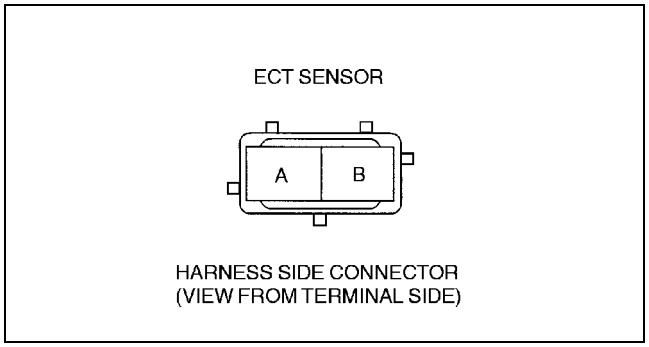


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the ECT sensor.

   Open circuit
   - ECT signal circuit (ECT sensor connector terminal A and PCM connector terminal 38 through common connector)
   - GND circuit (ECT sensor connector terminal B and PCM connector terminal 91)

   Short circuit
   - ECT signal circuit (ECT sensor connector terminal A and PCM connector terminal 38 to GND)
   - GND circuit (ECT sensor connector terminal B and PCM connector terminal 91 to GND)
5. Install the ECT sensor.



Z3U0140W026

CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM]

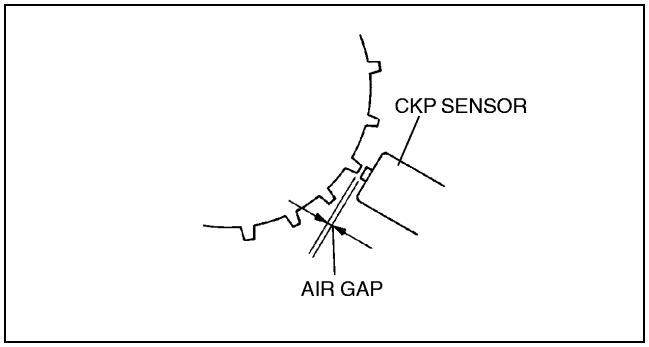
A3U014018230W03

Air Gap Inspection

Note
- Perform the following test only when directed.

1. Verify that the CKP sensor is installed properly.
2. Measure the air gap between the plate teeth and the CKP sensor using a feeler gauge.
   - If not as specified, adjust the CKP sensor or inspect the plate teeth for being twisted and/or chipped.
   - If any of the plate teeth is twisted and/or chipped, replace the plate. (See 01–40A–34 PLATE REMOVAL/INSTALLATION [ZM].)

Specification
0.5—1.5 mm {0.020—0.059 in}

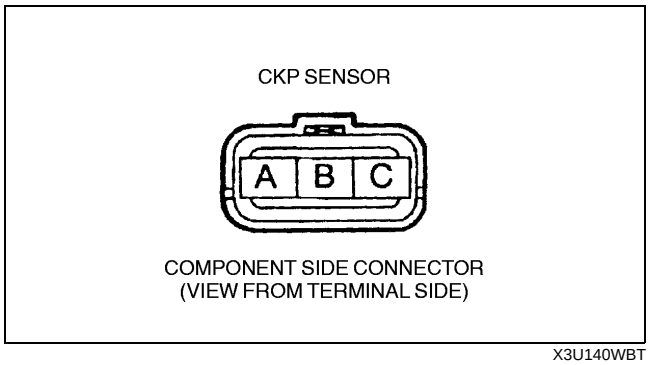


X3U140WAB

Resistance Inspection

1. Disconnect the CKP sensor connector.
2. Measure the resistance between CKP sensor terminals A and B using an ohmmeter.
   - If not as specified, replace the CKP sensor.
   - If CKP sensor resistance is okay, but PID value or PCM terminal 21 and 22 voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

Specification
Approx. 550 ohms

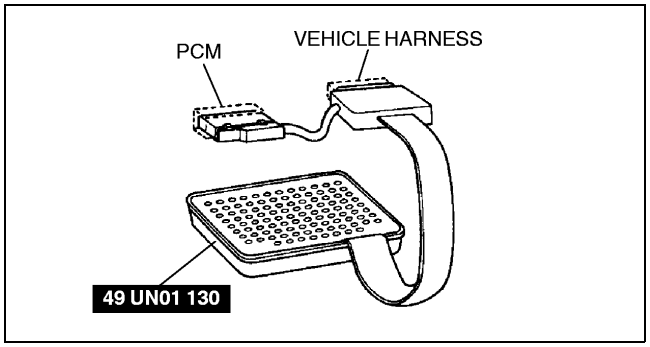


X3U140WBT

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the CKP sensor.

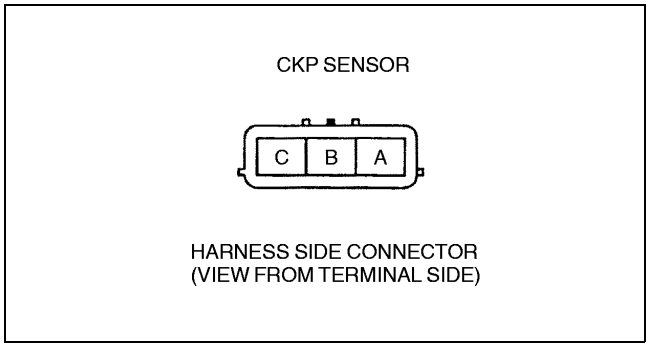
Open circuit

- CKP signal (+) circuit (CKP sensor connector terminal A and PCM connector terminal 21)
- CKP signal (–) circuit (CKP sensor connector terminal B and PCM connector terminal 22)

Short circuit

- CKP signal (+) circuit (CKP sensor connector terminal A and PCM connector 21 to GND)
- CKP signal (–) circuit (CKP sensor connector terminal B and PCM connector terminal 22)

5. Reconnect the CKP sensor connector.



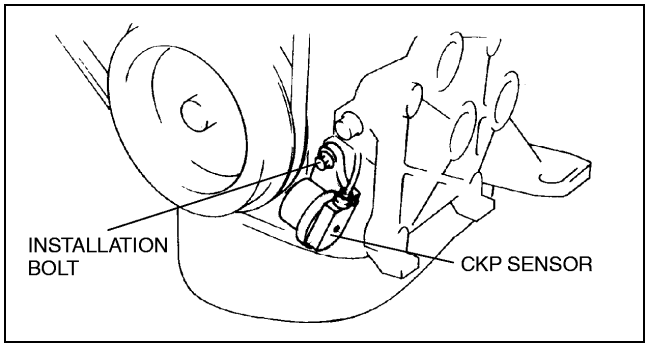
Y3U140WAF

CRANKSHAFT POSITION (CKP) SENSOR ADJUSTMENT [ZM]

A3U014018230W04

1. Loosen the CKP sensor installation bolt.
2. While moving the CKP sensor, adjust the air gap between the CKP sensor and the plate teeth on the plate using a feeler gauge.
   - If not adjusted within specification, replace the plate behind the crankshaft pulley or CKP sensor. (See 01–40A–34 PLATE REMOVAL/INSTALLATION [ZM].) (See 01–40A–34 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [ZM].)

   Specification
   0.5—1.5 mm {0.020—0.059 in}



X3U140WAD

3. Tighten the CKP sensor installation bolt.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [ZM]

A3U014018230W05

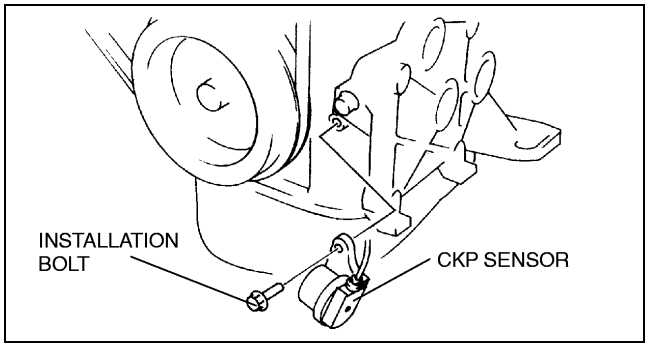
Caution
- **When foreign material such as an iron chip is on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

1. Disconnect the CKP sensor connector.
2. Remove the undercover.
3. Remove the CKP sensor installation bolt.
4. Install in the reverse order of removal.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

5. Reconnect the CKP sensor connector.

   Caution
   - **Do not forcefully pull the wiring harness of the CKP sensor, or harness will be damaged.**



X3U140WAE

6. Adjust the air gap. (See 01–40A–34 CRANKSHAFT POSITION (CKP) SENSOR ADJUSTMENT [ZM].)

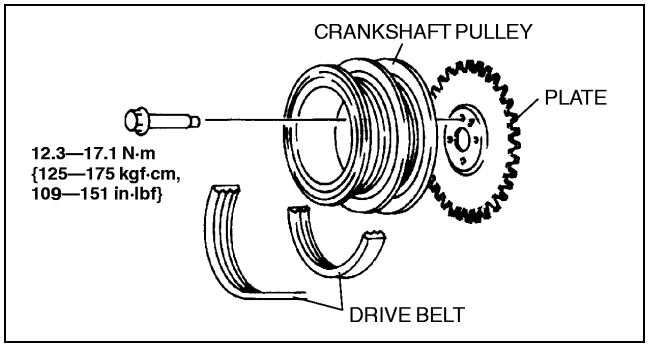
PLATE REMOVAL/INSTALLATION [ZM]

A3U014011408W01

1. Remove the crankshaft pulley. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [ZM].)
2. Remove the plate.

   Note
   - Adjust the drive belt when installing the drive belt. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].)

3. Install in the reverse order of removal.



Y3U140WA4

CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [ZM]

A3U014018200W03

Caution
- **When foreign material such as an iron chip is on the CMP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CMP sensor when replacing.**

1. Disconnect the negative battery cable.
2. Disconnect the CMP sensor connector.
3. Remove the CMP sensor installation bolt.
4. Remove the CMP sensor.
5. Make sure that the CMP sensor is free of any metallic shavings or particles.
   - If metallic shavings or particles are found on the sensor, clean them off.
6. Install in the reverse order of removal.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

CAMSHAFT POSITION (CMP) SENSOR INSPECTION [ZM]

A3U014018200W04

Visual Inspection

1. Remove the CMP sensor. (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [ZM].)

Note
- Make sure that the CMP sensor is free of any metallic shavings or particles.
- If metallic shavings or particles are found on the sensor, clean them off.

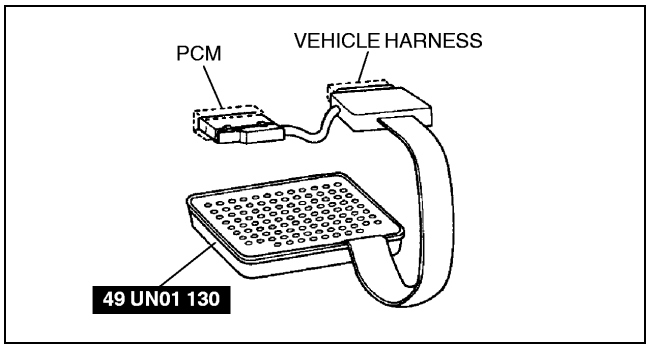
2. Install the CMP sensor. (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [ZM].)

Wave profile Inspection

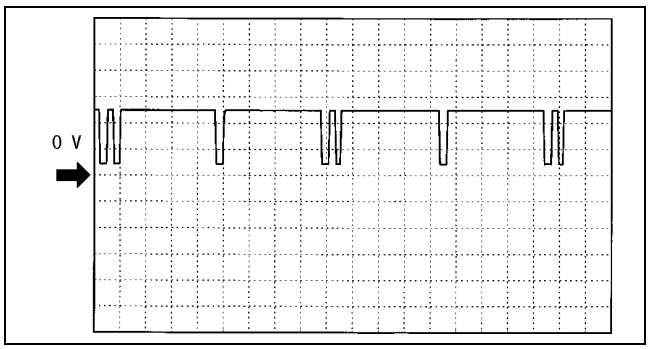
1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

4. Connect the oscilloscope testleads to the following PCM connector terminals.
   - (+) lead: PCM terminal 85
   - (-) lead: PCM terminal 103
5. Start the engine.
6. Monitor RPM PID.
7. Inspect wave profile at idle.
   - If wave profile or voltage are out of specifications, carry out the “Circuit Open/Short Inspection”.
     — PCM terminal: 85(+) ⇔ 103(-)
     — Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
     — Vehicle condition: Idle after warm up



X3U140WBN

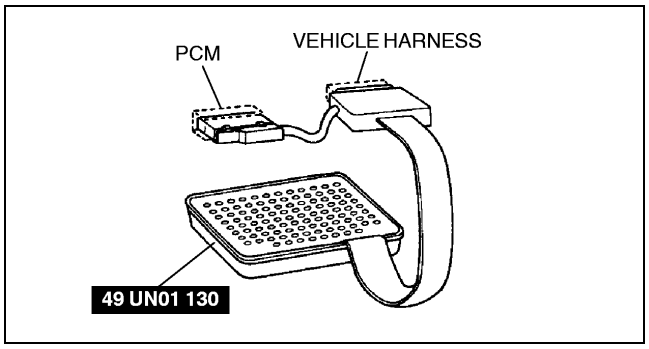


Z3U0140W018

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

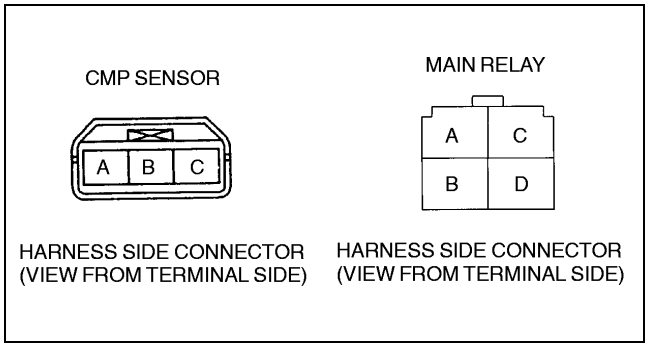


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the CMP sensor.

   Open circuit
   - CMP signal circuit (CMP sensor connector terminal B and PCM connector terminal 85)
   - Power circuit (CMP sensor connector terminal A and main relay terminal D through common connector)
   - GND circuit (CMP sensor connector terminal C and PCM connector terminal 103)

   Short circuit
   - CMP signal circuit (CMP sensor connector terminal B and PCM connector terminal 85 to GND)
   - Power circuit (CMP sensor connector terminal A and main relay terminal D through common connector to GND)
5. Reconnect the CMP sensor connector.
6. Inspect the camshaft pulley (exhaust side) for damage and cracks.



X3U140WAT

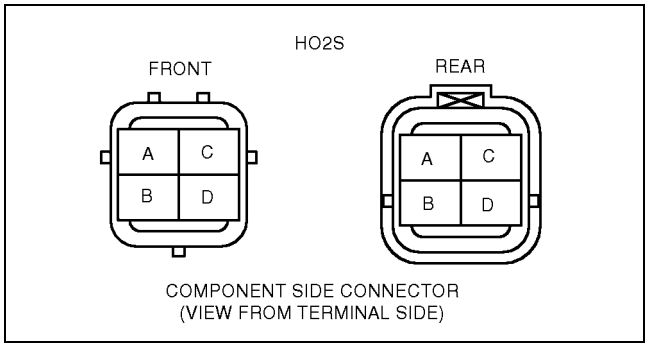
HEATED OXYGEN SENSOR (HO2S) INSPECTION [ZM]

A3U014018861W02

HO2S (Front and Rear) Voltage Inspection

Note
- Perform the following test only when directed.

1. Warm up the engine and run it at idle.
2. Disconnect the HO2S (Front or Rear) connector.
3. Connect the voltmeter test leads to the following HO2S terminals:
   - (+) lead—HO2S terminal A
   - (–) lead—HO2S terminal B
4. Run the engine at **3,000 rpm** until the voltmeter indicates **approx. 0—1.0 V**.
5. Verify that the voltmeter needle moves when the engine speed increases and decreases suddenly several times.
   - If not as specified, replace the HO2S.
   - If the HO2S is okay, but PID value or PCM terminal 60 (Front), 35 (Rear) voltage is out of specification, carry out the “Circuit Open/ Short Inspection”.



Z3U0140W023

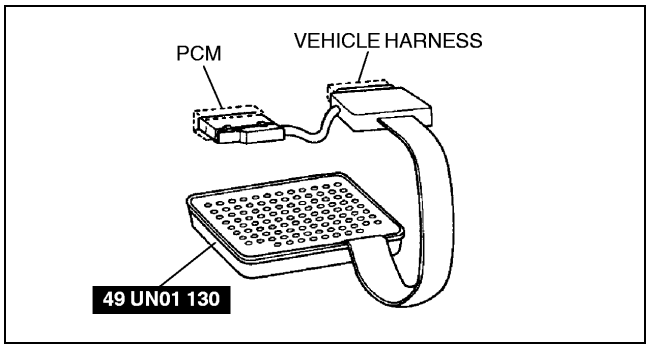
Specification

Engine speed	Voltage (V)
Increase	0.5—1.0
Decrease	0—0.5

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

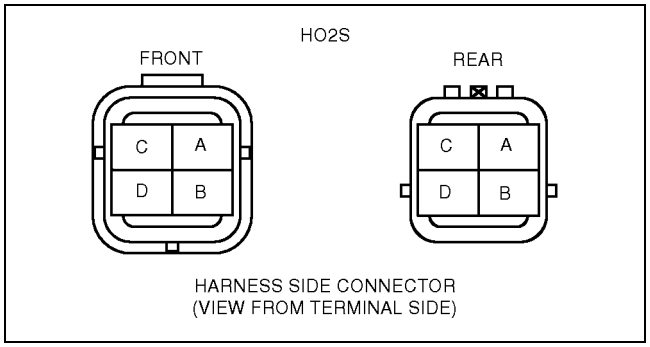


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the HO2S.

   Open circuit
   - HO2S signal circuit (HO2S connector terminal A and PCM connector terminal 60 (Front), 35 (Rear))
   - GND circuit (HO2S connector terminal B and PCM connector terminal 91)

   Short circuit
   - HO2S signal circuit (HO2S terminal A and PCM connector terminal 60 (Front), 35 (Rear) to GND)
5. Reconnect the HO2S connector.

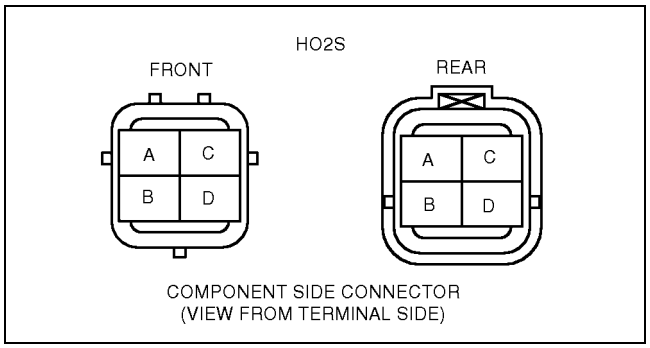


Z3U0140W024

HO2S Heater (Front and Rear) Resistance Inspection

1. Disconnect the HO2S (Front or Rear) connector.
2. Measure the resistance between HO2S terminals C and D using an ohmmeter.
   - If not as specified, replace the HO2S.
   - If the HO2S heater is okay, but PID value or PCM terminal 94 (Front), 93 (Rear) voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

   Specification
   Front: Approx. 5.6 ohms
   Rear: Approx. 15.7 ohms

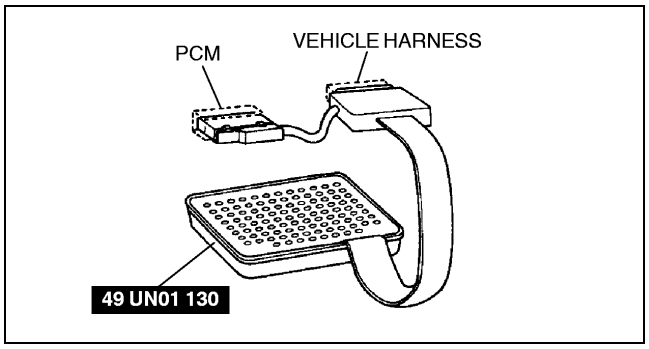


Z3U0140W023

Circuit Open/Short Inspection

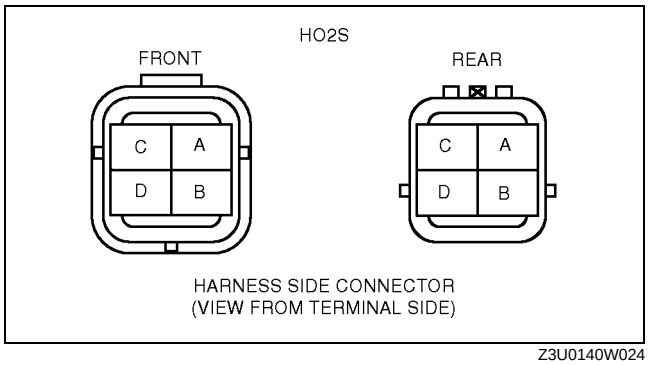
1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the HO2S.



Z3U0140W024

Open circuit
- Control circuit (HO2S connector terminal C and ignition switch (IG1) circuit through common connector)
- GND circuit (HO2S connector terminal D and PCM connector terminal 94 (Front), 93 (Rear))

Short circuit
- Control circuit (HO2S connector terminal C and ignition switch (IG1) circuit through common connector to GND)
- GND circuit (HO2S connector terminal D and PCM connector terminal 94 (Front), 93 (Rear) to GND)

5. Reconnect the HO2S connector.

EGR BOOST SENSOR INSPECTION [ZM]

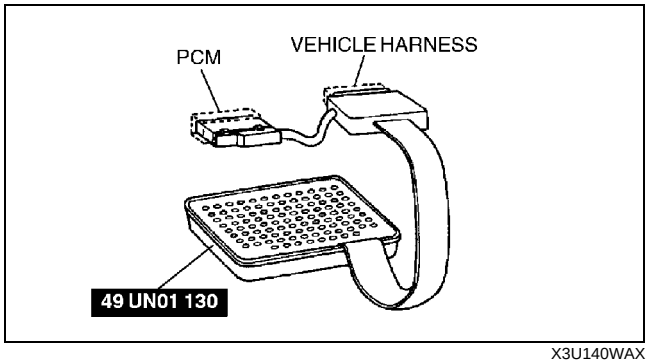
A3U014018211W02

Note
- Perform the following test only when directed.
- The following vacuum values are indicated by relative pressure from barometric pressure.

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
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—110 kgf·cm, 69.5—95.4 in·lbf}

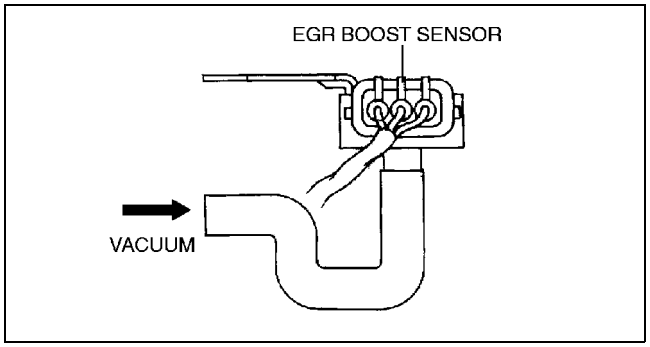
Caution
- **Do not apply vacuum outside of the specified limits, or EGR boost sensor will be damaged.**



X3U140WAX

4. Turn the ignition switch to ON.

5. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.



X3U140WAY

Note
- The output voltage varies with the measuring condition.

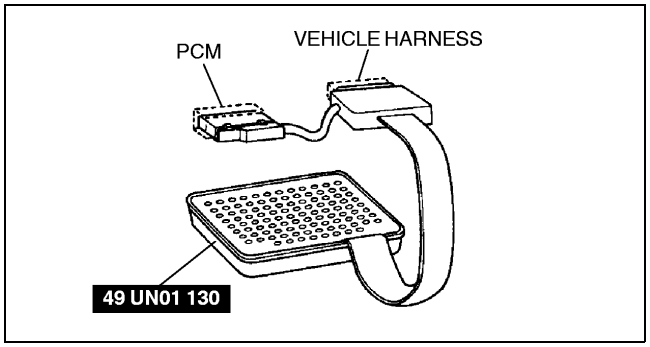
6. Verify that the PCM terminal 34 voltage is within specification.

Measuring condition:
Input voltage: 4.5—5.5 V
Ambient temperature: 10—50 °C {50—122 °F}
Sea level: –20—3,000 m {–656—9,840 ft}
Specification
BARO V variation: 2.3—4.7 V

7. Apply vacuum of **–26.6 kPa {–200 mmHg, –7.85 inHg}** to EGR boost sensor and verify that PCM 34 terminal voltage from Step 6 is within specification.
   - If not as specified, carry out the “Circuit Open/Short Inspection”.

Specification
BARO V variation: 0.8—1.3 V

Circuit Open/Short Inspection
1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.



X3U140WBN

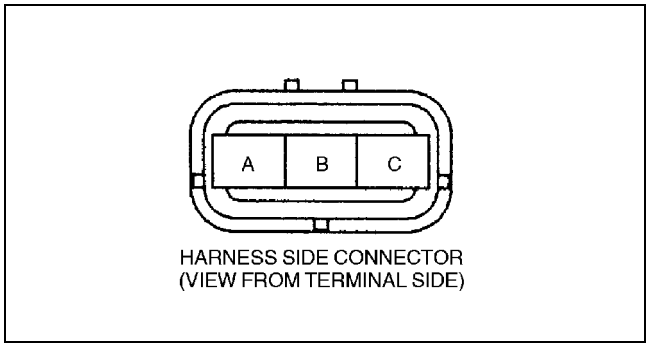
Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the EGR boost sensor.

Open circuit
- EGR boost (Barometric pressure) signal circuit (EGR boost sensor connector terminal A and PCM connector terminal 34)
- Constant voltage circuit (EGR boost sensor connector terminal C and PCM connector terminal 90)
- GND circuit (EGR boost sensor connector terminal B and PCM connector terminal 91)

Short circuit
- EGR boost (Barometric pressure) signal circuit (EGR boost sensor connector terminal A and PCM connector terminal 34)
- Constant voltage circuit (EGR boost sensor connector terminal C and PCM connector terminal 90)

5. Reconnect the EGR boost sensor connector.



Y3U140WA7

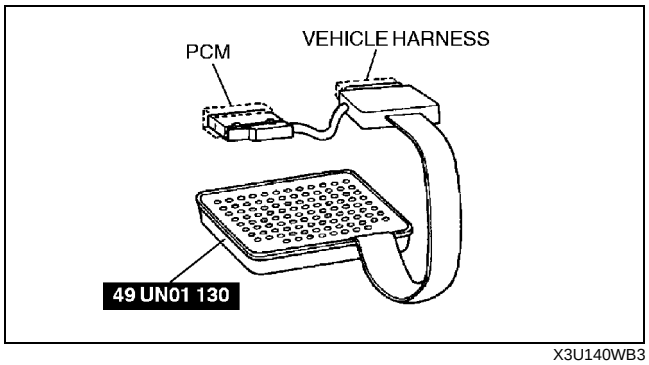
FUEL TANK PRESSURE SENSOR INSPECTION [ZM]

A3U014018212W02

Note
- Perform the following test only when directed.
- The following vacuum values are indicated by relative pressure from barometric pressure.

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
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—110 kgf·cm, 69.5—95.4 in·lbf}

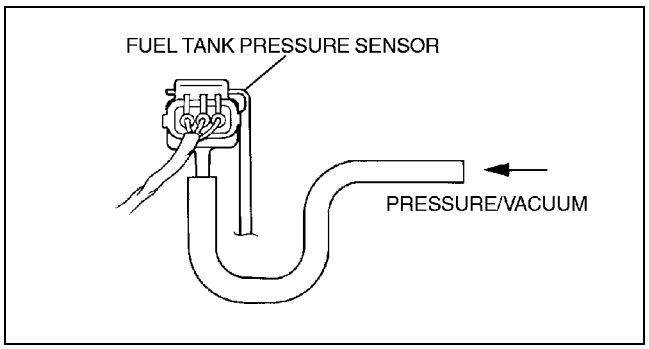


X3U140WB3

Caution
- **Do not apply vacuum outside of the specified limits, or the fuel tank pressure sensor will be damaged.**

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.



X3U140WB4

6. Decrease the applied pressure from **+.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, replace the fuel tank pressure sensor.
   - If fuel tank pressure sensor is okay, but PCM terminal 62 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

Specification

Applied vacuum	Output voltage (V)*
–6.66 kPa {–50 mmHg, –1.97 inHg}	0.45—0.55
0 kPa {0 mmHg, 0 inHg}	2.25—2.75
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.05—4.95

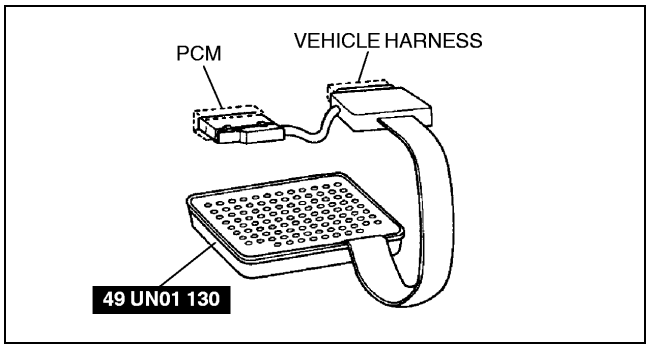
* : Measuring condition is as follows.

Input voltage: 5.0 V
Barometric pressure: 101.3 kPa {760 mmHg, 29.9 inHg} (Absolute pressure)
Barometric temperature: 30—100 °C {0—182 °F}

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

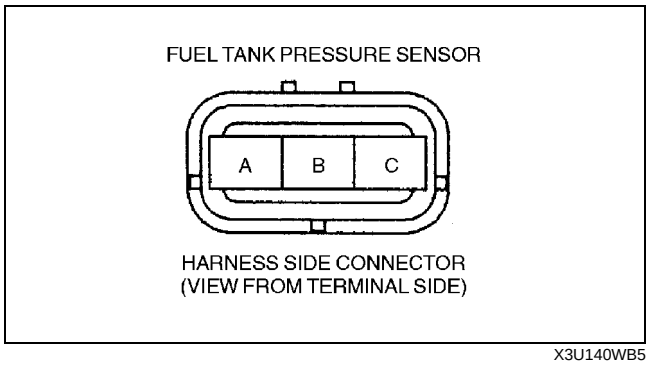


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the fuel tank pressure sensor.

   Open circuit
   - Fuel tank pressure signal circuit (Fuel tank pressure sensor connector terminal B and PCM connector terminal 62)
   - Constant voltage circuit (Fuel tank pressure sensor connector terminal C and PCM connector terminal 90)
   - GND circuit (Fuel tank pressure sensor connector terminal A and PCM connector terminal 91)

   Short circuit
   - Fuel tank pressure signal circuit (Fuel tank pressure sensor connector terminal B and PCM connector terminal 62)
   - Constant voltage circuit (Fuel tank pressure sensor connector terminal C and PCM connector terminal 90)
5. Reconnect the fuel tank pressure sensor connector.



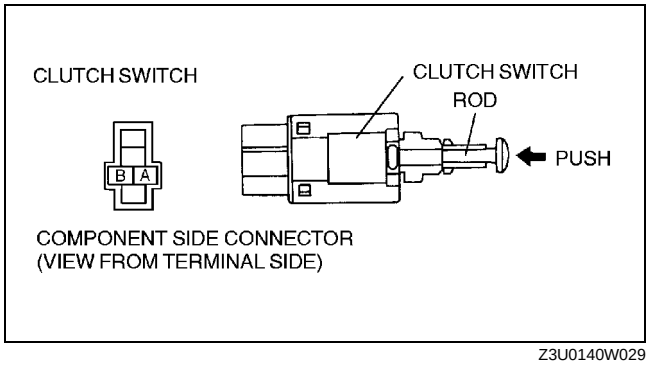
X3U140WB5

CLUTCH SWITCH INSPECTION [ZM]

A3U014018660W02

Note
- Perform the following test only when directed.

1. Verify that the clutch switch is installed properly.
2. Disconnect the negative battery cable.
3. Remove the clutch switch. (See 05–10–5 CLUTCH PEDAL REMOVAL/INSTALLATION.)
4. Inspect continuity between the clutch switch terminals A and B using an ohmmeter.
   - If not as specified, replace the clutch switch.
   - If the clutch switch is okay, but PID value or PCM terminal 6 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.



Z3U0140W029

○—○ : Continuity

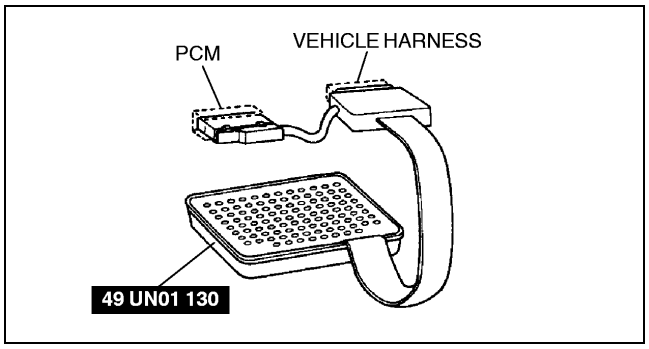
Condition	Terminal	
	A	B
The rod is pushed		
Except above	○	○

Z3U0140W030

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

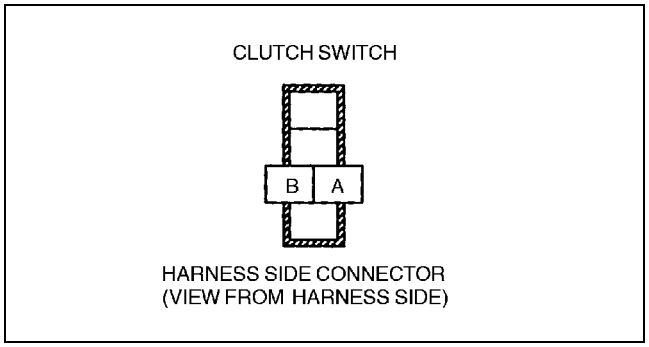


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the clutch switch.

   Open circuit
   - Signal circuit (Clutch switch connector terminal B and PCM connector terminal 6 through common connector)
   - GND circuit (Clutch switch connector terminal A and GND)

   Short circuit
   - Signal circuit (Clutch switch connector terminal B and PCM connector terminal 6 through common connector to GND)
5. Install the clutch switch.



Z3U0140W031

NEUTRAL SWITCH INSPECTION [ZM]

A3U014017640W02

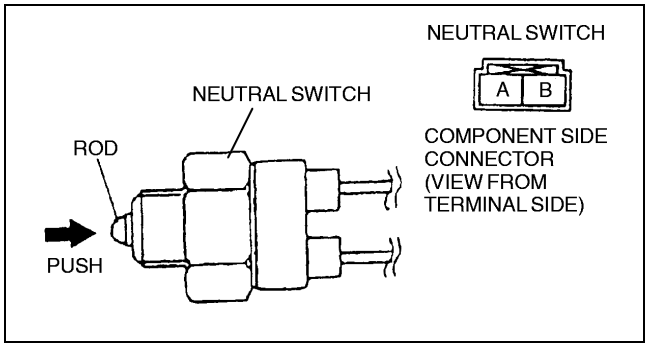
Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the neutral switch.
3. Inspect for continuity between the neutral switch terminals A and B using an ohmmeter.
   - If not as specified, replace the neutral switch.
   - If the neutral switch is okay, but PID value or PCM terminal 64 voltage is out of specification, carry out the “Circuit Open/ Short Inspection”.

○——○ : Continuity

Condition	Terminal	
	A	B
The rod is pushed	○	○
Except above		

X3U140WBD

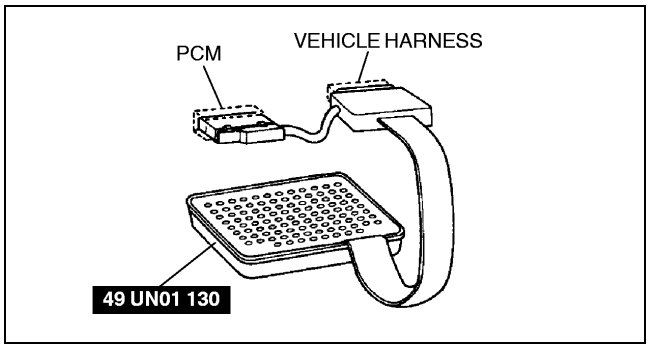


X3U140WBC

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

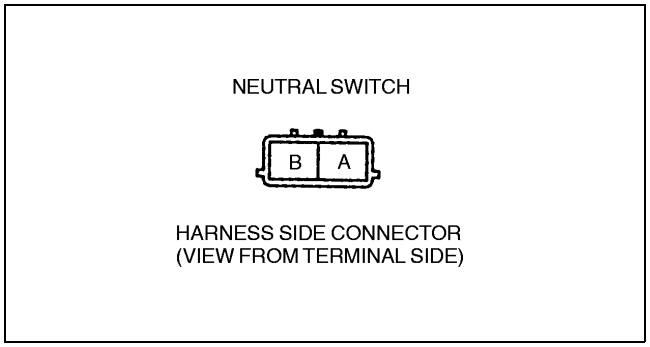


X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the neutral switch.

   Open circuit
   - Signal circuit (Neutral switch connector terminal A and PCM connector terminal 64 through common connector)
   - GND circuit (Neutral switch connector terminal B and GND through common connector)

   Short circuit
   - Signal circuit (Neutral switch connector terminal A and PCM terminal 64 through common connector to GND)
5. Install the neutral switch.



X3U140WBE

POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [ZM]

A3U014032230W02

Continuity Inspection

Note
- Perform the following test only when directed.

1. Inspect the following if the power steering is inoperative. (See 06–12–3 POWER STEERING FLUID INSPECTION.)
   - Power steering fluid level
   - Power steering fluid leakage
   - Power steering fluid pressure
2. Disconnect the PSP switch connector.
3. Start the engine.
4. Inspect for continuity between the PSP switch terminal and GND using an ohmmeter.
   - If not as specified, replace the PSP switch.
   - If the PSP switch is okay, but PID value or PCM terminal 31 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

○—○ : Continuity

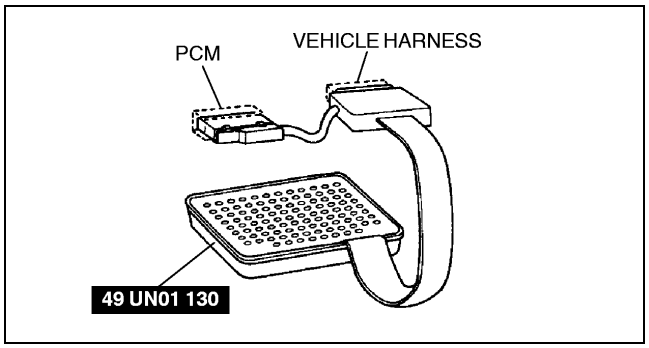
Condition	Terminal	GND
Steering wheel is in straight ahead position		
Steering wheel is fully turned	○	○

X3U140WBF

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WBN

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   - PSP signal circuit (PSP switch connector terminal and PCM connector terminal 31 through common connector)
   - GND circuit (PSP switch body and GND)
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the PSP switch.

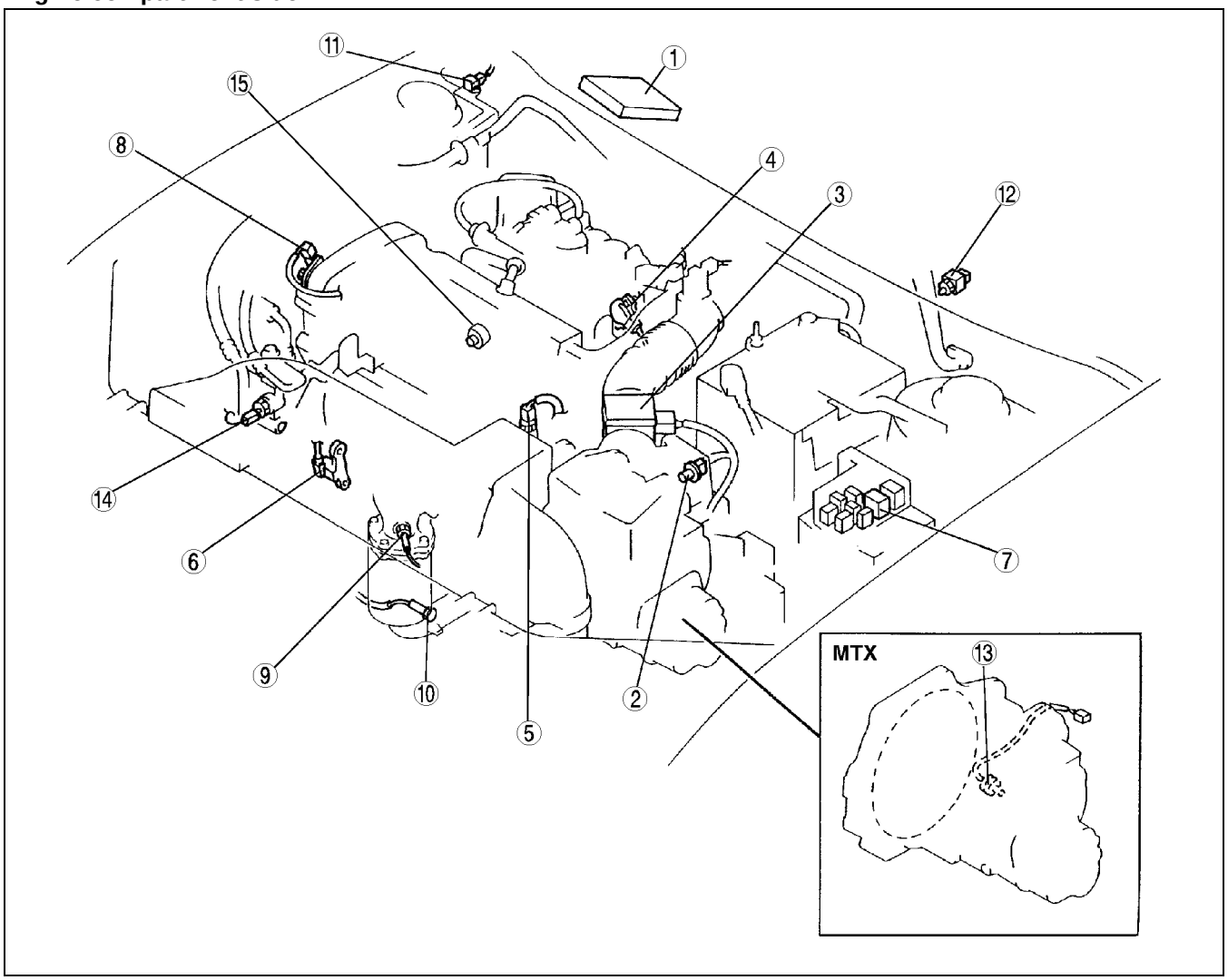
   Short circuit
   - PSP signal circuit (PSP switch connector terminal and PCM connector terminal 31 through common connector to GND)
5. Reconnect the PSP switch connector.

01–40B CONTROL SYSTEM [FS]

CONTROL SYSTEM COMPONENT LOCATION INDEX [FS]

A3U014018881W01

Engine compartment side

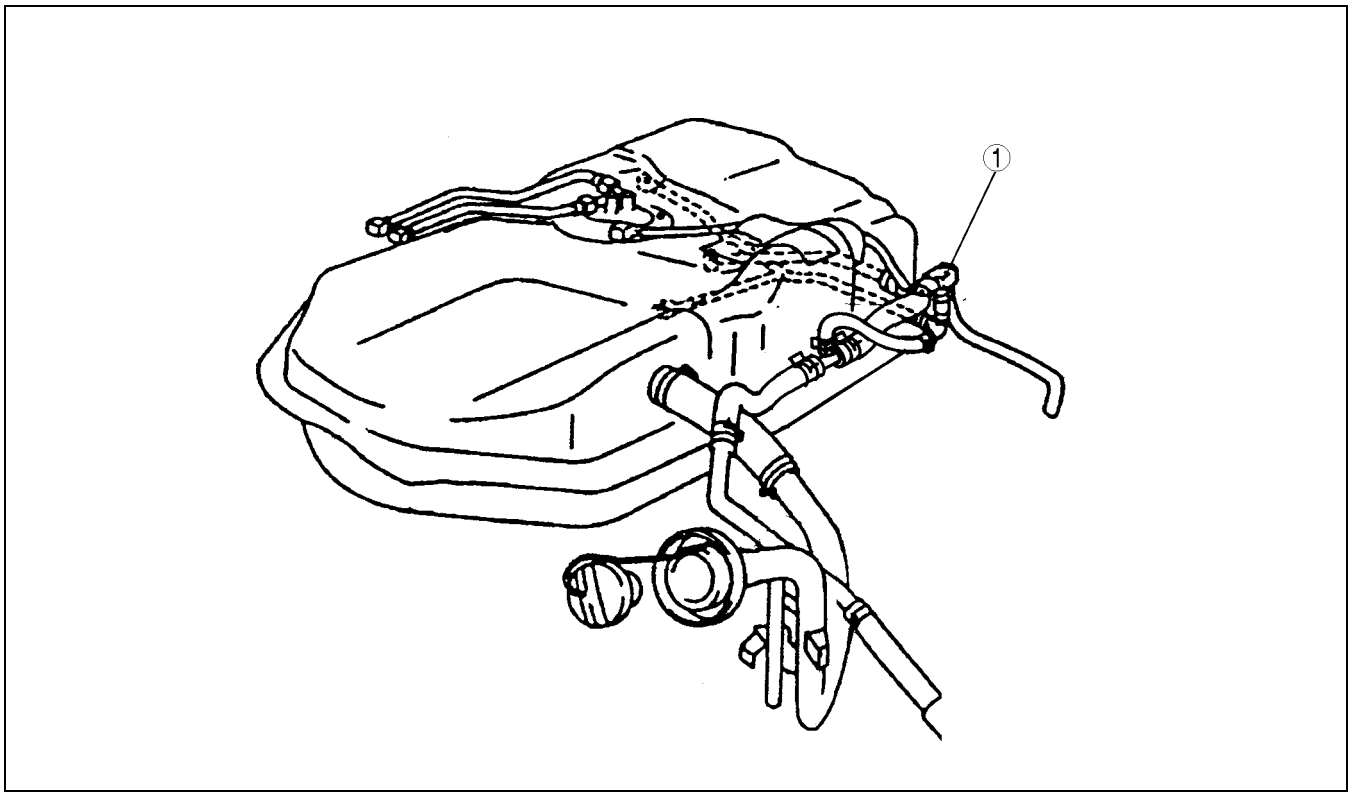


Z3U0140W101

1	PCM (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].) (See 01–40B–7 PCM INSPECTION [FS])
2	Intake air temperature (IAT) sensor (See 01–40B–27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [FS])
3	Mass air flow (MAF) sensor (See 01–40B–28 MASS AIR FLOW (MAF) SENSOR INSPECTION [FS])
4	Throttle position (TP) sensor (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS])
5	Engine coolant temperature (ECT) sensor (See 01–40B–30 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/ INSTALLATION [FS]) (See 01–40B–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [FS])
6	Crankshaft position (CKP) sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS]) (See 01–40B–34 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [FS])
7	Main relay (See 09–21–5 RELAY INSPECTION)
8	Camshaft position (CMP) sensor (See 01–40B–34 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [FS]) (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS])
9	Heated oxygen sensor (front) (See 01–40B–37 HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS])
10	Heated oxygen sensor (rear) (See 01–40B–37 HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS])
11	EGR boost sensor (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS])
12	Clutch switch (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS])
13	Neutral switch (See 01–40B–43 NEUTRAL SWITCH INSPECTION [FS])
14	Power steering pressure (PSP) switch (See 01–40B–44 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [FS])

15	Knock sensor (See 01–40B–36 KNOCK SENSOR INSPECTION [FS])

Fuel tank side

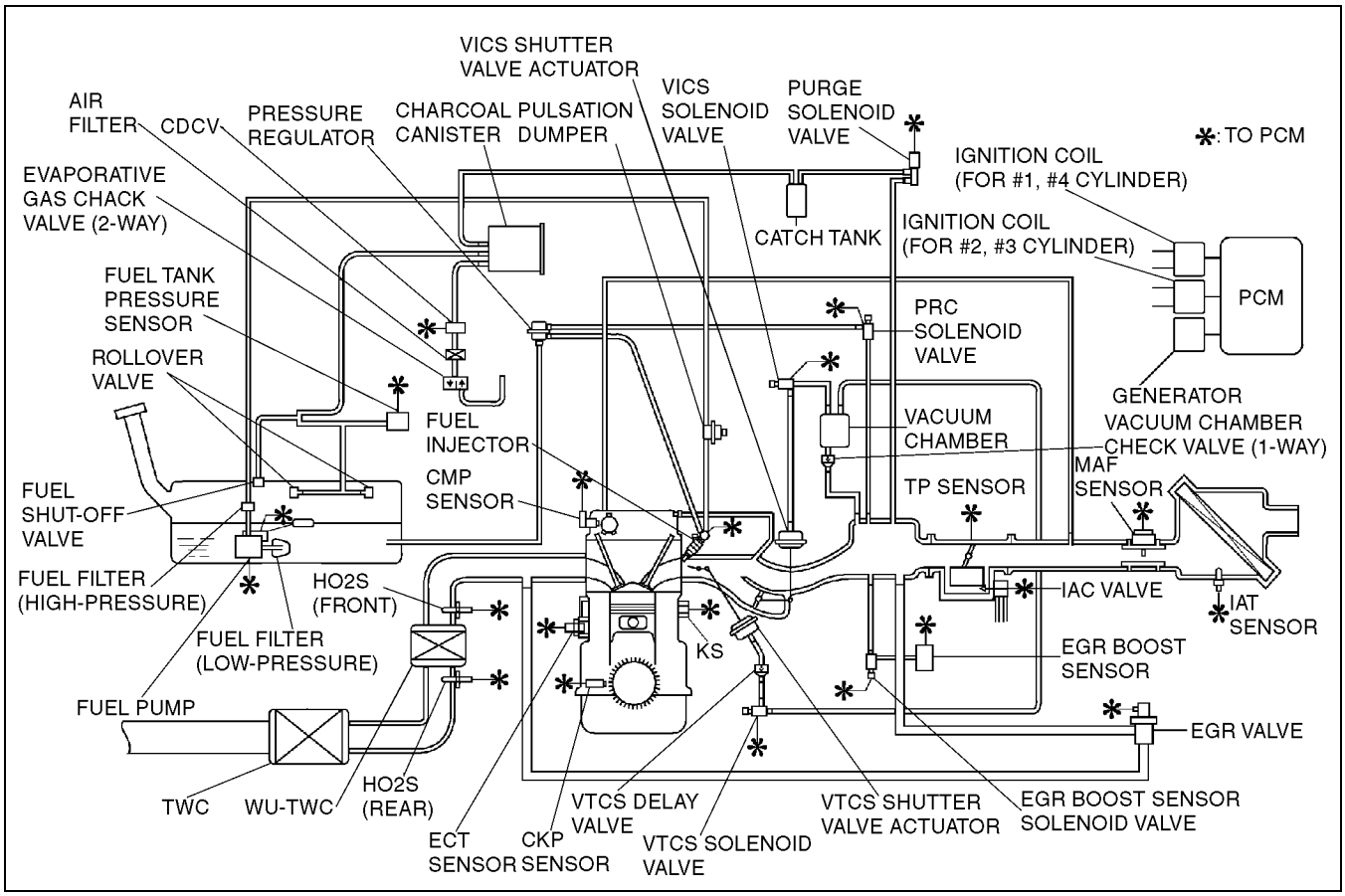


Z3U0140W002

1	Fuel tank pressure sensor (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS])

CONTROL SYSTEM DIAGRAM [FS]

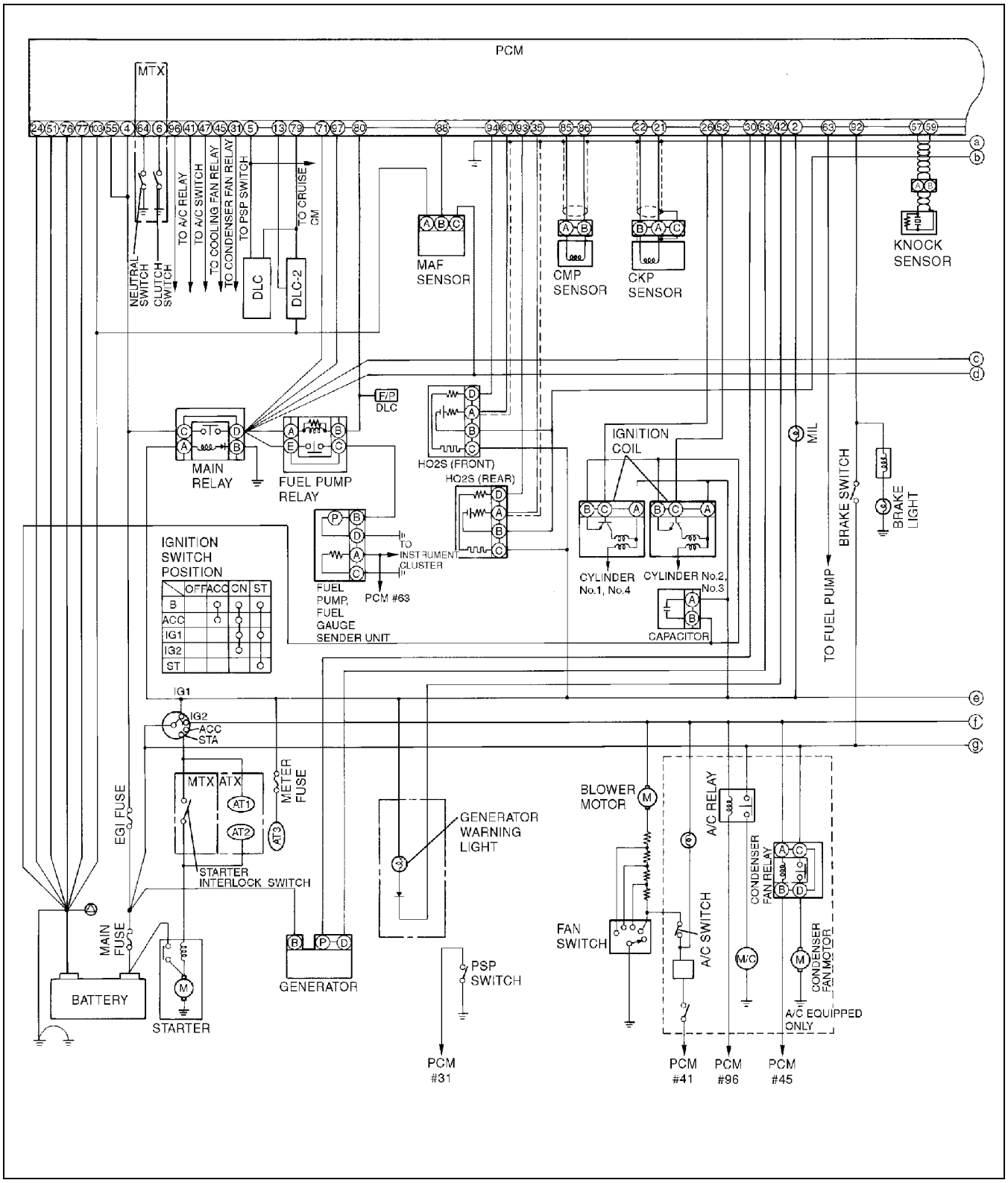
A3U014018881W02



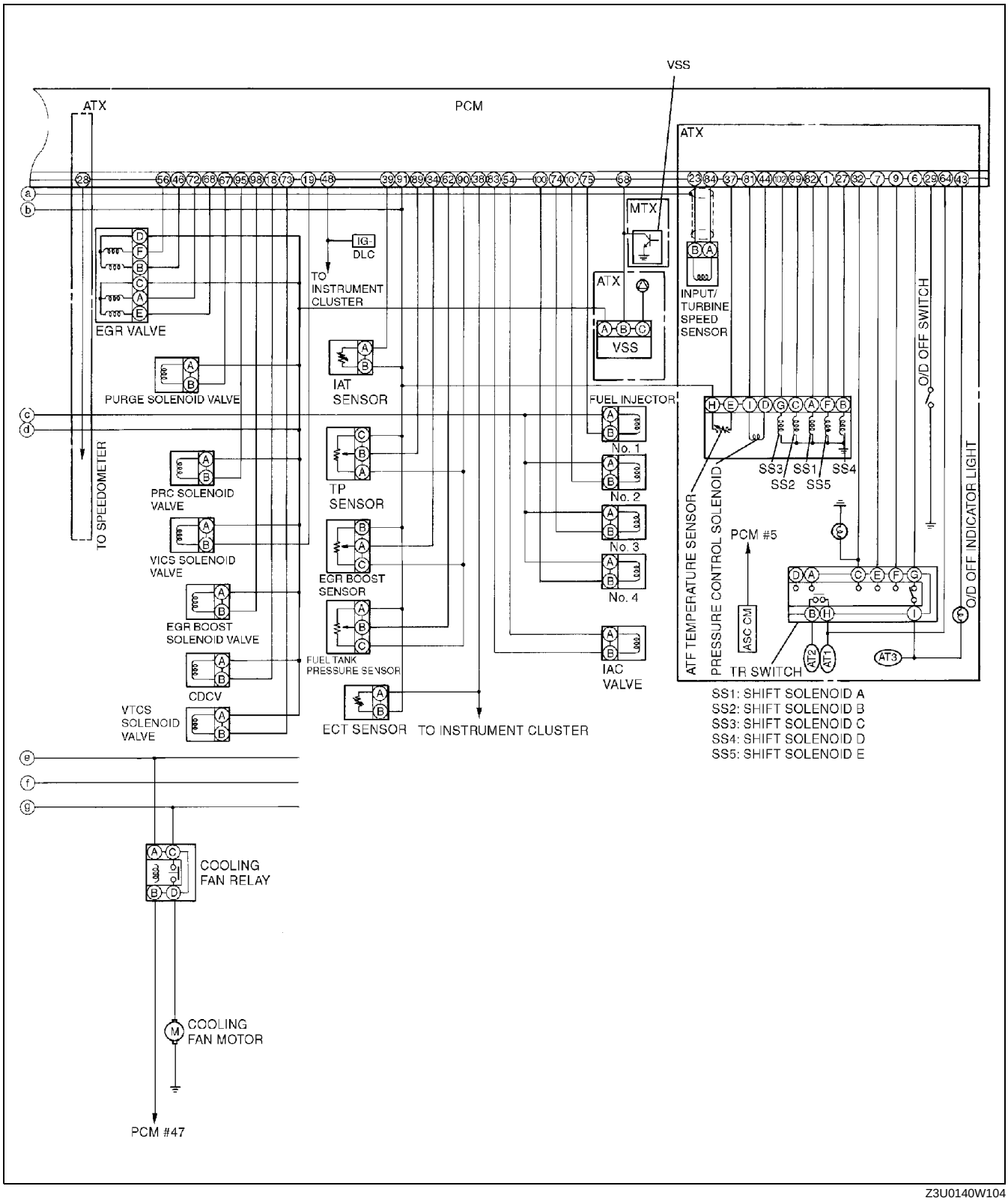
Z3U0140W102

CONTROL SYSTEM WIRING DIAGRAM [FS]

A3U014018881W03



A3U0140W001



Z3U0140W104

PCM REMOVAL/INSTALLATION [FS]

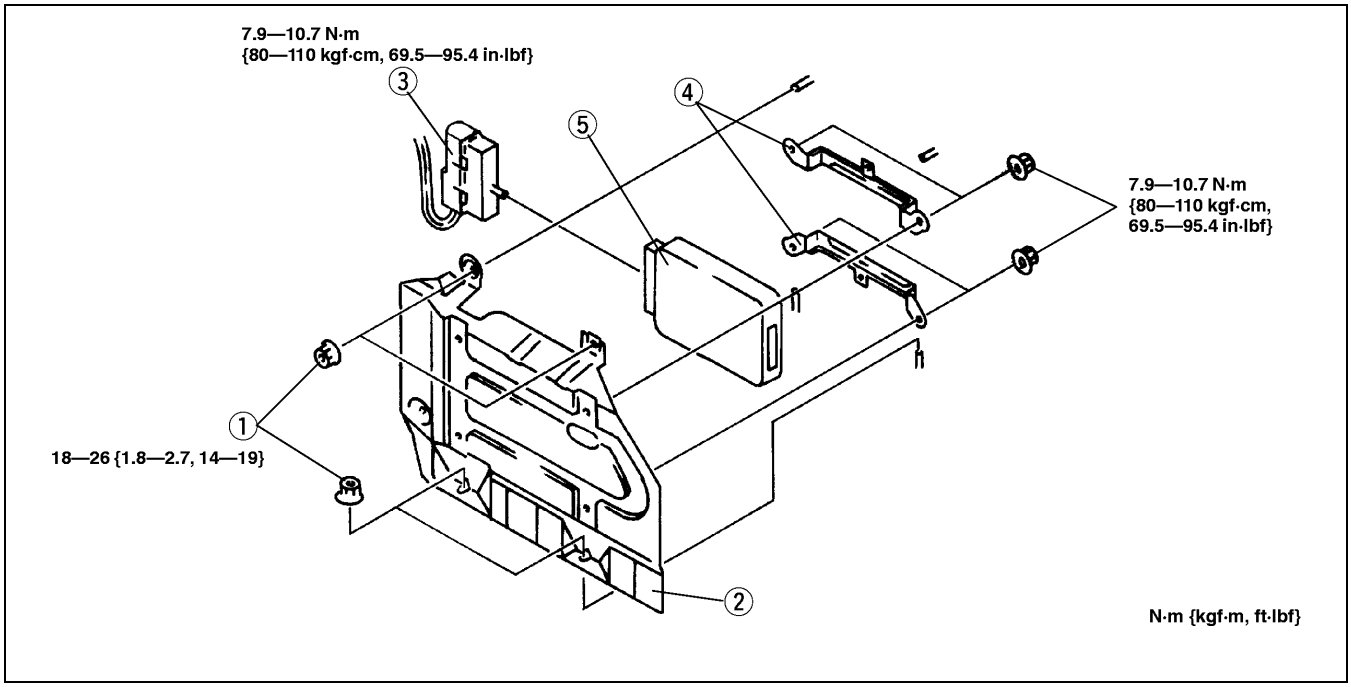
A3U014018880W01

1. Disconnect the negative battery cable.
2. Remove the front passenger side scuff plate.
3. Remove the front passenger side trim.
4. Partially peel off the floor covering from the front of the passenger's side.

Warning

- **The edge of the PCM plate is sharp. Be careful not to cut yourself when handling the PCM plate.**

5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.



X3U140WD1

1	Nut
2	PCM panel
3	PCM connector

4	Bracket
5	PCM

PCM INSPECTION [FS]

A3U014018880W02

Caution

- **The PCM terminal voltages vary with change in measuring conditions and vehicle conditions. Always complete the inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, diagnosis will fail.**

PCM Inspection Using the SST (WDS or equivalent)

Note

- PIDs for the following parts are not available on this model. Go to the appropriate part inspection page.
  - — CMP sensor (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS].)
  - — Main relay (See 09–21–5 RELAY INSPECTION.)

1. Connect the WDS or euivalent to the DLC-2. (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS].)
2. Turn the ignition switch on.
3. Measure the value.
   - If the value is not within the specification, follow the instruction in Action column.

PID/DATA MONITOR table (Reference)

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
ACCS (A/C relay)	ON/OFF	A/C operating: ON Ignition switch ON: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW Inspect A/C relay (See 09–21–5 RELAY INSPECTION)	96
ACSW (A/C switch)	ON/OFF	A/C switch and fan switch ON: ON A/C switch OFF: OFF	Inspect A/C switch (See 07–40–11 CLIMATE CONTROL UNIT INSPECTION)	41
ALTF (Generator field coil control duty value)	%	Ignition switch ON: 0% Idle: 0—100% Generator operating → E/L ON: Duty value rise	Inspect following PIDs: IAT, RPM, VPWR, B+2, ALTT V Inspect generator (See 01–17–3 GENERATOR INSPECTION)	53
ALTT V (Generator output voltage)	V	Ignition switch ON: 0 V Idle: 14—16 V	Inspect following PIDs: IAT, RPM, VPWR, B+2, ALTF Inspect generator (See 01–17–3 GENERATOR INSPECTION)	30
ARPMDES (Target engine speed)	rpm	Idle (No load): 650—750 rpm	Perform “On-Board Diagnostic Test” (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS])	—
BARO (Barometric pressure)	kPa / Hg	Below 400 m {0.25 mile} above sea level: 99—103 kPa {29—30 inHg}	Inspect EGR boost sensor (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS])	34
	V	Below 400 m {0.25 mile} above sea level: 4.1—4.3 V	Inspect EGR boost sensor (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS])	34
BOO (Brake switch)	ON/OFF	Brake pedal depressed: ON Brake pedal released: OFF	Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION)	92
B+2 (PCM back-up positive voltage)	V	Constant: B+	Inspect battery (See 01–17–1 BATTERY INSPECTION)	4
CDCV (Canister drain cut valve)	ON/OFF	Ignition switch ON: OFF Idle: OFF	Inspect CDCV (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	18
CHRGLP (Generator warning light)	ON/OFF	Ignition switch ON: ON Idle: OFF	Inspect generator warning light	42
CPP*2 (Clutch switch)	ON/OFF	Clutch pedal depressed: ON Clutch pedal released: OFF	Inspect clutch switch (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS])	6
ECT (Engine coolant temperature)	°C / °F	ECT 20 °C {68 °F}: 20 °C {68 °F} ECT 60 °C {140 °F}: 60 °C {140 °F}	Inspect ECT sensor (See 01–40B–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [FS])	38
	V	ECT 20 °C {68 °F}: 2.9—3.1 V After warm up: 0.2—1.0 V	Inspect ECT sensor (See 01–40B–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [FS])	38
EGRCHK (EGR boost sensor solenoid valve)	ON/OFF	Ignition switch ON: OFF Idle: OFF	Inspect EGR boost sensor solenoid valve (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION)	98
EVAPCP (Purge solenoid valve duty value)	%	Ignition switch ON: 0% Idle: 0%	Inspect following PIDs: IAT, RPM, ECT, MAF, TP, BARO, O2S11, VPWR Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION)	67
FAN2 (Condenser fan control)	ON/OFF	A/C operated: ON Others: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW, TEST Inspect condenser fan relay (See 09–21–5 RELAY INSPECTION)	45

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
FAN3 (Cooling fan control)	ON/OFF	Cooling fan operating (ECT above 97 °C {207 °F}) or terminal TEN grounded and throttle valve open or A/C relay on: ON Others: OFF	Inspect following PIDs: RPM, TP, ECT, ACSW, TEST Inspect cooling fan relay (See 09–21–5 RELAY INSPECTION)	47
FP (Fuel pump relay)	ON/OFF	Ignition switch ON: OFF Idle: ON Cranking: ON	Inspect following PID: RPM Inspect fuel pump relay (See 09–21–5 RELAY INSPECTION)	80
FPRC (PRC solenoid valve)	ON/OFF	Ignition switch ON: OFF Idle: OFF After hot start: ON	Inspect PRC solenoid valve (See 01–14–31 PRC SOLENOID VALVE INSPECTION)	95
FTL V (Fuel tank level signal voltage)	V	Idle condition • Fuel tank full: 1.0—1.5 V • Fuel tank empty: 4.4—4.8 V • Fuel tank half: 2.8—3.4 V **Note** • The voltages above will be measured when the battery positive voltage is between 12V and 14 V.	Inspect fuel gauge sender unit (See 09–22–4 Fuel Gauge)	63
FTP (Fuel tank pressure)	kPa / Hg	Ignition switch ON: 0—1.0 kPa {0—0.3 inHg} Idle: 0—1.0 kPa {0—0.3 inHg} **Note** • The pressure and output voltage varies according to the fuel temperature.	Inspect fuel tank pressure sensor (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS])	62
	V	Ignition switch ON: 2.5—2.8 V Idle: 2.5—2.8 V Fuel tank pressure 0 kPa {0 mmHg, 0 inHg}: 2.5 V Fuel tank pressure 1 kPa {7.5 mmHg, 0.3 inHg}: 2.8 V **Note** • The pressure and output voltage vary according to the fuel temperature.	Inspect fuel tank pressure sensor (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS])	62
FTP1SV	kPa	Perform “DTC INSPECTION”. (See 01–02B–15 DTC TABLE [FS])		—
FTP2SV	kPa			
FUELPW1 (Fuel injection duration)	ms	Ignition switch ON: 0 msec Idle: 2.5—4.0 msec	Inspect following PIDs: MAF, IAT, RPM, TP, ECT, PNP, CPP, O2S11, PSP, BOO, ACSW, VPWR Inspect CMP sensor (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS])	74, 75, 100, 101
GEAR (Gear position)	1/2/3/4	1GR: 1 2GR: 2 3GR: 3 4GR: 4	Inspect following PIDs: SSA/SS1, SSB/SS2, SSC/SS3, SSD/SS4, SSE/SS5	1, 27, 82, 99, 102
HTR11 (HO2S heater (Front))	ON/OFF	Ignition switch ON (engine stopped): OFF Approx. 15 seconds after engine start with ECT 20—30 °C {68—86°F}*: ON Others: ON ⇔ OFF	Inspect following PIDs: ECT V, MAF V. Inspect HO2S heater (See 01–40B–38 HO2S Heater (Front and Rear) Resistance Inspection)	94
HTR12 (HO2S heater (Rear))	ON/OFF	ECT above 70 °C {158 °F}: ON HO2S (Rear) heater is malfunctioning: OFF	Inspect following PIDs: ECT V, MAF V Inspect HO2S heater (See 01–40B–38 HO2S Heater (Front and Rear) Resistance Inspection)	93

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
IAC (IAC valve)	%	Ignition switch ON: 0% Idle: 25—35%	Inspect following PIDs: IAT V, RPM, ECT V, MAF V, TP V, NL SW, CLT SW, PSP SW, A/C SW, TEN Inspect IAC valve (See 01–13B–8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS])	54, 83
IAT (Intake air temperature)	°C / °F	IAT 20 °C {68 °F}: 20 °C {68 °F}	Inspect IAT sensor (See 01–40B–27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [FS])	39
	V	IAT 20 °C {68 °F}: 2.3—2.4 V IAT 30 °C {86 °F}: 1.7—1.9 V	Inspect IAT sensor (See 01–40B–27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [FS])	39
IMRC (VTCS solenoid valve)	ON/OFF	ECT above 65 °C {149 °F} while idling: OFF ECT below 65 °C {149 °F} and engine speed at 1,500 rpm: ON	Inspect VTCS solenoid valve (See 01–13B–15 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS])	19
IVC (VICS solenoid valve)	ON/OFF	Engine speed above 4,750 rpm: OFF Engine speed below 4,750 rpm: ON	Inspect VICS solenoid valve (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS])	—
LOAD (Load)	%	Idle: 13—20% (MTX), 14—22% (ATX) Engine speed at 2,500 rpm: 11—17% (MTX), 13—19% (ATX)	Perform “On-Board Diagnostic Test” (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS])	—
LONGFT1 (Long fuel trim)	%	Idle: –5—5%	Perform “On-Board Diagnostic Test” (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS])	—
LPS*1 (Pressure control solenoid)	A	Change current value according to throttle opening angle	Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION)	44, 81
MAF (Intake MAF)	gm/s	Idle:1.6—2.2 g/s (MTX), 1.6—2.4 g/s (ATX) Engine speed at 2,500 rpm: 5.1—6.5 g/s (MTX), 5.6—7.2 g/s (ATX)	Inspect MAF sensor (See 01–40B–28 MASS AIR FLOW (MAF) SENSOR INSPECTION [FS])	88
	V	Ignition switch ON: 0.6—2.0 V Idle: 0.8—2.2 V	Inspect MAF sensor (See 01–40B–28 MASS AIR FLOW (MAF) SENSOR INSPECTION [FS])	88
MIL (Malfunction indicator light)	ON/OFF	Ignition switch ON: ON DTC output: ON No DTC output: OFF	Inspect MIL	2
MODE1 (Readiness Function Code)	ON/OFF	RFC exists: ON No RFC: OFF	—	—
O2S11 (HO2S (Front))	V	Ignition switch ON: 0—1.0 V After warm up: 0—1.0 V Acceleration: 0.5—1.0 V Deceleration: 0—0.5 V	Inspect HO2S (See 01–40B–37 HO2S (Front and Rear) Voltage Inspection)	60
O2S12 (HO2S (Rear))	V	Ignition switch ON: 0—1.0 V Idle (After warm up): 0—1.0 V Idle (Engine cold): 0—0.5 V Accelerate: 0.5—1.0 V Decelerate: 0—0.5 V	Inspect HO2S (See 01–40B–37 HO2S (Front and Rear) Voltage Inspection)	35
PNP*1 (TR switch)	ON/OFF	P or N range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	64
PNP*2 (Neutral switch)	ON/OFF	Shift position at neutral: ON Others: OFF	Inspect neutral switch (See 01–40B–43 NEUTRAL SWITCH INSPECTION [FS])	64
PSP (PSP switch)	ON/OFF	Steering wheel is at straight ahead position: OFF Steering wheel is fully turned: ON	Inspect PSP switch (See 01–40B–44 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [FS])	31

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
RPM (Engine speed)	rpm	Idle: 650—750 rpm	Inspect CKP sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS])	21, 22
SEGRP (EGR valve (stepping motor) position)	step	Ignition switch ON: 0 step Idle: 0 step Cranking: 0—60 steps	Inspect following PIDs: ECT V, TP V. Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION)	46, 56, 68, 72
SHRTFT1 (Short fuel trim)	%	Idle: -10—10%	Perform “On-Board Diagnostic Test” (See 01–02B–7 ON-BOARD DIAGNOSTIC TEST [FS])	—
SPARKADV (Ignition timing)	BTDC	Idle: BTDC 6—18° Idle (Terminal TEN ground): BTDC 9—11°	Inspect following PIDs: MAF, IAT, RPM, TP, ECT, PSP, PNP, CPP, ACSW, TEST Perform Engine tune-up. (See 01–10B–25 ENGINE TUNE-UP [FS])	26, 52
SSA/SS1*1 (Shift solenoid A)	%	Fourth gear: 100% Others: 0%	Inspect shift solenoid A (See 05–17–28 SOLENOID VALVES INSPECTION)	82
SSB/SS2*1 (Shift solenoid B)	%	First gear: 100% Others: 0%	Inspect shift solenoid B (See 05–17–28 SOLENOID VALVES INSPECTION)	99
SSC/SS3*1 (Shift solenoid C)	%	First gear: 100% Second gear: 100% N position: ON Others: 0%	Inspect shift solenoid C (See 05–17–28 SOLENOID VALVES INSPECTION)	102
SSD/SS4*1 (Shift solenoid D)	ON/OFF	P or N position: ON 1 range: ON Others: OFF	Inspect shift solenoid D (See 05–17–28 SOLENOID VALVES INSPECTION)	27
SSE/SS5*1 (Shift solenoid E)	ON/OFF	TCC operating: ON 1 range: ON Others: OFF	Inspect shift solenoid E (See 05–17–28 SOLENOID VALVES INSPECTION)	1
TCIL (O/D OFF indicator light)	ON/OFF	O/D OFF mode: ON Others: OFF	Inspect O/D OFF indicator light	43
TCS (O/D OFF switch)	ON/OFF	O/D OFF switch pressed: ON Others: OFF	Inspect O/D OFF switch (See 05–17–19 O/D OFF SWITCH INSPECTION)	29
TEST (TEN terminal (DLC))	ON/OFF	Open terminal TEN: OFF Short terminal TEN: ON	Inspect DLC TEN terminal and PCM connector terminal 5	5
TFT*1 (Transaxle fluid temperature)	°C / °F	TFT 20 °C {68 °F}: 20 °C {68 °F} TFT 130 °C {266 °F}: 130 °C {266 °F}	Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)	37
TFTV*1 (TFT sensor signal voltage)	V	TFT 20 °C {68 °F}: 3.4—3.6 V TFT 130 °C {266 °F}: 0.4—0.5 V	Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)	37
TPOD*1 (TP)	%	CTP: 0% WOT: 100%	Inspect TP sensor (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS])	89
TP (TP sensor signal voltage)	V	CTP: 0.1—1.1 V WOT: 3.0—4.6 V	Inspect TP sensor (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS])	89
TRL*1 (TR switch [1range])	ON/OFF	1 range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	7
TROD*1 (TR switch [D range])	ON/OFF	D range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	6

Monitor item (Definition)	Unit/ Condition		Condition/Specification (Reference)	Action	PCM terminal
TRR*1 (TR switch [R position])	ON/OFF		R position: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	32
TRD*1 (TR switch [2range])	ON/OFF		2 range: ON Others: OFF	Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION)	9
TSS*1 (Input/turbine speed signal)	rpm		Ignition switch ON: 0 rpm Idle: 650—750 rpm	Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION)	23, 84
VPWR (Battery positive voltage)	V		Ignition switch ON: B+	Inspect main relay (See 09–21–5 RELAY INSPECTION) Inspect battery (See 01–17–1 BATTERY INSPECTION)	71, 97
VSS (Vehicle speed)	km/h	mph	Vehicle speed 20 km/h {12.5 mph}: 20 km/h {12.5 mph} Vehicle speed 40 km/h {25 mph}: 40km/h {25 mph}	Inspect VSS MTX: (See 09–22–4 Speedometer) ATX: (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX])	58

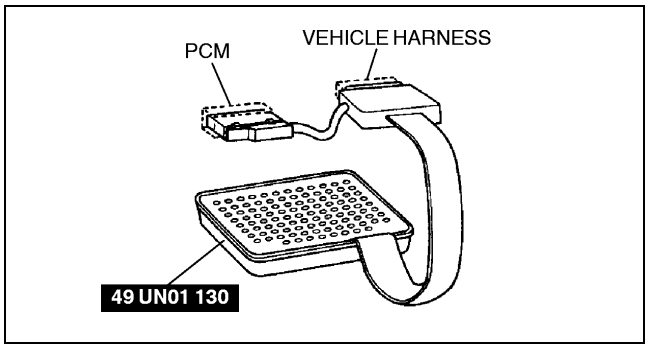
*1 : ATX only
*2 : MTX only

PCM Inspection Using the SST (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.
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, inspect the related system(s), wiring harnesses and connector(s) referring to the action column in the terminal voltage table.



X3U140WA2

Terminal voltage table (Reference)

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
1*1	Shift solenoid E control	Shift solenoid E	Idle (P position)		Below 1.0	• Inspect shift solenoid E (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
			1 range (1GR)		B+	
2	MIL control	MIL (in instrument cluster)	Ignition switch ON		Below 1.0	• Inspect MIL • Inspect related harness
			Idle		B+	
3	—	—	—		—	—
4	B+ monitor	Battery	Under any condition		B+	• Inspect battery (See 01–17–1 BATTERY INSPECTION) • Inspect EGI fuse • Inspect related harness
5	Diagnostic test mode	DLC terminal TEN	Ignition switch ON	Open terminal TEN	B+	• Inspect related harness
				Short to ground terminal TEN	Below 1.0	
6	Clutch operation (MTX)	Clutch switch	Clutch pedal depressed		Below 1.0	• Inspect clutch switch (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS]) • Inspect related harness
			Clutch pedal released		B+	
	D range (ATX)	TR switch (terminal G)	Ignition switch ON	Selector lever is at D range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other than D range	Below 1.0	
7*1	1 range	TR switch (terminal E)	Ignition switch ON	Selector lever is at 1 range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then 1 range	Below 1.0	
8	—	—	—		—	—
9*1	2 range	TR switch (terminal F)	Ignition switch ON	Selector lever is at 2 range	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then 2 range	Below 1.0	
10	—	—	—		—	—
11	—	—	—		—	—
12	—	—	—		—	—
13	EPROM flashing	DLC-2 terminal FEPS	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible.			• Inspect related harness
14	—	—	—		—	—
15	—	—	—		—	—
16	—	—	—		—	—
17	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
18	CDCV control	CDCV	Ignition switch ON		B+	• Inspect CDCV (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION) • Inspect related harness
			Diagnosis executed (while on-board device control is carried out)		Below 1.0	
19	VICS control	VICS solenoid valve	Engine speed: above 4,750 rpm		B+	• Inspect VICS solenoid valve (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS]) • Inspect related harness
			Engine speed: below4,750 rpm		Below 1.0	
20	—	—	—		—	—
21	NE (+)	CKP sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect CKP sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS]) • Inspect related harness
22	NE (–)	CKP sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect CKP sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS]) • Inspect related harness
23*1	Input/turbine speed (–)	Input/turbine speed sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION) • Inspect related harness
24	GND	GND	Under any condition		Below 1.0	• Inspect related harness
25	—	—	—		—	—
26	IGT1	Ignition coil (No. 1, 4 cylinders)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect ignition coil (See 01–18–2 IGNITION COIL INSPECTION) • Inspect related harness
27*1	Shift solenoid D control	Shift solenoid D	Idle	Selector lever is at P, N position and 1 range	B+	• Inspect shift solenoid D (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
				Others	Below 1.0	
28*1	Vehicle speed output	Speedometer (in instrument cluster)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect speedometer (See 09–22–4 Speedometer) • Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
29*1	O/D OFF signal	O/D OFF switch	Ignition switch ON	O/D OFF switch pushed	Below 1.0	• Inspect O/D OFF switch (See 05–17–19 O/D OFF SWITCH INSPECTION) • Inspect related harness
				O/D OFF switch released	B+	
30	Generator output voltage	Generator (terminal P)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect generator (See 01–17–3 GENERATOR INSPECTION) • Inspect related harness
31	PSP	PSP switch	Ignition switch ON		B+	• Inspect PSP switch (See 01–40B–44 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [FS]) • Inspect power steering system • Inspect related harness
			Idle	Steering wheel at straight ahead position	B+	
				While turning steering wheel	Below 1.0	
32*1	R position	TR switch (terminal C)	Ignition switch ON	Selector lever is at R position	B+	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Selector lever is at other then R position	Below 1.0	
33	—	—	—		—	—
34	BARO/EGR boost	EGR boost sensor	Ignition switch ON (Barometric pressure at 102 kPa {765 mmHg, 30 inHg})		Approx. 4.0	• Inspect EGR boost sensor (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS]) • Inspect related harness
35	Catalytic converter efficiency	HO2S (Rear)	Ignition switch ON		Below 1.0	• Inspect HO2S (Rear) (See 01–40B–37 HO2S (Front and Rear) Voltage Inspection) • Inspect related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
36	—	—	—		—	—
37*1	TFT	TFT sensor	Ignition switch ON	TFT 20 °C {68 °F}	3—4	• Inspect TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION) • Inspect related harness
				TFT 130 °C {266 °F}	0.2—0.7	
38	ECT	ECT sensor	Ignition switch ON	ECT 20 °C {68 °F}	2.9—3.1	• Inspect ECT sensor (See 01–40B–31 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [FS]) • Inspect related harness
				After warm up	0.2—1.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
39	IAT	IAT sensor (integrated with MAF sensor)	Ignition switch ON	IAT 20 °C {68 °F}	2.3—2.4	• Inspect IAT sensor (See 01–40B–27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [FS]) • Inspect related harness
				IAT 30 °C {86 °F}	1.7—1.9	
40	—	—	—		—	—
41	A/C on signal	Refrigerant pressure switch	Idle	A/C switch and fan switch on	Below 1.0	• Inspect A/C switch (See 07–40–9 REFRIGERANT PRESSURE SWITCH INSPECTION) • Inspect related harness
				A/C switch off	B+	
42	Generator warning light control	Generator warning light (in instrument cluster)	Ignition switch ON		Below 1.0	• Inspect generator warning light • Inspect related harness
			Idle		B+	
43*1	O/D OFF indicator light signal	O/D OFF indicator light	Ignition switch ON	O/D OFF indicator light illuminates	Below 1.0	• Inspect O/D OFF indicator light • Inspect related harness
				O/D OFF indicator light does not illuminate	B+	
44*1	Pressure control solenoid control (+)	Pressure control solenoid	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
45	Condenser fan control	Condenser fan relay	Ignition switch ON		B+	• Inspect condenser fan relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Idle	Condenser fan operating	Below 1.0	
				Others	B+	
46	EGR valve #3 coil control	EGR valve (terminal B)	Ignition switch ON		B+	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		B+	
47	Cooling fan control	Cooling fan relay	Ignition switch ON		B+	• Inspect cooling fan relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Idle	Cooling fan operating	Below 1.0	
				Others	B+	
48	Engine speed	Tachometer (in instrument cluster), DLC terminal IG–	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect tachometer (See 09–22–4 Tachometer) • Inspect related harness
49	—	—	—		—	—
50	—	—	—		—	—
51	GND	GND	Under any condition		Below 1.0	• Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
52	IGT2	Ignition coil (No. 2, 3 cylinders)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect ignition coil (See 01–18–2 IGNITION COIL INSPECTION) • Inspect related harness
53	Generator field coil control	Generator (terminal D)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect generator (See 01–17–3 GENERATOR INSPECTION) • Inspect related harness
54	IAC (+)	IAC valve	Ignition switch ON		B+	• Inspect IAC valve (See 01–13B–8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS]) • Inspect related harness
			Idle (After warm up and E/L off)		B+	
55	Back-up power supply	Battery (positive terminal)	Under any condition		B+	• Inspect battery (See 01–17–1 BATTERY INSPECTION) • Inspect EGI fuse • Inspect related harness
56	EGR valve #4 coil control	EGR valve (terminal F)	Ignition switch ON		Below 1.0	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		Below 1.0	
57	Knocking	Knock sensor (+)	Ignition switch ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Below 1.0	• Inspect knock sensor (See 01–40B–36 KNOCK SENSOR INSPECTION [FS] • Inspect related harness
58	Vehicle speed	Speedometer (MTX)	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect VSS (See 09–22–4 Speedometer) • Inspect related harness
		VSS (ATX)				• Inspect VSS (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX]) • Inspect related harness
59	Knocking	Knock sensor (-)	Ignition switch ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Below 1.0	• Inspect knock sensor (See 01–40B–36 KNOCK SENSOR INSPECTION [FS] • Inspect related harness
60	HO2S (Front)	HO2S (Front)	Ignition switch ON		0—1.0	• Inspect HO2S (Front) (See 01–40B–37 HO2S (Front and Rear) Voltage Inspection) • Inspect related harness
			Idle	After warm up	0—1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
61	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
62	Fuel tank pressure	Fuel tank pressure sensor	Ignition switch ON	Fuel tank pressure 0 kPa {0 mmHg, 0 inHg}	Approx. 2.5	• Inspect fuel tank pressure sensor (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS]) • Inspect related harness
				Fuel tank pressure 1 kPa {7.5 mmHg, 0.3 inHg}	Approx. 2.8	
63	Fuel tank level	Fuel gauge sender unit	Full fuel		0.2—0.5	• Inspect fuel gauge sender unit (See 09–22–4 Fuel Gauge) • Inspect related harness
			Half fuel		2.0—2.8	
			Empty fuel		3.4—4.4	
64	Neutral position (MTX)	Neutral switch	Shift lever is at neutral position		Below 1.0	• Inspect neutral switch (See 01–40B–43 NEUTRAL SWITCH INSPECTION [FS]) • Inspect related harness
			Shift lever is not at neutral position		B+	
	Load/no load signal (ATX)	TR switch (terminal H)	Ignition switch ON	Selector lever is at P or N position	Below 1.0	• Inspect TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) • Inspect related harness
				Others	B+	
65	—	—	—		—	—
66	—	—	—		—	—
67	Purge control	Purge solenoid valve	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect purge solenoid valve (See 01–16–12 PURGE SOLENOID VALVE INSPECTION) • Inspect related harness
68	EGR valve #1 coil control	EGR valve (terminal E)	Ignition switch ON		Below 1.0	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		Below 1.0	
69	—	—	—		—	—
70	—	—	—		—	—
71	Power supply	Main relay	Ignition switch ON		B+	• Inspect main relay (See 09–21–5 RELAY INSPECTION) • Inspect EGI fuse • Inspect related harness
			Ignition switch OFF		Below 1.0	
72	EGR valve #2 coil control	EGR valve (terminal A)	Ignition switch ON		B+	• Inspect EGR valve (See 01–16–15 EGR VALVE INSPECTION) • Inspect related harness
			Idle		B+	
73	VTCS control	VTCS solenoid valve	ECT above 67.5 °C {154 °F} while idling		B+	• Inspect VTCS solenoid valve (See 01–13B–15 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS]) • Inspect related harness
			ECT below 67.5 °C {154 °F} and engine speed below 3,250 rpm		Below 1.0	

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
74	Fuel injection (#3)	Fuel injector No.3	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect fuel injector No.3 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
75	Fuel injection (#1)	Fuel injector No.1	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect fuel injector No.1 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
76	GND	GND	Under any condition	Below 1.0	• Inspect related harness
77	GND	GND	Under any condition	Below 1.0	• Inspect related harness
78	—	—	—	—	—
79	K-LINE (serial communication)	DLC terminal KLN	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible.		• Inspect related harness
80	Fuel pump control	Fuel pump relay	Ignition switch ON	B+	• Inspect fuel pump relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Cranking	Below 1.0	
			Idle	Below 1.0	
81*1	Pressure control solenoid control (–)	Pressure control solenoid	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect pressure control solenoid (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
82*1	Shift solenoid A control	Shift solenoid A	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect shift solenoid A (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
83	IAC (-)	IAC valve	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect IAC valve (See 01–13B–8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS]) • Inspect related harness
84*1	Input/turbine speed (+)	Input/turbine speed sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION) • Inspect related harness
85	SGC(+)	CMP sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))		• Inspect CMP sensor (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS]) • Inspect related harness

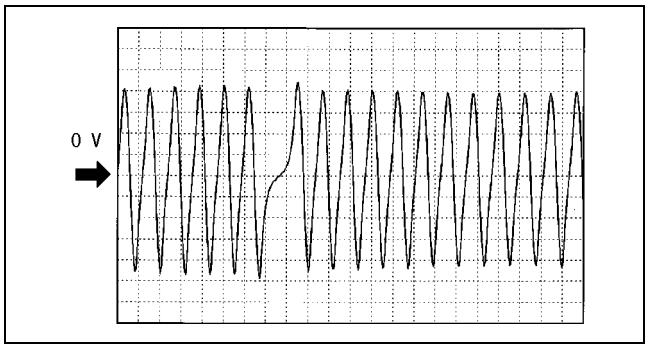
Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
86	SGC(-)	CMP sensor	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect CMP sensor (See 01–40B–35 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS]) • Inspect related harness
87	—	—	—		—	—
88	MAF	MAF sensor	Ignition switch ON		0.9—2.0	• Inspect MAF sensor (See 01–40B–28 MASS AIR FLOW (MAF) SENSOR INSPECTION [FS]) • Inspect related harness
			Idle		1.7—2.4	
89	Throttle position	TP sensor	Ignition switch ON	CTP	0.1—1.1	• Inspect TP sensor (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS]) • Inspect related harness
				WOT	3.0—4.6	
90	Constant voltage (Vref)	TP sensor, EGR boost sensor, Fuel tank pressure sensor	Ignition switch ON		Approx. 5.0	• Inspect related harness
91	Sensor GND	ECT sensor, IAT sensor, EGR boost sensor, Fuel tank pressure sensor, TP sensor, HO2S (Front, Rear), TFT sensor	Under any condition		Below 1.0	• Inspect related harness
92	Brake	Brake switch	Brake pedal depressed		B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect related harness
			Brake pedal released		Below 1.0	
93	HO2S (Rear) heater control	HO2S (Rear)	Idle	ECT above 70°C {158 °F}	Below 1.0	• Inspect HO2S (Rear) (See 01–40B–38 HO2S Heater (Front and Rear) Resistance Inspection) • Inspect related harness
				HO2S (Rear) is malfunctioning	B+	
94	HO2S (Front) heater control	HO2S (Front)	Ignition switch ON (engine stopped)		B+	• Inspect HO2S (Front) heater. (See 01–40B–38 HO2S Heater (Front and Rear) Resistance Inspection) • Inspect related harness
			Approx. 15 s after engine start with ECT 20—30°C {68—86 °F}		Below 1.0	
			Others		Below 1.0 ⇔ B+	
95	PRC	PRC solenoid valve	Ignition switch ON		B+	• Inspect PRC solenoid valve (See 01–14–31 PRC SOLENOID VALVE INSPECTION) • Inspect related harness
			After hot start		Below 1.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Action
96	A/C control	A/C relay	Idle	A/C switch and fan switch on	Below 1.0	• Inspect A/C relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
				A/C switch off	B+	
97	Power supply	Main relay	Ignition switch ON		B+	• Inspect main relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Ignition switch off		Below 1.0	
98	EGR boost sensor switching control	EGR boost solenoid valve	Ignition switch ON		B+	• Inspect EGR boost solenoid valve (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION) • Inspect related harness
			Idle		B+	
99*1	Shift solenoid B control	Shift solenoid B	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect shift solenoid B (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
100	Fuel injection (#4)	Fuel injector No.4	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect fuel injector No.4 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
101	Fuel injection (#2)	Fuel injector No.2	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect fuel injector No.2 (See 01–14–24 FUEL INJECTOR INSPECTION) • Inspect related harness
102*1	Shift solenoid C Control	Shift solenoid C	• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))			• Inspect shift solenoid C (See 05–17–28 SOLENOID VALVES INSPECTION) • Inspect related harness
103	GND	GND	Under any condition		Below 1.0	• Inspect related harness
104	—	—	—		—	—

*1 : ATX only

Inspection Using An Oscilloscope (Reference)
Ne signal

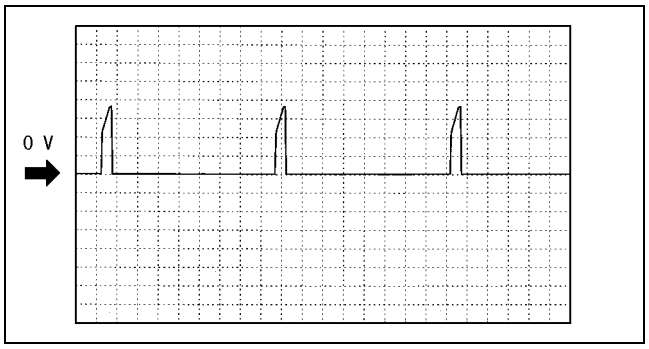
- PCM terminal: 21(+)-22(-)
- Oscilloscope setting: 2 V/DIV(Y), 2 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W006

IGT signal

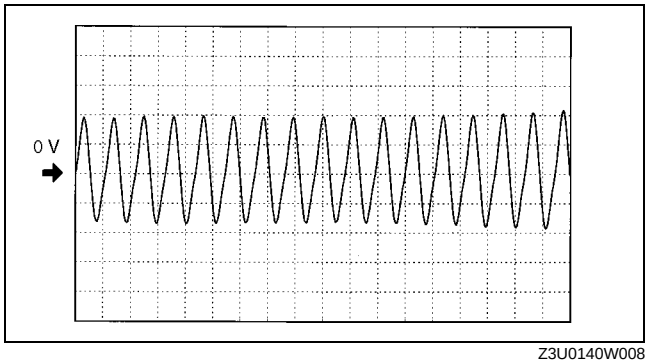
- PCM terminal:
  - IGT1: 26(+)-103(-)
  - IGT2: 52(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 10ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W007

Input/turbine speed signal

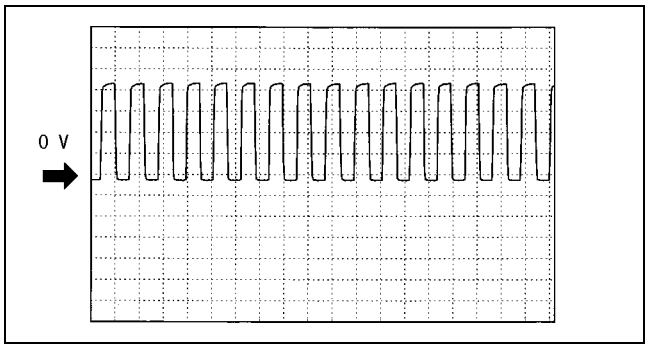
- PCM terminal: 84(+)-23(-)
- Oscilloscope setting: 0.4 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W008

Generator output voltage signal

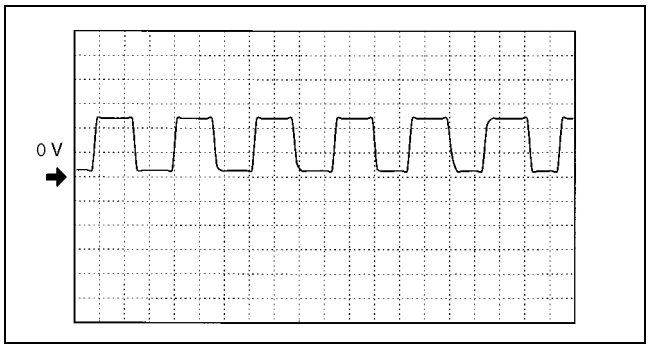
- PCM terminal: 30(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W009

Pressure control solenoid control signal
CTP

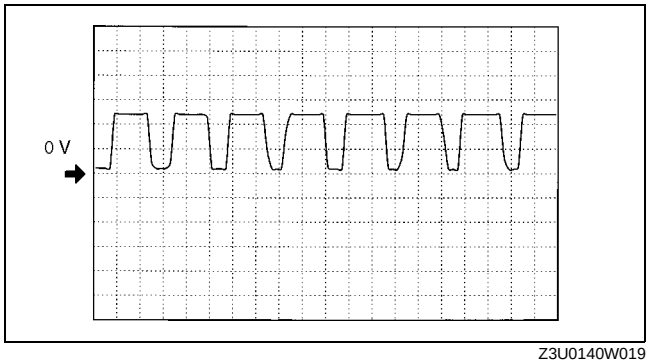
- PCM terminal: 81(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and closed throttle position



Z3U0140W010

WOT

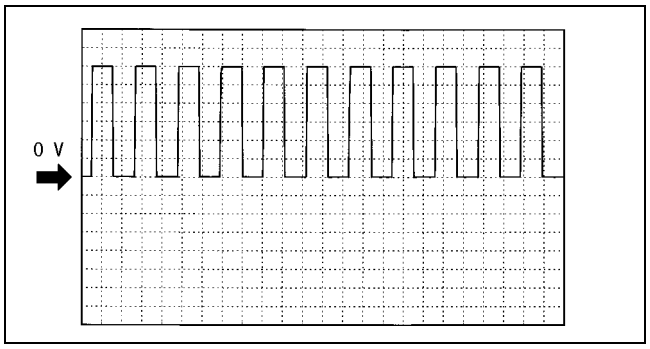
- PCM terminal: 81(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and wide open throttle



Z3U0140W019

Engine speed signal

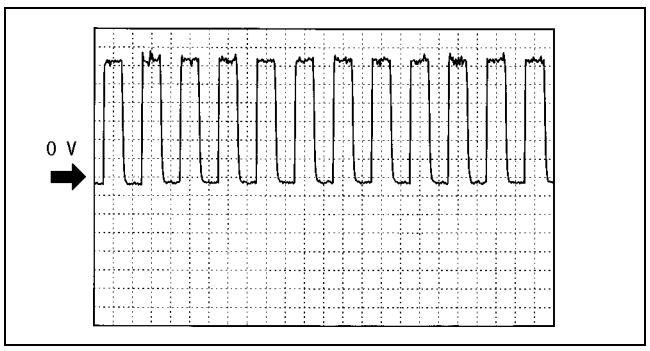
- PCM terminal: 48(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W011

Generator field coil control signal

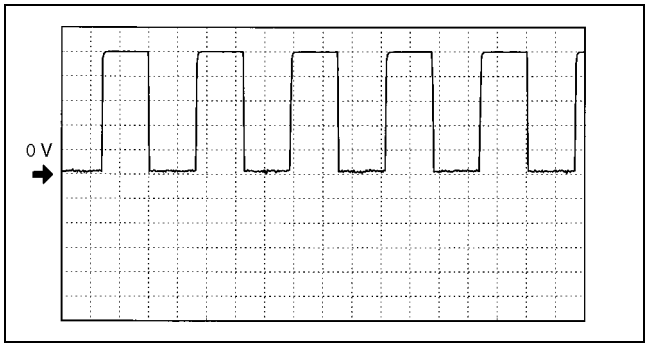
- PCM terminal: 53(+)-103(-)
- Oscilloscope setting: 0.2 V/DIV(Y), 2ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W012

Vehicle speed signal

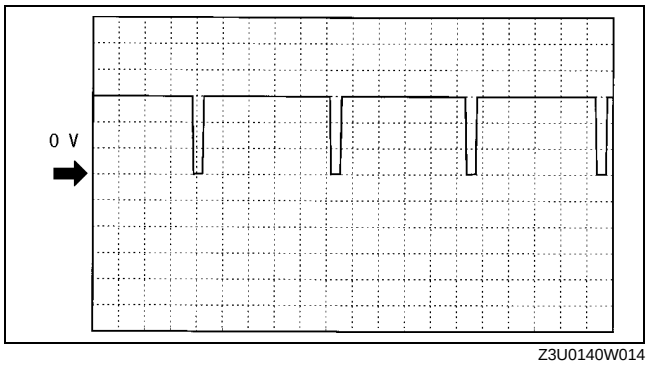
- PCM terminal: 58(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: drive the vehicle with 32 km/h [20 mph]



Z3U0140W013

Purge control signal

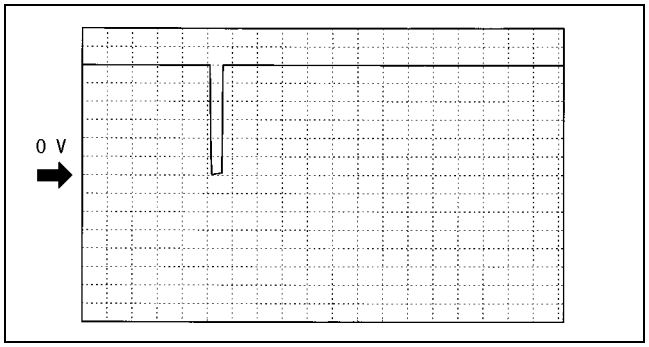
- PCM terminal: 67(+)-103(-)
- Oscilloscope setting: 4 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W014

Fuel injection signal

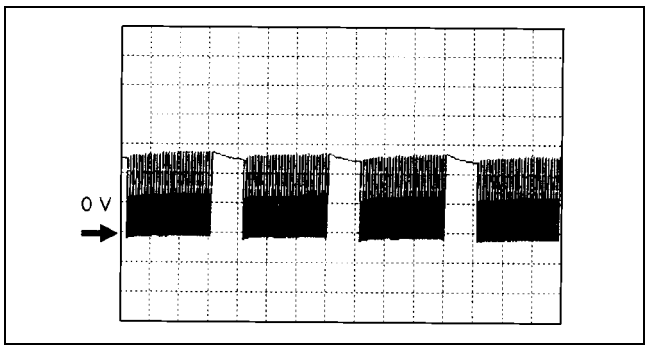
- PCM terminal
  - No.1:75(+)-103(-)
  - No.2:101(+)-103(-)
  - No.3:74(+)-103(-)
  - No.4:100(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W015

Shift solenoid A control

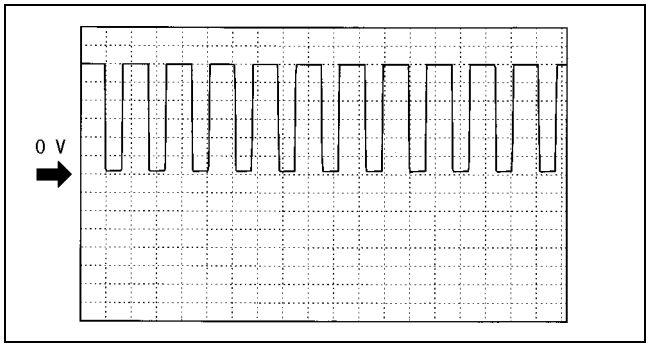
- PCM terminal: 82(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: drive in the 4th gear



Z3U0140W016

IAC signal

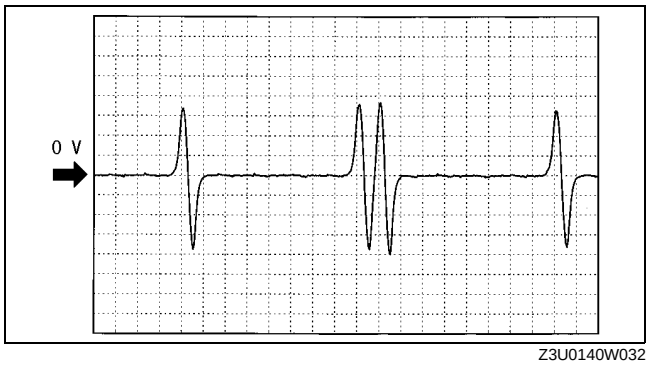
- PCM terminal: 83(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 0.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W017

SGC signal

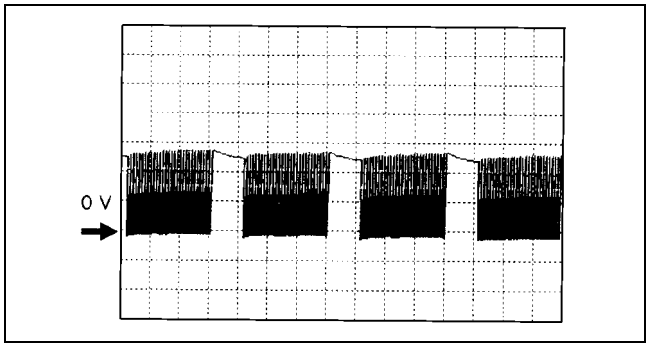
- PCM terminal: 85(+)-86(-)
- Oscilloscope setting: 1 V/DIV(Y), 10 ms/DIV(X), AC range
- Vehicle condition: idle after warm up



Z3U0140W032

Shift solenoid B cointrol signal

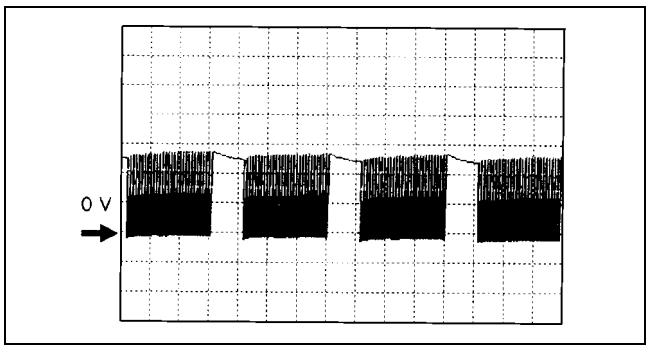
- PCM terminal: 99(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5ms/DIV(X), DC range
- Vehicle condition: Drive in D range, 1st gear



Z3U0140W016

Shift solenoid C cointrol signal

- PCM terminal: 102(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: Drive in 1st or 2nd gear



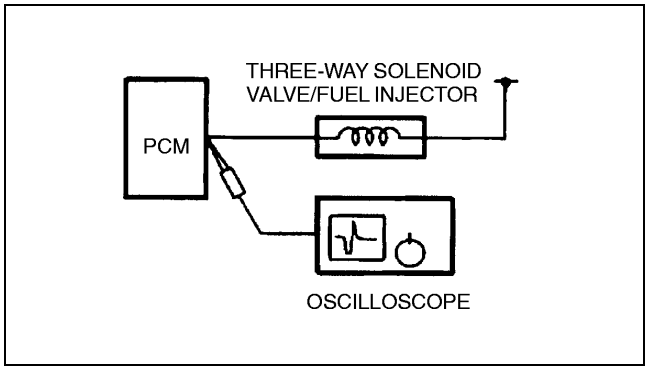
Z3U0140W016

INSPECTION USING AN OSCILLOSCOPE (REFERENCE) [FS]

A3U014018881W04

Purpose

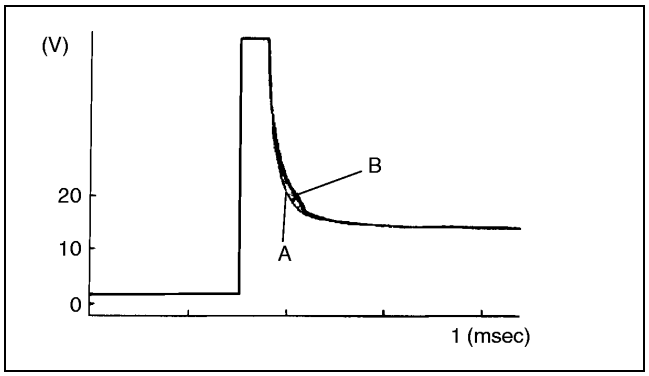
The use of oscilloscope makes the inspection of a part such as a stuck solenoid value possible without actually removing parts.



X3U101WNT

When Normal

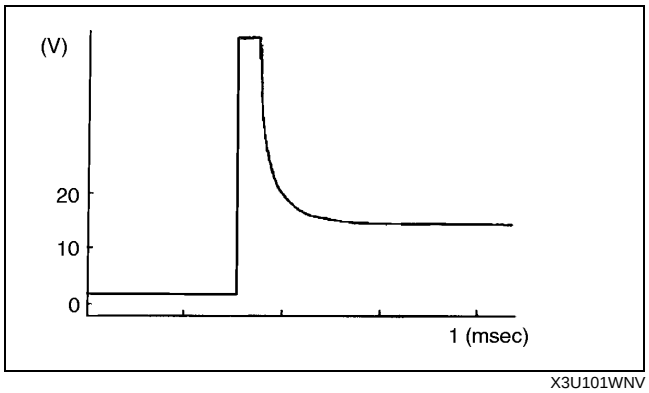
Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



X3U101WNU

When Plunger Stuck

When the plunger is stuck, pulse convergence is smooth because no induced electromotive voltage B is generated.



X3U101WNV

INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [FS]

A3U014018845W01

Resistance Inspection

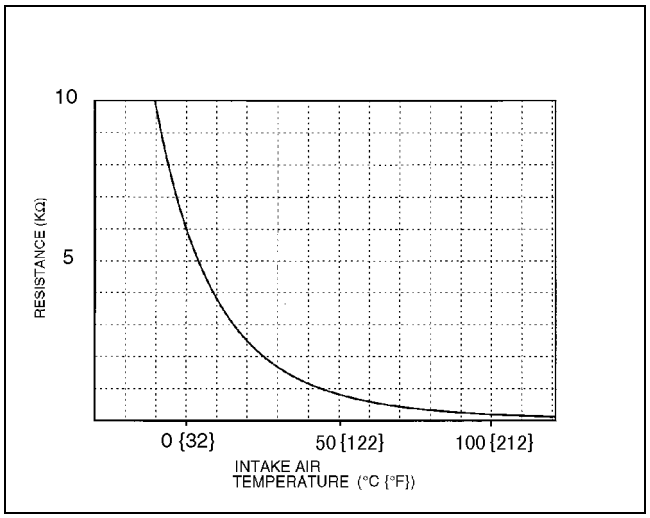
Note
- Perform the following test only when directed.

1. Remove the IAT sensor.
2. Measure the resistance of the IAT sensor terminals A and B using an ohmmeter.
   - If not as specified, replace the IAT sensor.
   - If IAT sensor is okay, but PID value or PCM terminal 39 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

Specification

Ambient temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.0—2.9
80 {176}	0.27—0.37

IAT sensoir signal characteristic (reference)

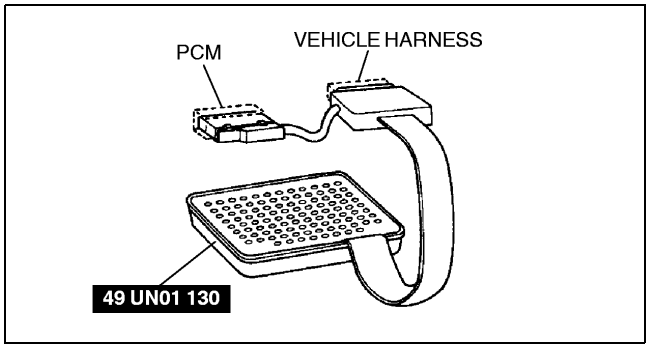


Z3U0140W021

Circuit Open/Short Inspection

1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



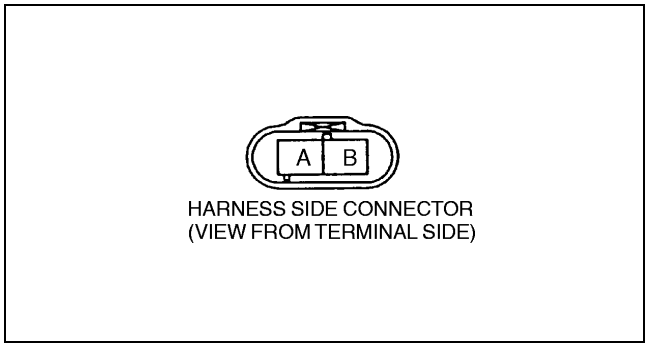
X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the IAT sensor.

Open circuit
- IAT signal circuit (IAT sensor connector terminal A and PCM connector terminal 39)
- GND circuit (IAT sensor connector terminal B and PCM connector terminal 91)

Short circuit
- IAT signal circuit (IAT sensor connector terminal A and PCM connector terminal 39 to GND)

5. Install the IAT sensor.



Y3U140WB1

MASS AIR FLOW (MAF) SENSOR INSPECTION [FS]

A3U014013210W01

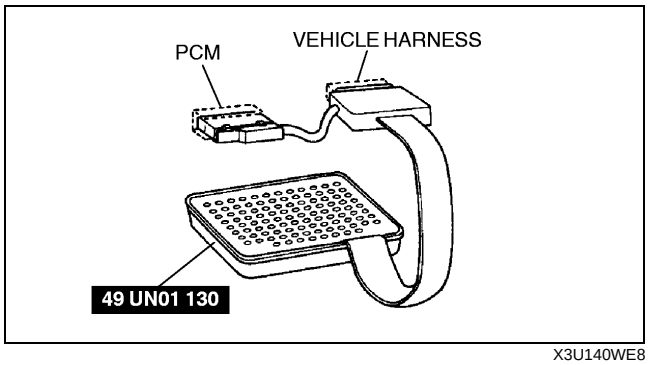
Note
- Perform the following test only when directed.

1. Visually inspect for damage, cracks, terminal bends and terminal rust on the MAF sensor.
   - If any of the above is found, replace the MAF sensor.
   - If the MAF sensor is okay, but PID value or PCM terminal 88 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

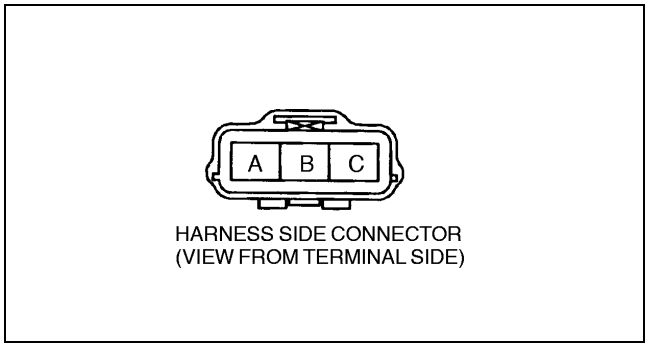
   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the MAF sensor.

   Open circuit
   - MAF signal circuit (MAF sensor connector terminal B and PCM connector terminal 88)
   - Power circuit (MAF sensor connector terminal C and main relay terminal D through common connector)
   - GND circuit (MAF sensor connector terminal A and PCM connector terminal 103 through common connector)



Y3U140WB2

Short circuit
- MAF signal circuit (MAF sensor connector terminal B and PCM connector terminal 88 to GND)
- Power circuit (MAF sensor connector terminal C and main relay terminal D through common connector to GND)

5. Reconnect the MAF sensor connector.

Note
- The scan tool shows the MAF rate and load value.

Specification

	Intake MAF (g/s)		Engine load calculated value (%)	
	MTX	ATX	MTX	ATX
Idle*1	1.6—2.5	1.8—2.6	13.0—18.0	14.5—19.0
Engine speed 2,500 rpm*2	6.2—7.4	6.5—7.9	12.5—17.0	13.0—17.0

*1 : 650—750 rpm
*2 : No load, neutral or P position

THROTTLE POSITION (TP) SENSOR INSPECTION [FS]

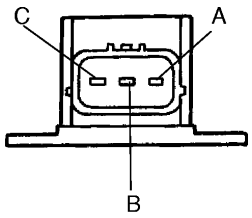
A3U014018910W01

Resistance Inspection

Note
- Perform the following test only when directed.

1. Inspect throttle valve CTP and accelerator cable free play (See 01–13B–17 ACCELERATOR CABLE INSPECTION [FS].)
   - If as specified, inspect resistance of the TP sensor.
2. Disconnect the TP sensor connector.
3. Measure the resistance between the TP sensor terminals A and C using an ohmmeter.
   - If not as specified, replace the TP sensor. (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
   - If as specified, but PID value or PCM terminal 89 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

Specification
4—6 kilohms



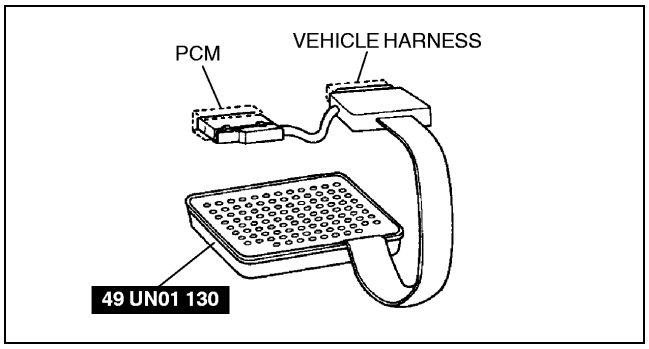
COMPONENT SIDE CONNECTOR
(VIEW FROM TERMONAL SIDE)

Y3U140WB3

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

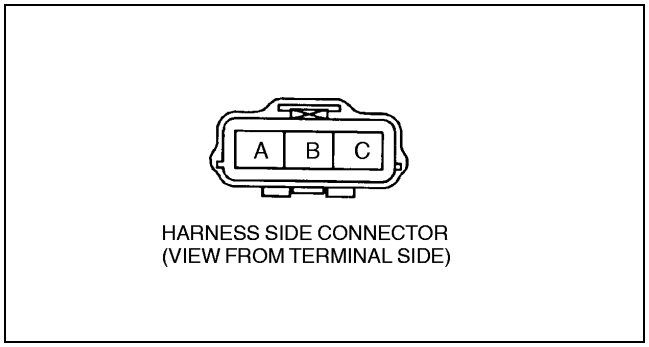


X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the TP sensor.

   Open circuit
   - Constant voltage circuit (TP sensor connector terminal A and PCM connector terminal 90)
   - TP signal circuit (TP sensor connector terminal B and PCM connector terminal 89)
   - GND circuit (TP sensor connector terminal C and PCM connector terminal 91)

   Short circuit
   - Constant voltage circuit (TP sensor connector terminal A and PCM connector terminal 90)
   - TP signal circuit (TP sensor connector terminal B and PCM connector terminal 89)
5. Reconnect the TP sensor connector.



Y3U140WB4

ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [FS]

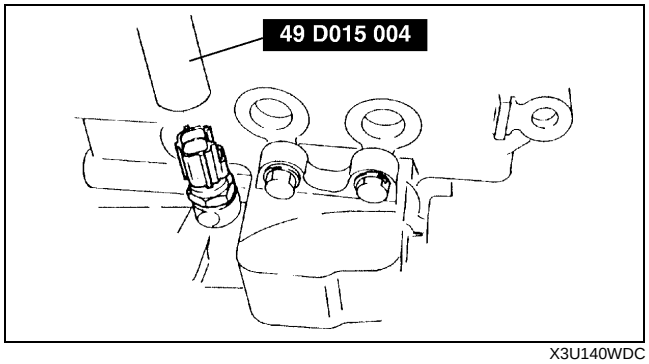
A3U014018840W01

Warning
- **When the engine is hot, it can badly burn. Turn off the engine and wait until it is cool before removing the ECT sensor.**

1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Disconnect the ECT sensor connector.
3. Remove the ECT sensor using the **SST**.
4. Replace the gasket.
5. Install in the reverse order of removal.

   Tightening torque
   16—23 N·m
   {1.6—2.4 kgf·m, 12—17 ft·lbf}

6. Refill the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)



X3U140WDC

ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [FS]

A3U014018840W02

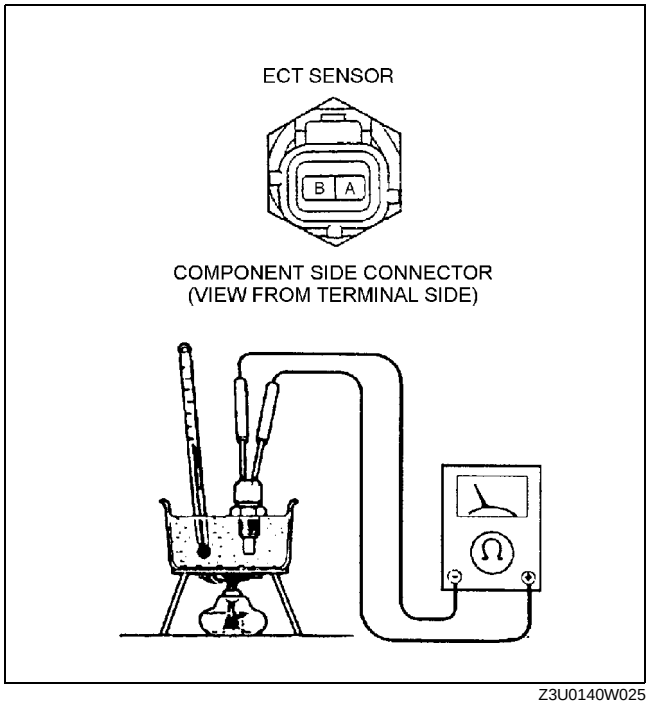
Note
- Perform the following test only when directed.

ECT Sensor Resistance Inspection

1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Remove the ECT sensor.
3. Place the ECT sensor in water with a thermometer, and heat the water gradually.
4. Measure the resistance between the ECT sensor terminals A and B using an ohmmeter.
   - If not as specified, replace the ECT sensor.
   - If the ECT sensor is okay, but PID value or PCM terminal 38 voltage is out of specification, carry out the “Circuit Open/ Short Inspection”.

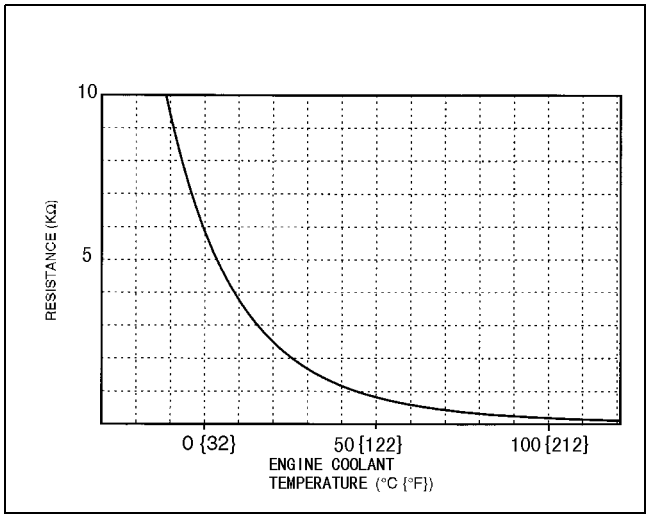
Specification

Water temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.2—2.6
80 {176}	0.29—0.34



Z3U0140W025

ECT sensor signal characteristic (reference)

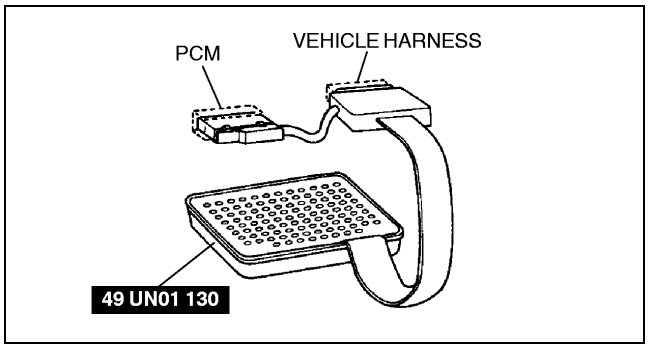


Z3U0140W022

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   16—23 N·m
   {1.6—2.4 kgf·m, 12—17 ft·lbf}

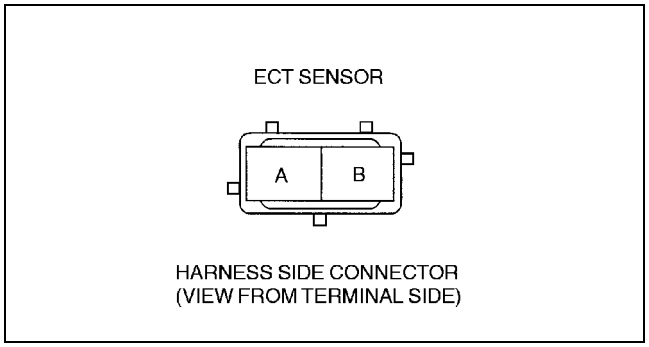


X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the ECT sensor.

   Open circuit
   - ECT signal circuit (ECT sensor connector terminal A and PCM connector terminal 38 through common connector)
   - GND circuit (ECT sensor connector terminal B and PCM connector terminal 91)

   Short circuit
   - ECT signal circuit (ECT sensor connector terminal A and PCM connector terminal 38 to GND)
5. Install the ECT sensor.



Z3U0140W026

CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS]

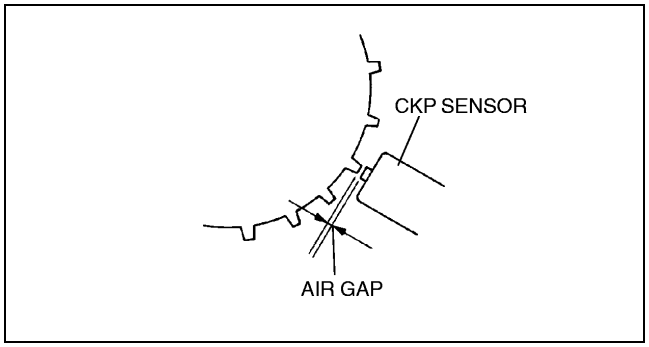
A3U014018230W01

Air Gap Inspection

Note
- Perform the following test only when directed.

1. Verify that the CKP sensor is installed properly.
2. Measure the air gap between the crankshaft pulley teeth and the CKP sensor using a feeler gauge.
   - If not as specified, replace the CKP sensor or inspect the crankshaft pulley teeth for being twisted and/or chipped.
   - If any of the crankshaft pulley teeth is twisted and/or chipped, replace the crankshaft pulley (See 01–10B–10 Crankshaft Pulley Removal Note.)

Specification
0.5—1.5 mm {0.020—0.059 in}

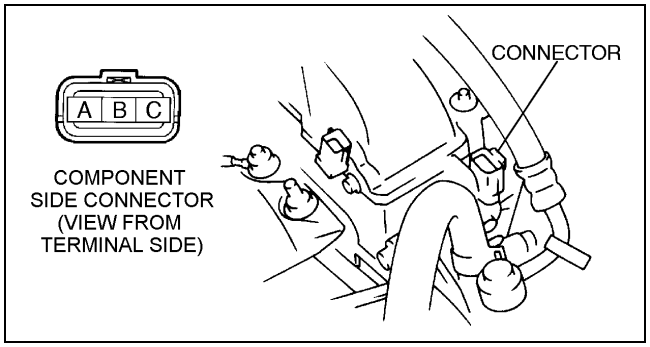


X3U140WDF

Resistance Inspection

1. Disconnect the CKP sensor connector.
2. Measure the resistance between the CKP sensor terminals A and B using an ohmmeter.
   - If not as specified, replace the CKP sensor.
   - If CKP sensor resistance is okay, but PID value or PCM terminal 21 and 22 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.

Specification
Approx. 550 ohms

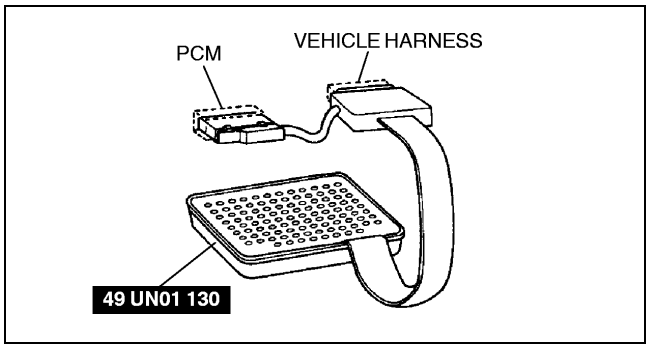


Y3U140WB8

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the CKP sensor.

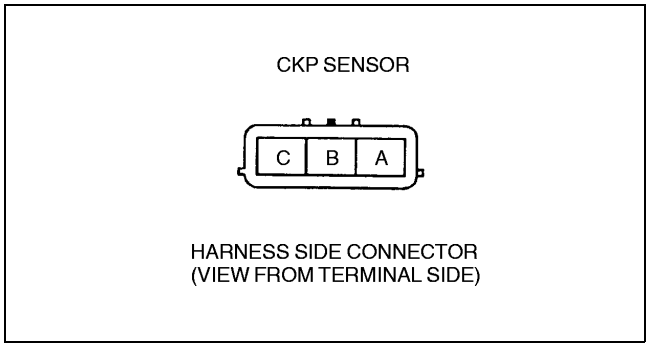
Open circuit

- CKP signal circuit (CKP sensor connector terminal A and PCM connector terminal 21)
- CKP signal circuit (CKP sensor connector terminal B and PCM connector terminal 22)

Short circuit

- CKP signal circuit (CKP sensor connector terminal A and PCM connector terminal 21 to GND)
- CKP signal circuit (CKP sensor connector terminal B and PCM connector terminal 22 to GND)

5. Reconnect the CKP sensor connector.



Y3U140WBP

CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [FS]

A3U014018230W02

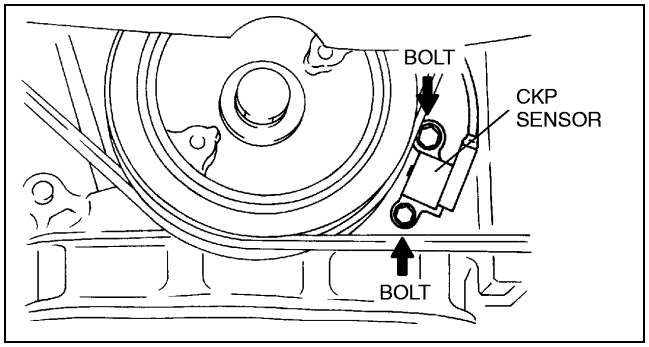
Caution
- **When foreign material such as an iron chip is on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

1. Disconnect the CKP sensor connector.
2. Remove the undercover.
3. Remove the CKP sensor installation bolt.
4. Install in the reverse order of removal.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

5. Reconnect the CKP sensor connector.

Caution
- **Do not forcefully pull the wiring harness of the CKP sensor, or harness will be damaged.**



X3U140WDH

CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [FS]

A3U014018200W01

Caution
- **When foreign material such as an iron chip is on the CMP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CMP sensor when replacing.**

1. Disconnect the negative battery cable.
2. Disconnect the CMP sensor connector.
3. Remove the CMP sensor installation bolt.
4. Remove the spacer.
5. Remove the CMP sensor.
6. Make sure that the CMP sensor is free of any metallic shavings or particles.
   - If metallic shavings or particles are found on the sensor, clean them off.
7. Install in the reverse order of removal.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

CAMSHAFT POSITION (CMP) SENSOR INSPECTION [FS]

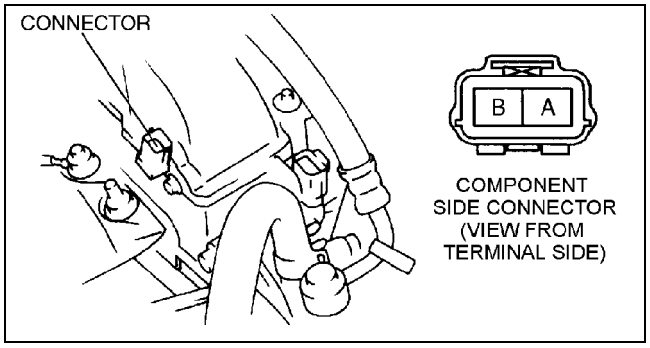
A3U014018200W02

Resistance Inspection

Note
- Perform the following test only when directed.

1. Disconnect the CMP sensor connector.
2. Measure the resistance between the CMP sensor connector terminals A and B using an ohmmeter.
   - If not as specified, replace the CMP sensor.
   - If CMP sensor resistance is okay, but PID value or PCM terminal 85 and 86 voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

Specification
0.95—1.25 kilohms

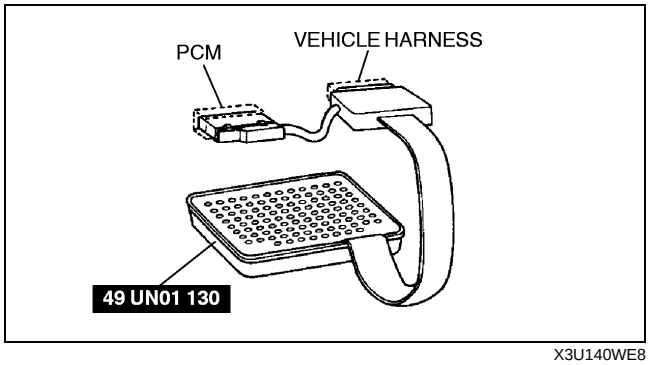


A3U0140W006

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the CMP sensor.

   Open circuit
   - CMP signal circuit (CMP sensor connector terminal A and PCM connector terminal 85)
   - CMP signal circuit (CMP sensor connector terminal B and PCM connector terminal 86)

   Short circuit
   - CMP signal circuit (CMP sensor connector terminal A and PCM connector terminal 85 to GND)
   - CMP signal circuit (CMP sensor connector terminal B and PCM connector terminal 86 to GND)
5. Reconnect the CMP sensor connector.

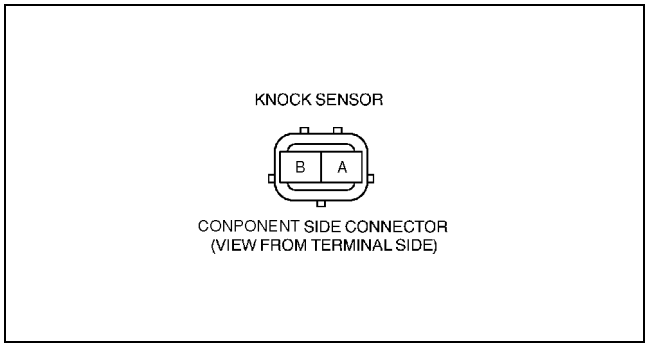
KNOCK SENSOR INSPECTION [FS]

A3U014018921W01

Note
- Perform the following test only when directed.

Resistance Inspection
1. Turn the ignition switch to LOCK.
2. Disconnect the knock sensor connector.
3. Measure the resistance between the knock sensor terminals A and B.
   - If not as specified, replace the knock sensor.
   - If the knock sensor is okay, but PCM terminals 57 and 59 voltages are out of specification, perform the "Circuit Open/Short Inspection".

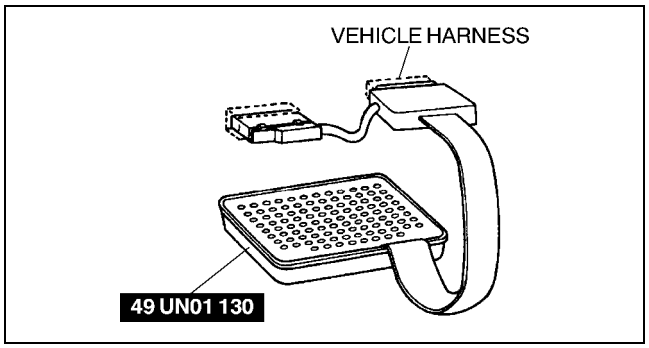
Specification
532—588 kilohms (20 °C {68 °F})



A3U0140W003

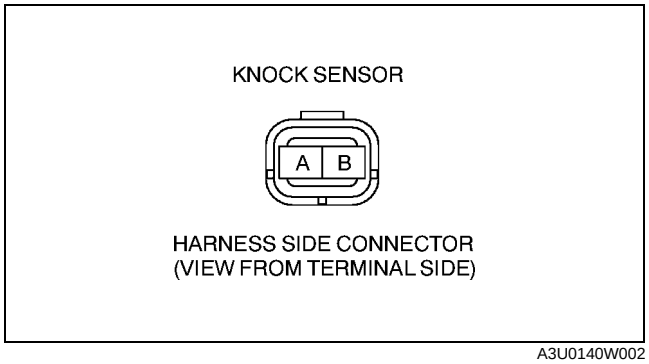
Circuit Open/Short Inspection
1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) with the PCM disconnected.
3. Tighten the connector attaching bolt.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



YMU116WAQ

4. Inspect the following wiring harness for open or short (Continuity check).



A3U0140W002

Open circuit
- If there is no continuity, the circuit is open. Repair or replace the harness.
  — Signal circuit (Knock sensor terminal A and PCM connector terminal 57)
  — Signal circuit (Knock sensor terminal B and PCM connector terminal 59)

Short circuit
- If there is continuity, the circuit is shorted. Repair or replace the harness.
  — Signal circuit (Knock sensor terminal A and PCM connector terminal 57 to GND)
  — Signal circuit (Knock sensor terminal B and PCM connector terminal 59 to GND)

KNOCK SENSOR REMOVAL/INSTALLATION [FS]

A3U014018921W02

1. Disconnect the knock sensor connector.
2. Remove the knock sensor.
3. Install in the reverse order of removal.

Tightening torque
19.6—34.3 N·m {2.00—3.49 kgf·m, 14.5—25.2 ft·lbf}

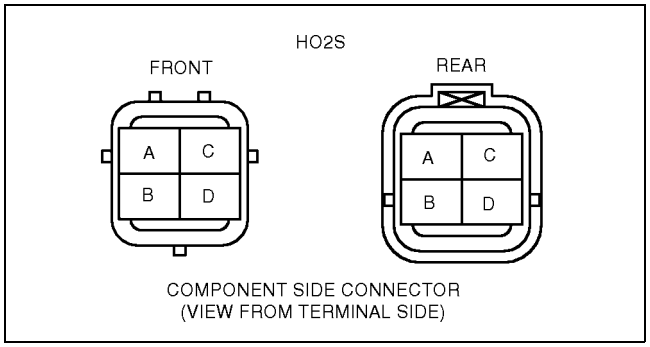
HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS]

A3U014018861W01

HO2S (Front and Rear) Voltage Inspection

Note
- Perform the following test only when directed.

1. Warm up the engine and run it at idle.
2. Disconnect the HO2S (Front or Rear) connector.
3. Connect a voltmeter test leads to the following HO2S terminals:
   - (+) lead—HO2S terminal A
   - (–) lead—HO2S terminal B
4. Run the engine at **3,000 rpm** until the voltmeter indicates **approx. 0.5—0.7 V**.
5. Verify that the voltmeter needle moves when the engine speed increases and decreases suddenly several times.
   - If not as specified, replace the HO2S.
   - If the HO2S is okay, but PID value or PCM terminal 60 (Front), 35 (Rear) voltage are out of specification, carry out the “Circuit Open/ Short Inspection”.



Z3U0140W023

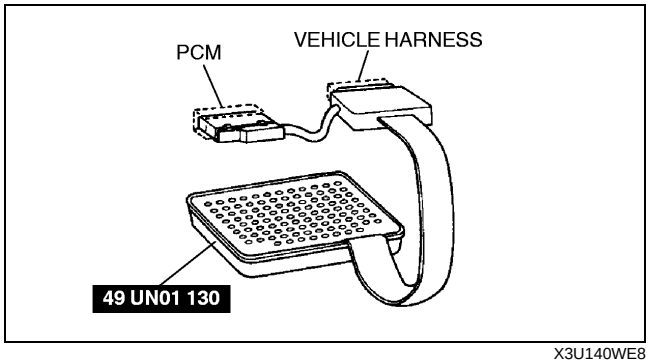
Specification

Engine condition	Voltage (V)
Acceleration	0.5—1.0
Deceleration	0—0.5

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



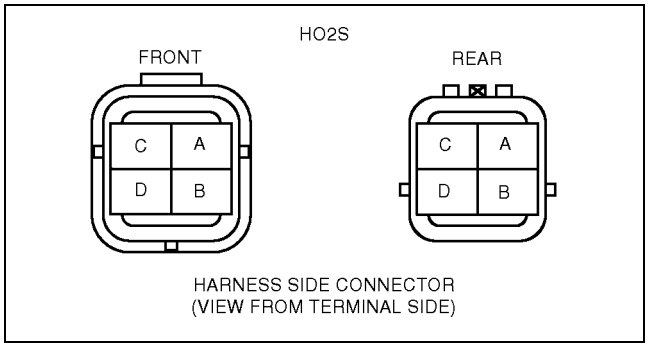
X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the HO2S.

Open circuit
- HO2S signal circuit (HO2S connector terminal A and PCM connector terminal 60 (Front), 35 (Rear))
- GND circuit (HO2S connector terminal B and PCM connector terminal 91)

Short circuit
- HO2S signal circuit (HO2S terminal A and PCM connector terminal 60 (Front), 35 (Rear) to GND)

5. Reconnect the HO2S connector.

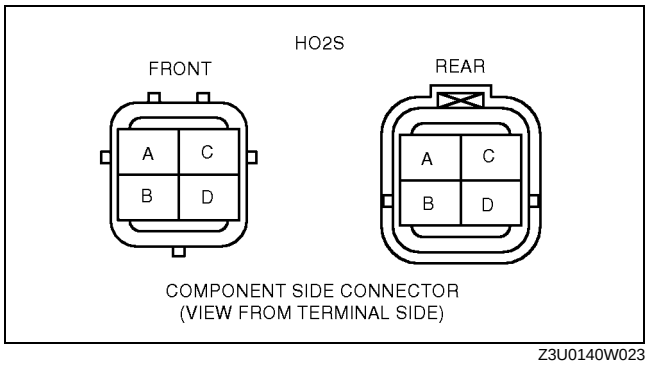


Z3U0140W024

HO2S Heater (Front and Rear) Resistance Inspection

1. Disconnect the HO2S (Front or Rear) connector.
2. Measure the resistance between HO2S terminals C and D using an ohmmeter.
   - If not as specified, replace the HO2S.
   - If the HO2S heater is okay, but PID value or PCM terminal 94 (Front), 93 (Rear) voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

Specification
Front: Approx. 5.6 ohms
Rear: Approx. 15.7 ohms



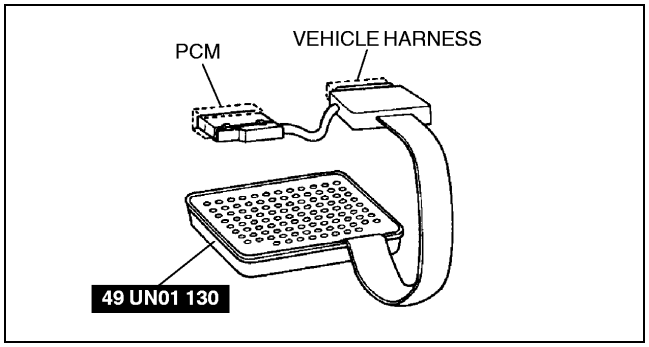
Z3U0140W023

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

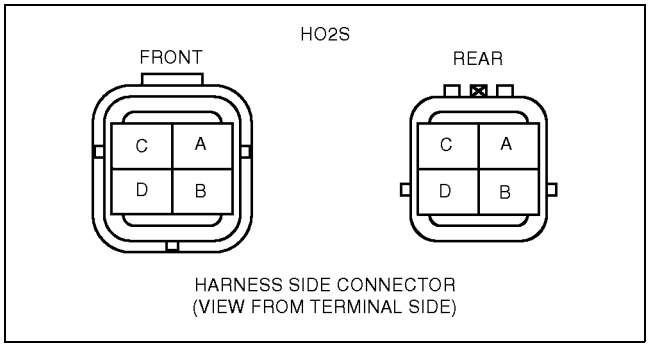
4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the HO2S.



X3U140WE8

Open circuit
- Control circuit (HO2S connector terminal C and ignition switch (IG1) circuit through common connector)
- GND circuit (HO2S connector terminal D and PCM connector terminal 94 (Front), 93 (Rear))

Short circuit
- Control circuit (HO2S connector terminal C and ignition switch (IG1) circuit through common connector to GND)
- GND circuit (HO2S connector terminal D and PCM connector terminal 94 (Front), 93 (Rear) to GND)



Z3U0140W024

5. Reconnect the HO2S connector.

EGR BOOST SENSOR INSPECTION [FS]

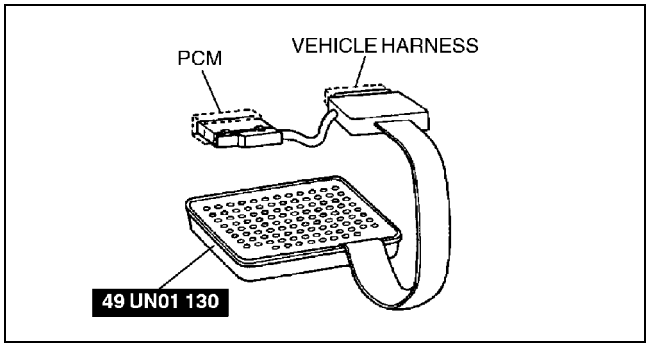
A3U014018211W01

Note
- Perform the following test only when directed.
- The following vacuum values are indicated by relative pressure from barometric pressure.

1. Remove the PCM. (See 01–40B–7 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—110 kgf·cm, 69.5—95.4 in·lbf}

Caution
- **Do not apply vacuum outside of the specified limits, or the EGR boost sensor will be damaged.**



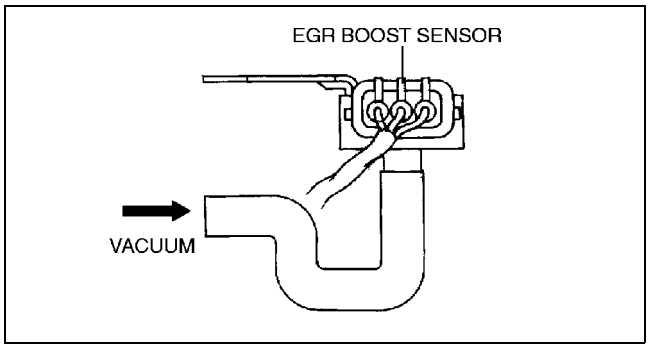
X3U140WAX

4. Turn the ignition switch to ON.
5. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.

Note
- The output voltage varies with the measuring condition.

6. Verify that the PCM 34 terminal voltage is within specification.

Measuring condition:
Input voltage: 4.5—5.5 V
Ambient temperature: 10—50 °C {50—122 °F}
Sea level: –20—3,000 m {–656—9,840 ft}
Specification
Measuring voltage: 2.3—4.7 V



X3U140WAY

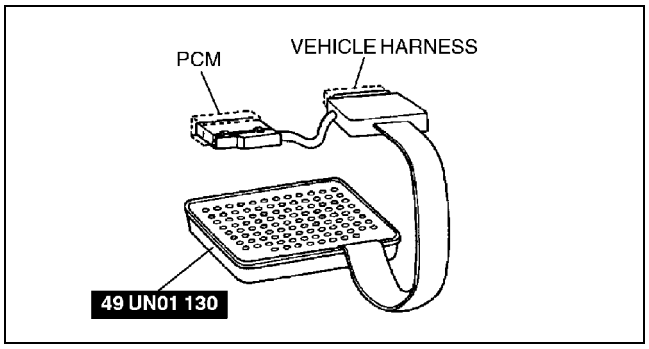
7. Apply vacuum of **–26.6 kPa {–200 mmHg, –7.85 inHg}** to EGR boost sensor and verify that the PCM 34 terminal voltage variation from the specified voltage in Step 6 is within specification.
   - If not as specified, carry out the “Circuit Open/Short Inspection”.

Specification
Monitoring voltage variation: 0.8—1.3 V

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

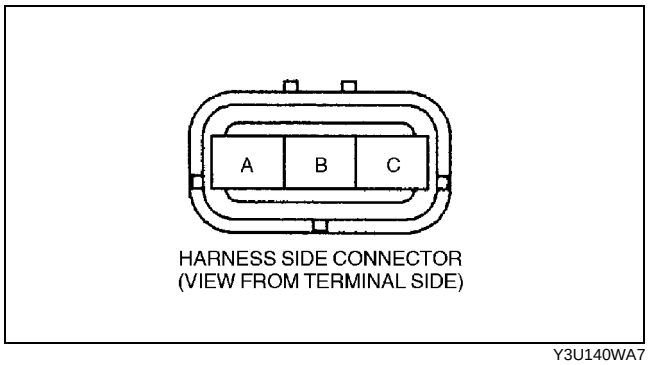


X3U140WAX

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the EGR boost sensor.

   Open circuit
   - EGR boost (Barometric pressure) signal circuit (EGR boost sensor connector terminal A and PCM connector terminal 34)
   - Constant voltage circuit (EGR boost sensor connector terminal C and PCM connector terminal 90)
   - GND circuit (EGR boost sensor connector terminal B and PCM connector terminal 91)

   Short circuit
   - EGR boost (Barometric pressure) signal circuit (EGR boost sensor connector terminal A and PCM connector terminal 34)
   - Constant voltage circuit (EGR boost sensor connector terminal C and PCM connector terminal 90)
5. Reconnect the EGR boost sensor connector.



Y3U140WA7

FUEL TANK PRESSURE SENSOR INSPECTION [FS]

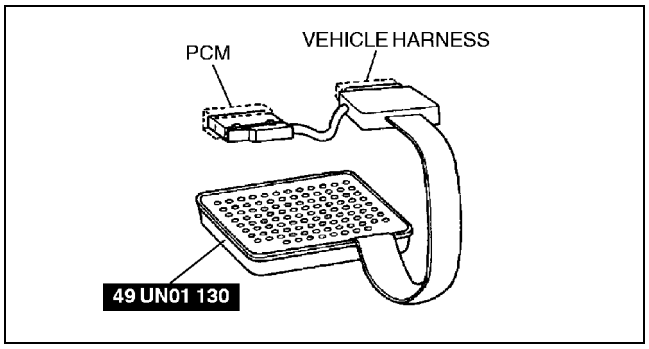
A3U014018212W01

Note
- Perform the following test only when directed.
- The following vacuum values are indicated by relative pressure from barometric pressure.

1. Remove the PCM. (See 01–40B–7 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—110 kgf·cm, 69.5—95.4 in·lbf}

   Caution
   - **Do not apply vacuum outside of the specified limits, or the fuel tank pressure sensor will be damaged.**

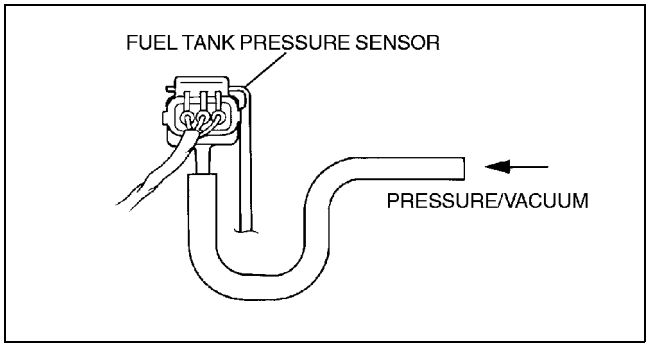


X3U140WB3

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.



X3U140WB4

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, replace the fuel tank pressure sensor.
   - If fuel tank pressure sensor is okay, but PCM terminal 62 voltage is out of specification, carry out the "Circuit Open/Short Inspection".

Specification

Applied pressure	Output voltage (V)*
–6.66 kPa {–50 mmHg, –1.97 inHg}	0.45—0.55
0 kPa {0 mmHg, 0 inHg}	2.25—2.75
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.05—4.95

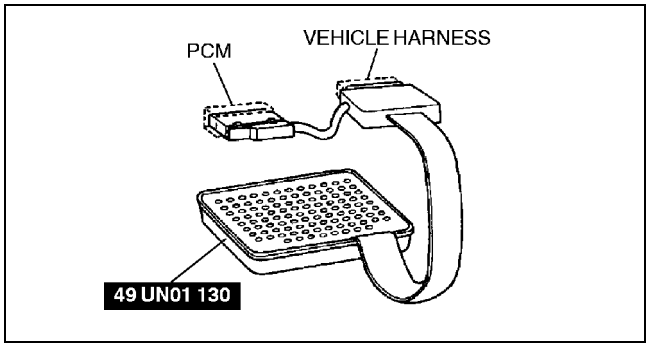
* : Measuring condition is as follows

Input voltage: 5.0 V
Barometric pressure: 101.3 kPa {760 mmHg, 29.9 inHg} (Absolute pressure)
Barometric temperature: 30—100 °C {0—182 °F}

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



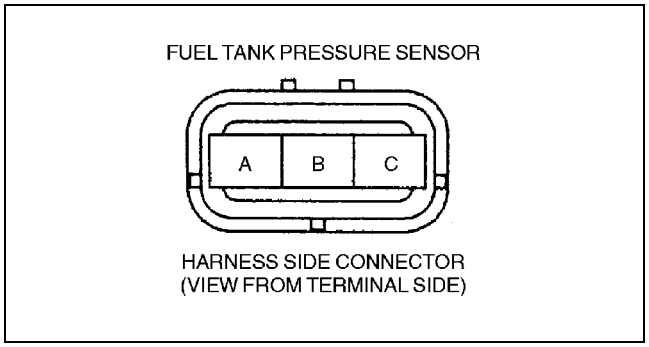
X3U140WB3

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the fuel tank pressure sensor.

   Open circuit
   - Fuel tank pressure signal circuit (Fuel tank pressure sensor connector terminal B and PCM connector terminal 62)
   - Constant voltage circuit (Fuel tank pressure sensor connector terminal C and PCM connector terminal 90)
   - GND circuit (Fuel tank pressure sensor connector terminal A and PCM connector terminal 91)

Short circuit
- Fuel tank pressure signal circuit (Fuel tank pressure sensor connector terminal B and PCM connector terminal 62)
- Constant voltage circuit (Fuel tank pressure sensor connector terminal C and PCM connector terminal 90)

5. Reconnect the fuel tank pressure sensor connector.



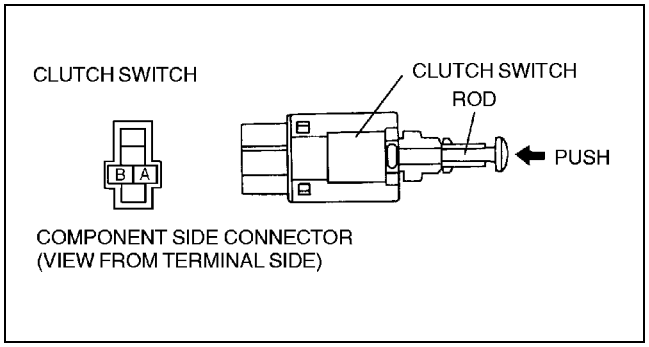
X3U140WB5

CLUTCH SWITCH INSPECTION [FS]

A3U014018660W01

Note
- Perform the following test only when directed.

1. Verify that the clutch switch is installed properly.
2. Disconnect the negative battery cable.
3. Remove the clutch switch. (See 05–10–5 CLUTCH PEDAL REMOVAL/INSTALLATION.)
4. Inspect the continuity between the clutch switch terminals using an ohmmeter.
   - If not as specified, replace the clutch switch.
   - If the clutch switch is okay, but PID value or PCM terminal 6 voltage is out of specification, carry out the “Circuit Open/Short Inspection”.



Z3U0140W029

○—○ : Continuity

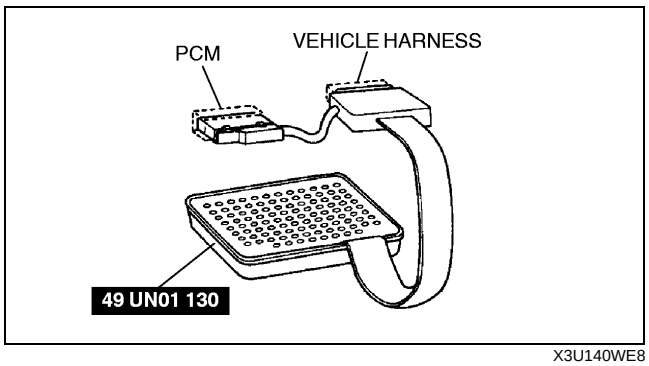
Condition	Terminal	
	A	B
The rod is pushed		
Except above	○	○

Z3U0140W030

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



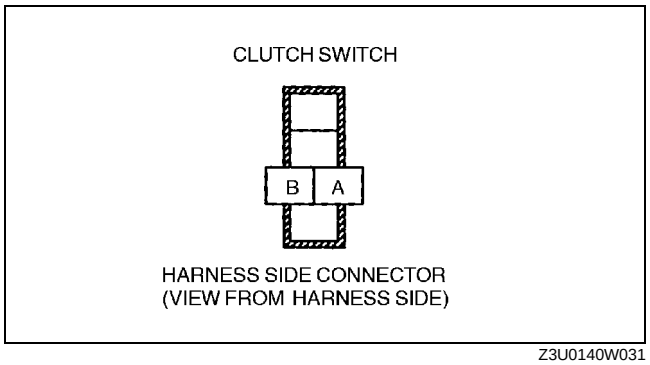
X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the clutch switch.

Open circuit
- Signal circuit (Clutch switch connector terminal B and PCM connector terminal 6 through common connector)
- GND circuit (Clutch switch connector terminal A and GND)

Short circuit
- Signal circuit (Clutch switch connector terminal B and PCM connector terminal 6 through common connector to GND)

5. Install the clutch switch.



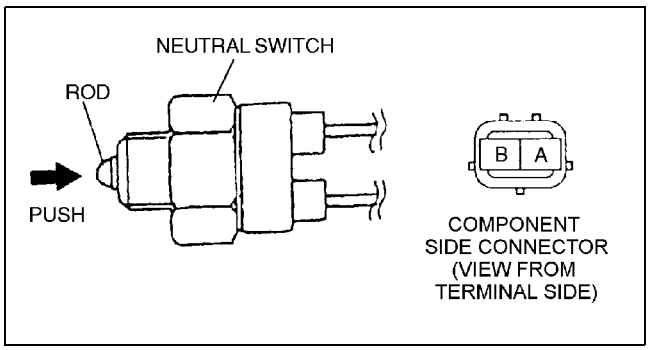
Z3U0140W031

NEUTRAL SWITCH INSPECTION [FS]

A3U014017640W01

Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the neutral switch.
3. Inspect for continuity between the neutral switch terminals using an ohmmeter.
   - If not as specified, replace the neutral switch.
   - If the neutral switch is okay, but PID value or PCM terminal 64 voltage is out of specification, carry out the “Circuit Open/ Short Inspection”.



A3U0140W004

○—○ : Continuity

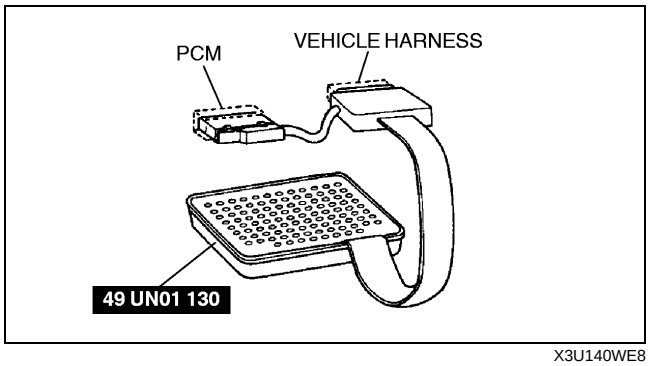
Condition	Terminal	
	A	B
The rod is pushed	○	○
Except above		

X3U140WE3

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the neural switch.

Open circuit
- Signal circuit (Neutral switch connector terminal A and PCM connector terminal 64 through common connector)
- GND circuit (Neutral switch connector terminal B and GND through common connector)

Short circuit
- Signal circuit (Neutral switch connector terminal A and PCM terminal 64 through common connector to GND)

5. Install the neutral switch.

POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [FS]

A3U014032230W01

Continuity Inspection

Note
- Perform the following test only when directed.

1. Inspect as follows if the power steering is inoperative. (See 06–12–3 POWER STEERING FLUID INSPECTION.)
   - Power steering fluid level
   - Power steering fluid leakage
   - Power steering fluid pressure
2. Disconnect the PSP switch connector.
3. Start the engine.
4. Inspect for continuity between the PSP switch terminal and GND using an ohmmeter.
   - If not as specified, replace the PSP switch.
   - If the PSP switch is okay, but PID value or PCM terminal 31 voltage are out of specification, carry out the “Circuit Open/Short Inspection”.

○—○ : Continuity

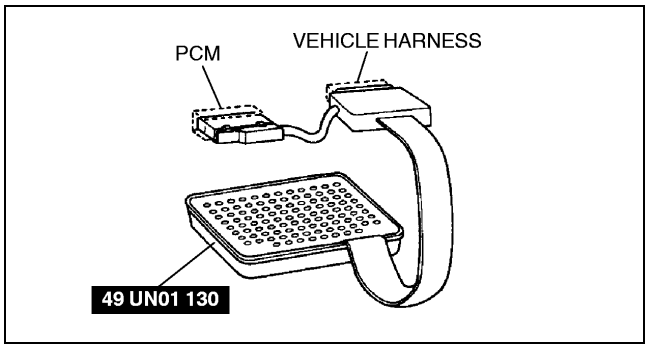
Condition	Terminal	GND
Steering wheel is in straight ahead position		
Steering wheel is fully turned	○	○

X3U140WE4

Circuit Open/Short Inspection

1. Remove the PCM. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WE8

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.
   - If there is an open or short circuit, repair or replace wiring harnesses.
   - If there is no open or short circuit, replace the PSP switch.

   Open circuit
   - PSP signal circuit (PSP switch connector terminal and PCM connector terminal 31 through common connector)
   - GND circuit (PSP switch body and GND)

   Short circuit
   - PSP signal circuit (PSP switch connector terminal and PCM connector terminal 31 through common connector to GND)
5. Reconnect the PSP switch connector.

01–50 TECHNICAL DATA

ENGINE TECHNICAL DATA

A3U015001001W01

Item			Engine			
			ZM		FS	
			MTX	ATX	MTX	ATX
MECHANICAL						
Drive belt deflection (mm {in})	Generator	New	5.5—7.0 {0.22—0.27}		6.5—7.5 {0.26—0.29}	
		Used	6.0—7.5 {0.24—0.29}		7.0—9.0 {0.28—0.35}	
		Limit	8.0 {0.31}		10.0 {0.39}	
	P/S, P/S+A/C	New	7.0—8.0 {0.28—0.31}		7.5—9.0 {0.30—0.35}	
		Used	9.0—10.0 {0.36—0.39}		8.0—9.5 {0.32—0.37}	
		Limit	11.5 {0.45}		11.0 {0.43}	
Drive belt tension (N {kgf, lbf})	Generator	New	500—740 {50—76, 110—160}		690—830 {70—85, 160—180}	
		Used	500—700 {50—72, 110—150}		500—680 {50—70, 110—150}	
		Limit	340 {35, 77}		390 {40, 88}	
	P/S, P/S+A/C	New	590—680 {60—70, 140—150}		590—780 {60—80, 140—170}	
		Used	430—490 {43—50, 95—110}		500—680 {50—70, 110—150}	
		Limit	250 {25, 55}		390 {40, 88}	
Valve clearance [Engine cold] (mm {in})	IN		0.25—0.31 {0.010—0.012} (0.28±0.03 {0.011±0.001})		0.225—0.295 {0.0089—0.0116} (0.26±0.035 {0.010±0.0014})	
	EX		0.25—0.31 {0.010—0.012} (0.28±0.03 {0.011±0.001})		0.225—0.295 {0.0089—0.0116} (0.26±0.035 {0.010±0.001})	
Compression pressure (kPa {kgf/cm^2, psi} [rpm])	Standard		1,373 {14.0, 199} [300]		1,177 {12.0, 171} [300]	
	Minimum		981 {10.0, 142} [300]		824 {8.4, 119} [300]	
	Maximum difference between cylinders		196 {2.0, 28}			
Tensioner spring free length (mm {in})			61.8 {2.43}		36.6 {1.44}	
Pushing distance of the camshaft oil seal (mm {in})			0—0.4 {0—0.01} (from the edge of the cylinder head)		0.3—0.7 {0.012—0.027} (from the edge of the cylinder head)	
Pushing distance of the front oil seal (mm {in})			0.5—1.0 {0.020—0.039} (from the edge of the oil pump body)		0—0.5 {0—0.01} (from the edge of the oil pump body)	
Pushing distance of the rear oil seal (mm {in})			0—0.5 {0—0.01} (from the edge of the rear cover)			
Cylinder head bolt length (mm {in})		Standard	99.2—99.8 {3.91—3.92}		104.2—104.8 {4.103—4.125}	
		Maximum	100.5 {3.956}		105.5 {4.153}	
Idle speed (rpm)			650—750			
Ignition timing (BTDC/rpm)			6—18°/650—750			
Idle-up speed[*1] (rpm)	E/L ON[*2]		650—750			
	A/C ON[*3]		700—800			
	P/S ON[*4]		700—800			
Idle mixture	HC concentration		within the regulation			
	CO concentration		within the regulation			

Item				Engine			
				ZM		FS	
				MTX	ATX	MTX	ATX
LUBRICATION SYSTEM							
Oil pressure			(kPa {kgf/cm^2, psi})	300—390 {3.0—4.0, 43—56} [at 3,000 rpm]		400—490 {4.0—5.0, 57—71} [at 3,000 rpm]	
Oil capacity (approximate quantity)	Total (dry engine)		(L {US qt, Imp qt})	3.4 {3.6, 3.0}		3.7 {3.9, 3.3}	
	Oil replacement		(L {US qt, Imp qt})	3.0 {3.2, 2.6}		3.3 {3.5, 2.9}	
	Oil and oil filter replacement		(L {US qt, Imp qt})	3.2 {3.4, 2.8}		3.5 {3.7, 3.1}	
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			
	Below 0 °C {32 °F}			SAE 5W-30			
Oil pump	Inner rotor tooth tip to outer rotor clearance	(mm {in})	Standard	0.02—0.18 {0.0008—0.0070}		0.130—0.206 {0.00512—0.0081}	
			Maximum	0.22 {0.087}		0.30 {0.012}	
	Outer rotor to body clearance	(mm {in})	Standard	0.09—0.18 {0.0036—0.0070}		0.113—0.186 {0.00445—0.00732}	
			Maximum	0.22 {0.087}			
	Side clearance	(mm {in})	Standard	0.03—0.11 {0.0012—0.0043}		0.035—0.095 {0.0014—0.0037}	
			Maximum	0.14 {0.005}			
	Pressure spring free length	(mm {in})		45.94 {1.809}		—	
	Pressing force at pressure spring height H	(N {kgf, lbf})	H: 33.50mm {1.319 in}	—		97.7—107.4 {9.96—10.96, 21.92—24.11}	
Front oil seal	Pushing distance of the front oil seal (from the edge of the oil pump body)	(mm {in})		0.5—1.0 {0.020—0.039}		0—0.5 {0—0.01}	
COOLING SYSTEM							
Coolant capacity (approximate quantity)		(L {US qt, Imp qt})		6.0 {6.4, 5.3}		7.5 {8.0, 6.6}	
Radiator cap valve opening pressure		(kPa {kgf/cm^2, psi})		94—122 {0.95—1.25, 13.6—17.7}			
Thermostat	Initial-opening temperature	(°C {°F})		83.5—88 {183—190}		80—84 {176—183}	
	Full-opening temperature	(°C {°F})		100 {212}		95 {203}	
	Full-open lift	(mm {in})		8.5 {0.33} min.			
Cooling fan motor current		(A)		2.4—4.4	5.2—7.2	2.4—4.4	5.2—7.2
FUEL SYSTEM							
Fuel line hold pressure		(kPa {kgf/cm^2, psi})		More than 150 {1.5, 22.0}			
Fuel pump maximum pressure		(kPa {kgf/cm^2, psi})		450—630 {4.5—6.5, 64—92}			
Fuel injector	Leakage			Less than 1 drop/2 minutes			
	Volume	(ml {cc, fl oz}/15 sec.)		38.1—40.4 {38.1—40.4, 1.29—1.36}		68—75 {68—75,2.30—2.53}	
	Resistance	(ohms)		Approx.13.8		14.2—14.8	
CHARGING SYSTEM							
Battery	Electrolyte gravity			1.27—1.29 [20 °C {68 °F}]			
	Back-up current[*5]	(mA)		Max. 20			
	Test load chart (A)	Battery type	50D20L	150			
			75D23L	—		195	
	Slow charge (A)	Battery type (5-hour rate)	50D20L (40)	4.0—5.0			
			75D23L (52)	—		5.5—6.5	
	Quick charge (A/30 min)	Battery type (5-hour rate)	50D20L (40)	25			
			75D23L (52)	—		35	

Item					Engine			
					ZM		FS	
					MTX	ATX	MTX	ATX
Generator	Rotor resistance (Between slip rings) (ohms)				2.5—2.9			
	Brush length	Standard (mm {in})			18.5 {0.73}			
		Minimum (mm {in})			5.0 {0.20}			
	Brush spring force	Standard (N {kgf, lbf})			4.8—6.0 {0.48—0.62, 1.06—1.36}			
		Minimum (N {kgf, lbf})			2.2 {0.22, 0.48}			
	Standard voltage (V)	Ignition switch ON	Terminal	B	B+			
				P	Approx. 1			
				D	Approx. 0			
		Idle [20 °C {68 °F}]	Terminal	B	13—15			
				P	Approx. 3—8			
				D	*			
	Generated current (Reference) (A)	Engine speed (rpm)	1,000	Terminal B current	0—60[*6]		0—59[*6]	
			2,000	Terminal B current	0—68[*6]		0—77[*6]	
IGNITION SYSTEM								
Ignition coil	Resistance [20°C{68°F}] (kilohms)	Secondary coil			8.0—12.0		7.2—10.8	
		Insulation resistance of case			10000			
High-tension lead	Resistance (kilohms)	No.1 lead			3.3—7.8		5.6—12.1	
		No.3 lead			2.9—6.9		1.9—4.0	
Spark plug	Type	NGK			ZFR5F-11[*7], ZFR6F-11[*8]		BKR5E-11[*7], BKR6E-11[*8]	
		DENSO			KJ16CR11[*7], KJ20CR11[*8]		K16PR-U11[*7], K20PR-U11[*8]	
		CHAMPION			—		RC10YC4[*7], RC8YC4[*8]	
		MAZDA			—		BP13 18 110[*7], BP14 18 110[*8]	
	Plug gap (mm {in})				1.0—1.1 {0.040—0.043}			
	Resistance (kilohms)	NGK			3.0—7.5			
		DENSO						
		CHAMPION			—		5—15	
		MAZDA						
	Tightening torque (N·m {kgf·m, ft·lbf})				15—22 {1.5—2.3, 11—16}			
STARTING SYSTEM								
Starter	Commutator diameter	Standard (mm {in})			29.4 {1.16}			
		Minimum (mm {in})			28.8 {1.14}			
	Brush length	Standard (mm {in})			12.3 {0.48}			
		Minimum (mm {in})			7.0 {0.28}			
	Brush spring force	Standard (N {kgf, lbf})			180—243 {18.3—24.8, 40.3—54.5}			
		Minimum (N {kgf, lbf})			57.7 {5.88, 12.9}			
	Pinion gap (mm {in})				3.0 {0.12}			
	No load test	Voltage (V)			11			
		Current (A)			Below 90			

* : Turn the following electrical loads on and verify that the voltage reading increases.

- Headlights
- Blower motor
- Rear window defroster

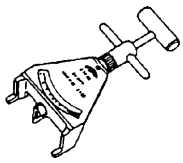
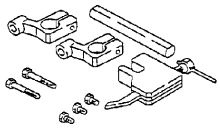
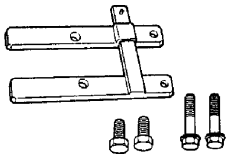
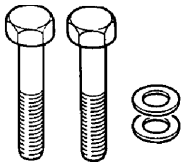
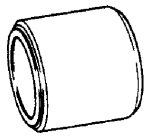
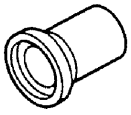
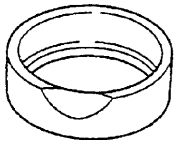
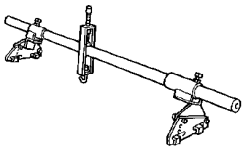
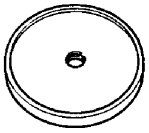
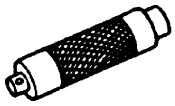
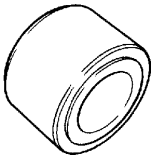
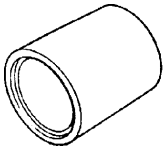
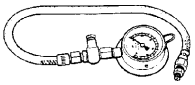
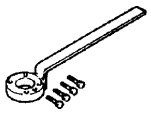
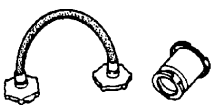
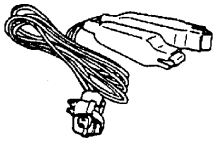
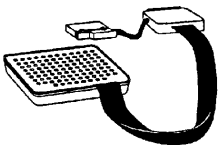
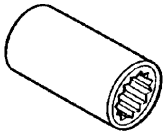
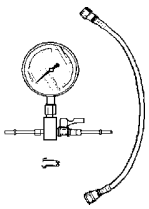
*1 : Excludes temporary idle speed drop just after the loads (E/L, A/C, P/S) are turned on.
*2 : Headlight, fan switch (3rd or higher) and cooling fan are turned on.
*3 : A/C switch and fan switch are tuned on.

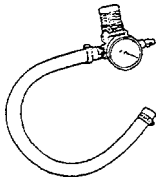
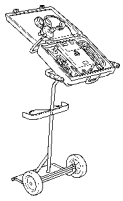
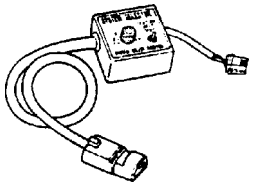
*4 : Steering wheel fully turned.
*5 : Back-up current is the constant flow of current present (for the audio unit, clock, PCM, etc.) when the ignition switch is at off and with the ignition key removed.
*6 : Must not be 0 A
*7 : Standard plug
*8 : Cold type plug

01–60 SERVICE TOOLS

ENGINE SST

A3U016001001W01

49 9200 020A V-ribbed belt tension gauge 	49 T012 0A0A Tappet holder set 	49 S120 710 Coupling flange holder <FS> 
49 E011 1A1 Holder set <FS> 	49 G011 103 Bolts <FS> 	49 B014 001 Oil seal installer 
49 H010 401 Oil seal installer <FS> 	49 G033 107A Dust cover installer <FS> 	49 E017 5A0 Engine support set 
49 W033 105 Oil seal installer <ZM> 	49 G030 797 Handle (Part of 49 G030 795) <ZM> 	49 B010 001 Oil seal installer <ZM> 
49 T028 302 Dust boot installer <ZM> 	49 0187 280A Oil pressure gauge 	49 G014 001 Oil filter wrench 
49 D011 102 Crankshaft lock tool <ZM> 	49 9200 145 (ATX) 49 D015 0A0 (MTX) Radiator cap tester adapter set 	49 L018 901 Injector checker 
49 UN01 130 104 Pin breakout box 	49 D015 004 Box wrench 	49 N013 1A0B Fuel pressure gauge set 

49 U014 001 Air pressure tester 	MZ254AT3641 Evaporative emission system tester 	49 B019 9A0 System selector 
418FS475 WDS 		

SUSPENSION

02
SECTION

02–10 GENERAL PROCEDURES

PRECAUTION (SUSPENSION)

A3U021001013W01

Wheels and Tires Removal/installation

1. 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}**.

Suspension Links Removal/installation

1. Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded.

Note

- Unloaded ... Fuel tank is full. Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated positions.

Power Steering Components Removal/installation

1. If any power steering fluid line has been disconnected anytime during the procedure, add ATF M-**III** or equivalent (e.g. Dexron®**III**), bleed the fluid line, and inspect for leakage after the procedure has been completed.

02–11 WHEEL ALIGNMENT

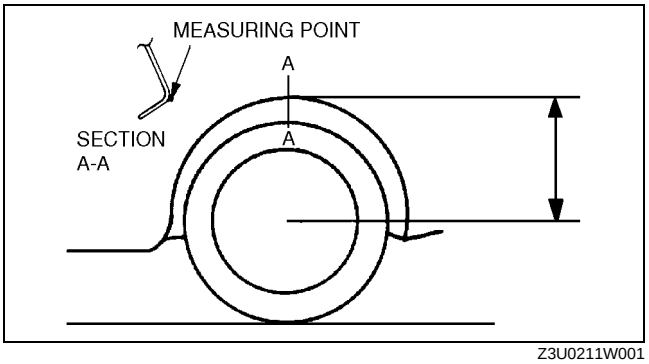
WHEEL ALIGNMENT PRE-INSPECTION

A3U021101013W01

1. Inspect the tire inflation, and adjust to the recommended pressure as necessary.
2. Inspect the front wheel for bearing play and correct it if necessary. (See 03–11–1 Wheel Bearing Play Inspection.)
3. Inspect the wheel and tire runouts. (See 02–50–1 SUSPENSION TECHNICAL DATA.)
4. Inspect the ball joints and steering linkage for excessive looseness.
5. Shake the vehicle to inspect the operation of the shock absorbers.

Note
- The vehicle must be on level ground and unloaded.
- Unloaded ... Fuel tank is full. Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated positions.

6. Measure the height from the center of the wheel to the fender brim. The difference between the left and right measurement must not exceed **10 mm {0.39 in}**.



Z3U0211W001

FRONT WHEEL ALIGNMENT

A3U021101015W01

Specification (Unloaded)*1

Item		Fuel gauge indication				
		Empty	1/4	1/2	3/4	Full
Total toe-in	(mm {in})	2±4 {0.08±0.16}				
	(degree)	0°12'±24'				
Maximum steering angle	Inner	37°±3°				
	Outer	33°±3°				
Caster angle*2		1°46'±1°	1°49'±1°	1°51'±1°	1°53'±1°	1°56'±1°
Camber angle*2		-0°48'±1°			-0°49'±1°	
Kingpin angle (reference value)		12°34'		12°35'		12°36'

*1 : Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated positions.
*2 : Difference between left and right must not exceed **1°30'**.

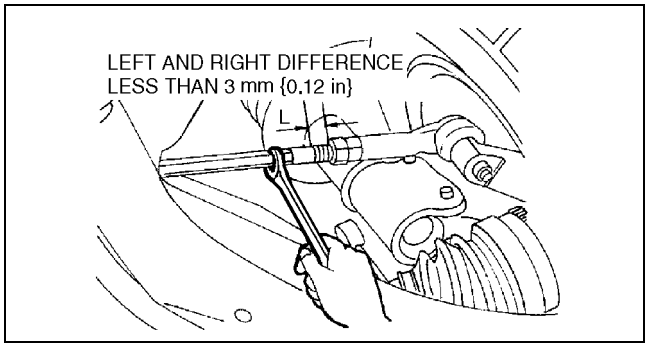
Maximum Steering Angle Adjustment

1. Loosen the tie-rod end locknuts.
2. Remove the steering gear boot clamp.

3. Turn the left and right tie rods to equalize the length L.

Maximum left/right difference
3 mm {0.12 in}

Note
- Turn the tie rods equally.



Z3U0211W002

4. Turn the tie rod to provide the correct maximum steering angle.
5. Tighten the tie-rod end locknuts.

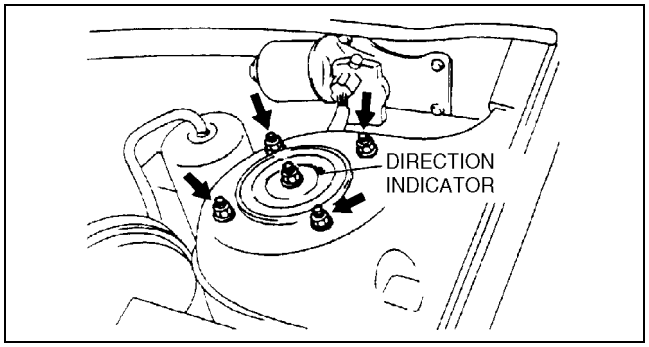
Tightening torque
68.7—98.0 N·m {7.0—10.0 kgf·m, 50.7—72.3 ft·lbf}

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.

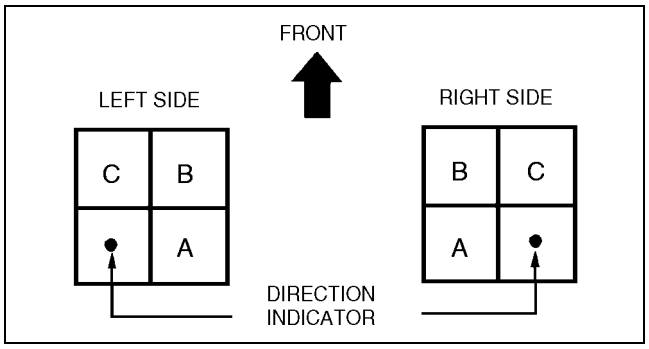
Direction indicator position	Adjustment valve from original position	
	Camber angle	Caster angle
A	+30'	0°
B	+30'	+30'
C	0°	+30'



Z3U0211W003

4. Install and tighten the mounting nuts to the specified torque.

Tightening torque
47—62 N·m {4.7—6.4 kgf·m, 34—46 ft·lbf}



Z3U0211W004

Total Toe-in Adjustment

1. Center the steering wheel and confirm that the vehicle wheels/tires are pointing straight.
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
68.7—98.0 N·m {7.0—10.0 kgf·m, 50.7—72.3 ft·lbf}

5. Verify that the boot is not twisted, and install the boot clamp.

REAR WHEEL ALIGNMENT

A3U021101016W01

Specification (Unloaded)*1

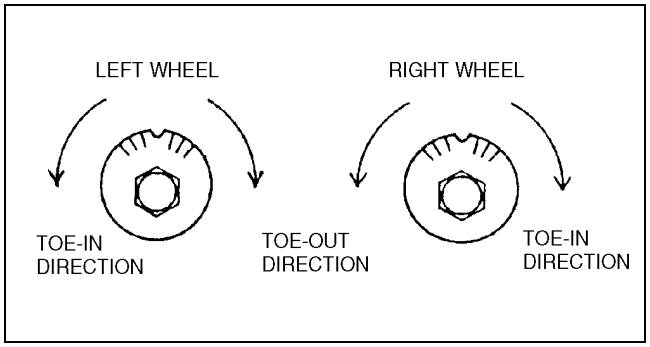
Fuel gauge indication		Empty	1/4	1/2	3/4	Full
Total toe-in	(mm {in})	2±4 {0.08±0.16}				
	(degree)	0°12'±24'				
Camber angle*2 (reference value)	14, 15 inch wheel	–0°23'±1°	–0°25'±1°	–0°27'±1°	–0°29'±1°	–0°31'±1°
	16 inch wheel	–0°27'±1°	–0°29'±1°	–0°31'±1°	–0°32'±1°	–0°34'±1°
Thrust angle (reference value)		0°±48'				

*1 : Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated positions. Adjust to the median when carrying out wheel alignment.
*2 : Difference between left and right must not exceed **1°30'**.

Total Toe-in Adjustment

1. Loosen the cam nut on the lateral link.
2. 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



Z3U0211W005

Note
- Turning the adjusting cam bolt one complete turn changes the toe-in **about 3.0 mm {0.12 in} (0°18')**.

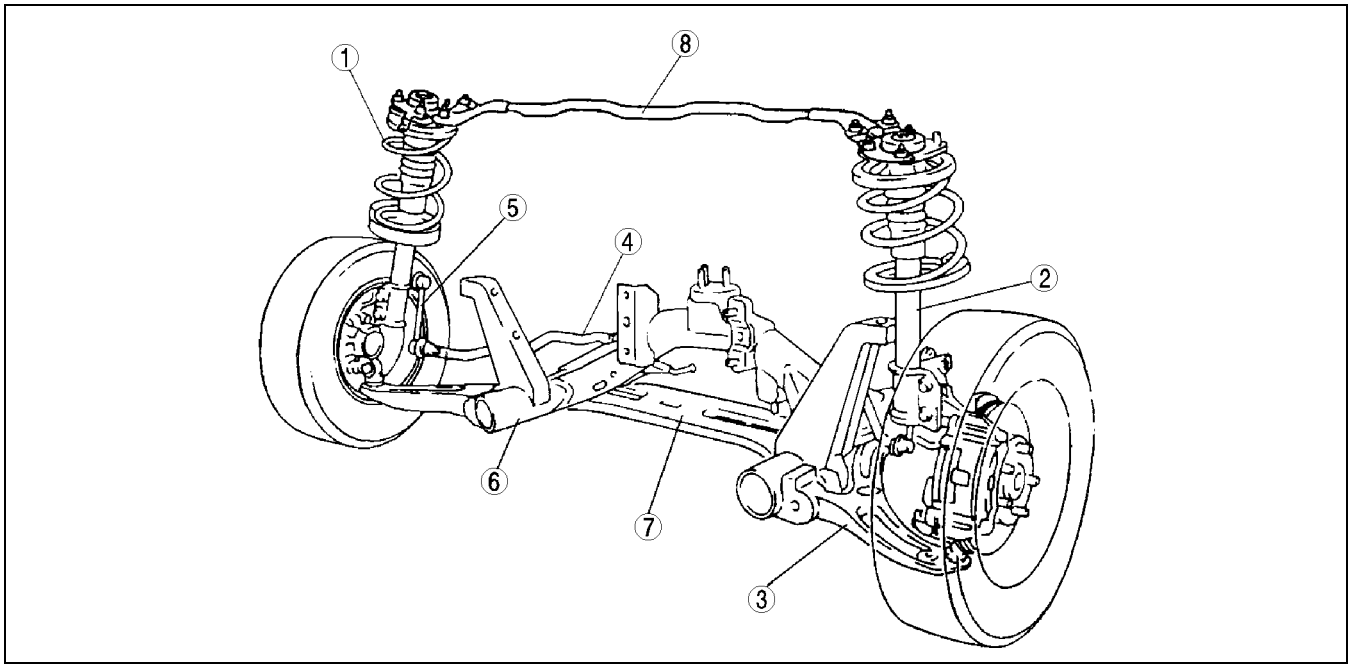
3. Tighten the cam nut.

Tightening torque
50—69 N·m {5.1—7.1 kgf·m, 37—50 ft·lbf}

02–13 FRONT SUSPENSION

FRONT SUSPENSION LOCATION INDEX

A3U021301015W01



A3U0213W001

1	Front shock absorber and coil spring (See 02–13–2 FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION)
2	Front shock absorber (See 02–13–4 FRONT SHOCK ABSORBER INSPECTION) (See 02–13–4 FRONT SHOCK ABSORBER DISPOSAL)
3	Front lower arm (See 02–13–5 FRONT LOWER ARM REMOVAL/ INSTALLATION) (See 02–13–7 FRONT LOWER ARM INSPECTION)
4	Front stabilizer (See 02–13–7 FRONT STABILIZER REMOVAL/ INSTALLATION)
5	Stabilizer control link (See 02–13–8 STABILIZER CONTROL LINK (FRONT) INSPECTION)
6	Front crossmember (See 02–13–8 FRONT CROSSMEMBER REMOVAL/INSTALLATION)
7	Transverse member (See 02–13–9 TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION)
8	Front strut bar (5HB only) (See02–13–10 FRONT STRUT BAR REMOVAL/ INSTALLATION)

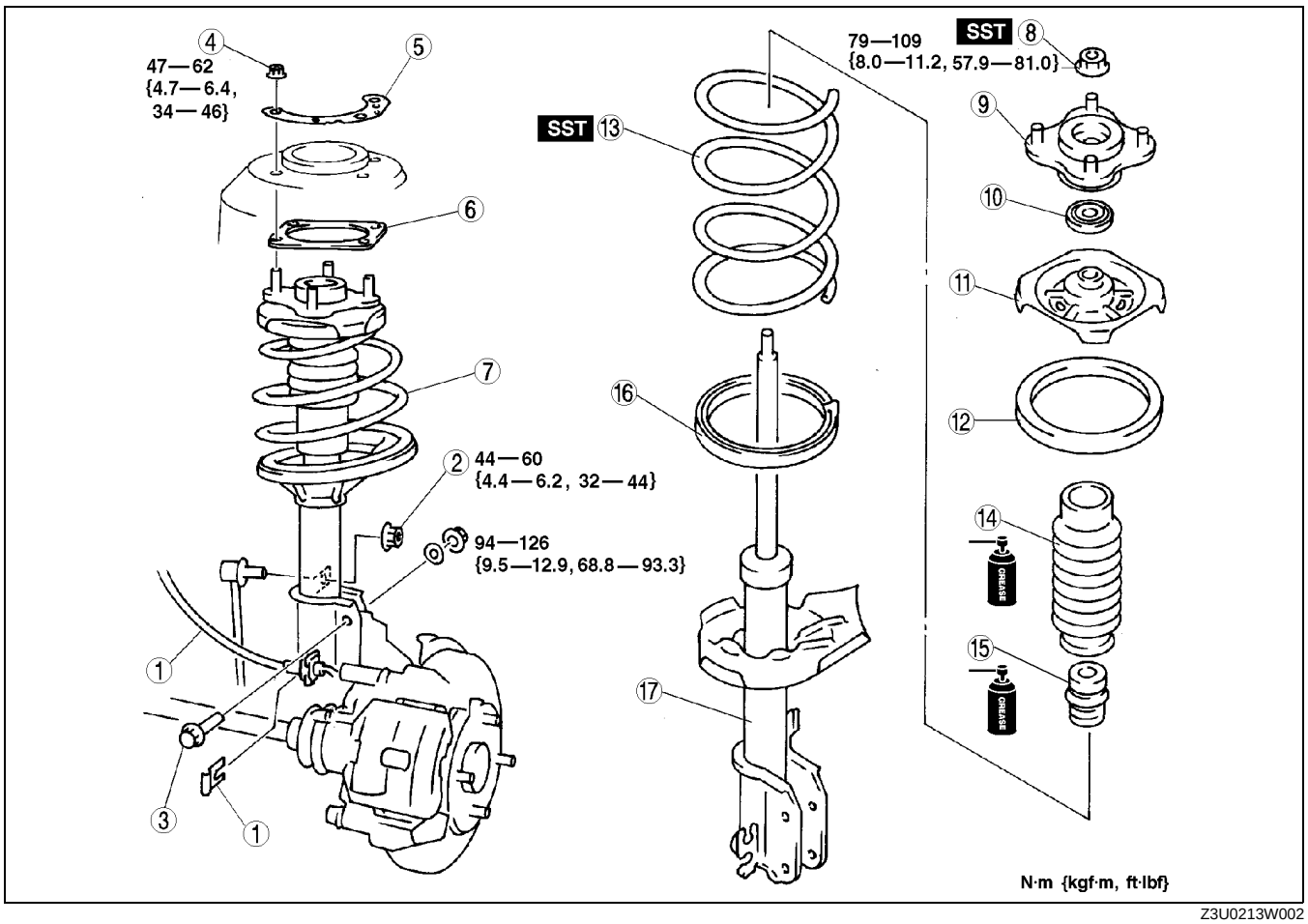
FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

A3U021304910W01

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-sensor (axle side) and set it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the front wheel alignment.
   - If not as specified, adjust the front wheel alignment. (See 02–11–1 FRONT WHEEL ALIGNMENT.)



Z3U0213W002

1	Clip and brake hose
2	Nut (Stabilizer control link)
3	Shock absorber bolt
4	Nut
5	Stiffener
6	Sheet
7	Front shock absorber and spring (See 02–13–4 Front Shock Absorber and Spring Installation Note)
8	Piston rod nut (See 02–13–3 Piston Rod Nut Removal Note)

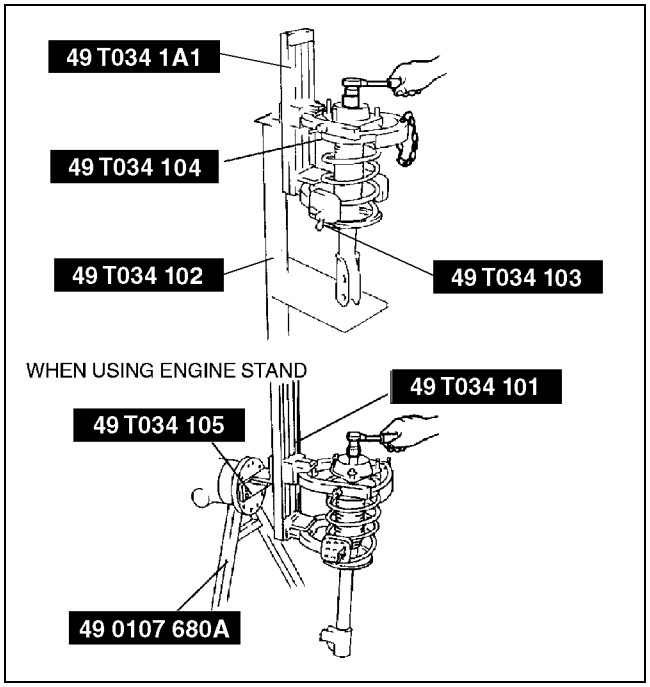
9	Mounting rubber
10	Bearing
11	Upper spring seat
12	Upper spring seat rubber
13	Coil spring (See 02–13–3 Coil Spring Installation Note)
14	Dust Boot
15	Bound stopper
16	Lower spring seat rubber
17	Shock absorber

Piston Rod Nut Removal Note

1. Protect the coil spring using a piece of cloth, then set the **SSTs**.

   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.**

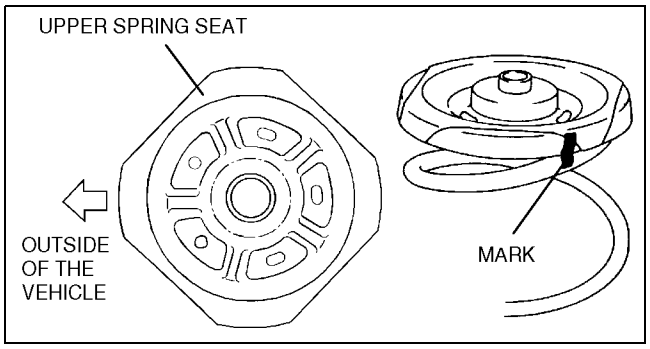
2. Compress the coil spring using the **SSTs**, and remove the piston rod nut.



Z3U0213W003

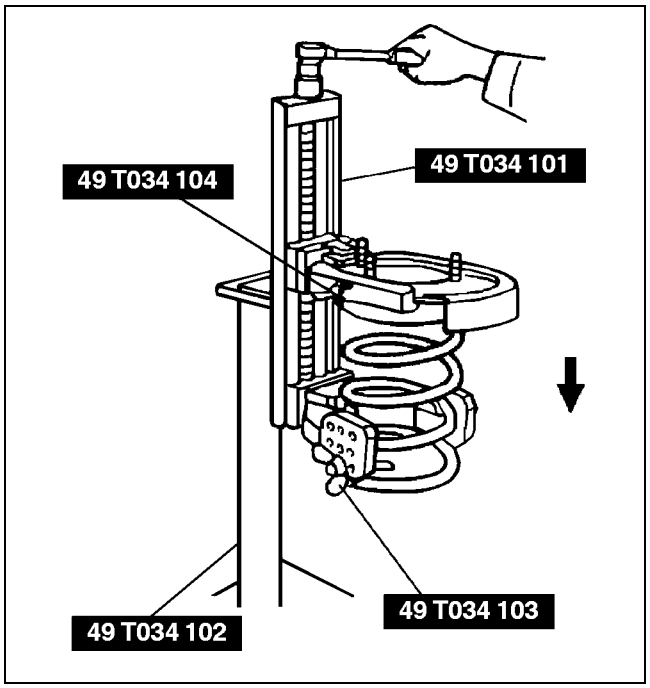
Coil Spring Installation Note

1. Temporarily install the coil spring, upper spring seat rubber and upper spring seat on the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
2. Mark the coil spring, upper spring seat rubber and upper spring seat for proper installation as shown in the figure.
3. Align the marks of the coil spring, upper spring seat rubber and upper spring seat. Protect the coil spring and upper seat spring using a piece of cloth, then set the **SSTs**.



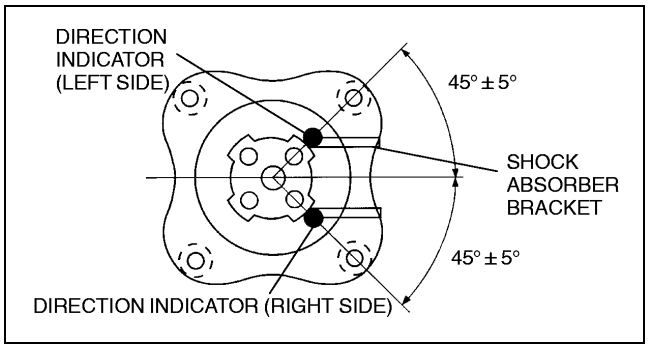
Z3U0213W004

4. Compress the coil spring using the **SSTs**.
5. Install the lower spring seat rubber on the lower spring seat.
6. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
7. Make sure that the marks on the shock absorber and upper spring seat are aligned.
8. Install the bearing, mounting rubber, and piston rod nut as shown in the figure, then remove the **SSTs**.



Z3U0213W005

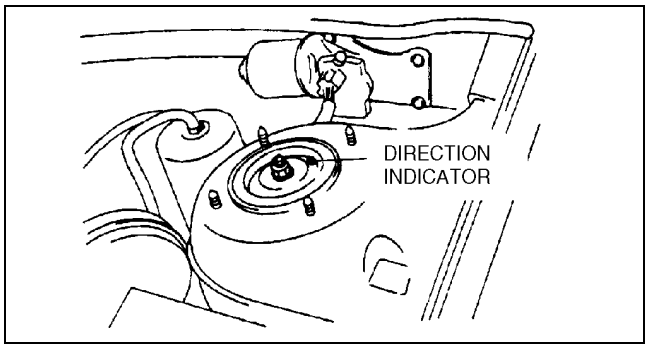
Piston rod nut tightening torque
79—109 N·m {8.0—11.2 kgf·m, 57.9—81.0 ft·lbf}



X3U213WA4

Front Shock Absorber and Spring Installation Note

1. Face the mounting block direction indicator toward the rear outboard position, and install the shock absorber.



Z3U0213W006

FRONT SHOCK ABSORBER INSPECTION

A3U021334700W01

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 **3 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.
   - If not as specified, replace the shock absorber.

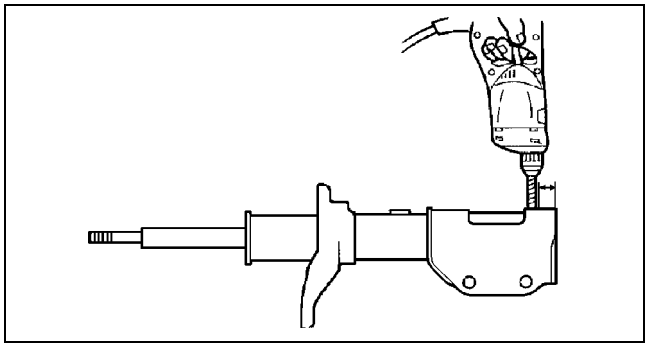
FRONT SHOCK ABSORBER DISPOSAL

A3U021334700W02

Warning

- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

1. Clamp a shock absorber flat or with the piston downwards.
2. Drill a **2—3 mm {0.08—0.11 in}** hole at a point **20—30 mm {0.8—1.1 in}** from the bottom of the tube, so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of waste oil according to the waste disposal law.



Z3U0213W007

Note

- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

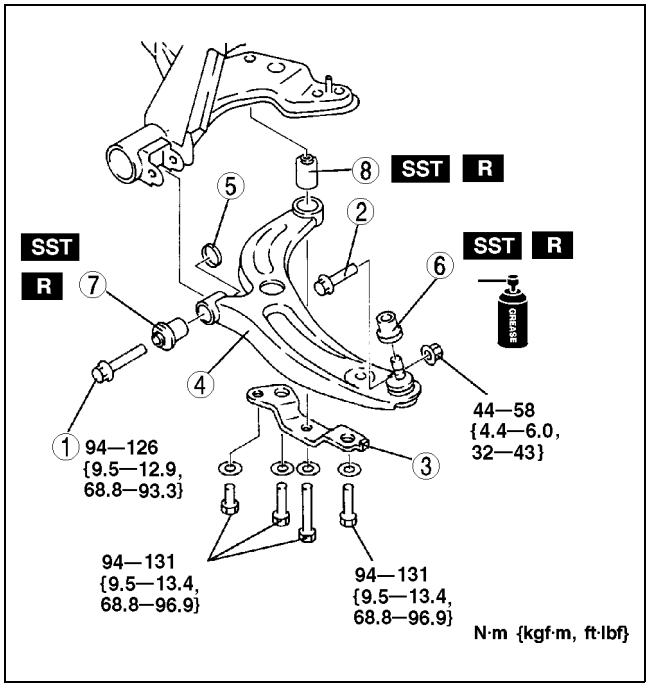
FRONT LOWER ARM REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.

1	Bolt
2	Bolt (Lower arm ball joint)
3	Bracket
4	Lower arm component
5	Stopper
6	Dust boot (See 02–13–5 Dust Boot Removal Note) (See 02–13–7 Dust Boot Installation Note)
7	Lower arm bushing (front) (See 02–13–5 Lower Arm Bushing (Front) Removal Note) (See 02–13–6 Lower Arm Bushing (Front) Installation Note)
8	Lower arm bushing (rear) (See 02–13–6 Lower Arm Bushing (Rear) Removal Note) (See 02–13–6 Lower Arm Bushing (Rear) Installation Note)

2. Install in the reverse order of removal.

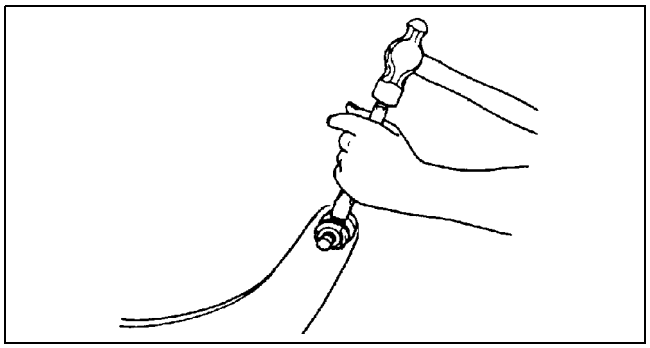
A3U021334300W01



Z3U0213W008

Dust Boot Removal Note

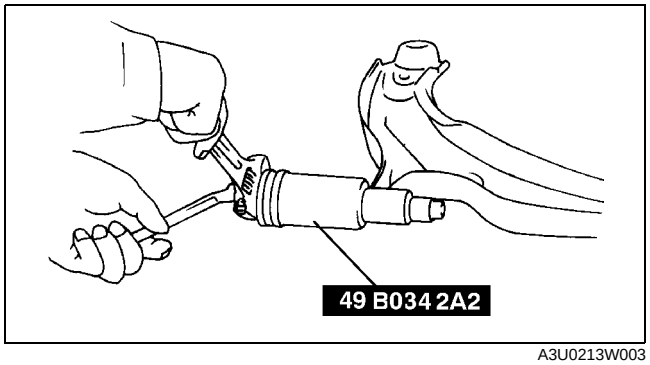
1. Remove the dust boot using a chisel, being careful not to damage the ball joint and the arm.



Z3U0213W009

Lower Arm Bushing (Front) Removal Note

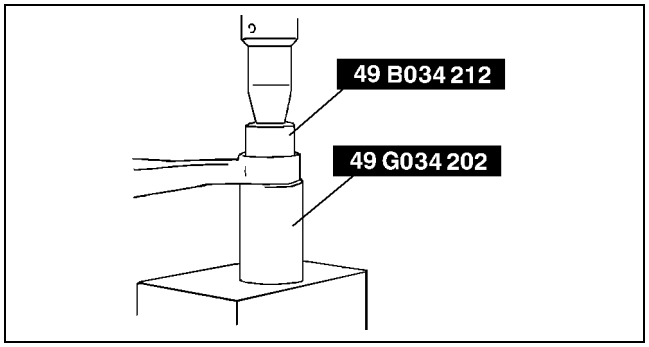
1. Cut away the projecting rubber of the lower arm bushing.
2. Set the **SST** onto the lower arm, and remove the bushing.



A3U0213W003

Lower Arm Bushing (Rear) Removal Note

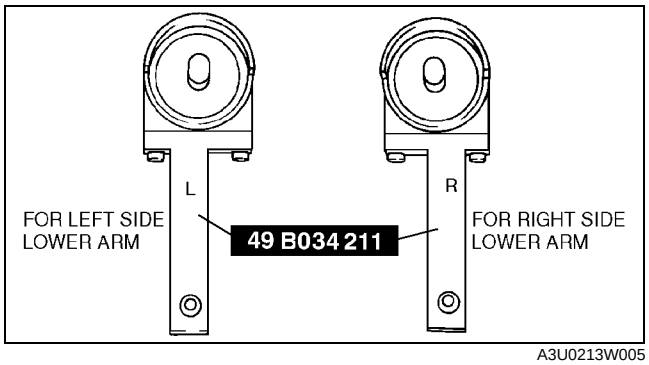
1. Remove the lower arm bushing using the **SSTs** and a press.



A3U0213W004

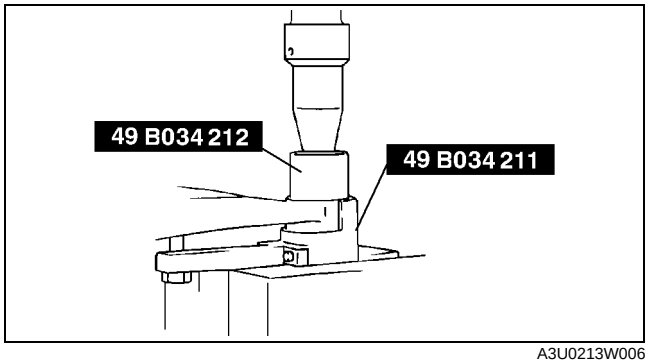
Lower Arm Bushing (Rear) Installation Note

1. Align the mark of the lower arm and the small projection of the lower arm bushing (rear) as shown in the figure.
2. Set the lower arm onto the **SST** (49 B034 211).



A3U0213W005

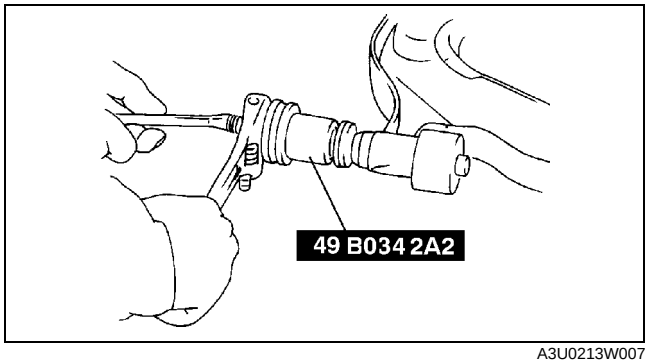
3. Press the new lower arm bushing using the **SST** (49 B034 212).



A3U0213W006

Lower Arm Bushing (Front) Installation Note

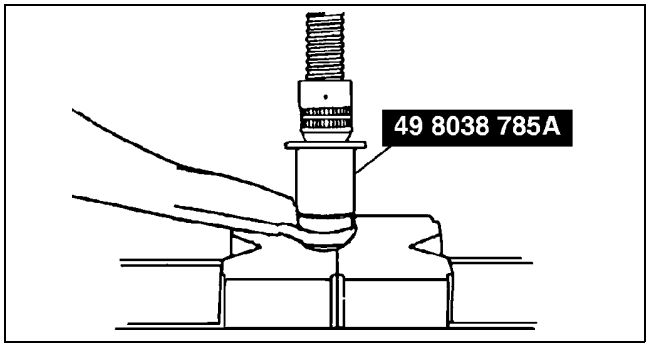
1. Install the new bushing, and pull it into the lower arm using the **SST**.



A3U0213W007

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 excess grease.



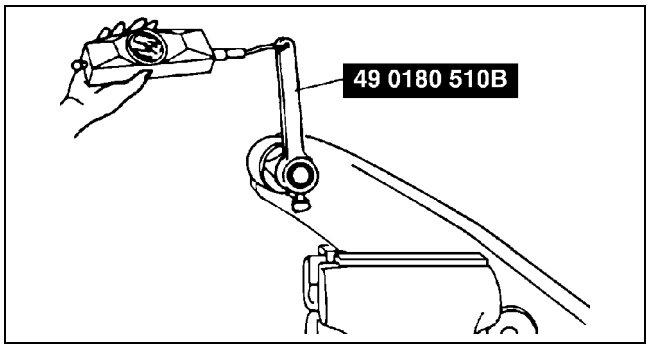
Z3U0213W015

FRONT LOWER ARM INSPECTION

A3U021334300W02

1. Remove the lower arm from the vehicle.
2. Inspect for damage, cracks, and bending.
3. Inspect the ball joint rotation torque.
   (1) Rotate the ball joint **5 times**.
   (2) Connect the **SST** to the ball stud, and measure the rotation torque using a pull scale.
   - Replace it if not within the specification.

Ball joint preload
1.0—4.9 N·m {10—50 kgf·cm, 9—43 in·lbf}
Pull scale reading
14—44 N {1.4—4.5 kgf, 3—10 lbf}



A3U0213W008

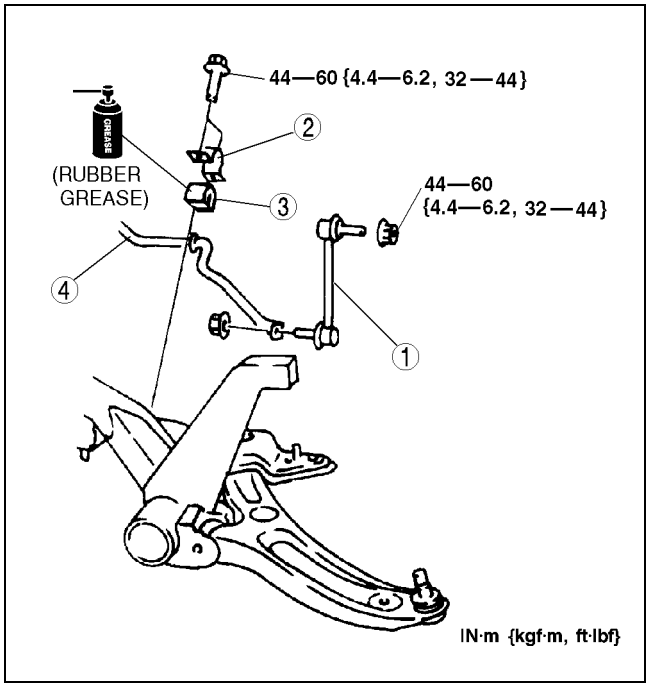
FRONT STABILIZER REMOVAL/INSTALLATION

A3U021334100W01

1. Remove the crossmember. (See 02–13–8 FRONT CROSSMEMBER REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	Stabilizer control link
2	Stabilizer bracket (See 02–13–8 Stabilizer Bracket Installation Note)
3	Stabilizer bushing
4	Front stabilizer

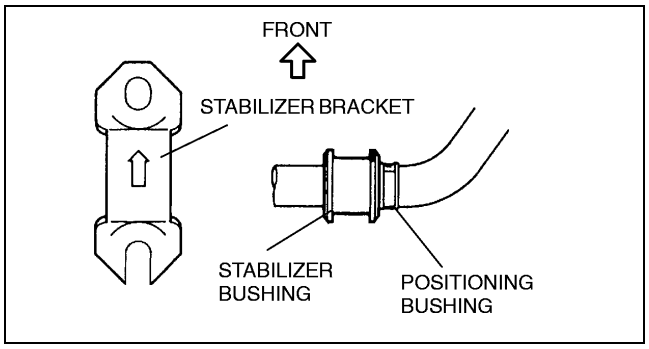
3. Install in the reverse order of removal.
4. Inspect the front wheel alignment and adjust it if necessary.



Z3U0213W016

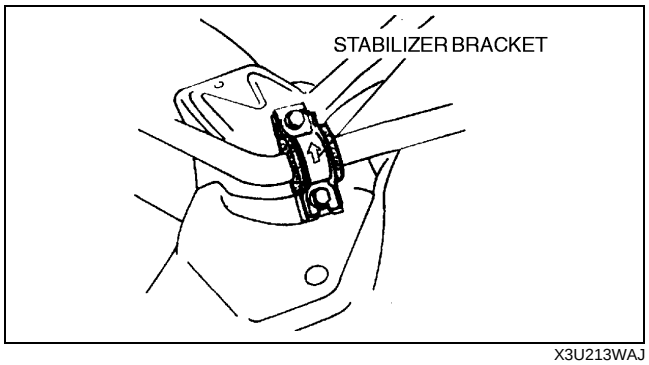
Stabilizer Bracket Installation Note

1. Apply rubber grease to the inside surface of the stabilizer bushing.
2. Align the bushing with the inside of positioning plate on the stabilizer bar.



X3U213WAH

3. Install the stabilizer bracket.



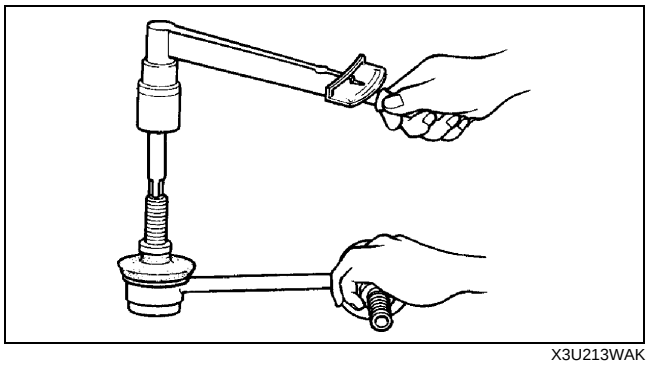
X3U213WAJ

STABILIZER CONTROL LINK (FRONT) INSPECTION

A3U021334150W01

1. Remove the stabilizer control link from the vehicle.
2. Inspect for bending and damage.
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.

   Starting torque
   0.2—2.5 N·m {1.4—26.0 kgf·cm, 1.3—22.0 in·lbf}



X3U213WAK

FRONT CROSSMEMBER REMOVAL/INSTALLATION

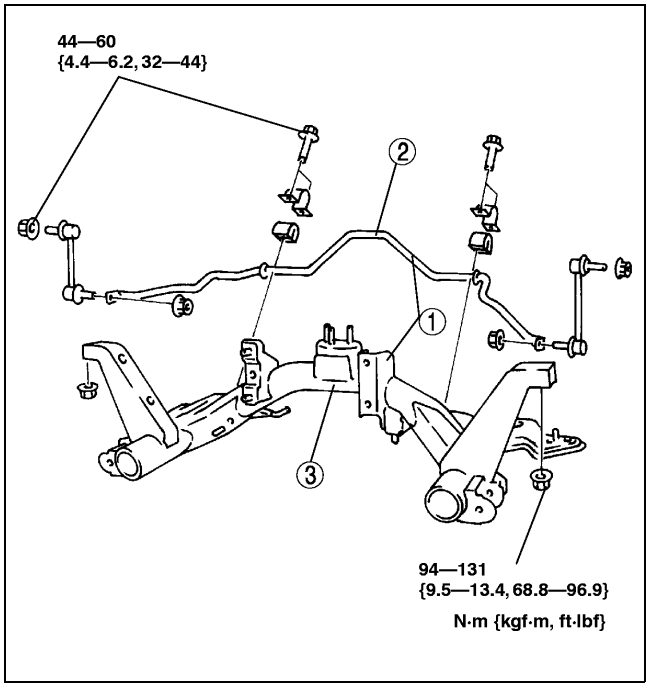
A3U021334800W01

1. For the MTX models, remove the change control rod and extension bar. (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R].)
2. Remove the front exhaust pipe. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.) (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
3. Remove the transverse member. (See02–13–9 TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION)
4. Remove the steering gear and linkage. (See 06–12–9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
5. Remove the front lower arm. (See 02–13–5 FRONT LOWER ARM REMOVAL/INSTALLATION.)

6. Remove in the order indicated in the table.

1	Crossmember component (See 02–13–9 Crossmember Component Removal Note)
2	Front stabilizer (See 02–13–7 FRONT STABILIZER REMOVAL/ INSTALLATION)
3	Front crossmember

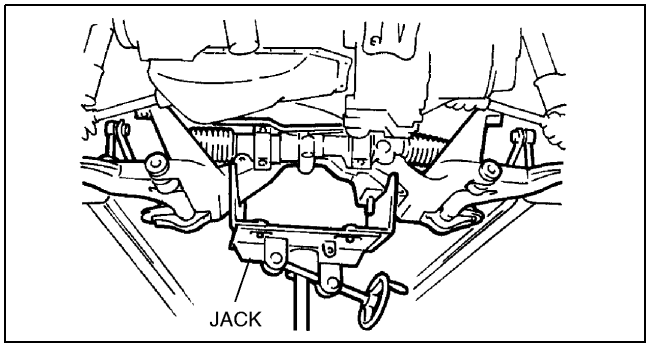
7. Install in the reverse order of removal.
8. Inspect the front wheel alignment as necessary.



X3U213WAL

Crossmember Component Removal Note

1. Support the crossmember using a jack and remove the bolts and nuts.
2. Remove the crossmember component.

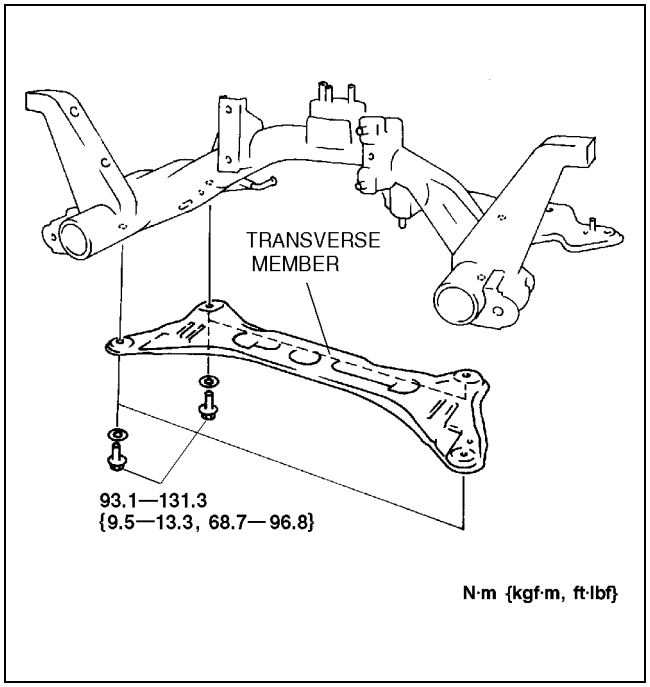


X3U213WAM

TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION

A3U021334890W01

1. Remove the transverse member.
2. Install the transverse member.



Y3E7414W001

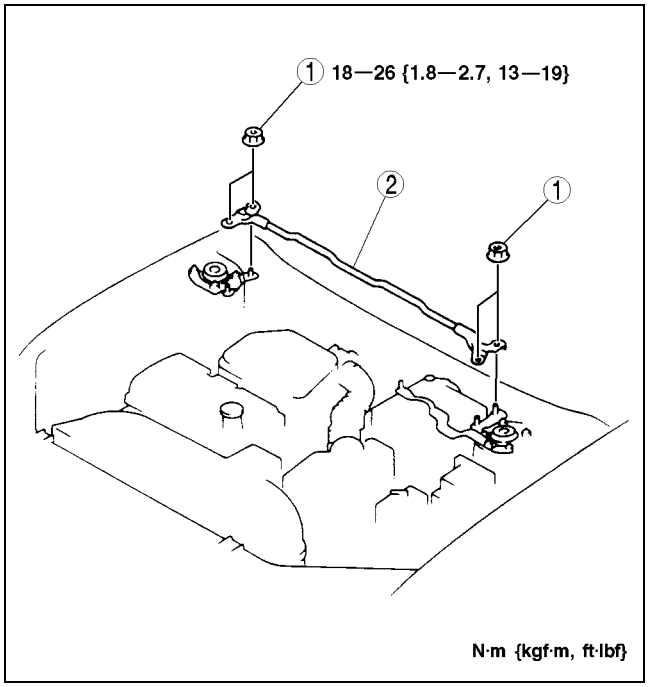
FRONT STRUT BAR REMOVAL/INSTALLATION

A3U021301015W02

1. Remove in the order indicated in the table.

1	Nut
2	Front strut bar

2. Install in the reverse order of removal.

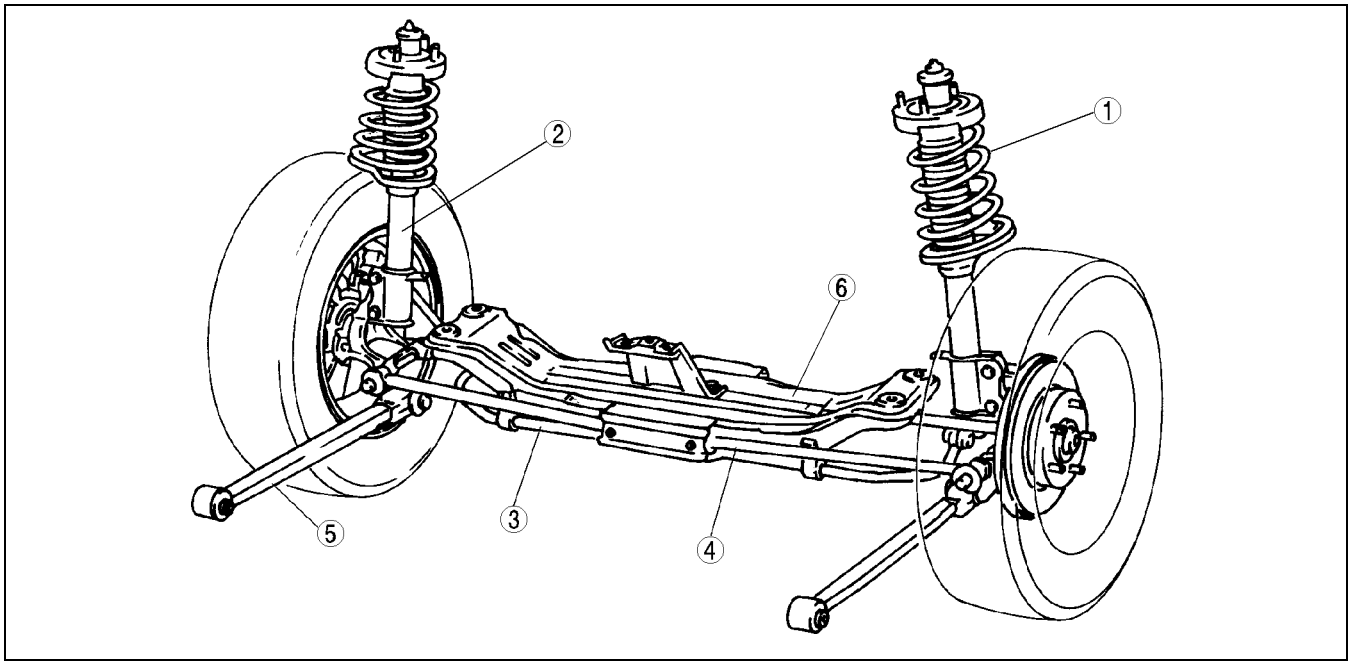


Y3A7414W002

02–14 REAR SUSPENSION

REAR SUSPENSION LOCATION INDEX

A3U021401016W01



Z3U0214W001

1	Rear shock absorber and coil spring (See 02–14–2 REAR SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION)
2	Rear shock absorber (See 02–14–3 REAR SHOCK ABSORBER INSPECTION) (See 02–14–3 REAR SHOCK ABSORBER DISPOSAL)
3	Rear stabilizer and stabilizer control link (See 02–14–4 REAR STABILIZER REMOVAL/INSTALLATION) (See 02–14–4 STABILIZER CONTROL LINK (REAR) INSPECTION)
4	Lateral link (See 02–14–5 LATERAL LINK AND TRAILING LINK REMOVAL/INSTALLATION)
5	Trailing link (See 02–14–5 LATERAL LINK AND TRAILING LINK REMOVAL/INSTALLATION)
6	Rear crossmember (See 02–14–6 REAR CROSSMEMBER REMOVAL/INSTALLATION)

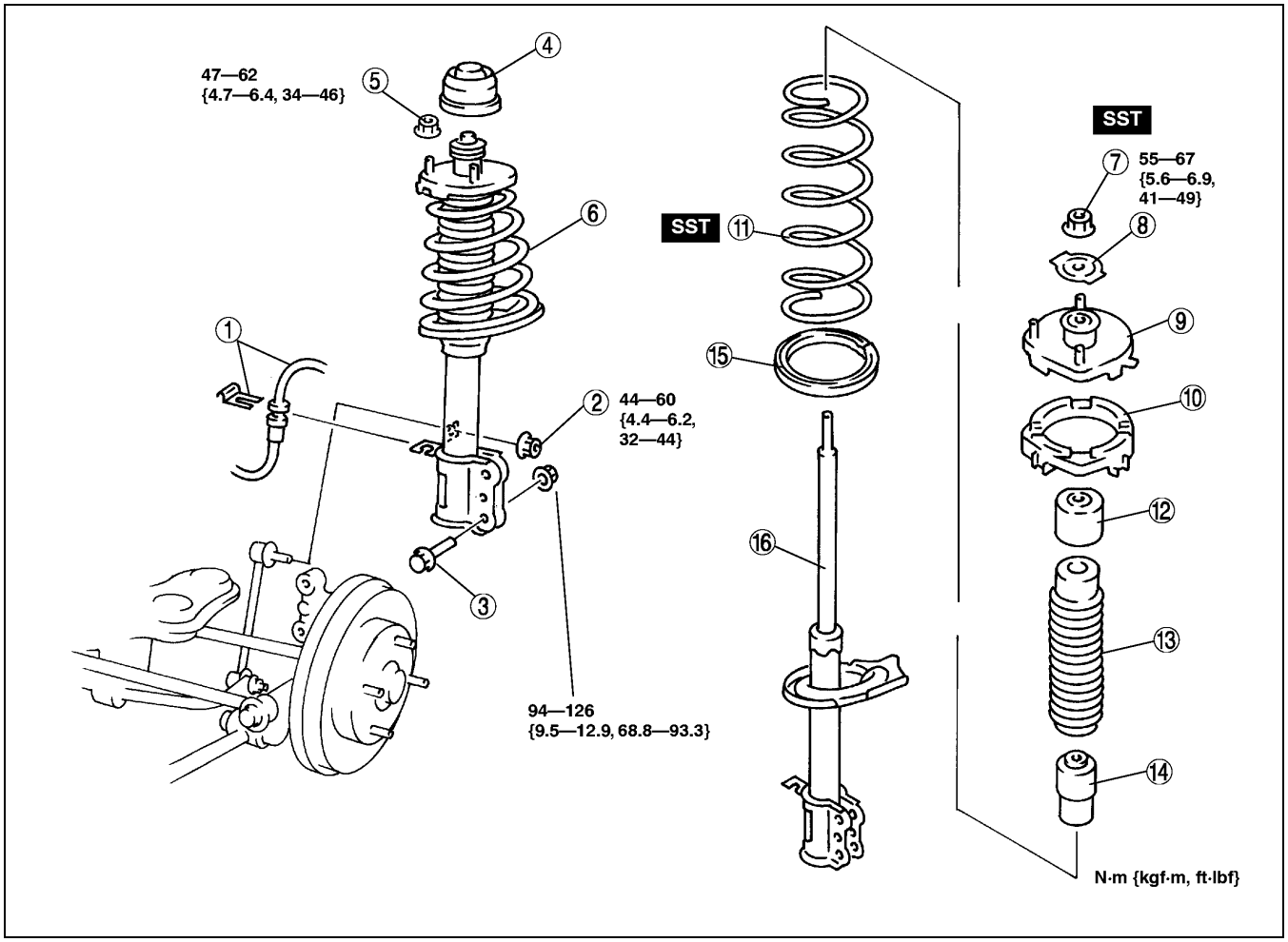
REAR SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION

A3U021405910W01

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 set it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. For the 4SD, remove the rear seat belt. (See 08–11–2 REAR SEAT BELT REMOVAL/INSTALLATION.) For the 5HB, remove the trunk side trim. (See 09–17–15 TRUNK SIDE TRIM REMOVAL/INSTALLATION)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



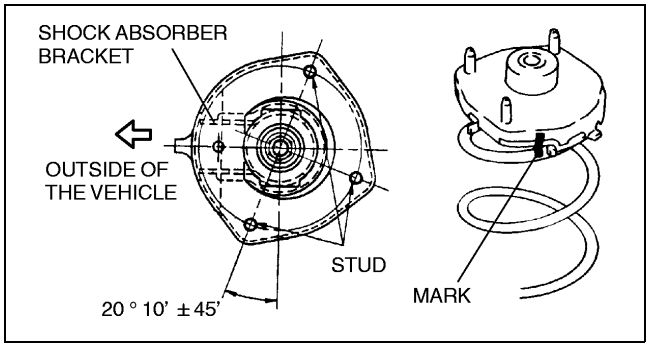
X3U214WA0

1	Clip and brake hose
2	Stabilizer control link nut
3	Shock absorber bolt
4	Cap
5	Nut
6	Rear shock absorber and spring
7	Piston rod nut (See 02–13–3 Piston Rod Nut Removal Note)
8	Washer

9	Mounting rubber
10	Upper spring seat
11	Coil spring (See 02–14–3 Coil Spring Installation Note)
12	Stopper seat
13	Dust cover
14	Bound stopper
15	Lower spring seat rubber
16	Rear shock absorber

Coil Spring Installation Note

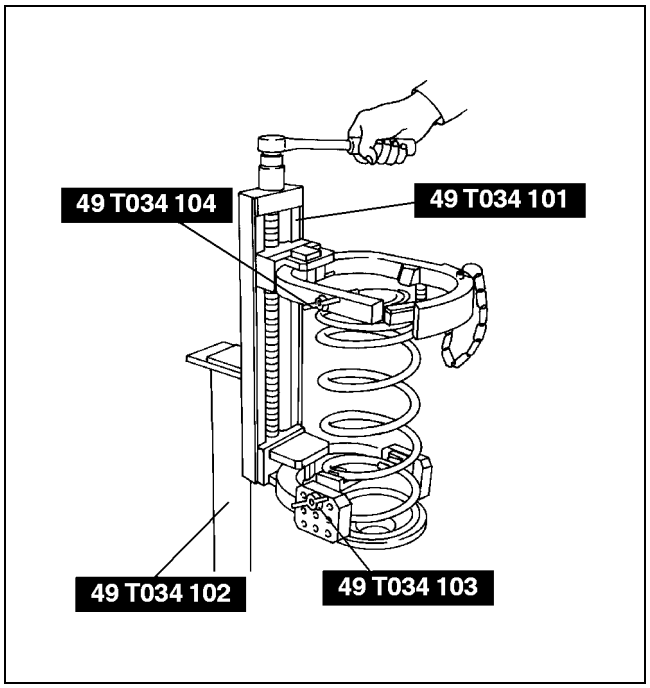
1. Temporarily install the coil spring, upper spring seat and mounting rubber on the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
2. Mark the coil spring, upper spring seat and mounting rubber for proper installation as shown in the figure. (The following figure shows how to install the right side. Install the left side symmetrically.)
3. Align the marks of the coil spring and upper spring seat rubber. Protect the coil spring and upper seat spring using a piece of cloth, then set the **SSTs**.



X3U214WA1

4. Compress the coil spring using the **SSTs**.
5. Install the lower spring seat rubber on the lower spring seat.
6. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
7. Align the marks of the mounting rubber and shock absorber.
8. Install the washer and piston rod nut, then remove the **SSTs**.

Piston rod nut tightening torque
55—67 N·m {5.6—6.9 kgf·m, 41—49 ft·lbf}



A3U0214W001

REAR SHOCK ABSORBER INSPECTION

A3U021428700W01

1. Inspect the rear shock absorber using the same procedure as the front shock absorber. (See 02–13–4 FRONT SHOCK ABSORBER INSPECTION.)

REAR SHOCK ABSORBER DISPOSAL

A3U021428700W02

1. Dispose of the rear shock absorber using the same procedure as the front shock absorber. (See 02–13–4 FRONT SHOCK ABSORBER DISPOSAL.)

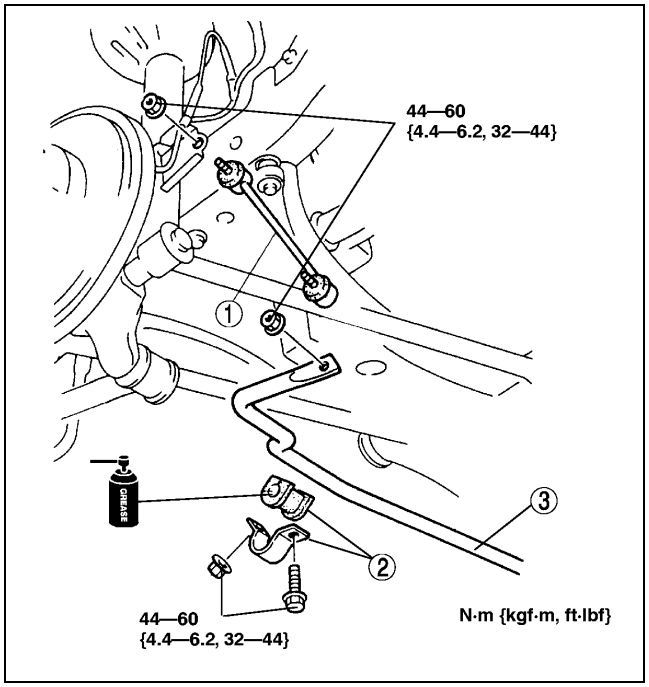
REAR STABILIZER REMOVAL/INSTALLATION

A3U021428100W01

1. Remove in the order indicated in the table.

1	Stabilizer control link
2	Stabilizer bushing and bracket (See 02–14–4 Stabilizer Bushing and Bracket Installation Note)
3	Rear stabilizer

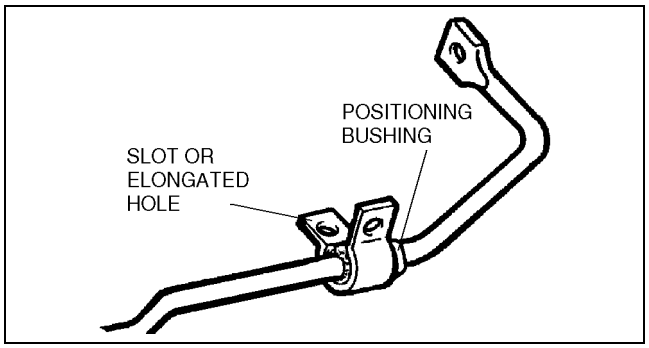
2. Install in the reverse order of removal.



X3U214WA3

Stabilizer Bushing and Bracket Installation Note

1. Align the bushing with the positioning bushing on the stabilizer bar.
2. Temporarily install the stabilizer bracket so that the slot (or elongated hole) faces downward.
3. Tighten the stabilizer bracket nut, then bolt.



Z3U0214W101

STABILIZER CONTROL LINK (REAR) INSPECTION

A3U021434150W01

1. Inspect the rear stabilizer control link in the same procedure as the front stabilizer control link inspection. (See 02–13–8 STABILIZER CONTROL LINK (FRONT) INSPECTION.)

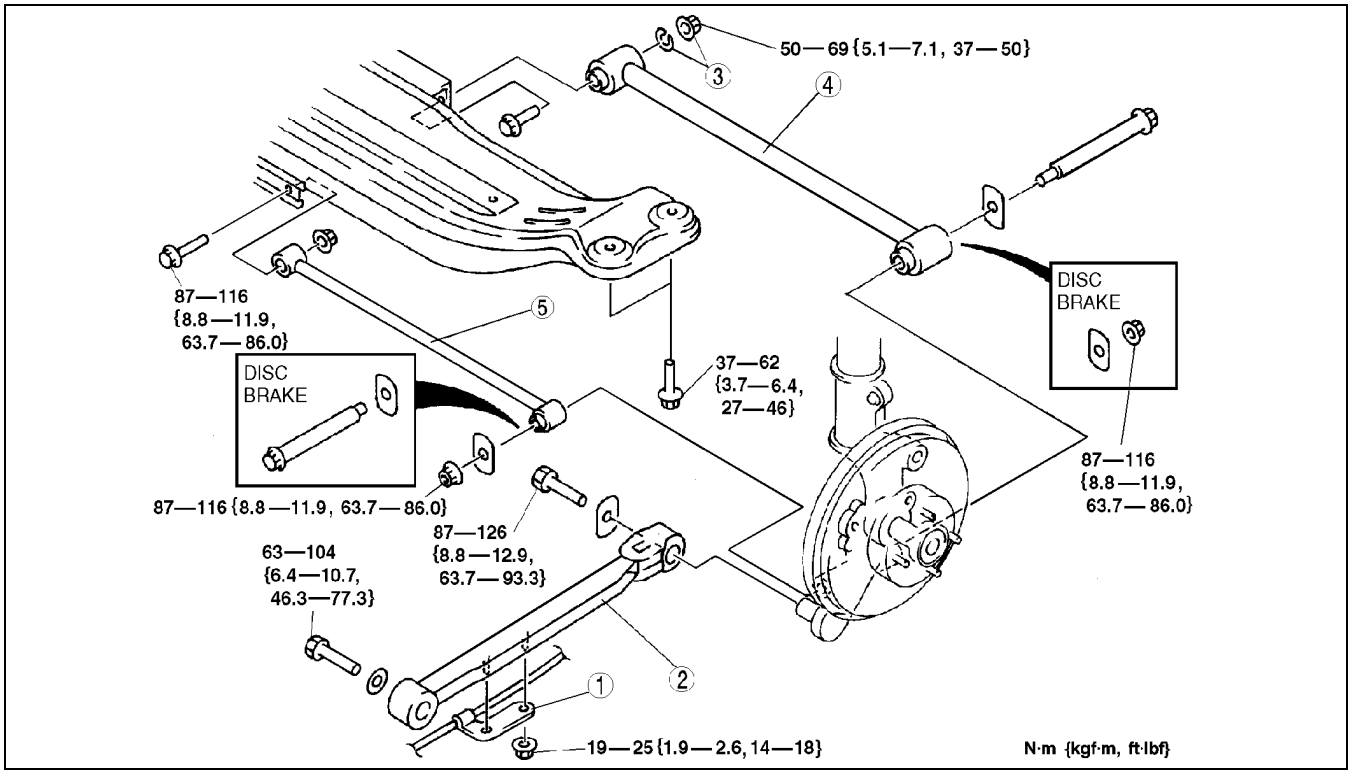
LATERAL LINK AND TRAILING LINK REMOVAL/INSTALLATION

A3U021428600W01

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.
3. Inspect the rear wheel alignment and adjust it as necessary.

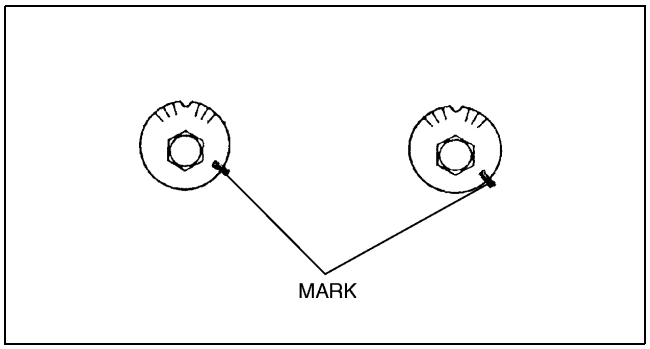


Z3U0214W006

1	Parking brake cable bracket
2	Trailing link
3	Nut, cam plate and adjusting cam bolt (See 02–14–5 Nut, Cam Plate and Adjusting Cam Bolt Removal Note) (See 02–14–6 Nut, Cam Plate, and Adjusting Cam Bolt Installation Note)
4	Rear lateral link
5	Front lateral link (See 02–14–6 Front Lateral Link Removal Note)

Nut, Cam Plate and Adjusting Cam Bolt Removal Note

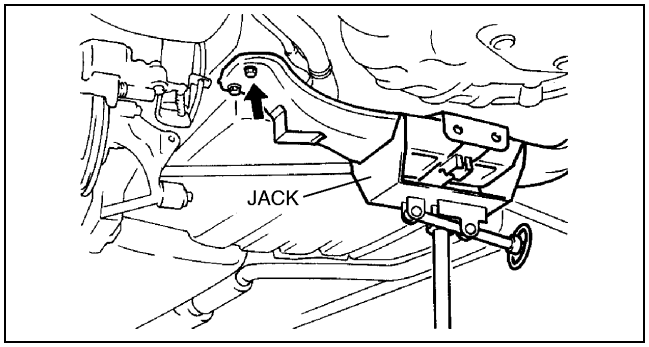
1. Before loosening the nut, make a mark on the cam plate and the crossmember for reference during installation.



Y3U214WA1

Front Lateral Link Removal Note

1. Support the rear crossmember using a jack, then remove the crossmember bolts.
2. Lower the crossmember to remove the lateral link bolt.



X3U214WA7

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 with the mark made before removing the adjusting cam bolt.
3. Tighten the nut.

Tightening torque
50—69 N·m {5.1—7.1 kgf·m, 37—50 ft·lbf}

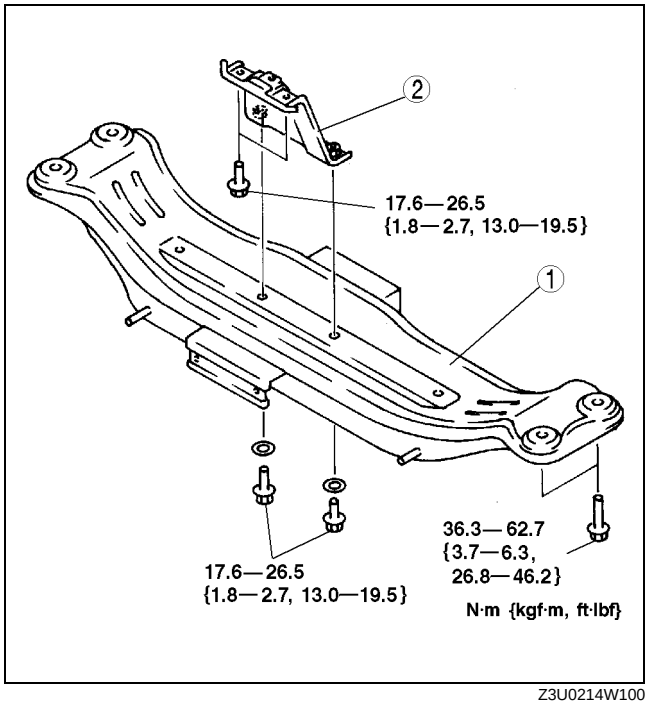
REAR CROSSMEMBER REMOVAL/INSTALLATION

A3U021428400W01

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.

1	Rear crossmember
2	Crossmember bracket

4. Install in the reverse order of removal.
5. Inspect the rear wheel alignment and adjust it as necessary.



Z3U0214W100

02–50 TECHNICAL DATA

SUSPENSION TECHNICAL DATA

A3U025001013W01

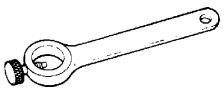
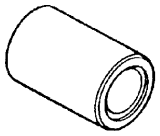
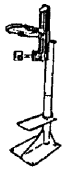
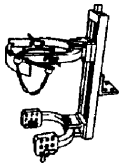
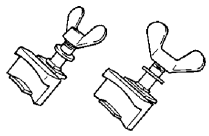
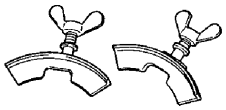
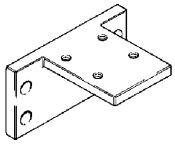
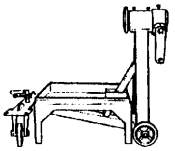
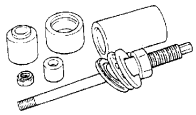
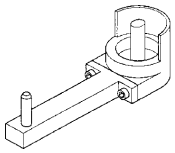
Item				Specification		
WHEEL ALIGNMENT						
Front wheel alignment (Unloaded)*1	Maximum steering angle		Inner	37°±3°		
			Outer	33°±3°		
	Total toe-in		(mm {in})	2±4 {0.08±0.16}		
			(degree)	0°12′±24′		
	Camber angle*2			–0°49′±1°		
	Caster angle*2			1°56′±1°		
	Kingpin angle (Reference value)			12°36′		
Rear wheel alignment (Unloaded)*1	Total toe-in		(mm {in})	2±4 {0.08±0.16}		
			(degree)	0°12′±24′		
	Camber angle*2 (Reference value)			–0°31′±1°(14,15inch wheel), –0°34′±1°(16inch wheel)		
	Thrust angle (Reference value)			0°±48′		
WHEELS AND TIRES						
Standard tire wheel	Size			14×5 1/2JJ	15×6JJ	16×6JJ
	Offset		(mm {in})	45 {1.77}		50 {1.97}
	Pitch circle diameter		(mm {in})	100 {3.94}		114.3 {4.50}
	Material			Steel	Steel or aluminum alloy	Aluminum alloy
Standard tire	Size			P185/65R14 85S	P195/55R15 84V	P195/50R16 83V
	Air pressure		(kPa {kgf/cm^2, psi})	220 {2.2, 32}		
	Remaining tread		(mm {in})	1.6 {0.063}		
Standard tire wheel and tire	Wheel and tire runout	Radial direction	(mm {in})	1.5 {0.06 max.}		
		Lateral direction	(mm {in})	Steel: 2.5 {0.10} max., Aluminum: 2.0 {0.08} max.		
	Wheel unbalance*3		(g {oz})	10 {0.35} max.	9 {0.32} max.	8 {0.30} max.
Temporary spare tire wheel	Size			14×4T		15×4T
	Offset		(mm {in})	40 {1.58}		45 {1.77}
	Pitch circle diameter		(mm {in})	100 {3.94}		114.3 {4.50}
	Material			Steel		
Temporary spare tire	Size			T125/70 D14		T115/70 D15
	Air pressure		(kPa {kgf/cm^2, psi})	420 {4.2, 60}		
Temporary spare tire wheel and tire	Wheel and tire runout	Radial direction	(mm {in})	2.0 {0.08} max.		
		Lateral direction	(mm {in})	2.5 {0.10} max.		
FRONT SUSPENSION						
Lower arm ball joint rotation torque (Pull scale reading)			(N {kgf, lbf})	14—44 {1.4—4.5, 3—10}		
Stabilizer control link rotation torque			(N·m {kgf·cm, in·lbf})	0.2—2.5 {1.4—26.0, 1.3—22.0}		
REAR SUSPENSION						
Stabilizer control link rotation torque			(N·m {kgf·cm, in·lbf})	0.2—2.5 {1.4—26.0, 1.3—22.0}		

*1 : Fuel tank is full. Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated positions. Adjust to the median when carrying out wheel alignment.
*2 : Difference between left and right must not exceed **1°30'**.
*3 : 1 balance weight: max. **60 g {2.12 oz}**. If the total weight exceeds **100 g {3.53 oz}** on one side, rebalance after moving the tire around on the rim. Do not use more than 2 balance weights on the inner or outer side of the wheel.

02–60 SERVICE TOOLS

SUSPENSION SST

A3U026001013W01

49 0180 510B Preload measuring attachment 	49 8038 785A Dust boot installer 	49 T034 1A0 Coil spring compressor set 
49 T034 101 Spring compressor (Part of 49 T034 1A0) 	49 T034 102 Stand (Part of 49 T034 1A0) 	49 T034 103 Hook (Part of 49 T034 1A0) 
49 T034 104 Support (Part of 49 T034 1A0) 	49 T034 105 Attachment 	49 0107 680A Engine stand 
49 B034 2A2 Rubber bushing replacer set 	49 B034 211 Rubber bushing installer 	49 B034 212 Rubber bushing replacer 
49 G034 202 Support block 	—	—

DRIVELINE/AXLE

03
SECTION

03–10 GENERAL PROCEDURES

PRECAUTION (DRIVELINE/AXLE)

A3U031001018W01

Wheel and Tire Removal/Installation

1. 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}**.

Brake Line Disconnection/Connection

Caution
- **Brake fluid will damage painted surfaces. If brake fluid gets on a painted surface, wipe it off immediately.**

1. 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 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

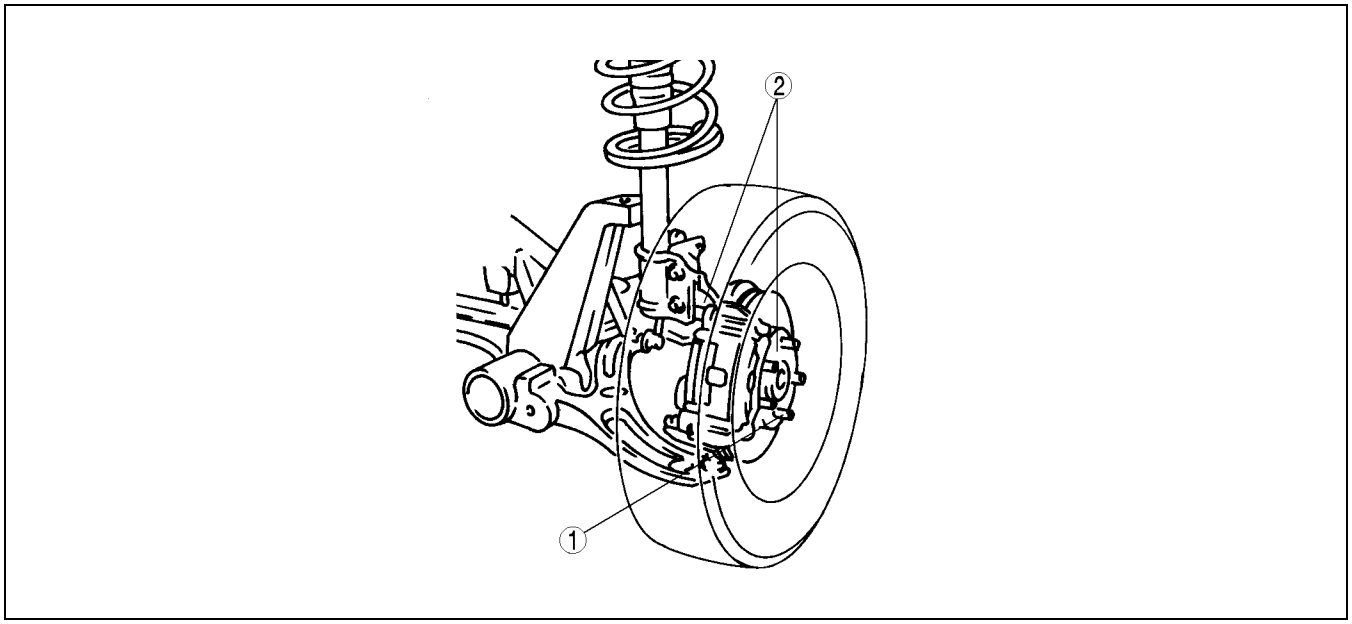
1. Tighten any part of the suspension that uses rubber bushings only after vehicle has been lowered and unloaded.

Note
- Unloaded ... Fuel tank is full. Engine coolant and engine oil are at specified level. Spare tire, jack, and tools are in designated position.

03–11 FRONT AXLE

FRONT AXLE LOCATION INDEX

A3U031104000W01



Z3U0311W001

1	Hub bolt (See 03–11–2 WHEEL HUB BOLT REPLACEMENT)

2	Wheel hub, steering knuckle (See 03–11–3 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION) (See 03–11–1 WHEEL HUB, STEERING KNUCKLE PRE-INSPECTION)

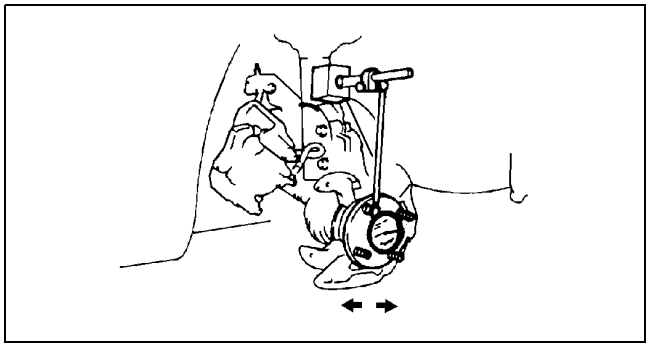
WHEEL HUB, STEERING KNUCKLE PRE-INSPECTION

A3U031104000W02

Wheel Bearing Play Inspection

1. Position a dial indicator against the wheel hub.
2. 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, replace the wheel bearing as necessary and tighten the locknut to the specified torque and retest.

Maximum wheel bearing play
0.05 mm {0.002 in}



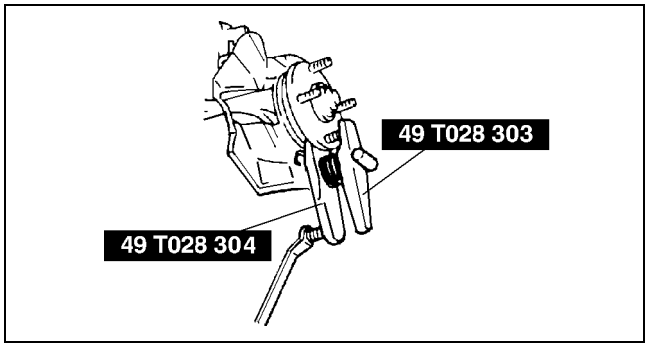
A3U0311W010

WHEEL HUB BOLT REPLACEMENT

A3U031104000W03

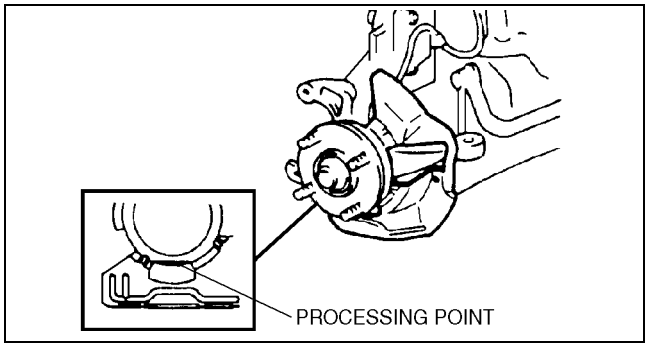
1. Remove the hub bolt using the **SSTs**.

   Note
   - If the dust cover interferes with the wheel hub bolt and the wheel hub bolt cannot be removed, tap the part shown in the figure with a chisel lightly and bend the processing point back to the steering knuckle side.



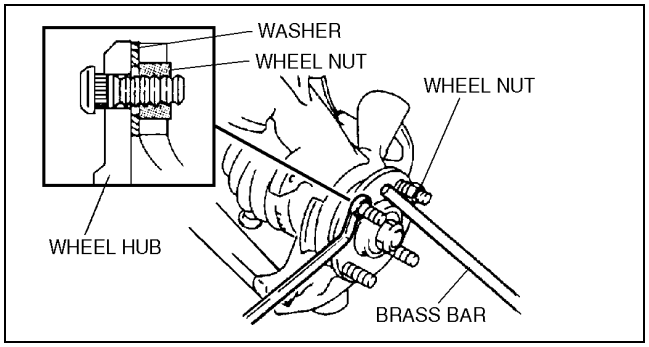
A3U0311W007

2. Install the hub bolt into the wheel hub and install a washer and hub nut on the hub bolt.



A3U0311W002

3. Tighten the hub nut while holding the wheel hub using a brass bar.



A3U0311W003

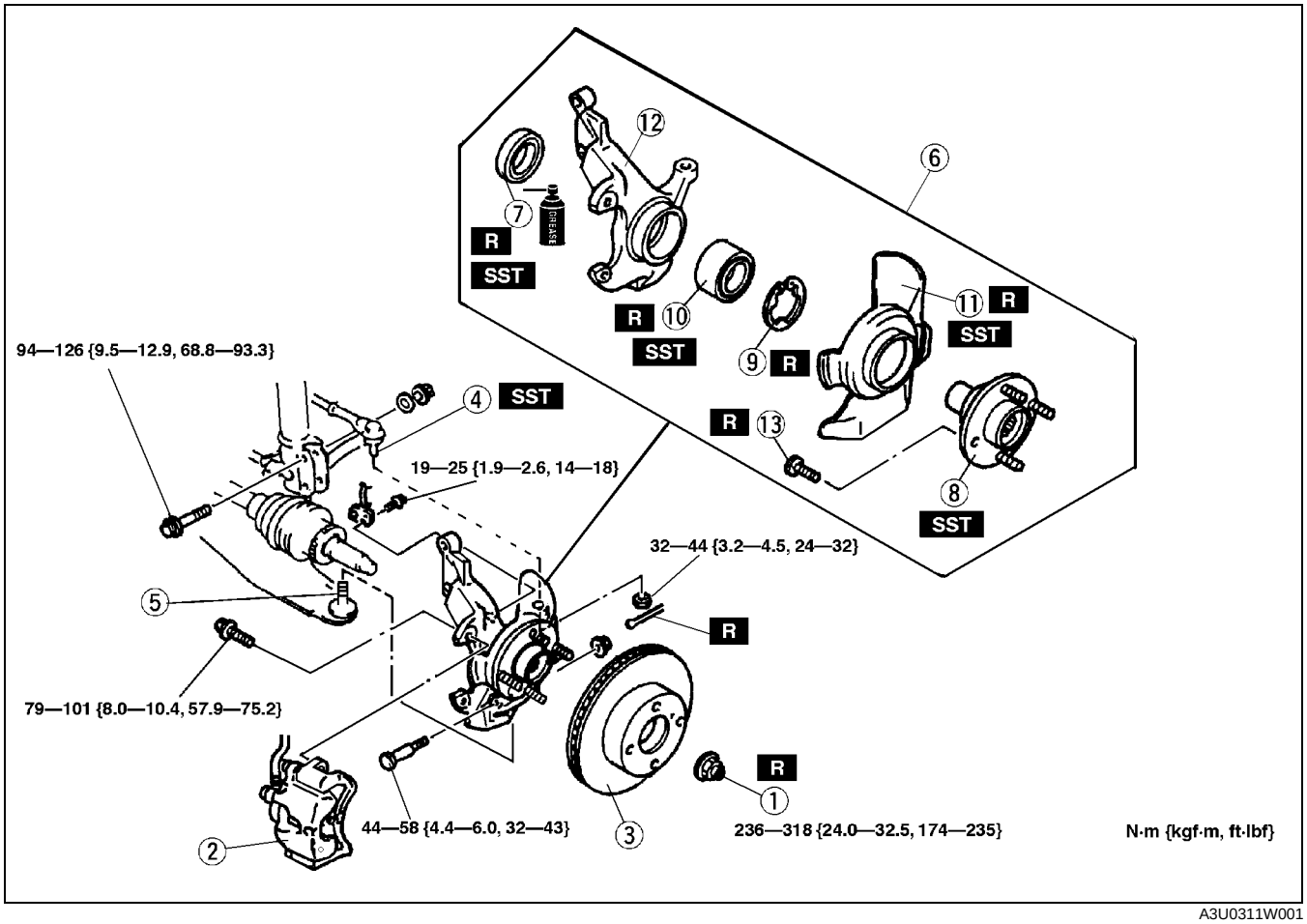
WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION

A3U031104000W04

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.
3. After installation, inspect the front wheel alignment. (See 02–11–1 FRONT WHEEL ALIGNMENT.)



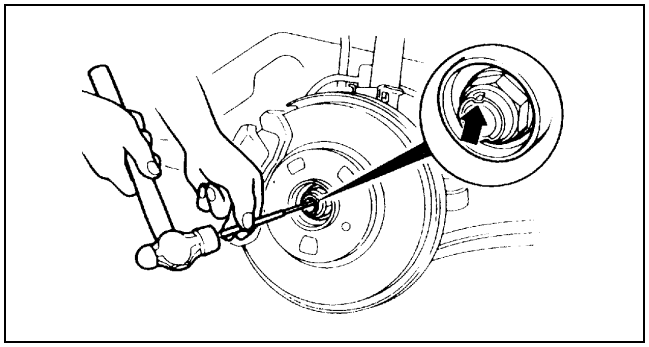
A3U0311W001

1	Locknut (See 03–11–4 Locknut Removal Note) (See 03–11–7 Locknut Installation Note)
2	Brake caliper component
3	Disc plate
4	Tie-rod end (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 03–11–7 Oil Seal Installation Note)
8	Wheel hub component (See 03–11–4 Wheel Hub Component Removal Note) (See 03–11–6 Wheel Hub Component Installation Note)

9	Retaining ring
10	Wheel bearing (See 03–11–4 Wheel Bearing Removal Note) (See 03–11–6 Wheel Bearing Installation Note)
11	Dust cover (See 03–11–5 Dust Cover Removal Note) (See 03–11–6 Dust Cover Installation Note)
12	Steering knuckle
13	Hub bolt (See 03–11–5 Hub Bolt Removal Note) (See 03–11–5 Hub Bolt Installation Note)

Locknut Removal Note

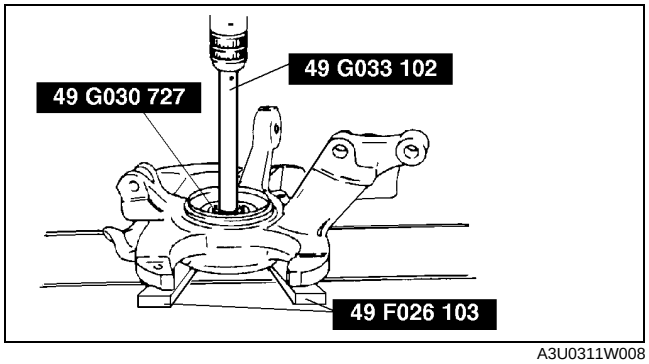
1. Knock the crimped portion of the locknut outward using a small chisel and a hammer.
2. Lock the hub by applying the brakes.
3. Remove the locknut.



X3U311WA5

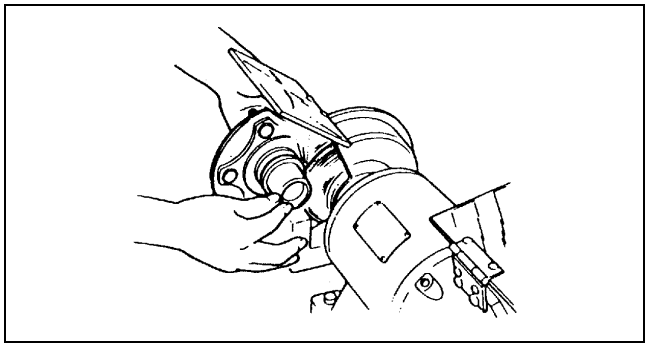
Wheel Hub Component Removal Note

1. Remove the wheel hub component using the **SSTs**.



A3U0311W008

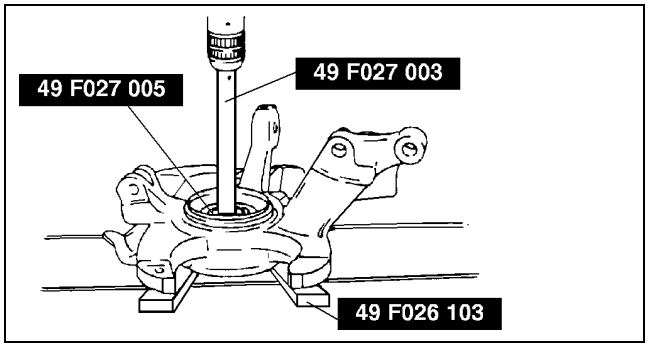
2. If the bearing inner race remains on the front wheel hub component, grind a section of the bearing inner race until **approx. 0.5 mm {0.020 in}** remains. Then remove it using a chisel.



X3U311WA7

Wheel Bearing Removal Note

1. Remove the wheel bearing using the **SSTs**.

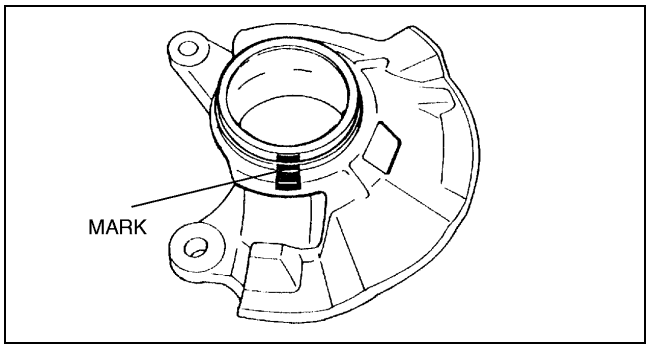


A3U0311W009

Dust Cover Removal Note

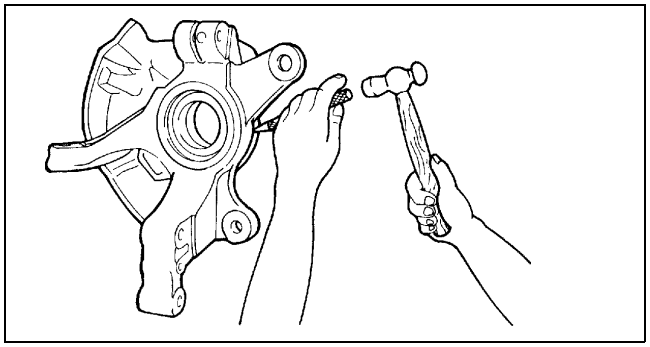
Note
- The dust cover does not need to be removed unless it is being replaced.

1. Mark the dust cover and steering knuckle for proper installation.



Y3U311WA1

2. Remove the dust cover using a chisel.

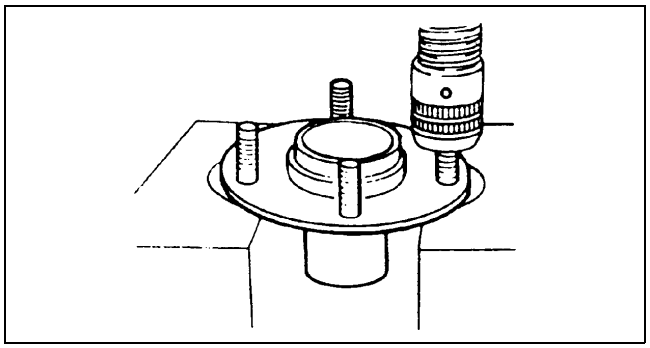


X3U311WAA

Hub Bolt Removal Note

Note
- The hub bolts do not need to be removed unless they are being replaced.

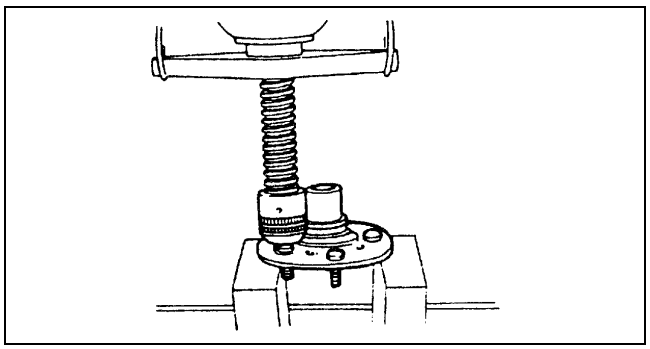
1. Remove the hub bolts using a press.



X3U311WAB

Hub Bolt Installation Note

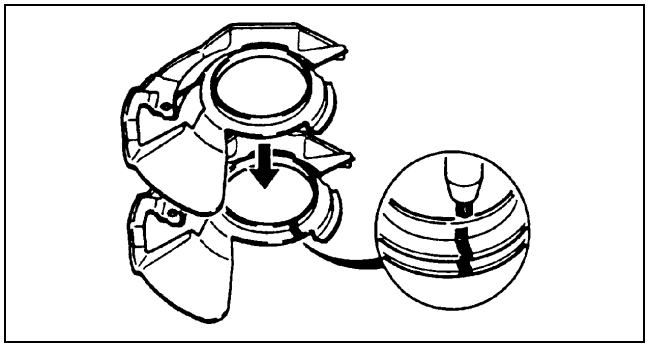
1. Install the new hub bolts using a press.



X3U311WAC

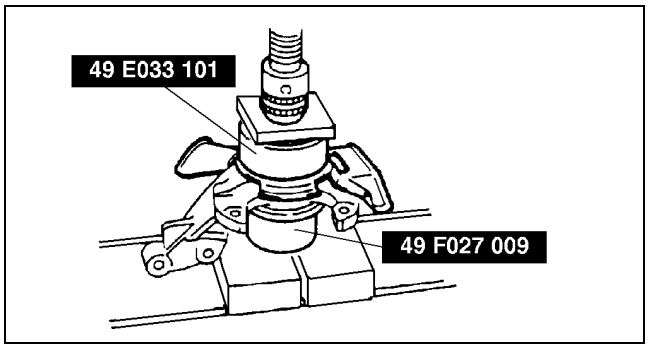
Dust Cover Installation Note

1. Mark the new dust cover in the same way as the removed one.
2. Align the marks of the new dust cover and the knuckle.



X3U311WAD

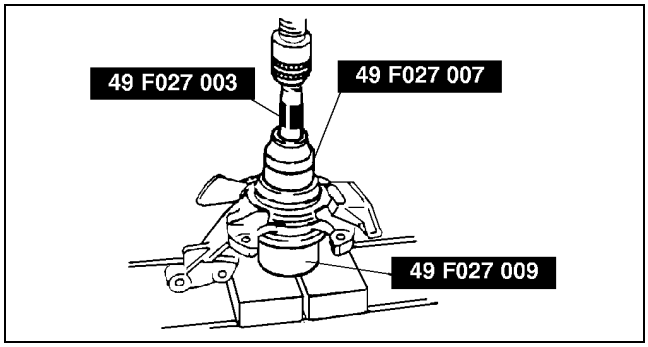
3. Install the new dust cover using the **SSTs**.



A3U0311W004

Wheel Bearing Installation Note

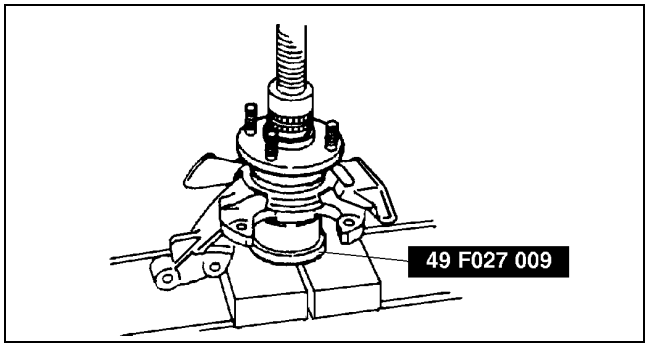
1. Install the new wheel bearing using the **SSTs**.



A3U0311W005

Wheel Hub Component Installation Note

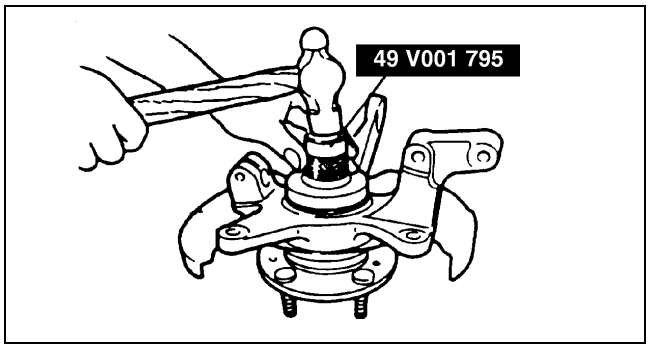
1. Install the wheel hub component using the **SST**.



A3U0311W006

Oil Seal Installation Note

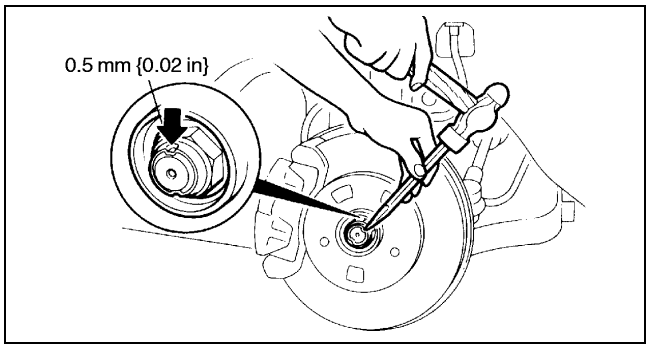
1. Apply grease to the new oil seal lip.
2. Install the new oil seal flush with the knuckle using the **SST**.



X3U311WAH

Locknut Installation Note

1. Install a new locknut and stake it as shown.

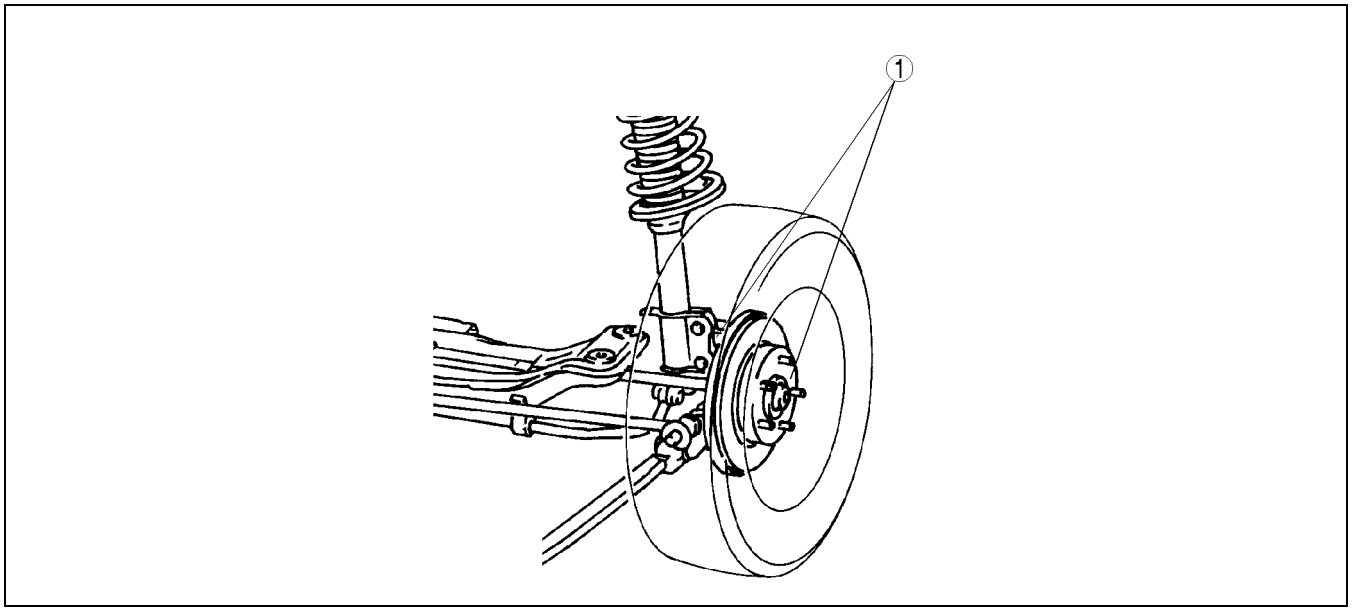


X3U311WAJ

03–12 REAR AXLE

REAR AXLE LOCATION INDEX

A3U031205000W01



Z3U0312W005

1	Wheel hub, hub spindle (See 03–12–1 WHEEL HUB, HUB SPINDLE PRE-INSPECTION) (See 03–12–4 WHEEL HUB, HUB SPINDLE (DISC BRAKE TYPE) REMOVAL/INSTALLATION) (See 03–12–2 WHEEL HUB, HUB SPINDLE (DRUM BRAKE TYPE) REMOVAL/INSTALLATION)

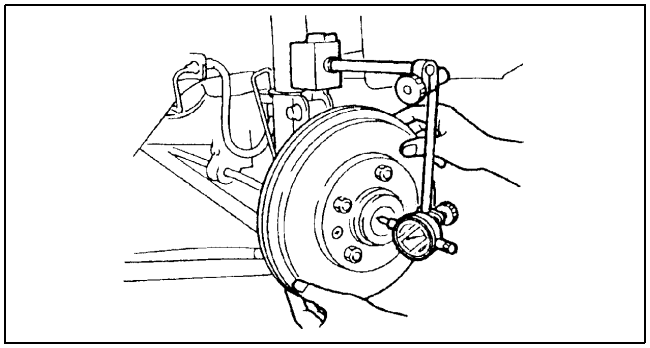
WHEEL HUB, HUB SPINDLE PRE-INSPECTION

A3U031205000W02

Wheel Bearing Play Inspection

1. Position a dial indicator against the brake drum (brake drum type), or wheel hub (disc brake type).
2. 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, replace the wheel hub component as necessary and tighten the locknut to the specified torque and retest.

Wheel bearing play
0.05 mm {0.002 in}



X3U312WA0

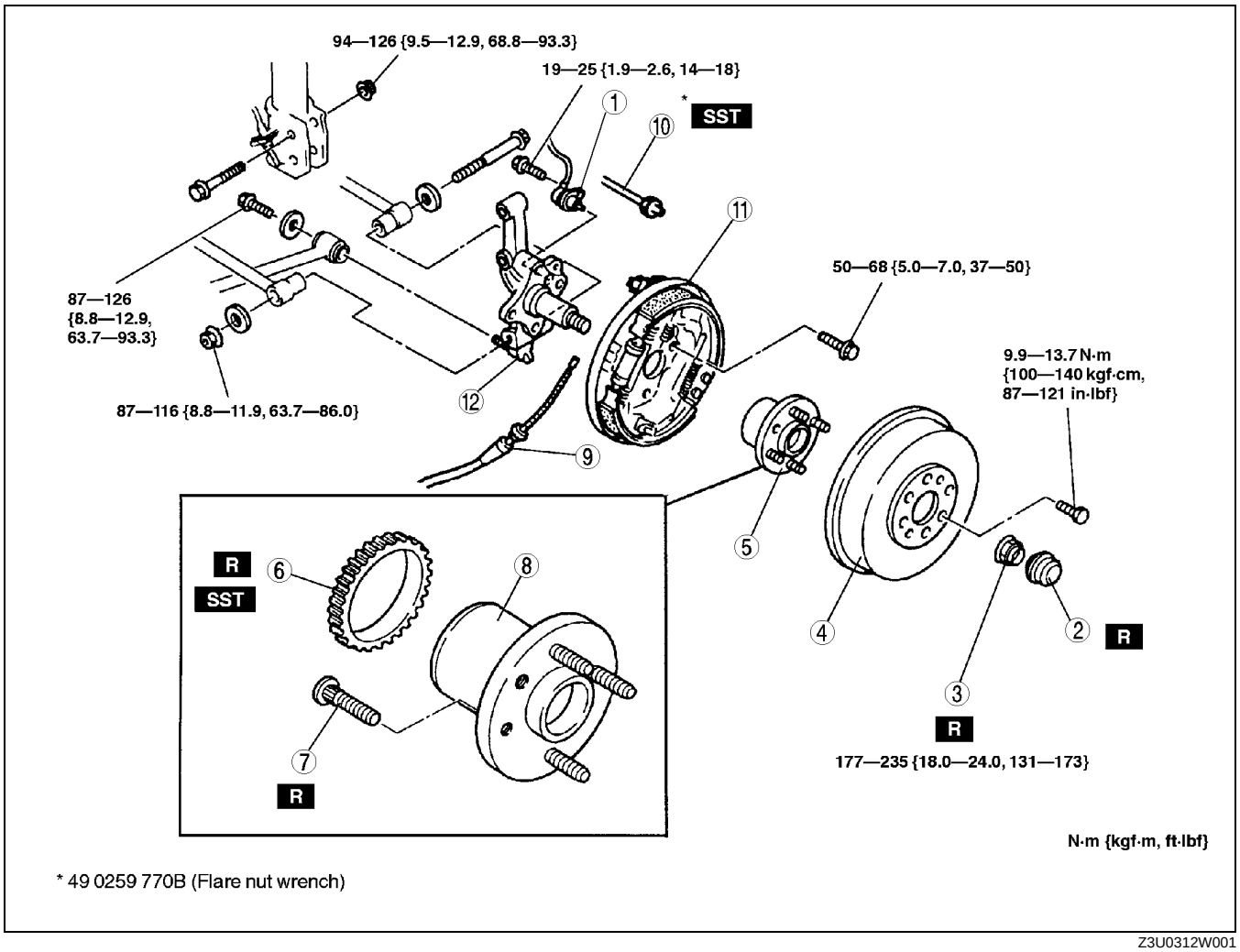
WHEEL HUB, HUB SPINDLE (DRUM BRAKE TYPE) REMOVAL/INSTALLATION

A3U031205000W03

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.



* 49 0259 770B (Flare nut wrench)

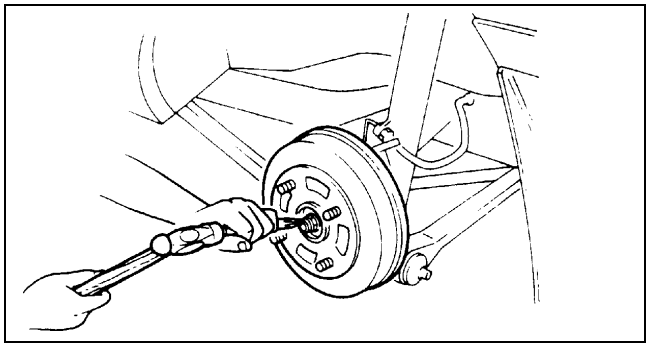
Z3U0312W001

1	ABS-wheel speed sensor
2	Hub cap
3	Locknut (See 03–12–3 Locknut Removal Note) (See 03–12–4 Locknut Installation Note)
4	Brake drum
5	Wheel hub 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 03–11–5 Hub Bolt Removal Note) (See 03–11–5 Hub Bolt Installation Note)
8	Wheel hub
9	Parking brake cable
10	Brake pipe
11	Rear brake component
12	Hub spindle

Locknut Removal Note

1. Raise the staked portion of the locknut using a small cape chisel and a hammer.
2. Lock the hub by applying the brakes.
3. Remove the locknut.



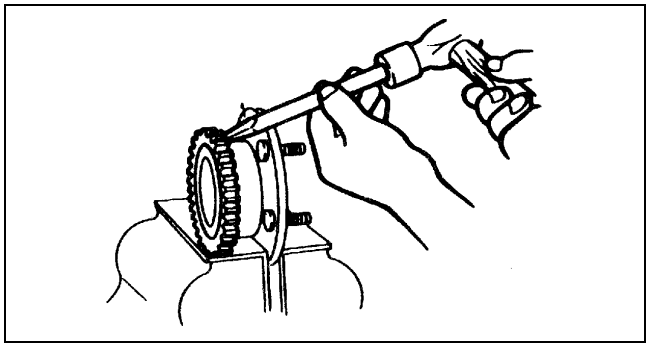
X3U312WA2

ABS Sensor Rotor (With ABS) Removal Note

Note

- The sensor rotor does not need to be removed unless it is being replaced.

1. Remove the sensor rotor using a chisel.



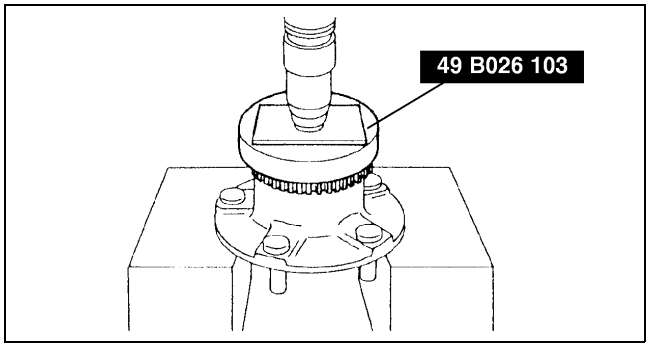
X3U312WA3

ABS Sensor Rotor (With ABS) Installation Note

1. Set the **SST** as shown in the figure.

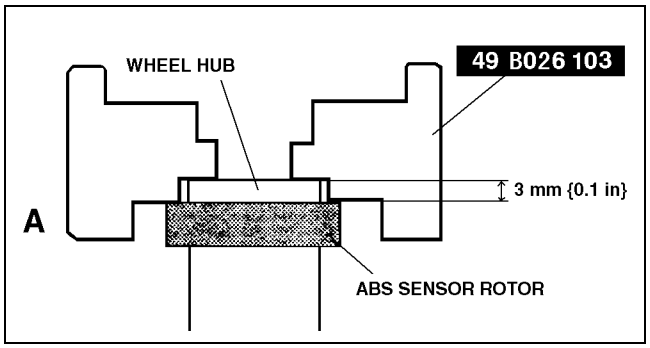
Caution

- **Position the SST so that marking A faces the bottom.**



X3U312WA4

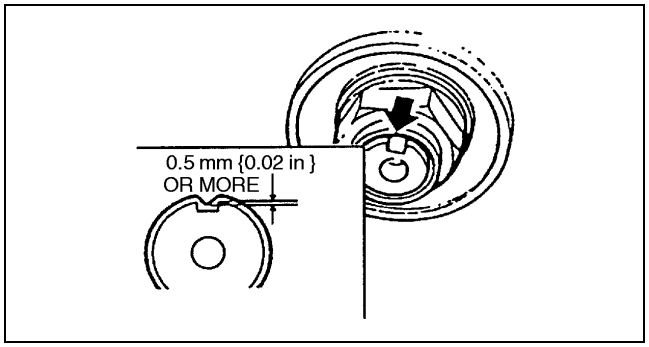
2. Press on the new sensor rotor using the **SST** and a press.



A3U0312W003

Locknut Installation Note

1. Install a new locknut and stake it as shown.



X3U312WA5

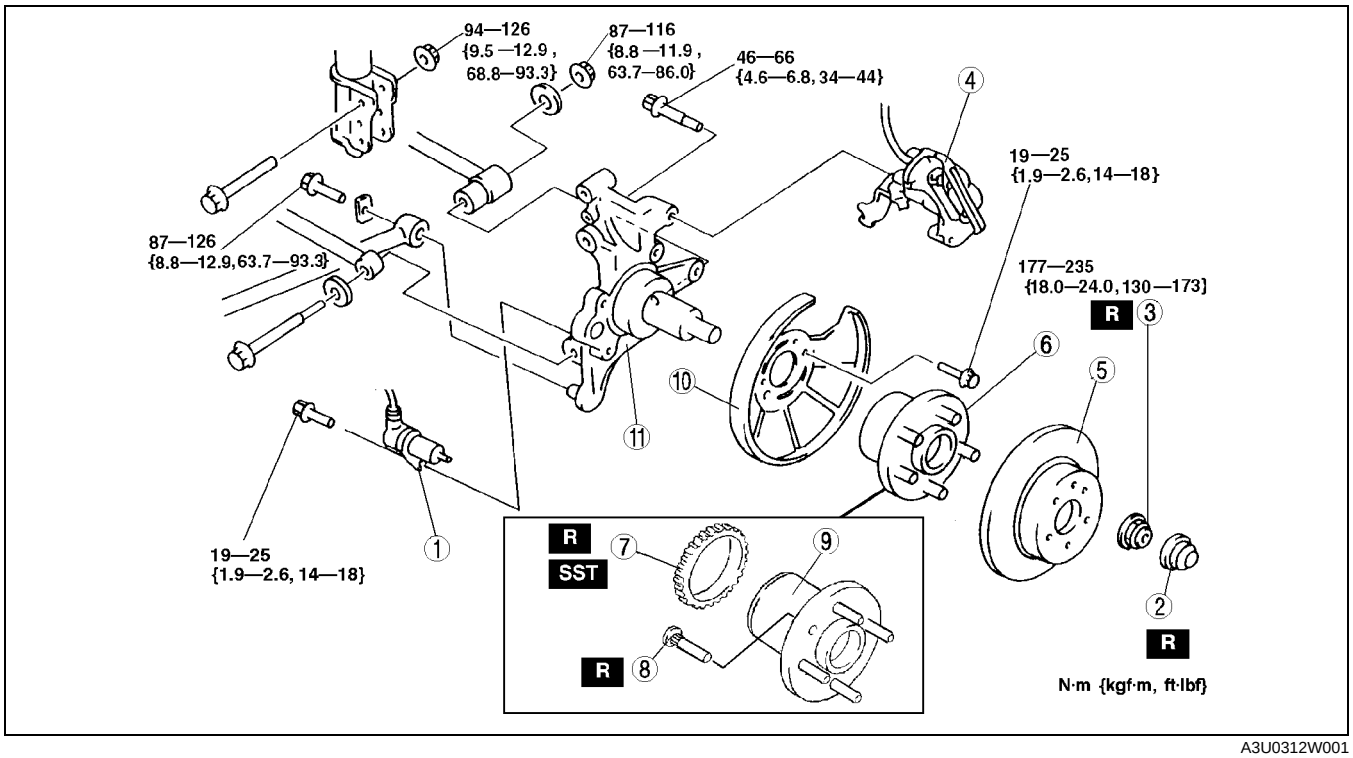
WHEEL HUB, HUB SPINDLE (DISC BRAKE TYPE) REMOVAL/INSTALLATION

A3U031205000W04

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 set 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.



A3U0312W001

1	ABS wheel-speed sensor
2	Hub cap
3	Locknut (See 03–12–2 WHEEL HUB, HUB SPINDLE (DRUM BRAKE TYPE) REMOVAL/ INSTALLATION)
4	Brake caliper component
5	Disc plate
6	Wheel hub and ABS sensor rotor

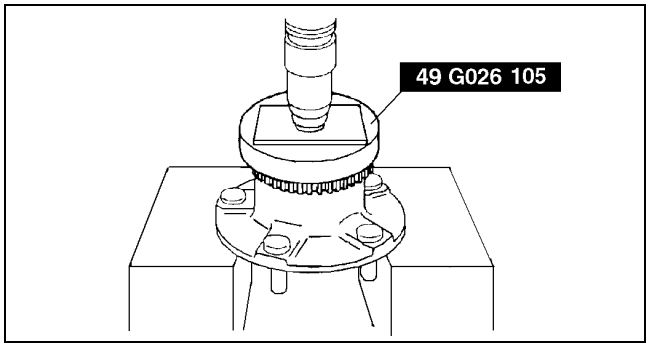
7	ABS sensor rotor (See 03–12–2 WHEEL HUB, HUB SPINDLE (DRUM BRAKE TYPE) REMOVAL/ INSTALLATION) (See 03–12–5 ABS Sensor Rotor (With ABS) Installation Note)
8	Hub bolt
9	Wheel hub component
10	Dust cover
11	Hub spindle

ABS Sensor Rotor (With ABS) Installation Note

1. Set the **SST** as shown in the figure.

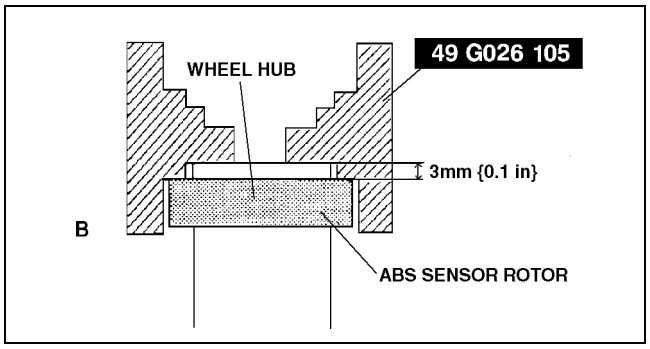
Caution

- **Position the SST so that marking B faces the bottom.**



A3U0312W002

2. Press on the new sensor rotor using the **SST** and a press.

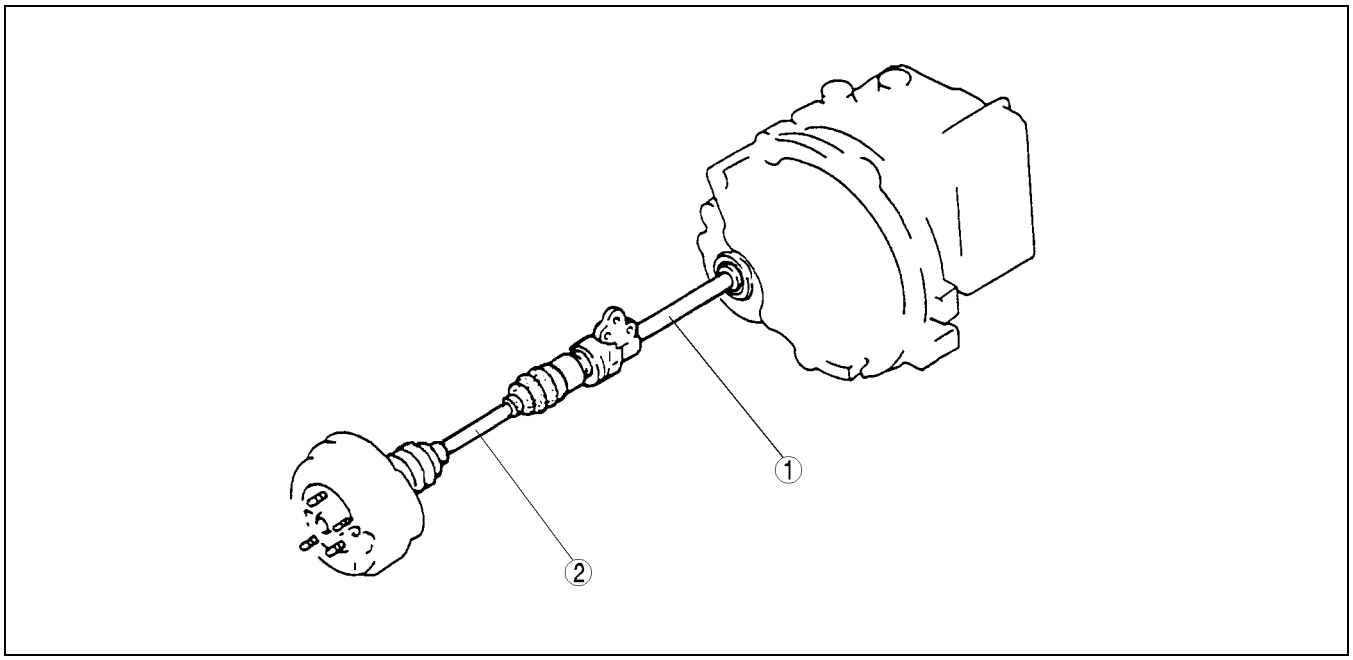


A3U0312W004

03–13 DRIVE SHAFT

DRIVE SHAFT LOCATION INDEX

A3U031325500W01



Z3U0313W007

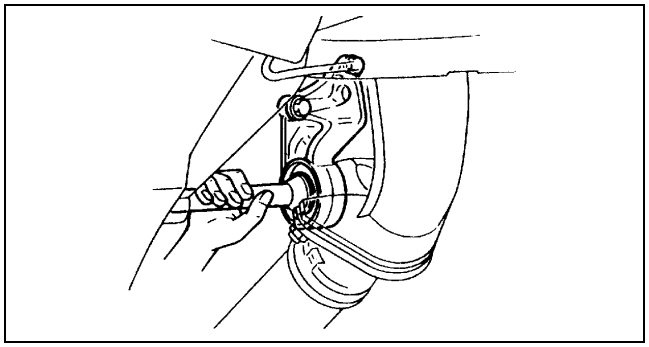
1	Joint shaft (See 03–13–2 JOINT SHAFT PRE-INSPECTION) (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION) (See 03–13–6 JOINT SHAFT DISASSEMBLY/ ASSEMBLY)

2	Drive shaft (See 03–13–8 DRIVE SHAFT PRE-INSPECTION) (See 03–13–9 DRIVE SHAFT REMOVAL/ INSTALLATION) (See 03–13–12 DRIVE SHAFT (ZM, FS ATX, FS MTX RIGHT SIDE) DISASSEMBLY/ASSEMBLY) (See 03–13–17 DRIVE SHAFT (FS MTX LEFT SIDE) DISASSEMBLY/ASSEMBLY)

JOINT SHAFT PRE-INSPECTION

A3U031325700W01

1. Verify that the joint shaft is not twisted or cracked.
   - Replace it as necessary.
2. Turn the joint shaft by hand and verify that the bearing rotates smoothly and freely.
   - Replace it as necessary.



X3U313WA0

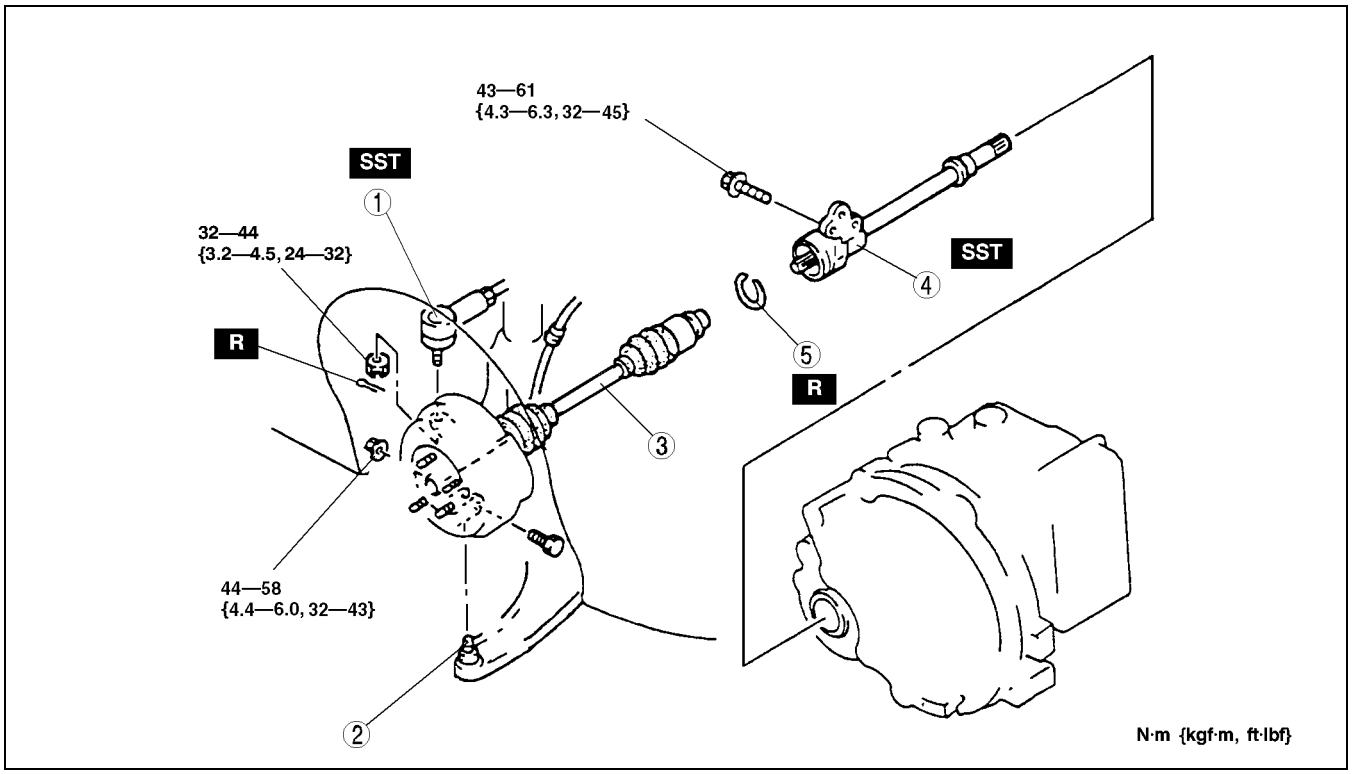
JOINT SHAFT REMOVAL/INSTALLATION

A3U031325700W02

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor could 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. Drain the transaxle oil.
2. Rmove in the order indicated in the table.
3. Install in the reverse order of removal.



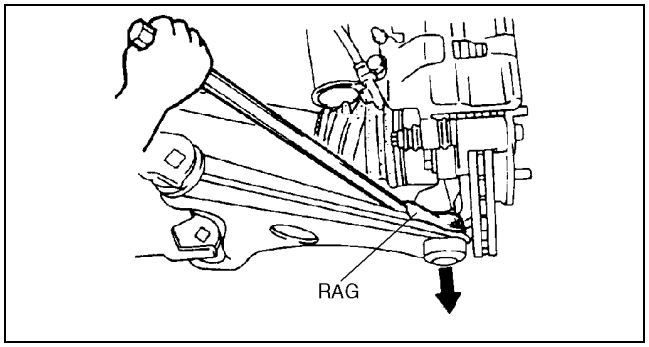
Y3E6316W001

1	Tie-rod end
2	Lower arm ball joint
3	Right drive shaft and axle (See 03–13–4 Right Drive Shaft and Axle Removal Note) (See 03–13–5 Right Drive Shaft and Axle Installation Note)

4	Joint shaft (See 03–13–4 Joint Shaft Removal Note) (See 03–13–5 Joint Shaft Installation Note)
5	Clip (See 03–13–5 Clip Installation Note)

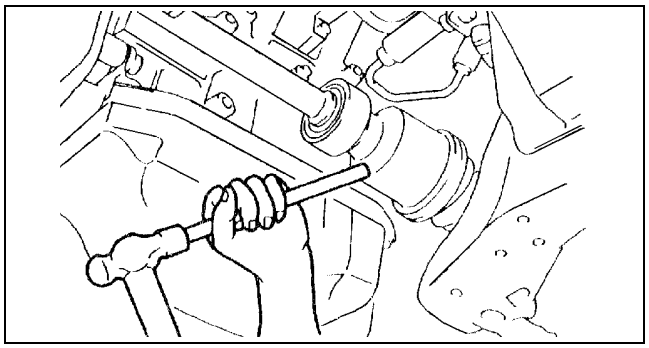
Right Drive Shaft and Axle Removal Note

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.



Z3U0312W003

4. As shown in the figure, insert a pry bar between the right drive shaft and the joint shaft and tap on the bar to uncouple them.



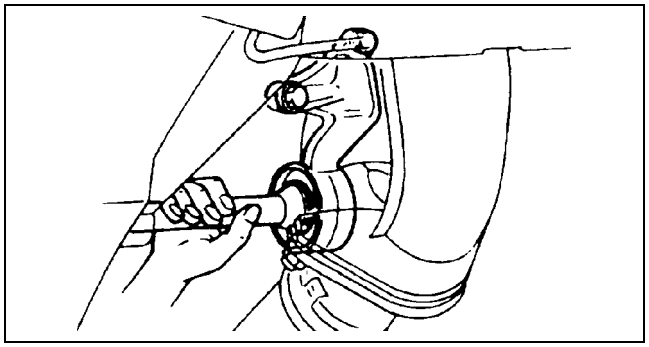
Y3E6316W007

Joint Shaft Removal Note

1. Secure the joint shaft bracket cylinder block.
2. Pull the joint shaft straight out.

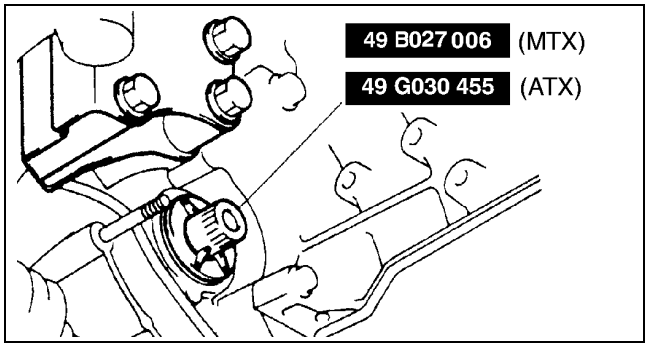
Caution

- **The sharp edges of the joint shaft can slice or puncture the oil seal. Be careful when installing the joint shaft to the transaxle.**



Y3E6316W008

3. Insert the **SST** into the transaxle to hold the side gears after joint shaft removed.

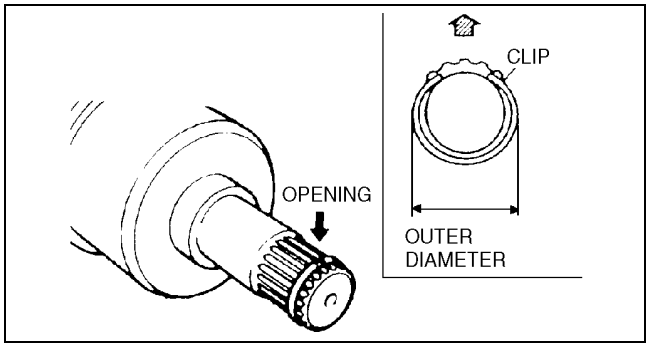


Y3E6316W009

Clip Installation Note

1. Install a new clip onto the joint shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.
2. After installation, measure the outer diameter. If it exceeds the specification, repeat steps 1—2 using a new clip.

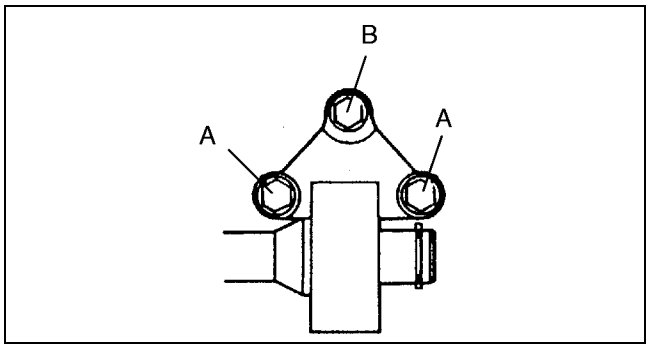
Outer diameter specification
30.0 mm {1.18 in}



Z3U0312W004

Joint Shaft Installation Note

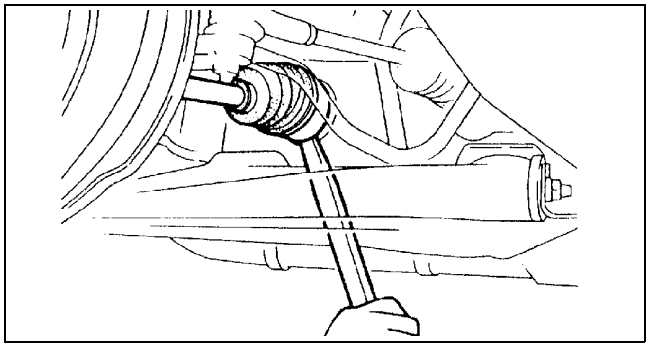
1. Install the joint shaft with the end gap of the new clip facing upward.
2. For FS engine, tighten the bolt A, then tighten the bolt B.



Y3E6316W011

Right Drive Shaft and Axle Installation Note

1. Push the drive shaft into the joint shaft.
2. After installation, pull the transaxle side outer ring forward to verify that the drive shaft is securely held by the clip.
3. Set the lower arm with steering knuckle, then tighten the bolt and nut.

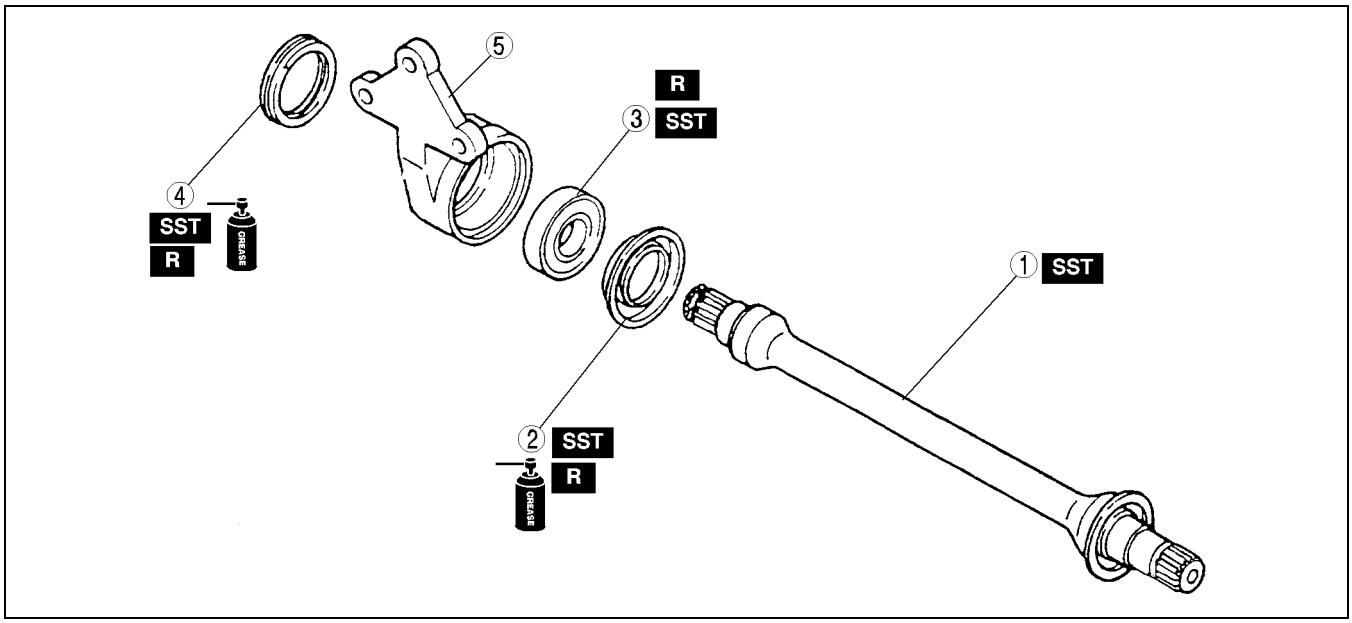


Y3E6316W021

JOINT SHAFT DISASSEMBLY/ASSEMBLY

A3U031325700W03

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of removal.

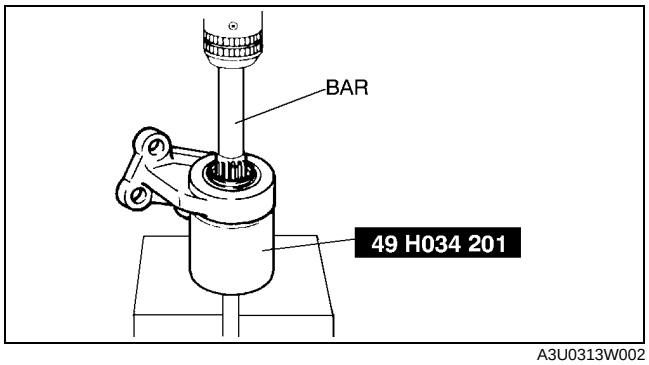


Y3E6316W002

1	Joint shaft (See 03–13–6 Joint Shaft Disassembly Note) (See 03–13–8 Joint Shaft Assembly Note)
2	Dust Seal (left) (See 03–13–7 Dust Seal (left) Assembly Note)
3	Bearing (See 03–13–6 Bearing Disassembly Note) (See 03–13–7 Bearing Assembly Note)
4	Dust Seal (right) (See 03–13–7 Dust Seal (right) Assembly Note)
5	Bracket

Joint Shaft Disassembly Note

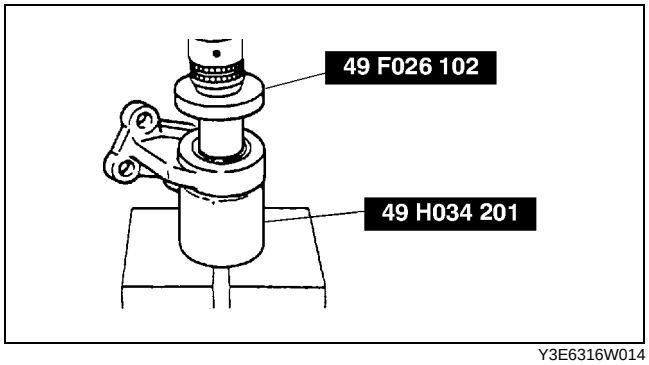
1. Disassemble the joint shaft using the **SST**.



A3U0313W002

Bearing Disassembly Note
(If the bearing remains on the bracket)

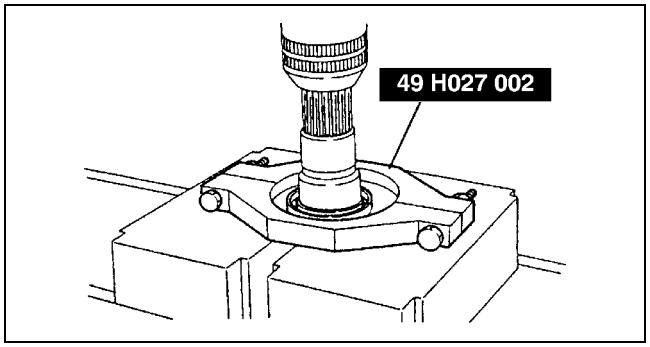
1. Remove the bearing using the **SST**.



Y3E6316W014

(If the bearing remains on the joint shaft)

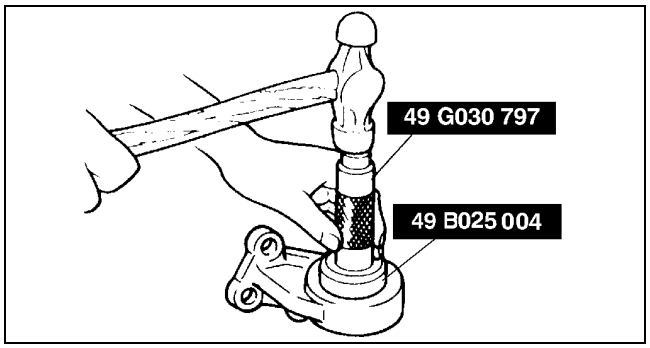
1. While holding the joint shaft, press out the bearing using the **SST**.



Y3E6316W015

Dust Seal (right) Assembly Note

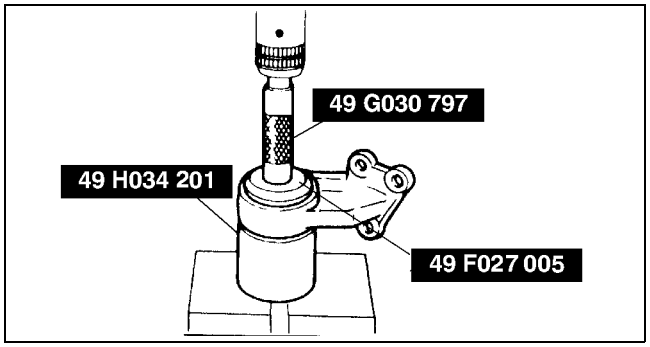
1. Apply grease to a new dust seal lip.
2. Install the new right side dust seal using the **SSTs**.



Y3E6316W016

Bearing Assembly Note

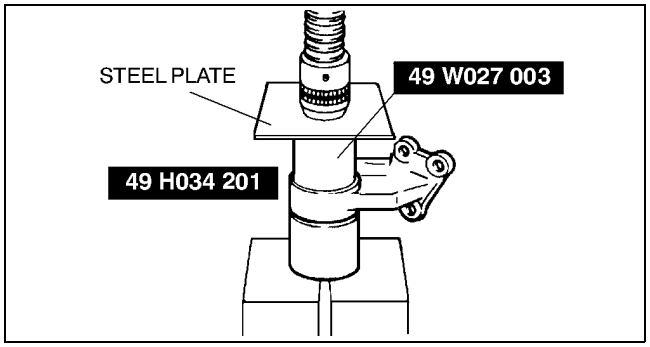
1. Install the new bearing using the **SSTs**.



Y3E6316W017

Dust Seal (left) Assembly Note

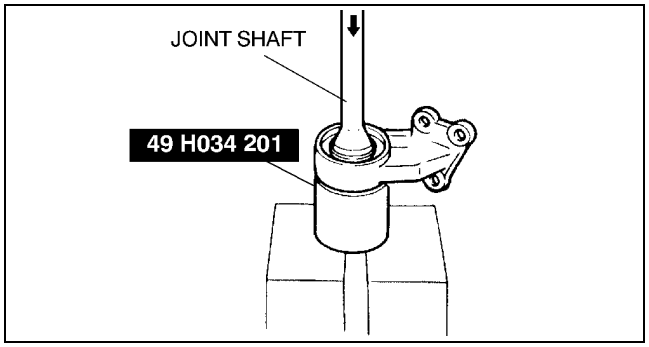
1. Apply grease to a new dust seal lip.
2. Install the new left side dust seal using a steel plate and the **SSTs**.



A3U0313W003

Joint Shaft Assembly Note

1. Assemble the joint shaft using a press and the **SSTs**

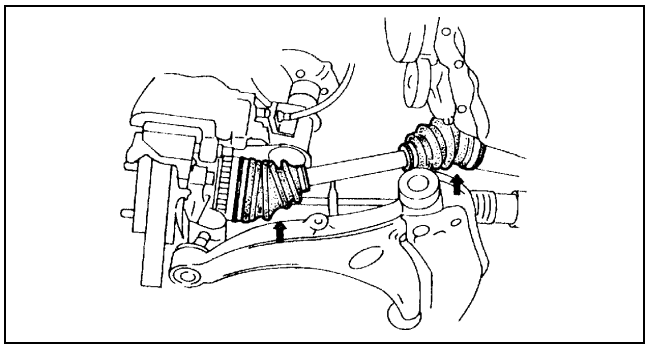


Y3E6316W019

DRIVE SHAFT PRE-INSPECTION

1. Inspect the dust boot on the drive shaft for cracks, damage, leaking grease, and looseness in the boot band.
2. Inspect the drive shaft for bends, cracks, and wear in the joint or splines.
   - Repair or replace the drive shaft or boot/band as necessary.

A3U031325500W02



X3U313WAH

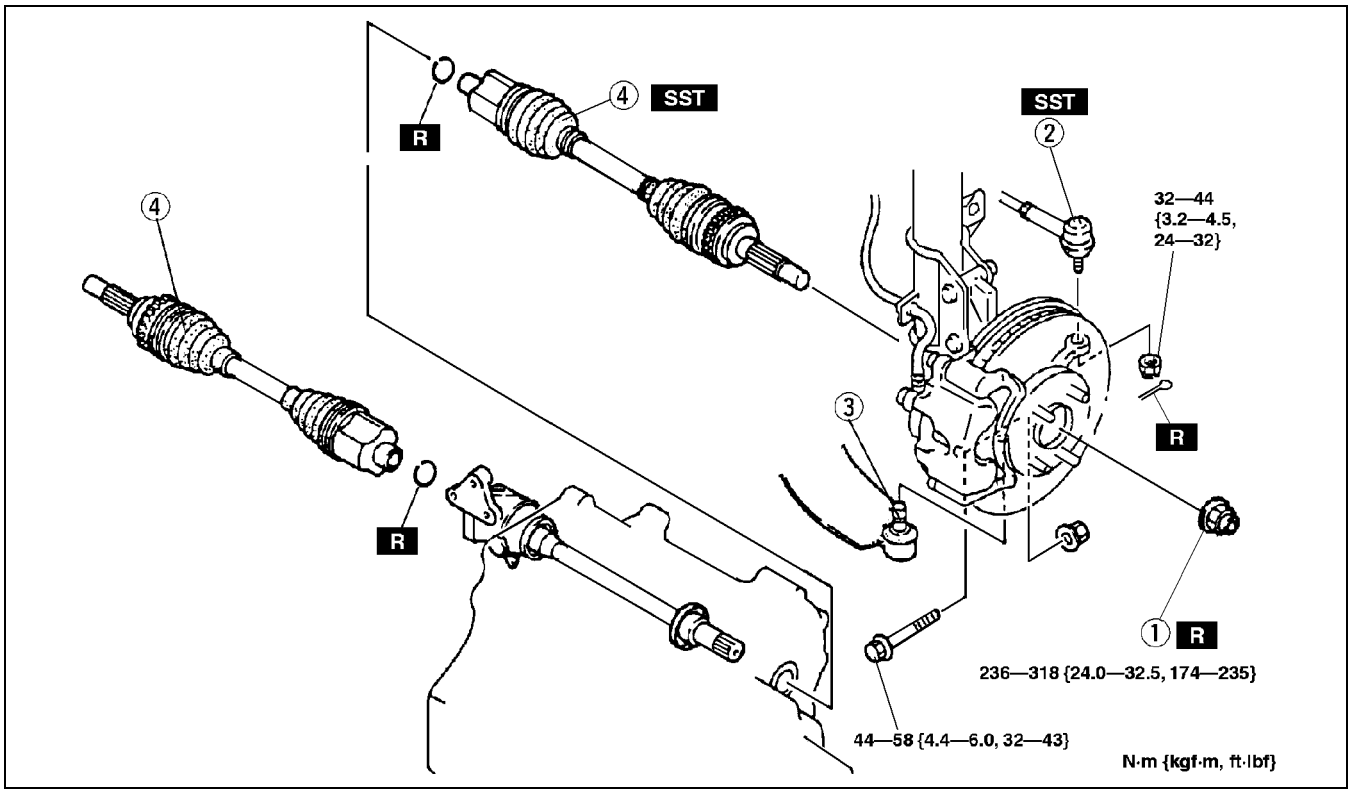
DRIVE SHAFT REMOVAL/INSTALLATION

A3U031325500W03

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. Drain the transaxle oil.
2. Remove the splash shield.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



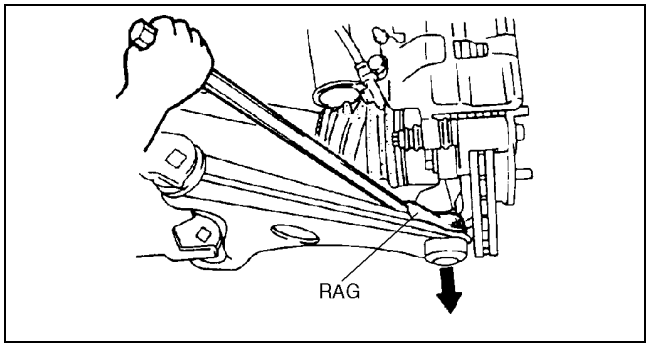
A3U0313W001

1	Locknut
2	Tie-rod end
3	Lower arm ball joint

4	Drive shaft (See 03–13–9 Drive Shaft Removal Note) (See 03–13–11 Drive Shaft Installation Note)

Drive Shaft Removal Note

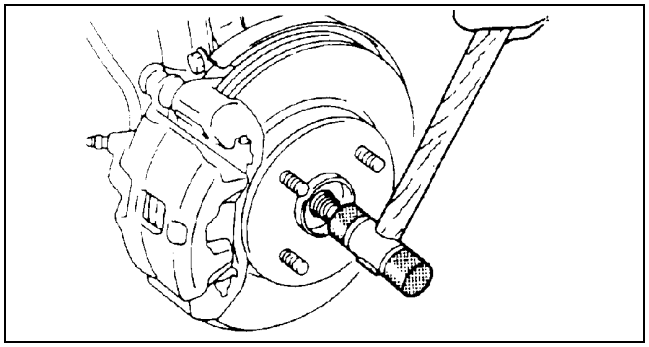
1. Remove the clinch bolt and nut.
2. Wrap a rag around the ball joint dust boot.
3. Pry the lower arm out of the knuckle.
4. Install a spare nut onto the drive shaft so that the nut is flush with the end of the drive shaft.
5. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.



Z3U0312W003

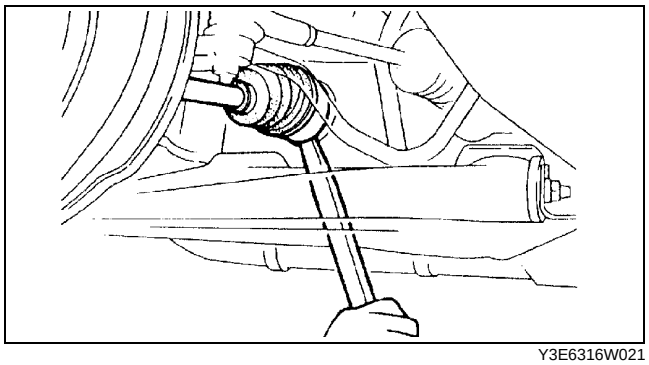
6. Separate the drive shaft from the wheel hub.

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.**



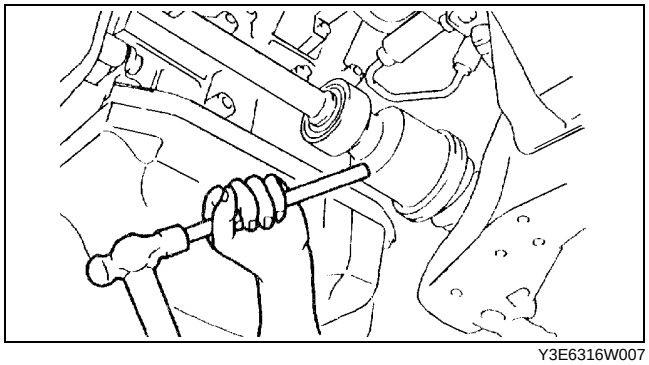
Y3E6316W020

7. 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.



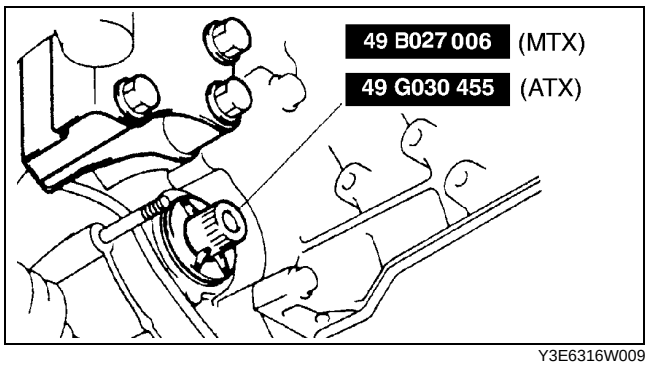
Y3E6316W021

8. Separate the right side drive shaft from the joint shaft by hammering on a bar inserted between them.



Y3E6316W007

9. Install the **SST** into the transaxle to hold the side gears after drive shaft is removed.



Y3E6316W009

Drive Shaft Installation Note
(Left side)

1. Install a new clip onto the drive shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.
2. After installation, measure the outer diameter.
   - If it exceeds the specification, repeat Steps 1—2 using a new clip.

Outer diameter specification

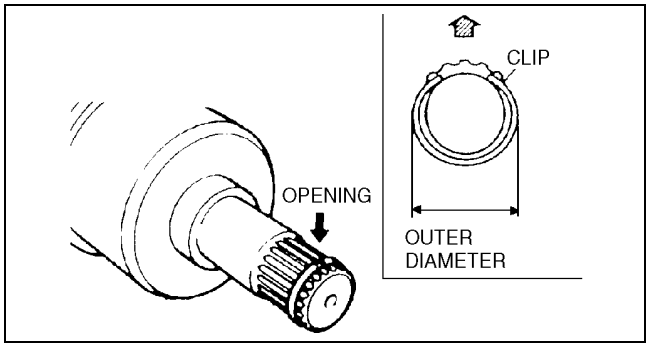
mm {in}

Engine	Outer diameter
ZM (MTX)	27.2 {1.03}
ZM (ATX)	29.2 {1.15}
FS (MTX)	30.5 {1.20}
FS (ATX)	29.2 {1.15}

Caution

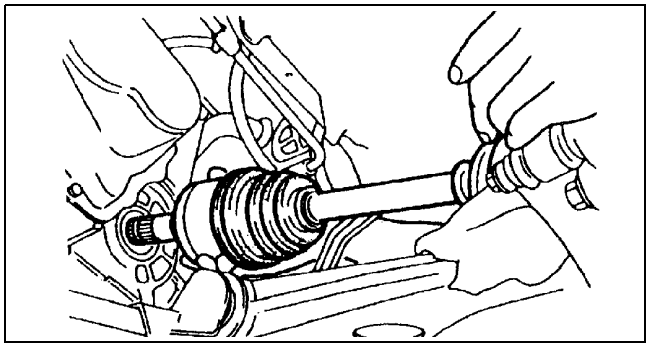
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when installing the drive shaft to the transaxle.**
- **The oil seals are damaged easily if this procedure is not done correctly.**

3. Insert the drive shaft into the wheel hub.
4. Apply ATF to the oil seal lip.



Z3U0312W004

5. Push the drive shaft into the transaxle.
6. After installation, pull the transaxle side outer ring forward to confirm that the drive shaft is securely held by the clip.



Y3E6316W023

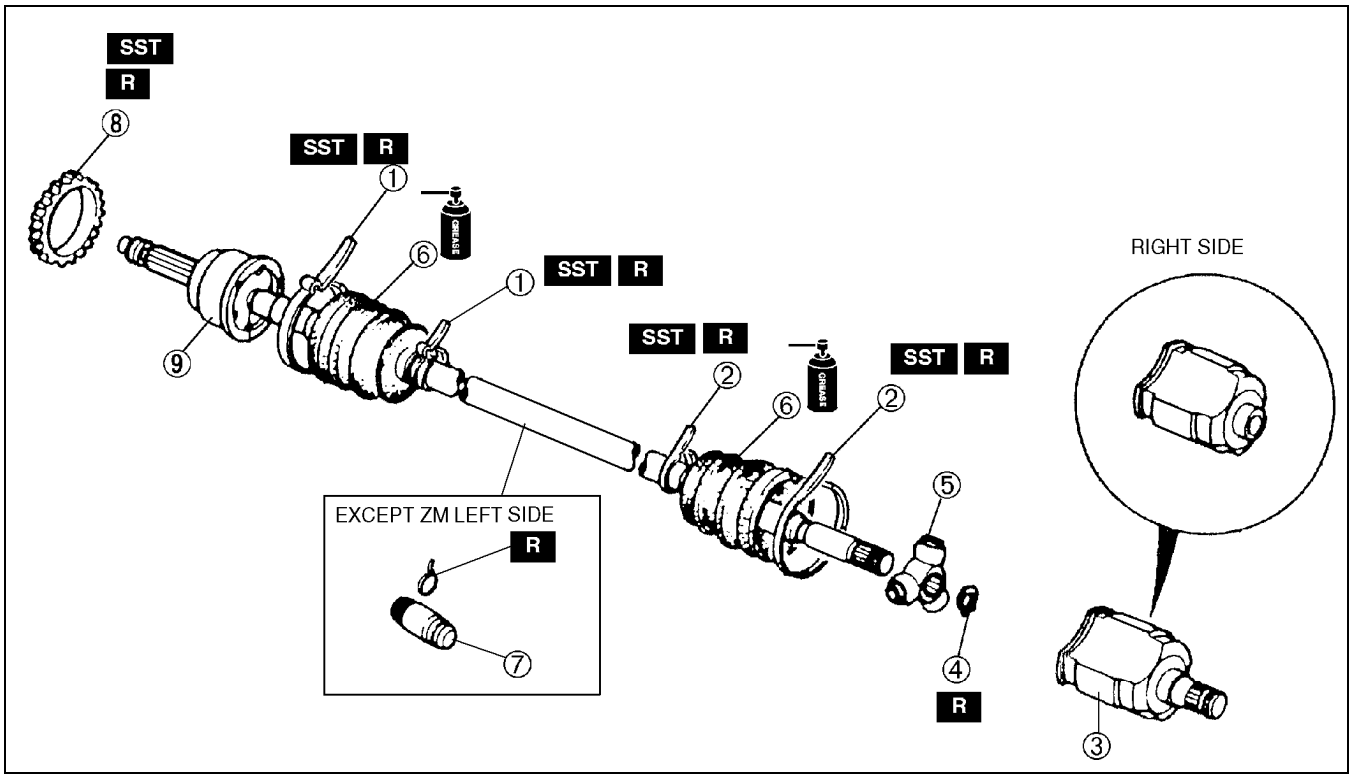
(Right side)

1. Install the joint shaft with the end-gap of a new clip facing upward.
2. Install the drive shaft into the wheel hub.
3. Push the drive shaft into the joint shaft.
4. After installation, pull the transaxle side outer ring forward to confirm that the drive shaft is securely held by the clip.

DRIVE SHAFT (ZM, FS ATX, FS MTX RIGHT SIDE) DISASSEMBLY/ASSEMBLY

A3U031325500W04

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



A3U0313W004

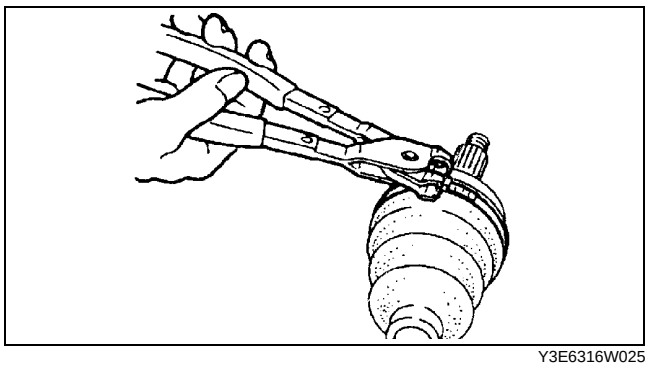
1	Boot band (wheel side) (See 03–13–12 Boot Band (Wheel Side) Disassembly Note) (See 03–13–16 Boot Band (Wheel Side) Assembly Note)
2	Boot band (transaxle side) (See 03–13–13 Boot Band (Transaxle Side) Disassembly Note) (See 03–13–16 Boot Band (Transaxle Side) Assembly Note)
3	Outer ring (See 03–13–13 Outer Ring Disassembly Note) (See 03–13–15 Outer Ring Assembly Note)
4	Snap ring
5	Tripod joint (See 03–13–13 Tripod Joint Disassembly Note) (See 03–13–15 Tripod Joint Assembly Note)
6	Boot (See 03–13–13 Boot Disassembly Note) (See 03–13–14 Boot Assembly Note)
7	Dynamic Damper (See 03–13–14 Dynamic Damper Assembly Note)
8	ABS sensor rotor (with ABS) (See 03–13–14 ABS Sensor Rotor (With ABS) Disassembly Note) (See 03–13–14 ABS Sensor Rotor (With ABS) Assembly Note)
9	Shaft and ball joint component

Boot Band (Wheel Side) Disassembly Note

Note

- Thoot band need not to be replaced if removed.

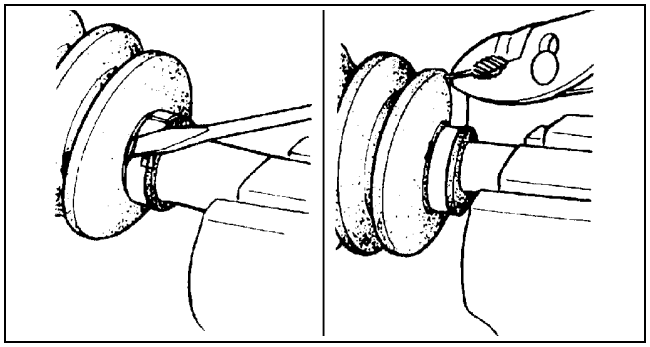
1. Remove the boot clamp with end clamp pliers as shown and discard the clamp.



Y3E6316W025

Boot Band (Transaxle Side) Disassembly Note

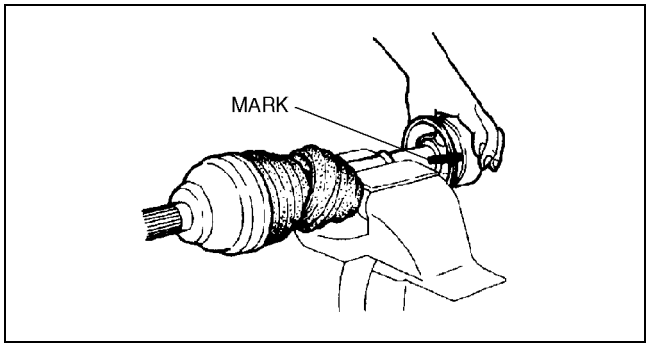
1. Pry up the locking clips using a screwdriver.
2. Pull back the end of the band.



Y3E6316W031

Outer Ring Disassembly Note

1. Mark the outer ring and the shaft for proper assembly.
2. Remove the outer ring.



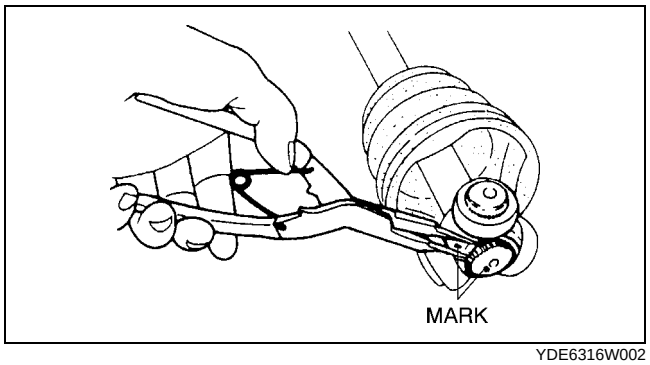
Z3U0313W002

Tripod Joint Disassembly Note

1. Mark the shaft and tripod joint for proper assembly.
2. Remove the snap ring using snap-ring pliers.
3. Remove the tripod joint from the shaft.

Caution

- **Do not use a hammer to remove the joint shaft.**



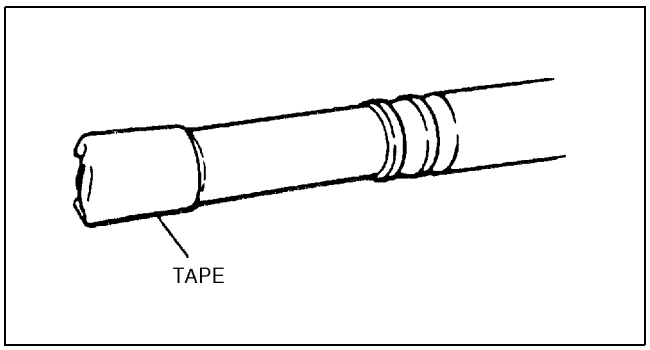
YDE6316W002

Boot Disassembly Note

Note

- The wheel side boot does not need to be removed unless replacing the boot or the ball joint and shaft component.
- Do not strip the tape until the boot is assembled.

1. Wrap the shaft splines with tape.
2. Remove the boot.

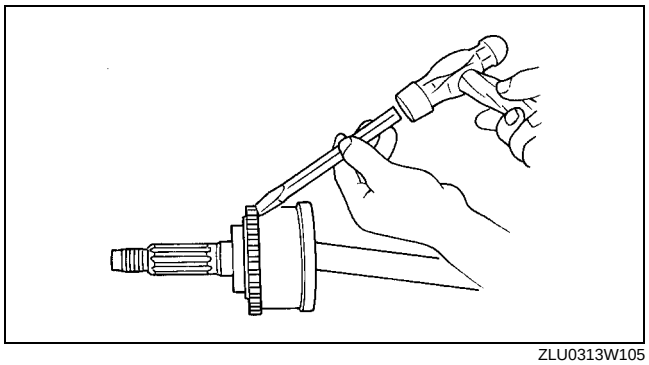


Z3U0313W003

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.**

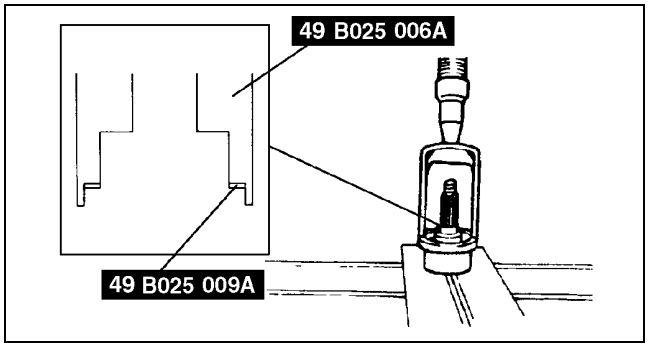
1. Tap the ABS sensor rotor off the drive shaft using a chisel.



ZLU0313W105

ABS Sensor Rotor (With ABS) Assembly Note

1. Set a new ABS sensor rotor on the drive shaft and press it on using the **SSTs**.



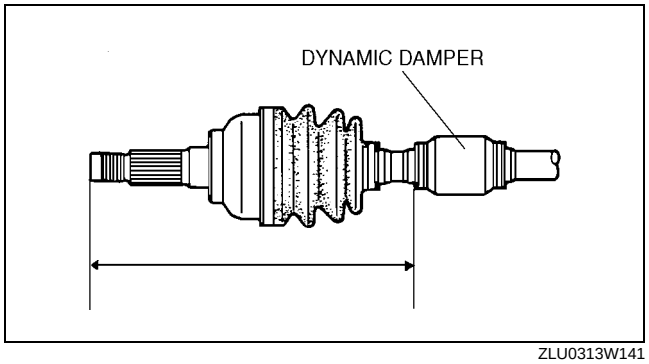
Z3U0313W004

Dynamic Damper Assembly Note

1. Install the dynamic damper as shown in the figure.

   Standard length
   292—298 mm {11.5—11.7 in}

2. Install the new boot band onto the dynamic damper.



ZLU0313W141

Boot Assembly Note

1. Fill the boot (wheel side) with the specified grease .

Caution
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

Note
- The wheel side and transaxle side boots are different.
- Use the specified grease supplied in the boot kit.

Grease amount
ZM: 60—80 g {2.12—2.82 oz}
FS: 75—95 g {2.65—3.35 oz}

2. Install the boot with the splines of the shaft still wrapped in tape from disassembly.
3. Remove the tape.

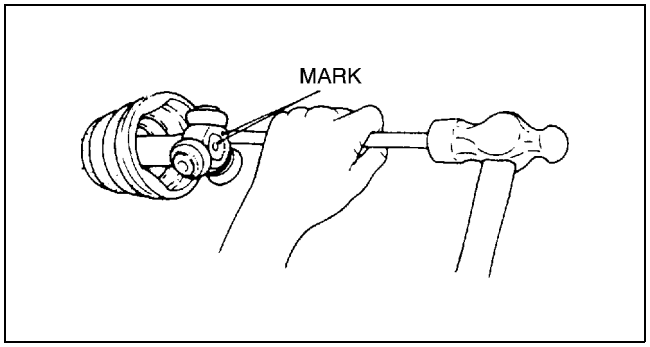
Tripod Joint Assembly Note

1. Align the marks and install the tripod joint using a bar and a hammer.

Caution
- **Do not damage the roller.**

2. Install the new snap ring using a snap-ring pliers.

Caution
- **Install the snap ring in the shaft groove securely.**



YDE6316W006

Outer Ring Assembly Note

1. Fill the outer ring and boot (transaxle side) with the specified grease from a tube, not by hand.

Caution
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

Note
- Use the specified grease supplied in the boot kit.

Grease amount
115—135 g {4.06—4.76 oz}

2. Install the outer ring.
3. Set the drive shaft to the standard length.

Standard length

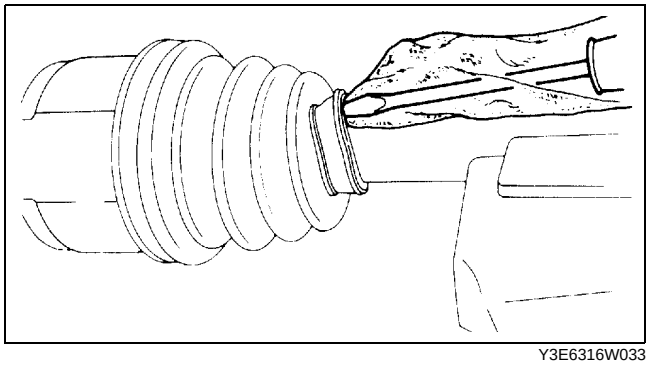
mm {in}

Engine	Left side	Right side
ZM (MTX)	642.6—652.6 {25.30—25.69}	607.9—617.9 {23.94—24.32}
ZM (ATX)	626.7—636.7 {24.68—25.06}	
FS (MTX)	—	604.6—614.6 {23.81—24.19}
FS (ATX)	627.9—637.9 {24.73—25.11}	608.9—618.9 {23.98—24.36}

4. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

Caution
- **Be careful not to allow the greaseto leak.**
- **Do not damage the boot.**

5. Verify that the drive shaft length is within the specification.


Y3E6316W033

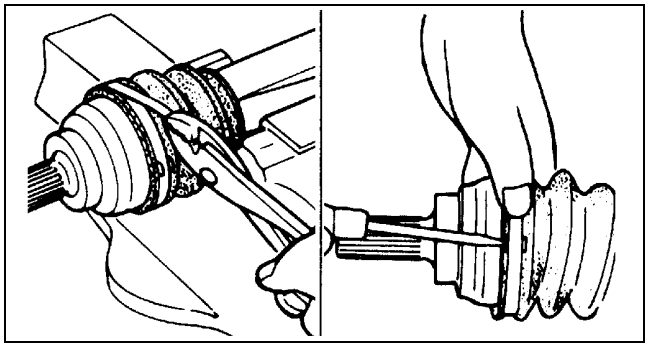
Boot Band (Transaxle Side) Assembly Note

1. Fold the band back and use pliers to pull it tight.

   Note
   - Always use new bands.
   - The band should be folded in the direction opposite to the forward revolving direction of the drive shaft.

2. Lock the end of the band by bending the locking clips.

   Caution
   - **Verify that the boot band is installed in the boot groove securely.**



Y3E6316W035

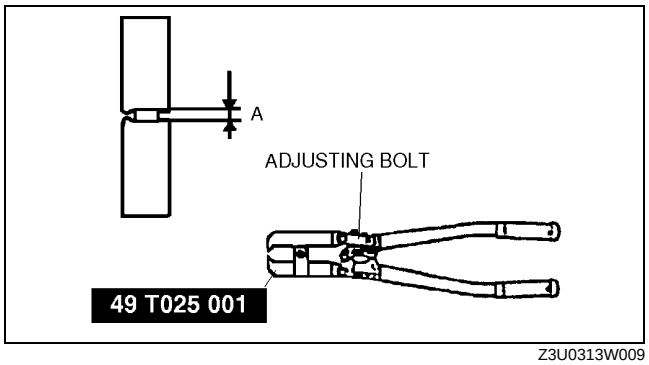
Boot Band (Wheel Side) Assembly Note

1. Adjust clearance A by turning the adjusting bolt of the **SST**.

   Clearance A
   2.9 mm {0.11 in}

2. Crimp the wheel side small boot band 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}



Z3U0313W009

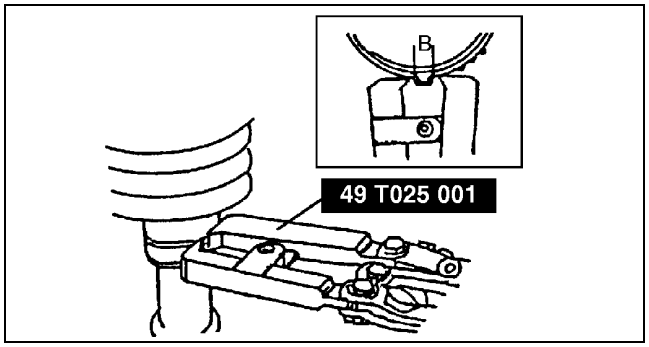
3. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat from Step 1.
4. Fill the boot with the repair kit grease.
5. Adjust clearance A by turning the adjusting bolt of the **SST**.

   Clearance A
   3.2 mm {0.13 in}

6. Crimp the wheel side big boot band using the **SST**.
7. 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}

8. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat from Steps 5.

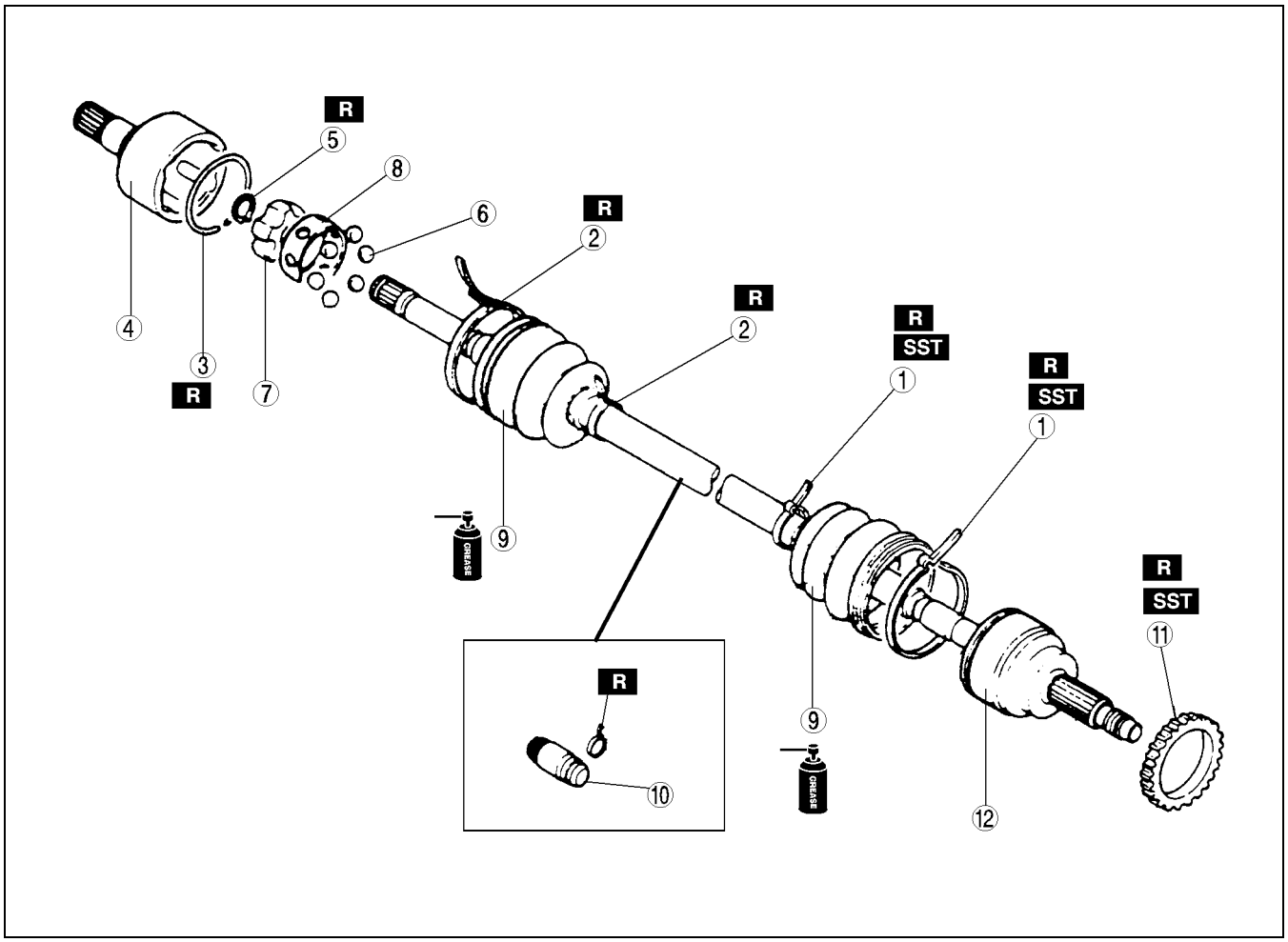


Y3E6316W028

DRIVE SHAFT (FS MTX LEFT SIDE) DISASSEMBLY/ASSEMBLY

A3U031325500W05

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



A3U0313W005

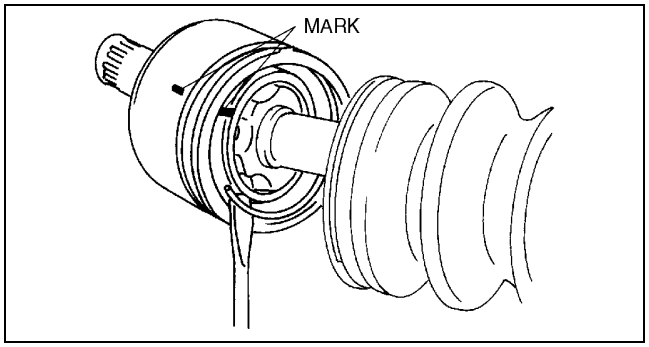
1	Boot band (wheel side) (See 03–13–12 DRIVE SHAFT (ZM, FS ATX, FS MTX RIGHT SIDE) DISASSEMBLY/ASSEMBLY)
2	Boot band (transaxle side) (See 03–13–12 DRIVE SHAFT (ZM, FS ATX, FS MTX RIGHT SIDE) DISASSEMBLY/ASSEMBLY)
3	Clip (See 03–13–18 Outer Ring Disassembly Note) (See 03–13–19 Outer Ring, Clip Assembly Note).
4	Outer ring (See 03–13–19 Outer Ring, Clip Assembly Note)
5	Snap ring (See 03–13–19 Cage, Inner Ring, Balls, Snap Ring Assembly Note)
6	Balls (See 03–13–18 Balls, Inner Ring, Cage Disassembly Note) (See 03–13–19 Cage, Inner Ring, Balls, Snap Ring Assembly Note)
7	Inner Ring (See 03–13–18 Balls, Inner Ring, Cage Disassembly Note) (See 03–13–19 Cage, Inner Ring, Balls, Snap Ring Assembly Note)
8	Cage (See 03–13–18 Balls, Inner Ring, Cage Disassembly Note) (See 03–13–19 Cage, Inner Ring, Balls, Snap Ring Assembly Note)
9	Boot (See 03–13–18 Boot Assembly Note)
10	Dynamic damper (See 03–13–18 Dynamic Damper Assembly Note)
11	ABS sensor rotor (See 03–13–12 DRIVE SHAFT (ZM, FS ATX, FS MTX RIGHT SIDE) DISASSEMBLY/ASSEMBLY)
12	Shaft and ball joint component

Outer Ring Disassembly Note

1. Mark the drive shaft and outer ring for proper assembly.

   Caution
   - **Mark with paint; do not use a punch.**

2. Remove the clip.



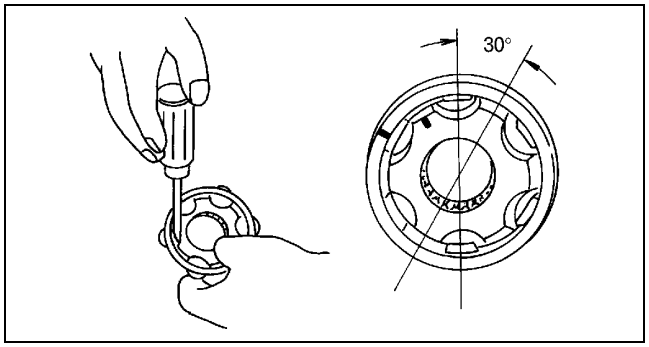
Z3U0313W005

Balls, Inner Ring, Cage Disassembly Note

1. Mark the inner ring and cage.

   Caution
   - **Mark with paint; do not use a punch.**

2. Remove the snap ring using snap-ring pliers.
3. Turn the cage approximately 30 degree and pull the cage and balls away from the inner ring.



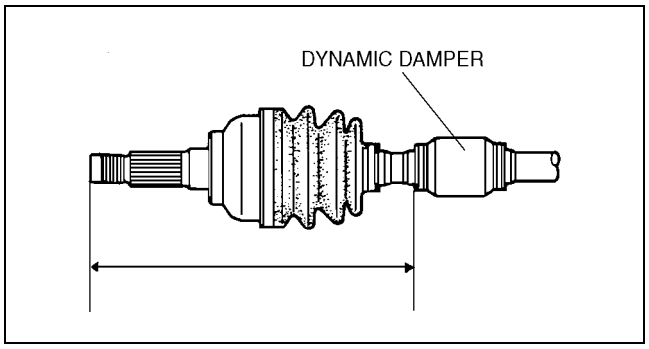
YYJ6316W007

Dynamic Damper Assembly Note

1. Install the dynamic damper as shown in the figure.

   Standard length
   292—298 mm {11.5—11.7 in}

2. Install the new boot band onto the dynamic damper.



ZLU0313W141

Boot Assembly Note

1. Fill the boot (wheel side) with the specified grease from a tube, not by hand.

   Caution
   - **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

   Note
   - The wheel side and transaxle side boots are different.
   - Use the specified grease supplied in the boot kit.

   Grease amount
   75—95 g {2.65—3.35 oz}

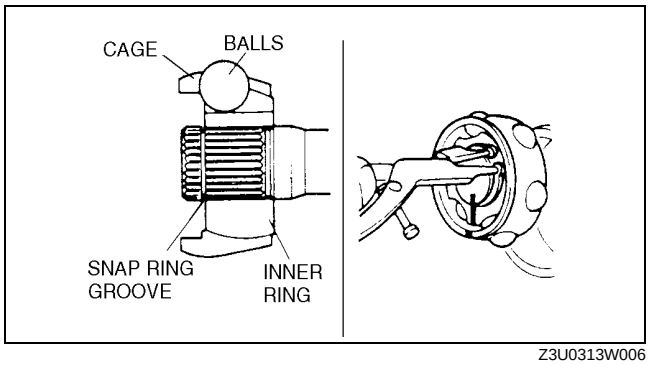
2. With the splines of the shaft still wrapped in tape from disassembly, install the boot.
3. Remove the tape.

Cage, Inner Ring, Balls, Snap Ring 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.



Z3U0313W006

Outer Ring, Clip Assembly Note

1. Fill the outer ring and boot (transaxle side) with the specified grease.

   Caution
   - **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

   Note
   - Use the specified grease supplied in the boot kit.

   Grease amount
   95—115 g {3.36—4.05 oz}

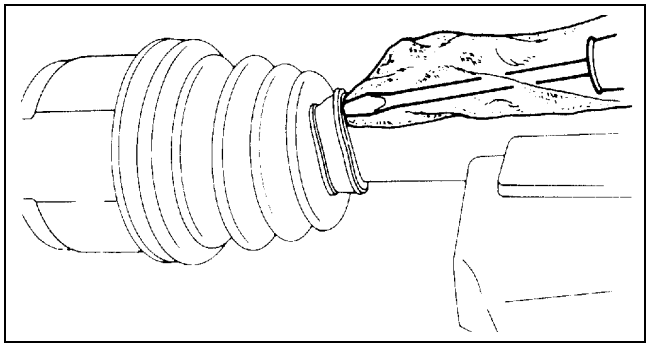
2. Align the marks, and install the outer ring on to the shaft.
3. Install a new clip.
4. Install the boot.
5. Set the drive shaft to the standard length.

   Standard length
   641.0—651.0 {25.24—25.62}

6. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

   Caution
   - **Be careful not to allow the grease to leak.**
   - **Do not damage the boot.**

7. Verify that the drive shaft length is within the specification.


Y3E6316W033

03–50 TECHNICAL DATA

DRIVELINE/AXLE TECHNICAL DATA

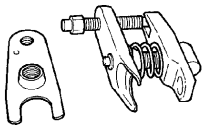
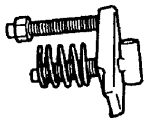
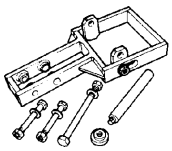
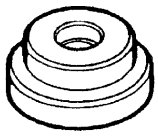
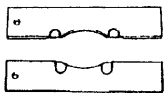
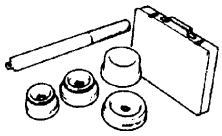
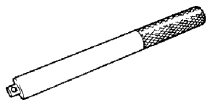
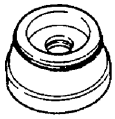
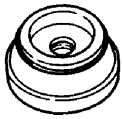
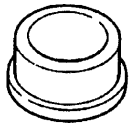
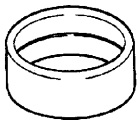
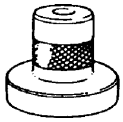
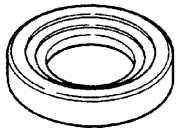
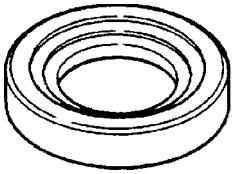
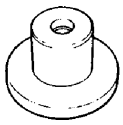
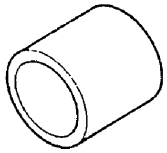
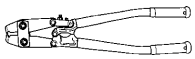
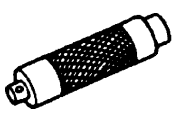
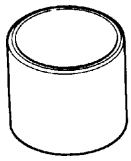
A3U035001018W01

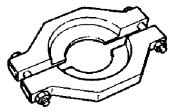
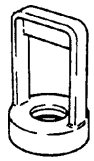
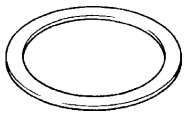
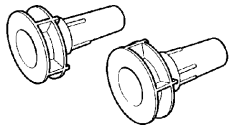
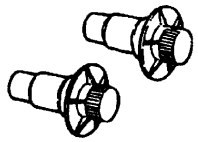
Item			ZM		FS	
			MTX	ATX	MTX	ATX
FRONT AXLE						
Maximum wheel bearing play	(mm {in})		0.05 {0.002}			
REAR AXLE						
Maximum wheel bearing play	(mm {in})		0.05 {0.002}			
DRIVE SHAFT						
Shaft length (Air in boot at atmospheric pressure)	(mm {in})	Left side	642.6—652.6 {25.30—25.69}	626.7—636.7 {24.68—25.06}	641.0—651.0 {25.24—25.62}	627.9—637.9 {24.73—25.11}
		Right side	607.9—617.9 {23.94—24.32}		604.6—614.6 {23.81—24.19}	608.9—618.9 {23.98—24.36}

03–60 SERVICE TOOLS

DRIVELINE/AXLE SST

A3U036001018W01

49 T028 3A0 Ball joint puller set 	49 T028 303 Body (Part of 49 T028 3A0) 	49 T028 304 Attachment (Part of 49 T028 3A0) 
49 B026 1A0 Wheel hub puller set 	49 G033 102 Handle (Part of 49 B026 1A0) 	49 G030 727 Attachment (Part of 49 B026 1A0) 
49 F026 103 Wheel hub puller 	49 F027 0A1 Bearing installer set 	49 F027 003 Handle (Part of 49 F027 0A1) 
49 F027 005 Attachment ø62 (Part of 49 F027 0A1) 	49 F027 007 Attachment ø72 (Part of 49 F027 0A1) 	49 F027 009 Attachment ø68 & 77 (Part of 49 F027 0A1) 
49 E033 101 Dust cover installer 	49 V001 795 Oil seal installer 	49 B026 103 Sensor rotor installer 
49 G026 105 Sensor rotor installer 	49 F026 102 Bearing installer 	49 W027 003 Bearing installer 
49 T025 001 Boot clamp crimper 	49 G030 797 Handle (Part of 49 G030 795) 	49 B025 004 Dust boot installer 

49 H027 002 Bearing installer 	49 H034 201 Support block 	49 B025 006A Sensor rotor installer 
49 B025 009A Installer attachment 	49 B027 006 Diff. side gear holder (MTX) 	49 G030 455 Diff. side gear holder (ATX) 

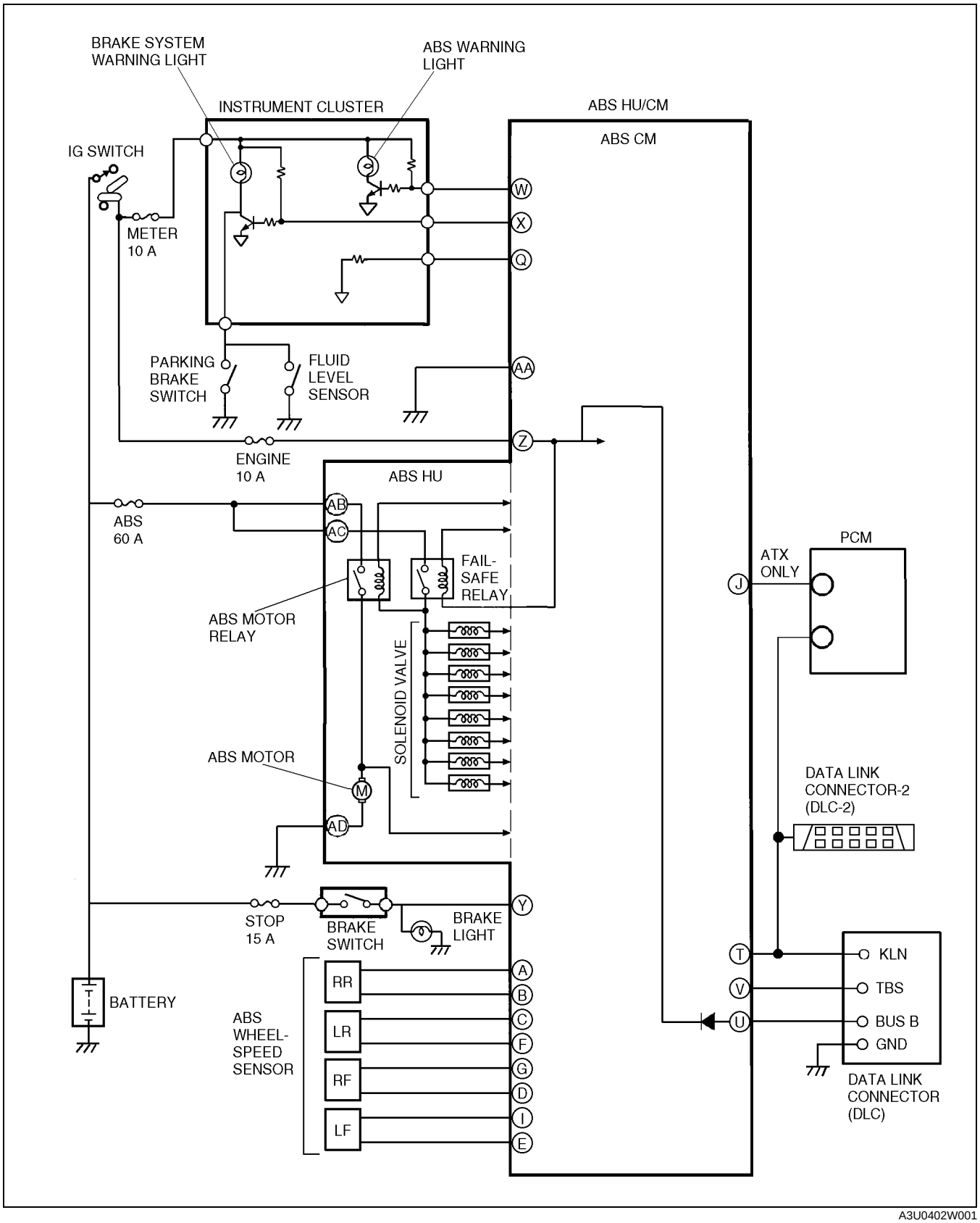
BRAKES

04
SECTION

04–02 ON-BOARD DIAGNOSTIC

ABS SYSTEM DIAGRAM

A3U040243000W01



A3U0402W001

ABS ON-BOARD DIAGNOSTIC

A3U040243000W02

On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the ABS and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  - — Provides a quick inspection of the ABS.
  - — Is usually performed at the start of each diagnostic procedure.
  - — Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  - — Read/clear diagnostic results, PID monitor and record and active command modes.

Read/clear diagnostic results

- This function allows you to read or clear DTCs in the ABS HU/CM memory.

PID/data monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

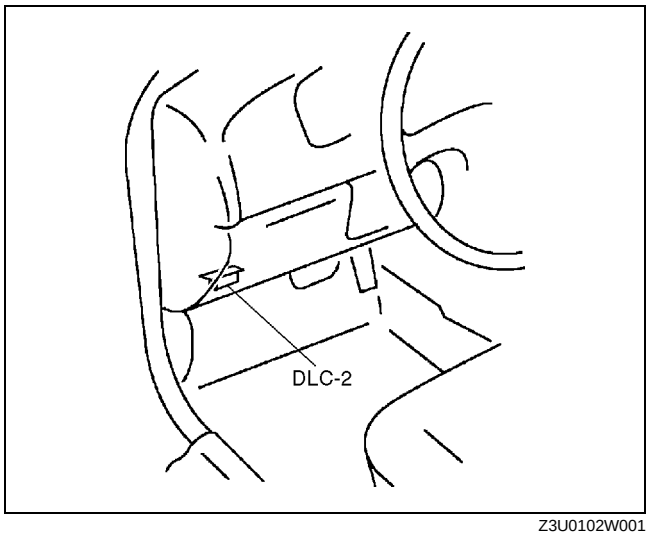
Active command modes

- This function allows you to control devices through the **SST** (WDS or equivalent).

DTCs Retrieving Procedure

Using SST (WDS or equivalent)

1. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located the left side of the steering column.
2. Retrieve DTC by WDS or equivalent.



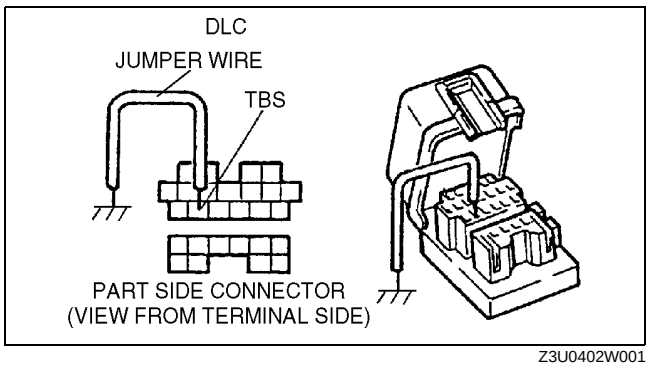
Z3U0102W001

Without using SST (WDS or equivalent)

Caution

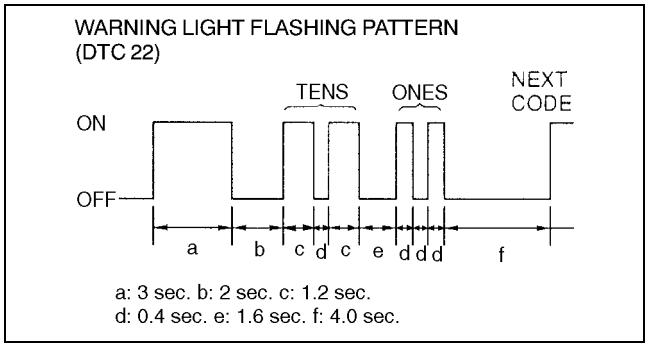
- **Connecting the wrong DLC terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

1. Connect the TBS terminal at DLC to body ground using a jumper wire.
2. Turn the ignition key to ON (engine OFF).



Z3U0402W001

3. After the ABS warning light illuminates for **3 sec**, the ABS warning light indicates DTCs.
4. After completion of repairs, clear DTCs.



YMU402WA1

DTCs Clearing Procedure
Using SST (WDS or equivalent)

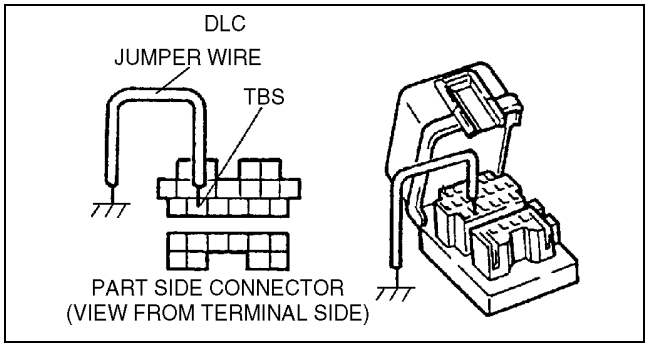
1. After repairs have been made, perform the **DTCs retrieving procedure**.
2. Erase DTC by WDS or equivalent.
3. Ensure that the customer's concern has been resolved.

Note
- After repairing the ABS wheel-speed sensor or replacing ABS HU/CM, the ABS and/or BRAKE system warning light may not go off when ignition key is turned ON. In this case, start engine and drive the vehicle at a speed of more than **10 km/h {6.2 mph}** until the ABS and/or BRAKE system warning light goes off.

Without using SST (WDS or equivalent)

Caution
- **Connecting the wrong DLC terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

1. Connect the TBS terminal at the DLC to body ground using a jumper wire.
2. Turn the ignition key to ON (engine OFF).
3. Output all stored DTCs.
4. After verifying that the first code is repeated, depress the brake pedal **10 times** at intervals of less than **1 second**.
5. Turn the ignition key to OFF and disconnect the jumper wire.
6. Turn the ignition key to ON and verify the ABS warning light turns off after **3 seconds**.



Z3U0402W001

Note
- DTCs cannot be cleared if the following conditions occur:
  — If intervals of depressing the brake pedal exceed **1 second**.
  — The brake switch has failed.
- After repairing the ABS wheel-speed sensor or replacing ABS HU/CM, the ABS and/or BRAKE system warning light may not go off when ignition key is turned ON. In this case, start engine and drive the vehicle at a speed of more than **10 km/h {6.2 mph}** until the ABS and/or BRAKE system warning light goes off.

PID/Data Monitor and Record Procedure

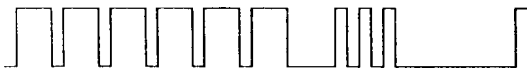
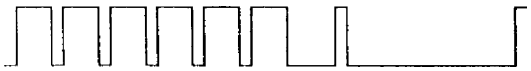
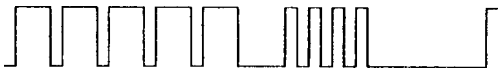
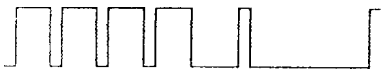
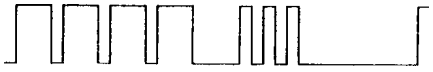
1. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located the left side of the steering column.
2. Access and monitor PIDs by WDS or equivalent.

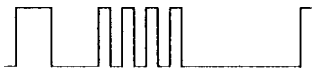
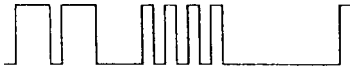
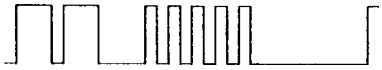
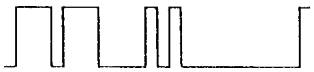
Active Command Modes Procedure

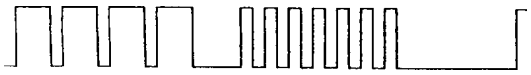
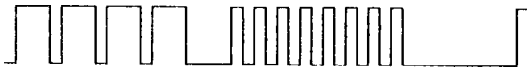
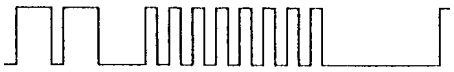
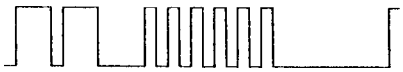
Note
- When driving, the ABS motor and each valve forcibly turn ABS_POWER on, and then each command on. ABS_POWER regulates the power supply for the ABS motor and 8 valves.

1. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located the left side of the steering column.
2. Turn the ignition key to ON (Engine OFF) or start engine.
3. Activate active command modes by WDS or equivalent.

DTC Table

DTC		ABS warning light flashing pattern	DTC definition	Diagnosis system component	Page
WDS or equivalent	ABS warning light				
B1318	63		Battery low voltage	ABS HU/CM power supply	(See 04–02–18 DTC B1318 (63).)
B1342	61		Defecive ABS CM	ABS HU/CM (CM)	(See 04–02–18 DTC B1342 (61).)
C1095	54		Circuit failure of ABS motor and/or motor relay	ABS motor, motor relay	(See 04–02–17 DTC C1095 (54), C1096 (53).)
C1096	53		Open circuit of ABS motor and/or motor relay	ABS motor, motor relay	(See 04–02–17 DTC C1095 (54), C1096 (53).)
C1140	30		ABS HU failure	ABS HU/CM (pump)	(See 04–02–14 DTC C1140 (30).)
C1145	11		Circuit failure of RF ABS wheel-speed sensor	Right front ABS wheel-speed sensor	(See 04–02–11 DTC C1145 (11), C1155 (12), C1165 (13), C1175 (14).)
C1148	41		RF ABS wheel-speed sensor and/or sensor rotor malfunction	Right front ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1155	12		Circuit failure of LF ABS wheel-speed sensor	Left front ABS wheel-speed sensor	(See 04–02–11 DTC C1145 (11), C1155 (12), C1165 (13), C1175 (14).)
C1158	42		LF ABS wheel-speed sensor and/or sensor rotor malfunction	Left front ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1165	13		Circuit failure of RR ABS wheel-speed sensor	Right rear ABS wheel-speed sensor	(See 04–02–11 DTC C1145 (11), C1155 (12), C1165 (13), C1175 (14).)
C1168	43		RR ABS wheel-speed sensor and/or sensor rotor malfunction	Right rear ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)

DTC		ABS warning light flashing pattern	DTC definition	Diagnosis system component	Page
WDS or equivalent	ABS warning light				
C1175	14		Circuit failure of LR ABS wheel-speed sensor	Left rear wheel-speed sensor	(See 04–02–11 DTC C1145 (11), C1155 (12), C1165 (13), C1175 (14).)
C1178	44		LR ABS wheel-speed sensor and/or sensor rotor malfunction	Left rear ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1186	51		Open circuit of fail-safe relay	Fail-safe relay	(See 04–02–16 DTC C1186 (51), C1266 (52).)
C1194	24		LF pressure reduction solenoid valve malfunction	Left front ABS pressure reduction solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1198	25		LF pressure retention solenoid valve malfunction	Left front ABS pressure retention solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1210	22		RF pressure reduction solenoid valve malfunction	Right front ABS pressure reduction solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1214	23		RF pressure retention solenoid valve malfunction	Right front ABS pressure retention solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1233	46		LF ABS wheel-speed sensor input signal missing	Left front ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)

DTC		ABS warning light flashing pattern	DTC definition	Diagnosis system component	Page
WDS or equivalent	ABS warning light				
C1234	45		RF ABS wheel-speed sensor input signal missing	Right front ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1235	47		RR ABS wheel-speed sensor input signal missing	Right rear ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1236	48		LR ABS wheel-speed sensor input signal missing	Left rear ABS wheel-speed sensor/sensor rotor	(See 04–02–12 DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48).)
C1242	28		LR pressure reduction solenoid valve malfunction	Left rear ABS pressure reduction solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1246	26		RR pressure reduction solenoid valve malfunction	Right rear ABS pressure reduction solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1250	29		LR pressure retention solenoid valve malfunction	Left rear ABS pressure retention solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)
C1254	27		RR pressure retention solenoid valve malfunction	Right rear ABS pressure retention solenoid valve	(See 04–02–14 DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27).)

DTC		ABS warning light flashing pattern	DTC definition	Diagnosis system component	Page
WDS or equivalent	ABS warning light				
C1266	52		Circuit failure of fail-safe relay	Fail-safe relay	(See 04–02–16 DTC C1186 (51), C1266 (52).)
C1510	32		RF ABS wheel-speed sensor and/or ABS HU malfunction	Right front solenoid valve, ABS motor, right front ABS wheel-speed sensor/sensor rotor	(See 04–02–15 DTC C1510 (32), C1511 (33), C1512 (34), C1513 (35).)
C1511	33		LF ABS wheel-speed sensor and/or ABS HU malfunction	Left front solenoid valve, ABS motor, left front ABS wheel-speed sensor/sensor rotor	(See 04–02–15 DTC C1510 (32), C1511 (33), C1512 (34), C1513 (35).)
C1512	34		RR ABS wheel-speed sensor and/or ABS HU malfunction	Right rear solenoid valve, ABS motor, right rear ABS wheel-speed sensor/sensor rotor	(See 04–02–15 DTC C1510 (32), C1511 (33), C1512 (34), C1513 (35).)
C1513	35		LR ABS wheel-speed sensor and/or ABS HU malfunction	Left rear solenoid valve, ABS motor, left rear ABS wheel-speed sensor/sensor rotor	(See 04–02–15 DTC C1510 (32), C1511 (33), C1512 (34), C1513 (35).)

PID/DATA Monitor Table

PID Name (Definition)	Unit/Condition	Condition/Specification	Action	ABS HU/CM terminal
ABS_LAMP (ABS warning light output state)	ON/OFF	• ABS warning light is illuminated: ON • ABS warning light is not illuminated: OFF	Inspect ABS warning light (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION)	W
ABSLF_I (Left front ABS pressure retention solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABSLF_O (Left front ABS pressure reduction solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABSLR_I (Left rear ABS pressure retention solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—

PID Name (Definition)	Unit/Condition	Condition/Specification	Action	ABS HU/CM terminal
ABSLR_O (Left rear ABS pressure reduction solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABSRF_I (Right front ABS pressure retention solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABSRF_O (Right front ABS pressure reduction solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/INSTALLATION	—
ABSRR_I (Right rear ABS pressure retention solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABSRR_O (Right rear ABS pressure reduction solenoid valve output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (solenoid valve is activated/deactivated) • Not ABS and/or EBD control: OFF (solenoid valve is deactivated)	Internal fault of ABS HU/CM. Replace ABS HU/CM (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION)	—
ABS_VOLT (System battery voltage value)	V	• Ignition key at ON: B+ • Idle: 14—16V	Inspect power supply circuit (See 04–13–6 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) INSPECTION)	—
BOO_ABS (Brake pedal switch input)	ON/OFF	• Brake pedal is depressed: ON • Brake pedal is released: OFF	Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION)	Y
BRAKE_LMP (BRAKE system warning light output state)	ON/OFF	• BRAKE system warning light is illuminated: ON • BRAKE system warning light is not illuminated: OFF	Inspect BRAKE system warning light (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION)	X
CCNTABS (Number of continuous DTC)	—	• DTC is detected: 1—255 • DTC is not detected: 0	Perform inspection using appropriate DTC (See 04–02–3 ABS ON-BOARD DIAGNOSTIC)	—
LF_WSPD (Left front ABS wheel-speed sensor input)	KPH/MPH	• Vehicle is stopped: 0KPH {0MPH} • Indicates vehicle speed	Inspect ABS wheel-speed sensor/sensor rotor. (See 04–13–9 FRONT/ REAR ABS WHEEL-SPEED SENSOR INSPECTION)	I, E

PID Name (Definition)	Unit/Condition	Condition/Specification	Action	ABS HU/CM terminal
LR_WSPD (Left rear ABS wheel-speed sensor input)	KPH/MPH	• Vehicle is stopped: 0KPH {0MPH} • Indicates vehicle speed	Inspect ABS wheel-speed sensor/sensor rotor. (See 04–13–9 FRONT/ REAR ABS WHEEL-SPEED SENSOR INSPECTION)	C, F
PMP MTR (ABS motor relay output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (ABS motor is activated/ deactivated) • Not ABS and/or EBD control: OFF (ABS motor is deactivated)	Inspect ABS HU/CM connector and ABS HU/CM (See 04–13–3 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) SYSTEM INSPECTION)	—
PMPSTAT (ABS motor output state)	ON/OFF	• During ABS and/or EBD control: ON/OFF (ABS motor is activated/ deactivated) • Not ABS and/or EBD control: OFF (ABS motor is deactivated)	Inspect ABS HU/CM connector and ABS HU/CM (See 04–13–3 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) SYSTEM INSPECTION)	—
RF_WSPD (Right front ABS wheel-speed sensor input)	KPH/MPH	• Vehicle is stopped: 0KPH {0MPH} • indicates vehicle speed	Inspect ABS wheel-speed sensor/sensor rotor. (See 04–13–9 FRONT/ REAR ABS WHEEL-SPEED SENSOR INSPECTION)	D, G
RR_WSPD (Right rear ABS wheel-speed sensor input)	KPH/MPH	• Vehicle is stopped: 0KPH {0MPH} • indicates vehicle speed	Inspect ABS wheel-speed sensor/sensor rotor. (See 04–13–9 FRONT/ REAR ABS WHEEL-SPEED SENSOR INSPECTION)	A, B
ABSVLVRLY (Fail-safe relay output state)	ON/OFF	• Ignition key at ON: ON • Other condition (Power supply circuit is open): OFF	Inspect ABS HU/CM connector and ABS HU/CM (See 04–13–3 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) SYSTEM INSPECTION)	—

Active Command Modes Table

Command Name	Definition	Operation	Note
PMP_MOTOR	ABS motor	ON/OFF	Ignition key at ON (engine OFF), and driving
RF_OUTLET	Right front ABS pressure reduction solenoid valve	ON/OFF	
RF_INLET	Right front ABS pressure retention solenoid valve	ON/OFF	
LF_OUTLET	Left front ABS pressure reduction solenoid valve	ON/OFF	
LF_INLET	Left front ABS pressure retention solenoid valve	ON/OFF	
RR_OUTLET	Right rear ABS pressure reduction solenoid valve	ON/OFF	
RR_INLET	Right rear ABS pressure retention solenoid valve	ON/OFF	
LR_OUTLET	Left rear ABS pressure reduction solenoid valve	ON/OFF	
LR_INLET	Left rear ABS pressure retention solenoid valve	ON/OFF	
ABS_POWER	Fail-safe relay	ON/OFF	
VS_OUTPUT	Vehicle speed signal	KPH/MPH	

Note

- When operating, the ABS motor and each valve forcibly turn ABS_POWER on, and then each command on. ABS_POWER regulates the power supply for the ABS motor and 8 valves.

DTC C1145 (11), C1155 (12), C1165 (13), C1175 (14)

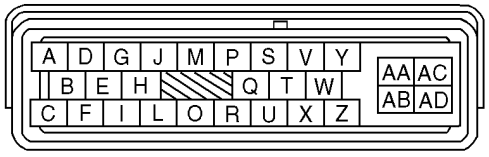
A3U040243000W03

Caution

- **When attaching the tester lead to the ABS HU/CM or the ABS HU/CM harness connector the SST (49 G066 001) must be used. (See 04–13–6 ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION.)**

DTC	**C1145 (11)** **C1155 (12)** **C1165 (13)** **C1175 (14)**	**RF ABS wheel-speed sensor** **LF ABS wheel-speed sensor** **RR ABS wheel-speed sensor** **LR ABS wheel-speed sensor**
DETECTION CONDITION	• When open or short circuit is detected.	
POSSIBLE CAUSE	• Open circuit or short to power circuit of ABS wheel-speed sensor(s) circuit • ABS wheel-speed sensor(s) malfunction	

ABS HU/CM



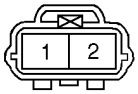
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR

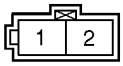
(VIEW FROM TERMINAL SIDE)

ABS WHEEL-SENSOR

LF, RF



LR, RR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

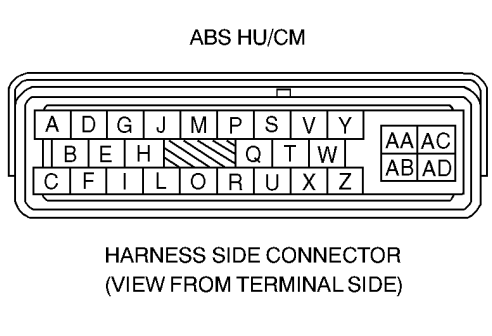
STEP	INSPECTION		ACTION
1	**INSPECT ABS WHEEL-SPEED SENSOR CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Connect **SST** (adapter harness) to ABS HU/CM connector (harness side) with ABS HU/CM disconnected. • Measure resistance between suspected sensor terminals of **SST**. — RF ABS wheel-speed sensor: G—D — LF ABS wheel-speed sensor: E—I — RR ABS wheel-speed sensor: A—B — LR ABS wheel-speed sensor: C—F • Is resistance **within 1.3—1.7 kilohm**?	Yes	Go to next step.
		No	Go to Step 3.
2	**INSPECT ABS WHEEL-SPEED SENSOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage between suspected sensor terminal(s) of **SST** (adapter harness) and ground(s). — RF ABS wheel-speed sensor: G, D — LF ABS wheel-speed sensor: I, E — RR ABS wheel-speed sensor: A, B — LR ABS wheel-speed sensor: C, F • Is there any **B+**?	Yes	Repair or replace harness for short to power circuit between ABS HU/CM and ABS wheel-speed sensor(s), then go to Step 5.
		No	Go to Step 5.
3	**INSPECT ABS WHEEL-SPEED SENSOR** • Turn ignition key to OFF. • Disconnect suspected sensor connector(s) and inspect resistance between sensor terminals (part side). • Is resistance **within 1.3—1.7 kilohm**?	Yes	Go to next step.
		No	Replace ABS wheel-speed sensor, then go to Step 5.

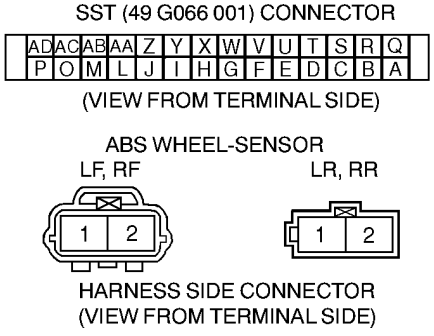
STEP	INSPECTION		ACTION
4	**INSPECT ABS HU/CM TO ABS WHEEL-SPEED SENSOR CIRCUIT FOR OPEN CIRCUIT** • Inspect continuity between suspected sensor terminal(s) of **SST** and ABS wheel-speed sensor connector. (vehicle harness side) — RF ABS wheel-speed sensor (+): G-1 — RF ABS wheel-speed sensor (–): D-2 — LF ABS wheel-speed sensor (+): I-1 — LF ABS wheel-speed sensor (–): E-2 — RR ABS wheel-speed sensor (+): A-1 — RR ABS wheel-speed sensor (–): B-2 — LR ABS wheel-speed sensor (+): C-1 — LR ABS wheel-speed sensor (–): F-2 • Is there continuity?	Yes	Repair or replace poor connections of ABS HU/CM connector and/or ABS wheel-speed sensor connector(s), then go to next step.
		No	Repair or replace harness for open circuits between ABS HU/CM and ABS wheel-speed sensor(s), then go to next step.
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory (See 04–02–4 DTCs Clearing Procedure) • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC C1148 (41), C1158 (42), C1168 (43), C1178 (44), C1233 (46), C1234 (45), C1235 (47), C1236 (48)
A3U040243000W04

Caution
- **When attaching the tester lead to the ABS HU/CM or the ABS HU/CM harness connector the SST (49 G066 001) must be used. (See 04–13–6 ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION.)**

DTC	**C1148 (41), C1234 (45)** **C1158 (42), C1233 (46)** **C1168 (43), C1235 (47)** **C1178 (44), C1236 (48)**	**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	• C1148 (41), C1158 (42), C1168 (43), C1178 (44): ABS wheel-speed signal is out of specification when just after vehicle has started to move. • C1234 (45), C1233 (46), C1235 (47), C1236 (48): ABS wheel-speed signal malfunction (distortion/ sudden change) is detected during driving.	
POSSIBLE CAUSE	• Short to ground circuit of ABS wheel-speed sensor(s) circuit • ABS wheel-speed sensor(s) malfunction • Damaged ABS sensor rotor(s) • Incorrect clearance between ABS sensor and sensor rotor	





Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT INPUT SIGNAL STATUS OF CONCERN IS INTERMITTENT OR CONSTANT** • Turn ignition key to OFF. • Connect **SST** (WDS or equivalent) to DLC-2. • Start engine and drive vehicle. • Access LF_WSPD, LR_WSPD, RF_WSPD and RR_WSPD PID using **SST** (WDS or equivalent) • Are PIDs display vehicle speed and 4 PIDs equal?	Yes	Go to Step 5.
		No	Go to next step.
2	**INSPECT ABS WHEEL-SPEED SENSOR CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Connect **SST** (adapter harness) to ABS HU/CM connector (harness side) with ABS HU/CM disconnected. • Inspect continuity between suspected sensor terminal(s) of **SST** (adapter harness) and ground(s). — RF ABS wheel-speed sensor: G — LF ABS wheel-speed sensor: I — RR ABS wheel-speed sensor: A — LR ABS wheel-speed sensor: C • Is there continuity?	Yes	Go to next step.
		No	Go to Step 4.
3	**INSPECT ABS WHEEL-SPEED SENSOR FOR SHORT TO GROUND** • With ignition key at OFF, disconnected suspected sensor connector(s), inspect continuity between suspected sensor terminal(s) 1 (part side) and ground(s). • Is there continuity?	Yes	Replace ABS wheel-speed sensor(s), then go to Step 8.
		No	Repair or replace harness (short to ground) between ABS HU/CM and ABS wheel-speed sensor connector(s), then go to Step 8.
4	**INSPECT SENSOR ROTOR CLEARANCE** • Jack-up vehicle and support it with safety stands. • Remove suspected wheel(s). • Inspect clearance between sensor and rotor. • Is clearance **within 0.3—1.1 mm {0.012—0.043 in}**?	Yes	Go to Step 8.
		No	Replace ABS wheel-speed sensor(s), then go to Step 8.
5	**INSPECT ABS WHEEL-SPEED SENSOR OUTPUT PULSE** • Start engine and drive vehicle. • Inspect output voltage pattern using an oscilloscope. (See 04–13–10 Voltage Pattern Inspection) • Is output voltage pattern okay?	Yes	Go to Step 8.
		No	Go to next step.
6	**INSPECT SENSOR ROTOR FOR DAMAGE** • Jack-up vehicle and support it with safety stands. • Remove suspected wheel(s). • Visually inspect sensor rotor for missing, deformed and obstructed teeth. **Number of teeth: 44** • Is sensor rotor okay?	Yes	Go to next step.
		No	Replace rotor, then go to Step 8.
7	**INSPECT SENSOR ROTOR CLEARANCE** • Inspect clearance between sensor and rotor. • Is clearance **within 0.3—1.1 mm {0.012—0.043 in}**?	Yes	Go to next step.
		No	Replace ABS wheel-speed sensor, then go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnected all disconnected connectors. • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or above. • Gradually slow down vehicle and stop. • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC C1194 (24), C1198 (25), C1210 (22), C1214 (23), C1242 (28), C1246 (26), C1250 (29), C1254 (27)

A3U040243000W05

DTC	**C 1210 (22)** **C 1214 (23)** **C 1194 (24)** **C 1198 (25)** **C 1246 (26)** **C 1254 (27)** **C 1242 (28)** **C 1250 (29)**	**RF pressure reduction solenoid valve** **RF pressure retention solenoid valve** **LF pressure reduction solenoid valve** **LF pressure retention solenoid valve** **RR pressure reduction solenoid valve** **RR pressure retention solenoid valve** **LR pressure reduction solenoid valve** **LR solenoid pressure retention valve**
DETECTION CONDITION	Solenoid monitor signal does not track in response to solenoid ON/OFF command.	
POSSIBLE CAUSE	• Open circuit, short to power or short to ground of solenoid valve circuit in ABS HU/CM • Stuck solenoid valve in ABS HU/CM	

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or **above at least 1 minute**. • Gradually slow down and stop vehicle. • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC C1140 (30)

A3U040243000W06

DTC C1140 (30)		**ABS HU/CM (pump)**
DETECTION CONDITION	Right front and left rear wheels, or left front and right rear wheels lock is detected during ABS operation.	
POSSIBLE CAUSE	Stuck ABS pump in ABS HU/CM	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM OPERATION** • Perform ABS HU/CM system inspection. (See 04–13–3 System Inspection) • Is it okay?	Yes	Go to next step.
		No	Replace ABS HU/CM, then go to Step 4.
2	**INSPECT CONVENTIONAL BRAKE OPERATION** • Inspect brake fluid level. • Start engine. • Perform a road test to verify conventional vehicle braking performance. • Is there any concern?	Yes	Inspect conventional brake line, then go to Step 4.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT REAR BRAKE DRAGGING** • Turn ignition key to OFF. • Jack-up vehicle and support it with safety stand. • Release parking brake. • Turn rear wheel by hand and inspect for rear brake drag. • Is rear brake dragging?	Yes	Repair parking brake system, then go to next step.
		No	Go to next step.
4	**VERIFY TROUBLESHOOTING COMPLETED** • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or **above at least 1 minute**. • Gradually slow down vehicle and stop. • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC C1510 (32), C1511 (33), C1512 (34), C1513 (35)

A3U040243000W07

DTC	**C1510 (32)** **C1511 (33)** **C1512 (34)** **C1513 (35)**	**RF solenoid valve, ABS motor or RF ABS wheel-speed sensor/sensor rotor** **LF solenoid valve, ABS motor or LF ABS wheel-speed sensor/sensor rotor** **RR solenoid valve, ABS motor or RR ABS wheel-speed sensor/sensor rotor** **LR solenoid valve, ABS motor or LR ABS wheel-speed sensor/sensor rotor**
DETECTION CONDITION	• Wheel lock is detected during ABS operation (pressure reduction inoperative).	
POSSIBLE CAUSE	• Low electrical power supply • Malfunction of solenoid valve in ABS HU/CM • Malfunction of ABS wheel-speed sensor • Damaged ABS sensor rotor • Stuck ABS motor in ABS HU/CM • Malfunction of hydraulic unit of ABS HU/CM	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY OTHER DTC HAS RECORDED** • Is DTC B1318 (63) also stored?	Yes	Go to DTC B1318 (63) inspection.
		No	Go to next step.
2	**VERIFY OTHER DTC HAS RECORDED** • Is any of DTC C1214 (22), C1210 (23), C1198 (24), C1194 (25), C1254 (26), C1246 (27), C1250 (28) and/or C1242 (29) also stored?	Yes	Go to applicable DTC inspection.
		No	Go to next step.
3	**VERIFY OTHER DTC HAS RECORDED** • Is any of DTC C1145 (11), C1148 (41), C1155 (12) C1158 (42), C1165 (13), C1168 (43), C1175 (14), C1178 (44), C1233 (46), C1234 (45), C1235 (47) and/or C1236 (48) also stored?	Yes	Go to applicable DTC inspection.
		No	Go to next step.
4	**VERIFY OTHER DTC HAS RECORDER** • Is any of DTC C1095 (59) and/or C1096 (53) also stored?	Yes	Go to applicable DTC inspection.
		No	Go to next step.
5	**INSPECT ABS HU/CM OPERATION** • Perform ABS HU/CM system inspection.(See 04–13–3 System Inspection) • Is it okay?	Yes	Go to next step.
		No	Replace ABS HU/CM, then go to next step.
6	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or **above at least 1 minute**. • Gradually slow down and stop vehicle. • Is same DTC present?	Yes	Replace ABS HU/CM.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC C1186 (51), C1266 (52)

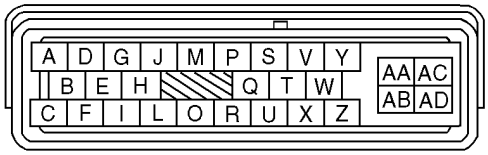
A3U040243000W08

Caution

- **When attaching the tester lead to the ABS HU/CM or the ABS HU/CM harness connector the SST (49 G066 001) must be used. (See 04–13–6 ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION.)**

DTC C1186 (51), C1266 (52)	Fail-safe relay
DETECTION CONDITION	• C1186 (51): Fail-safe relay in ABS HU/CM stuck OFF when ignition switch is turned ON, fail-safe relay ON is commanded. • C1266 (52): Fail-safe relay in ABS HU/CM stuck ON when ignition switch is turned ON, fail-safe relay OFF is commanded.
POSSIBLE CAUSE	• Open circuit, short to power or short to ground circuit of fail-safe relay in ABS HU/CM • Stuck ON or OFF of fail-safe relay in ABS HU/CM • Open circuit of fail-safe relay power supply circuit

ABS HU/CM



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR

(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS FUSE CONDITION** • Is ABS fuse (**60 A**) okay?	Yes	Go to next step.
		No	Replace fuse, then go to Step 3.
2	**INSPECT FAIL-SAFE RELAY POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Connect **SST** (adapter harness) to ABS HU/CM connector (harness side) with ABS HU/CM disconnected. • Turn ignition key to ON (engine OFF). • Measure voltage between terminal AC of **SST** (adapter harness) and ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit between battery positive terminal and ABS HU/CM terminal AC, then go to next step.
3	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnected all disconnected connectors. • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		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 C1095 (54), C1096 (53)

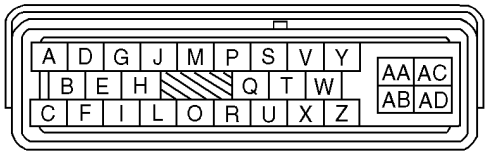
A3U040243000W09

Caution

- **When attaching the tester lead to the ABS HU/CM or the ABS HU/CM harnesses connector the SST (49 G066 001) must be used. (See 04–13–6 ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION.)**

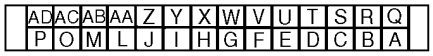
DTC C1095 (53), C1096 (54)	Motor relay, ABS Motor
DETECTION CONDITION	• C1095 (53): ABS motor stuck OFF when vehicle is started or during ABS operation, ABS motor ON is commanded. • C1096 (54): ABS motor stuck ON when vehicle is started or during ABS operation, ABS motor OFF is commanded.
POSSIBLE CAUSE	• Open circuit, or short power or short to ground of motor relay and/or ABS motor in ABS HU/CM • Stuck motor relay and/or ABS motor • Open circuit of ABS motor power supply • Open circuit of ABS motor ground

ABS HU/CM



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



(VIEW FROM TERMINAL SIDE)

04–02

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY OTHER DTC HAS RECORDED** • If any of DTC C1186 (51) and/or C1266 (52) also stored?	Yes	Go to applicable DTC inspection.
		No	Go to next step.
2	**INSPECT ABS FUSE CONDITION** • Is ABS fuse (**60 A**) okay?	Yes	Go to next step.
		No	Replace fuse, then go to Step 5.
3	**INSPECT MOTOR RELAY POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Connect **SST** (adapter harness) to ABS HU/CM connector (harness side) with HU/CM disconnected. • Turn ignition key to ON (engine OFF). • Measure voltage between ABS HU/CM terminal AB (harness side) and ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit between battery positive terminal and ABS HU/CM terminal AB, then go to Step 5.
4	**INSPECT ABS HU/CM GROUND CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Inspect continuity between ABS HU/CM terminal AD of **SST** and ground. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit between ABS HU/CM terminal AD and ground, then go to next step.
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnected all disconnected connectors. • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or above. • Gradually slow down and stop vehicle. • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC B1342 (61)

A3U040243000W10

DTC B1342 (61)	ABS HU/CM (CM)
DETECTION CONDITION	The on-board diagnostic function detects computer malfunction.
POSSIBLE CAUSE	• Malfunction of ABS HU/CM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Start engine and drive vehicle at **10 km/h {6.2 mph}** or above. • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC B1318 (63)

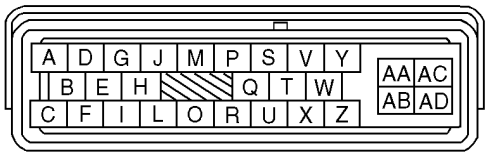
A3U040243000W11

Caution

- **When attaching the tester lead to the ABS HU/CM or the ABS HU/CM harnesses connector the SST (49 G066 001) must be used. (See 04–13–6 ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION.)**

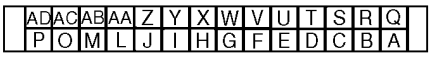
DTC B1318 (63)	ABS HU/CM power supply
DETECTION CONDITION	• Voltage at Z terminal of ABS HU/CM drops **below 10 V** when driving vehicle.
POSSIBLE CAUSE	• Low power supply • Battery and/or generator malfunction • Poor ground or open circuit of ground

ABS HU/CM



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

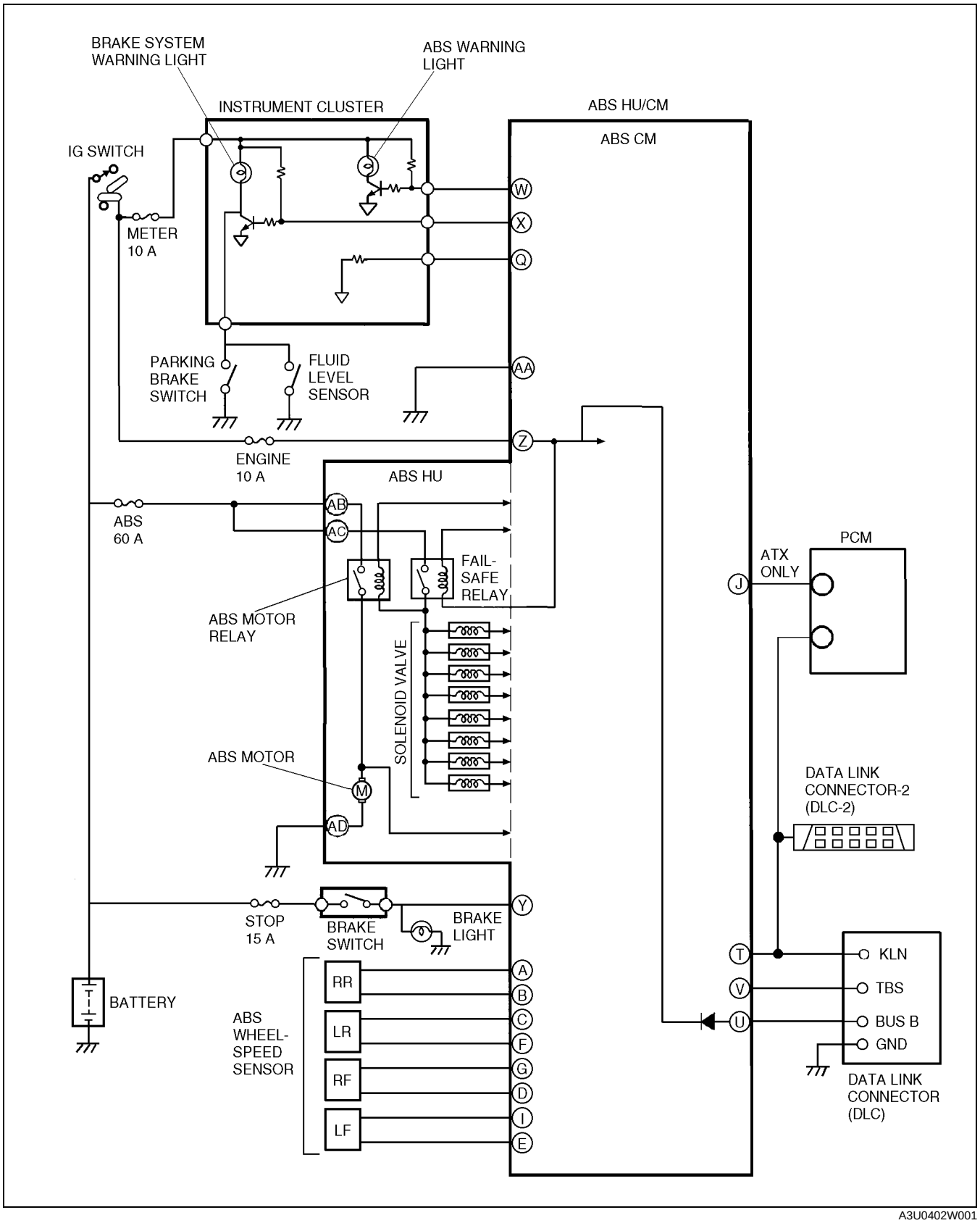
STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Connect **SST** (adapter harness) to ABS HU/CM connector (harness side) with ABS HU/CM disconnected. • Start engine. • Measure voltage between terminal Z of **SST** (harness side) and ground. • Is voltage **above 10 V**?	Yes	Go to next step.
		No	Go to Step 3.

STEP	INSPECTION		ACTION
2	**INSPECT ABS HU/CM GROUND CIRCUIT FOR POOR GROUND AND OPEN CIRCUIT** • Turn ignition key to OFF. • Measure resistance between terminal AA of **SST** and ground. • Is resistance **within 0—1 ohm**?	Yes	Go to Step 5.
		No	If there is no continuity: • Repair or replace harness for open between ABS HU/CM and ground, then go to Step 5. If resistance is not **within 0—1 ohm**: • Repair or replace harness for poor ground then go to Step 5.
3	**INSPECT BATTERY POWER** • Inspect battery. (See 01–50–1 ENGINE TECHNICAL DATA) • Is it okay?	Yes	Go to next step.
		No	Replace battery, then go to Step 5.
4	**INSPECT GENERATOR** • Inspect generator. (See 01–17–3 GENERATOR INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Repair or replace generator, then go to Step 5.
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnected all disconnected connectors. • Clear DTC from memory. (See 04–02–4 DTCs Clearing Procedure) • Is same DTC present?	Yes	Replace ABS HU/CM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is there any other DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

04–03 SYMPTOM TROUBLESHOOTING

ABS SYSTEM DIAGRAM

A3U040343000W01



A3U0402W001

FOREWORD

A3U040343000W02

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Test. To check the DTC, follow the OBD TEST steps.

ABS

A3U040343000W03

Foreword

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps.

Precaution

When inspecting or servicing the ABS, note the following points:

1. The ABS warning light and/or BRAKE system warning light illuminate even when the system is normal.

Warning lights that may illuminate	Cases in which the light may illuminate	Condition in which the light will go out	ABS and EBD control
• ABS warning light • BRAKE system warning light (*1)	Under any of the following conditions: • When the front wheels are jacked up, stuck, or placed on a chassis roller, and only the front wheel ABS wheel speed sensors are spun for **more than 20 seconds**.	After turning ignition switch OFF, vehicle is driven at speed **greater than 10 km/h {6.2 mph}** and normal operation is confirmed.	• ABS: Cuts control. • EBD: 1. Cuts control, in cases where the light may illuminate, only when ABS HU/CM detects that a wheel speed sensor determines that more than 2 rear wheels are malfunctioning. 2. Operates control, if wheel speed sensor determines that more than 3 wheels are functioning correctly.
	Parking brake is not fully released while driving.		
	Brake drag.		
	Sudden acceleration/ deceleration.		
	Left/ right or front/ rear tires are different. (Size, radius, tire pressure, or wear is other than that listed on tire label.)		
• ABS warning light	Battery voltage at ABS HU/ CM ignition terminal Z drops **below about 9 to 10 V**. (*2)	Battery voltage rises **above about 10 V**.	ABS: Operates control. EBD: Operates control.
• ABS warning light • BRAKE system warning light	Battery voltage at ABS HU/ CM ignition terminal Z drops **below about 9 to 10 V**. (*2)	Battery voltage rises **above about 10 V**. (Only BRAKE system warning light goes out.) Battery voltage rises **above about 10 V**. (Both warning lights go out)	ABS: Operates control. EBD: Operates control.

*1 : In cases where the light may illuminate, only when ABS HU/CM detects that a rear wheel's speed sensor is malfunctioning.

*2 : If battery voltage drops **below about 9 to 10 V** while vehicle speed is **greater than 6 km/h {3.7 mph}**, ABS HU/CM records **DTC B1318 (DTC 63)**.

2. Precautions during servicing of ABS
   The ABS is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.
   (1) Malfunctions in electrical system
   - The ABS hydraulic unit and control module (ABS HU/CM) has an on-board diagnostic function. With this function, the ABS warning light and/or BRAKE system warning light will come on when there is a problem in the electrical system. Also, past and present malfunctions are recorded in the ABS HU/CM. This function can find malfunctions that do not occur during periodic inspections. Turn the ignition switch on by connecting the **SST** (WDS or equivalent) to the DLC-2 inside the Passenger comportment. **Approximately 5 seconds** later the stored malfunctions will be displayed in order of occurrence. To find out the causes of ABS malfunctions, use these on-board diagnostic results.
   - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the harness. The ABS HU/CM usually operates normally. Be careful when searching for the cause of malfunction.
   - After repair, it is necessary to erase the DTC from the ABS HU/CM memory. Also, if the ABS related parts have been replaced, verify that the no DTC has been displayed after repairs.

- After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the ABS HU/CM (ABS motor or ABS motor relay or solenoid valve), the ABS warning light may not go off even when the ignition switch is turned on. In this case, drive the vehicle at a speed of **more than 10 km/h {6.2 mph}**, make sure the ABS warning light goes off, and then erase the DTC.
- When repairing, if the ABS related connectors are disconnected and the ignition switch is turned on, the ABS HU/CM will mistakenly detect a fault and record it as a malfunction.
- To protect the ABS HU/CM, make sure the ignition is off before connecting or disconnecting the ABS HU/CM connector.
- To protect the terminal, use the **SST** (49 G066 001) when connecting the tester lead to the ABS HU/CM connector.

(2) Malfunctions in hydraulic system

- Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in an ABS component or the conventional brake system.
- The ABS hydraulic unit contains delicate mechanical parts. If foreign materials get into the component, the ABS may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the ABS does not. Make sure foreign materials do not get inside when servicing the ABS (e.g. brake fluid replacement, pipe removal).

SYMPTOM TROUBLESHOOTING

A3U040343000W04

ABS Symptom Troubleshooting

- Verify the symptom, and perform troubleshooting according to the appropriate number.

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Neither ABS warning light nor BRAKE system warning light illuminate	Neither ABS warning light nor BRAKE system warning light illuminate with ignition switch on.	(See 04–03–5 NO.1 NEITHER ABS WARNING LIGHT NOR BRAKE SYSTEM WARNING LIGHT ILLUMINATE)
2	ABS warning light does not illuminate	ABS warning light does not illuminate with ignition switch on.	(See 04–03–6 NO.2 ABS WARNING LIGHT DOES NOT ILLUMINATE)
3	BRAKE system warning light does not illuminate	BRAKE system warning light does not illuminate with ignition switch on.	(See 04–03–7 NO.3 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE)
4	ABS warning light and BRAKE system warning light stay ON	Both ABS warning light BRAKE system warning light stay on **more than 4 seconds** with ignition switch on.	(See 04–03–8 NO.4 ABS WARNING LIGHT AND BRAKE SYSTEM WARNING LIGHT STAY ON)
5	ABS warning light stays ON	ABS warning light stays on **more than 4 seconds** with ignition switch on.	(See 04–03–10 NO.5 ABS WARNING LIGHT STAYS ON)
6	BRAKE system warning light stays ON	BRAKE system warning light stays on **more than 4 seconds** with ignition switch on. (Parking brake is released)	(See 04–03–12 NO.6 BRAKE SYSTEM WARNING LIGHT STAYS ON)
7	BRAKE system malfunction	There is a malfunction in system even though ABS warning light and BRAKE system warning light does not illuminate.	(See 04–03–13 NO.7 BRAKE SYSTEM MALFUNCTION)

Quick Diagnosis Chart
Vehicles with ABS

×: Applicable

Troubleshooting item	Possible factor	ABS HU/CM	Instrument cluster	ABS warning light circuit	BRAKE system warning light circuit	Battery	Brake fluid	Brake fluid level sensor	Parking brake switch	Charging system	ABS HU/CM power supply (terminal Z)	ABS HU/CM GND 1 (terminal AA)	Instrument cluster power supply (terminal 1J)	Instrument cluster GND (terminal 1D)	Conventional brakes	Brake pipe routing
1	Neither ABS warning light nor BRAKE system warning light illuminate		×										×	×		
2	ABS warning light does not illuminate	×	×	×												
3	BRAKE system warning light does not illuminate	×	×		×											
4	ABS warning light and BRAKE system warning light stay ON	×	×	×	×	×				×	×	×				
5	ABS warning light stays ON	×	×	×		×				×						
6	BRAKE system warning light stays ON	×	×		×		×	×	×							
7	BRAKE system malfunction	×													×	×

Y3U403WA1

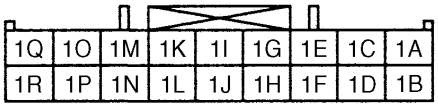
NO.1 NEITHER ABS WARNING LIGHT NOR BRAKE SYSTEM WARNING LIGHT ILLUMINATE

A3U040343000W05

- 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	Neither ABS warning light nor BRAKE system warning light illuminate
DESCRIPTION	• Neither ABS warning light nor BRAKE system warning light illuminate with ignition switch on.
POSSIBLE CAUSE	• Warning light circuit and indicator light circuits open circuit or shorted to ground.

INSTRUMENT CLUSTER CONNECTOR (18-PIN)



(VIEW FROM HARNESS SIDE)

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** • Do other warning and indicator lights illuminate when IG switch is turned ON?	Yes	Replace instrument cluster (open circuit in instrument cluster).
		No	Go to next step.

STEP	INSPECTION		ACTION
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN WARNING LIGHTS' COMMON GROUND OR TURN SIGNAL INDICATOR LIGHT** • Turn ignition switch ON. • Turn signal switch ON. • Does turn signal indicator light in instrument cluster illuminate?	Yes	Replace instrument cluster (open circuit in instrument cluster).
		No	Go to next step.
3	**INSPECT INSTRUMENT CLUSTER POWER SUPPLY FUSE** • Is instrument cluster ignition power supply fuse okay?	Yes	Go to next step.
		No	Check for a short to ground on blown fuse's circuit. Repair or replace as necessary. Install appropriate amperage fuse.
*4	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER POWER SUPPLY AND INSTRUMENT CLUSTER FOR CONTINUITY** • Turn ignition switch ON. • Measure voltage at instrument cluster connector (18-pin) terminal 1J. • Is voltage **approximately 12V**?	Yes	Go to next step
		No	Repair wiring harness between fuse block and instrument cluster.
*5	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUTY) IS IN WIRING HARNESS (BETWEEN INSTRUMENT CLUSTER AND GROUND) OR INSTRUMENT CLUSTER** • Turn ignition switch to LOCK. • Disconnect instrument cluster connector. • Is there continuity between instrument cluster connector (18-pin) terminal 1D and ground?	Yes	Replace instrument cluster (open circuit in instrument cluster).
		No	Repair wiring harness between instrument cluster and ground.

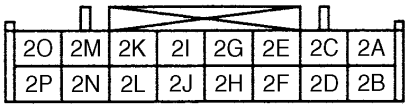
NO.2 ABS WARNING LIGHT DOES NOT ILLUMINATE

A3U040343000W06

- 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.

2	**ABS warning light does not illuminate**
DESCRIPTION	• ABS warning light does not illuminate with ignition switch on.
POSSIBLE CAUSE	• ABS warning light circuit open circuit or shorted to ground.

INSTRUMENT CLUSTER CONNECTOR (16-PIN)



(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK FOR SHORT TO GROUND IN ABS HU/CM** • Disconnect ABS HU/CM connector and turn ignition switch on. • Does ABS warning light illuminate?	Yes	Replace ABS HU/CM (short to ground in ABS HU/CM).
		No	Go to next step.
2	**INSPECT ABS WARNING LIGHT BULB** • Remove instrument cluster. • Inspect ABS warning light bulb. • Is it okay?	Yes	Go to next step.
		No	Replace ABS warning light bulb.

STEP	INSPECTION		ACTION
*3	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM) OR INSTRUMENT CLUSTER (OPEN CIRCUIT OR SHORT TO GROUND)** • Is there continuity between instrument cluster connector (16-pin) terminal 2B and ground?	Yes	Repair wiring harness between instrument cluster and ABS HU/CM.
		No	Replace instrument cluster (open circuit or short to ground in ABS HU/CM).

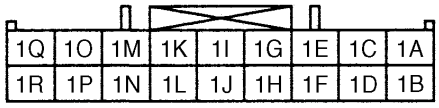
NO.3 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE

A3U040343000W07

- 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.

3	BRAKE system warning light does not illuminate
DESCRIPTION	• BRAKE system warning light does not illuminate with ignition switch on.
POSSIBLE CAUSE	• Open circuit or short to ground in BRAKE system warning light circuit.

INSTRUMENT CLUSTER CONNECTOR (18-PIN)



(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK FOR SHORT TO GROUND IN ABS HU/CM** • Disconnect ABS HU/CM connector and turn ignition switch on. • Does BRAKE system warning light illuminate?	Yes	Replace ABS HU/CM (short to ground in ABS HU/CM).
		No	Go to next step.
2	**INSPECT BRAKE SYSTEM WARNING LIGHT BULB** • Remove instrument cluster. • Inspect BRAKE system warning light bulb. • Is it okay?	Yes	Go to next step.
		No	Replace BRAKE system warning light bulb.
*3	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM) OR INSTRUMENT CLUSTER (OPEN OR SHORT TO GROUND)** • Is there continuity between instrument cluster connector (18-pin) terminal 1G and ground?	Yes	Repair wiring harness between instrument cluster and ABS HU/CM.
		No	Replace instrument cluster (open circuit or short to ground in ABS HU/CM).

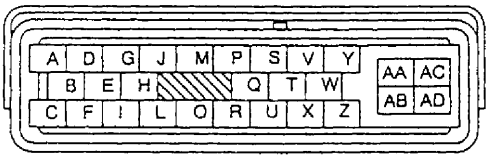
NO.4 ABS WARNING LIGHT AND BRAKE SYSTEM WARNING LIGHT STAY ON

A3U040343000W08

- 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.

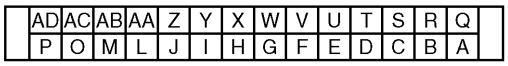
4	**ABS warning light and BRAKE system warning light stay ON**
DESCRIPTION	• Both ABS warning light and BRAKE system warning light stay on **more than 4 seconds** with ignition switch on.
POSSIBLE CAUSE	• ABS HU/CM detects ABS proportioning system malfunction • ABS HU/CM detects low voltage in power supply (ABS HU/CM ignition terminal Z voltage is **below about 8 to 9 V**) • ABS HU/CM does not operate • Both warning light circuits (ABS and BRAKE system) open circuit or shorted to ground

ABS HU/CM HARNESS SIDE CONNECTOR



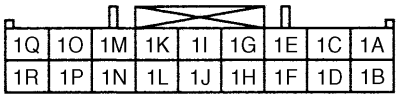
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



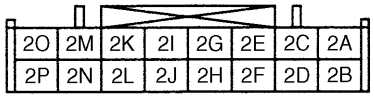
(VIEW FROM TERMINAL SIDE)

INSTRUMENT CLUSTER CONNECTOR (18-PIN)



(VIEW FROM HARNESS SIDE)

INSTRUMENT CLUSTER CONNECTOR (16-PIN)



(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM POWER SUPPLY FUSE** • Is ABS HU/CM ignition power supply fuse okay?	Yes	Go to next step.
		No	Check for a short to ground on blown fuse's circuit. Repair or replace as necessary. Install appropriate amperage fuse.
2	**INSPECT WIRING HARNESS BETWEEN ABS CM AND DLC-2 FOR CONTINUITY OR SHORTS** • Perform DTC inspection. • Is error message displayed regarding communication between ABS HU/CM and WDS or equivalent?	Yes	If a communication error message is displayed even after inspecting according to procedures displayed on the WDS or equivalent, go to Step 8.
		No	Go to next step.
3	**CHECK FOR DTCS IN ABS HU/CM** • Have DTCs been recorded in memory?	Yes	Perform inspection using appropriate DTC.
		No	Go to next step.
4	**INSPECT PID/DATA IN ABS HU/CM** • Inspect the following items using WDS or equivalent. — **ABS_LAMP** (ABS warning light) — **BRAKE_LMP** (BRAKE system warning light) — **ABS_VOLT** (power supply voltage) • Is **ABS_LAMP** and **BRAKE_LMP** ON after **more than 4 seconds** with ignition switch on?	Yes	Go to Step 7.
		No	Go to next step.
5	**CHECK FOR OPEN CIRCUITS IN ABS HU/CM** • Disconnect ABS HU/CM. Connect the **SST** (49 G066 001) (vehicle harness side only). • Use the **SST** connector to ground the warning light terminal (ABS: terminal W, BRAKE system: terminal X) to body ground. • Do both ABS warning light and BRAKE system warning light go out with ignition switch on?	Yes	Replace ABS HU/CM (open circuit in ABS HU/CM).
		No	Go to next step.

STEP	INSPECTION		ACTION
*6	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM) OR INSTRUMENT CLUSTER (OPEN CIRCUIT OR SHORT TO GROUND)** • Disconnect instrument cluster connector. • Is there continuity between following ABS HU/CM connector terminals and instrument cluster connector terminals? — Terminal W and terminal 2B (16-pin) — Terminal X and terminal 1G (18-pin)	Yes	Replace instrument cluster (open circuit or short to ground in instrument cluster).
		No	Repair wiring harness between ABS HU/CM (ABS: terminal W, BRAKE system: terminal X) and instrument cluster.
7	**INSPECT ABS HU/CM IGNITION POWER SUPPLY SYSTEM (TERMINAL Z)** • Check the voltage for PID/DATA monitor **ABS_VOLT** item. **Specification: above 10 V** • Is voltage within specification?	Yes	Replace ABS HU/CM (open circuit or short in ground circuit in ABS HU/CM).
		No	Go to next step.
8	**INSPECT BATTERY** • Is battery voltage normal?	Yes	Go to next step.
		No	Inspect battery and charging system.
9	**INSPECT CHARGING SYSTEM** • Is battery voltage normal with electrical load (A/C, headlights, etc.) on and engine idling?	Yes	Go to next step.
		No	Inspect charging system (drive belt tension, generator, etc.).
10	**VERIFY THAT ABS HU/CM CONNECTOR IS CONNECTED WITH ABS HU/CM** • Is ABS HU/CM securely connected?	Yes	Go to Step 12.
		No	Connect ABS HU/CM connector securely, then go to next step.
11	**CONFIRM THAT MALFUNCTION SYMPTOM DO NOT REOCCUR AFTER ABS HU/CM IS CONNECTED** • Do both ABS warning light and BRAKE system warning lights go out after **more than 4 seconds** with ignition switch on?	Yes	Temporary poor connection in ABS HU/CM connector. Inspect connector and terminal.
		No	Go to next step.
12	**VERIFY THAT ABS HU/CM CONNECTOR TERMINALS Z AND AA ARE CONNECTED** • Does malfunction symptom happen again when ABS HU/CM connector terminals Z and AA are shaken while the ignition switch is ON?	Yes	Connect ABS HU/CM connector terminals Z and AA securely, then go to next step.
		No	Go to Step 14.
13	**CONFIRM THAT MALFUNCTION SYMPTOM DO NOT REOCCUR AFTER ABS HU/CM CONNECTOR TERMINALS Z AND AA ARE CONNECTED** • Do both ABS warning light and BRAKE system warning lights go out after **more than 4 seconds** with ignition switch on?	Yes	Temporary poor connection at terminal. Inspect ABS HU/CM connector and terminal.
		No	Go to next step.
*14	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM POWER SUPPLY AND ABS HU/CM FOR CONTINUITY** • Disconnect ABS HU/CM connector. Connect the **SST** (49 G066 001) (vehicle harness side only). • Is voltage **approximately 12 V** at **SST** connector terminal Z?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and ABS HU/CM.
*15	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND GROUND FOR CONTINUITY** • Turn ignition switch to LOCK. • Is there continuity between **SST** connector terminal AA and ground?	Yes	If a communication error message is displayed on WDS or equivalent in Step 1 inspection, go to next step. If a communication error message is not displayed on WDS or equivalent in Step 1 inspection, troubleshooting is completed.
		No	Repair wiring harness between ABS HU/CM and ground.
*16	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Is there continuity between **SST** connector terminal T and DLC-2?	Yes	Go to next step.
		No	Repair wiring harness between ABS HU/CM and DLC-2.

STEP	INSPECTION		ACTION
*17	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO B+** • Is voltage **approximately 12 V** at **SST** connector terminal T?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Go to next step.
*18	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Is there continuity between **SST** connector terminal T and ground?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Replace ABS HU/CM (communication circuit malfunction in ABS HU/CM).

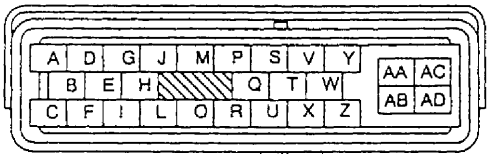
NO.5 ABS WARNING LIGHT STAYS ON

A3U040343000W09

- 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.

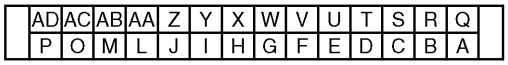
5	ABS warning light stays ON
DESCRIPTION	• ABS warning light stays on **more than 4 seconds** with ignition switch on.
POSSIBLE CAUSE	• ABS HU/CM detects ABS system malfunction • ABS HU/CM detects low voltage in power supply (ABS HU/CM ignition terminal Z voltage is **below about 8 to 9 V**) • Warning light circuit open or shorted to ground

ABS HU/CM HARNESS SIDE CONNECTOR



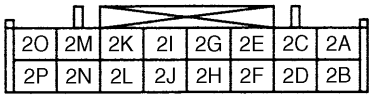
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



(VIEW FROM TERMINAL SIDE)

INSTRUMENT CLUSTER CONNECTOR (16-PIN)



(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY AND SHORTS** • Perform DTC inspection. • Is error message displayed regarding communication between ABS HU/CM and WDS or equivalent?	Yes	If the communication error message is displayed even after inspecting according to procedures displayed on the WDS or equivalent, go to Step 8.
		No	Go to next step.
2	**CHECK FOR DTCS IN ABS HU/CM** • Have DTCs been recorded in memory?	Yes	Perform inspection using appropriate DTC.
		No	Go to next step.
3	**INSPECT PID/DATA IN ABS HU/CM** • Inspect the following items using WDS or equivalent. — **ABS_LAMP** (ABS warning light) • Is **ABS_LAMP** ON after **more than 4 seconds** with ignition switch on?	Yes	Go to Step 8.
		No	Go to next step.
4	**VERIFY THAT ABS HU/CM CONNECTOR TERMINAL W IS CONNECTED** • Does malfunction symptom happen again when ABS HU/CM connector terminal W is shaken while the ignition switch is ON?	Yes	Connect ABS HU/CM connector terminal W securely, then go to next step.
		No	Go to Step 6.

STEP	INSPECTION		ACTION
5	**CONFIRM THAT MALFUNCTION SYMPTOM DO NOT REOCCUR AFTER ABS HU/CM CONNECTOR TERMINAL W IS CONNECTED** • Do ABS warning light go out after **more than 4 seconds** with ignition switch on?	Yes	Temporary poor connection at terminal. Inspect ABS HU/CM connector and terminal.
		No	Go to next step.
6	**CHECK FOR OPEN CIRCUITS IN ABS HU/CM** • Disconnect ABS HU/CM. Connect the **SST** (49 G066 001) (vehicle harness side only). • Use the **SST** connector to ground ABS warning light terminal W to body ground. Does ABS warning light go out with ignition switch on?	Yes	Replace ABS HU/CM (open circuit in ABS HU/CM).
		No	Go to next step.
*7	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM) OR INSTRUMENT CLUSTER (OPEN CIRCUIT OR SHORT TO GROUND)** • Disconnect instrument cluster. • Is there continuity between following **SST** connector terminal W and instrument cluster connector (16-pin) terminal 2B?	Yes	Replace instrument cluster (open circuit or ground to short in instrument cluster).
		No	Repair wiring harness between ABS HU/CM (terminal W) and instrument cluster.
8	**INSPECT ABS HU/CM IGINITION POWER SUPPLY SYSTEM (TERMINAL Z)** • Check the voltage for PID/DATA monitor **ABS_VOLT** item. **Specification: above 10V** • Is voltage within specification?	Yes	Replace ABS HU/CM (open circuit or short in ground circuit in ABS HU/CM).
		No	Go to next step.
9	**INSPECT BATTERY** • Is battery voltage normal?	Yes	Go to next step
		No	Inspect battery and charging system
10	**INSPECT CHARGING SYSTEM** • Is battery voltage normal with electrical load (A/C, headlights, etc) on and engine idling?	Yes	Go to next step
		No	Inspect charging system (drive belt tension, generator, etc).
*11	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM POWER SUPPLY AND ABS HU/CM FOR CONTINUITY** • Disconnect ABS HU/CM. Connect **SST** (49 G066 001) (vehicle harness side only). • Is voltage **approximately 12V** at **SST** connector terminal Z?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and ABS HU/CM
*12	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND GROUND FOR CONTINUITY** • Turn ignition switch to LOCK • Is there continuity between **SST** connector terminal AA and ground?	Yes	If a communication error message is displayed on WDS or equivalent in Step 1 inspection, go to next step. If a communication error message is not displayed on WDS or equivalent in Step 1 inspection, trouble shooting is completed.
		No	Repair wiring harness between ABS HU/CM and ground.
*13	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Disconnect ABS HU/CM. Connect the **SST** (49 G066 001) (vehicle harness side only). • Is there continuity between **SST** connector terminal T and DLC-2?	Yes	Go to next step.
		No	Repair wiring harness between ABS HU/CM and DLC-2.
*14	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO B+** • Is voltage **approximately 12 V** at **SST** connector terminal T?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Go to next step.
*15	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Is there continuity between **SST** connector terminal T and ground?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Replace ABS HU/CM (communication circuit malfunction in ABS HU/CM).

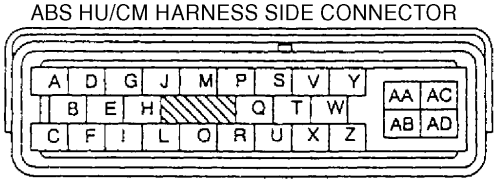
NO.6 BRAKE SYSTEM WARNING LIGHT STAYS ON

A3U040343000W10

- 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.

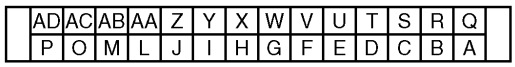
6	**BRAKE system warning light stays ON**
DESCRIPTION	• Brake system warning light stays on **more than 4 seconds** with ignition switch on. (Parking brake is released.)
POSSIBLE CAUSE	• Warning light circuit open or shorted to ground in ABS HU/CM • Short to ground in circuit in parking brake switch and/or brake fluid level sensor

ABS HU/CM HARNESS SIDE CONNECTOR



(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE FLUID LEVEL** • Is brake fluid level okay?	Yes	Go to next step.
		No	Add brake fluid.
2	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY AND SHORTS** • Inspect the following items using WDS or equivalent. — **BRAKE_LMP** (BRAKE system warning light) • Is error message displayed regarding communication between ABS HU/CM and WDS or equivalent?	Yes	If a communication error message is displayed even after inspecting according to procedures displayed on the WDS or equivalent, go to Step 8.
		No	Go to next step.
3	**INSPECT PID/DATA IN ABS HU/CM** • Inspect **BRAKE_LMP** (BRAKE system warning light) using WDS or equivalent. • Is **BRAKE_LMP** is ON after **more than 4 seconds** with ignition switch on?	Yes	Replace ABS HU/CM (open circuit or short to ground in ABS HU/CM).
		No	Go to next step.
4	**VERIFY THAT ABS HU/CM CONNECTOR TERMINAL X IS CONNECTED** • Does malfunction symptom happen again when ABS HU/CM connector terminal X is shaken while the ignition switch is ON?.	Yes	Connect ABS HU/CM connector terminal X securely, then go to next step.
		No	Go to Step 6.
5	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECCUR AFTER ABS HU/CM CONNECTOR TERMINAL X IS CONNECTED** • Does BRAKE system warning light go out after **more than 4 seconds** with ignition switch on?	Yes	Temporary poor connection at terminal. Inspect ABS HU/CM connector and terminal.
		No	Go to next step.
*6	**CHECK FOR OPEN CIRCUITS IN ABS HU/CM** • Disconnect ABS HU/CM. Connect the **SST** (49 G066 001) (vehicle harness side only). • Use the **SST** connector to ground BRAKE system warning light terminal X to body ground. • Does BRAKE system warning light go out with ignition switch on?	Yes	Replace ABS HU/CM (open circuit in ABS HU/CM).
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN PARKING BRAKE SWITCH OR BRAKE FLUID LEVEL SENSOR, OR IN SOME OTHER PART** • Disconnect the following in order: 1. Parking brake switch connector 2. Brake fluid level sensor connector • Does BRAKE system warning light go out with ignition switch on?	Yes	Replace parking brake switch and/or brake fluid level sensor (shorted on some internal part).
		No	Perform the following inspections. Repair if necessary. • Open circuit in wiring harness between ABS HU/CM (terminal X) and instrument cluster (BRAKE system warning light) • Short to ground in wiring harness between instrument cluster (BRAKE system warning light) and parking brake switch. • Short to ground in wiring harness between instrument cluster (BRAKE system warning light) and brake fluid level sensor. If above inspections are okay, replace instrument cluster (open or ground to short in instrument cluster).
*8	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Disconnect ABS HU/CM. Connect the **SST** (49 G066 001) (vehicle harness side only). • Is there continuity between **SST** connector terminal T and DLC-2?	Yes	Go to next step.
		No	Repair wiring harness between ABS HU/CM and DLC-2.
*9	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO B+** • Is voltage **approximately 12 V** at **SST** connector terminal T?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Go to next step.
*10	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Is there continuity between **SST** connector terminal T and ground?	Yes	Repair wiring harness between ABS HU/CM and DLC-2.
		No	Replace ABS HU/CM (communication circuit malfunction in ABS HU/CM).

NO.7 BRAKE SYSTEM MALFUNCTION

A3U040343000W11

7	**BRAKE system malfunction**
DESCRIPTION	• There is a malfunction in system even though ABS warning light and BRAKE system warning light does not illuminate.
POSSIBLE CAUSE	• There is a mechanical malfunction in system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK FOR DTCS IN ABS HU/CM** • Have DTCs been recorded in memory?	Yes	Perform inspection using appropriate DTC.
		No	Go to next step.
2	**INSPECT ABS HYDRAULIC UNIT** • Perform “ABS hydraulic unit system inspection”. • Is system okay?	Yes	Inspect conventional brake system.
		No	**If wheels do not rotate:** • Replace ABS HU/CM. **If wheels rotate but order in which wheels rotate is incorrect:** • Inspect brake pipe passage to ABS HU/CM.

04–10 GENERAL PROCEDURES

PRECAUTION (BRAKES)

A3U041001020W01

Wheels and Tires Removal/Installation

1. 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}**.

Brake Lines Disconnection/Connection

Caution

- **Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.**

1. 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 anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

Connectors Disconnection

1. Disconnect the negative battery cable before doing any work that requires handling of connectors. Reconnect the negative battery cable only after the work is completed.

ABS Components Operations

1. Make sure that there are no DTCs in the ABS memory after working on ABS components.
   - If there are any DTCs in the memory, clear them.

04–11 CONVENTIONAL BRAKE SYSTEM

CONVENTIONAL BRAKE SYSTEM LOCATION INDEX

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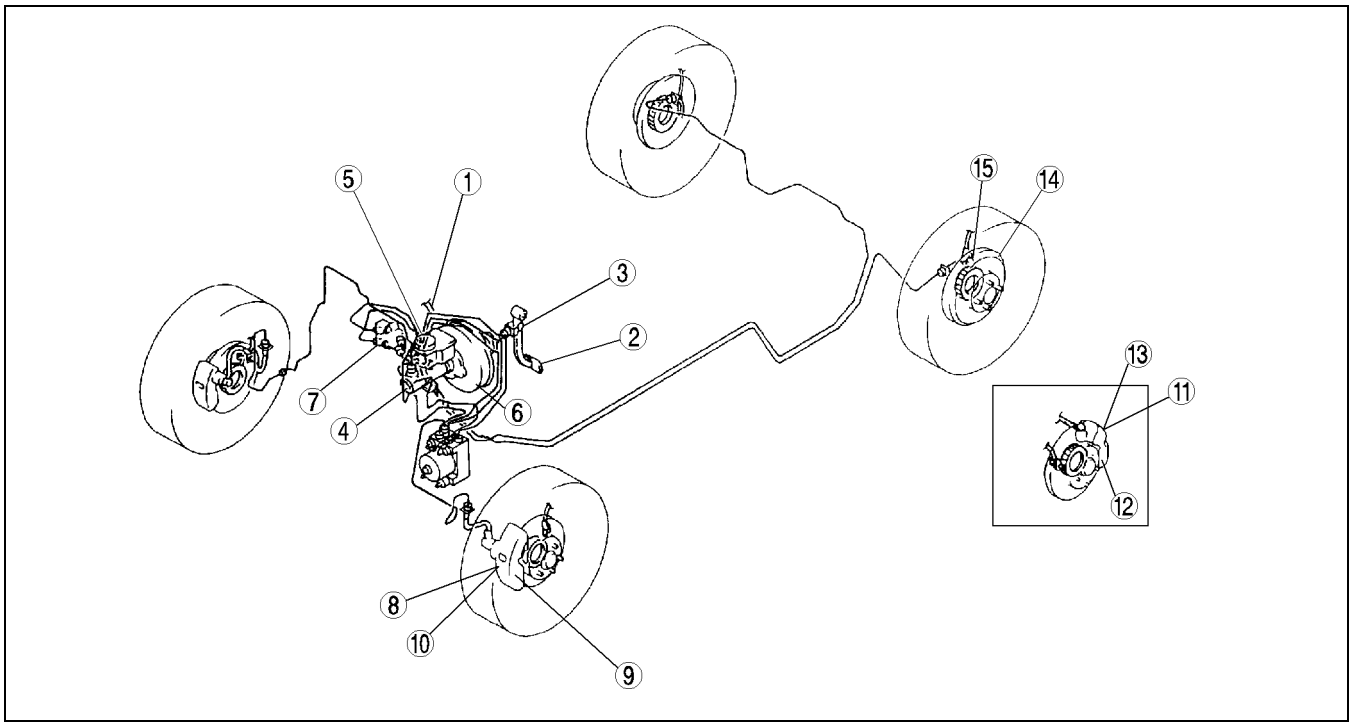

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1	Vacuum line (See 04–11–3 VACUUM HOSE CHECK VALVE INSPECTION (POWER BRAKE UNIT))
2	Brake pedal (See 04–11–3 BRAKE PEDAL INSPECTION) (See 04–11–5 BRAKE PEDAL REMOVAL/ INSTALLATION)
3	Brake switch (See 04–11–5 BRAKE SWITCH INSPECTION)
4	Master cylinder (See 04–11–6 MASTER CYLINDER REMOVAL/ INSTALLATION) (See 04–11–10 MASTER CYLINDER DISASSEMBLY/ASSEMBLY)
5	Brake fluid level sensor (See 04–11–9 FLUID LEVEL SENSOR INSPECTION)
6	Power brake unit (See 04–11–11 POWER BRAKE UNIT INSPECTION) (See 04–11–13 POWER BRAKE UNIT REMOVAL/ INSTALLATION)
7	Dual proportioning valve (without ABS) or brake pipe joint (with ABS) (See 04–11–13 DUAL PROPORTIONING VALVE (WITHOUT ABS) INSPECTION) (See 04–11–14 DUAL PROPORTIONING VALVE (WITHOUT ABS) AND BRAKE PIPE JOINT (WITH ABS) REPLACEMENT)

8	Front brake (disc) (See 04–11–14 FRONT BRAKE (DISC) INSPECTION) (See 04–11–17 FRONT BRAKE (DISC) REMOVAL/ INSTALLATION)
9	Front disc pad (See 04–11–19 DISC PAD (FRONT) REPLACEMENT)
10	Front caliper (See 04–11–20 CALIPER (FRONT) DISASSEMBLY/ASSEMBLY)
11	Rear brake (disc) (See 04–11–21 REAR BRAKE (DISC) INSPECTION) (See 04–11–22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION)
12	Rear disc pad (See 04–11–23 DISC PAD (REAR) REPLACEMENT)
13	Rear caliper (See 04–11–24 CALIPER (REAR) DISASSEMBLY/ ASSEMBLY)
14	Rear brake (drum) (See 04–11–25 REAR BRAKE (DRUM) INSPECTION) (See 04–11–26 REAR BRAKE (DRUM) REMOVAL/ INSTALLATION)
15	Wheel cylinder (See 04–11–27 WHEEL CYLINDER DISASSEMBLY/ASSEMBLY)

AIR BLEEDING

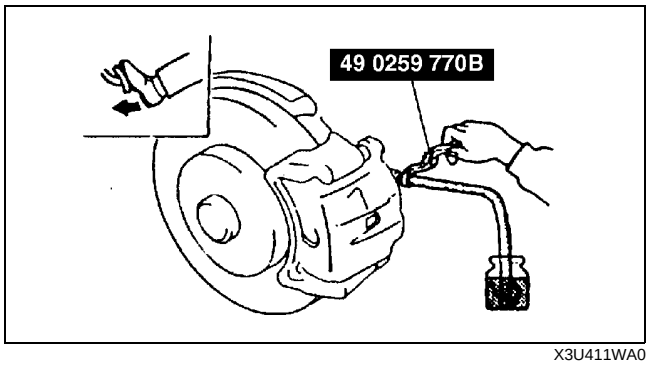
A3U041143001W01

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 slave cylinder farthest from the brake master cylinder, and move to the next farthest slave cylinder until all 4 cylinders 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 slave cylinder until all 4 cylinders have been bled.

Specified fluid
SAEJ1703 or FMVSS 116 DOT-3

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, fluid filled container.
4. The first person depresses the brake pedal a few times, and then holds it in the depressed position.
5. The second person loosens the bleeder screw, drains out the fluid and closes the screw using the **SST**.
6. Repeat Steps 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}



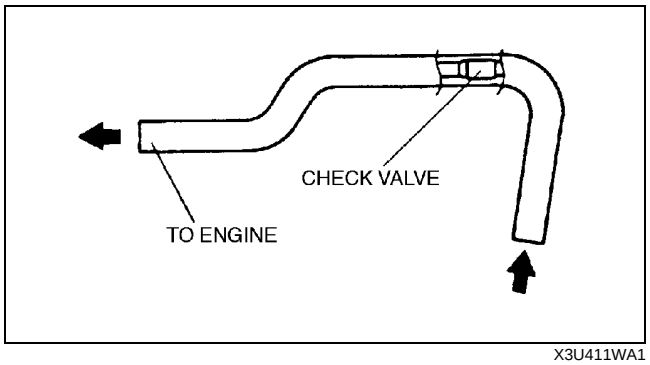
X3U411WA0

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.

VACUUM HOSE CHECK VALVE INSPECTION (POWER BRAKE UNIT)

A3U041143980W01

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.



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BRAKE PEDAL INSPECTION

A3U041143300W01

Brake Pedal Height Inspection

1. Verify that the distance from the carpet to the center of the upper surface of the pedal pad is as specified.

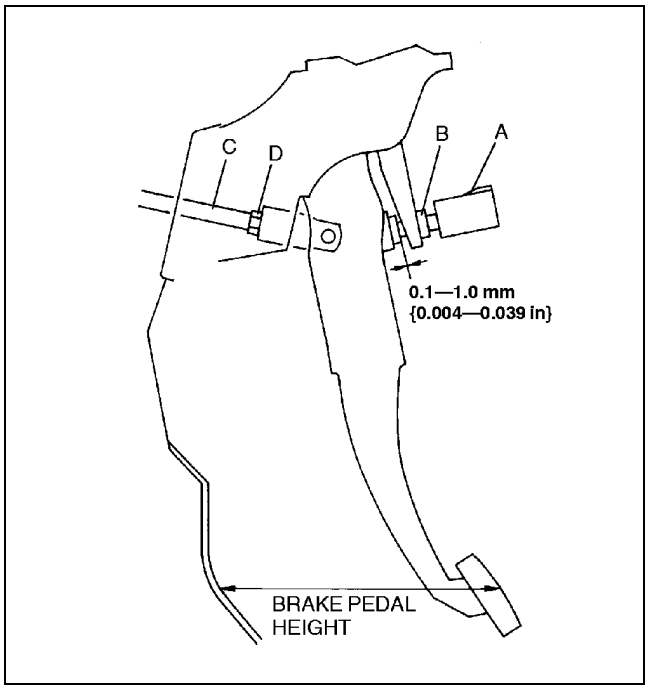
Pedal height (reference value)
185 mm {7.28 in}

Brake Pedal Height Adjustment

1. Disconnect the brake switch connector.
2. Loosen locknut B and turn switch A until it does not contact the pedal.
3. Loosen locknut D and turn rod C to adjust the height.
4. Tighten the bolt with locknut B so that clearance between the bolt for brake light switch A and pedal stopper is within the specification.

   Specification
   0.1—1.0 mm {0.004—0.039 in}
   Tightening torque
   13.8—17.6 N·m {140—180 kgf·cm, 122—156 in·lbf}

5. Connect the brake switch connector.
6. After adjustment, inspect the pedal play and the brake light operation.

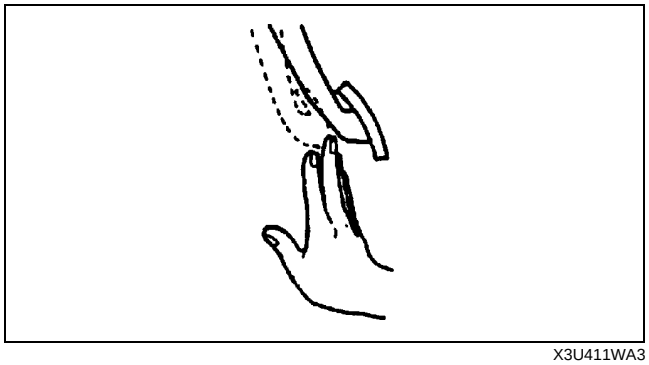


X3U411WA2

Brake Pedal Play Inspection

1. Depress the pedal a few times to eliminate the vacuum in the system.
2. Remove the spring pin, verify that the holes in the fork and in the pedal are aligned, and reinstall the pin. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION.)
3. Gently depress the pedal by hand until resistance is felt, and check the pedal play.

   Pedal play
   4—12 mm {0.16—0.47 in}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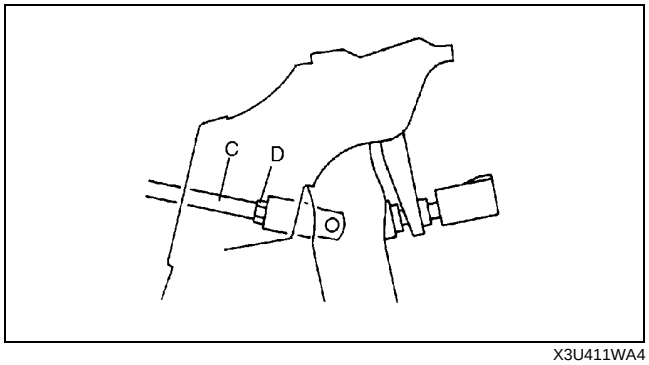
Brake Pedal Play Adjustment

1. Remove the spring pin and clevis pin. (See 04–11–5 BRAKE PEDAL REMOVAL/INSTALLATION.)
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 spring pin.
4. Tighten locknut D.

   Tightening torque
   24—34 N·m {2.4—3.5 kgf·m, 18—25 ft·lbf}

5. Check the pedal height and the brake light operation.



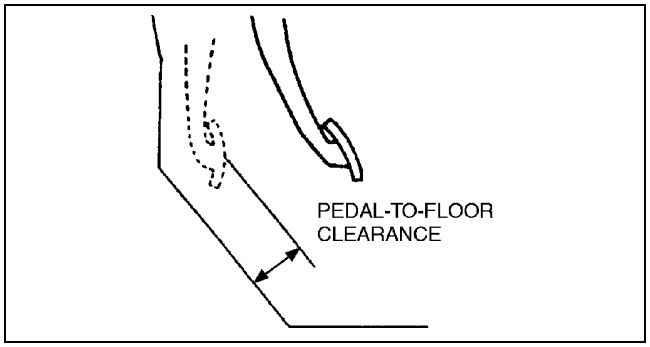
X3U411WA4

Pedal-to-floor Clearance Inspection

1. Start the engine and depress the brake pedal with a force of **588 N {60 kgf, 132 lbf}**
2. Verify that the distance from the floor panel to the pedal pad center is as specified when the pedal is depressed.
   - If the distance is less than specified, check for the air in brake system.

Specification

ZM : 88 mm {3.5 in} min.
FS : 84 mm {3.3 in} min.



X3U411WA5

BRAKE PEDAL REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.

1	Brake switch connector
2	Spring pin
3	Clevis pin
4	Brake pedal
5	Brake switch
6	Pedal pad

2. Install in the reverse order of removal.

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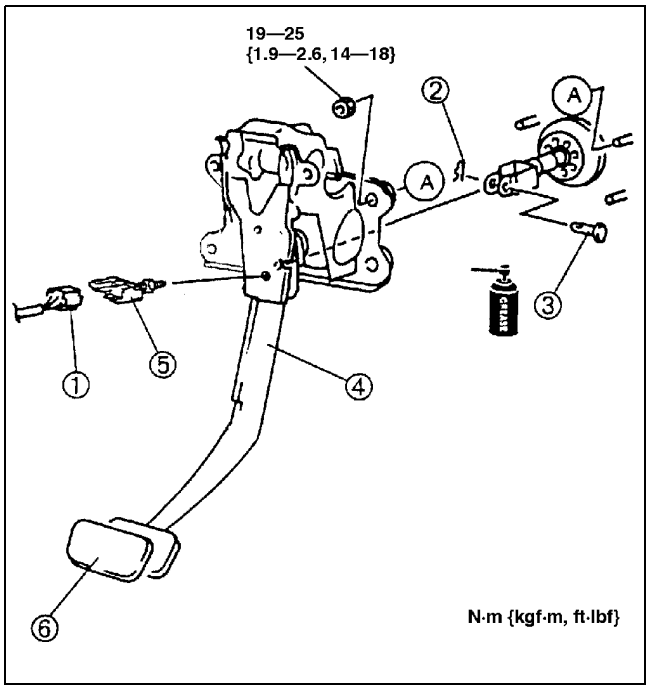

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BRAKE SWITCH INSPECTION

1. Disconnect the brake switch connector.
2. Inspect for continuity between the terminals of the brake switch connector using the ohmmeter.
   - If not as specified, replace the brake switch.

○—○ : Continuity

Condition	Terminal			
	A	B	C	D
Brake pedal is depressed	○	○		
Brake pedal is not depressed			○	○

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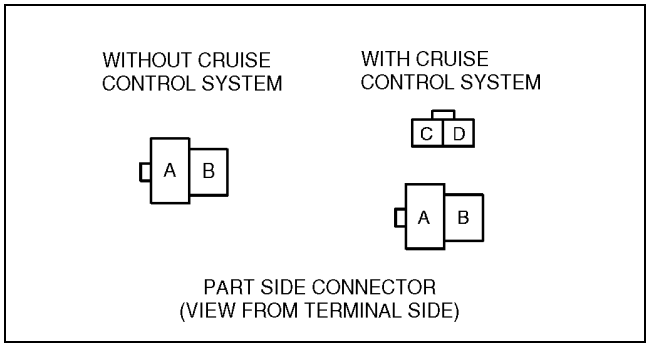

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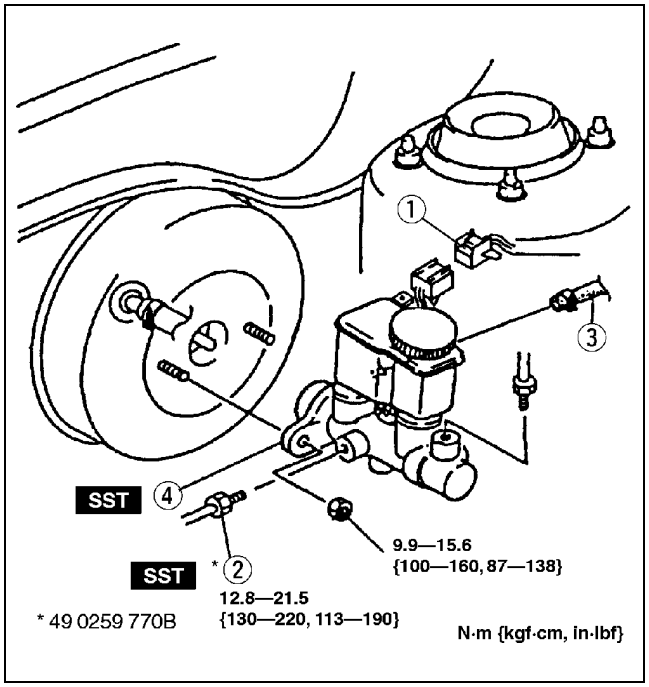
MASTER CYLINDER REMOVAL/INSTALLATION

A3U041143400W01

1. Remove in the order indicated in the table.

1	Brake fluid level sensor connector
2	Brake pipe
3	Hose (MTX)
4	Master cylinder (See 04–11–6 Master Cylinder Installation Note

2. Install in the reverse order of removal.



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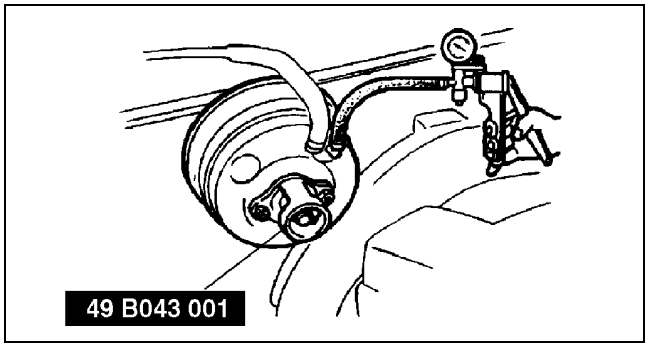
Master Cylinder Installation Note

FS

1. Turn the nut of the **SST** clockwise to fully retract the **SST** gauge rod. Attach the **SST** to the power brake unit.

   Tightening torque
   9.9—15 N·m {1.0—1.6 kgf·m, 7.3—11 ft·lbf}

2. Apply a **66.7 kPa {500 mmHg, 19.7 inHg}** vacuum by using a vacuum pump.



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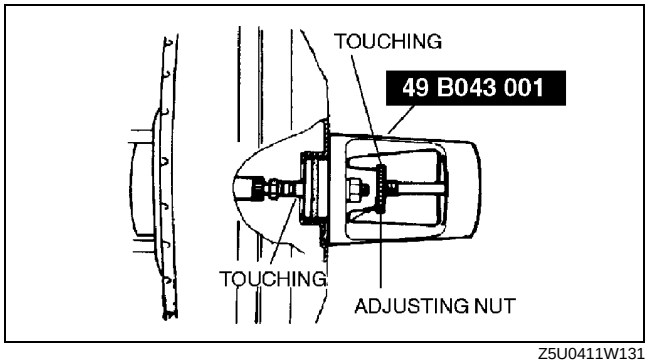
3. Turn the adjusting nut of the **SST** counterclockwise until the gauge rod just contacts the push rod end of the power brake unit. Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and **SST** body.
4. Remove the **SST** from the power brake unit without disturbing the adjusting nut. Set the **SST** onto the master cylinder as shown in the figure.

   Caution
   - **When pushing the SST gauge rod into the master cylinder piston, only use enough pressure to push the rod to the bottom of the piston. If too much pressure is applied, a false reading will occur.**



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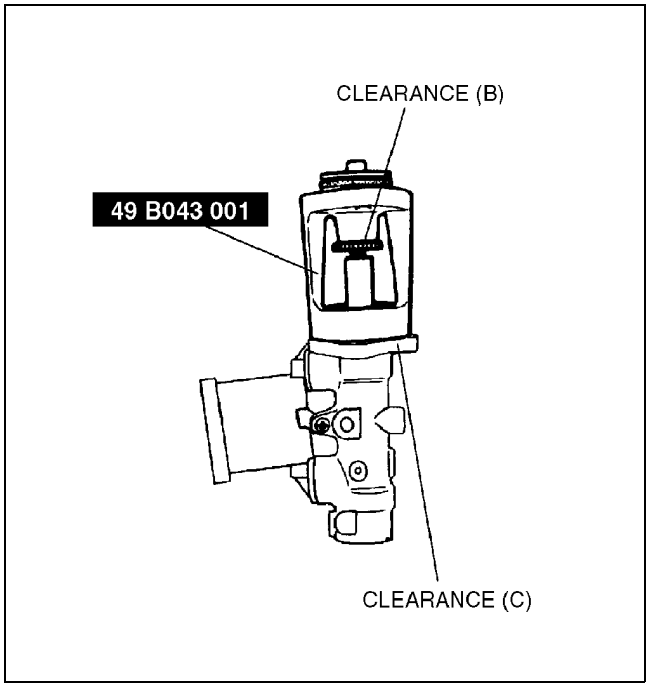
5. Push lightly on the end of the **SST** gauge rod to be sure it has contacted the bottom of the master cylinder piston, but do not push so hard that the piston moves. Note any clearance between the **SST** body and the adjusting nut (clearance B) or between the body and the master cylinder (clearance C).

Measurement	Push rod
Clearance at (B)	Too short
Clearance at (C)	Too long
No clearance at (B) or (C)	



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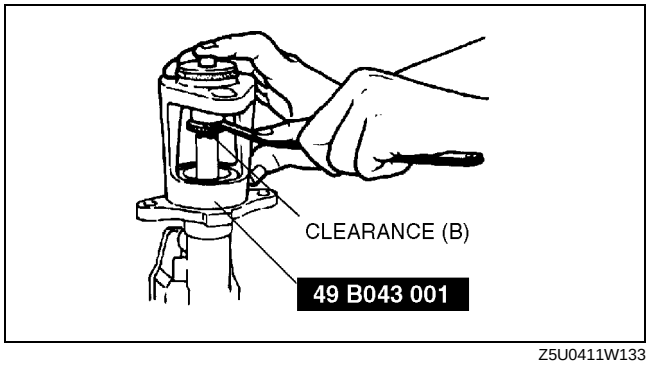
Adjusting the push rod clearance at B

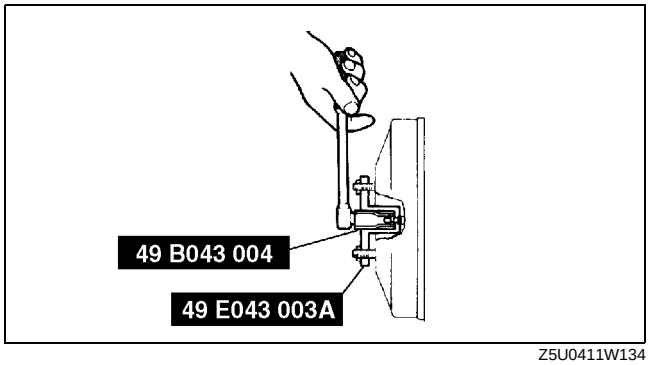
Note
- The threads of the push rod are specially designed so that the bolt becomes harder to turn past a certain point. This is to prevent the bolt from coming loose. Turn the bolt only within this range when adjusting.

1. Push lightly on the end of the **SST** gauge rod, and measure the clearance between the adjusting nut and the **SST** body.



Z5U0411W133

2. Using the **SST**, turn the nut to lengthen the power brake unit push rod an amount equal to the sum substracting **0.1—0.4 mm {0.004—0.016 in}** from the clearance measured at B.

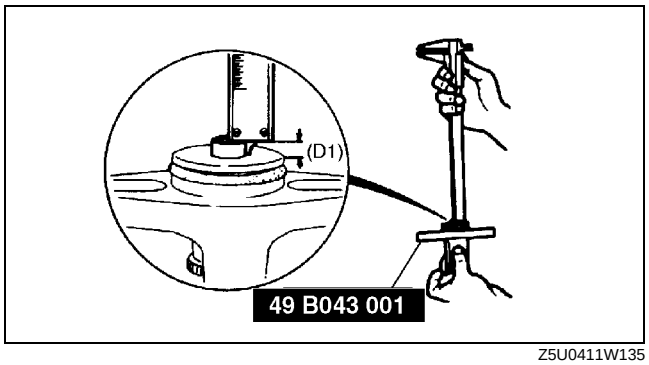


Z5U0411W134

Adjusting the push rod clearance at C or no clearance at B or C

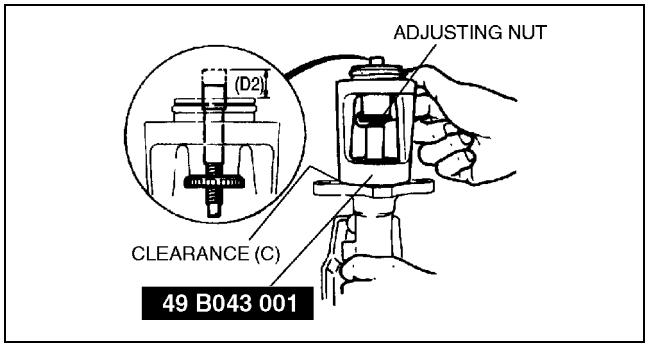
Note
- The threads of the push rod are specially designed so that the bolt becomes harder to turn past a certain point. This is to prevent the bolt from coming loose. Turn the bolt only within this range when adjusting.

1. Measure and record height D1 of the gauge rod.
2. Turn the adjusting nut until the **SST** body sets evenly on the master cylinder. (Turn only enough for the body to touch.)



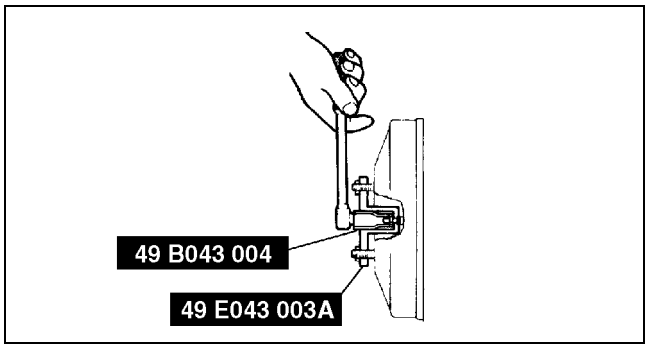
Z5U0411W135

3. Measure and record height D2 of the gauge rod.



Z5U0411W136

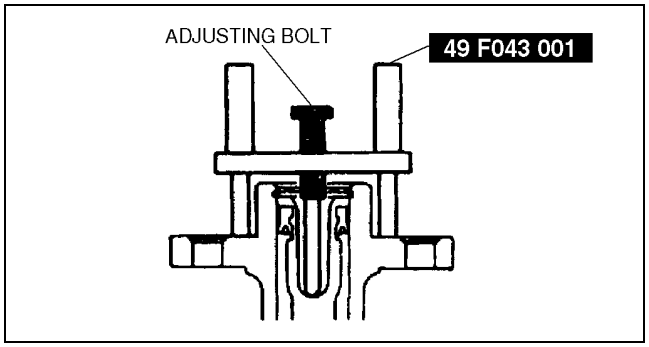
4. Subtract D1 from D2 and add **0.1—0.4 mm {0.004—0.016 in}**. Using the **SST**, turn the nut to shorten the power booster push rod an amount equal to the sum.



Z5U0411W134

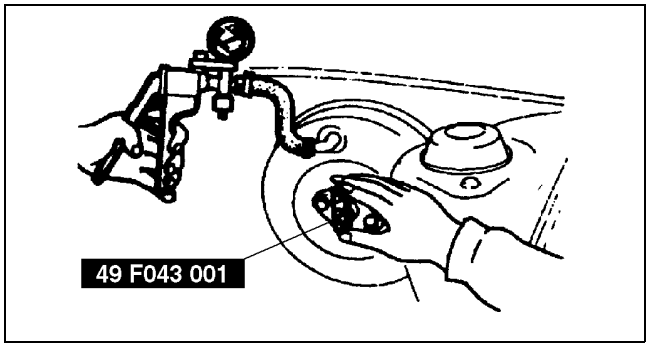
ZM

1. Place the **SST** atop the master cylinder. Turn the adjusting bolt until it touches the bottom of the push rod hole in the piston.
2. Apply **66.7 kPa {500 mmHg, 19.7 inHg}** vacuum to the power brake unit using a vacuum pump.

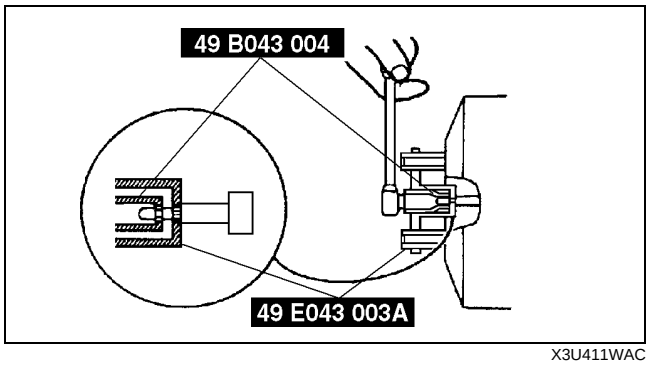


X3U411WAA

3. Invert the **SST** used in Step 1 and place it on the power brake unit.
4. Measure the clearance between the end of the **SST** and the push rod of the power brake unit.
   - If it is not **0.1—0.4 mm {0.004—0.016 in}**, loosen the push rod locknut and turn the push rod to adjust it using the **SSTs**.



X3U411WAB

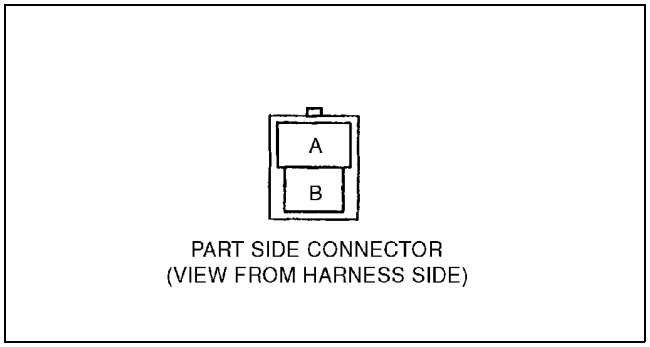


X3U411WAC

FLUID LEVEL SENSOR INSPECTION

A3U041143540W01

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.



Y3U411WA1

○——○ : Continuity

Fluid level	Terminal	
	A	B
Below MIN	○	○
Above MIN		

X3U411WAD

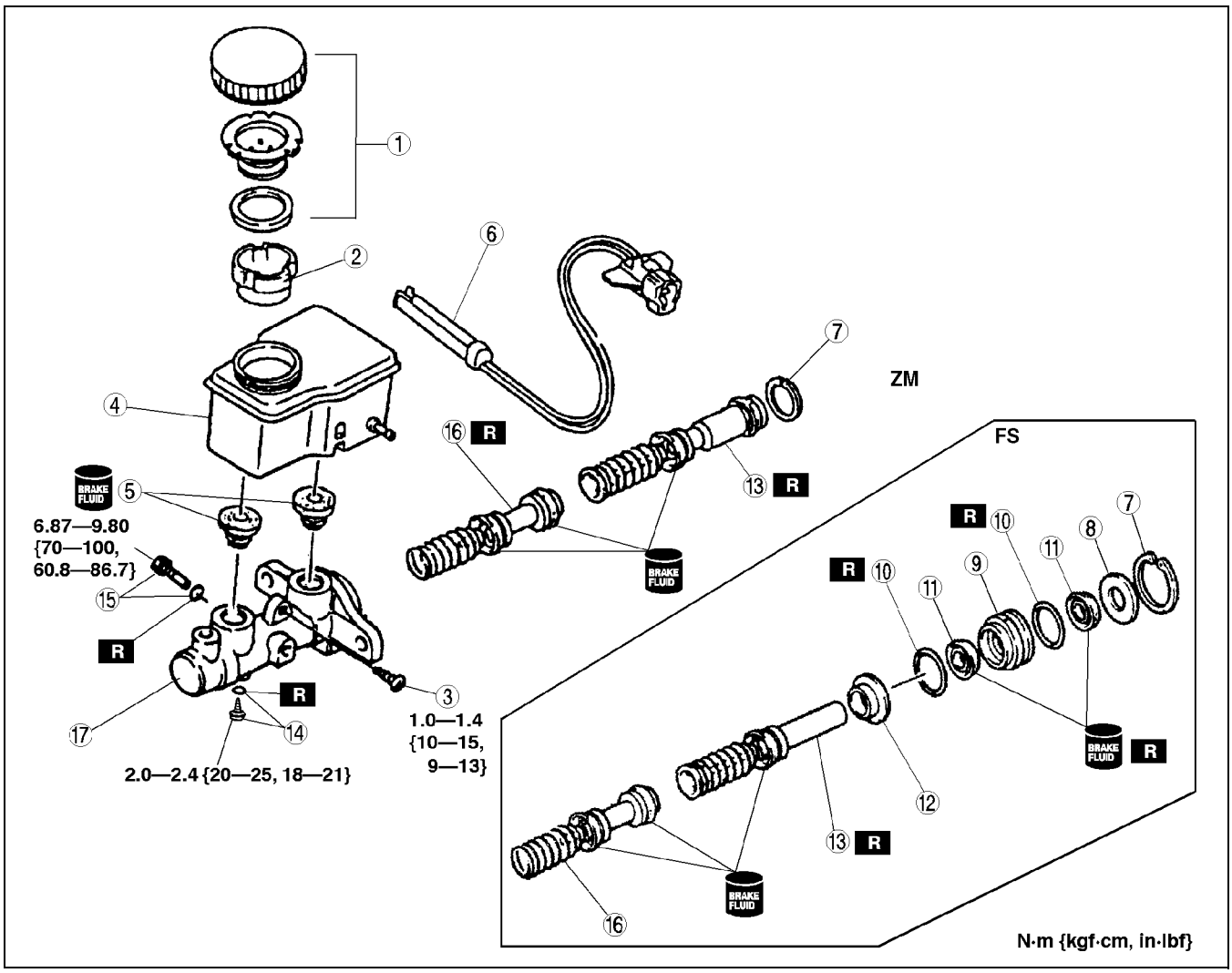
MASTER CYLINDER DISASSEMBLY/ASSEMBLY

A3U041143400W02

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.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



Z3U0411W011

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

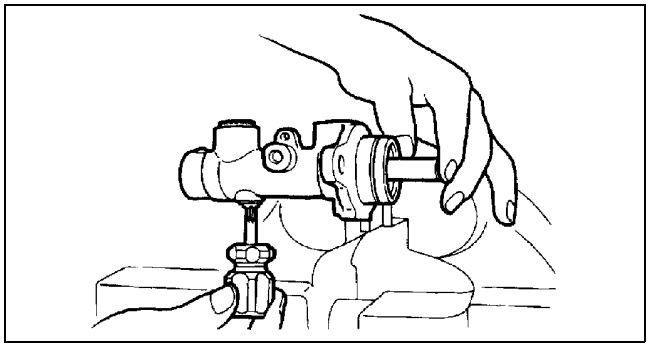
11	Cup
12	Primary piston stopper
13	Primary piston
14	Stop screw and O-ring (without ABS) (See04–11–11 Stop Screw and O-ring (without ABS) Assembly Note)
15	Stop pin and O-ring (with ABS) (See 04–11–11 Stop Pin and O-ring (with ABS) Assembly Note)
16	Secondary piston
17	Master cylinder body

Stop Screw and O-ring (without ABS) Assembly Note

1. Install the secondary piston and primary piston.
2. Install the new O-ring onto the stop screw.
3. Push the primary piston assembly in full.
4. Install and tighten the stop screw.

Tightening torque
2.0—2.4 N·m {20—25 kgf·cm, 18—21 in·lbf}

5. Push and release the secondary piston component to verify that it is held properly by the stop screw.



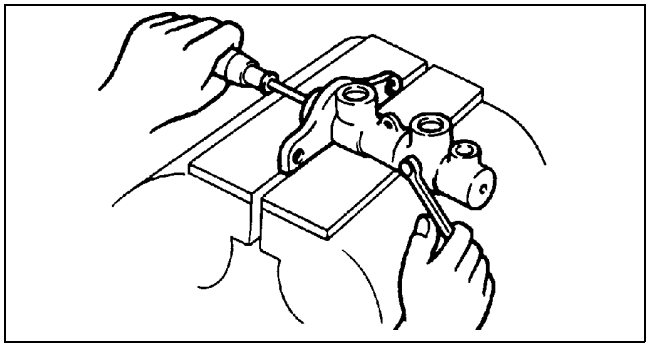
X3U411WAG

Stop Pin and O-ring (with ABS) Assembly Note

1. Install the secondary piston with the piston hole facing the stop pin and primary piston.
2. Install the new O-ring onto the stop pin.
3. Push the primary piston assembly in full.
4. Install and tighten the stop pin.

Tightening torque
6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}

5. Push and release the secondary piston component to verify that it is held properly by the stop pin.



X3U411WAH

POWER BRAKE UNIT INSPECTION

A3U041143800W01

Power Brake Unit Function Check
Simple method

Note
- Replace power brake unit component if necessary.

Step 1

1. With engine stopped, depress the pedal a few times.
2. With pedal depressed, start the engine.
   - If the pedal moves down slightly, immediately after engine starts, the unit is operating.
   - If not as specified, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair if necessary, and inspect it again.

Step 2

1. Start the engine.
2. Stop the engine after it has run for **1 or 2 minutes**.
3. Depress the pedal with usual force.
   - If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
   - If not as specified, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair if necessary, and inspect it again.

Step 3

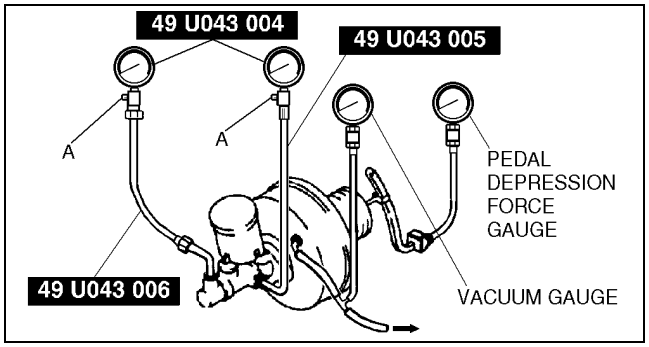
1. Start the engine.
2. Depress the pedal with usual force.
3. Stop the engine with the pedal held depressed.
4. Hold the pedal down for **about 30 seconds**.
   - If the pedal height does not change, the unit is operating.
   - If not as specified, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair if necessary, and inspect it again.

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.



A3U0411W002

Checking for vacuum loss (unloaded condition)

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 **63.4—66.6 kPa {475—500 mmHg, 18.8—19.6 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 if necessary, and inspect it again.

(loaded condition)

1. Start the engine.
2. Depress the brake pedal with a force of **200 N {20 kgf, 44 lbf}**.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
4. Observe the vacuum gauge for **15 seconds**.
   - If the gauge shows **63.4—66.6 kPa {475—500 mmHg, 18.8—19.6 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 if 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.

Engine type	Pedal force	Fluid pressure
ZM	200 N {20 kgf, 44 lbf}	650 kPa {7 kgf/cm^2, 94 psi} min.
FS		600 kPa {6 kgf/cm^2, 87 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 as specified, inspect for damage on the check valve or vacuum hose, and fluid leakage of the hydraulic line. Repair as necessary, and inspect again.

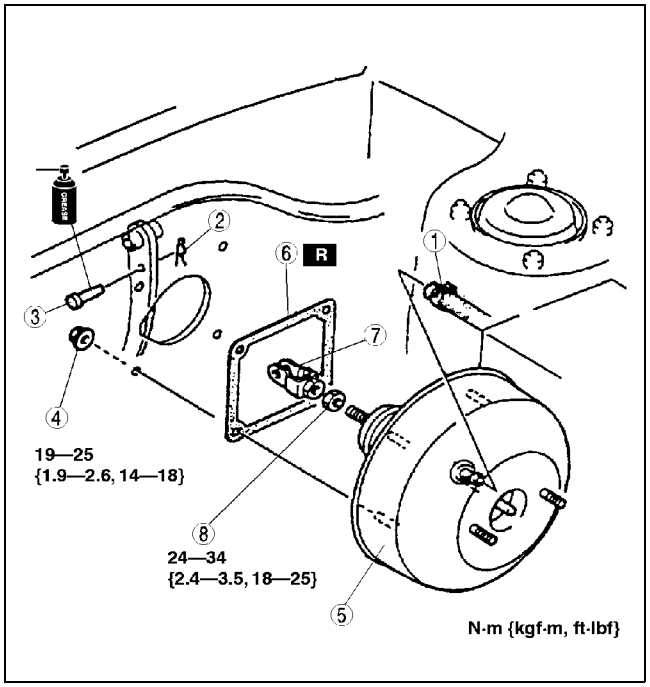
Engine type	Pedal force	Fluid pressure
ZM	200 N {20 kgf, 44 lbf}	6,500 kPa {66 kgf/cm^2, 943 psi} min.
FS		7,200 kPa {73 kgf/cm^2, 1,044 psi} min.

POWER BRAKE UNIT REMOVAL/INSTALLATION

A3U041143800W02

1. Remove the battery and battery cover.
2. Remove the master cylinder. (See 04–11–6 MASTER CYLINDER REMOVAL/ INSTALLATION.)
3. Remove in the order indicated in the table.

1	Vacuum hose
2	Snap pin
3	Clevis pin
4	Nut
5	Power brake unit
6	Gasket
7	Fork
8	Nut



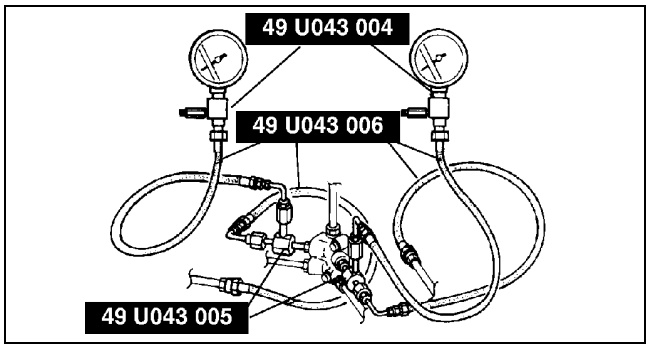
X3U411WAK

4. Install in the reverse order of removal.

DUAL PROPORTIONING VALVE (WITHOUT ABS) INSPECTION

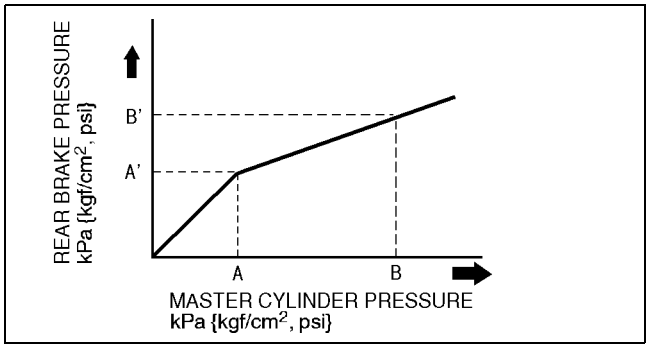
A3U041143900W01

1. Connect the **SSTs** to the brake pipes as shown in the figure.
2. Bleed the air from the brake system.



X3U411WAL

3. Measure the fluid pressure of the master cylinder and the rear brake.
   - If not within the specification, replace the dual proportioning valve.



A3U0411W003

Fluid pressure

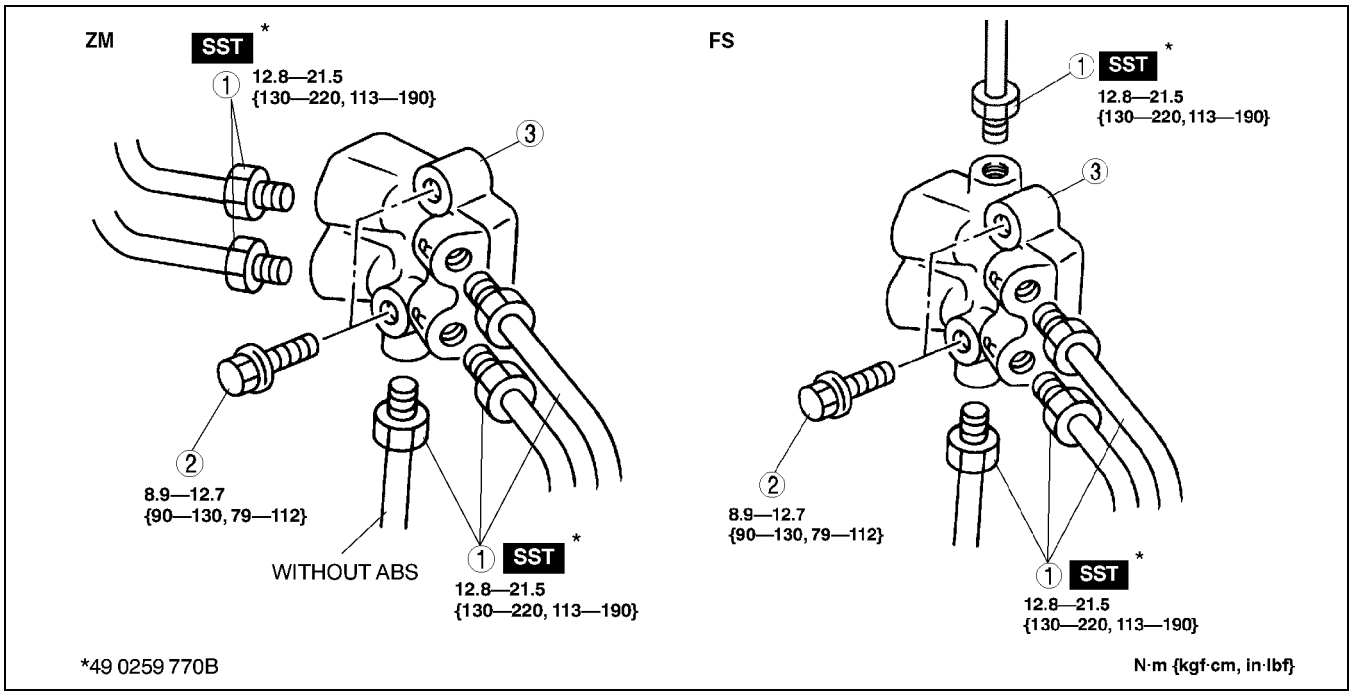
kPa {kgf/cm^2, psi}

Engine type	A	A'	B	B'
ZM	2,900 {30, 430}	2,900 {30, 430}±200 {2, 30}	5,900 {60, 850}	3,800 {39, 550}±300 {3, 40}
FS	3,400 {35, 500}	3,400 {35, 500}±300 {3, 40}	5,900 {60, 850}	4,200 {42.5, 600}±400 {4, 60}

DUAL PROPORTIONING VALVE (WITHOUT ABS) AND BRAKE PIPE JOINT (WITH ABS) REPLACEMENT

A3U041143900W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



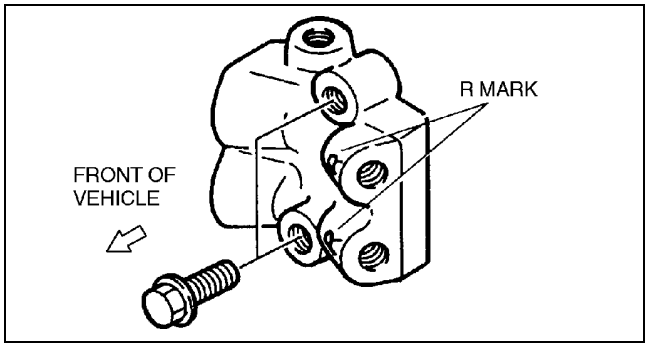
Z3U0411W001

1	Brake pipe
2	Bolt

3	Dual proportioning valve (without ABS) or brake pipe joint (with ABS) (See 04–11–14 Dual Proportioning Valve (Without ABS) or Brake Pipe Joint (With ABS) Installation Note)

Dual Proportioning Valve (Without ABS) or Brake Pipe Joint (With ABS) Installation Note

1. Install the dual proportioning valve so that the R mark faces the left side of the vehicle.



X3U411WAP

FRONT BRAKE (DISC) INSPECTION

A3U041133980W01

Brake Judder Repair Hint

Description

1. Brake judder concern has the following 3 characteristics:

Steering wheel vibration

1. Steering wheel vibrates in the direction of its rotation. This characteristic is most noticeable when applying brakes at a vehicle speed of **100—140 km/h {62.1—86.8 mph}**.

Floor vibration

1. When applying brakes, the vehicle body shakes back and forth. The seriousness of shake is not influenced by vehicle speed.

Brake pedal vibration

1. When applying brakes, a pulsating force tries to push the brake pad back occurs. The pulsation is transmitted to the brake pedal.
2. The following are the main possible causes of brake judder:

Due to an excessive runout (side-to-side wobble) of disc plate, the thickness of disc plate is uneven.

1. If the runout is **more than 0.05 mm {0.002 in} 10 mm {0.39 in}** from the disc plate edge, an uneven wear occurs on the disc plate because the pad contacts the plate unevenly.
2. If the runout is **less than 0.05 mm {0.002 in}**, uneven wear does not occur.

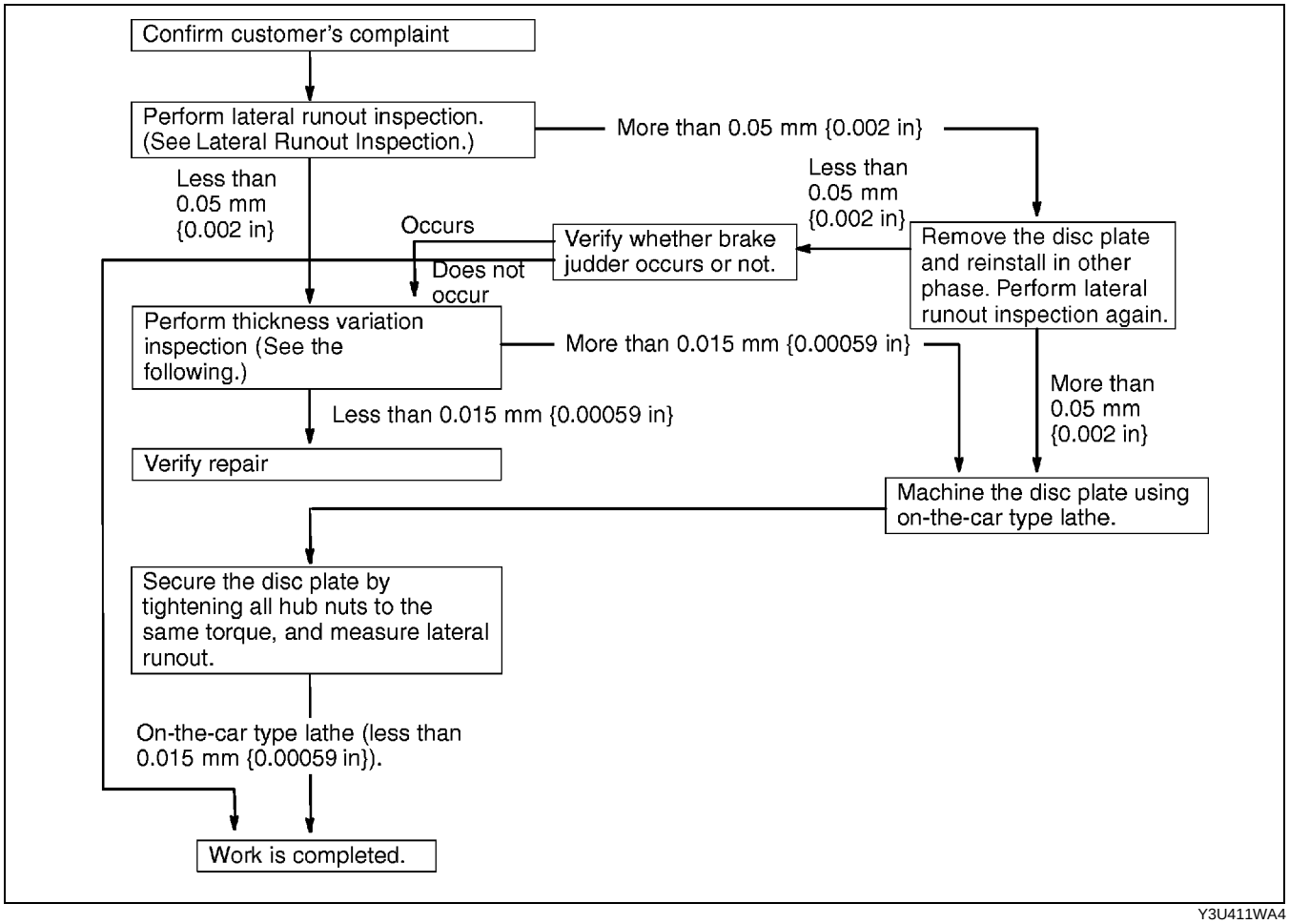
The disc plate is deformed by heat.

1. Repeated panic braking may raise the temperature in some portions of disc plate by **approximately 1,000 °C {1,832 °F}**. This results in deformed disc plate.

Due to corrosion, the thickness and friction coefficient of disc plate change.

1. If a vehicle is parked under damp conditions for a long time, corrosion occurs on the friction surface of disc plate.
2. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

Inspection and repair procedure



Y3U411WA4

Lateral runout inspection

1. To secure the disc plate and the hub, tighten the hub nuts upside down or insert a washer (thickness **10 mm {0.39 in}**, inner diameter **more than 12 mm {0.47 in}**) between the hub bolt and the hub nut.

   Note
   - The component parts of the **SST** (49 B017 001 or 49 G019 003) can be used as a suitable washer.

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.39 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

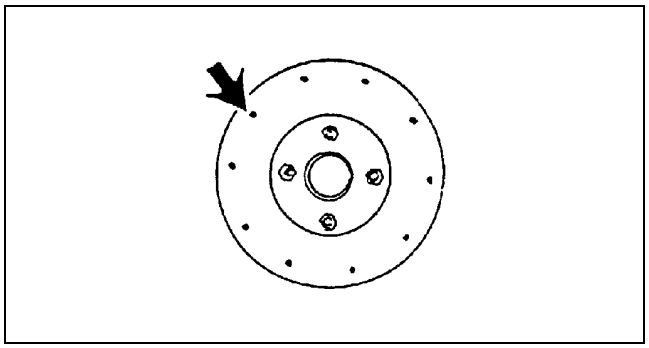
   Runout limit
   0.05 mm {0.002 in}

Thickness variation inspection

1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in the illustration using a caliper (micrometer).
3. Subtract the minimum value from the maximum, and if the result is not within specification, machine the disc plate using a lathe.

   Thickness variation limit
   0.015 mm {0.00059 in}

   Warning
   - **Do not exceed minimum disc plate thickness.**



X3U411WAR

Disc Plate Thickness Inspection

Caution
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

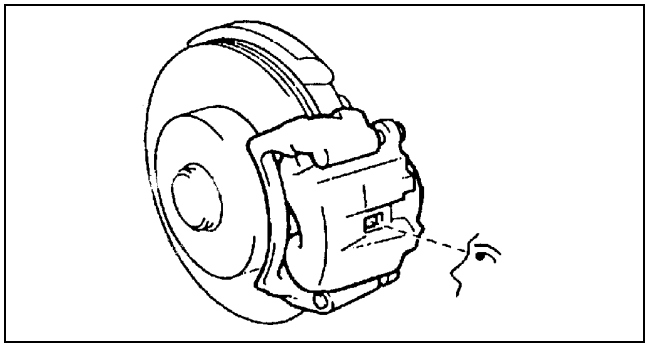
Minimum
ZM: 20 mm {0.78 in}
FS: 22 mm {0.87 in}
Minimum thickness after machining using a brake lathe on-vehicle
ZM: 20.8 mm {0.82 in}
FS: 22.8 mm {0.90 in}

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

Minimum thickness
ZM: 1.5 mm {0.059 in} min.
FS: 2.0 mm {0.079 in} min.

4. Replace the pads as a set: right and left wheels, if either one is at or less than the minimum thickness.

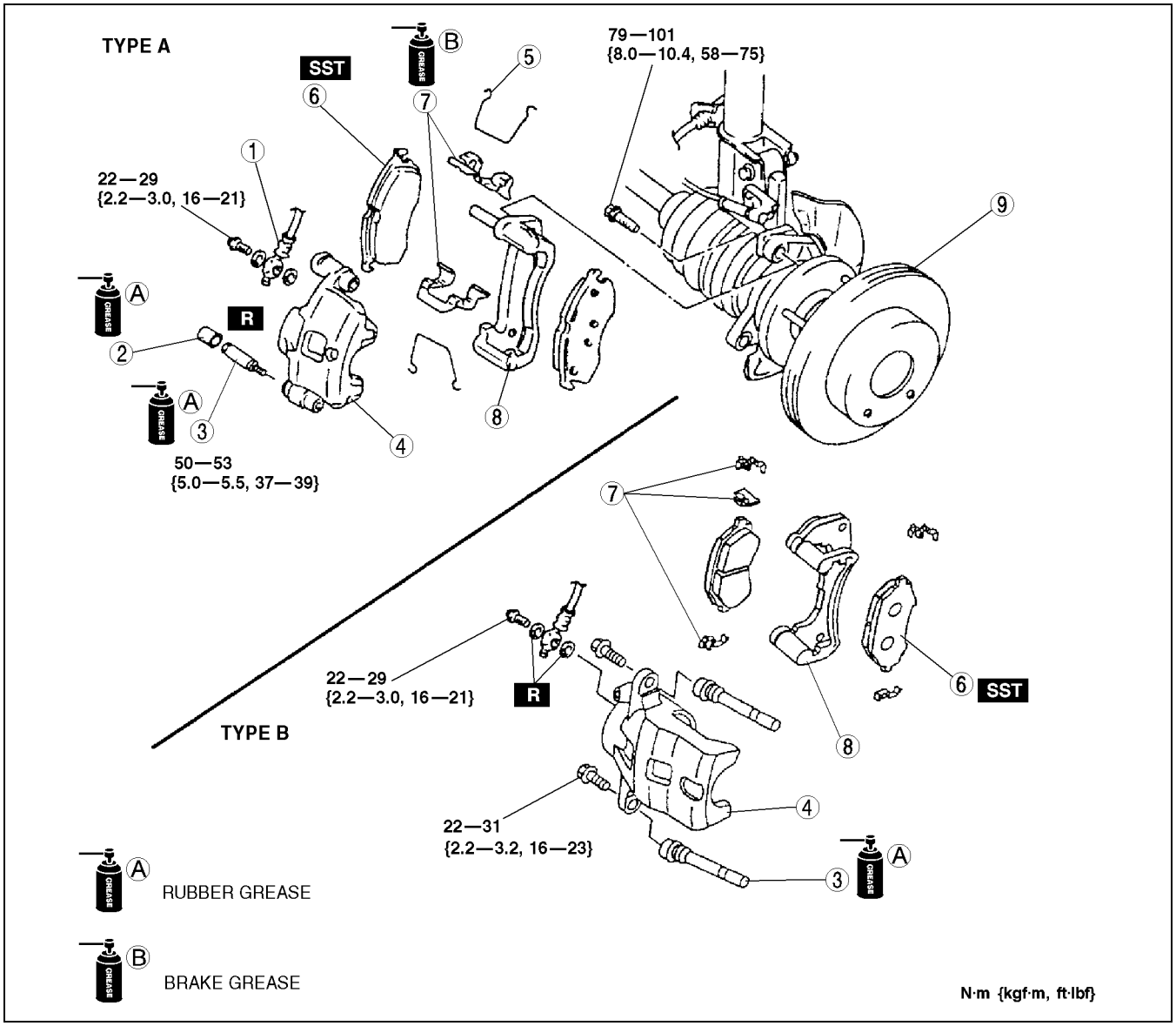


X3U411WAS

FRONT BRAKE (DISC) REMOVAL/INSTALLATION

A3U041133980W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the pedal a few times, rotate the wheel by hand, and verify that the brake does not drag.



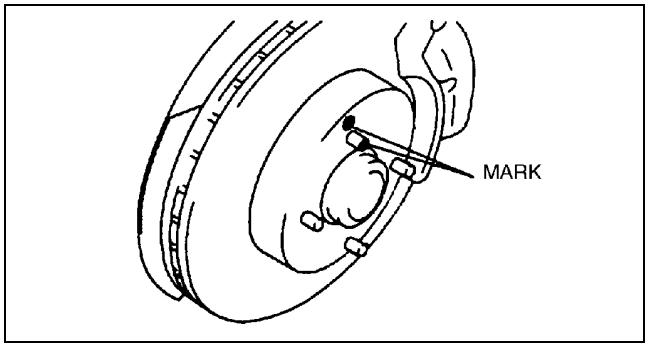
Z3U0411W003

1	Flexible hose
2	Cap (type A only)
3	Guide pin
4	Caliper
5	M-spring (type A only)

6	Disc pad (See 04–11–18 Disc Pad Installation Note)
7	Guide plate
8	Mounting support
9	Disc plate (See 04–11–18 Disc Plate Removal Note) (See 04–11–18 Disc Plate Installation Note)

Disc Plate Removal Note

1. Mark the wheel hub bolt and disc plate before removal for reference during installation.



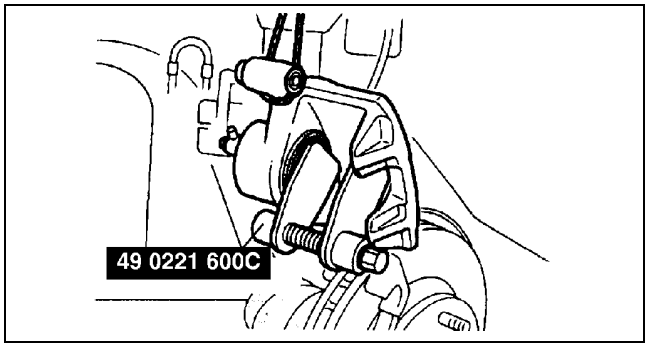
X3U411WAU

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 using the **SST**.
2. Install the disc pad.

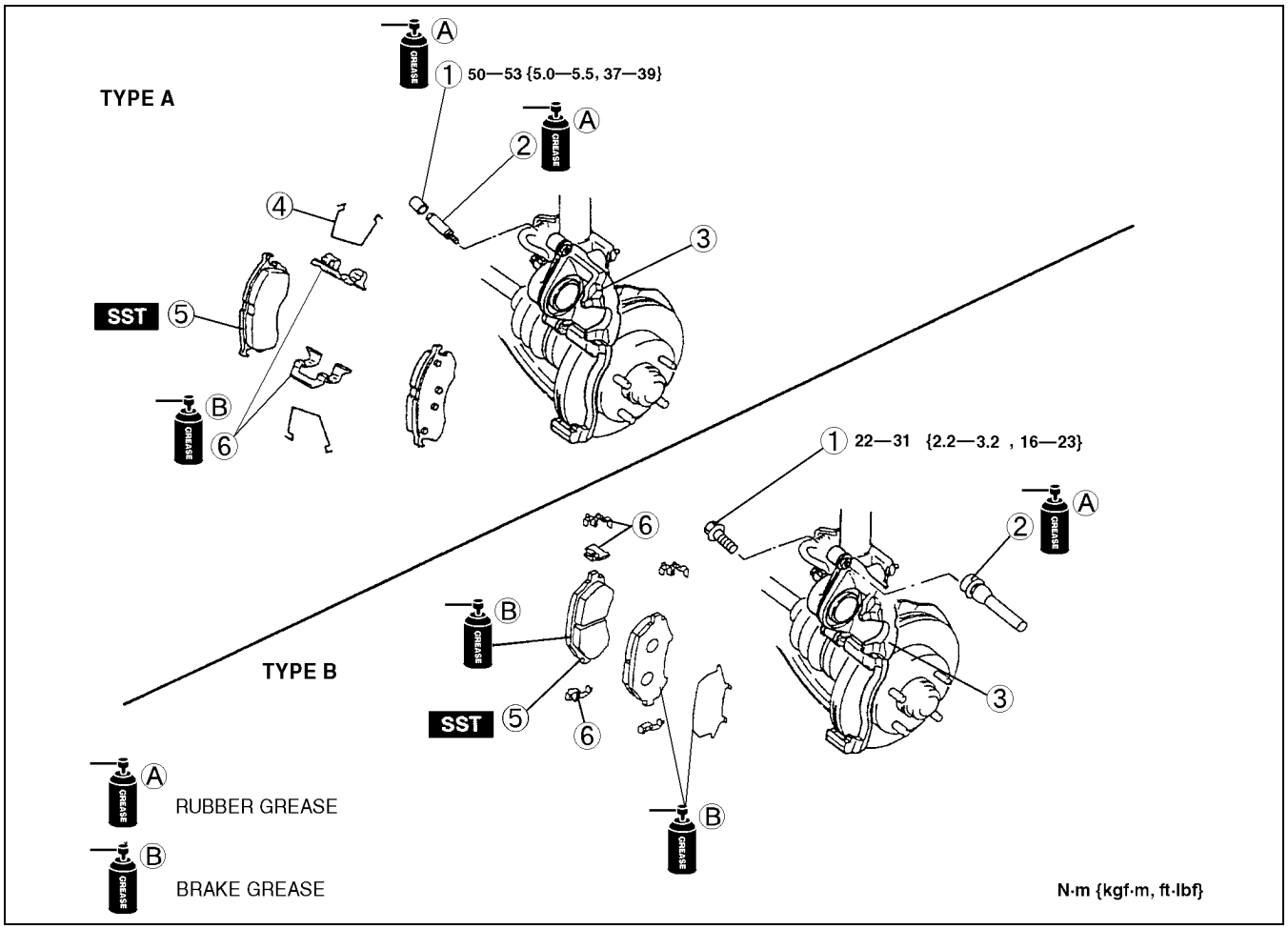


X3U411WAV

DISC PAD (FRONT) REPLACEMENT

A3U041133630W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z3U0411W004

1	Cap (type A), bolt (type B)
2	Guide pin
3	Caliper

4	M-spring (type A only)
5	Disc pad (See 04–11–18 Disc Pad Installation Note)
6	Guide plate

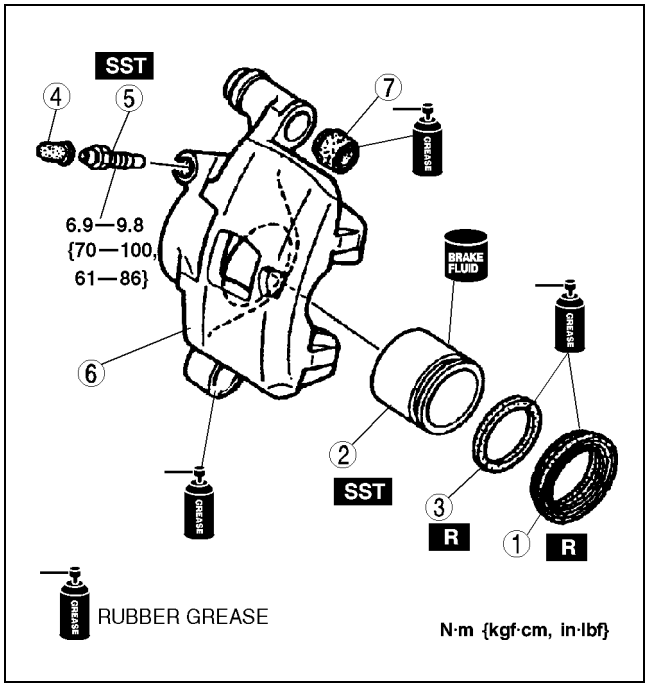
CALIPER (FRONT) DISASSEMBLY/ASSEMBLY

A3U041133990W01

1. Disassemble in the order indicated in the table.

1	Dust seal
2	Piston (See 04–11–20 Piston Disassembly Note)
3	Piston seal (See 04–11–20 Piston Seal Disassembly Note)
4	Bleeder cap
5	Bleeder screw (See 04–11–21 Bleeder Screw Assembly Note)
6	Caliper body
7	Boot

2. Assemble in the reverse order of removal.



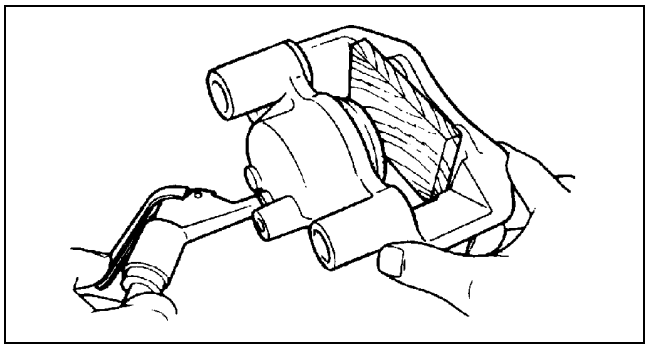
Z3U0411W005

Piston Disassembly Note

Caution

- **Blow the compressed air slowly to prevent the piston from suddenly popping out.**

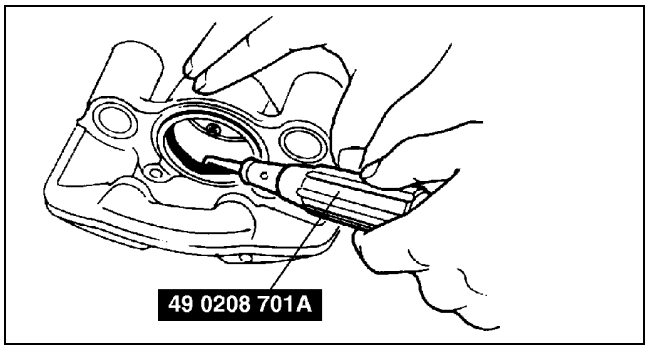
1. Place a piece of wood in the caliper, then blow compressed air through the hole to force the piston out of the caliper.



X3U411WAY

Piston Seal Disassembly Note

1. Remove the piston seal from the brake caliper using the **SST**.

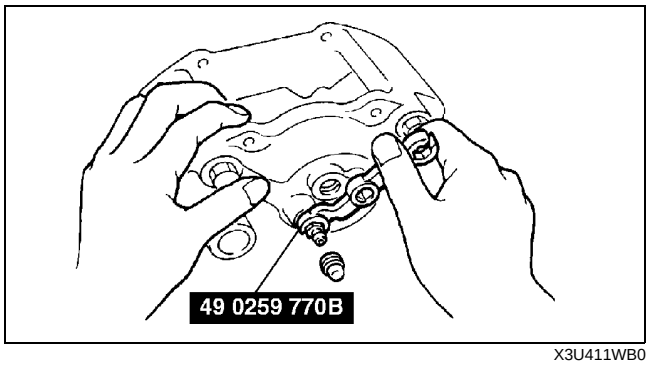


X3U411WAZ

Bleeder Screw Assembly Note

1. Assemble the bleeder screw to the caliper using the **SST**.

Tightening torque
6.9—9.8 N·m {70—100 kgf·cm, 61—86 in·lbf}



X3U411WB0

REAR BRAKE (DISC) INSPECTION

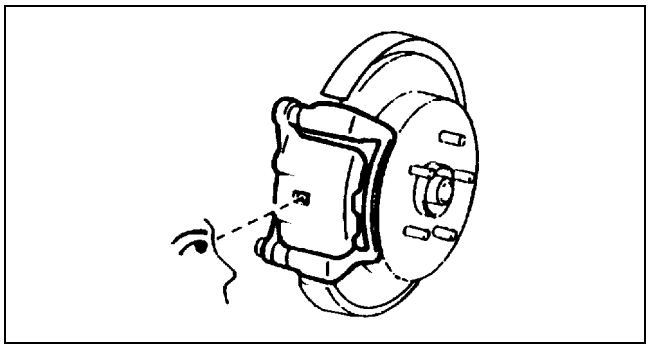
A3U041126980W01

Brake Judder Repair Hint
(See 04–11–14 Brake Judder Repair Hint.)

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.

Minimum thickness
1.0 mm {0.039 in}



W6U411WB7

Disc Plate Thickness Inspection

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

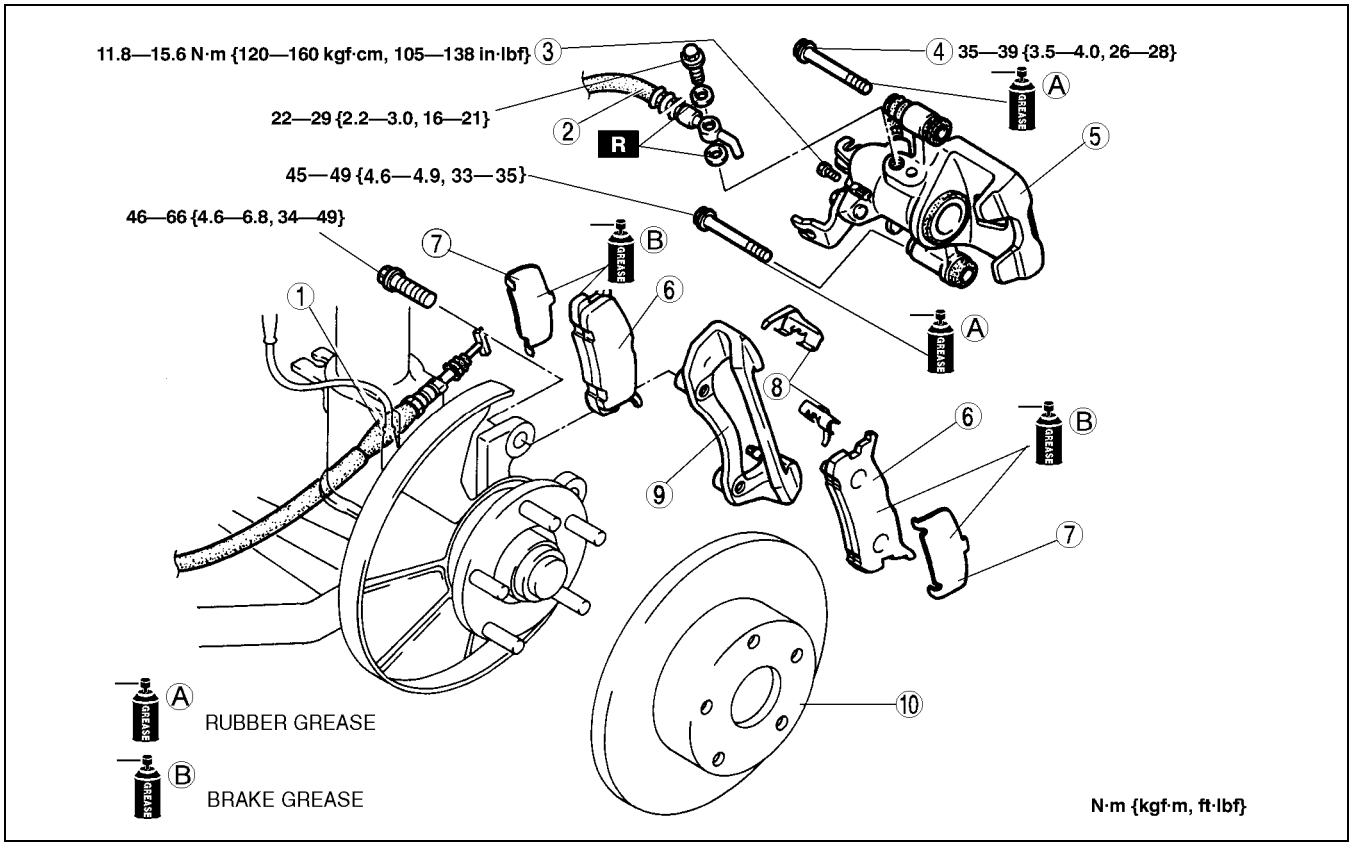
Caution
- **When it is necessary to machine the disc plate, and the disc plate is removed from the vehicle then machined, excessive runout may result. Machine the disc plate which is installed on the vehicle.**

Minimum
8 mm {0.31 in}
Minimum thickness after machining by using a brake lathe on-vehicle
8.8 mm {0.35 in}

REAR BRAKE (DISC) REMOVAL/INSTALLATION

A3U041126980W02

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.



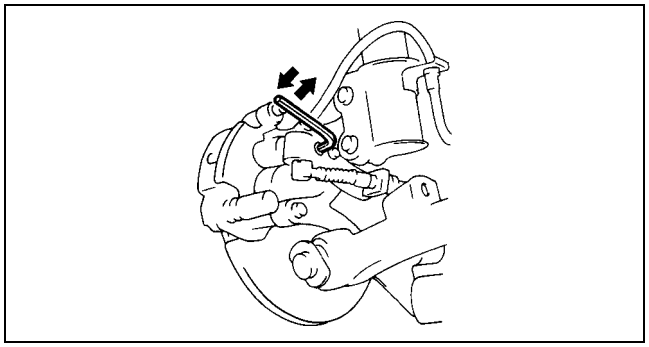
A3U0411W101

1	Parking brake cable, clip
2	Flexible hose
3	Screw plug
4	Lock bolt
5	Caliper
6	Disc pad (See 04–11–22 Disc Pad Installation Note)

7	Shim
8	Guide plate
9	Mounting support
10	Disc plate (See 04–11–18 Disc Plate Removal Note) (See 04–11–18 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.

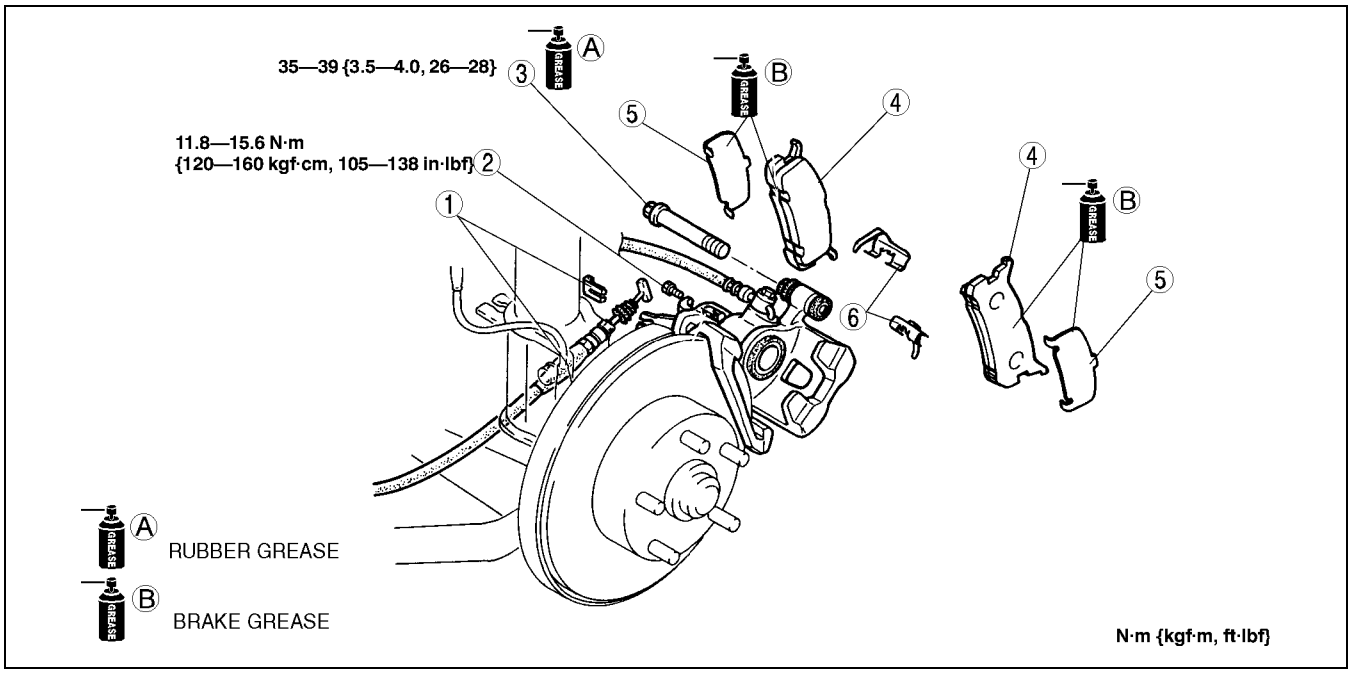


W6U411WB9

DISC PAD (REAR) REPLACEMENT

A3U041126630W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z3U0411W009

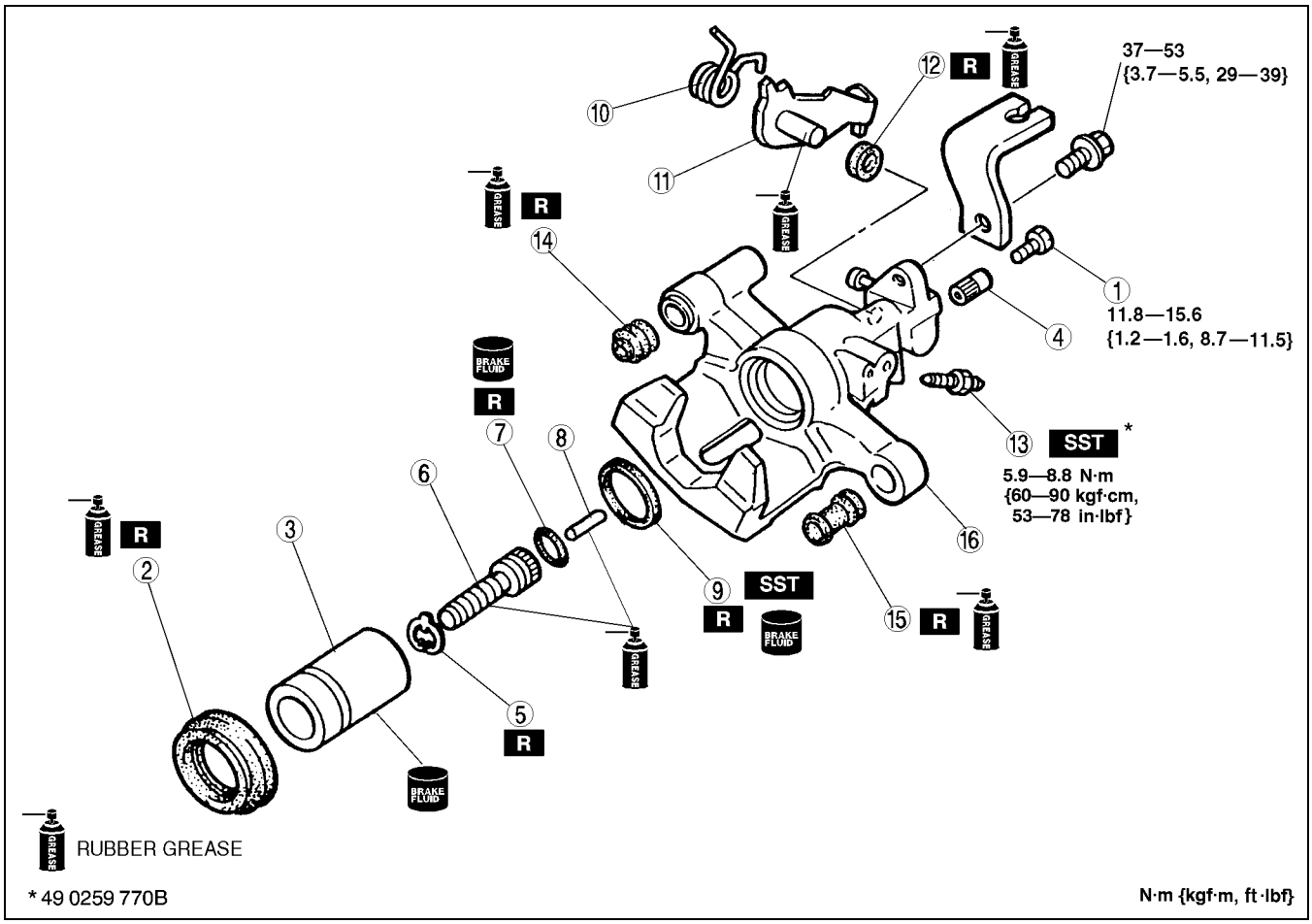
1	Parking brake cable, clip
2	Screw plug
3	Lock bolt

4	Disc pad (See 04–11–22 Disc Pad Installation Note)
5	Shim
6	Guide plate

CALIPER (REAR) DISASSEMBLY/ASSEMBLY

A3U041126990W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



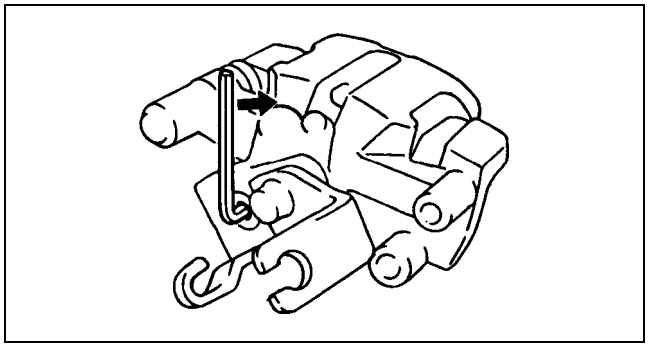
Z3U0411W010

1	Screw plug
2	Dust seal
3	Piston (See 04–11–24 Piston Disassembly Note) (See 04–11–25 Piston Assembly Note)
4	Manual adjustment gear
5	Snap ring
6	Adjusting bolt
7	O-ring
8	Connecting link

9	Piston seal (See 04–11–20 Piston Seal Disassembly Note)
10	Spring
11	Operating lever
12	Boot
13	Bleeder screw
14	Boot
15	Boot
16	Caliper body

Piston Disassembly Note

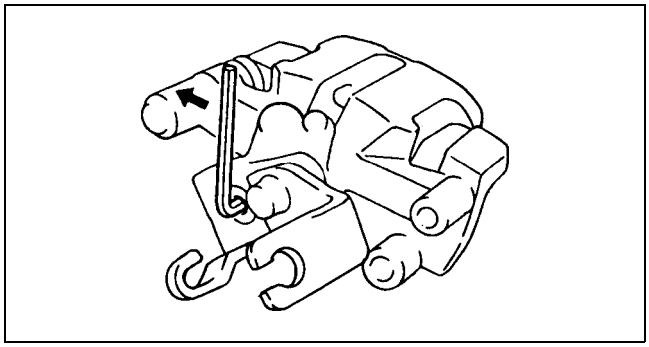
- Turn the adjustment gear clockwise with an Allen wrench to remove the piston from the adjustment gear. (Turn the adjustment gear until it becomes easy to turn.)



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

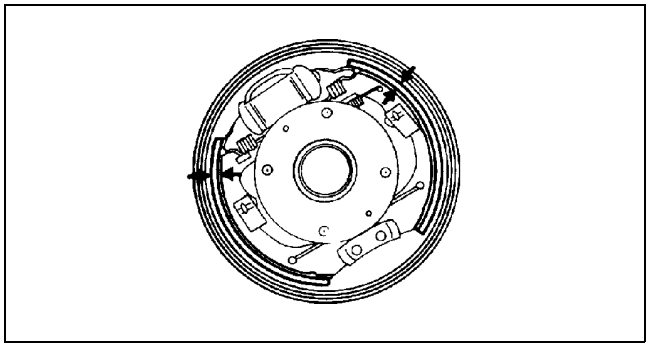
A3U041126250W01

Brake Lining Thickness Inspection

1. Remove the brake drum.
2. Inspect the remaining thickness of the lining.

   Thickness
   1.0 mm {0.039 in} min.

3. Replace both left and right brake shoes if either is at or less than the minimum thickness.



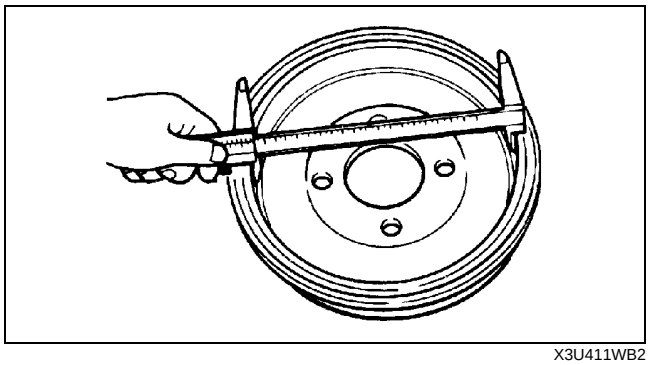
X3U411WB1

Brake Drum Inspection

1. Measure the inner diameter of the drum.

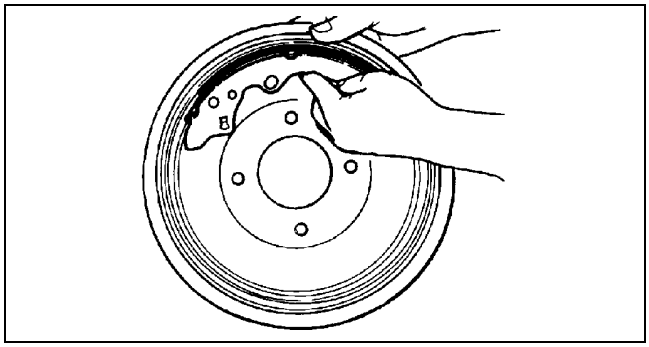
   Maximum diameter
   201.5 mm {7.933 in}

2. Inspect for scratches and uneven or abnormal wear inside the drum.
3. Repair or replace the drum if necessary.



X3U411WB2

4. When repairing or replacing the drum, inspect the contact with the shoes.

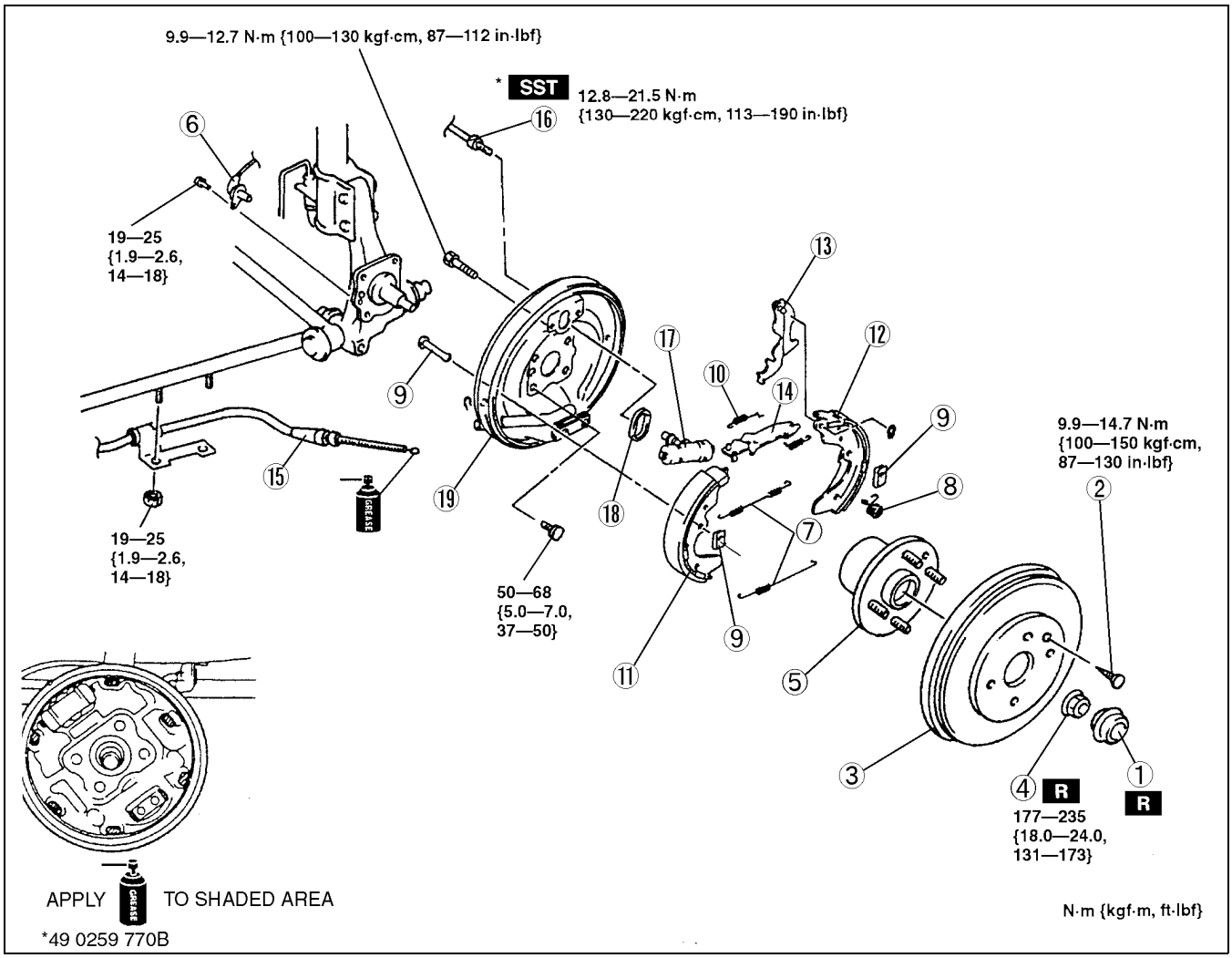


X3U411WB3

REAR BRAKE (DRUM) REMOVAL/INSTALLATION

A3U041126250W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Perform the following.
   (1) Depress the brake pedal a few times. Then verify that the brakes do not drag.
   (2) Inspect the pedal-to-floor clearance.
   (3) Inspect the parking brake lever stroke.



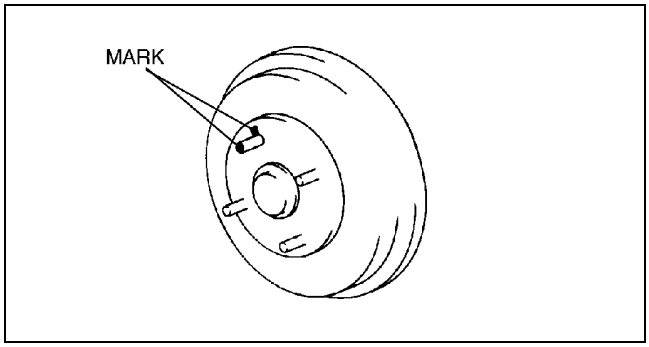
Y3U411WA6

1	Hub cap
2	Screw
3	Brake drum (See 04–11–27 Brake Drum Removal Note) (See 04–11–27 Brake Drum Installation Note)
4	Locknut (See 03–11–4 Locknut Removal Note) (See 03–11–7 Locknut Installation Note)
5	Wheel hub
6	ABS wheel-speed sensor (if equipped)
7	Return spring
8	Lever spring

9	Hold pin and hold spring
10	Anti-rattle spring
11	Leading shoe
12	Trailing shoe
13	Operating lever
14	Adjuster
15	Parking brake cable
16	Brake pipe
17	Wheel cylinder
18	O-ring
19	Backing plate

Brake Drum Removal Note

1. Mark the wheel hub bolt and brake drum before removal for reference during installation.



X3U411WB5

Brake Drum Installation Note

1. Remove any rust or grime on the contact face of the drum brake.
2. Install the brake drum and align the marks made before removal.

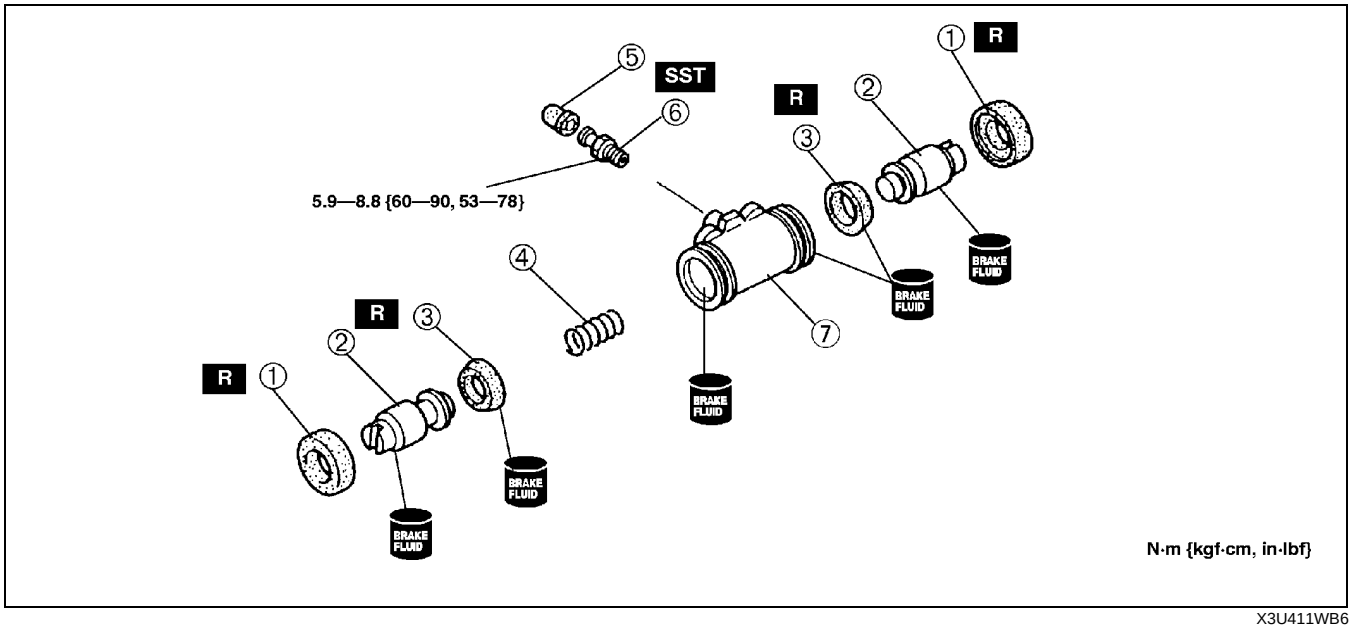
WHEEL CYLINDER DISASSEMBLY/ASSEMBLY

A3U041126610W01

Caution

- **Replace the wheel cylinder component if a problem is found.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



X3U411WB6

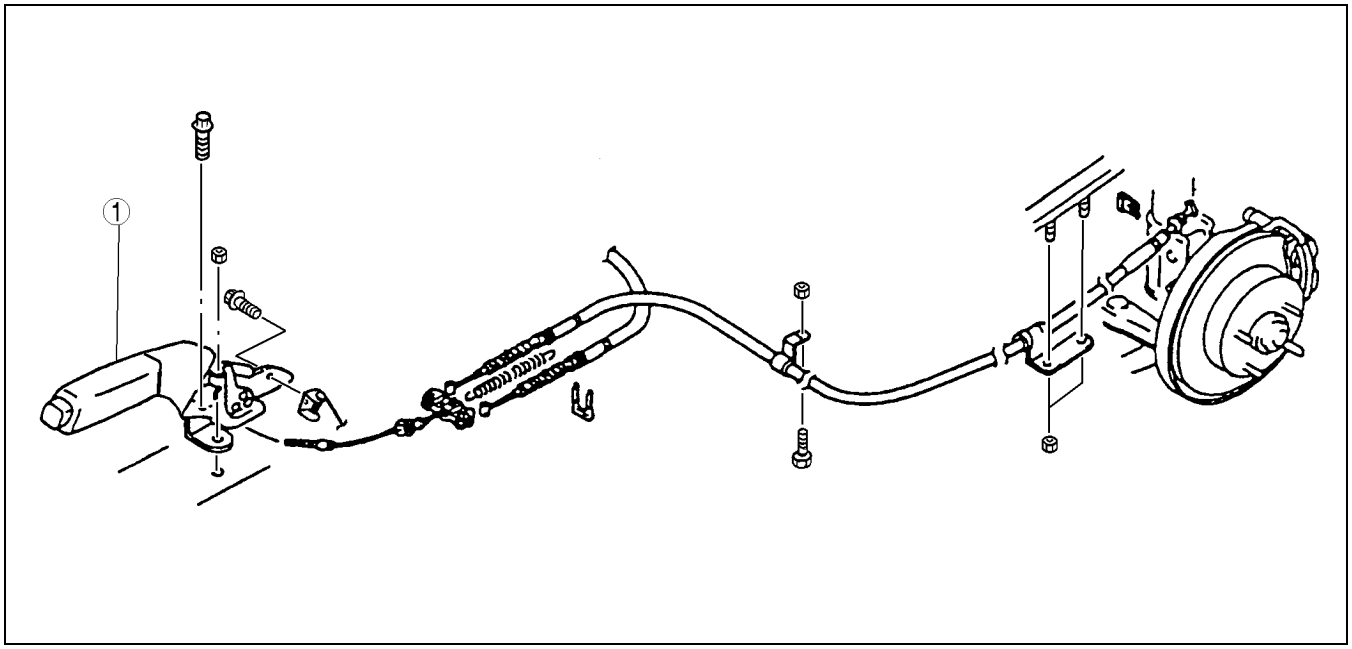
1	Boot
2	Wheel cylinder piston
3	Piston cup
4	Wheel cylinder spring

5	Bleeder cap
6	Bleeder screw (See 04–11–21 Bleeder Screw Assembly Note)
7	Wheel cylinder body

04–12 PARKING BRAKE SYSTEM

PARKING BRAKE SYSTEM LOCATION INDEX

A3U041244000W01



A3U0412W001

1	Parking brake (See 04–12–1 PARKING BRAKE (LEVER TYPE) INSPECTION) (See 04–12–1 PARKING BRAKE (LEVER TYPE) ADJUSTMENT) (See 04–12–2 PARKING BRAKE (LEVER TYPE) REMOVAL/INSTALLATION)

PARKING BRAKE (LEVER TYPE) INSPECTION

A3U041244000W02

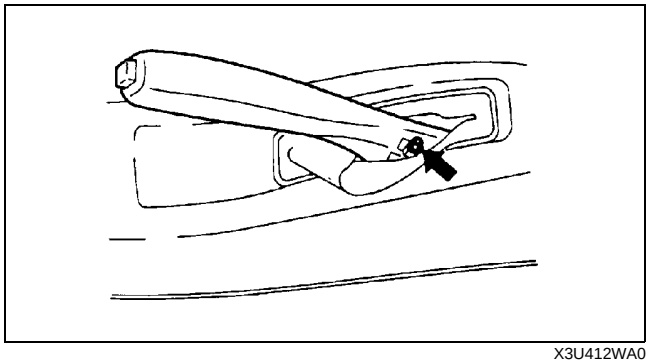
1. Pull the parking brake lever a few times.
2. Depress the brake pedal a few times.
3. Inspect the parking brake stroke by pulling the parking brake lever with a force of **98 N {10 kgf, 22 lbf}**.

Stroke
5—7 notches

PARKING BRAKE (LEVER TYPE) ADJUSTMENT

A3U041244000W03

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.
4. After adjustment, inspect the following points:
   (1) Turn the ignition switch to ON, pull the parking brake lever one notch, and verify that the parking brake warning light illuminates.
   (2) Verify that the rear brakes do not drag.

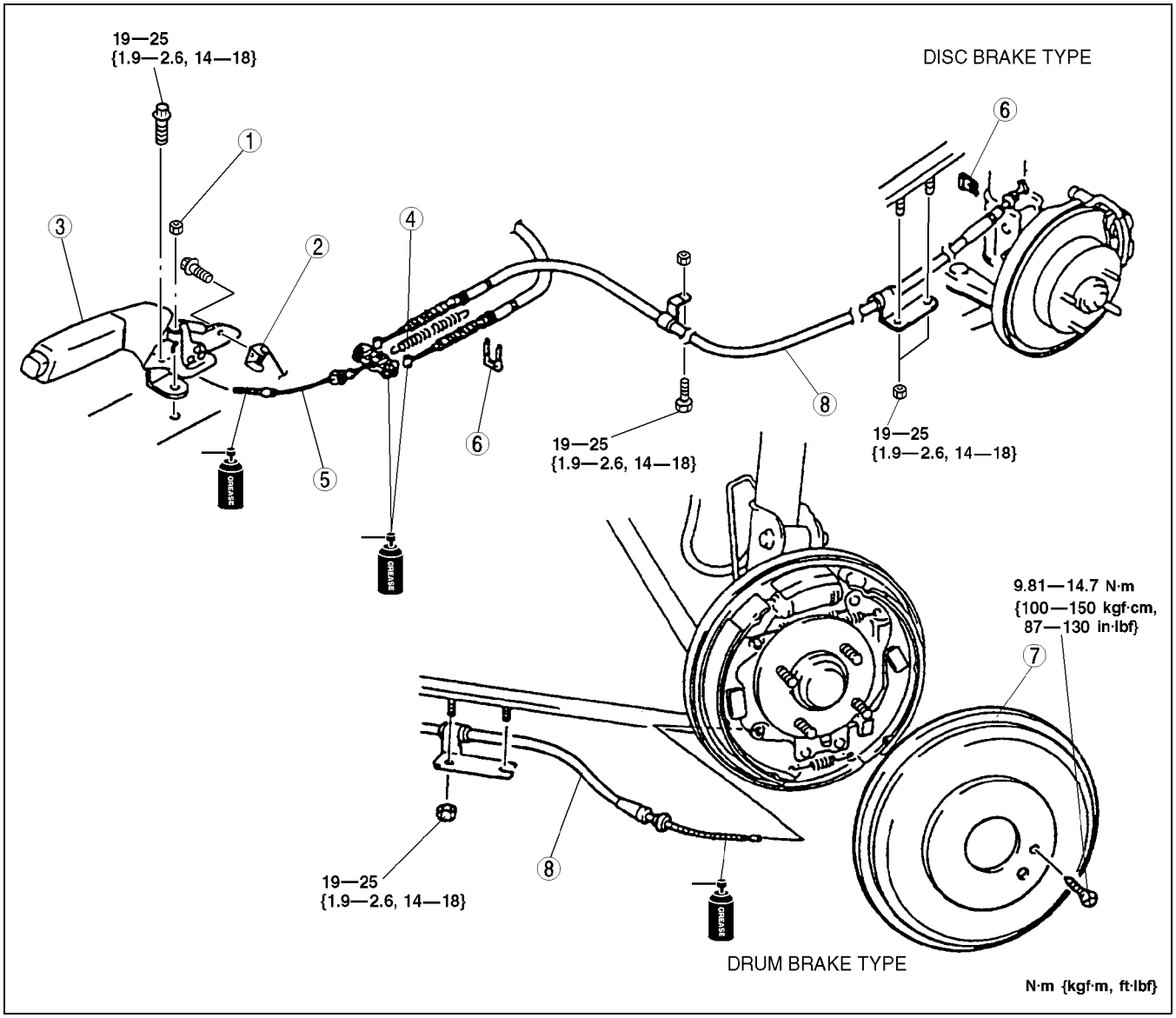


X3U412WA0

PARKING BRAKE (LEVER TYPE) REMOVAL/INSTALLATION

A3U041244000W04

1. Remove the rear console. (See 09–17–5 CONSOLE REMOVAL/INSTALLATION.)
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. (See 04–12–1 PARKING BRAKE (LEVER TYPE) ADJUSTMENT.)



A3U0412W002

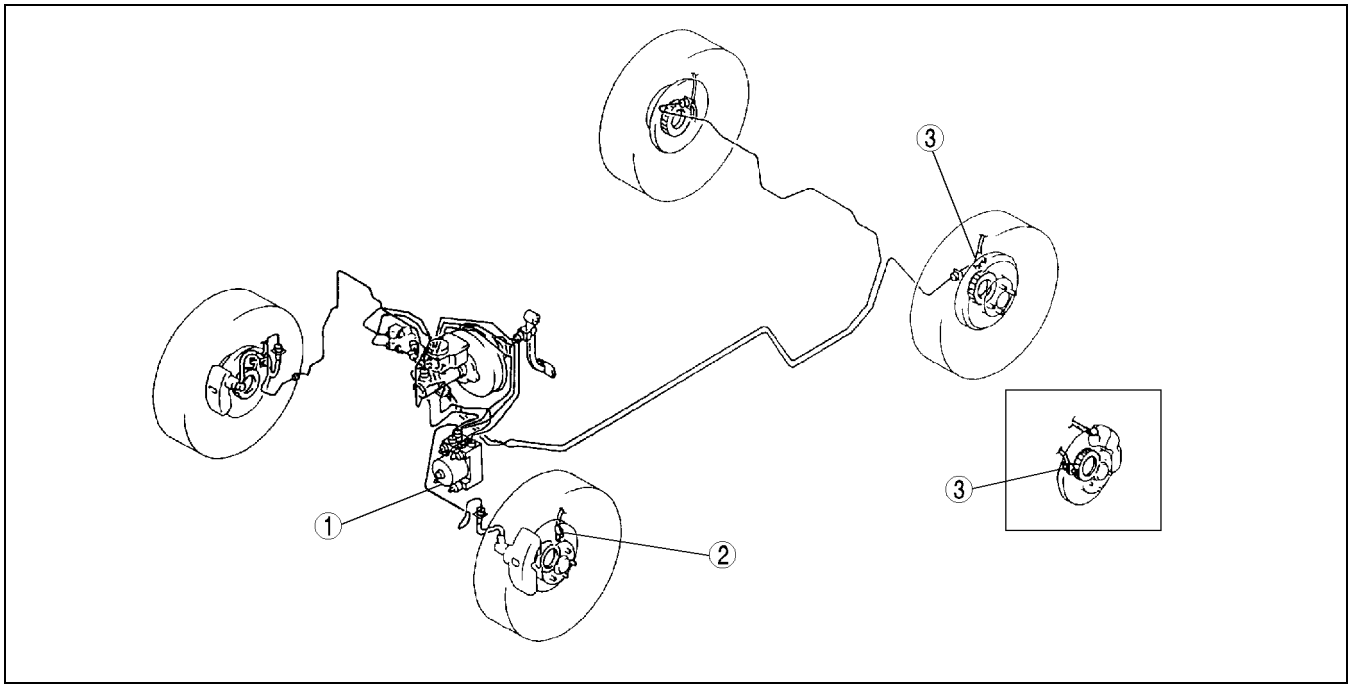
1	Adjusting nut
2	Parking brake switch
3	Parking brake lever
4	Return spring

5	Front cable and equalizer
6	Clip
7	Brake drum
8	Parking brake cable

04–13 ANTILOCK BRAKE SYSTEM

ABS LOCATION INDEX

A3U041343000W01



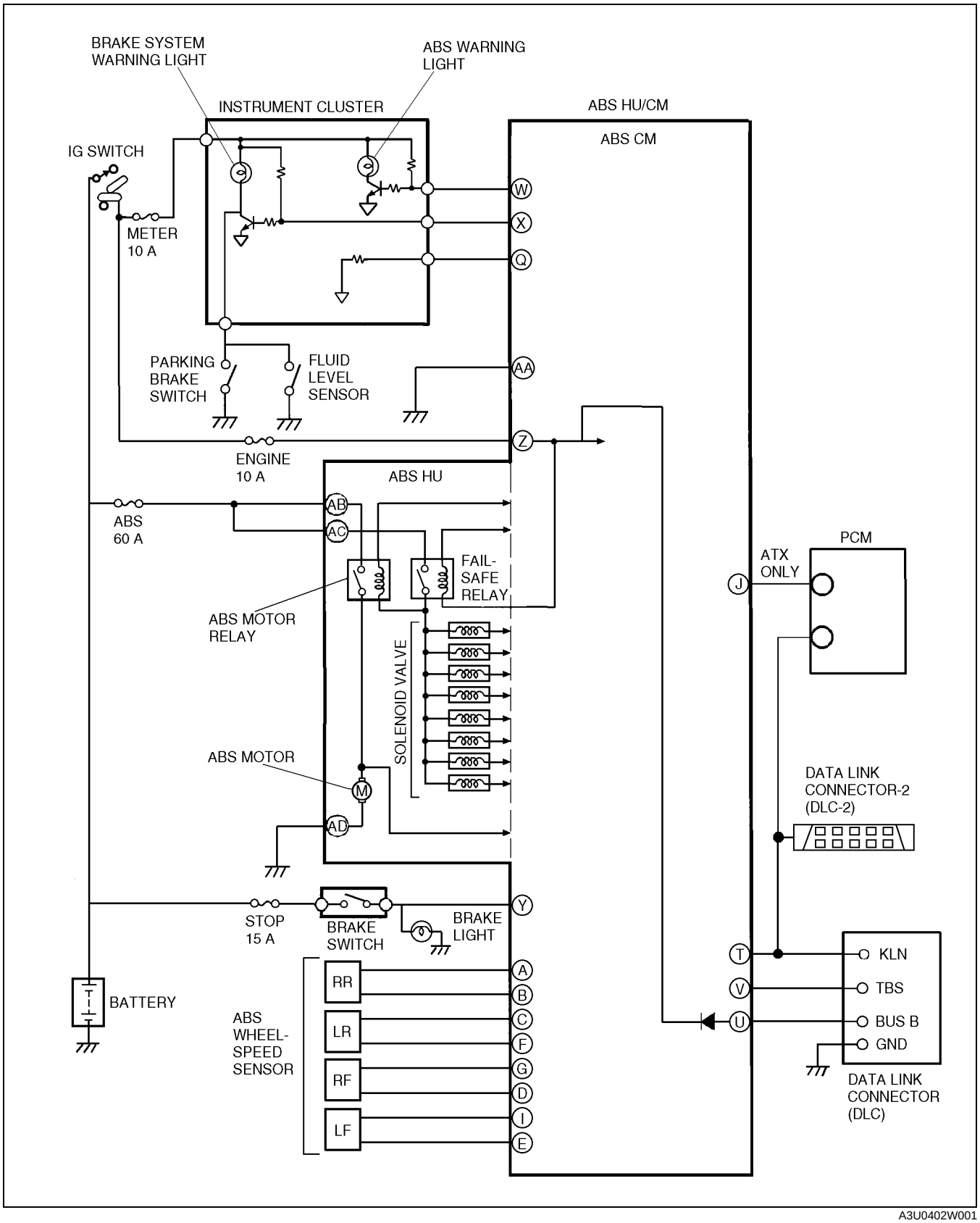
Z3U0413W101

1	ABS HU/CM (See 04–13–3 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) SYSTEM INSPECTION) (See 04–13–5 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) REMOVAL/ INSTALLATION) (See 04–13–6 ABS HYDRAULIC UNIT (HU)/ CONTROL MODULE (CM) INSPECTION)

2	ABS wheel-speed sensor (front) (See 04–13–9 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION) (See 04–13–9 FRONT/REAR ABS WHEEL-SPEED SENSOR INSPECTION)
3	ABS wheel-speed sensor (rear) (See 04–13–10 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION) (See 04–13–9 FRONT/REAR ABS WHEEL-SPEED SENSOR INSPECTION)

ABS SYSTEM DIAGRAM

A3U041343000W02



A3U0402W001

ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) SYSTEM INSPECTION

A3U041343780W01

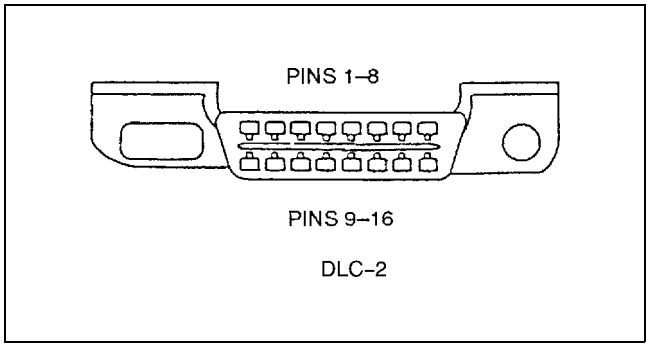
System Inspection

Preparation

1. Verify that the battery is fully charged. With the ignition switch on, verify that the ABS and BRAKE system warning lights goes out after **3 seconds**.
2. If the lights stays on after **3 seconds**, the ABS HU/CM detects a failure. Follow the troubleshooting procedures.
3. Turn the ignition switch off.
4. On level ground, jack up the vehicle and support it evenly on safety stands. Shift the transaxle to N position.
5. Release the parking brake.
6. Rotate the wheels by hand, and inspect for brake drag.

Using the SSTs

1. Perform the “Preparation.”
2. Connect the **SSTs** (WDS or equivalent) to the data link connector-2 (DLC-2).
3. Set up an active command mode inspection according to the combination of commands below. (See 04–02–3 ABS ON-BOARD DIAGNOSTIC.)



X3U101WA1

OPERATION	COMMAND NAME				COMMAND TYPE
	PMP_MOTOR	RF_OUTLET	RF_INLET	ABS_POWER	
Pressure retention	OFF	OFF	ON	ON	Manual
Pressure reduction	ON	ON	ON	ON	

The chart above shows an example of a right wheel inspection.

Note

- When working with two people, one should press on the brake pedal, the other should attempt to rotate the wheel being inspected.

4. Send the command while pressing on the brake pedal and attempting to rotate the wheel being inspected.
5. When pressure is being maintained, and click sound indicating the solenoid is operating comes from the ABS HU/CM, confirm that the wheel does not rotate. When pressure is being reduced, and click sound indicating the solenoid is operating comes from the ABS HU/CM, confirm that the wheel rotates, even though the brake pedal is being depressed.

Note

- To protect the ABS HU/CM, the solenoid valve used for simulations and the ABS motor stay on for **10 seconds** each time they are switched on.
- Performing the inspections above determines the following.
  - — The ABS HU/CM brake lines are normal.
  - — The ABS HU/CM hydraulic system is not significantly abnormal.
  - — The ABS HU/CM wiring is normal.
- However, the following items cannot be checked.
  - — ABS HU/CM input system harness and parts
  - — Extremely small leaks in the ABS HU/CM internal hydraulic system
  - — Unusual intermittent occurrences in the above items

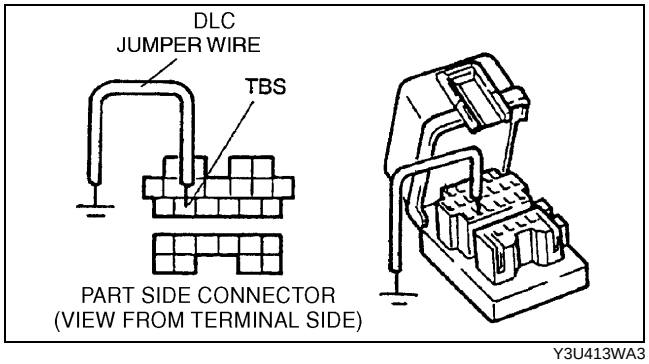
Without using the SSTs

1. Perform the “Preparation.”

Caution

- **Connecting the wrong data link connector (DLC) terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

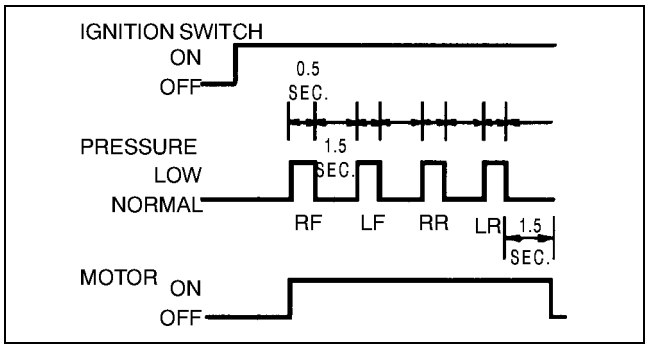
2. Use a jumper wire to short terminal TBS of the DLC to body GND.
3. Depress the brake pedal, and have an assistant verify that the right front wheel does not turn.
4. With the brake pedal still depressed, turn the ignition switch on and verify that the brake is released momentarily (**approx. 0.5 sec.**) and that the wheel turns when pressure-reduction operates.
5. Inspect the operation of the remaining wheels in order: right front, left front, right rear, left rear.
   - Replace the ABS HU/CM if wheels do not rotate.
   - Inspect brake piping to ABS HU/CM if operation of the remaining wheel order is not within specified.



Y3U413WA3

Note

- If Steps 4 and 5 show correct operation, the following systems are okay:
  — Brake piping to ABS HU/CM
  — Braking system, including ABS HU/CM
  — Electrical system in ABS HU/CM (solenoid, ABS motor, etc.)
- The following are not inspected with above steps:
  — Input system and harness of ABS HU/CM
  — Intermittent failure
  — Fluid leakage from brake including the ABS HU/CM and master cylinder



YMU413WA7

6. Turn the ignition switch off and remove the jumper wire.

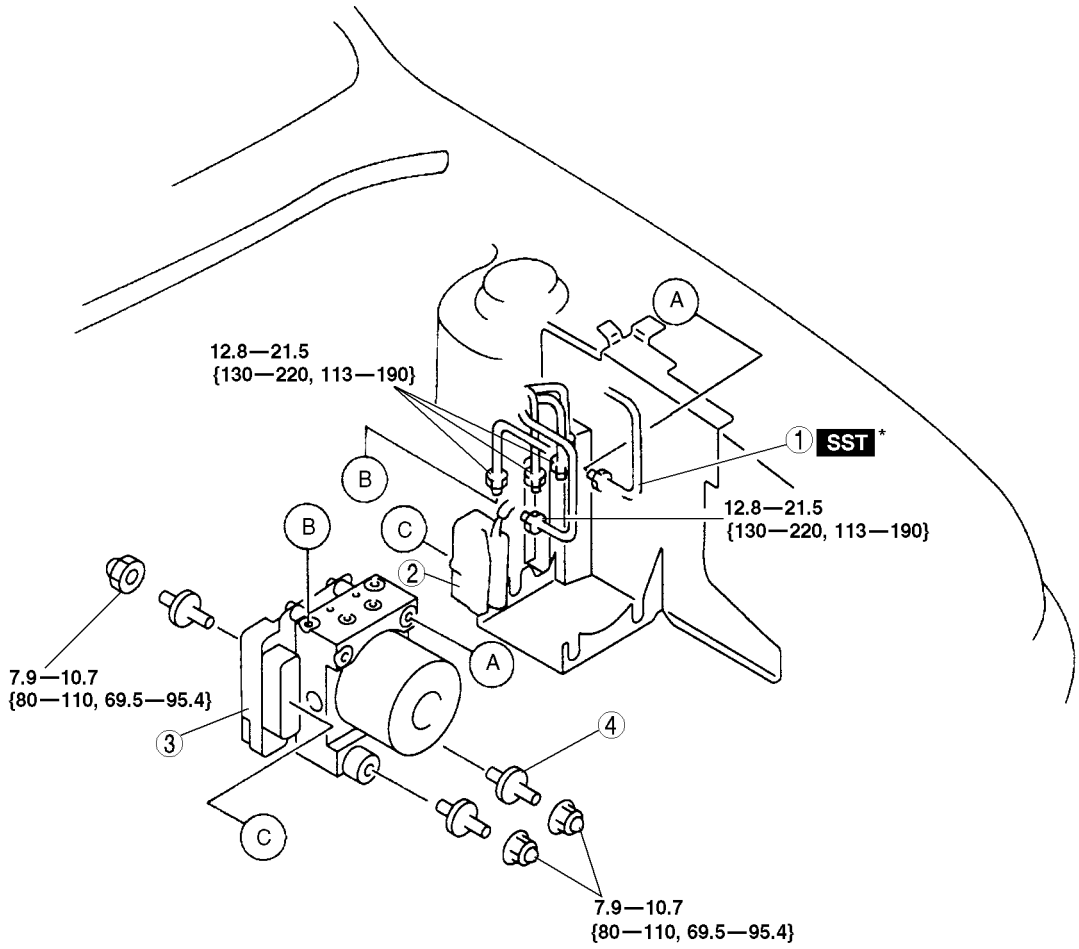
ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) REMOVAL/INSTALLATION

A3U041343700W01

Caution

- **Do not drop the ABS hydraulic unit (HU) /control module (CM). Replace it if it is subjected to an impact.**

1. Remove the battery and battery tray.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



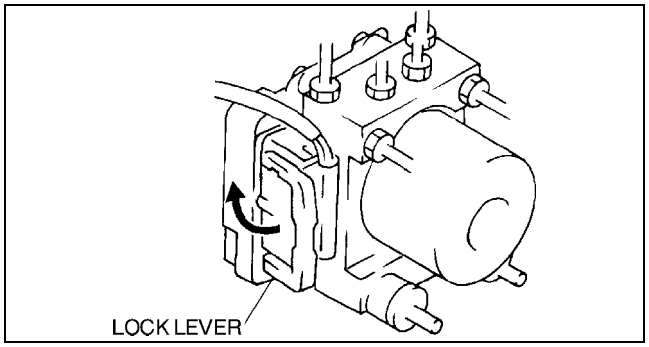
A3U0413W101

1	Brake pipe
2	Connector (See 04–13–6 Connector Removal Note) (See 04–13–6 Connector Installation Note

3	ABS HU/CM (See 04–13–6 ABS HU/CM Removal/Installation Note)
4	stud

Connector Removal Note

1. Pull the lock lever up and make it unlock.
2. Remove the connector.



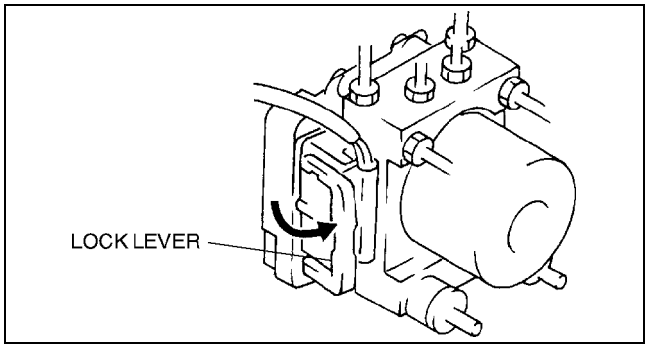
YMU413WC8

ABS HU/CM Removal/Installation Note

1. When removing/installing the ABS HU/CM from/to the vehicle, attach a strip of protective tape on the ABS HU/CM connector to prevent brake fluid from entering.

Connector Installation Note

1. Verify that the lock lever of the harness connector is completely pulled up.

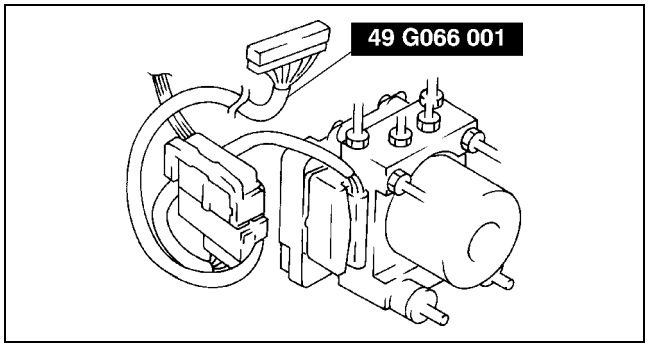


YMU413WC9

ABS HYDRAULIC UNIT (HU)/CONTROL MODULE (CM) INSPECTION

A3U041367650W01

1. Disconnect the negative battery cable.
2. Connect the **SST** between the ABS HU/CM and harness connector with the ignition switch off.
3. Attach the tester leads to the **SST** and inspect voltage referring the table below.

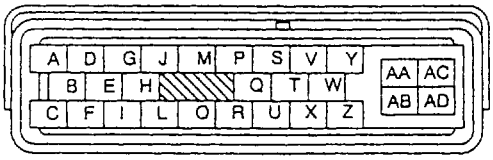


YMU413WA3

Terminal Voltage Table (Reference)

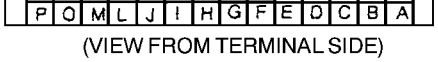
(Engine is idling, and connector is connected unless otherwise indicated)

ABS HU/CM



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SST (49 G066 001) CONNECTOR



(VIEW FROM TERMINAL SIDE)

Y3U402WA8

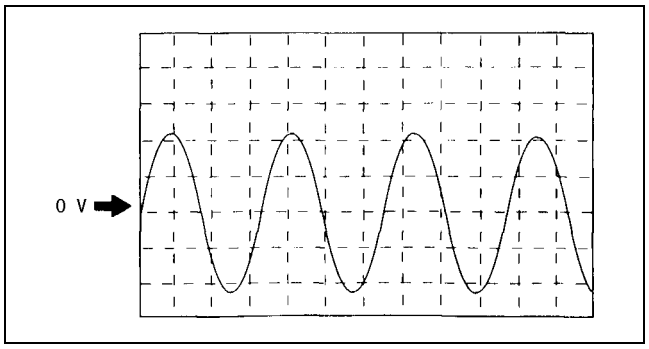
Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
A B	RR wheel-speed	RR wheel-speed sensor	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0 (AC)	• Inspect related harness • Inspect ABS wheel-speed sensor
C F	LR wheel-speed	LR wheel-speed sensor	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0 (AC)	
D G	RF wheel-speed	RF wheel-speed sensor	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0 (AC)	
E I	LF wheel-speed	LF wheel-speed sensor	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0 (AC)	
H	—	—	—	—	—
J*1	Vehicle speed output	PCM	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0	• Inspect related harness • Inspect ABS wheel-speed sensor
L	—	—	—	—	—
M	—	—	—	—	—
O	—	—	—	—	—
P	—	—	—	—	—
Q	Vehicle speed output	Instrument cluster	Vehicle is stopped • Inspect by using the wave profile. (See 04–13–8 Inspection Using An Oscilloscope (Reference))	0	• Inspect related harness • Inspect ABS wheel-speed sensor
R	—	—	—	—	—
S	—	—	—	—	—
T	On-board diagnosis	KLN terminal of DLC and DLC-2	—	No need to check	—
U*2	—	DLC	—	No need to check	—
V	On-board diagnosis	TBS terminal of DLC	—	10—14	• Inspect related harness
W	ABS warning light	ABS warning light	Illuminated	Below 0.5	• Inspect related harness
			Not illuminated	Above 1.5	
X	Brake system warning light	Brake system warning light	Illuminated	Below 0.5	• Inspect related harness
			Not illuminated	Above 1.5	
Y	Brake switch	Brake switch	Brake pedal is depressed	10—14	• Inspect related harness
			Brake pedal is released	Below 0.5	
Z	Power supply	Ignition switch	—	B+	• Inspect related harness
AA	Ground	Ground	—	0	• Inspect related harness
AB	Power supply (ABS motor)	Battery	—	B+	• Inspect related harness
AC	Power supply (Solenoid valve)	Battery	—	B+	
AD	Ground	Ground	—	0	• Inspect related harness

*1 : ATX only
*2 : Use this terminal at factory only, not used for inspection and repair at field

Inspection Using An Oscilloscope (Reference)
Wheel speed

- ABS HU/CM terminal:
  RR : A (+) — B (-)
  LR : C (+) — F (-)
  RF : D (+) — G (-)
  LF : E (+) — I (-)
- Oscilloscope setting:
  1 V/DIV (Y), 2 ms/DIV (X), AC range
- Vehicle condition: Driving 30 km/h (18.6 mph)

Note
- As vehicle speed increases, period of wave shortens.
- If there is malfunctioning in the sensor rotor, wave profile warps.

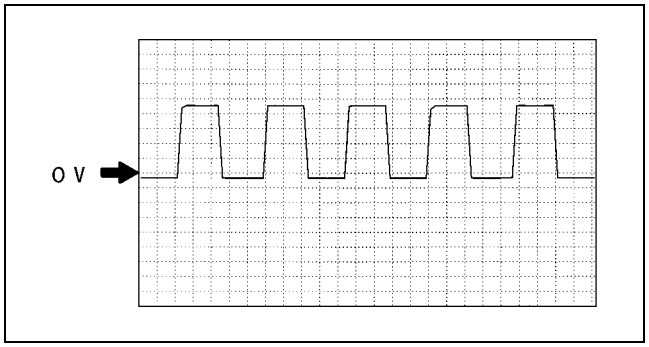


Z3U0413W201

Vehicle speed output (to PCM) (ATX only)

- ABS HU/CM terminal: J (+) — AA (-)
- Oscilloscope setting:
  1 V/DIV (Y), 5 ms/DIV (X), DC range
- Vehicle condition: Driving 30 km/h (18.6 mph)

Note
- As vehicle speed increases, period of wave shortens.

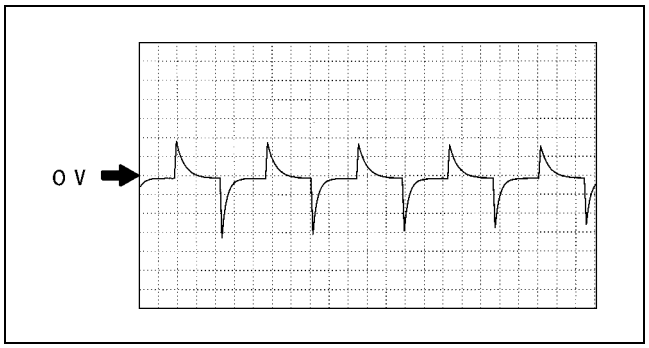


Z3U0413W202

Vehicle speed output (to instrument cluster)

- ABS HU/CM terminal: Q (+) — AA (-)
- Oscilloscope setting:
  1 V/DIV (Y), 5 ms/DIV (X), DC range
- Vehicle condition: Driving 30 km/h (18.6 mph)

Note
- As vehicle speed increases, period of wave shortens.

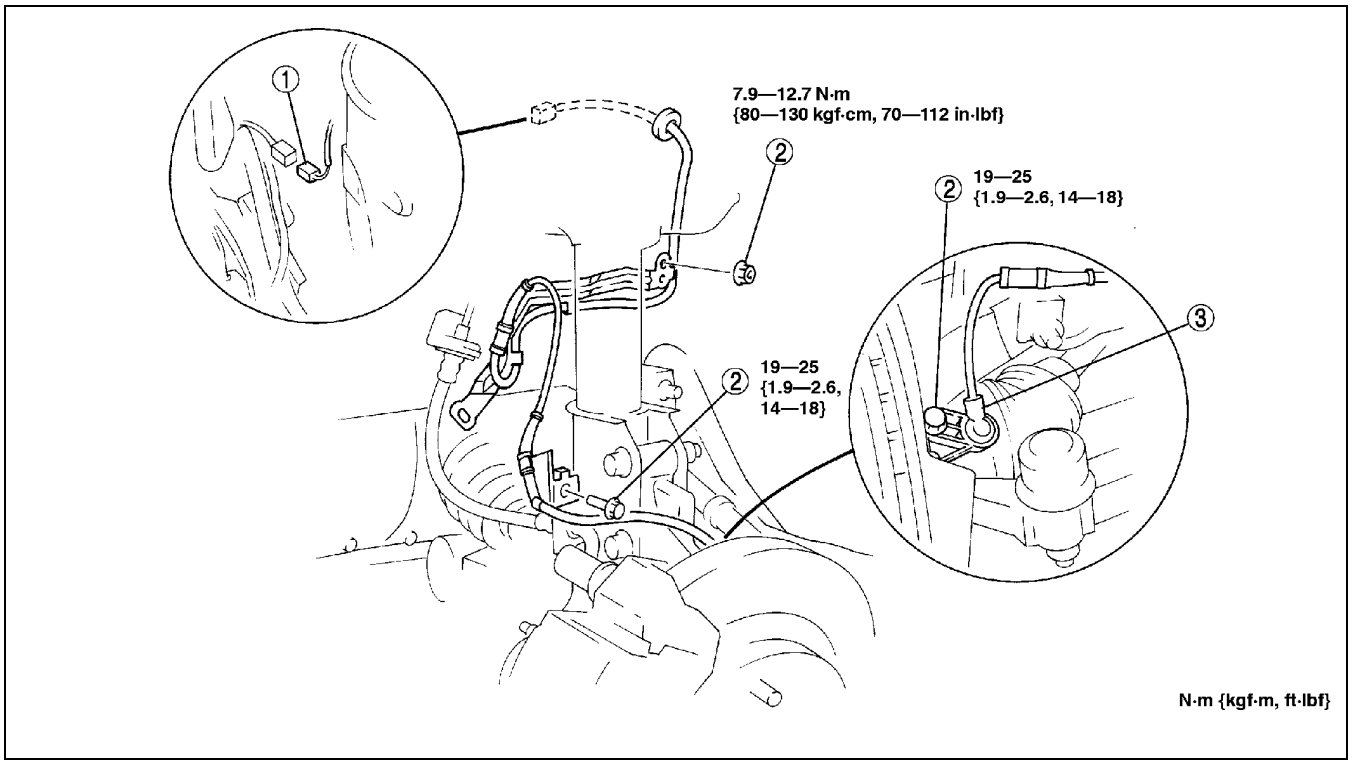


Z3U0413W203

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

A3U041343720W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



X3U413WAB

1	Connector
2	Bolt, nut
3	Front ABS wheel-speed sensor

FRONT/REAR ABS WHEEL-SPEED SENSOR INSPECTION

A3U041343720W02

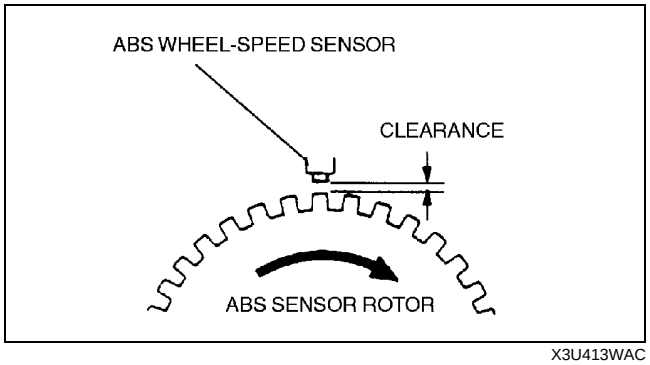
Visual Inspection

1. Remove the wheel and tire, and inspect the sensor for looseness and damage. Replace the sensor if necessary.

Clearance Inspection

1. Inspect the clearance between the wheel-speed sensor and the sensor rotor.

Clearance
0.3—1.1 mm {0.012—0.043 in}



X3U413WAC

Resistance Inspection

1. Disconnect the ABS wheel-speed sensor connector.
2. Inspect the resistance at the ABS wheel-speed sensor.
   - If not as specified, replace the ABS wheel-speed sensor.

Resistance
1.3—1.7 kilohm

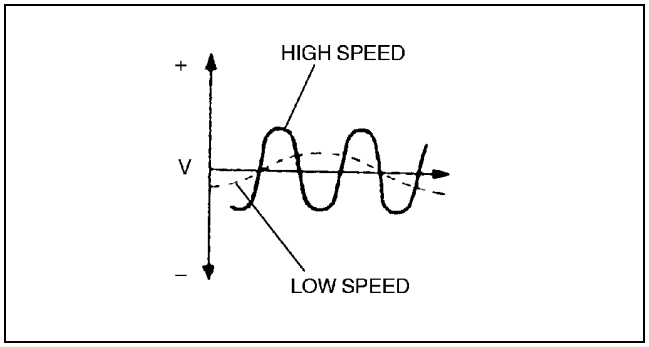
Voltage Inspection

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 sensor by rotating each wheel one revolution per second.
   - If not as specified, replace the ABS wheel-speed sensor.

Voltage
0.25—1.2 V (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.
3. Using an oscilloscope, inspect voltage pattern for distortion and noise by rotating each wheel.
   - If there is distortion or noise, inspect the ABS sensor rotor.

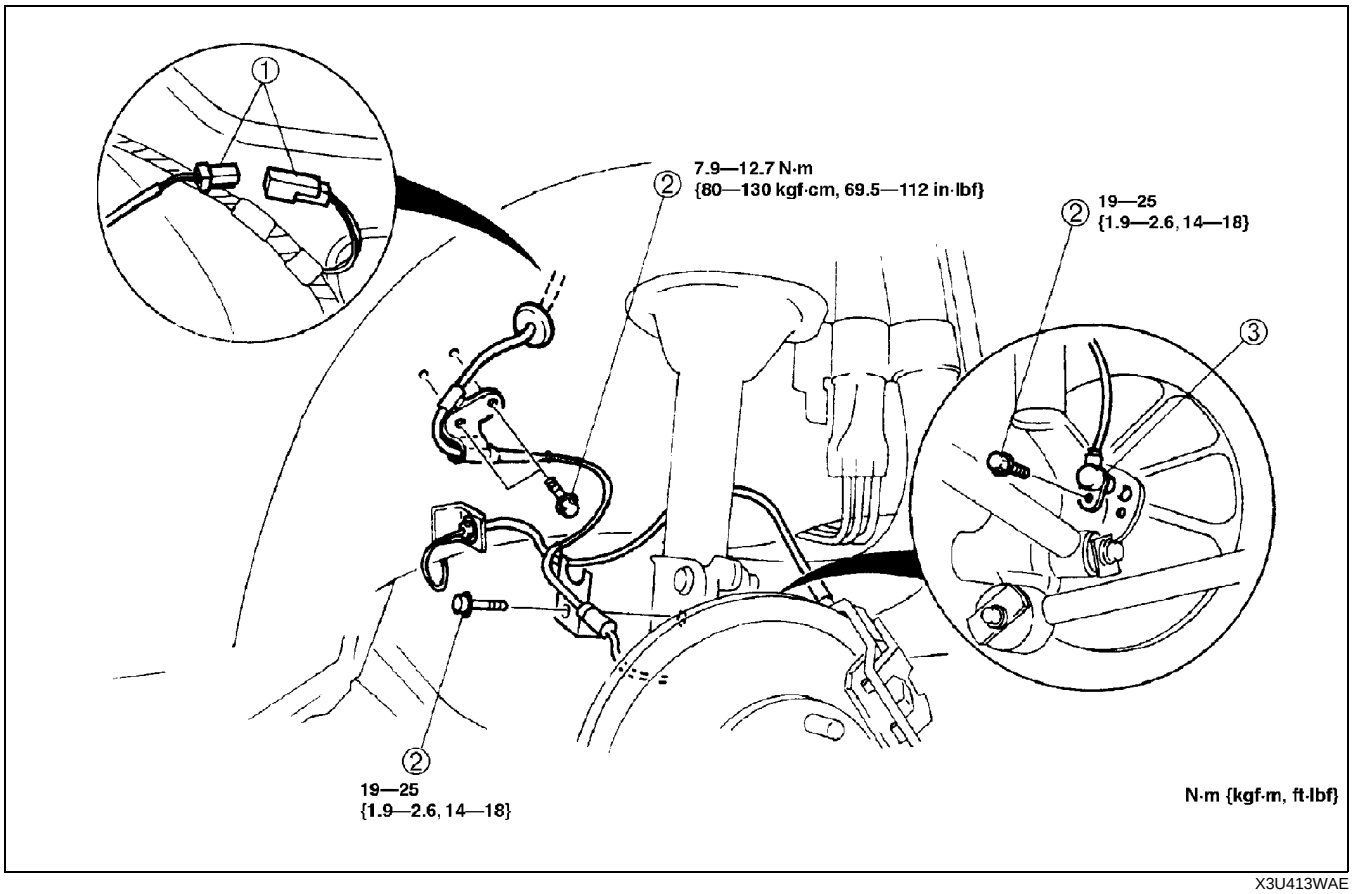


X3U413WAD

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

A3U041343710W01

1. For 4SD, remove the rear seat back. (See 09–13–5 REAR SEAT REMOVAL/INSTALLATION.)
   For 5HB, remove the trunk side trim. (See 09–17–15 5HB.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



X3U413WAE

1	Connector
2	Bolt
3	Rear ABS wheel-speed sensor

04–50 TECHNICAL DATA

BRAKES TECHNICAL DATA

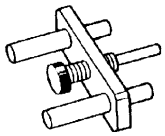
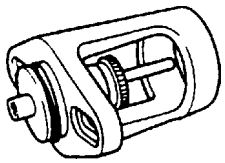
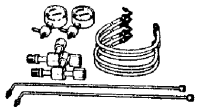
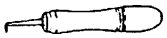
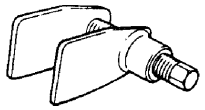
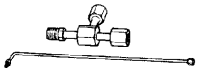
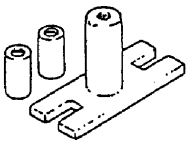
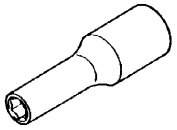
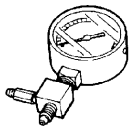
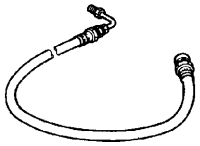
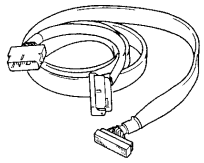
A3U045001020W01

Item			ZM engine	FS engine
CONVENTIONAL BRAKE SYSTEM				
Brake pedal	Brake pedal height (mm {in})		185 {7.28} (reference value)	
	Brake pedal play (mm {in})		4—12 {0.16—0.47}	
	Pedal-to-floor clearance (Brake pedal when depressed at 588 N {60 kgf, 132 lbf}) (mm {in})		88 {3.5} min.	84 {3.3} min.
Power brake unit	Fluid pressure (kPa {kgf/cm^2, psi})	At 0 kPa {0 mmHg, 0 inHg}	650 {7, 94} min.	600 {6, 87} min.
		At 66.7 kPa {500 mmHg, 19.7 inHg}	6,500 {66, 943} min.	7,200 {73, 1,044} min.
Dual proportioning valve (without ABS)	Switching point (kPa {kgf/cm^2, psi})		2,900 {30, 430} ±200 {2, 30}	3,400 {35, 500} ±300 {3, 40}
	Rear wheel pressure when master cylinder pressure is 5900 kPa {60 kgf/cm^2, 850 psi} (kPa {kgf/cm^2, psi})		3,800 {39, 550} ±300 {3, 40}	4,200 {42.5, 600} ±400 {4, 60}
Front disc brake	Minimum disc pad thickness (mm {in})		1.5 {0.059}	2.0 {0.079}
	Minimum disc plate thickness (mm {in})		20 {0.78}	22 {0.87}
	Disc plate runout limit (mm {in})		0.05 {0.002}	
Rear disc brake	Minimum disc pad thickness (mm {in})		—	1.0 {0.039}
	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})		201.5 {7.933}	—
	Minimum lining thickness (mm {in})		1.0 {0.039}	
	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)		5—7	

04–60 SERVICE TOOLS

BRAKES SST

A3U046001020W01

49 0259 770B Flare nut wrench 	49 F043 001 Adjust gauge 	49 B043 001 Adjust gauge 
49 U043 0A0A Oil pressure gauge set 	49 0208 701A Boot air-out tool 	49 0221 600C Disc brake expand tool 
49 U043 005 Joint (Part of 49 U043 0A0A) 	49 E043 003A Turning lock tool 	49 B043 004 Socket wrench 
49 U043 004 Oil pressure gauge (Part of 49 U043 0A0A) 	49 U043 006 Hose (Part of 49 U043 0A0A) 	49 G066 001 Adapter harness 
418FS475 WDS 	—	—

TRANSMISSION/TRANSAXLE

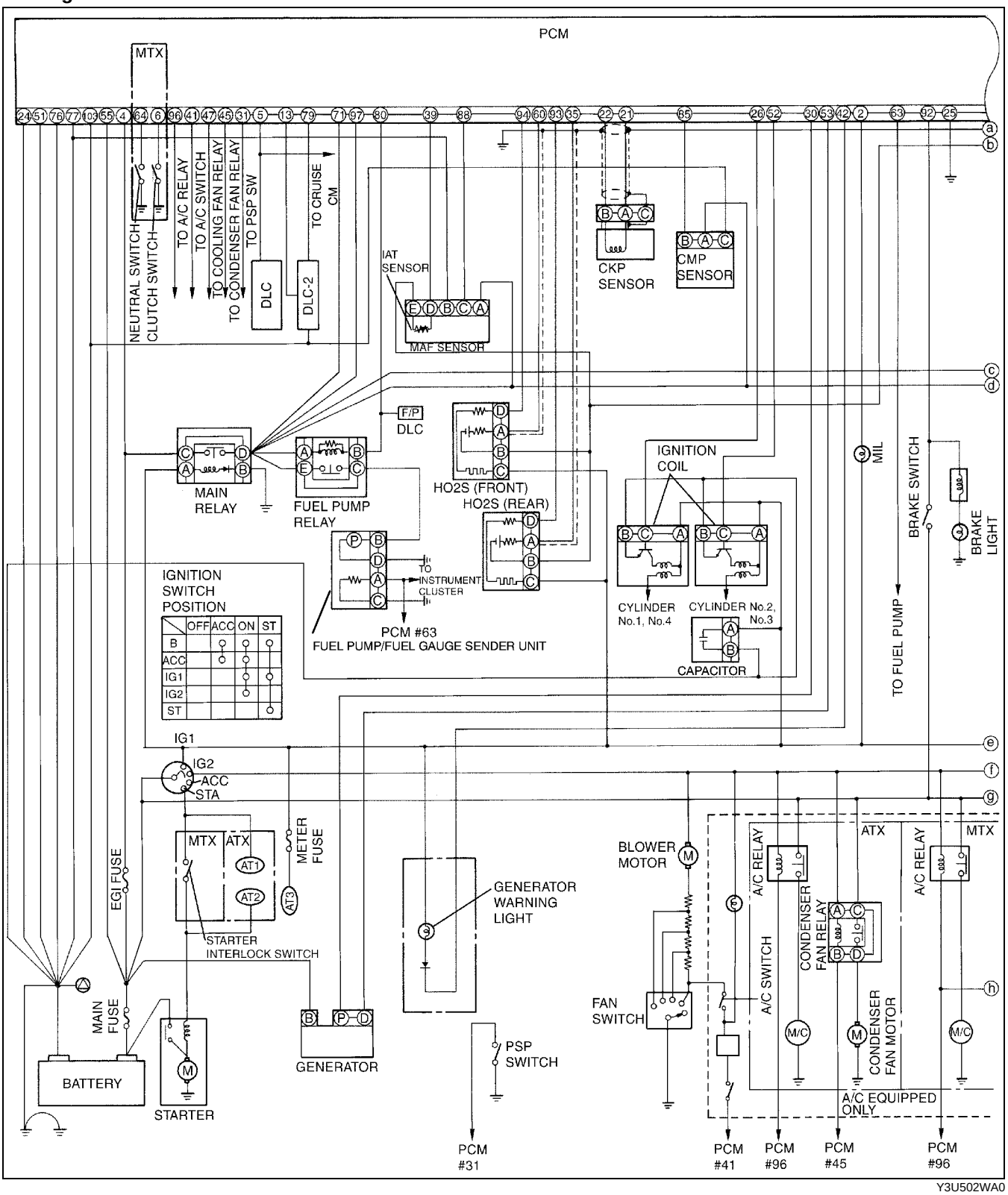
05
SECTION

05–02 ON-BOARD DIAGNOSTIC

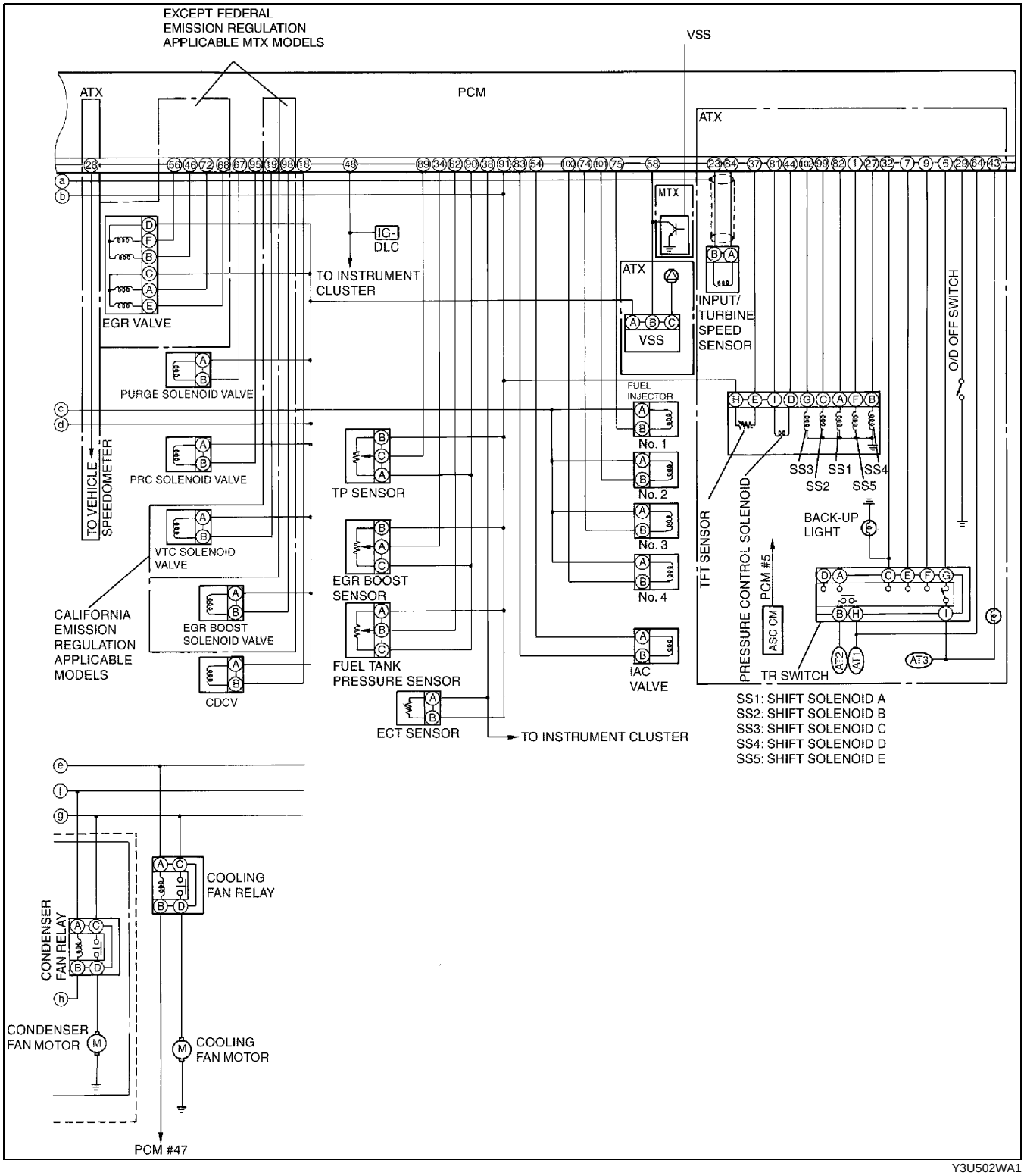
AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM

A3U050201030W01

ZM Engine

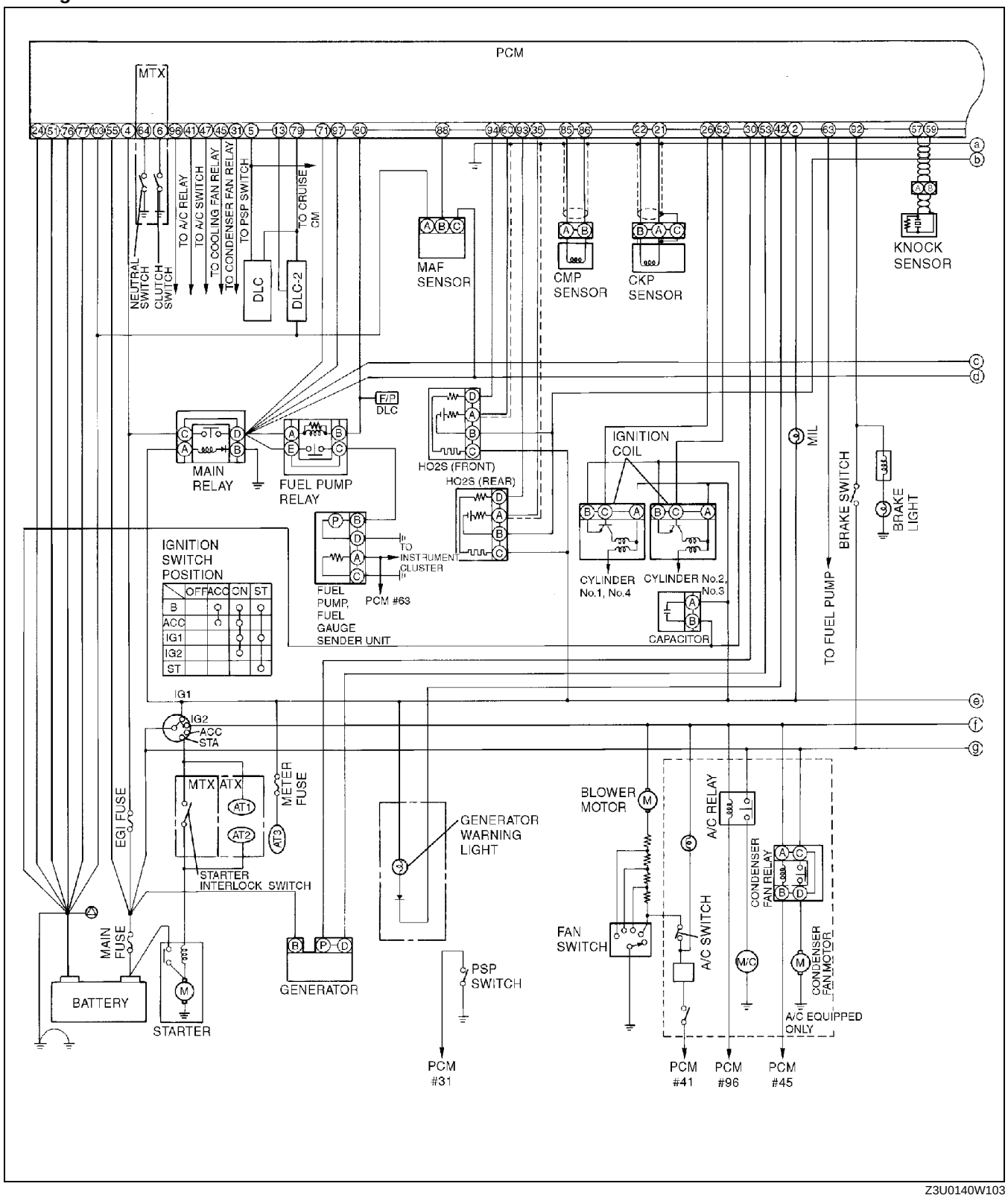


Y3U502WA0

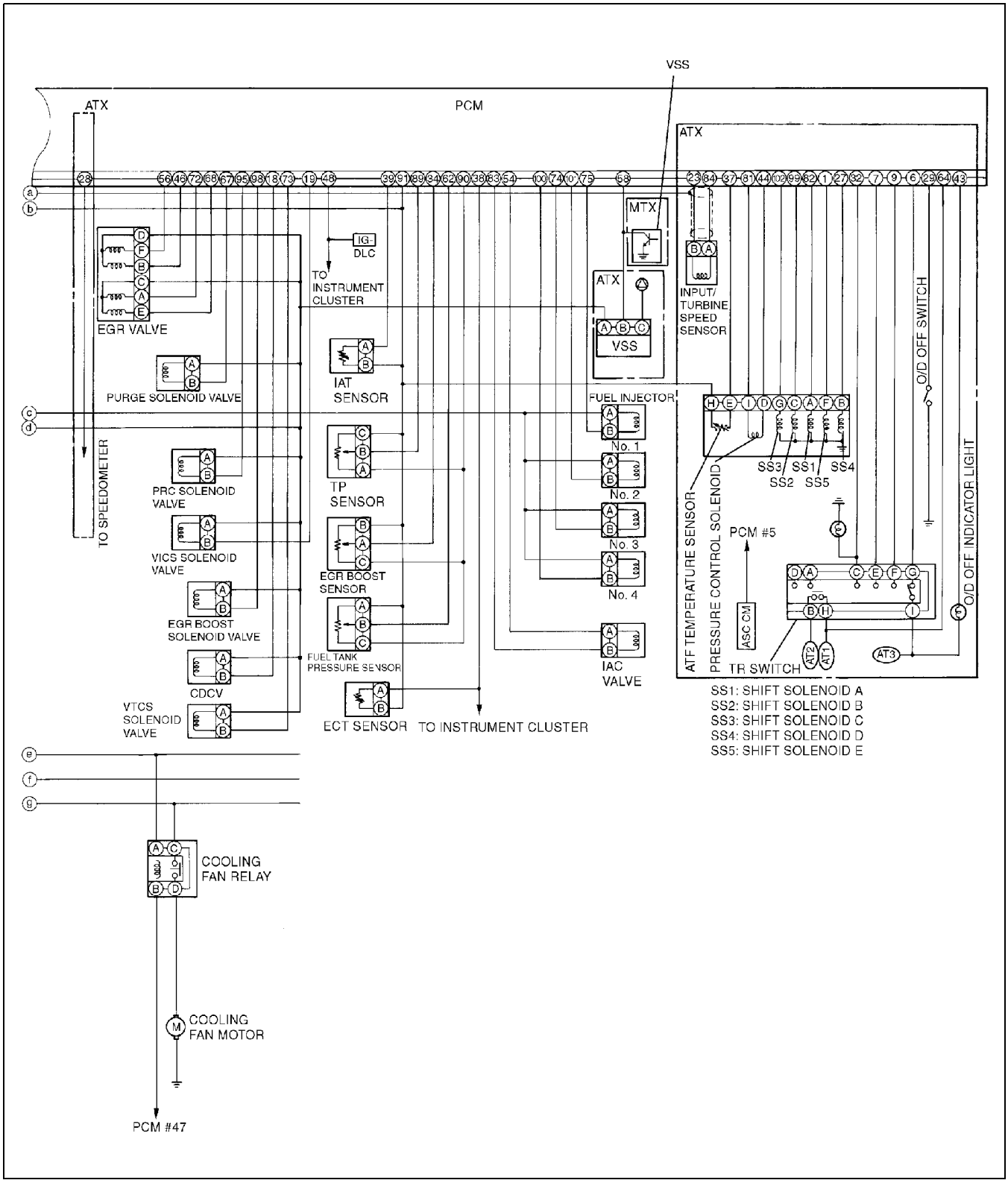

EXCEPT FEDERAL
EMISSION REGULATION
APPLICABLE MTX MODELS
VSS
ATX
PCM
ATX
MTX
IG-DLC
TO INSTRUMENT CLUSTER
ATX
VSS
INPUT/ TURBINE SPEED SENSOR
O/D OFF SWITCH
EGR VALVE
PURGE SOLENOID VALVE
FUEL INJECTOR
No. 1
No. 2
No. 3
No. 4
TO VEHICLE SPEEDOMETER
PRC SOLENOID VALVE
TP SENSOR
SS3
SS1
SS4
SS2
SS5
BACK-UP LIGHT
VTC SOLENOID VALVE
EGR BOOST SENSOR
TFT SENSOR
PRESSURE CONTROL SOLENOID
PCM #5
ASC CM
CALIFORNIA EMISSION REGULATION APPLICABLE MODELS
EGR BOOST SOLENOID VALVE
FUEL TANK PRESSURE SENSOR
IAC VALVE
TR SWITCH
CDCV
ECT SENSOR
TO INSTRUMENT CLUSTER
SS1: SHIFT SOLENOID A
SS2: SHIFT SOLENOID B
SS3: SHIFT SOLENOID C
SS4: SHIFT SOLENOID D
SS5: SHIFT SOLENOID E
COOLING FAN RELAY
CONDENSER FAN RELAY
CONDENSER FAN MOTOR
COOLING FAN MOTOR
PCM #47

Y3U502WA1

FS Engine



Z3U0140W103

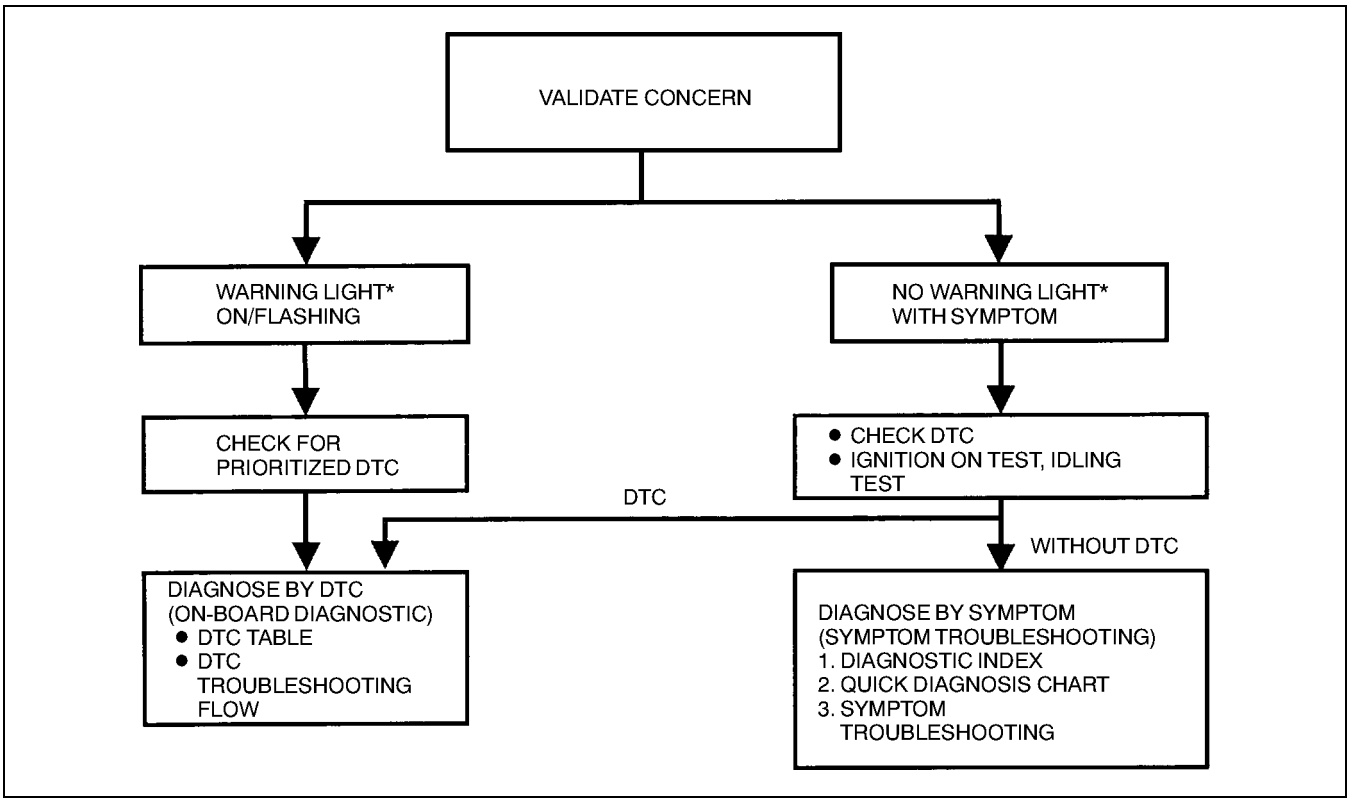


Z3U0140W104

FOREWARD

A3U050201030W02

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL), O/D OFF indicator light flashing, and PCM memory for diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - — If the DTC exists, diagnose the applicable DTC. (See 05–02–7 DTC TABLE.)
  - — If the DTC does not exist, MIL does not illuminate, and O/D OFF indicator light flashes, diagnose the applicable symptom troubleshooting. (See 05–03–7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE.)



YMU102WBX

*:Malfunction indicator lamp (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION

A3U050201030W03

DTC Reading Procedure

(See 01–02A–8 DTCs Retrieving Procedure.)
(See 01–02B–7 DTCs Retrieving Procedure.)

AFTER REPAIR PROCEDURE

A3U050201030W04

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 WDS or equivalent to the DLC-2.
2. Turn the ignition key to ON (engine OFF).
3. Verify that DTCs are cleared from memory.
4. Decrease ATF temperature to **20 °C {68 °F} or below**.
5. Start the engine then wait **180 seconds or more**.
6. Warm up the engine and ATX.
   - Engine coolant temperature: **60 °C {140 °F} or above**.
   - Transaxle fluid temperature: **20 °C {68 °F} or above**.
7. Shift the selector lever between P position to 1 range while depressing brake pedal.
8. Drive the vehicle for **150 seconds or more** at a vehicle speed **between 25 and 59 km/h {15 and 36 mph}**, then **60 km/h {37 mph} or more** for **100 seconds or more**.
9. Drive the vehicle in D range and shift gears between 1st and 4th (TCC operation) gear.
10. Gradually slow down and stop the vehicle.

11. Make sure that the repaired DTC does not recur.

DTC TABLE

A3U050201030W05

DTC No.	Condition	MIL	O/D OFF indicator light flashes	DC	Monitor item	Memory function	Page
P0031	HO2S heater (front) circuit low	(See 01–02A–19 DTC P0031 [ZM]) (See 01–02B–19 DTC P0031 [FS])					
P0032	HO2S heater (front) circuit high	(See 01–02A–20 DTC P0032 [ZM]) (See 01–02B–20 DTC P0032 [FS])					
P0037	HO2S heater (rear) circuit low	(See 01–02A–22 DTC P0037 [ZM]) (See 01–02B–22 DTC P0037 [FS])					
P0038	HO2S heater (rear) circuit high	(See 01–02A–23 DTC P0038 [ZM]) (See 01–02B–23 DTC P0038 [FS])					
P0101	MAF circuit range/performance problem	(See 01–02B–25 DTC P0101 [FS])					
P0102	MAF circuit low input	(See 01–02A–25 DTC P0102 [ZM]) (See 01–02B–27 DTC P0102 [FS])					
P0103	MAF circuit high input	(See 01–02A–28 DTC P0103 [ZM]) (See 01–02B–29 DTC P0103 [FS])					
P0106	BARO circuit performance problem	(See 01–02A–29 DTC P0106 [ZM]) (See 01–02B–30 DTC P0106 [FS])					
P0107	BARO circuit low input	(See 01–02A–31 DTC P0107 [ZM]) (See 01–02B–31 DTC P0107 [FS])					
P0108	BARO circuit high input	(See 01–02A–32 DTC P0108 [ZM]) (See 01–02B–34 DTC P0108 [FS])					
P0111	IAT circuit performance problem	(See 01–02A–34 DTC P0111 [ZM]) (See 01–02B–35 DTC P0111 [FS])					
P0112	IAT circuit low input	(See 01–02A–35 DTC P0112 [ZM]) (See 01–02B–36 DTC P0112 [FS])					
P0113	IAT circuit high input	(See 01–02A–36 DTC P0113 [ZM]) (See 01–02B–38 DTC P0113 [FS])					
P0117	ECT circuit low input	(See 01–02A–39 DTC P0117 [ZM]) (See 01–02B–40 DTC P0117 [FS])					
P0118	ECT circuit high input	(See 01–02A–41 DTC P0118 [ZM]) (See 01–02B–42 DTC P0118 [FS])					
P0121	TP circuit range/performance problem	(See 01–02B–43 DTC P0121 [FS])					
P0122	TP circuit low input	(See 01–02A–42 DTC P0122 [ZM]) (See 01–02B–46 DTC P0122 [FS])					
P0123	TP circuit high input	(See 01–02A–45 DTC P0123 [ZM]) (See 01–02B–47 DTC P0123 [FS])					
P0125	Excessive time to enter closed loop fuel control	(See 01–02A–46 DTC P0125 [ZM]) (See 01–02B–49 DTC P0125 [FS])					
P0126	Coolant thermostat stuck to open	(See 01–02B–50 DTC P0126, P0128 [FS])					
P0128	Coolant thermostat stuck to open	(See 01–02B–50 DTC P0126, P0128 [FS])					
P0130	HO2S (Front) circuit malfunction	(See 01–02A–48 DTC P0130 [ZM])					
P0131	HO2S (Front) no inversion (Low voltage stuck)	(See 01–02B–52 DTC P0131 [FS])					
P0132	HO2S (Front) no inversion (High voltage stuck)	(See 01–02B–55 DTC P0132 [FS])					
P0133	HO2S (Front) circuit malfunction	(See 01–02B–57 DTC P0133 [FS])					
P0134	HO2S (Front) circuit no activity detected	(See 01–02A–50 DTC P0134 [ZM]) (See 01–02B–61 DTC P0134 [FS])					
P0138	HO2S (Rear) circuit high input	(See 01–02A–53 DTC P0138 [ZM]) (See 01–02B–63 DTC P0138 [FS])					
P0140	HO2S (Rear) circuit no activity detected	(See 01–02A–55 DTC P0140 [ZM]) (See 01–02B–64 DTC P0140 [FS])					
P0171	Fuel trim system too lean	(See 01–02A–57 DTC P0171 [ZM]) (See 01–02B–67 DTC P0171 [FS])					
P0172	Fuel trim system too rich	(See 01–02A–60 DTC P0172 [ZM]) (See 01–02B–70 DTC P0172 [FS])					
P0300	Random misfire detected	(See 01–02A–61 DTC P0300 [ZM]) (See 01–02B–71 DTC P0300 [FS])					

DTC No.	Condition	MIL	O/D OFF indicator light flashes	DC	Monitor item	Memory function	Page
P0301	Cylinder 1 misfire detected	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM]) (See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])					
P0302	Cylinder 2 misfire detected	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM]) (See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])					
P0303	Cylinder 3 misfire detected	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM]) (See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])					
P0304	Cylinder 4 misfire detected	(See 01–02A–65 DTC P0301, P0302, P0303, P0304 [ZM]) (See 01–02B–75 DTC P0301, P0302, P0303, P0304 [FS])					
P0325	Knock sensor circuit malfunction	(See 01–02B–77 DTC P0325 [FS])					
P0335	CKP sensor circuit malfunction	(See 01–02A–67 DTC P0335 [ZM]) (See 01–02B–79 DTC P0335 [FS])					
P0340	CMP sensor circuit malfunction	(See 01–02B–80 DTC P0340 [FS])					
P0401	EGR flow insufficient detected	(See 01–02A–69 DTC P0401 [ZM]) (See 01–02B–82 DTC P0401 [FS])					
P0402	EGR flow excessive detected	(See 01–02A–70 DTC P0402 [ZM]) (See 01–02B–83 DTC P0402 [FS])					
P0421	Warm-up catalyst system efficiency below threshold	(See 01–02A–71 DTC P0421 [ZM]) (See 01–02B–84 DTC P0421 [FS])					
P0442	Evaporative emission system leak detected (small leak)	(See 01–02A–72 DTC P0442 [ZM]) (See 01–02B–86 DTC P0442 [FS])					
P0443	Evaporative emission control system purge solenoid valve circuit malfunction	(See 01–02A–75 DTC P0443 [ZM]) (See 01–02B–89 DTC P0443 [FS])					
P0451	Fuel tank pressure sensor performance problem	(See 01–02A–77 DTC P0451 [ZM]) (See 01–02B–90 DTC P0451 [FS])					
P0452	Fuel tank pressure sensor low input	(See 01–02A–78 DTC P0452 [ZM]) (See 01–02B–93 DTC P0452 [FS])					
P0453	Fuel tank pressure sensor high input	(See 01–02A–80 DTC P0453 [ZM]) (See 01–02B–95 DTC P0453 [FS])					
P0455	Evaporative emission control system leak detected (blockage or large leak)	(See 01–02A–83 DTC P0455 [ZM]) (See 01–02B–97 DTC P0455 [FS])					
P0456	Evaporative emission control system leak detected (very small leak)	(See 01–02B–102 DTC P0456 [FS])					
P0461	Fuel gauge sender unit circuit range/ performance	(See 01–02A–87 DTC P0461 [ZM]) (See 01–02B–104 DTC P0461 [FS])					
P0462	Fuel gauge sender unit circuit low input	(See 01–02A–88 DTC P0462 [ZM]) (See 01–02B–105 DTC P0462 [FS])					
P0463	Fuel gauge sender unit circuit high input	(See 01–02A–90 DTC P0463 [ZM]) (See 01–02B–107 DTC P0463 [FS])					
P0464	Fuel gauge sender unit circuit performance (slosh check)	(See 01–02A–91 DTC P0464 [ZM]) (See 01–02B–108 DTC P0464 [FS])					
P0480	Cooling fan relay malfunction	(See 01–02A–92 DTC P0480 [ZM]) (See 01–02B–109 DTC P0480 [FS])					
P0500	VSS circuit malfunction (MTX)	(See 01–02A–94 DTC P0500 [ZM]) (See 01–02B–111 DTC P0500 [FS])					
	VSS circuit malfunction (ATX)	ON	YES	2	CCM	×	(See 05–02–10 DTC P0500)
P0505	IAC valve circuit malfunction	(See 01–02B–113 DTC P0505 [FS])					
P0506	Idle control system RPM lower than expected	(See 01–02A–96 DTC P0506 [ZM]) (See 01–02B–115 DTC P0506 [FS])					
P0507	Idle control system RPM higher than expected	(See 01–02A–97 DTC P0507 [ZM]) (See 01–02B–117 DTC P0507 [FS])					
P0550	PSP switch circuit malfunction	(See 01–02A–99 DTC P0550 [ZM]) (See 01–02B–118 DTC P0550 [FS])					
P0660	VICS solenoid valve circuit malfunction	(See 01–02B–119 DTC P0660 [FS])					
P0703	Brake switch input malfunction	(See 01–02A–100 DTC P0703 [ZM]) (See 01–02B–122 DTC P0703 [FS])					
P0704	Clutch switch input circuit malfunction (MTX)	(See 01–02A–102 DTC P0704 [ZM]) (See 01–02B–123 DTC P0704 [FS])					

DTC No.	Condition	MIL	O/D OFF indicator light flashes	DC	Monitor item	Memory function	Page
P0705	Neutral switch input circuit malfunction (MTX)	(See 01–02A–104 DTC P0705 [ZM]) (See 01–02B–125 DTC P0705 [FS])					
	Transaxle range (TR) switch circuit malfunction (Short circuit) (ATX)	ON	YES	1	CCM	×	(See 05–02–14 DTC P0705)
P0706	Transaxle range (TR) switch circuit malfunction (Open circuit)	ON	YES	2	CCM	×	(See 05–02–16 DTC P0706)
P0710	Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground/open circuit)	ON	YES	1	CCM	×	(See 05–02–18 DTC P0710)
P0711	Transaxle fluid temperature (TFT) sensor circuit malfunction (Stuck)	ON	NO	2	CCM	×	(See 05–02–21 DTC P0711)
P0715	Input/turbine speed sensor circuit malfunction	ON	YES	1	CCM	×	(See 05–02–22 DTC P0715)
P0731	Gear 1 incorrect (Incorrect Gear Ratio Detected)	OFF	YES	1	CCM	×	(See 05–02–24 DTC P0731)
P0732	Gear 2 incorrect (Incorrect Gear Ratio Detected)	OFF	YES	1	CCM	×	(See 05–02–26 DTC P0732)
P0733	Gear 3 incorrect (Incorrect Gear Ratio Detected)	OFF	YES	1	CCM	×	(See 05–02–28 DTC P0733)
P0734	Gear 4 incorrect (Incorrect Gear Ratio Detected)	OFF	YES	1	CCM	×	(See 05–02–30 DTC P0734)
P0741	Torque converter clutch (TCC) (stuck OFF)	OFF	YES	1	CCM	×	(See 05–02–32 DTC P0741)
P0742	Torque converter clutch (TCC) (stuck ON)	OFF	YES	1	CCM	×	(See 05–02–33 DTC P0742)
P0745	Pressure control solenoid malfunction	OFF	YES	1	CCM	×	(See 05–02–36 DTC P0745)
P0751	Shift solenoid A stuck OFF	ON	YES	2	CCM	×	(See 05–02–38 DTC P0751)
P0752	Shift solenoid A stuck ON	ON	YES	2	CCM	×	(See 05–02–40 DTC P0752)
P0753	Shift solenoid A malfunction (electrical)	ON	YES	1	CCM	×	(See 05–02–42 DTC P0753)
P0756	Shift solenoid B stuck OFF	ON	YES	2	CCM	×	(See 05–02–44 DTC P0756)
P0757	Shift solenoid B stuck ON	ON	YES	2	CCM	×	(See 05–02–46 DTC P0757)
P0758	Shift solenoid B malfunction (electrical)	ON	YES	1	CCM	×	(See 05–02–48 DTC P0758)
P0761	Shift solenoid C stuck OFF	ON	YES	2	CCM	×	(See 05–02–50 DTC P0761)
P0762	Shift solenoid C stuck ON	ON	YES	2	CCM	×	(See 05–02–52 DTC P0762)
P0763	Shift solenoid C malfunction (electrical)	ON	YES	1	CCM	×	(See 05–02–54 DTC P0763)
P0766	Shift solenoid D stuck OFF	ON	YES	2	CCM	×	(See 05–02–56 DTC P0766)
P0767	Shift solenoid D stuck ON	ON	YES	2	CCM	×	(See 05–02–58 DTC P0767.)
P0768	Shift solenoid D malfunction (electrical)	ON	YES	1	CCM	×	(See 05–02–60 DTC P0768)
P0771	Shift solenoid E stuck OFF	ON	YES	2	CCM	×	(See 05–02–62 DTC P0771)
P0772	Shift solenoid E stuck ON	ON	YES	2	CCM	×	(See 05–02–64 DTC P0772)
P0773	Shift solenoid E malfunction (electrical)	ON	YES	1	CCM	×	(See 05–02–66 DTC P0773)
P1102	MAF sensor inconsistent with TP sensor (Lower than expected)	(See 01–02A–106 DTC P1102 [ZM])					

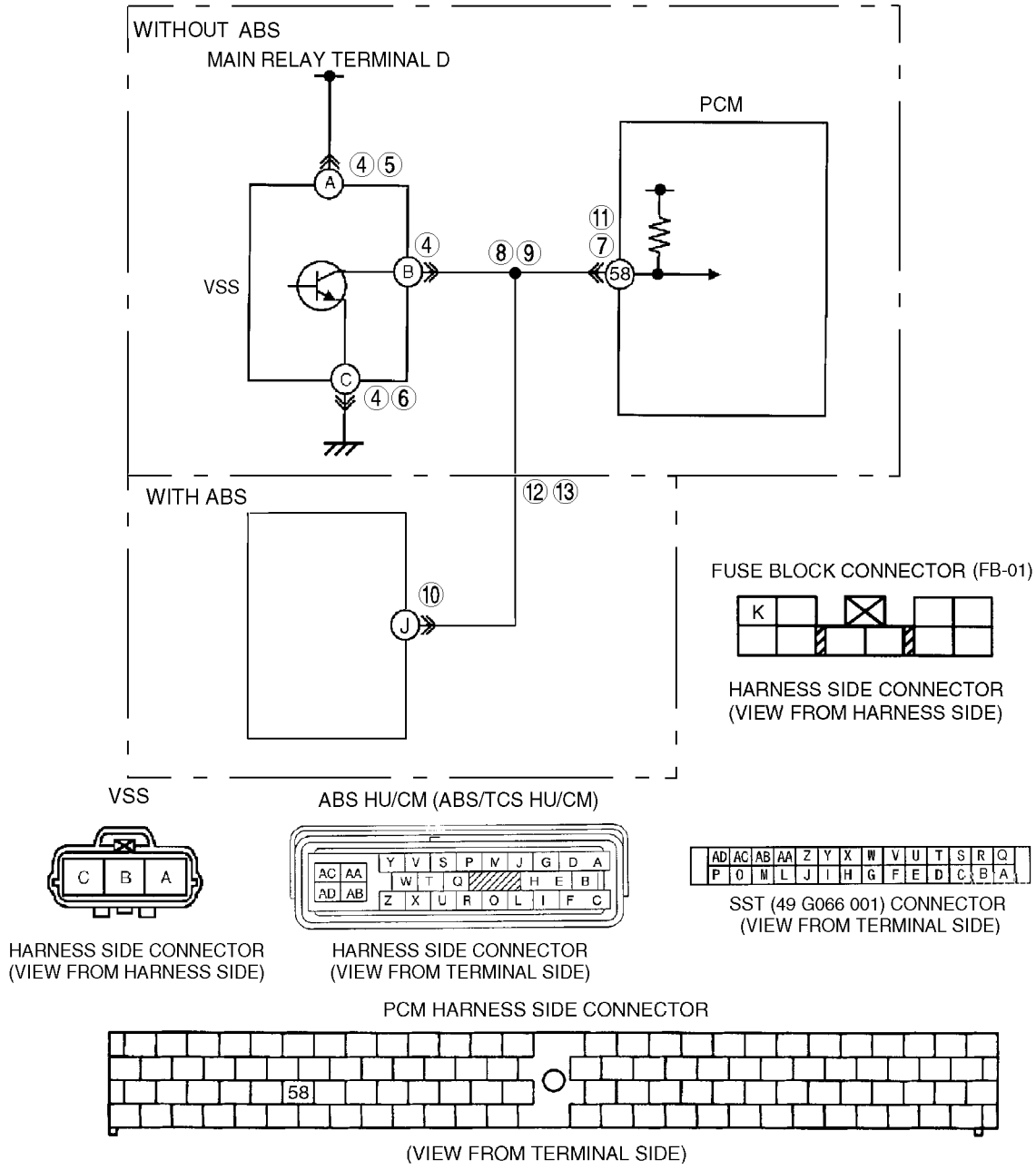
DTC No.	Condition	MIL	O/D OFF indicator light flashes	DC	Monitor item	Memory function	Page
P1103	Mass air flow inconsistent with engine speed (Greater than expected)	(See 01–02A–107 DTC P1103 [ZM])					
P1122	Throttle position stuck closed (lower than expected)	(See 01–02A–108 DTC P1122 [ZM])					
P1123	Throttle position stuck open (higher than expected)	(See 01–02A–110 DTC P1123 [ZM])					
P1170	HO2S (front) no inversion	(See 01–02A–111 DTC P1170 [ZM])					
P1250	PRC solenoid valve circuit malfunction	(See 01–02A–114 DTC P1250 [ZM]) (See 01–02B–127 DTC P1250 [FS])					
P1345	CMP sensor circuit malfunction	(See 01–02A–116 DTC P1345 [ZM])					
P1449	CDCV circuit malfunction	(See 01–02A–118 DTC P1449 [ZM]) (See 01–02B–129 DTC P1449 [FS])					
P1450	Evaporative emission control system malfunction (excessive vacuum)	(See 01–02A–120 DTC P1450 [ZM]) (See 01–02B–131 DTC P1450 [FS])					
P1487	EGR boost sensor solenoid valve circuit malfunction	(See 01–02A–121 DTC P1487 [ZM]) (See 01–02B–133 DTC P1487 [FS])					
P1496	EGR valve stepping motor coil 1 open or short	(See 01–02A–123 DTC P1496 [ZM]) (See 01–02B–135 DTC P1496 [FS])					
P1497	EGR valve stepping motor coil 2 open or short	(See 01–02A–125 DTC P1497 [ZM]) (See 01–02B–137 DTC P1497 [FS])					
P1498	EGR valve stepping motor coil 3 open or short	(See 01–02A–127 DTC P1498 [ZM]) (See 01–02B–139 DTC P1498 [FS])					
P1499	EGR valve stepping motor coil 4 open or short	(See 01–02A–129 DTC P1499 [ZM]) (See 01–02B–141 DTC P1499 [FS])					
P1504	IAC valve circuit malfunction	(See 01–02A–131 DTC P1504 [ZM])					
P1512	VTCS shutter valve close stuck	(See 01–02A–134 DTC P1512 [ZM]) (See 01–02B–143 DTC P1512 [FS])					
P1562	PCM +BB voltage low	(See 01–02A–135 DTC P1562 [ZM]) (See 01–02B–144 DTC P1562 [FS])					
P1569	VTCS solenoid valve circuit low input	(See 01–02A–137 DTC P1569 [ZM]) (See 01–02B–146 DTC P1569 [FS])					
P1570	VTCS solenoid valve circuit high input	(See 01–02A–139 DTC P1570 [ZM]) (See 01–02B–148 DTC P1570 [FS])					
P1631	Generator output voltage signal no electricity	(See 01–02A–141 DTC P1631 [ZM]) (See 01–02B–150 DTC P1631 [FS])					
P1632	Battery voltage monitor signal circuit malfunction	(See 01–02A–143 DTC P1632 [ZM]) (See 01–02B–152 DTC P1632 [FS])					
P1633	Battery overcharge	(See 01–02A–144 DTC P1633 [ZM]) (See 01–02B–153 DTC P1633 [FS])					
P1634	Generator terminal B circuit open	(See 01–02A–145 DTC P1634 [ZM]) (See 01–02B–154 DTC P1634 [FS])					

DTC P0500

A3U050201030W06

DTC P0500	Vehicle speed sensor (VSS) malfunction
DETECTION CONDITION	• Vehicle speed signal not input after following conditions are met and **4.5 seconds or more** have passed — D, 2, or 1 range switch ON. — P and N position of TR switch OFF. — Engine coolant temperature **60 °C {140 °F} or above**. — Turbine speed **1,500 rpm or above**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.

DTC P0500	Vehicle speed sensor (VSS) malfunction
POSSIBLE CAUSE	**Without ABS:** • VSS malfunction • Open circuit between VSS terminal B and PCM terminal 58 • Short to ground between VSS terminal B and PCM terminal 58 • Open circuit between VSS terminal A and fuse block connector (FB-01) terminal K • Open circuit between VSS terminal C and body ground • Damaged connectors between VSS and PCM • PCM malfunction **With ABS:** • ABS HU/CM malfunction • Open circuit between ABS HU/CM terminal J and PCM terminal 58 • Short to ground between ABS HU/CM terminal J and PCM terminal 58 • Damaged connectors between ABS HU/CM and PCM • PCM malfunction



Diagnostic procedure

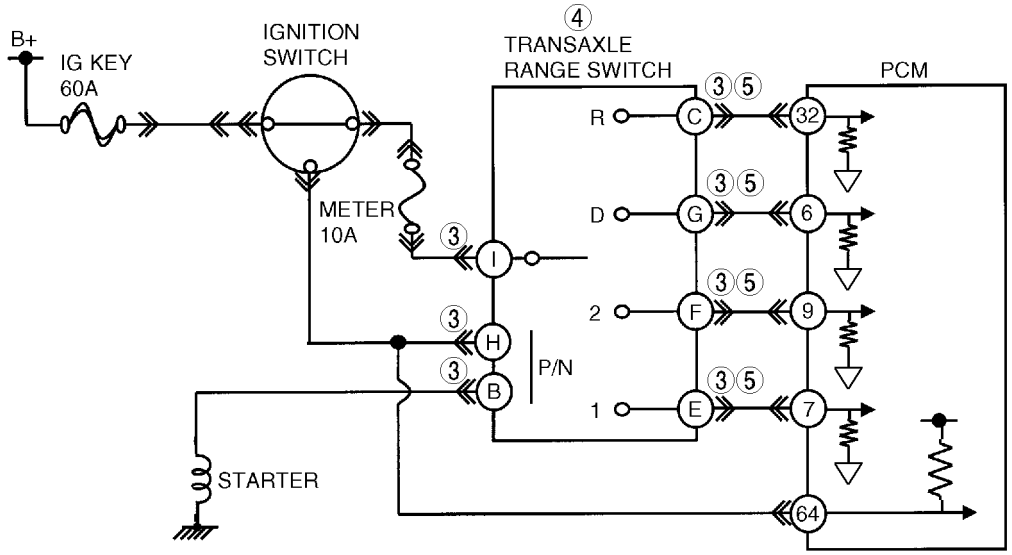
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 VEHICLE SPECIFICATION** • Verify vehicle specification (With ABS, or without ABS). • Go to appropriate step.		• With ABS: Go to Step 10. • Without ABS: Go to next step
4	**INSPECT VSS CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect VSS connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace pin or connector, then go to Step 14.
5	**INSPECT VSS POWER CIRCUIT FOR OPEN CIRCUIT** • Verify that VSS connector is disconnected. • Turn ignition key to ON (Engine OFF). • Check voltage between VSS terminal A (harness-side) and ground • Is voltage reading **B+**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 14.
6	**INSPECT VSS GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Verify that VSS connector is disconnected. • Check for continuity between VSS terminal C (harness-side) and ground • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 14.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 pin or connector, then go to Step 14.
8	**INSPECT VEHICLE SPEED SIGNAL CIRCUIT FOR OPEN** • Disconnect PCM connector and VSS connector. • Inspect for continuity between VSS terminal B and PCM terminal 58. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 14.
9	**INSPECT VEHICLE SPEED SIGNAL CIRCUIT FOR SHORT TO GROUND** • Verity that VSS connector and PCM connector are disconnected. • Inspect for continuity between PCM terminal 58 and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 14.
		No	Repair VSS, then go to Step 14.
10	**INSPECT ABS HU/CM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ABS HU/CM connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace pin or connector, then go to Step 14.
11	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 pin or connector, then go to Step 14.

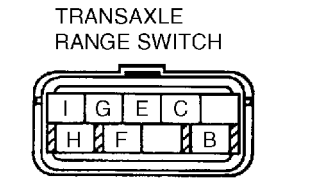
STEP	INSPECTION		ACTION
12	**INSPECT VEHICLE SPEED SIGNAL CIRCUIT FOR OPEN** • Disconnect PCM connector and ABS HU/CM connector. • Connect **SST** to ABS HU/CM vehicle harness side connector (Do not connect to ABS HU/CM). • Inspect for continuity between VSS terminal J and PCM terminal 58. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 14.
13	**INSPECT VEHICLE SPEED SIGNAL CIRCUIT FOR SHORT TO GROUND** • Verity that ABS HU/CM connector and PCM connector are disconnected. • Inspect for continuity between PCM terminal 58 and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 14.
		No	Inspect ABS HU/CM, then go to Step 14.
14	**VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Warm up engine. • Drive vehicle under following conditions for **4.5 seconds** or more while monitoring PIDs. — Engine coolant temp: **60 °C {140 °F} or above** — Drive in 1 range — Frequency of input/turbine speed sensor: **800 Hz** • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0705

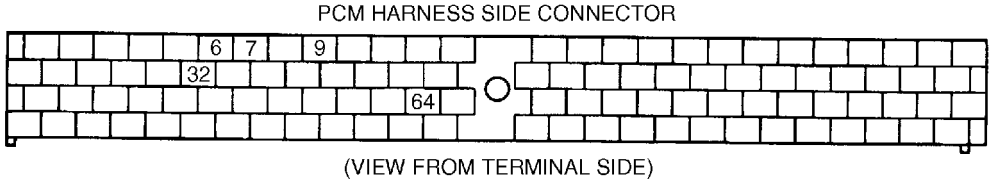
A3U050201030W07

DTC P0705	Transaxle range (TR) switch circuit malfunction (short circuit)
DETECTION CONDITION	• When all conditions below satisfied and **100 seconds or more** have passed: — Any of D, 2 or 1 range of TR switch ON. — Engine speed **530 rpm or above**. — P/N position or R position of TR switch 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 flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• TR switch malfunction • Short to power between TR switch terminal C and PCM terminal 32 • Short to power between TR switch terminal G and PCM terminal 6 • Short to power between TR switch terminal F and PCM terminal 9 • Short to power between TR switch terminal E and PCM terminal 7 • Damaged connector between TR switch and PCM • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



(VIEW FROM TERMINAL SIDE)

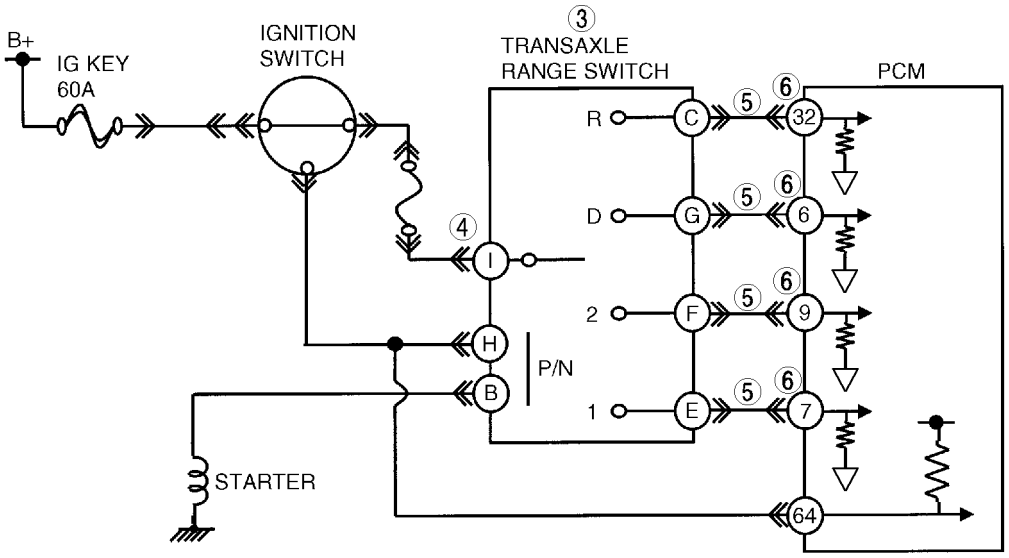
Diagnostic procedure

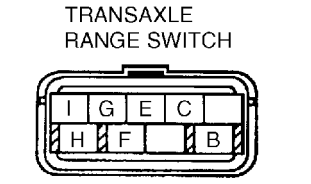
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 TR SWITCH CONNECTOR** • Turn ignition key OFF. • Disconnect TR switch connector. • Inspect for bent terminals of pins using mirror. • Are TR switch terminals okay?	Yes	Go to next step.
		No	Repair terminals or replace TR switch, then go to Step 6. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION.)
4	**INSPECT TR SWITCH CONTINUITY** • Turn ignition key to OFF. • Disconnect TR switch connector. • Is there continuity between TR switch terminals (part-side)? (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	Yes	Go to next step.
		No	Replace TR switch, then go to Step 6. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION.)
5	**INSPECT TR SWITCH CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Measure voltage at TR switch terminals C, E, F and G (harness-side). • Is there **0 V** at TR switch harness side connector?	Yes	Go to next step.
		No	Repair or replace wiring, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0705 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Run engine at **530 rpm or above**. • Drive vehicle in each range (D, 2, and 1) at engine speed **530 rpm or above** (VSS PID) for **100 seconds or more**. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

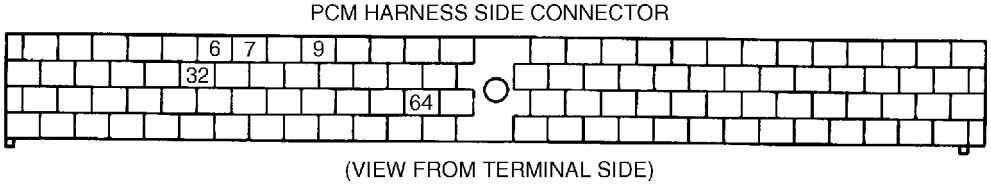
DTC P0706

A3U050201030W08

DTC P0706	Transaxle range (TR) switch circuit malfunction (open circuit)
DETECTION CONDITION	• When all conditions below satisfied and **100 seconds or more** have passed. — D, 2, 1range and R range switch not input. — Engine speed **530 rpm or above**. — Vehicle speed **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 two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Charging system malfunction • TR switch malfunction • TR switch misadjustment • Open circuit between TR switch terminal G and PCM terminal 6 • Open circuit between TR switch terminal F and PCM terminal 9 • Open circuit between TR switch terminal E and PCM terminal 7 • Open circuit between TR switch terminal I and dash harness (JB-04) terminals • Damaged connectors between TR switch and PCM • PCM malfunction







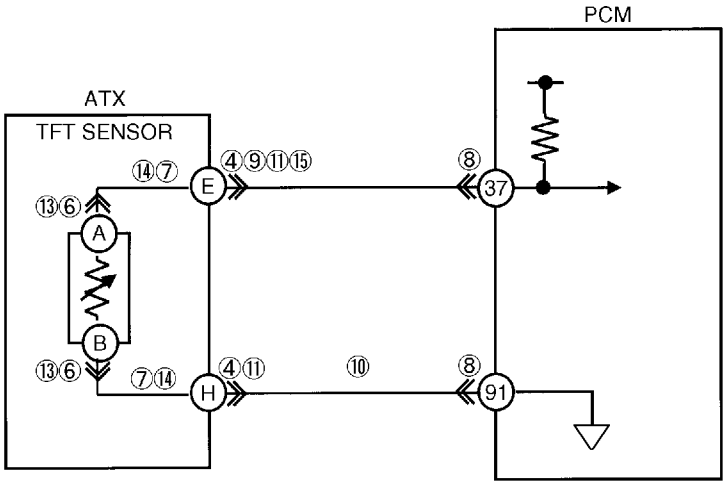
Diagnostic procedure

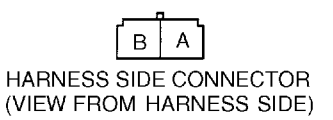
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 TR SWITCH FOR OPEN** • Turn ignition key to OFF. • Disconnect TR switch connector. • Inspect for continuity between TR switch terminals (part-side). — D range: I and G — 2 range: I and F — 1 range: I and E — R range: I and C • Is there continuity between TR switch terminals (part-side)? (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	Yes	Go to next step.
		No	Replace TR switch, then go to Step 7. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION.)
4	**INSPECT TR SWITCH POWER CIRCUIT FOR OPEN** • Turn ignition key to ON. • Inspect voltage at TR switch terminal I (harness-side). • Is there **B+** at TR switch terminal I (harness-side)?	Yes	Go to next step.
		No	Inspect main fuse. • If okay, repair or replace wiring, then go to Step 7.
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 7.
6	**INSPECT TR SWITCH SIGNAL CIRCUIT FOR OPEN** • Inspect for continuity between TR switch terminals (harness-side) and PCM terminals (harness-side). — D range: G to 6 — 2 range: F to 9 — 1 range: E to 7 — R range: C to 32 • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0706 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in each range (D, 2, 1, and R) for **100 seconds or more** under following conditions. — Engine speed (RPM PID) **530 rpm or above** — Vehicle speed (VSS PID) **20 km/h {12 mph} or above** • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0710

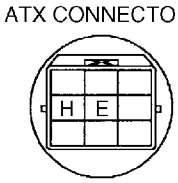
A3U050201030W09

DTC P0710	Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• If PCM detects either of following conditions for **150 seconds or more**, PCM determines that TFT sensor circuit has a malfunction. — TFT sensor voltage is **0.06 V or below** and vehicle speed **20 km/h {12 mph} or above**. — TFT sensor voltage is **4.67 V or above** and vehicle speed **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 flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • Open circuit between TFT sensor terminal A and ATX connector terminal E • Short to ground between TFT sensor terminal A and ATX connector terminal E • Open circuit between TFT sensor terminal B and ATX connector terminal H • Short to ground between TFT sensor terminal B and ATX connector terminal H • Open circuit between ATX connector terminal E and PCM terminal 37 • Short to ground between ATX connector terminal E and PCM terminal 37 • Open circuit between ATX connector terminal H and PCM terminal 91 • Damaged connectors between TFT sensor and PCM • PCM malfunction

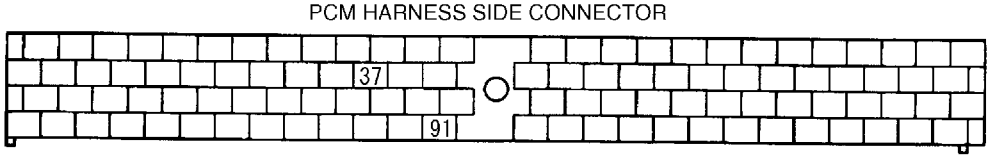




HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



(VIEW FROM TERMINAL SIDE)

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 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** • Turn ignition key to OFF. • Connect breakout box to PCM. • Turn ignition key to ON (engine OFF). • Measure the voltage at PCM terminal 37. • Are voltage readings **within 0.06—4.67 V**?	Yes	Go to intermittent concern troubleshooting procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].) (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Voltage **0.06 V or below**: go to Step 11. Voltage **4.67 V or above**: go to next step.
4	**INSPECT ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Inspect ATX connector connection. • Disconnect ATX 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 16.
5	**INSPECT TFT SENSOR CIRCUIT** • Turn ignition key to ON (engine OFF). • Measure the voltage at PCM terminal 37 when connect between ATX connector terminals E and H (vehicle harness-side) using jumper wire. • Verify that voltage changes to **0.06 V or below**. • Does voltage change?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT TFT SENSOR CONNECTOR FOR POOR 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 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)
7	**INSPECT TFT SENSOR CIRCUIT FOR OPEN** • Check for continuity between TFT sensor terminals (harness-side) and ATX connector terminals (transaxle case side). — ATX connector terminal E and TFT sensor terminal A — ATX connector terminal H and TFT sensor terminal B • Is there continuity?	Yes	Replace TFT sensor, then go to Step 16. (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)
		No	Repair or replace harness, then go to Step 16.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 terminal, then go to Step 16.
9	**INSPECT HARNESS FOR OPEN CIRCUIT** • Disconnect ATX connector. • Connect the PCM connector. • Turn ignition key to ON (engine OFF). • Inspect voltage at ATX connector terminal E (vehicle harness-side). • Is voltage **5 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 16.

STEP	INSPECTION		ACTION
10	**INSPECT ATX CONNECTOR CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Inspect continuity between ATX connector terminal H (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 ATX connector. • Inspect for bent terminals. • Are the 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 if voltage changes to **4.67 V or above** at PCM terminal 37 when ATX connector disconnected. • Does voltage 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 the terminals bent?	Yes	Repair terminals or replace TFT sensor, then go to Step 16. (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)
		No	Go to next step.
14	**INSPECT TFT SENSOR CIRCUIT FOR SHORT TO GROUND** • Inspect 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 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)
15	**INSPECT ATX CONNECTOR CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Inspect for continuity between ATX connector terminal E (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 WDS or equivalent. • Drive vehicle under following condition for **150 seconds or more**. — Vehicle speed (VSS PID) **20 km/h {12 mph} or above**. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0711

A3U050201030W10

DTC P0711	Transaxle fluid temperature (TFT) sensor circuit malfunction (stuck)
DETECTION CONDITION	• When all conditions below are satisfied. — When **180 seconds** have passed after engine is started, vehicle is driven for **150 seconds or more** at vehicle speed **between 25 – 59 km/h {15 – 36 mph}**, then **60 km/h {37 mph} or more** for **100 seconds or more**. — P0710 not output. — Variation in ATF voltage **below 0.06 V**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during 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 the PCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • Connector corrosion • PCM malfunction

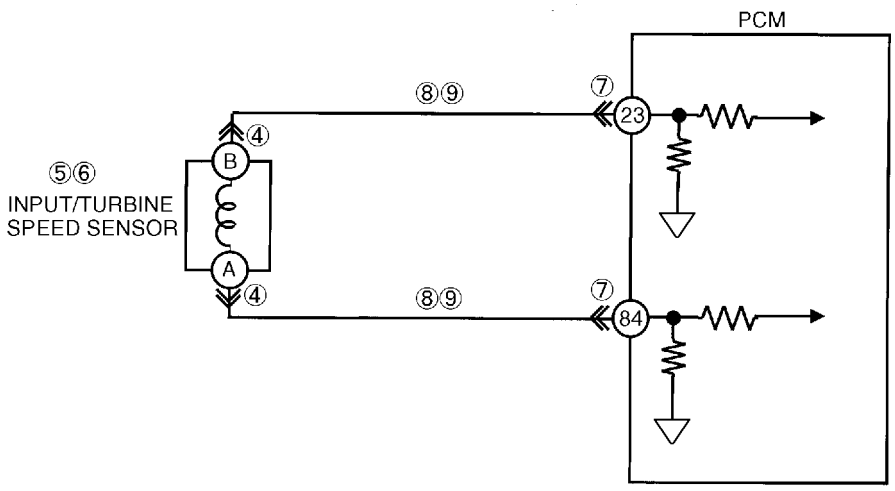
Diagnostic procedure

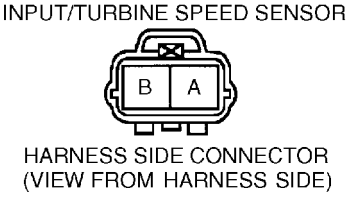
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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** • Turn ignition key to OFF. • Connect breakout box to PCM. • Turn ignition key to ON (engine OFF). • Measure the voltage at PCM terminal 37. • Record terminal 37 voltage. • Start engine. • Drive vehicle at **60 km/h {37 mph} or above** for **430 seconds or more**. • Record terminal 37 voltage again. • Is variation in voltage **0.06V or above**?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT TERMINAL CONDITION** • Turn ignition key to OFF. • Disconnect ATX connector. • Inspect terminals for corrosion. • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace terminals, then go to next step.
5	**VERIFY TROUBLESHOOTING OF DTC P0711 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Decrease ATF temperature to **20 °C {68 °F} or below**. • Start engine and wait for **180 seconds or more**. • Drive vehicle at a vehicle speed **between 25 – 59 km/h {15 – 36 mph}** for **150 seconds or more**. • Drive vehicle at vehicle speed **60 km/h {37 mph} or above** for **100 seconds or more**. • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

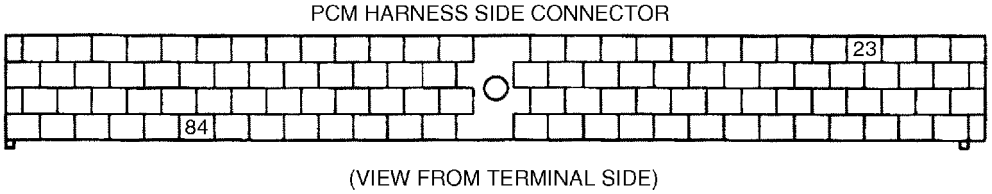
DTC P0715

A3U050201030W11

DTC P0715	Input/turbine speed sensor circuit malfunction
DETECTION CONDITION	• When all conditions below satisfied and **0.7 second or more** have passed. — D, 2 or 1 range of TR switch input. — Driving vehicle with vehicle speed **40 km/h {25 mph} or above**. — Input/turbine speed sensor signal not input. **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	• Input/turbine speed sensor malfunction • Short to ground between input/turbine speed sensor terminal A and PCM terminal 84 • Short to ground between input/turbine speed sensor terminal B and PCM terminal 23 • Open circuit between input/turbine speed sensor terminal A and PCM terminal 84 • Open circuit between input/turbine speed sensor terminal B and PCM terminal 23 • Damaged connectors between input/turbine speed sensor and PCM • PCM malfunction







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 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** • Turn ignition key to OFF. • Start engine. • Measure frequency of input/turbine speed sensor using a oscilloscope. — IG ON: **0 Hz** — Idle: **Within 320—374 Hz** (P, N position) • Are frequency of input/turbine speed sensor readings within specifications?	Yes	Go to intermittent concern troubleshooting procedure. (See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].) (See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)
		No	Go to next step.
4	**INSPECT INPUT/TURBINE SPEED SENSOR CONNECTOR FOR POOR CONNECTION** • 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 connector 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 250—600 ohms** between input/turbine speed sensor terminals (part-side)? (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION.)	Yes	Go to next step.
		No	Replace input/turbine speed sensor, then go to Step 10. (See 05–17–26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION.)
6	**INSPECT INPUT/TURBINE SPEED SENSOR** • Remove input/turbine speed sensor. • Is there iron powder stuck on input/turbine speed sensor? (See 05–17–26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION.)	Yes	Clean input/turbine speed sensor, then go to Step 10.
		No	Go to next step.
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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.
8	**INSPECT INPUT/TURBINE SPEED SENSOR CIRCUIT FOR OPEN** • Inspect input/turbine speed sensor terminals (harness-side) and PCM terminals (harness-side). — A and 84 — B and 23 • 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** • Inspect input/turbine speed sensor terminal (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.

STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P0715 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle with vehicle speed **40 km/h {25 mph} or above** for **0.7 second or more**. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0731

A3U050201030W12

DTC P0731	Gear 1 incorrect (Incorrect Gear Ratio Detected)
DETECTION CONDITION	• PCM monitors revolution ratio of forward clutch drum revolution to differential gear case revolution when the following monitoring conditions are met. If revolution ratio is **below 2.157**, PCM determines that there is malfunction. **Monitoring condition:** — ATF temperature **20 °C {68 °F} or above**. — Driving in 1GR in D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Throttle opening angle **3.13% or above** (FS engine) — Throttle opening angle **3.91% or above** (ZM engine) — Differential gear case (output) revolution speed **35 rpm or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate. • O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is not available. • Pending code is not available. • DTC stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid A stuck • Pressure control solenoid stuck • Line pressure low • One-way clutch slipping • Forward clutch slipping • Control valve stuck • Oil pump • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information.
		No	Go to next step.
2	**CHECK ATF CONDITION** • Check ATF condition. (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace transaxle, then go to Step 8.
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 8.

STEP	INSPECTION		ACTION
4	**INSPECT SHIFT SOLENOID VALVE A** • Perform inspection of operation. (See 05–17–28 SOLENOID VALVES INSPECTION.) • Verify the click sound of shift solenoid A when applying B+ to transaxle connector terminal A. • Was click heard from solenoids?	Yes	Go to next step.
		No	Replace solenoid that you could not hear click sound, then go to Step 8. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressures. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump, then go to Step 8. Any ranges: Replace control valve body, then go to Step 8. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
6	**INSPECT STALL SPEED** • Measure stall speed in D range. (See 05–17–13 Stall Test.) **Specification** **FS engine**: **2,200—2,500 rpm** **ZM engine**: **2,300—2,600 rpm** • Is stall speed within specification?	Yes	Go to next step.
		No	Replace automatic transaxle, then go to Step8. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
7	**INSPECT FREQUENCY OF INPUT/TURBINE SPEED SENSOR WHEN DRIVING VEHICLE** • Turn ignition key to OFF. • Connect WDS or equivalent. • Start engine. • Measure frequency of input/turbine speed sensor while driving vehicle under the following conditions: — Vehicle speed (VSS PID): **20 km/h {12 mph}** — Drive in D range, 1st gear — Throttle opening angle (TP PID): **about 25%** • Was frequency of input/turbine speed sensor at **approx. 1,087 Hz**?	Yes	Go to next step.
		No	Replace control valve body, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
8	**VERIFY REPAIR OF DTC P0731** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • Start engine. • Warm up transaxle. • Drive vehicle under the following conditions for **more than 15 seconds**. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 1st gear — Throttle opening angle (TP PID): **3.13% or above** (FS engine) — Throttle opening angle (TP PID): **3.91% or above** (ZM engine) — Vehicle speed (VSS PID): **4 km/h {3 mph} or above** • Are any DTCs present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0732

A3U050201030W13

DTC P0732	Gear 2 incorrect (Incorrect Gear Ratio Detected)
DETECTION CONDITION	• PCM monitors revolution ratio of forward clutch drum revolution to differential gear case revolution when the following monitoring conditions are met. If revolution ratio is **below 1.249 or above 2.157**, PCM determines that there is malfunction. **Monitoring condition:** — ATF temperature **20 °C {68 °F} or above**. — Driving in 2 GR in D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate. • O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is not available. • Pending code is not available. • DTC stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoids A, B or C stuck • Pressure control solenoid stuck • Line pressure low • 2-4 brake band slipping • Forward clutch slipping • Control valve stuck • Oil pump • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information.
		No	Go to next step.
2	**CHECK ATF CONDITION** • Check ATF condition. (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace transaxle, then go to Step 8.
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 8.
4	**INSPECTION SHIFT SOLENOID VALVE A, B AND C FOR CLICK SOUND** • Perform inspection of operation. (See 05–17–28 SOLENOID VALVES INSPECTION.) • Verify the click sound of shift solenoid A, B, and C when applying B+ to each transaxle connector terminal. • Was click heard from solenoids?	Yes	Go to next step.
		No	Replace solenoid that you could not hear click sound, then go to Step 8. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressures. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump, then go to Step 8. Any ranges: Replace control valve body, then go to Step 8. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
6	**INSPECT STALL SPEED** • Measure stall speed in D range. (See 05–17–13 Stall Test.) **Specification** **FS engine**: **2,200—2,500 rpm** **ZM engine**: **2,300—2,600 rpm** • Is stall speed within specification?	Yes	Go to next step.
		No	Replace automatic transaxle, then go to Step8. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
7	**INSPECT FREQUENCY OF INPUT/TURBINE SPEED SENSOR WHEN DRIVING VEHICLE** • Turn ignition key to OFF. • Connect WDS or equivalent. • Start engine. • Measure frequency of input/turbine speed sensor while driving vehicle under the following conditions: — Vehicle speed: **40 km/h {24 mph}** (VSS PID) — Drive in D range, 2nd gear — Throttle opening angle: **about 25% (TP PID)** • Was frequency of input/turbine speed sensor at **approx. 1,156 Hz**?	Yes	Go to next step.
		No	Replace control valve body, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
8	**VERIFY REPAIR OF DTC P0732** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • Start engine. • Warm up transaxle. • Drive vehicle under the following conditions for **more than 15 seconds**. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 2nd gear — Vehicle speed (VSS PID): **3.8 km/h {2.4 mph} or above** • Are any DTCs present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0733

A3U050201030W14

DTC P0733	Gear 3 incorrect (Incorrect Gear Ratio Detected)
DETECTION CONDITION	• PCM monitors revolution ratio of forward clutch drum revolution to differential gear case revolution when the following monitoring conditions are met. If revolution ratio is **below 0.863 or above 1.249**, PCM determines that there is malfunction. **Monitoring condition:** — ATF temperature **20 °C {68 °F} or above**. — Driving in 3 GR in D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate. • O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is not available. • Pending code is not available. • DTC stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoids A or C stuck • Pressure control solenoid stuck • Line pressure low • 3-4 clutch slipping • Forward clutch slipping • Control valve stuck (Bypass, TCC or 3-4 shift valve) • Oil pump • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information.
		No	Go to next step.
2	**CHECK ATF CONDITION** • Check ATF condition. (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace transaxle, then go to Step 8.
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 8.
4	**INSPECTION SHIFT SOLENOID VALVE A AND C FOR CLICK SOUND** • Perform inspection of operation. (See 05–17–28 SOLENOID VALVES INSPECTION.) • Verify the click sound of shift solenoid A and C when applying B+ to each transaxle connector terminal. • Was click heard from solenoids?	Yes	Go to next step.
		No	Replace solenoid that you could not hear click sound, then go to Step 8. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressures. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump, then go to Step 8. Any ranges: Replace control valve body, then go to Step 8. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
6	**INSPECT STALL SPEED** • Measure stall speed in D range. (See 05–17–13 Stall Test.) **Specification** **FS engine**: **2,200—2,500 rpm** **ZM engine**: **2,300—2,600 rpm** • Is stall speed within specification?	Yes	Go to next step.
		No	Replace automatic transaxle, then go to Step 8. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
7	**INSPECT FREQUENCY OF INPUT/TURBINE SPEED SENSOR WHEN DRIVING VEHICLE** • Turn ignition key to OFF. • Connect WDS or equivalent. • Start engine. • Measure frequency of input/turbine speed sensor while driving vehicle under the following conditions: — Vehicle speed (VSS PID): **60 km/h {37 mph}** — Drive in D range, 3rd gear — Throttle opening angle (TP PID): **about 25%** • Was frequency of input/turbine speed sensor at **approx. 1,158 Hz**?	Yes	Go to next step.
		No	Replace control valve body, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
8	**VERIFY REPAIR OF DTC P0732** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • Start engine. • Warm up transaxle. • Drive vehicle under the following conditions for **more than 15 seconds**. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 3rd gear — Vehicle speed (VSS PID): **4 km/h {3 mph} or above** • Are any DTCs present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0734

A3U050201030W15

DTC P0734	Gear 4 incorrect (Incorrect Gear Ratio Detected)
DETECTION CONDITION	• PCM monitors revolution ratio of forward clutch drum revolution to differential gear case revolution when the following monitoring conditions are met. If revolution ratio is **below 0.6 or above 1.249**, PCM determines that there is malfunction. **Monitoring condition:** — ATF temperature **20 °C {68 °F} or above**. — Driving in 4 GR in D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Vehicle speed **50 km/h {31 mph} or above**. — Closed throttle position. — Differential gear case (output) revolution speed **35 rpm or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate. • O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is not available. • Pending code is not available. • DTC stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoids A, B or C stuck • Pressure control solenoid stuck • Line pressure low • 2-4 brake band slipping • 3-4 clutch slipping • Forward clutch slipping • Control valve stuck (Bypass or 3-4 shift valve) • Oil pump • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information.
		No	Go to next step.
2	**CHECK ATF CONDITION** • Check ATF condition. (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) • Is it okay?	Yes	Go to next step.
		No	Replace transaxle, then go to Step 8.
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 8.
4	**INSPECT SHIFT SOLENOID VALVE A AND D FOR CLICK SOUND** • Perform inspection of operation. (See 05–17–28 SOLENOID VALVES INSPECTION.) • Verify the click sound of shift solenoids A and D when applying B+ to each transaxle connector terminal. **Note** • Click from solenoid D is barely audible. Remove solenoids to correctly inspect if necessary. • Was click heard from solenoids?	Yes	Go to next step.
		No	Replace solenoid that you could not hear click sound, then go to Step 8. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressures. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump, then go to Step 8. Any ranges: Replace control valve body, then go to Step 8. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
6	**INSPECT STALL SPEED** • Measure stall speed in D range. (See 05–17–13 Stall Test.) **Specification** **FS engine**: **2,200—2,500 rpm** **ZM engine**: **2,300—2,600 rpm** • Is stall speed within specification?	Yes	Go to next step.
		No	Replace automatic transaxle, then go to Step 8. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.)
7	**INSPECT FREQUENCY OF INPUT/TURBINE SPEED SENSOR WHEN DRIVING VEHICLE** • Turn ignition key to OFF. • Connect WDS or equivalent. • Start engine. • Measure frequency of input/turbine speed sensor while driving vehicle under the following conditions: — Vehicle speed (VSS PID): **80 km/h {49 mph}** — Drive in D range, 4th gear — Throttle opening angle (TP PID): **about 25%** • Was frequency of input/turbine speed sensor at **approx. 1,120 Hz**?	Yes	Go to next step.
		No	Replace control valve body, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.)
8	**VERIFY REPAIR OF DTC P0732** • Make sure to reconnect all disconnected connectors. • Clear DTC using WDS or equivalent. • Start engine. • Warm up transaxle. • Drive vehicle under the following conditions for **more than 15 seconds**. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 4th gear — Throttle opening angle (TP PID): **0%** — Vehicle speed (VSS PID): **50 km/h {31 mph} or above** • Are any DTCs present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Are any DTCs present? • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.)	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0741

A3U050201030W16

DTC P0741	Torque converter clutch (TCC) stuck OFF
DETECTION CONDITION	• When all conditions below satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Vehicle speed **within 60—100 km/h {37—62 mph}**. — TCC operation — Shift solenoid A duty value exceeds **99%** — Power or normal mode — Difference between engine speed and turbine speed **more than 100 rpm** — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **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	• ATF level low • Deteriorated ATF • Shift solenoids A, B, C, D, E, and pressure control solenoid stuck • Line pressure low • 2-4 brake band slipping • 3-4 clutch slipping • Control valve stuck. • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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	**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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 4. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 6. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
4	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—169 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 6. • Any ranges: Replace ATX, then go to Step 6. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)

STEP	INSPECTION		ACTION
5	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**VERIFY TROUBLESHOOTING OF DTC P0741 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up engine and ATX. • Drive vehicle under following conditions for **15 seconds or more**. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 4th gear (TCC operation) — Vehicle speed (VSS PID): **within 60—100 km/h {37—62 mph}** • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0742

A3U050201030W17

DTC P0742	Torque converter clutch (TCC) stuck ON
DETECTION CONDITION	• All of following conditions satisfied under each of following throttle conditions. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Vehicle speed **below 70 km/h {43 mph}**. — Torque converter clutch (TCC) no operation — Difference between engine speed and turbine speed **below 50 rpm** — DTC P0734 not output • Throttle conditions. — **FS engine** • Throttle opening angle (TP PID) **above 6.25%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 3.13—6.25%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. — **ZM engine** • Throttle opening angle (TP PID) **above 7.03%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 1.56—7.03%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. **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	• ATF level low • Deteriorated ATF • Shift solenoids A, B, C, D, E, and pressure control solenoid stuck • Line pressure low • 2-4 brake band slipping • 3-4 clutch slipping • Control valve stuck • PCM malfunction

Diagnostic procedure

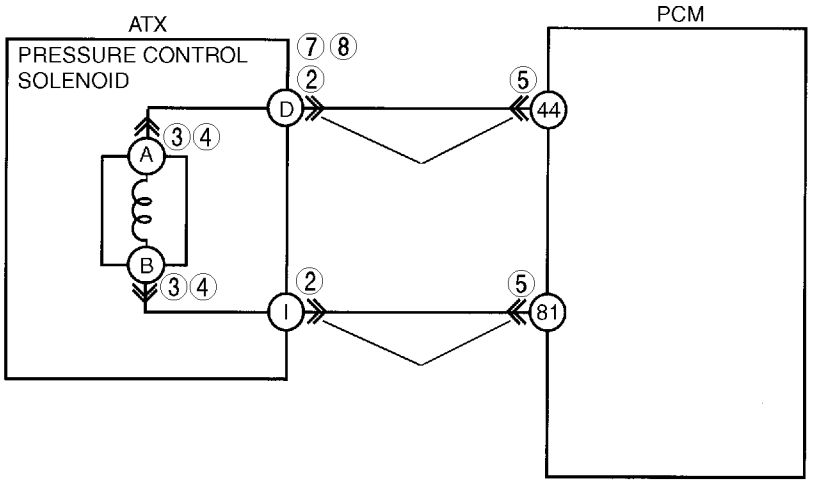
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 4. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
3	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 6. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
4	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 6. • Any ranges: Replace ATX, then go to Step 6. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
5	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/ INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0742 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up engine and ATX. • Drive vehicle under following. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range, 4th gear (TCC operation) — Vehicle speed: **below 70 km/h {43 mph}**. • Throttle conditions — **FS engine** • Throttle opening angle (TP PID) **above 6.25%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 3.13—6.25%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. — **ZM engine** • Throttle opening angle (TP PID) **7.03%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 1.56—7.03%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0745

A3U050201030W18

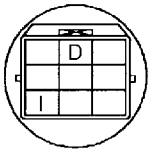
DTC P0745	Pressure control solenoid malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that pressure control solenoid circuit has a malfunction — Pressure control solenoid voltage stuck **0 V** after engine start — Pressure control solenoid voltage stuck **B+** after engine start **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate if PCM detects 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	• Pressure control solenoid malfunction • Open circuit between pressure control solenoid terminal B and ATX connector terminal I • Open circuit between ATX connector terminal I and PCM terminal 81 • Short to ground between ATX connector terminal D and PCM terminal 44 • Short to power between ATX connector terminal D and PCM terminal 44 • Open circuit between pressure control solenoid terminal A and ATX connector terminal D • Open circuit between ATX connector terminal D and PCM terminal 44 • Damaged connector between pressure control solenoid and PCM • PCM malfunction



PRESSURE CONTROL SOLENOID

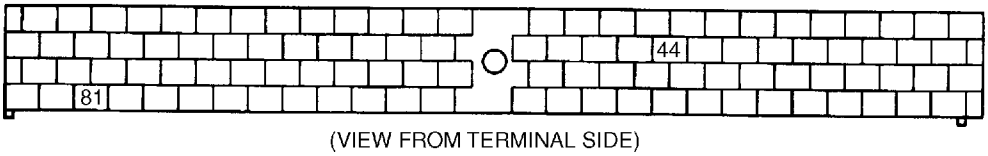
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

ATX CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

PCM HARNESS SIDE CONNECTOR



(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
3	**INSPECT RESISTANCE** • Inspect resistance between ATX connector (transaxle case side) terminals D and I. • Is resistance **within 2.4—7.3 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 6.
		No	Go to next step.
4	**INSPECT PRESSURE CONTROL SOLENOID CONNECTOR FOR POOR CONNECTION** • 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** • Inspect resistance between pressure control solenoid terminals A and B. • Is resistance **within 2.4—7.3 ohms**? (See 05–17–28 Inspection of Resistance (On-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 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
6	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • Inspect for continuity between PCM (harness-side) and ATX connector (vehicle harness-side). — PCM terminal 44 and ATX connector terminal D — PCM terminal 81 and ATX connector terminal I • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, the go to Step 10.
8	**INSPECT ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage at ATX connector terminal D (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. • Inspect for continuity between ATX connector terminal D (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P0745 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Make sure to wait **more than 1 second** after turning ignition key to ON. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0751

A3U050201030W19

DTC P0751	Shift solenoid A stuck OFF
DETECTION CONDITION	• When any of P0731, P0732, and P0733 are not generated, and all conditions below satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225— 4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above**. — Torque converter clutch (TCC) not operating — Revolution ratio of forward clutch drum revolution to differential gear case revolution **within 0.91—1.09**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid A stuck • Control valve stuck • PCM malfunction

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 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0751 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0752

A3U050201030W20

DTC P0752	Shift solenoid A stuck ON
DETECTION CONDITION	• When P0734 is not generated, and all conditions below satisfied in 1GR and 2GR. — ATF temperature **20 °C {68 °F} or above**. — Engine run. — Either of P0705 or P0706 output, or D range is selected. — Brake pedal depressed. — Throttle opening angle closed throttle position. — Vehicle speed **0 km/h {0 mph}**. — Input/turbine speed sensor signal **187.5 rpm or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715, P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid A stuck • Control valve stuck • PCM malfunction

Diagnostic procedure

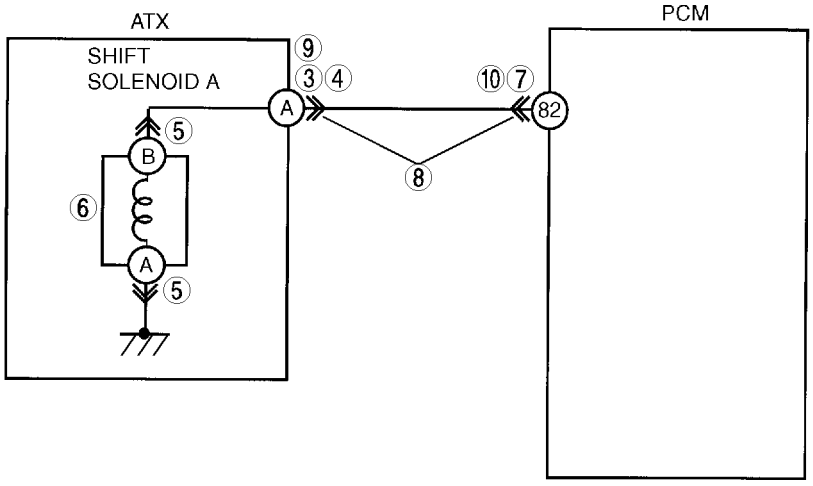
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)

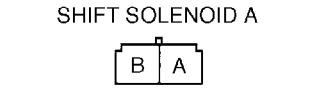
STEP	INSPECTION		ACTION
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0752 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0753

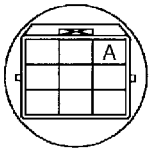
A3U050201030W21

DTC P0753	Shift solenoid A malfunction (electrical)
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 ATX connector terminal A and PCM terminal 82 • Short to power between ATX connector terminal A and PCM terminal 82 • Open circuit between shift solenoid A terminal B and ATX connector terminal A • Open circuit between ATX connector terminal A and PCM terminal 82 • Open circuit between shift solenoid A terminal A and body ground point • Damaged connector between shift solenoid A and PCM • PCM malfunction

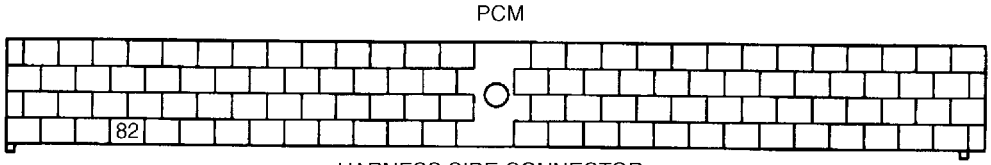




HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

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 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 ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
4	**INSPECT RESISTANCE** • Check resistance between ATX connector terminal A (transaxle case side) and body ground. • Is resistance **within 1.0—4.2 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT SHIFT SOLENOID A CONNECTOR FOR POOR CONNECTION** • Disconnect shift solenoid A 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.
6	**INSPECT RESISTANCE** • Inspect resistance between shift solenoid A terminals A and B (part-side). • Is resistance **within 1.0—4.2 ohms**? (See 05–17–29 Resistance Inspection (Off-vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid A installation. • If solenoid installed correctly, replace solenoid, then go to Step 11. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • Inspect for continuity between PCM terminal 82 (harness-side) and ATX connector 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 ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage at ATX connector 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. • Inspect for continuity between PCM terminal 82 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 11.
		No	Go to next step.

STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P0753 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0756

A3U050201030W22

DTC P0756	Shift solenoid B stuck OFF
DETECTION CONDITION	• When any of DTC P0732, P0733, and P0734 are not generated, and all conditions below satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in 1GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above** — Throttle opening angle (TP PID) **3.13% or above** (FS engine). — Throttle opening angle (TP PID) **3.91% or above** (ZM engine). — Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 2.157**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid B stuck • Control valve stuck • PCM malfunction

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 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0756 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Engine speed: **450 rpm or above** (RPM PID) — Throttle opening angle (TP PID): **3.13% or above** (FS engine) — Throttle opening angle (TP PID): **3.91% or above** (ZM engine) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0757

A3U050201030W23

DTC P0757	Shift solenoid B stuck ON
DETECTION CONDITION	• When either of DTC P0731 and P0733 are not generated, and both the following conditions are satisfied. — When all conditions below satisfied while driving in 2GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Differential gear case (output) revolution speed **35 rpm or above**. • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 1.249 or more than 2.157**. • Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. — When all conditions below satisfied with driving in 4GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Differential gear case (output) revolution speed **35 rpm or above**. • Vehicle speed **50 km/h {31 mph}**. • Throttle opening angle closed throttle position. • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 0.6 or 1.249 or above**. • Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid B stuck • Control valve stuck • PCM malfunction

Diagnostic procedure

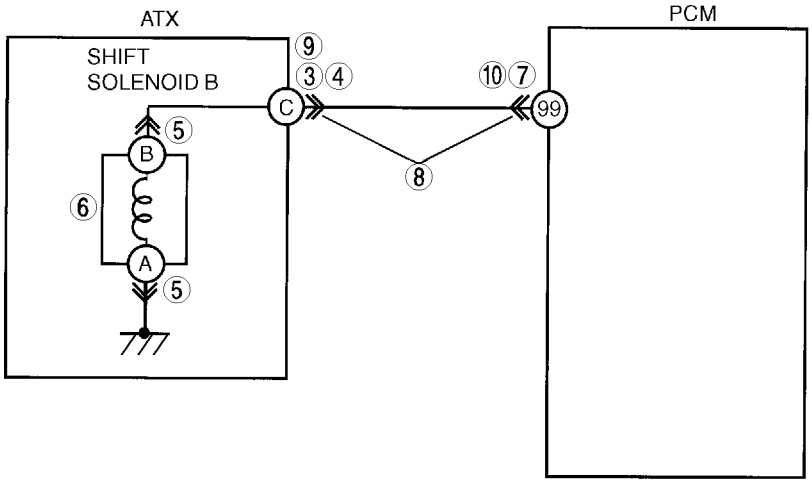
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

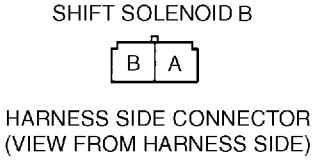
STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0757 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Engine speed: **450 rpm or above** (RPM PID) — Throttle opening angle (TP PID): **0%** (4th gear only) — Vehicle speed (VSS PID): **50 km/h {31 mph}** (4th gear only) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0758

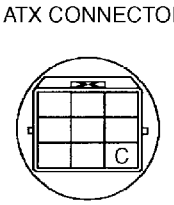
A3U050201030W24

DTC P0758	Shift solenoid B malfunction (electrical)
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 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 B malfunction • Short to ground between ATX connector terminal C and PCM terminal 99 • Short to power between ATX connector terminal C and PCM terminal 99 • Open circuit between shift solenoid B terminal B and ATX connector terminal C • Open circuit between ATX connector terminal C and PCM terminal 99 • Open circuit between shift solenoid B terminal A and body ground point • Damaged connector between shift solenoid B and PCM • PCM malfunction

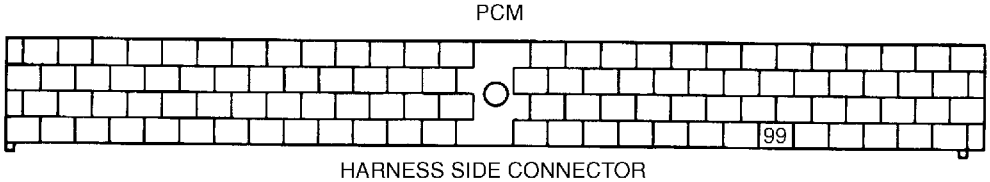




HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

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.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
4	**INSPECT RESISTANCE** • Inspect resistance between ATX connector terminal C (transaxle case side) and body ground. • Is resistance **within 1.0—4.2 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT SHIFT SOLENOID B CONNECTOR FOR POOR CONNECTION** • 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 terminal, then go to Step 11.
6	**INSPECT RESISTANCE** • Inspect resistance between shift solenoid B terminals A and B (part-side). • Is resistance **within 1.0—4.2 ohms**? (See 05–17–29 Resistance Inspection (Off-vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid B installation. • If solenoid installed correctly, replace solenoid, then go to Step 11. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • Inspect for continuity between PCM terminal 99 (harness-side) and ATX connector 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 ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check for voltage at ATX connector 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 99 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 11.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0758 SHIFT SOLENOID B COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0761

A3U050201030W25

DTC P0761	Shift solenoid C stuck OFF
DETECTION CONDITION	• When either of DTC P0733 and P0734 are not generated, and both the following conditions are satisfied. — When all conditions below satisfied while driving in 1GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Throttle opening angle **(TP PID) 3.13% or above** (FS engine). • Throttle opening angle **(TP PID) 3.91% or above** (ZM engine). • Differential gear case (output) revolution speed **35 rpm or above**. • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 2.157**. • Any of DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773 not output. — When all conditions below satisfied while driving in 2GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Differential gear case (output) revolution speed **35 rpm or above**. • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 1.249 or 2.157 or above**. • Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid C stuck • Control valve stuck • PCM malfunction

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 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0761 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Throttle opening angle (TP PID): **3.13% or above** (FS engine) — Throttle opening angle (TP PID): **3.91% or above** (ZM engine) (TP PID) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0762

A3U050201030W26

DTC P0762	Shift solenoid C stuck ON
DETECTION CONDITION	• When either of DTC P0731 and P0732 are not generated, and both the following conditions are satisfied. — When all conditions below satisfied while driving in 3GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Differential gear case (output) revolution speed **35 rpm or above**. • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 0.863 or 1.249 or above**. • Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. — When all conditions below satisfied while driving in 4GR. • ATF temperature **20 °C {68 °F} or above**. • Driving in D range. • Engine run. • Turbine speed **within 225—4,988 rpm**. • Vehicle speed **50 km/h {31mph}** or above. • Differential gear case (output) revolution speed **35 rpm or above**. • Throttle opening angle at closed throttle position • Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 0.6 or 1.249 or above**. • Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid C and pressure control solenoid stuck • Control valve stuck • PCM malfunction

Diagnostic procedure

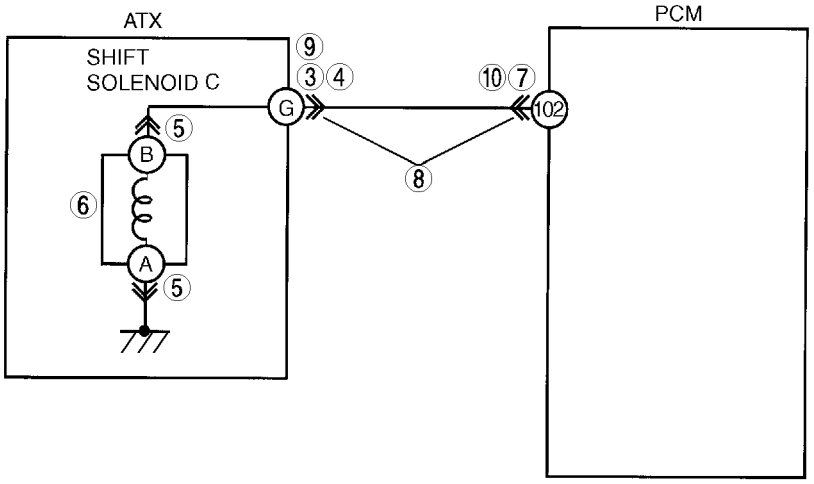
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

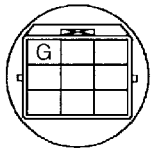
STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0762 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Throttle opening angle (TP PID): **0%** (4GR only) — Vehicle speed (VSS PID): **50 km/h {31 mph} or above** (4GR only) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0763

A3U050201030W27

DTC P0763	Shift solenoid C malfunction (electrical)
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 ATX connector terminal G and PCM terminal 102 • Short to power between ATX connector terminal G and PCM terminal 102 • Open circuit between shift solenoid C terminal B and ATX connector terminal G • Open circuit between ATX connector terminal G and PCM terminal 102 • Open circuit between shift solenoid C terminal A and body ground point • Damaged connector between shift solenoid C and PCM. • PCM malfunction.



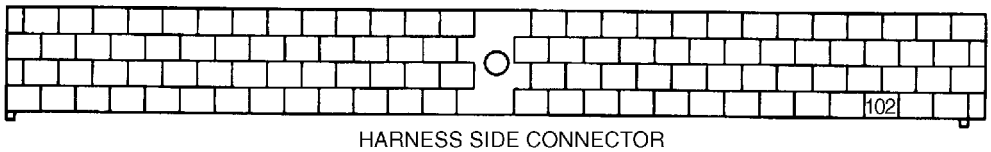


ATX CONNECTOR

HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

SHIFT SOLENOID B

HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

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.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
4	**INSPECT RESISTANCE** • Inspect resistance between ATX connector terminal G (transaxle case side) and body ground. • Is resistance **within 1.0—4.2 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT SHIFT SOLENOID C CONNECTOR FOR POOR CONNECTION** • 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.
6	**INSPECT RESISTANCE** • Inspect resistance between shift solenoid C terminals A and B (part-side). • Is resistance **within 1.0—4.2 ohms**? (See 05–17–29 Resistance Inspection (Off-vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid C installation. • If solenoid installed correctly, replace solenoid, then go to Step 11. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • inspect for continuity between PCM terminal 102 (harness-side) and ATX connector terminal G (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 ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at ATX connector terminal G (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. • Inspect for continuity between PCM terminal 102 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 11.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0763 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0766

A3U050201030W28

DTC P0766	Shift solenoid D stuck OFF
DETECTION CONDITION	• When any of DTC P0731, P0732, and P0733 not output (correct judgment), and all conditions below are satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above**. — Vehicle speed **50 km/h {31 mph} or above**. — Throttle opening angle closed throttle position. — Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 0.6 or 1.249 or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid D stuck • Control valve stuck • PCM malfunction

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 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0766 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Throttle opening angle (TP PID): **0%** (4GR only) — Vehicle speed: **50 km/h {31 mph} or above**. (4GR only) (VSS PID) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0767

A3U050201030W29

DTC P0767	Shift solenoid D stuck ON
DETECTION CONDITION	• When any of DTC P0731, P0732, P0734, and P0741 are not generated, and all conditions below are satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Differential gear case (output) revolution speed **35 rpm or above**. — Revolution ratio of forward clutch drum revolution to differential gear case revolution **below 0.863 or 1.249 or above**. — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid D stuck • Control valve stuck • PCM malfunction

Diagnostic procedure

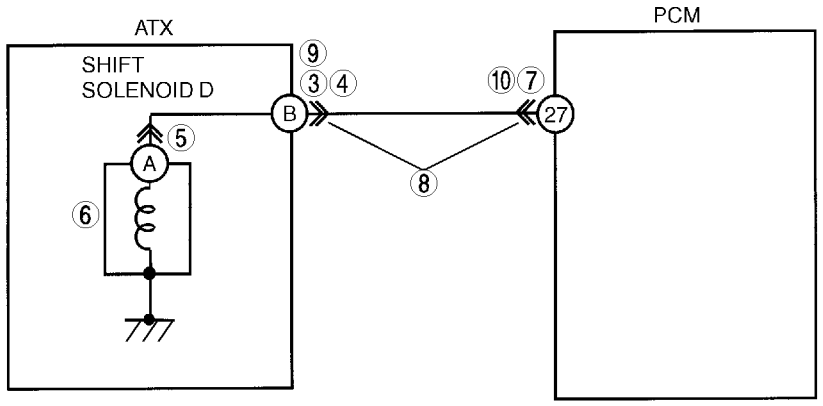
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)

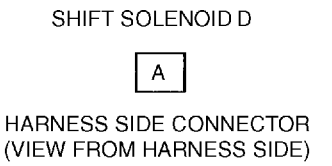
STEP	INSPECTION		ACTION
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0767 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

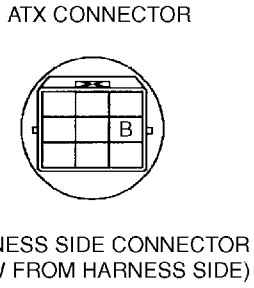
DTC P0768

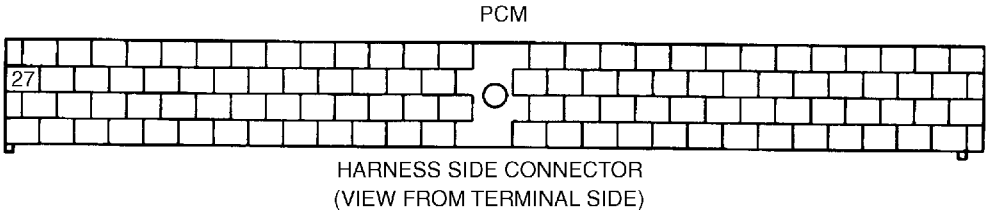
A3U050201030W30

DTC P0768	Shift solenoid D malfunction (electrical)
DETECTION CONDITION	• If PCM detects either of following conditions while driving in 4GR at D range, PCM determines that shift solenoid D circuit has a malfunction: — Shift solenoid D voltage is stuck at **B+** after engine start. — Shift solenoid D 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 D malfunction • Short to ground between ATX connector terminal B and PCM terminal 27 • Short to power between ATX connector terminal B and PCM terminal 27 • Open circuit between shift solenoid D terminal A and ATX connector terminal B • Open circuit between ATX connector terminal B and PCM terminal 27 • Damaged connector between shift solenoid D and PCM • PCM malfunction









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.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
4	**INSPECT RESISTANCE** • Inspect resistance between ATX connector terminal B (transaxle case side) and body ground. • Is resistance **within 10.9—26.2 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT SHIFT SOLENOID D CONNECTOR FOR POOR CONNECTION** • Disconnect shift solenoid D 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.
6	**INSPECT RESISTANCE** • inspect resistance between shift solenoid D terminal A (part-side) and body ground. • Is resistance **within 10.9—26.2 ohms**? (See 05–17–29 Resistance Inspection (Off-vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid D installation. • If solenoid installed correctly, replace solenoid, then go to Step 11. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • Inspect for continuity between PCM terminal 27 (harness-side) and ATX connector 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 ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage at ATX connector 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. • Inspect continuity between PCM terminal 27 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 11.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0768 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0771

A3U050201030W31

DTC P0771	Shift solenoid E stuck OFF
DETECTION CONDITION	• When any of P0731, P0732, and P0734 are not generated, and all conditions below are satisfied. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Vehicle speed **within 60—100 km/h {37—62 mph}**. — TCC operation — Shift solenoid A duty value exceeds **99%** — Power or normal mode — Difference between engine speed and turbine speed **more than 100 rpm** — Any of the following not generated: DTC P0500, P0705, P0706, P0710, P0715,P0751, P0752, P0753, P0756, P0757, P0758, P0761, P0762, P0763, P0766, P0767, P0768, P0771, P0772, P0773. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid E stuck • Control valve stuck • PCM malfunction

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 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0771 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Vehicle speed: **within 60—100 km/h {37—62 mph}** (4th gear only). • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0772

A3U050201030W32

DTC P0772	Shift solenoid E stuck ON
DETECTION CONDITION	• When any of DTC P0731, P0733, and P0734 are not generated, and all of following conditions satisfied under each of following throttle conditions. — ATF temperature **20 °C {68 °F} or above**. — Driving in 4GR at D range. — Engine run. — Turbine speed **within 225—4,988 rpm**. — Vehicle speed **below 70 km/h {43 mph}**. — Torque converter clutch (TCC) no operation — Difference between engine speed and turbine speed **below 50 rpm** • Throttle conditions. — **FS engine** • Throttle opening angle (TP PID) **above 6.25%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 3.13—6.25%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. — **ZM engine** • Throttle opening angle (TP PID) **above 7.03%** and **10 seconds or more** have passed. • Throttle opening angle (TP PID) **within 1.56—7.03%** and **3 seconds or more** have passed. • Throttle opening angle at closed throttle position and **10 seconds or more** have passed. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ATF level low • Deteriorated ATF • Shift solenoid E stuck • Control valve stuck • PCM malfunction

Diagnostic procedure

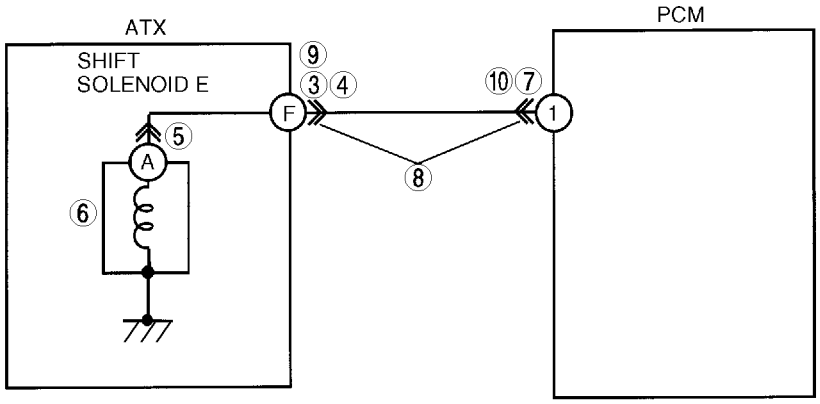
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins 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 05–17–17 Automatic Transaxle Fluid (ATF) Condition Inspection.)	Yes	Go to next step.
		No	If ATF color milky or reddish brown, replace ATF, then go to Step 5. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 7. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)

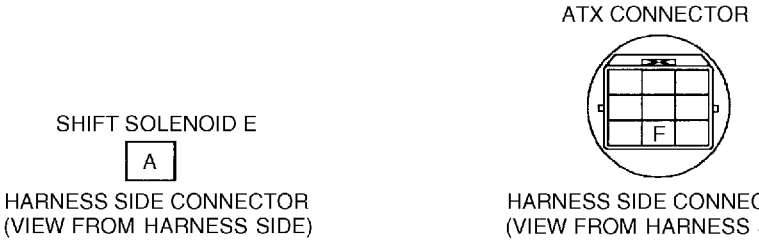
STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** **FS engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,160—1,320 kPa {11.9—13.4 kgf/cm^2, 170—190 psi}** **ZM engine** **Idle: 330—470 kPa {3.4—4.7 kgf/cm^2, 49—66 psi}** **Stall: 1,200—1,360 kPa {12.3—13.8 kgf/cm^2, 175—196 psi}** • Is line pressure within specification? (See 05–17–12 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 7. • Any ranges: Replace ATX, then go to Step 7. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
6	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Turn ignition key to OFF. • Remove control valve body. • Disassemble control valve body. • Is each valve operation okay and is return spring okay? (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)	Yes	Replace ATX, then go to next step (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
		No	Repair or replace shift valve and return spring, then go to next step. (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION.) (See ATX Workshop Manual FN4A-EL (9999-95-FN4A-99).)
7	**VERIFY TROUBLESHOOTING OF DTC P0772 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Start engine. • Warm up ATX. • Drive the vehicle under the following conditions and make sure that gears shift smoothly from 1GR to 4GR. — ATF temperature: **20 °C {68 °F} or above** — Drive in D range — Vehicle speed (VSS PID): **below 70 km/h {43 mph}** (4th gear only) • Is pending code present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

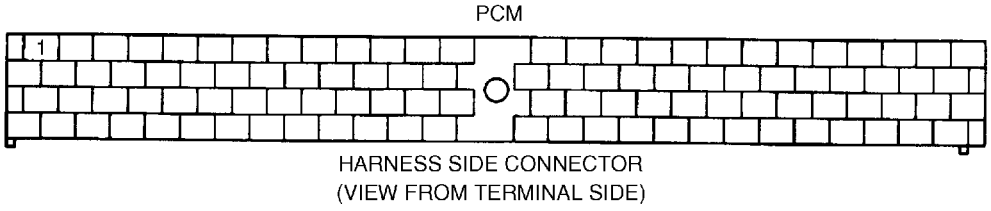
DTC P0773

A3U050201030W33

DTC P0773	Shift solenoid E malfunction (electrical)
DETECTION CONDITION	• If PCM detects either of following conditions while driving in 4GR at D range with TCC operation, PCM determines that shift solenoid E circuit has a malfunction: — Shift solenoid E voltage is stuck at **B+** after engine start. — Shift solenoid E 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 E malfunction • Short to ground between ATX connector terminal F and PCM terminal 1 • Short to power between ATX connector terminal F and PCM terminal 1 • Open circuit between shift solenoid E terminal A and ATX connector terminal F • Open circuit between ATX connector terminal F and PCM terminal 1 • Damaged connector between shift solenoid E and PCM • PCM malfunction







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 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.

STEP	INSPECTION		ACTION
3	**INSPECT ATX CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect ATX 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.
4	**INSPECT RESISTANCE** • Inspect resistance between ATX connector terminal F (transaxle case side) and body ground. • Is resistance **within 10.9—26.2 ohms**? (See 05–17–28 Inspection of Resistance (On-vehicle).)	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT SHIFT SOLENOID E CONNECTOR FOR POOR CONNECTION** • Disconnect shift solenoid E 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.
6	**INSPECT RESISTANCE** • Inspect resistance between shift solenoid E terminal A (part-side) and body ground. • Is resistance **within 10.9—26.2 ohms**? (See 05–17–29 Resistance Inspection (Off-vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid E installation. • If solenoid installed correctly, replace solenoid, then go to Step 11. (See 05–17–30 SOLENOID VALVES REMOVAL/ INSTALLATION.)
7	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • 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 ATX CONNECTOR CIRCUIT FOR OPEN** • Inspect for continuity between PCM terminal 1 (harness-side) and ATX connector terminal F (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 ATX CONNECTOR CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage at ATX connector terminal F (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. • Inspect for continuity between PCM terminal 1 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to Step 11.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0773 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using WDS or equivalent. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Are any DTCs present?	Yes	Replace PCM, then go to next step. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
		No	No concern is detected. Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform “After Repair Procedure”. (See 05–02–6 AFTER REPAIR PROCEDURE.) • Are any DTCs present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

PID/DATA MONITOR INSPECTION

A3U050201030W34

1. Connect the **SSTs** (WDS or equivalent) to the DLC-2.
2. Measure the PID value.

Note

- Perform part inspection for the output device after PCM inspection.
- 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
GEAR	—	1GR: 1 2GR: 2 3GR: 3 4GR: 4	Inspect following PIDs: SSA/SS1, SSB/ SS2, SSC/SS3, SSD/SS4, SSE/SS5	1, 27, 82, 99, 102
TFT (Transaxle fluid temperature)	°C	Indicates transaxle fluid temperature	Inspect TFT sensor. (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION.)	37
TFT V (Transaxle fluid signal voltage)	V	ATF **20 °C {68 °F}**: **3.4—3.6 V** ATF **130 °C {266 °F}**: **0.4—0.5 V**	Inspect TFT sensor. (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION.)	37
VPWR (Battery positive voltage)	V	Ignition switch ON: **B+** Engine running: **B+**	Inspect main relay. (See 09–21–5 RELAY INSPECTION.) Inspect buttery. (See 01–17–1 BATTERY INSPECTION.)	71, 97
TROD (TR switch (D range))	ON/OFF	D range: ON Others: OFF	Inspect TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	6
TRL (TR switch (1 range))	ON/OFF	1 range: ON Others: OFF	Inspect TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	7
LPS (Pressure control solenoid)	A	ATF temperature at **60 °C {140 °F}** Idle:**0.94—0.96 A** Stall (D range):**0.25—0.35 A** Stall (R range):**0—0.05 A**	Inspect pressure control solenoid. (See 05–17–28 SOLENOID VALVES INSPECTION.)	44, 81
LINEDES	kPa / inHg	Indicates target line pressure	Inspect following PIDs: TFT, TFT V, VPWR, TP, TSS, VSS, TROD, TRD, TRL, PNP	—
TCIL (O/D OFF indicator light)	ON/OFF	O/D OFF mode: ON Others: OFF	Inspect O/D OFF indicator light.	43
TCS (O/D OFF switch)	ON/OFF	O/D OFF switch pressed: ON O/D OFF switch released: OFF	Inspect O/D OFF switch. (See 05–17–19 O/D OFF SWITCH INSPECTION.)	29
TRR (TR switch (R position))	ON/OFF	R position: ON Others: OFF	Inspect TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	32
TRD (TR switch (2 range))	ON/OFF	2 range: ON Others: OFF	Inspect TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	9
SSA/SS1 (Shift solenoid A)	%	4GR: **99%** others: **0%**	Inspect shift solenoid A. (See 05–17–28 SOLENOID VALVES INSPECTION.)	82
SSB/SS2 (Shift solenoid B)	%	1GR at D range: **99%** Others: **0%**	Inspect shift solenoid B. (See 05–17–28 SOLENOID VALVES INSPECTION.)	99
SSC/SS3 (Shift solenoid C)	%	1GR/2GR: **99%** Others: **0%**	Inspect shift solenoid C. (See 05–17–28 SOLENOID VALVES INSPECTION.)	102

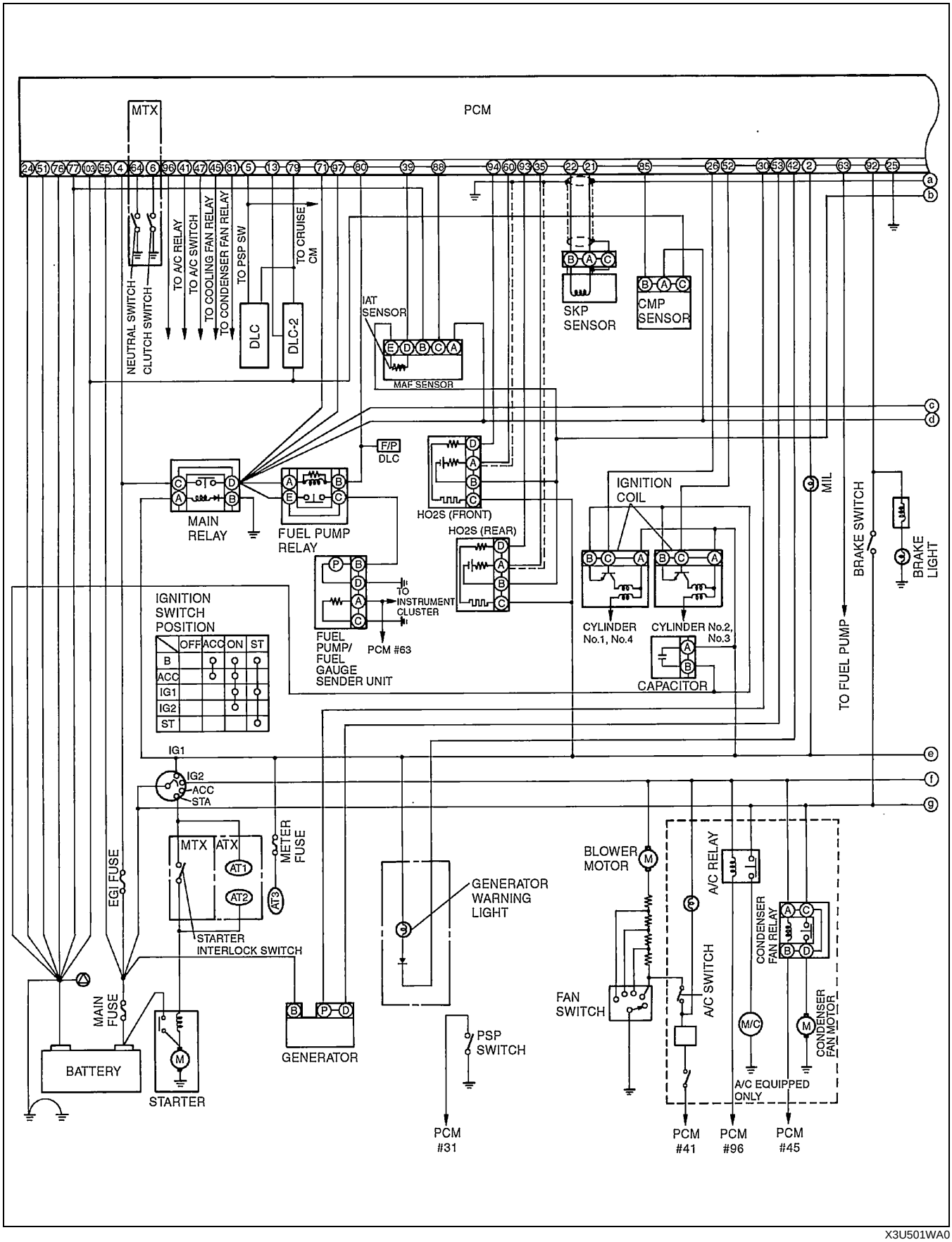
Monitor item (Definition)	Unit/ Condition		Condition/Specification	Action	PCM terminal
SSD/ SS4 (Shift solenoid D)	ON/OFF		P or N position, 4GR, and 1GR at 1range: ON Others: OFF	Inspect shift solenoid D. (See 05–17–28 SOLENOID VALVES INSPECTION.)	27
SSE/SS5 (Shift solenoid E)	ON/OFF		4GR with TCC ON, and 1GR at 1range: ON Others: OFF	Inspect shift solenoid E. (See 05–17–28 SOLENOID VALVES INSPECTION.)	1
TPOD (Throttle position sensor)	%		CTP: **0%** WOT:**100%**	Inspect TP sensor. (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM].) (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS].)	89
TP (Throttle position sensor signal voltage)	V		CTP: **0.4—1.5 V** WOT: **4.0—5.0 V**	Inspect TP sensor. (See 01–40A–28 THROTTLE POSITION (TP) SENSOR INSPECTION [ZM].) (See 01–40B–29 THROTTLE POSITION (TP) SENSOR INSPECTION [FS].)	89
PNP (TR switch)	ON/OFF		P position: ON N position: ON Others: OFF	Inspect TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.)	64
TSS (Input/turbine speed)	RPM		Ignition switch ON: **0 rpm** Idle: **700—800 rpm** (P, N position) Indicates Input/turbine speed	Inspect input/turbine speed sensor. (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION.)	23, 84
VSS (Vehicle speed)	KPH	MPH	Indicates vehicle speed	Inspect VSS. (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX].)	58

05–03 SYMPTOM TROUBLESHOOTING

AUTOMATIC TRANSAXLE SYSTEM WIRING DIAGRAM

A3U050301030W01

ZM Engine



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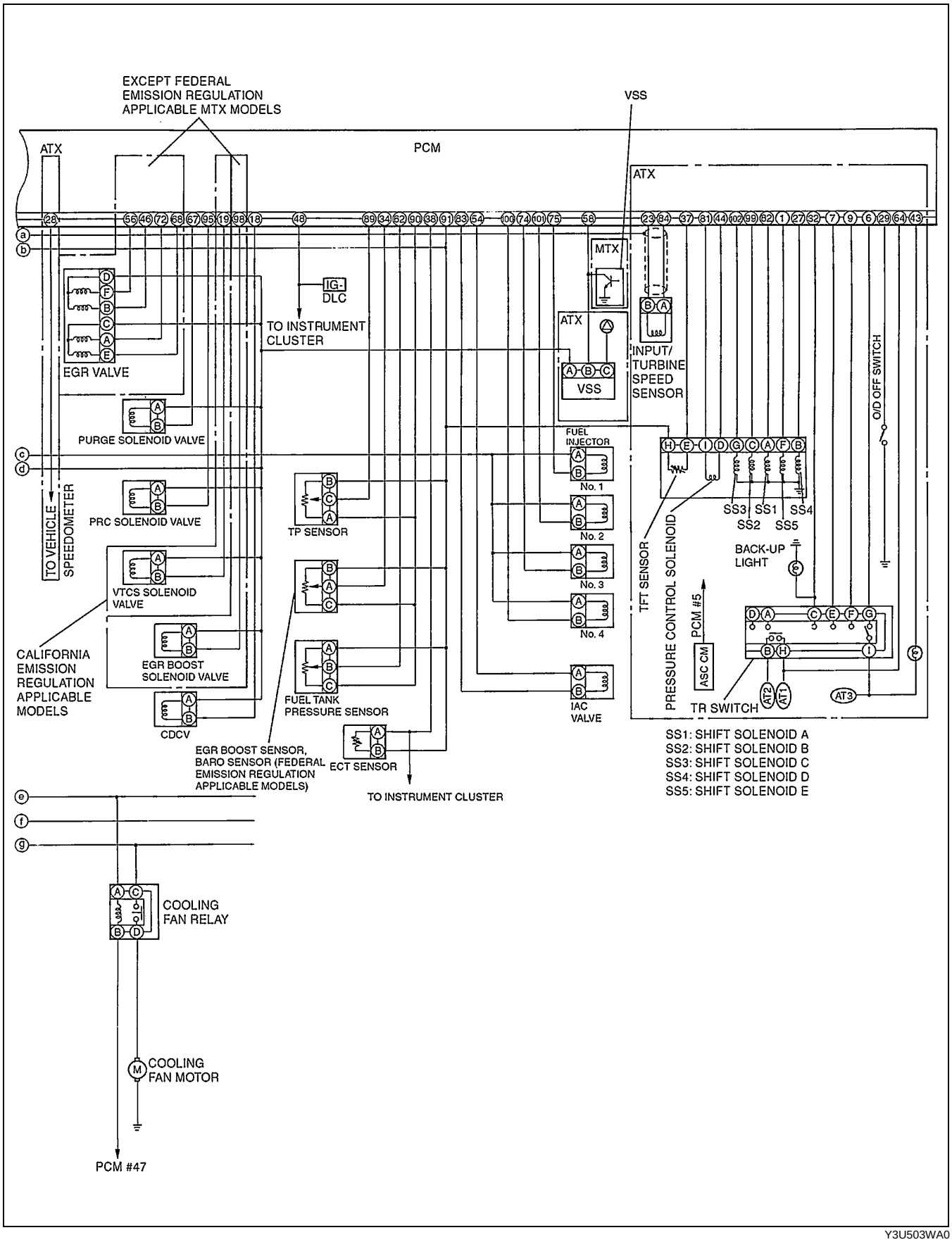
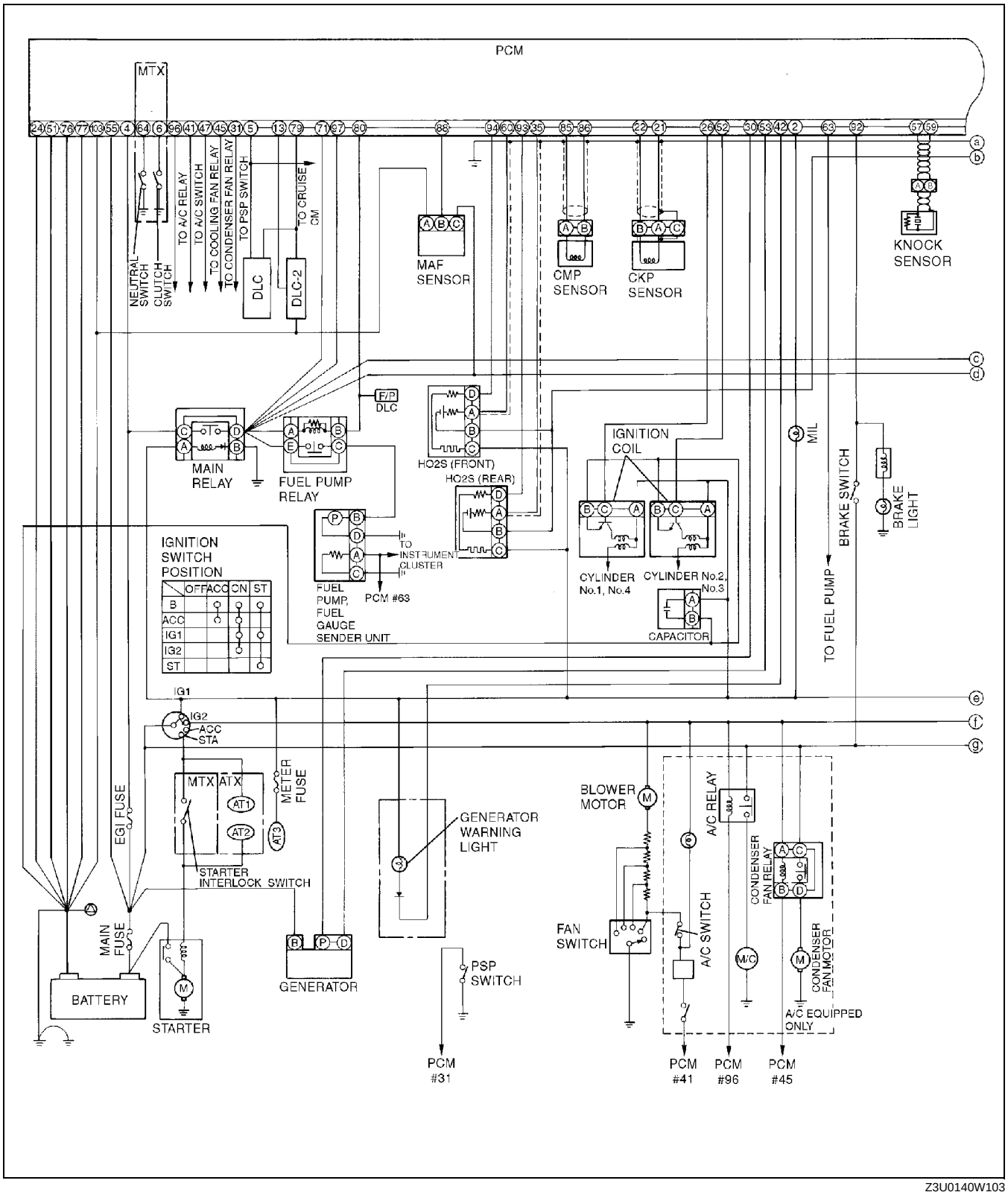

EXCEPT FEDERAL EMISSION REGULATION APPLICABLE MTX MODELS
VSS
ATX
PCM
ATX
MTX
IG-DLC
TO INSTRUMENT CLUSTER
ATX
VSS
INPUT/ TURBINE SPEED SENSOR
O/D OFF SWITCH
EGR VALVE
PURGE SOLENOID VALVE
FUEL INJECTOR
No. 1
No. 2
No. 3
No. 4
IAC VALVE
TO VEHICLE SPEEDOMETER
PRC SOLENOID VALVE
TP SENSOR
SS3 SS1 SS4
SS2 SS5
BACK-UP LIGHT
VTCS SOLENOID VALVE
TFT SENSOR
PRESSURE CONTROL SOLENOID
PCM #5
ASC CM
CALIFORNIA EMISSION REGULATION APPLICABLE MODELS
EGR BOOST SOLENOID VALVE
FUEL TANK PRESSURE SENSOR
TR SWITCH
CDCV
EGR BOOST SENSOR, BARO SENSOR (FEDERAL EMISSION REGULATION APPLICABLE MODELS)
ECT SENSOR
TO INSTRUMENT CLUSTER
SS1: SHIFT SOLENOID A
SS2: SHIFT SOLENOID B
SS3: SHIFT SOLENOID C
SS4: SHIFT SOLENOID D
SS5: SHIFT SOLENOID E
COOLING FAN RELAY
COOLING FAN MOTOR
PCM #47

Y3U503WA0

FS Engine



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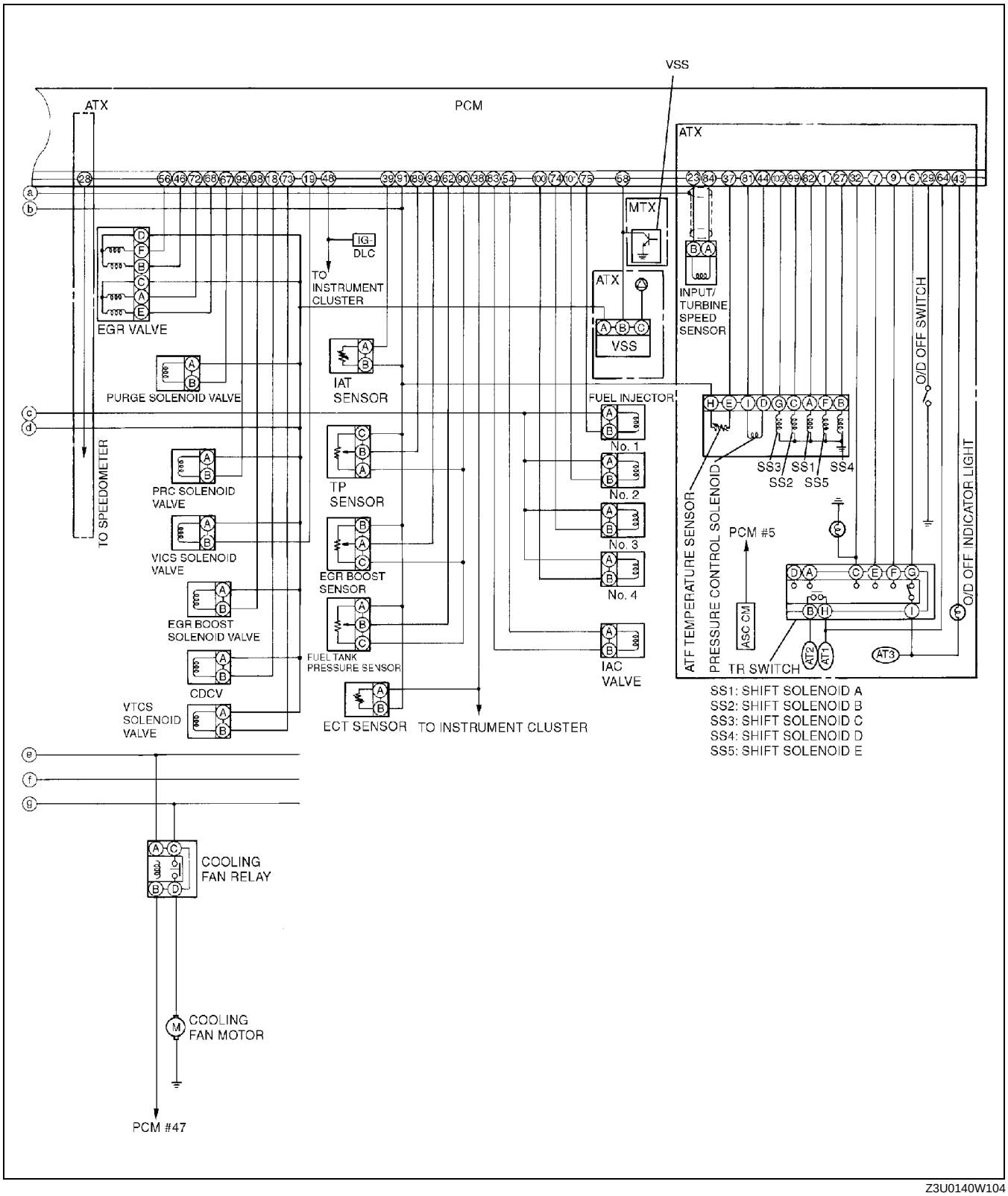
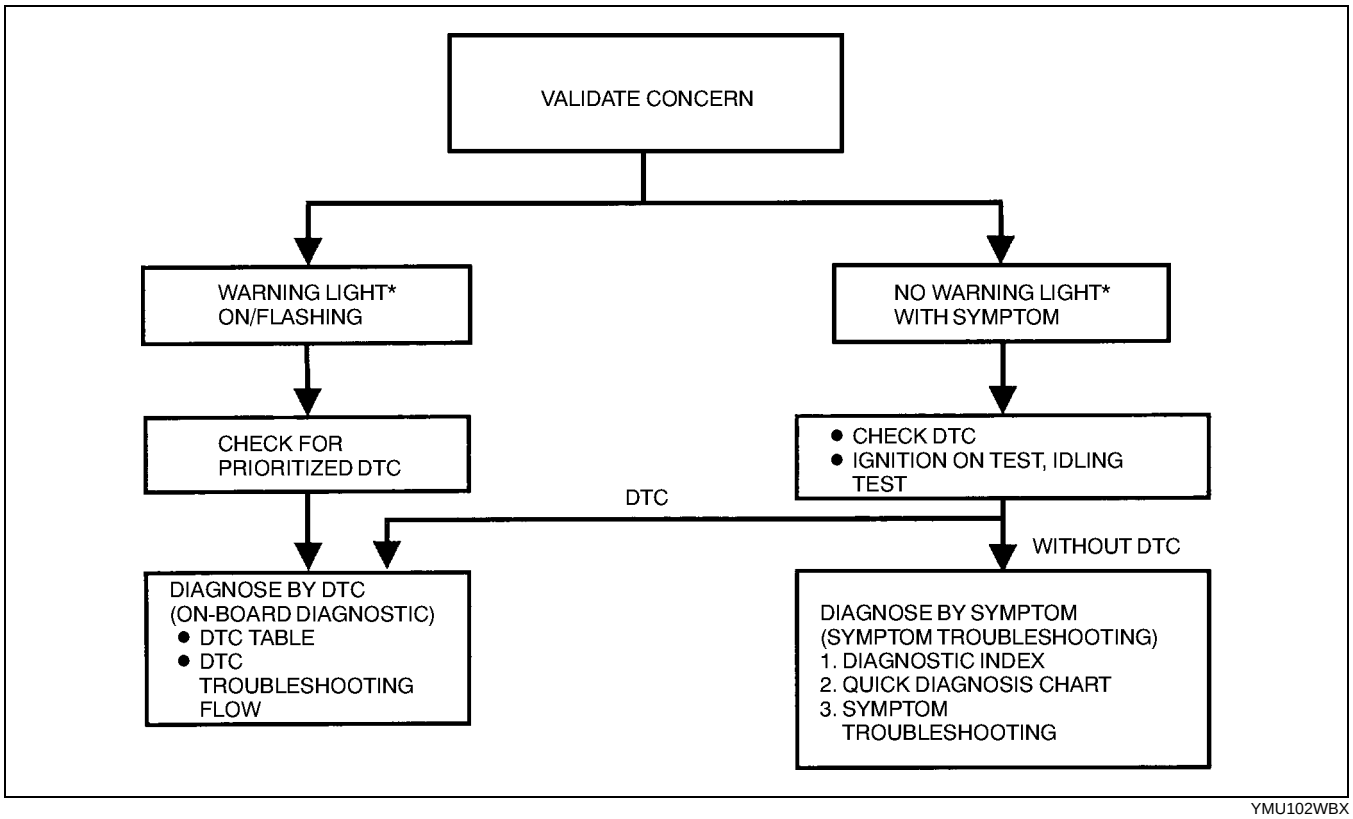


Z3U0140W104

FOREWORD

A3U050301030W02

- When the customer reports a vehicle malfunction, check the malfunction indicator light (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 the DTC exists, diagnose the applicable DTC. (See 05–02–7 DTC TABLE.)
  - — If the DTC does not exist and the MIL does not illuminate and no O/D OFF indicator light flashes, diagnose the applicable symptom troubleshooting. (See 05–03–7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE.)



YMU102WBX

* : Malfunction Indicator Light (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE BASIC INSPECTION

A3U050301030W03

STEP	INSPECTION		ACTION
1	• Turn ignition switch on. • When selector lever is moved, is the selector illumination synchronized with the lever location? 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 and TR switch. Repair or replace defected areas. (See 05–18–2 SELECTOR LEVER INSPECTION.) (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION.) If selector lever and TR switch are okay, go to next step.
2	• Inspect ATF color and condition. (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) • Are ATF color and odor normal?	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection result. Flush automatic transaxle and cooler line as necessary.
3	• Perform the line pressure test. (See 05–17–12 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.
4	• Perform the stall test. (See 05–17–13 Stall Test.) • Is stall speed okay?	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection result.

STEP	INSPECTION		ACTION
5	• Inspect the value at the following PIDs using the WDS or equivalent. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) — TP, and VSS PIDs • Is PID value okay?	Yes	Perform symptom troubleshooting and follow procedures.
		No	Repair or replace any defective parts according to inspection result.

AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE

A3U050301030W04

- 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 is depressed.	(See 05–03–11 NO.1 VEHICLE DOES NOT MOVE IN D, 2, 1 RANGES, OR IN R POSITION.)
2	• Vehicle moves in N position	• Vehicle creeps in N position. • Vehicle creeps if brake pedal is not depressed in N position.	(See 05–03–11 NO.2 VEHICLE MOVES IN N POSITION.)
3	• Vehicle moves in P position, or parking gear does not disengage when P is disengaged	• Vehicle rolls when on a downward slope and tires do not lock in P position. • Tires are locked when P is 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 05–03–11 NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED.)
4	• Excessive creep	• Vehicle accelerates in D, 2, 1 ranges, and R position without depressing accelerator pedal.	(See 05–03–11 NO.4 EXCESSIVE CREEP.)
5	• No creep at all	• Vehicle does not move in D, 2, 1 ranges, or R position when idling on flat paved road.	(See 05–03–12 NO.5 NO CREEP AT ALL.)
6	• Low maximum speed and poor acceleration	• Vehicle acceleration is poor at start. • Delayed acceleration when accelerator pedal is depressed while driving.	(See 05–03–12 NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION.)
7	• No shifting	• Single shift range only. • Sometimes it shifts correctly.	(See 05–03–13 NO.7 NO SHIFTING.)
8	• Does not shift to fourth gear (4GR)	• Vehicle does not upshift from 3GR to 4GR even though vehicle speed is increased. • Vehicle does not shift to 4GR even though accelerator pedal is released in D range at **60 km/h {37 mph}**.	(See 05–03–13 NO.8 DOES NOT SHIFT TO FOURTH GEAR (4GR).)
9	• Abnormal shifting	• Shift incorrectly (incorrect shift pattern).	(See 05–03–14 NO.9 ABNORMAL SHIFTING.)
10	• Frequent shifting	• Downshifting occurs immediately even when accelerator pedal is depressed slightly in D, 2, 1 ranges except O/D OFF mode.	(See 05–03–14 NO.10 FREQUENT SHIFTING.)
11	• Shift point is high or low	• Shift point is considerably different from automatic shift diagram. • Shift delayed when accelerating. • Shift occurs quickly when accelerating and engine speed does not increase.	(See 05–03–14 NO.11 SHIFT POINT IS HIGH OR LOW.)
12	• Torque converter clutch (TCC) non-operation	• TCC does not operate when vehicle reaches TCC operation range.	(See 05–03–15 NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION.)
13	• No kickdown	• Does not downshift when accelerator pedal is fully depressed within kickdown range.	(See 05–03–15 NO.13 NO KICKDOWN.)

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
14	• Engine flares up or slips when upshifting or downshifting	• When accelerator pedal is depressed at start, engine speed increases normally but vehicle speed increase slowly. • When accelerator pedal is depressed while driving, engine speed increases but vehicle speed does not.	(See 05–03–16 NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING.)
15	• Engine flares up or slips when accelerating vehicle	• Engine flares up when accelerator pedal is depressed for upshifting. • Engine flares up suddenly when accelerator pedal is depressed for downshifting.	(See 05–03–16 NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE.)
16	• Judder upon torque converter clutch (TCC) operation	• Vehicle jolts when TCC is engaged.	(See 05–03–16 NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION.)
17	• Excessive shift shock from N to D or N to R position/range	• Strong shock is felt when shifting from N to D or N to R position/range at idle.	(See 05–03–17 NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE.)
18	• Excessive shift shock when upshifting and downshifting	• Excessive shift shock is felt when depressing accelerator pedal to accelerate at upshifting. During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting.	(See 05–03–17 NO.18 EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING.)
19	• Excessive shift shock on torque converter clutch (TCC)	• Strong shock is felt when TCC is engaged.	(See 05–03–17 NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC).)
20	• Noise occurs at idle when vehicle is stopped in all positions/ranges	• Transaxle is noisy in all positions and ranges when vehicle is idling.	(See 05–03–17 NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES.)
21	• Noise occurs at idle when vehicle is stopped in D, 2, 1 ranges, or in R position	• Transaxle is noisy in driving ranges when vehicle is idling.	(See 05–03–18 NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D, 2, 1 RANGES, OR IN R POSITION.)
22	• No engine braking in O/D OFF mode	• Engine speed drops to idle but vehicle coasts when accelerator pedal is released during cruising at medium to high speeds. • Engine speed drops to idle but vehicle coasts when accelerator pedal is released when in 1 range at low vehicle speed.	(See 05–03–18 NO.22 NO ENGINE BRAKING IN O/D OFF MODE.)
23	• Transaxle overheats	• Burnt smell is emitted from transaxle. • Smoke is emitted from transaxle.	(See 05–03–19 NO.23 TRANSAXLE OVERHEATS.)
24	• Engine stalls when shifted to D, 2, 1 ranges, or in R position	• Engine stalls when shifting from N or P position to D, 2, 1 ranges or R position at idle.	(See 05–03–19 NO.24 ENGINE STALLS WHEN SHIFTED TO D, 2, 1 RANGES, OR IN R POSITION.)
25	• Engine stalls when driving at slow speed or stopping	• Engine stalls when brake pedal is depressed while driving at low speed or stopping.	(See 05–03–19 NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING.)
26	• O/D OFF indicator light does not illuminate when O/D OFF switch is turned to on	• O/D OFF indicator light in dashboard does not illuminate when O/D OFF switch is turned on and ignition switch at on.	(See 05–03–20 NO.26 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED TO ON.)
27	• O/D OFF indicator light illuminates when O/D OFF switch is not turned to on	• O/D OFF indicator light in dashboard illuminates even though O/D OFF switch is turned off and ignition switch at on.	(See 05–03–20 NO.27 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED TO ON.)

Quick Diagnosis Chart

No.	Item	Selector lever is misadjusted	Not within line pressure specification	Idle speed is misadjusted	Ignition timing is misadjusted	TR switch is misadjusted	Electrical system components										
							ATX outer parts										
							TP sensor		Input/turbine speed sensor		VSS		O/D OFF switch		ECT sensor		
							Signal is not inputed	Malfunction signal is inputed	Signal is not inputed	Malfunction signal is inputed	Signal is not inputed	Malfunction signal is inputed	Signal is not inputed	Malfunction signal is inputed	Signal is not inputed	Malfunction signal is inputed	Poor GND
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 is disengaged	×															
4	Excessive creep			×	×												
5	No creep at all		×				×	×	×	×	×	×					×
6	Low maximum speed and poor acceleration		×		×		×	×	×	×	×	×	×	×			×
7	No shifting						×	×	×	×	×	×	×	×			×
8	Does not shift to fourth gear (4GR)						×	×	×	×	×	×	×	×			×
9	Abnormal shifting	×	×			×	×	×	×	×	×	×					×
10	Frequent shifting						×	×	×	×	×	×					×
11	Shift point is 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 shift shock from N to D or N to R position/range		×	×			×	×	×	×	×	×					×
18	Excessive shift shock when upshifting and downshifting		×				×	×	×	×	×	×					×
19	Excessive shift shock on torque converter clutch (TCC)		×				×	×	×	×	×	×					×
20	Noise occurs at idle when vehicle is stopped in all positions/ranges																
21	Noise occurs at idle when vehicle is stopped in D, 2, 1 ranges, or in R position																
22	No engine braking in O/D OFF mode						×	×	×	×	×	×	×	×			×
23	Transaxle overheats		×														×
24	Engine stalls when shifted to D, 2, 1 ranges, or in R position			×													
25	Engine stalls when driving at slow speed or stopping			×													
26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to on												×	×			
27	O/D OFF indicator light illuminates when O/D OFF switch is not turned to on													×			
Item (Symptom / Cause of trouble / Inspection method)																	
Line pressure test			×														
Stall test																	
Time lag test																	
Diagnostic trouble code						×	×		×		×				×		

X3U501WAR

No.	Item	Signal is not inputed	Malfunction signal is inputed	Shift solenoid D malfunction	Shift solenoid E malfunction	Shift solenoid A malfunction	Shift solenoid B malfunction	Shift solenoid C malfunction	Pressure control solenoid malfunction	Control valve is not operating properly	Forward accumulator is not operating properly	Servo apply accumulator is not operating properly	Oil cooler is not operating properly	Slipping (Brake, clutch)	Burnt (Brake, clutch)	Torque converter is not operating properly	TCC burnt
		TFT sensor															
		Electrical system components								Hydraulic system components				Powertrain system			
		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 is disengaged																
4	Excessive creep																
5	No creep at all		×	×	×	×	×	×	×	×				×	×	×	
6	Low maximum speed and poor acceleration	×	×	×	×	×	×	×	×	×				×	×	×	×
7	No shifting			×	×	×	×	×	×	×				×	×		
8	Does not shift to fourth gear	×	×	×	×	×	×	×		×				×	×		
9	Abnormal shifting			×	×	×	×	×		×	×	×		×	×		
10	Frequent shifting									×				×			
11	Shift point is high or low																
12	Torque converter clutch 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 operation									×						×	×
17	Excessive shift shock from N to D or N to R position/range		×				×		×	×	×	×		×	×		
18	Excessive shift shock when upshifting and downshifting	×	×	×	×	×	×	×	×	×	×	×		×	×		
19	Excessive shift shock on torque converter clutch		×			×				×						×	×
20	Noise occurs at idle when vehicle is stopped in all positions/ranges																
21	Noise occurs at idle when vehicle is stopped in D, 2, 1 ranges, or in R position																
22	No engine braking in O/D OFF mode									×				×	×		
23	Transaxle overheats	×	×							×			×				×
24	Engine stalls when shifted to D, 2, 1 ranges, or in R position									×						×	
25	Engine stalls when driving at slow speed or stopping									×						×	
26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to on																
27	O/D OFF indicator light illuminates when O/D OFF switch is not turned to on																
	Line pressure test									×				×	×		
	Stall test									×				×	×	×	
	Time lag test										×	×		×	×		
	Diagnostic trouble code	×		×	×	×	×	×	×								

Symptom / Cause of trouble / Inspection method / Item

X3U501WAS

NO.1 VEHICLE DOES NOT MOVE IN D, 2, 1 RANGES, OR IN R POSITION

A3U050301030W05

1	Vehicle does not move in D, 2, 1 ranges, or in R position
DESCRIPTION	• Vehicle does not move when accelerator pedal is depressed.
POSSIBLE CAUSE	• If the vehicle does not move in D, 2, 1 ranges or R position, basically, the malfunction is in the ATX. (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 ATX, inspect the sensors, output circuit, and the related harnesses. a. Clutch slippage, worn (D, 2, 1 ranges - Forward clutch, R position - Reverse clutch, Low and reverse brake) • Line pressure low • Sensor GND malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Pressure control solenoid malfunction • Body GND malfunction • Control valve body malfunction b. Selector lever malfunction c. Parking mechanism not operating properly d. Torque converter malfunction

NO.2 VEHICLE MOVES IN N POSITION

A3U050301030W06

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 ATX. Since a malfunction in the sensor circuit or output circuit is the cause of the malfunction in the ATX, inspect the sensors, output circuit, and the related harnesses. a. Clutch burned (Forward clutch) • Control valve body malfunction b. Selector lever position disparity (Although the selector illumination shows N position, the hydraulic circuit shows D range or R position)

NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED

A3U050301030W07

3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged
DESCRIPTION	• Vehicle rolls when on a downward slope and tires do not lock in P position. • Tires are locked when P is 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	• Parking mechanism malfunction (May have effect on noise or shock from transaxle) • Improper adjustment of selector lever • If vehicle moves in N position, perform No.2 “Vehicle moves in N position”

NO.4 EXCESSIVE CREEP

A3U050301030W08

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 symptom troubleshooting No.8 “Fast idle/runs on”. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].)

NO.5 NO CREEP AT ALL

A3U050301030W09

5	No creep at all
DESCRIPTION	• Vehicle does not move in D, 2, 1 ranges, or R position when idling on flat paved road.
POSSIBLE CAUSE	• Either the transaxle is stuck in 3GR or 4GR position, or there is clutch circuit slippage because the 3–4 clutch is stuck. a. Clutch burned • Line pressure low • Shift solenoid D malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Pressure control solenoid malfunction • Body GND malfunction • Control valve body malfunction b. Transaxle fixed in 3GR (Operation of fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Electronic parts of output and input system are malfunctioning c. Engine torque is not produced • Torque converter is malfunctioning

NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION

A3U050301030W10

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 3GR, the malfunction is in the engine circuit. a. Clutch slippage, burned • Line pressure low • TP sensor malfunction • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Pressure control solenoid malfunction • Body GND malfunction • Control valve body malfunction b. Transaxle fixed in 3GR (Operation of fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Electronic parts of output and input system are malfunctioning c. Insufficient starting torque (Suspected when in-gear condition, shift control and engine circuit are normal) • Torque converter is malfunctioning (Poor operation, sticking) d. Engagement of TCC operation range (Operation of fail-safe function) • TFT sensor malfunction (Short or open circuit)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Go to symptom troubleshooting No.11 “Lack/loss of power”. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].) • Is engine control system okay?	Yes	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)
		No	Repair or replace any defective parts according to inspection results.

Note

- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.7 NO SHIFTING

A3U050301030W11

7	No shifting
DESCRIPTION	• Single shift range only. • Sometimes it shifts correctly.
POSSIBLE CAUSE	• When the gear position is fixed in 3GR due to the fail-safe operation, the malfunction is in the ATX. • Perform malfunction diagnosis according to No.6 “Low maximum speed and poor acceleration”. a. Clutch burned • Line pressure low • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Pressure control solenoid malfunction • Body GND malfunction • Control valve body malfunction b. Transaxle fixed in 3GR (Operation in fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Disconnected shift solenoid connector • Poor GND of shift solenoid

NO.8 DOES NOT SHIFT TO FOURTH GEAR (4GR)

A3U050301030W12

8	Does not shift to fourth gear (4GR)
DESCRIPTION	• Vehicle does not upshift from 3GR to 4GR even though vehicle speed is increased. • Vehicle does not shift to 4GR even though accelerator pedal is released in D range at **60 km/h {37 mph}**.
POSSIBLE CAUSE	• Basically, the TCC does not operate when the fail-safe is operating. Verify the DTC first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the O/D OFF switch circuit or TR switch circuit. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** a. TCC slippage, burned • Line pressure low • TP sensor malfunction • ECT sensor malfunction • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction b. TFT sensor malfunction • Short or open circuit in wiring • Poor connection of connector • Sensor malfunction c. TR switch malfunction • Short or open circuit in wiring • Poor connection of connector • Sensor malfunction • Selector lever adjustment incorrect • TR switch adjustment incorrect d. Shift solenoid A, shift solenoid E malfunction • Short or open circuit in wiring • Poor connection of connector • Solenoid valve stuck e. O/D OFF switch malfunction f. Torque converter malfunction g. Control valve body malfunction

NO.9 ABNORMAL SHIFTING

A3U050301030W13

9	Abnormal shifting
DESCRIPTION	• Shift incorrectly (incorrect shift pattern).
POSSIBLE CAUSE	• There is a malfunction in the signal circuit which controls shifting (TP sensor, input/turbine speed sensor, VSS), the control valve is stuck, the accumulator (forward or servo apply) is stuck, or the clutch circuit is stuck. a. Clutch slippage, burned • Line pressure low • TP sensor malfunction or misadjustment • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Body GND malfunction • Accelerator cable misadjustment • Control valve body malfunction

NO.10 FREQUENT SHIFTING

A3U050301030W14

10	Frequent shifting
DESCRIPTION	• Downshifting occurs immediately even when accelerator pedal is depressed slightly in D, 2, 1 ranges except O/D OFF mode.
POSSIBLE CAUSE	• The circuit which is the cause is basically the same as for No.9 “Abnormal shifting”. However, a malfunction of the input signal to the TP sensor, input/turbine speed sensor, VSS (including the sensor GND, sensor harness and connector), or clutch slippage (clutch stuck, low pressure in line) may also be the cause.

NO.11 SHIFT POINT IS HIGH OR LOW

A3U050301030W15

11	Shift point is high or low
DESCRIPTION	• Shift point is considerably different from automatic shift diagram. • Shift delays when accelerating. • Shift occurs quickly when accelerating and engine speed does not increase.
POSSIBLE CAUSE	• If the transaxle shift abnormal, there is a malfunction of the input signal to the TP sensor, input/turbine speed sensor, or VSS. • If the engine speed is high or low regardless that shifting is normal, inspect the tachometer. • Verify that the output signal of the TP sensor changes linearly.

NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION

A3U050301030W16

12	Torque converter clutch (TCC) non-operation
DESCRIPTION	• TCC does not operate when vehicle reaches TCC operation range.
POSSIBLE CAUSE	• Basically, the TCC does not operate when the fail-safe is operating. Verify the DTC first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the O/D OFF switch circuit or TR switch circuit. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** a. TCC burned • TP sensor malfunction • TFT sensor malfunction • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction • Shift solenoid D malfunction (Sticking) • Shift solenoid E malfunction (Sticking) • Shift solenoid A malfunction (Sticking) • Shift solenoid B malfunction (Sticking) • Shift solenoid C malfunction (Sticking) • TCC hydraulic pressure system (Poor operation, sticking) b. TP sensor malfunction (Not operating linearly) c. Input/turbine speed sensor or VSS malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove torque converter. • Inspect torque converter. (See ATX Workshop Manual.) • Is torque converter okay?	Yes	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)
		No	Replace torque converter.

Note

- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.13 NO KICKDOWN

A3U050301030W17

13	No kickdown
DESCRIPTION	• Does not downshift when accelerator pedal is fully depressed within kickdown range.
POSSIBLE CAUSE	• If the transaxle does not downshift though shifting is normal, the malfunction is in the TP sensor circuit (including the sensor GND, sensor harness and connector).

NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING

A3U050301030W18

14	Engine flares up or slips when upshifting or downshifting
DESCRIPTION	• When accelerator pedal is depressed at start, engine speed increases normally but vehicle speed increase slowly. • When accelerator pedal is 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. a. Clutch stuck, slippage (forward clutch, 3–4 clutch, low and reverse brake, 2–4 brake band, one-way clutch) • Line pressure low • TP sensor malfunction or misadjustment • VSS malfunction • Input/turbine speed sensor malfunction • Sensor GND malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Pressure control solenoid malfunction • Body GND malfunction • Accelerator cable misadjustment • Control valve body malfunction b. Poor operation of mechanical pressure • Selector lever position disparity • TR switch position disparity

NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE

A3U050301030W19

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 to No.15.

NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION

A3U050301030W20

16	Judder upon torque converter clutch (TCC) operation
DESCRIPTION	• Vehicle jolts when TCC is engaged.
POSSIBLE CAUSE	• Poor TCC engagement due to either slippage because the TCC is stuck or the line pressure is low. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** a. TCC piston slippage, burned • Line pressure low • TP sensor malfunction or misadjustment • VSS malfunction • Input/turbine speed sensor malfunction • Shift solenoid A malfunction • Control valve body malfunction b. Torque converter malfunction

NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE

A3U050301030W21

17	Excessive shift shock from N to D or N to R position/range
DESCRIPTION	• Strong shock is felt when shifting from N to D or N to R position/range at idle.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. If no DTC is output, the shift shock may worsen due to poor operation of the control valve body or sticking of the clutch. a. Clutch burned (N→D: Forward clutch, N→R: Reverse clutch or low and reverse brake) • Line pressure low • TP sensor malfunction • VSS malfunction • Input/turbine speed sensor malfunction • Accelerator cable misadjustment • Control valve body malfunction b. Poor hydraulic operation (Malfunction in range change) • Servo apply accumulator malfunction c. Idle speed high d. Poor tightening torque of engine mount and/or exhaust mount

NO.18 EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING

A3U050301030W22

18	Excessive shift shock when upshifting and downshifting
DESCRIPTION	• Excessive shift shock is felt when depressing accelerator pedal to accelerate at upshifting. During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. The shift shock may also worsen if the TP sensor, input/turbine speed sensor, or VSS signal malfunctions. a. Clutch slippage, burned (2–4 brake band, 3–4 clutch) • Line pressure low, high • TP sensor malfunction • VSS malfunction • Input/turbine speed sensor malfunction • TFT sensor malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Pressure control solenoid malfunction • Accelerator cable misadjustment • Control valve body malfunction b. Poor hydraulic operation (Malfunction in range change) • Forward accumulator malfunction • Servo apply accumulator malfunction

NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC)

A3U050301030W23

19	Excessive shift shock on torque converter clutch (TCC)
DESCRIPTION	• Strong shock is felt when TCC is engaged.
POSSIBLE CAUSE	• The troubleshooting flow is the same as for No.16 “Judder (Intense vibration) upon torque converter clutch (TCC) operation”.

NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES

A3U050301030W24

20	Noise occurs at idle when vehicle is stopped in all positions/ranges
DESCRIPTION	• Transaxle is noisy in all positions and ranges when vehicle is idling.
POSSIBLE CAUSE	• The malfunction is in the 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 solenoid D, E or duty solenoid valves. • 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	• Inspect engine condition. • Is there engine concern (i.e. rough idle)?	Yes	Go to appropriate symptom troubleshooting. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].)
		No	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)

Note
- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D, 2, 1 RANGES, OR IN R POSITION

A3U050301030W25

21	Noise occurs at idle when vehicle is stopped in D, 2, 1 ranges, or in R position
DESCRIPTION	• Transaxle is noisy in driving ranges when vehicle is idling.
POSSIBLE CAUSE	• Although the malfunction is basically the same as No.20 “Noise occurs at idle when vehicle is stopped in all positions/ranges”, other causes may be selector lever or TR switch not adjusted properly.

NO.22 NO ENGINE BRAKING IN O/D OFF MODE

A3U050301030W26

22	No engine braking in O/D OFF mode
DESCRIPTION	• Engine speed drops to idle but vehicle coasts when accelerator pedal is released during cruising at medium to high speeds. • Engine speed drops to idle but vehicle coasts when accelerator pedal is released when in 1 range at low vehicle speed.
POSSIBLE CAUSE	a. Clutch slippage, or burned (low and reverse brake) • Line pressure low • VSS malfunction • Input/turbine speed sensor malfunction • TP sensor malfunction • Control valve body malfunction b. O/D OFF switch on but not recognized by PCM (short, or open circuit, poor operation) • O/D OFF switch signal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Do following symptoms occur concurrently? • Engine flares up or slips during acceleration. • Engine flares up or slips when shifting.	Yes	Go to symptom troubleshooting No.14 “Engine flares up or slips when upshifting or downshifting” or No.15 “Engine flares up or slips when accelerating vehicle”.
		No	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)

Note
- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.23 TRANSAXLE OVERHEATS

A3U050301030W27

23	Transaxle overheats
DESCRIPTION	• Burnt smell is emitted from transaxle. • Smoke is emitted from transaxle.
POSSIBLE CAUSE	• The malfunction is restricted to hindrance of coolant at the oil cooler. In addition, overheating of the transaxle may be caused by a malfunction of the TFT sensor. a. Burned (TCC) • Control valve body malfunction • Accelerator cable misadjustment b. Oil cooler malfunction (Foreign material mixed in with ATF) c. TFT sensor malfunction d. Excessive amount of ATF e. Torque converter malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for bend, damage, corrosion or kinks of oil cooler pipes. • Are oil cooler pipes okay?	Yes	Go to next step.
		No	Replace any defective parts.
2	• Remove torque converter. • Inspect torque converter. (See ATX Workshop Manual.) • Is torque converter okay?	Yes	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)
		No	Replace torque converter.

Note
- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.24 ENGINE STALLS WHEN SHIFTED TO D, 2, 1 RANGES, OR IN R POSITION

A3U050301030W28

24	Engine stalls when shifted to D, 2, 1 ranges, 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 (i.e. IAC system). Otherwise, the malfunction is in the input/turbine speed sensor (engine sometimes starts) or TCC circuit (engine always stalls).

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Go to symptom troubleshooting No.4 “Engine stalls”. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].) • Is engine control system okay?	Yes	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)
		No	Repair or replace any defective parts according to inspection results.

Note
- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING

A3U050301030W29

25	Engine stalls when driving at slow speed or stopping
DESCRIPTION	• Engine stalls when brake pedal is depressed while driving at low speed or stopping.
POSSIBLE CAUSE	• The malfunction is on the engine control side (e.g. Fuel injection control and IAC system).

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Go to symptom troubleshooting No.9 “Low idle/stalls during deceleration”. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].) • Is engine control system okay?	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection results.
2	• Go to symptom troubleshooting No.4 “Engine Stalls”. (See 01–03A–7 SYMPTOM DIAGNOSTIC INDEX [ZM].) (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].) • Is engine control system okay?	Yes	Repeat basic inspection and repair or replace any defective parts according to inspection result. (See 05–03–6 AUTOMATIC TRANSAXLE BASIC INSPECTION.)
		No	Repair or replace any defective parts according to inspection results.

Note
- If malfunction remains, inspect related Service Bulletins 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 PCM.

NO.26 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED TO ON

A3U050301030W30

26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to ON
DESCRIPTION	• O/D OFF indicator light in instrument cluster does not illuminate when O/D OFF switch is turned on and ignition switch at on.
POSSIBLE CAUSE	• O/D OFF switch, O/D OFF indicator light or related wiring harness malfunction

NO.27 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED TO ON

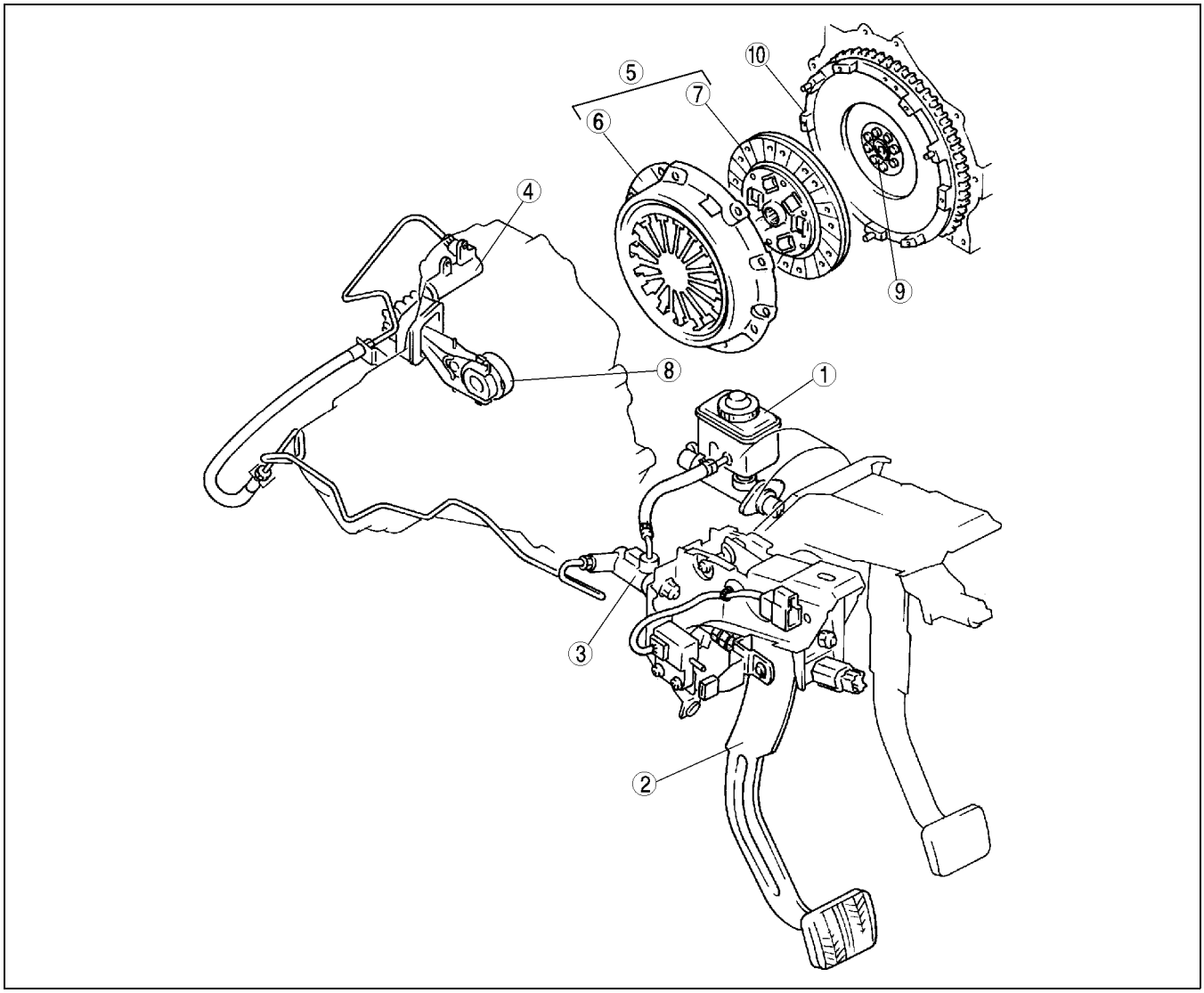
A3U050301030W31

27	O/D OFF indicator light illuminates when O/D OFF switch is not turned to ON
DESCRIPTION	• O/D OFF indicator light in instrument cluster illuminates even though O/D OFF switch is turned off and ignition switch at on.
POSSIBLE CAUSE	• O/D OFF switch or related wiring harness malfunction

05–10 CLUTCH

CLUTCH COMPONENT LOCATION INDEX

A3U051016003W01



Z3U510W01

1	Clutch fluid (See 05–10–3 CLUTCH FLUID INSPECTION) (See 05–10–3 CLUTCH FLUID REPLACEMENT/ AIR BLEEDING)
2	Clutch pedal (See 05–10–3 CLUTCH PEDAL INSPECTION) (See 05–10–4 CLUTCH PEDAL ADJUSTMENT) (See 05–10–5 CLUTCH PEDAL REMOVAL/ INSTALLATION)
3	Clutch master cylinder (See 05–10–6 CLUTCH MASTER CYLINDER REMOVAL/INSTALLATION) (See 05–10–7 CLUTCH MASTER CYLINDER DISASSEMBLY/ASSEMBLY)
4	Clutch release cylinder (See 05–10–8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION) (See 05–10–10 CLUTCH RELEASE CYLINDER DISASSEMBLY/ASSEMBLY)

5	Clutch unit (See 05–10–11 CLUTCH UNIT REMOVAL/ INSTALLATION)
6	Clutch cover (See 05–10–13 CLUTCH COVER INSPECTION)
7	Clutch disc (See 05–10–14 CLUTCH DISC INSPECTION)
8	Clutch release collar (See 05–10–15 CLUTCH RELEASE COLLAR INSPECTION)
9	Pilot bearing (See 05–10–15 PILOT BEARING INSPECTION)
10	Flywheel (See 05–10–15 FLYWHEEL INSPECTION)

GENERAL PROCEDURES

A3U051016003W02

Clutch Pipe Removal/Installation Note

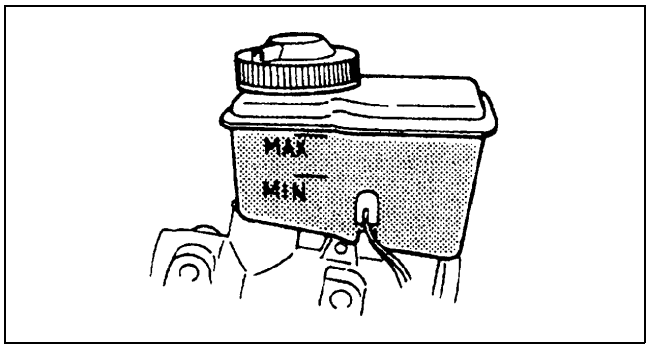
- When any clutch pipe has been disconnected anytime during the procedure, add brake fluid, bleed the air, and inspect for leakage after the procedure has been completed.
- When removing the clutch pipe, remove it using the **SST** (49 0259 770B). When installing the clutch pipe, change the clutch pipe tightening torque to allow for use of a torque wrench-**SST** (49 0259 770B) combination, and then tighten the clutch pipe using the **SST** (49 0259 770B). (See 00–00–15 Torque Formulas.)

CLUTCH FLUID INSPECTION

A3U051016010W01

Note

- A common reservoir is used for the clutch and brake system fluid.
- The fluid in the reservoir must be maintained between the MIN/MAX level during replacement.



U3U51001

CLUTCH FLUID REPLACEMENT/AIR BLEEDING

A3U051016010W02

1. Remove the splash shield.

Caution

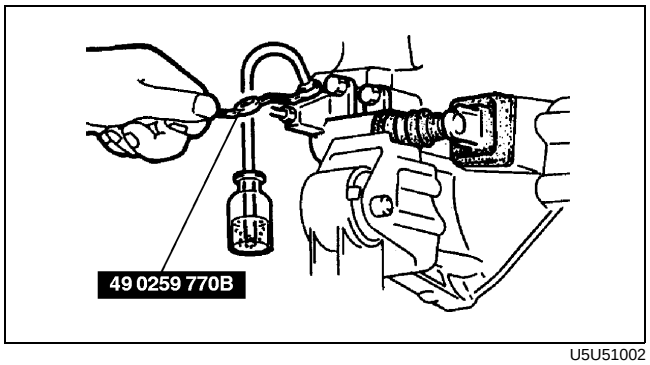
- **Clutch fluid will damage painted surfaces. Be sure to use a container or rags to collect it. If fluid does get on a painted surface, wipe it off immediately with a rag.**

Note

- Do not mix different brands of fluid.
- Do not reuse the clutch fluid that was drained.

2. Draw the fluid from the reservoir with a suction pump.
3. Remove the bleeder cap from the clutch release cylinder and attach a vinyl hose to the bleeder plug.
4. Place the other end of the vinyl hose in a clear container.
5. Slowly pump the clutch pedal several times.
6. With the clutch pedal depressed, loosen the bleeder screw using the **SST** to let the fluid escape. Close the bleeder screw using the **SST**.
7. Repeat Steps 5 and 6 until only clean fluid is seen.
8. Tighten the bleeder screw.

Tightening torque
5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}



U5U51002

9. Add fluid to the MAX mark.
10. Install the splash shield.
11. Verify the correct clutch operation.

CLUTCH PEDAL INSPECTION

A3U051041030W01

Clutch Pedal Height Inspection

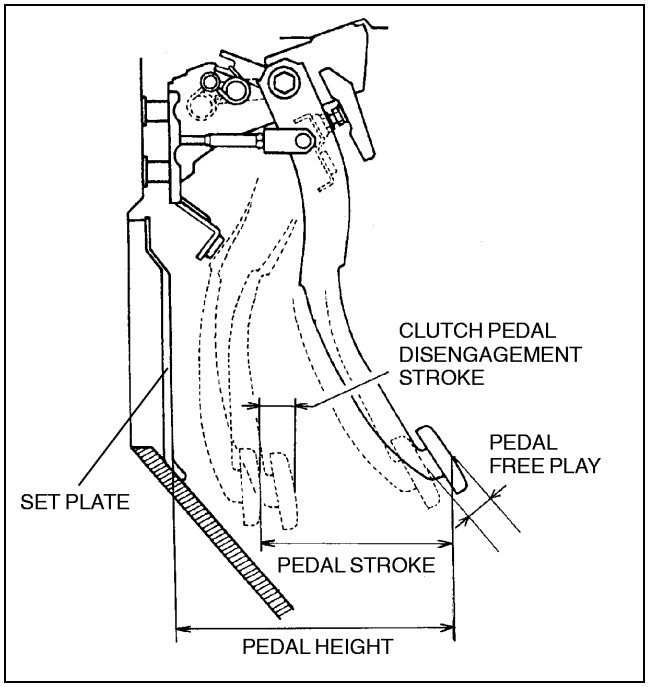
1. Measure the distance from the upper surface of the pedal pad to the set plate.
   - If not as specified, adjust the clutch pedal height.

Pedal height
210—215 mm {8.27—8.46 in} [from set plate]

Clutch Pedal Free Play Inspection

1. Depress the clutch pedal by hand until clutch resistance is felt, and measure the pedal free play.
   - If not as specified, adjust the clutch pedal free play.

   Free play
   0.7—3.5 mm {0.03—0.13 in}
   Total free play
   5.6—15.0 mm {0.23—0.59 in}



X3U510WA0

CLUTCH PEDAL ADJUSTMENT

A3U051041030W02

Clutch Pedal Height Adjustment

1. Adjust the pedal height by turning locknut A and adjustment bolt B.

   Pedal height
   210—215 mm {8.27—8.46 in} [from set plate]

Clutch Pedal Free Play Adjustment

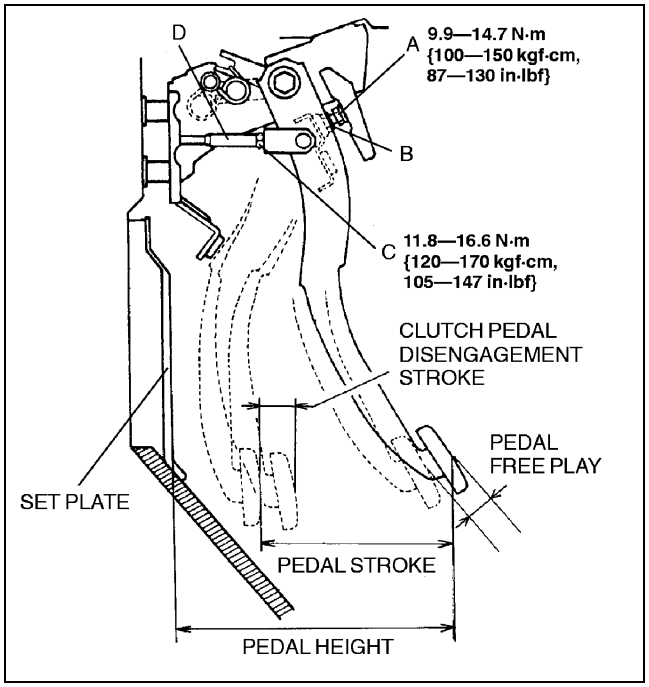
1. Adjust the pedal free play by turning locknut C and adjusting push rod D.

   Pedal free play
   0.7—3.5 mm {0.03—0.13 in}

Clutch Pedal Disengagement Stroke

1. Measure the clutch pedal disengagement stroke.
   - If the clutch pedal disengagement stroke is not within the specification, adjust the pedal height and pedal free play, and verify the pedal stroke.

   Clutch pedal disengagement stroke
   45—55 mm {1.8—2.1 in} (reference value)
   Pedal stroke
   130—140 mm {5.12—5.51 in} (reference value)

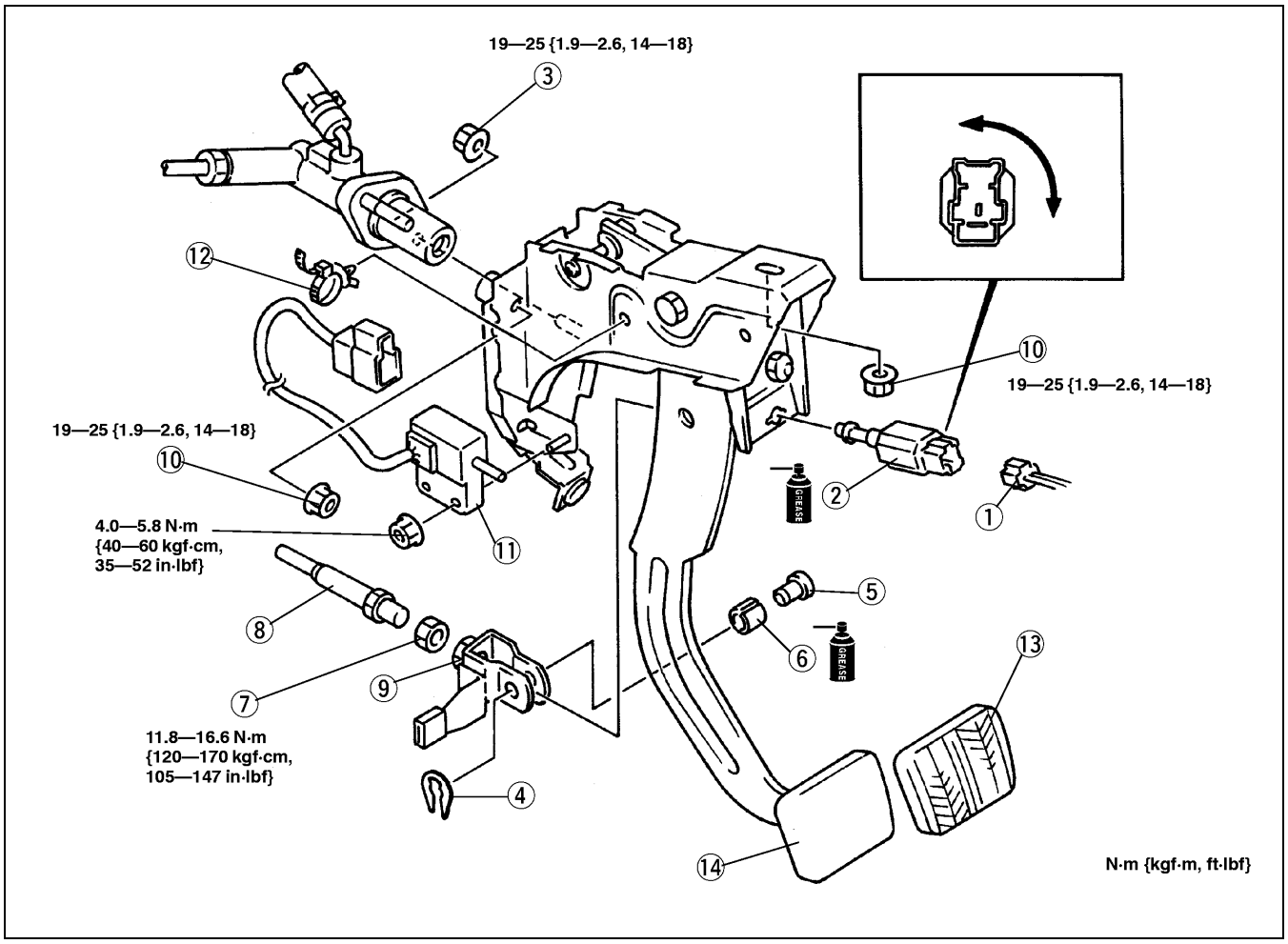


Y3U510WA0

CLUTCH PEDAL REMOVAL/INSTALLATION

A3U051041030W03

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, adjust the clutch pedal. (See 05–10–4 CLUTCH PEDAL ADJUSTMENT.)



X3U510WA2

1	Clutch switch connector
2	Clutch switch
3	Nut
4	Clip
5	Pin
6	Bushing
7	Locknut

8	Push rod
9	Fork end
10	Nut
11	Clutch cut switch
12	Band
13	Pedal pad
14	Clutch pedal

CLUTCH MASTER CYLINDER REMOVAL/INSTALLATION

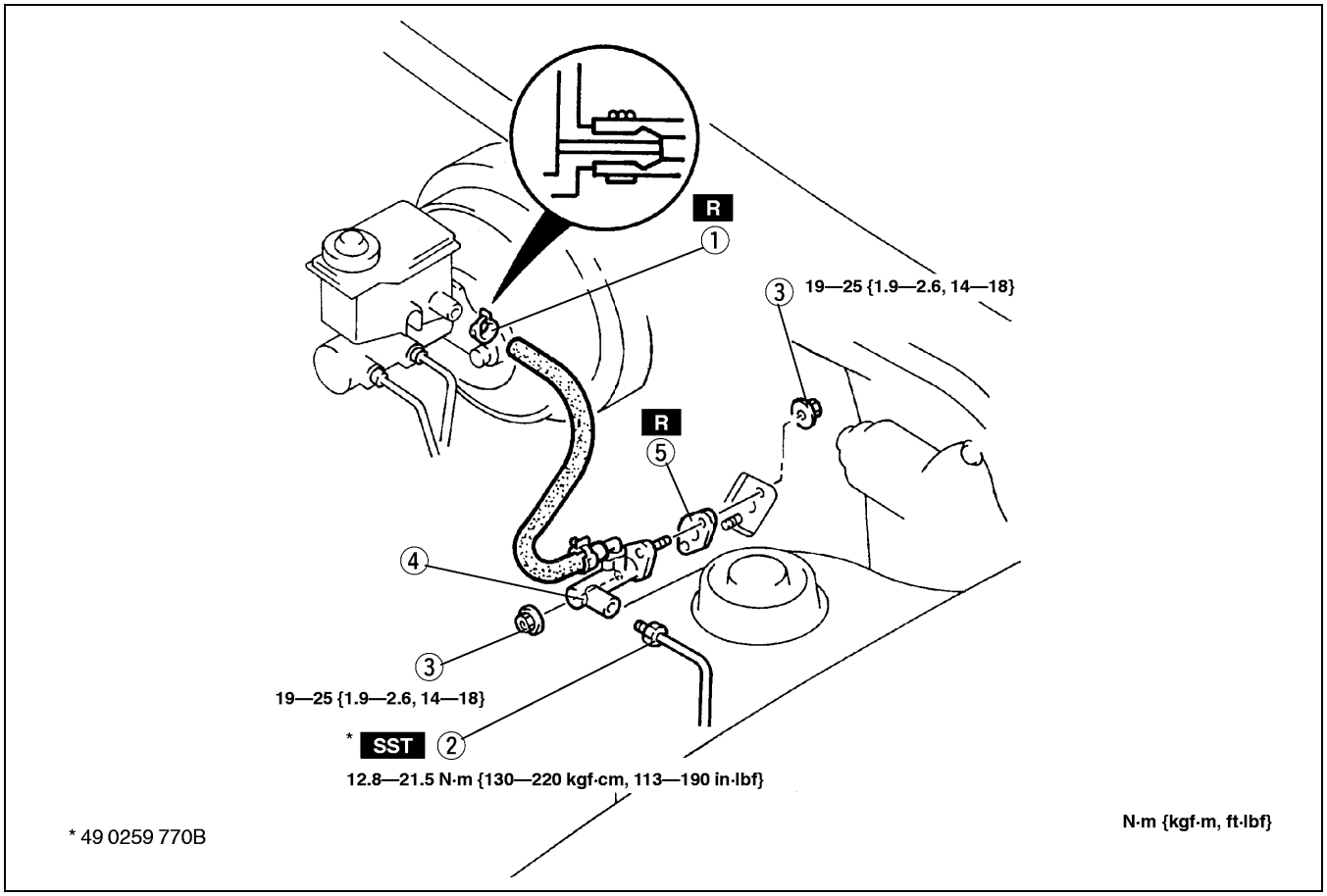
A3U051041990W01

1. Remove the battery and battery cover.

Caution

- **Clutch fluid will damage painted surfaces. Be sure to use a container or rags to collect it. If fluid does get on a painted surface, wipe it off immediately with a rag.**

2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



X3U510WA3

1	Clip
2	Clutch pipe
3	Nut

4	Clutch master cylinder
5	Gasket

CLUTCH MASTER CYLINDER DISASSEMBLY/ASSEMBLY

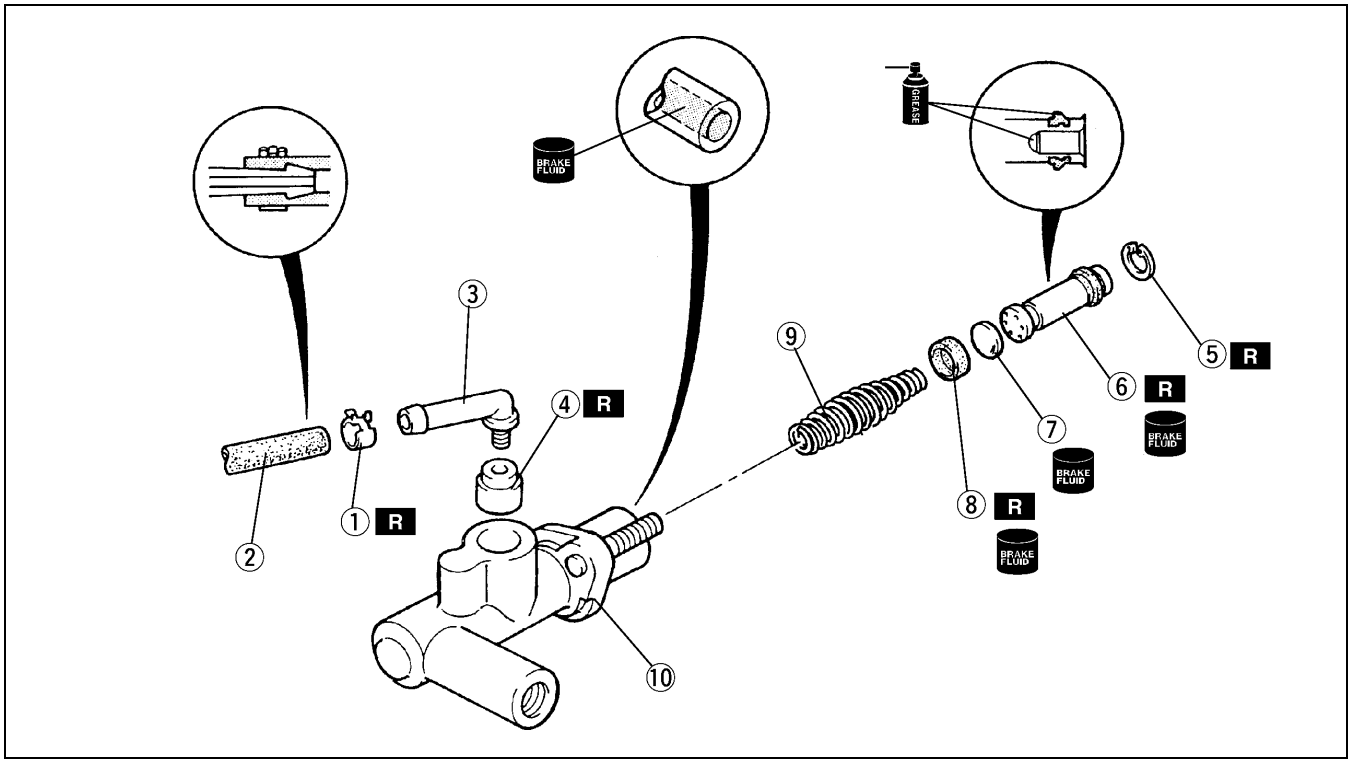
A3U051041990W02

1. Disassemble in the order indicated in the table.

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.**

2. Assemble in the reverse order of disassembly.



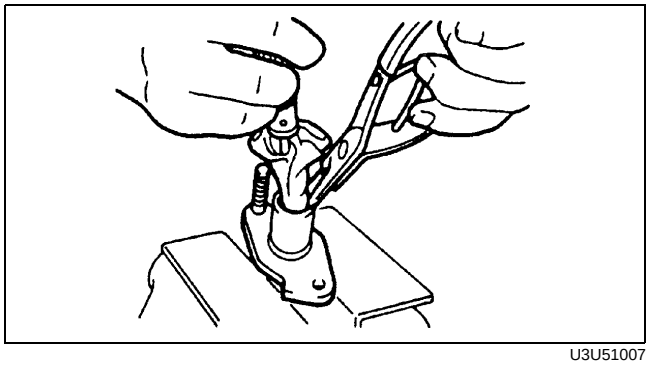
X3U510WA4

1	Clip
2	Hose
3	Joint
4	Bushing
5	Snap ring (See 05–10–7 Snap Ring Disassembly Note.) (See 05–10–8 Snap Ring Assembly Note.)

6	Piston and secondary cup component
7	Spacer
8	Primary cup
9	Return spring
10	Clutch master cylinder body

Snap Ring Disassembly Note

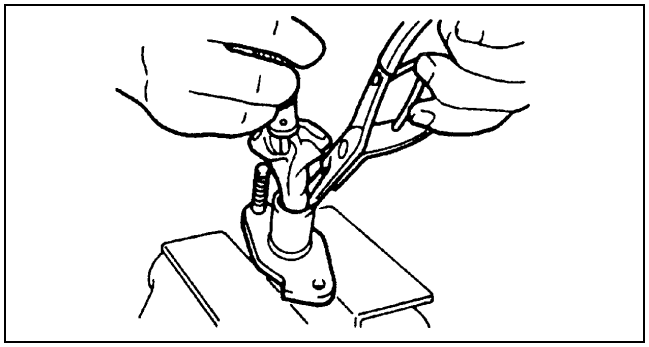
1. Hold the piston down with a cloth-wrapped pin punch.



U3U51007

Snap Ring Assembly Note

1. Hold the piston down using a cloth-wrapped pin punch.



U3U51007

CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION

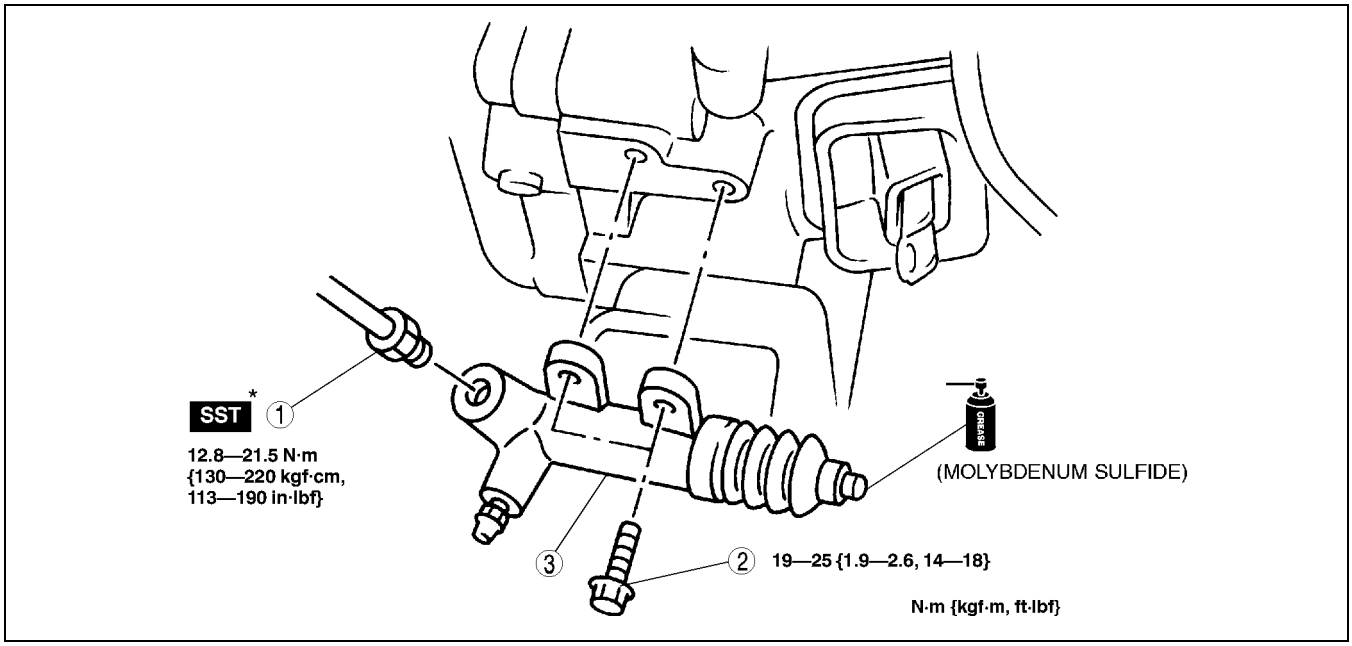
A3U051041920W01

Caution

- **Clutch fluid will damage painted surfaces. If clutch fluid does get on a painted surface, wipe it off immediately.**

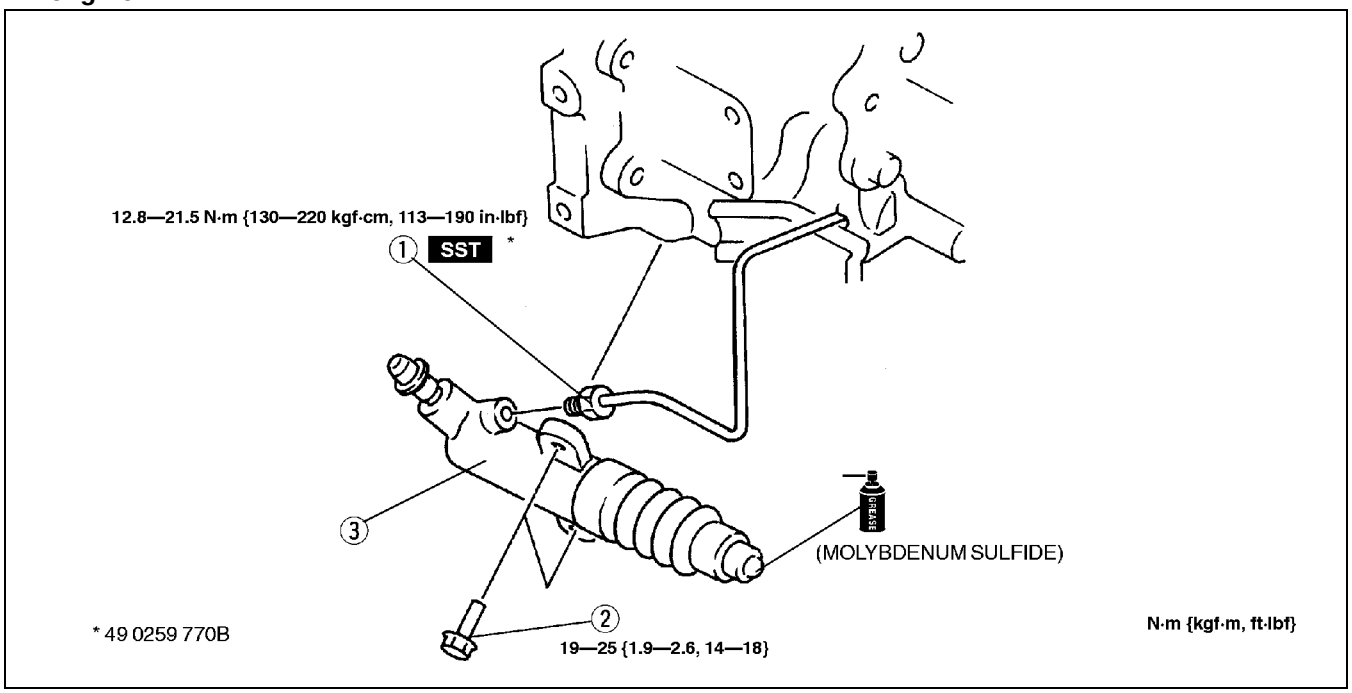
1. Remove in the order indicated in the table.
2. Plug the clutch pipe after removing it to avoid leakage.
3. Install in the reverse order of removal.

FS engine



Z3U510W02

ZM engine



X3U510WA5

1	Clutch pipe
2	Bolt

3	Clutch release cylinder

CLUTCH RELEASE CYLINDER DISASSEMBLY/ASSEMBLY

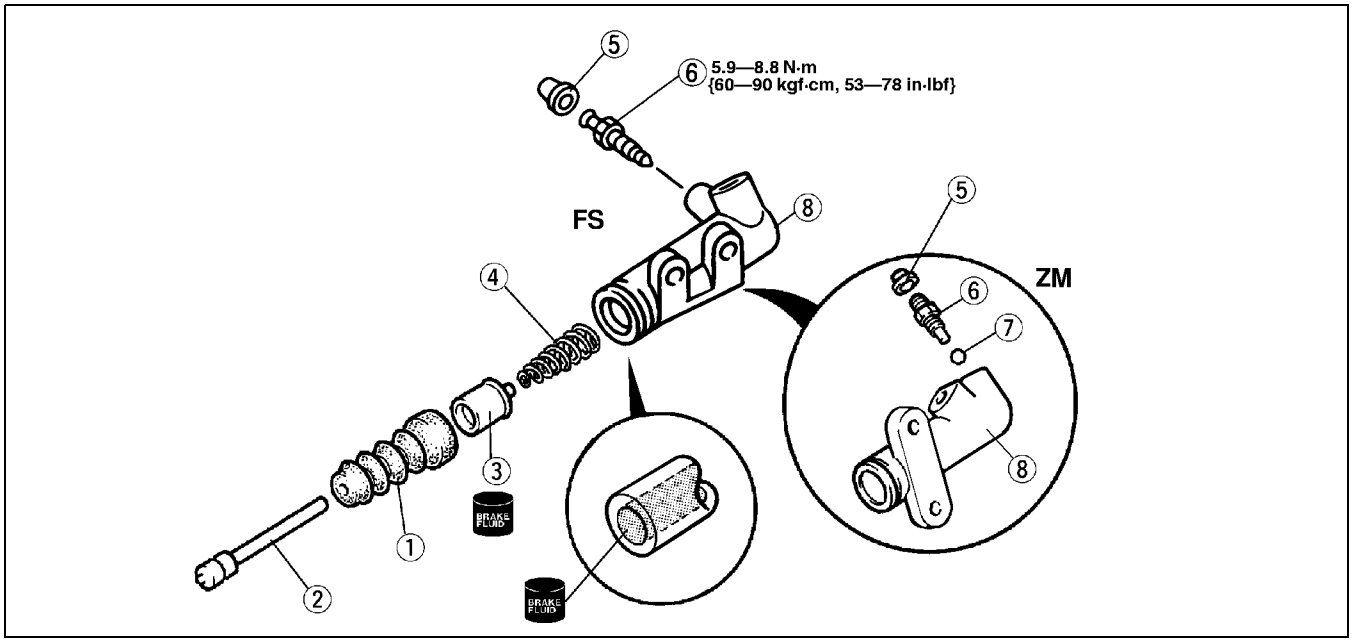
A3U051041920W02

1. Disassemble in the order indicated in the table.

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.**

2. Wipe all parts, and use compressed air to clean all ports, passages, and inner parts.
3. Assemble in the reverse order of disassembly.



Z3U510W03

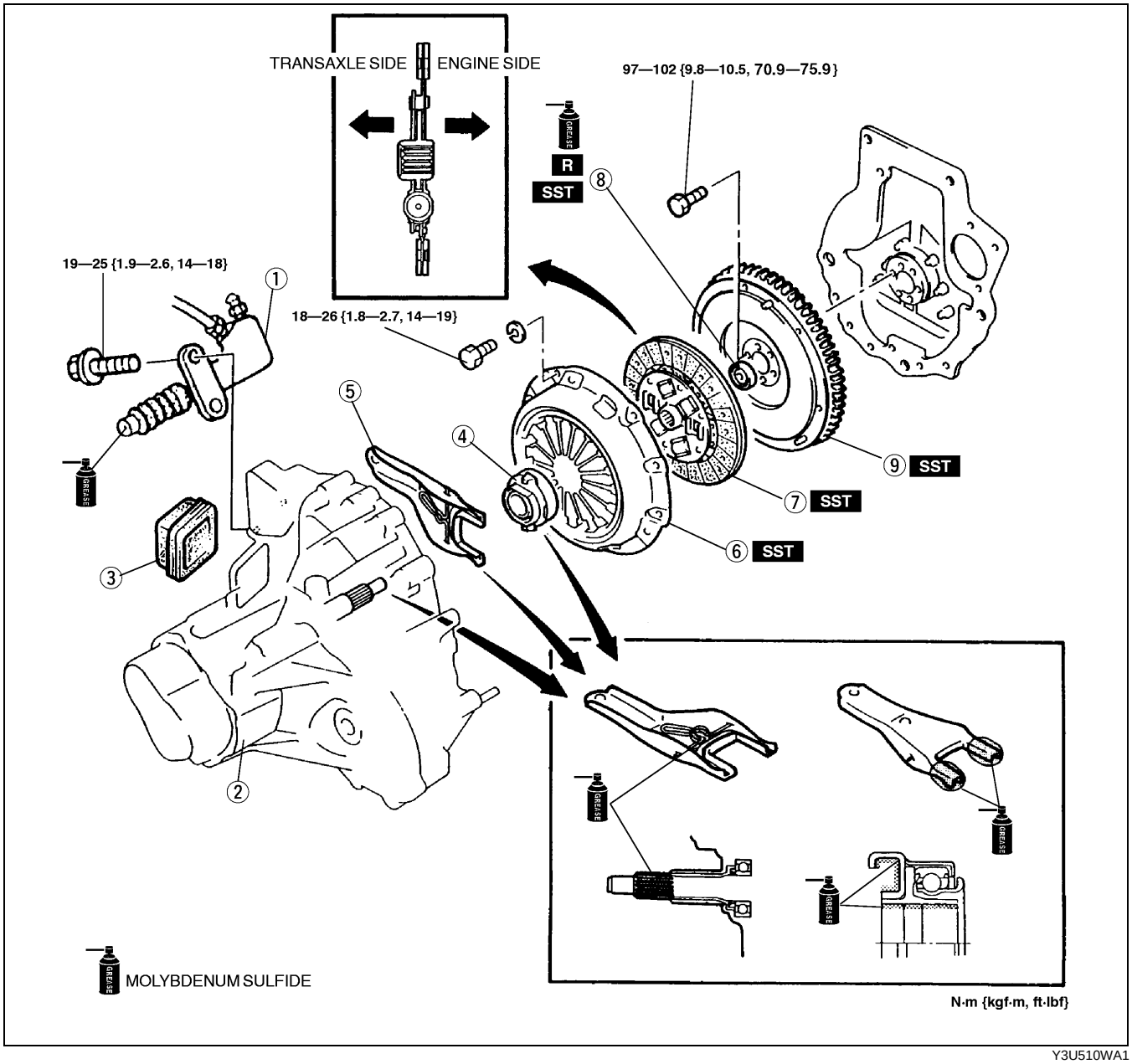
1	Boot
2	Push rod
3	Piston and cup component
4	Return spring

5	Bleeder cap
6	Bleeder screw
7	Steel ball
8	Clutch release cylinder body

CLUTCH UNIT REMOVAL/INSTALLATION

A3U051016000W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



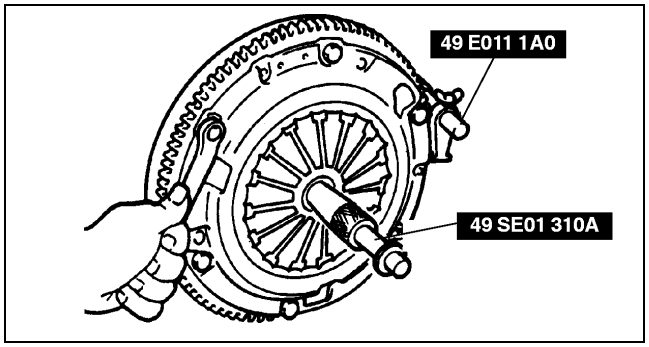
Y3U510WA1

1	Clutch release cylinder
2	Transaxle (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R].) (See 05–15B–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [G15M-R].)
3	Boot
4	Clutch release collar
5	Clutch release fork

6	Clutch cover (See 05–10–12 Clutch Cover Removal Note.) (See 05–10–13 Clutch Cover Installation Note.)
7	Clutch disc (See 05–10–13 Clutch Disc Installation Note.)
8	Pilot bearing (See 05–10–12 Pilot Bearing Removal Note.) (See 05–10–13 Pilot Bearing Installation Note.)
9	Flywheel (See 05–10–12 Flywheel Removal Note.) (See 05–10–12 Flywheel Installation Note.)

Clutch Cover Removal Note

1. Install the **SSTs**.
2. Loosen each bolt one turn at a time in a crisscross pattern until the spring tension is released.
3. Remove the clutch cover and disc.



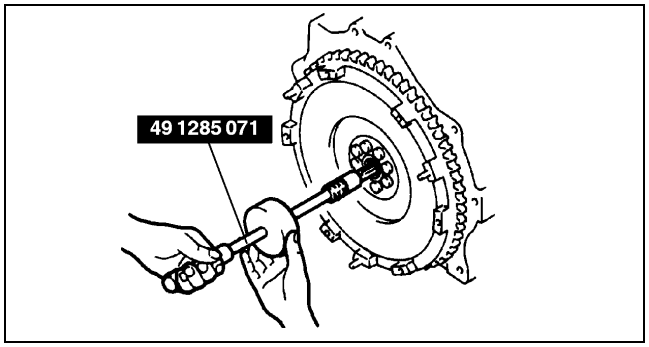
X3U510WA8

Pilot Bearing Removal Note

Note

- The pilot bearing does not need to be removed unless you are replacing it.

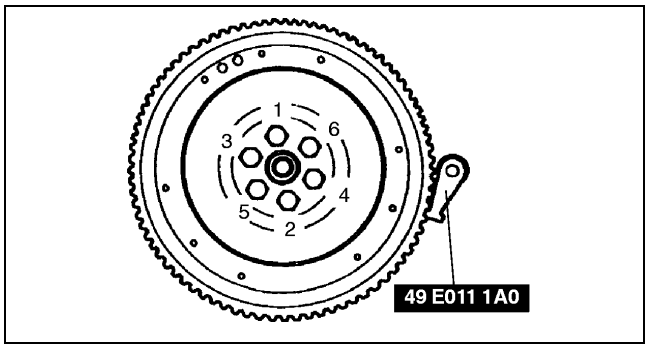
1. Use the **SSTs** to remove the pilot bearing.



X3U510WA9

Flywheel Removal Note

1. Hold the flywheel using the **SST**.
2. Remove the bolts evenly and gradually in the pattern shown.
3. Remove the flywheel.
4. Inspect for oil leakage from the crankshaft rear oil seal.
   - If there is any such leakage or if the oil seal is damaged, replace the crankshaft rear oil seal.

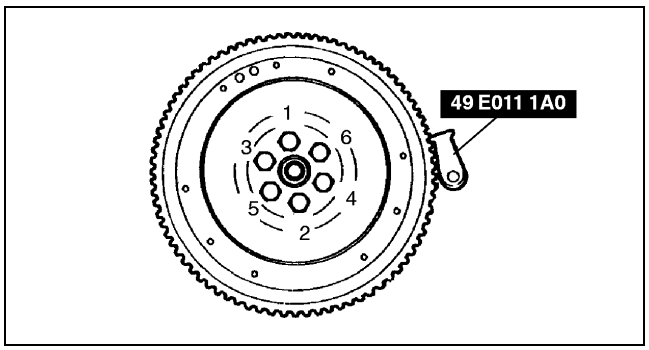


U3U51013

Flywheel Installation Note

1. Install the flywheel to the crankshaft.
2. Hand-tighten the flywheel installation bolts.
3. Install the **SST** to the flywheel.
4. Tighten the flywheel installation bolts in the pattern shown.

Tightening torque
97—102 N·m {9.8—10.5 kgf·m, 70.9—75.9 ft·lbf}

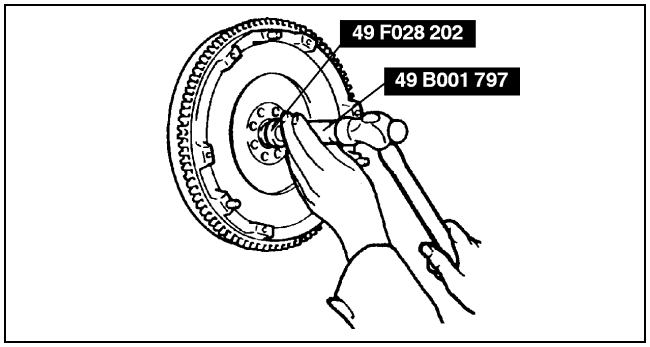


U3U51014

Pilot Bearing Installation Note

1. Install a new pilot bearing using the **SST**.

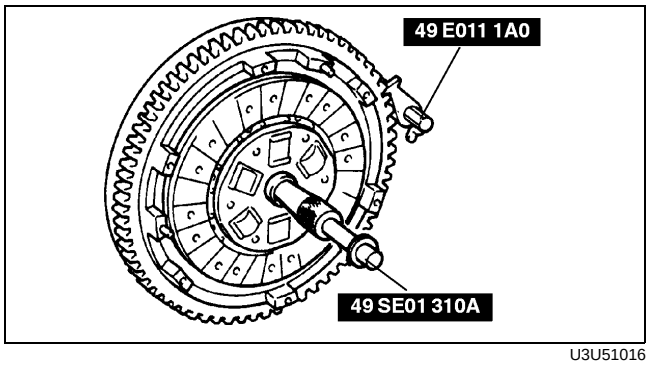
Bearing installation depth
0—0.4 mm {0—0.01 in}



X3U510WB0

Clutch Disc Installation Note

1. Hold the clutch disc in position using the **SSTs**.

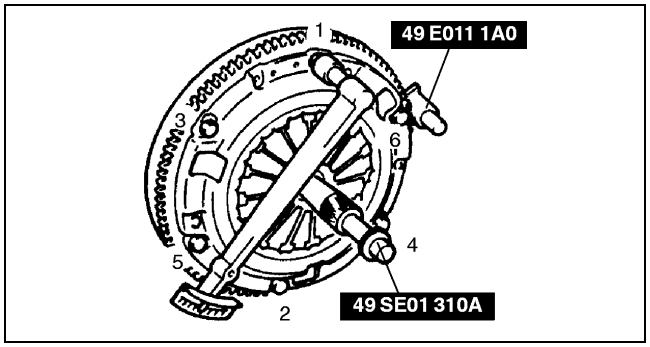


U3U51016

Clutch Cover Installation Note

1. Install the **SSTs**.
2. Tighten the bolts evenly and gradually in the pattern shown.

Tightening torque
18—26 N·m {1.8—2.7 kgf·m, 14—19 ft·lbf}



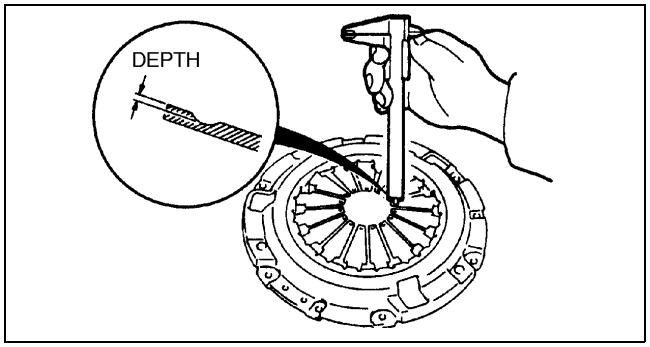
U3U51017

CLUTCH COVER INSPECTION

A3U051016410W01

1. Measure the wear of the diaphragm spring fingers.

Depth
0.5 mm {0.020 in} max.

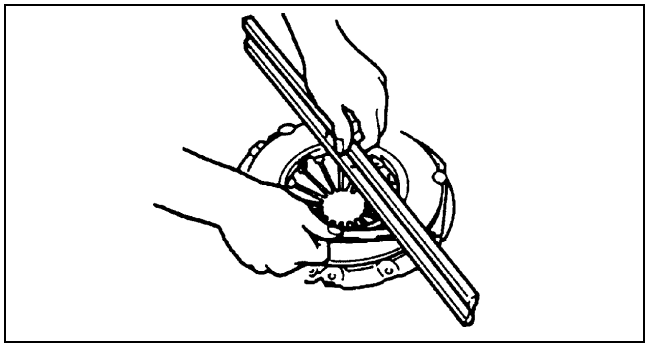


U3U51018

2. Measure the flatness of the pressure plate surface using a straightedge and a feeler gauge as shown in the figure.

   Maximum clearance
   0.5 mm {0.020 in}

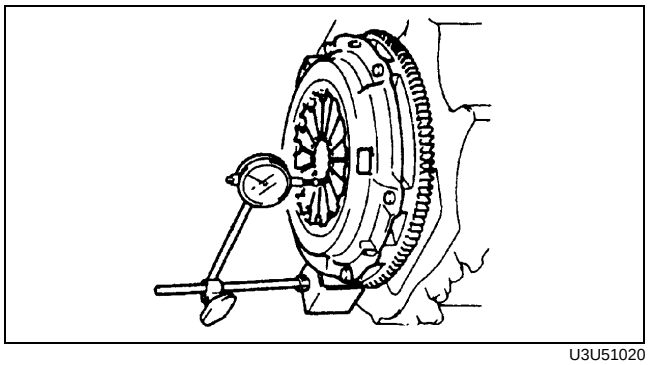
   Note
   - When inspecting the diaphragm spring fingers, mount a dial indicator on the cylinder block.



U3U51019

3. Rotate the flywheel and inspect for misaligned diaphragm spring fingers.
   - If the misalignment exceeds the maximum, replace the clutch cover.

   Misalignment
   0.6 mm {0.024 in} max.

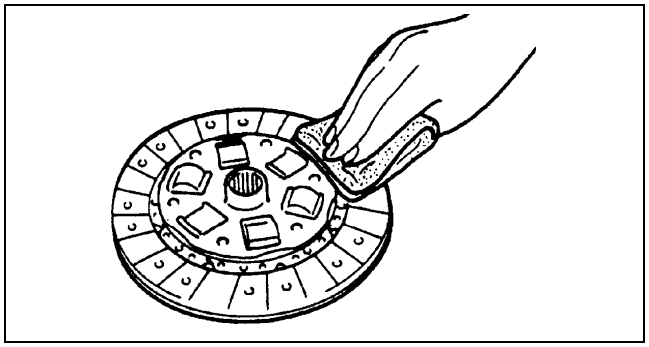


U3U51020

CLUTCH DISC INSPECTION

A3U051016460W01

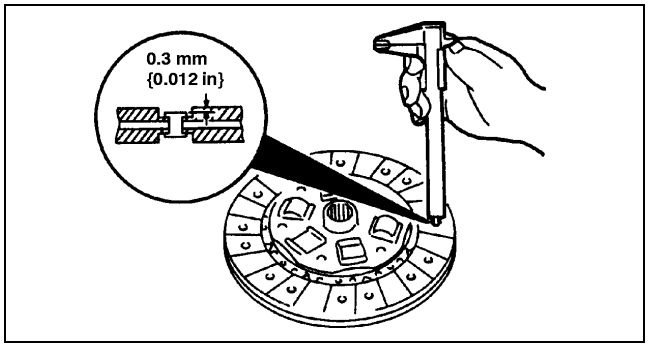
1. Inspect the contact surface of the clutch disc for scoring, cracks, burning, and oil contamination.
2. Remove minor scoring or burning using emery paper.
   - Repair if scoring or burning is major.
   - Replace if cracked or contaminated with oil.
3. Inspect for loose facing rivets and dampers.
   - If the clutch disc is loose, replace the clutch disc.



U3U51021

4. Using vernier calipers, measure the thickness of the lining at a rivet head on both sides.
   - If the thickness of the lining at any rivet head is less than the minimum, replace the clutch disc.

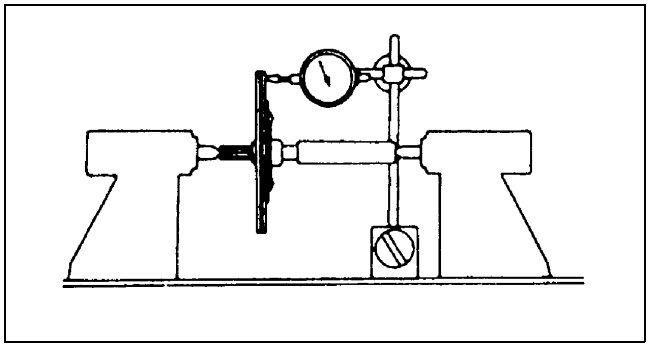
   Thickness
   0.3 mm {0.012 in} min.



W3U510WC1

5. Measure the clutch disc runout using a dial indicator.
   - If the runout exceeds the maximum, replace the clutch disc.

Runout
0.7 mm {0.028 in} max.



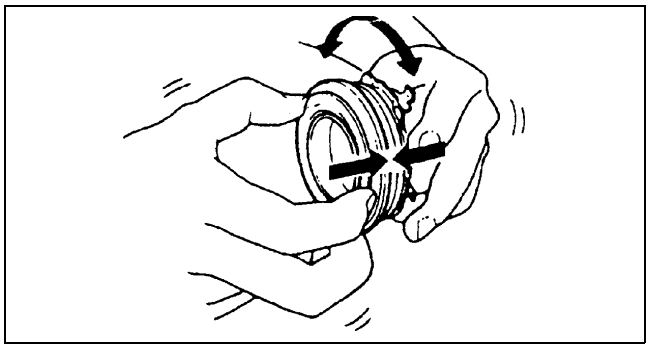
U3U51023

CLUTCH RELEASE COLLAR INSPECTION

A3U051016510W01

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.

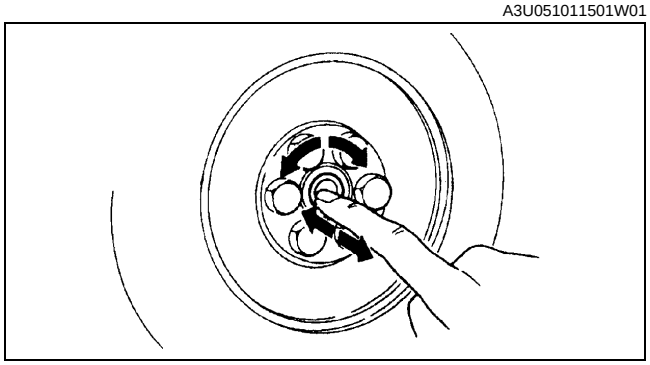


U3U51024

PILOT BEARING INSPECTION

A3U051011501W01

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.

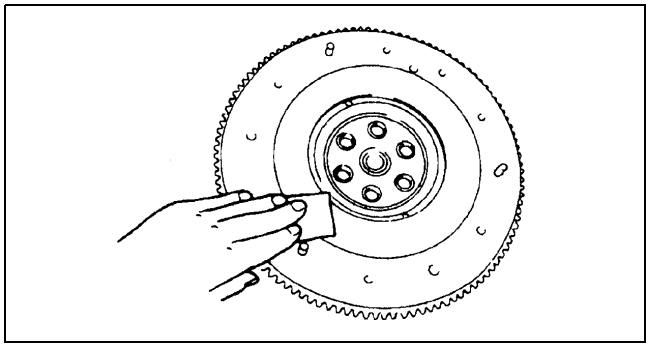


U3U51025

FLYWHEEL INSPECTION

A3U051011500W01

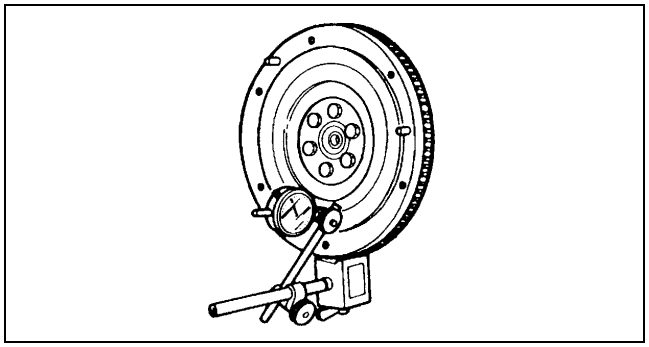
1. Inspect the contact surface for scoring, cracks, and burning.
2. Remove minor scoring or burning using emery paper.
   - Repair if scoring or burning is major.
   - Replace if cracked.
3. Inspect the ring gear teeth for wear and damage.
   - If worn or damaged, replace the flywheel.



U3U51026

4. Install a dial indicator on the cylinder block.
5. Measure the flywheel runout using a dial indicator.
   - If the runout exceeds the maximum, replace the flywheel.

Runout
0.2 mm {0.008 in} max.

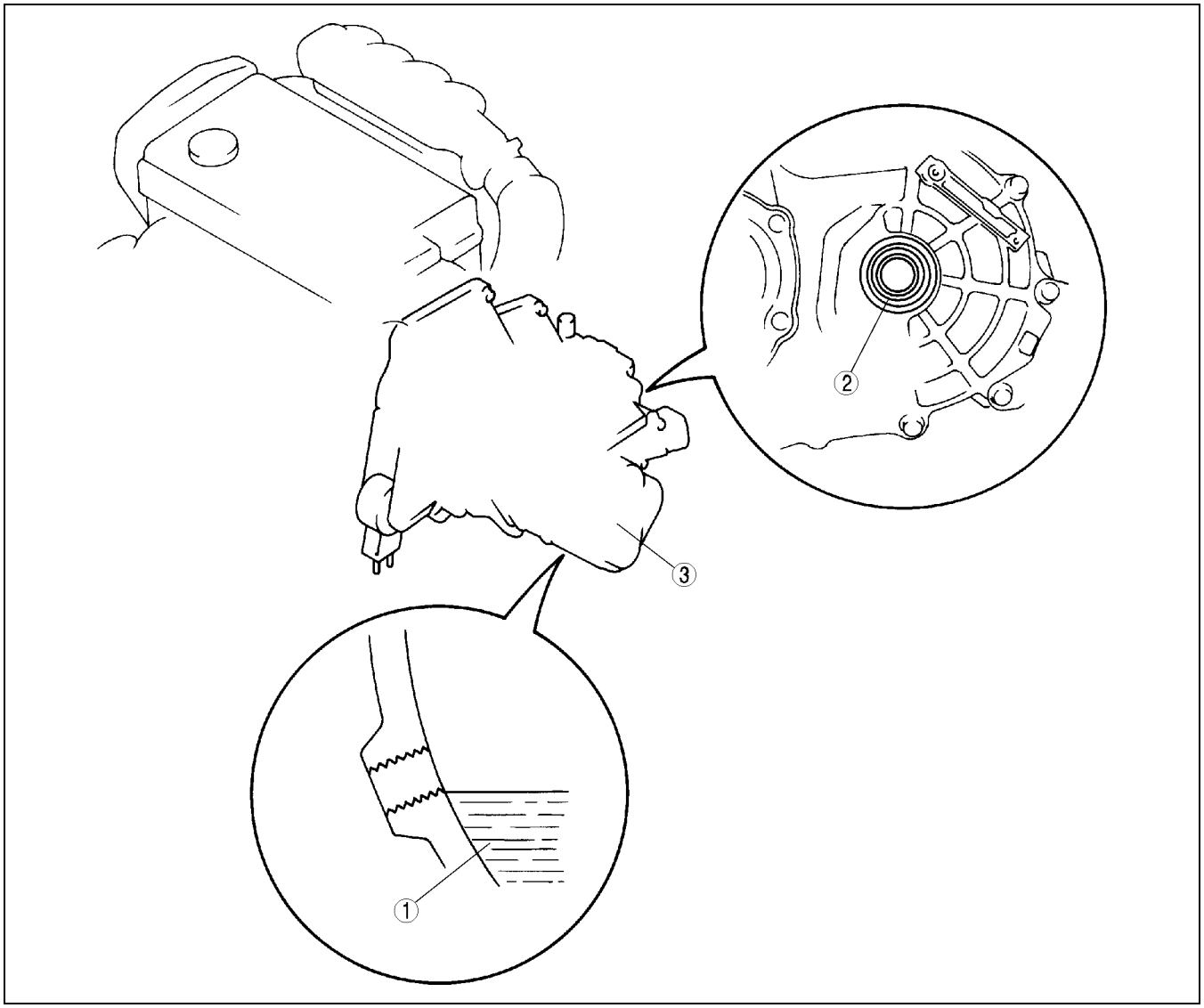


X3U510WB1

05–15A MANUAL TRANSAXLE [F25M-R]

MANUAL TRANSAXLE [F25M-R] LOCATION INDEX

A3U051501025W01



Z3U515W01

1	Transaxle oil (See 05–15A–2 TRANSAXLE OIL INSPECTION [F25M-R]) (See 05–15A–2 TRANSAXLE OIL REPLACEMENT [F25M-R])

2	Oil seal (differential) (See 05–15A–2 OIL SEAL (DIFFERENTIAL) REPLACEMENT [F25M-R])
3	Manual transaxle (See 05–15A–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R])

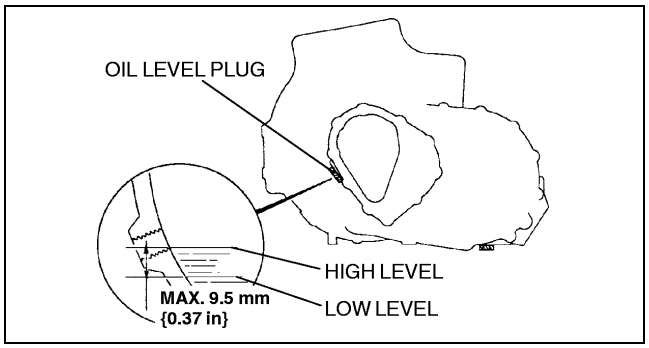
TRANSAXLE OIL INSPECTION [F25M-R]

A3U051527001W01

Note
- Park the vehicle on level ground.

1. Remove the oil level plug and the washer.
2. Verify that the oil is near the bottom of the plug port within the range shown in the figure.
   - If the oil level is low, add the specified type of oil to the bottom of the plug port through the oil level plug hole.

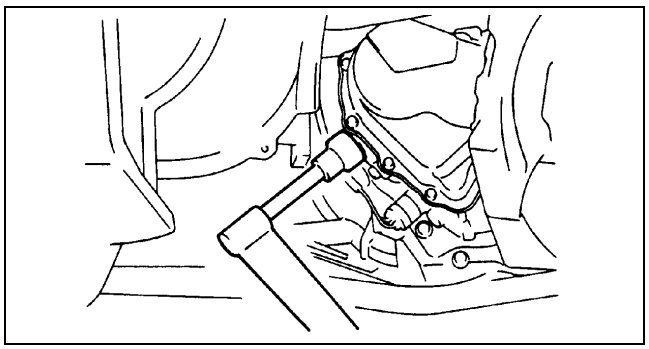
Specified oil
Grade: API service GL-4 or GL-5
Viscosity: SAE 75W—90 (All season) or SAE 80W—90 (Above 10 °C {50 °F})



X3U515WA0

3. 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}



U3U51502

TRANSAXLE OIL REPLACEMENT [F25M-R]

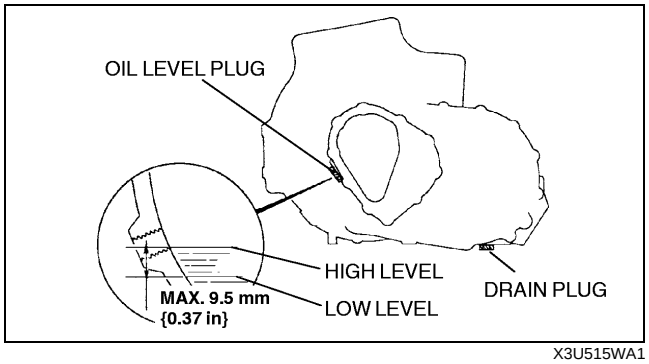
A3U051527001W02

1. Remove the drain plug and the washer.
2. Drain the oil into a 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 and the washer. 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
Viscosity: SAE 75W—90 (All season) or SAE 80W—90 (Above 10 °C {50 °F})
Capacity (approximate quantity)
2.68 L {2.83 US qt, 2.36 Imp qt}



X3U515WA1

5. Install a new washer and the oil level plug.

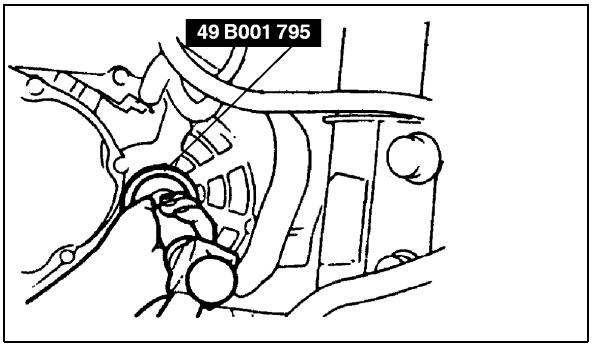
Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}

OIL SEAL (DIFFERENTIAL) REPLACEMENT [F25M-R]

A3U051527165W01

1. Drain the transaxle oil into a container.
2. Separate the drive shaft and joint shaft from the transaxle. (See 03–13–3 JOINT SHAFT REMOVAL/INSTALLATION.) (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
3. Remove the oil seal using a screwdriver and seal remover.

4. Using the **SST** and a hammer, tap the new oil seal in evenly until the **SST** contacts the transaxle case.
5. Coat the oil seal lip with transaxle oil.
6. Insert the drive shaft and joint shaft to the transaxle. (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION.) (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
7. Add the specified amount and type of transaxle oil. (See 05–15A–2 TRANSAXLE OIL REPLACEMENT [F25M-R].)

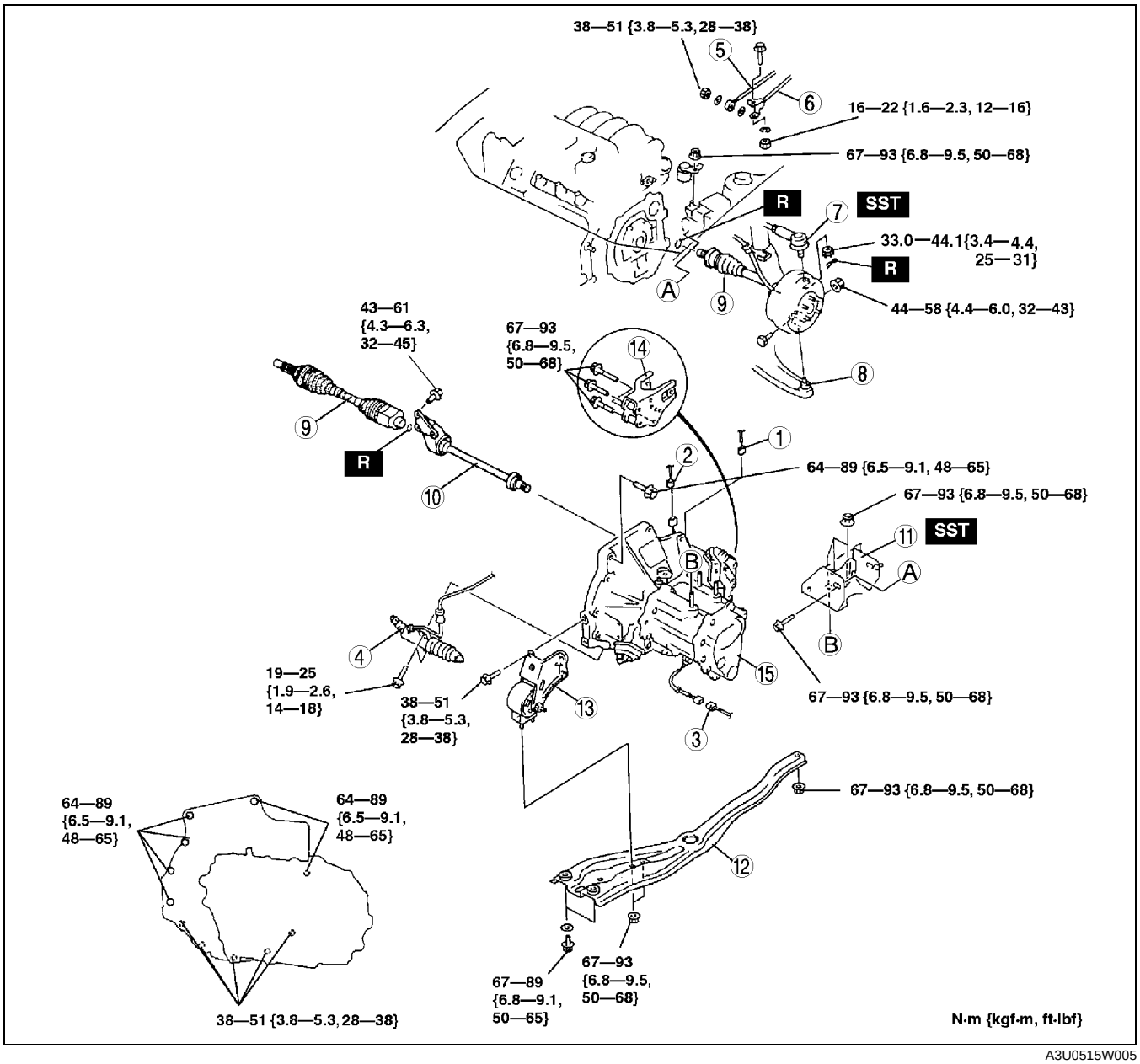


U3U51503

MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [F25M-R]

A3U051501029W01

1. Remove the battery, battery cover, and battery tray.
2. Remove the fresh-air duct and air cleaner component.
3. Remove the wheels and tires and splash shields.
4. Remove the EGR pipe, front pipe and TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
5. Drain the transaxle oil into a container.
6. Remove the starter. (See 01–19–1 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 05–15A–2 TRANSAXLE OIL REPLACEMENT [F25M-R].)
10. Warm up the engine and transaxle, inspect for oil leakage, and inspect the transaxle operation.



A3U0515W005

1	Speedometer sensor connector
2	Neutral switch connector
3	Back-up light switch connector
4	Clutch release cylinder
5	Extension bar
6	Change control rod

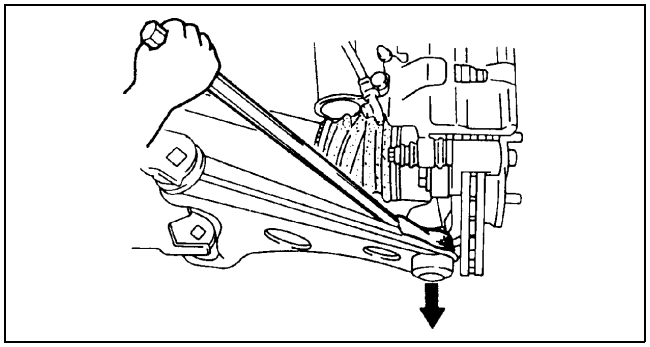
7	Tie-rod end ball joint (See 06–12–9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
8	Lower arm ball joint (See 05–15A–5 Lower Arm Ball Joint Removal Note.)

9	Drive shaft (See 03–13–9 DRIVE SHAFT REMOVAL/ INSTALLATION.)
10	Joint shaft (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION.)
11	No.4 engine mount bracket (See 05–15A–5 No.4 Engine Mount Bracket Removal Note.)
12	Engine mount member (See 05–15A–6 Engine Mount Member Installation Note.)
13	No.2 engine mount
14	No.1 engine mount bracket
15	MTX (See 05–15A–5 Manual Transaxle (MTX) Removal Note.) (See 05–15A–6 Manual Transaxle (MTX) Installation Note.)

Lower Arm Ball Joint Removal Note

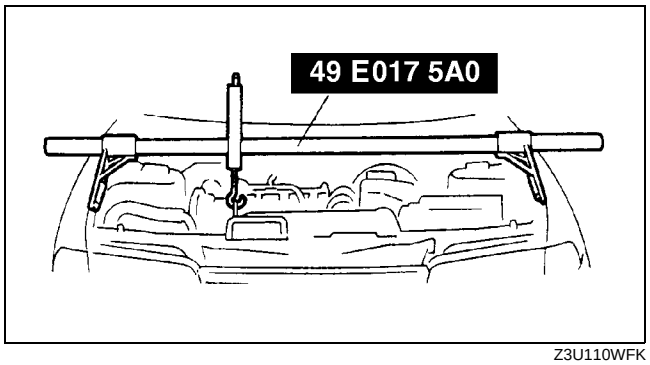
Caution
- **Wrap a rag around the ball joint dust seal to protect it from getting damages.**

1. Pry the lower arm out of the knuckle.



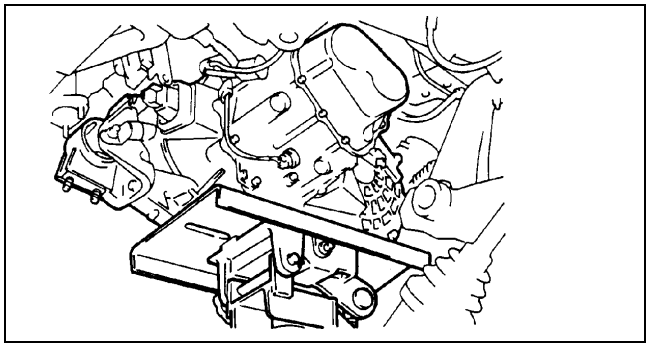
X3U515WA4

No.4 Engine Mount Bracket Removal Note
1. Support the engine using the **SST** before removing the No.4 engine mount bracket.
2. Remove the No.4 engine mount bracket.



Z3U110WFK

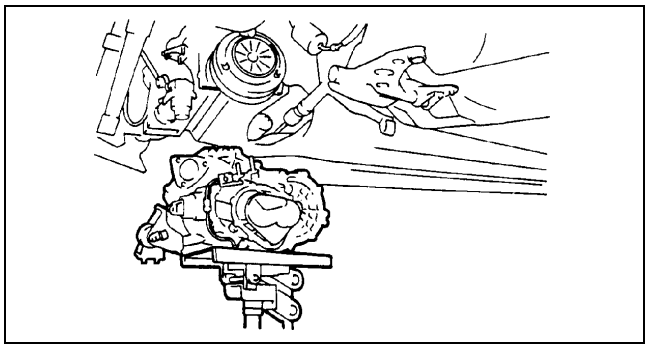
Manual Transaxle (MTX) Removal Note
1. Loosen the **SST** (49 E017 5A0) and lean the engine toward the transaxle.
2. Support the transaxle on a jack.
3. Remove the transaxle mounting bolts.
4. Remove the transaxle.



X3U515WA6

Manual Transaxle (MTX) Installation Note

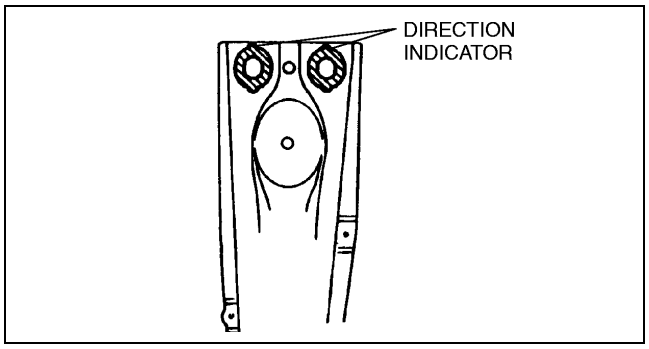
1. Set the transaxle on a jack and lift into place.
2. Install the transaxle mounting bolts.



X3U515WA7

Engine Mount Member Installation Note

1. Verify that the engine mount rubbers are installed as shown.



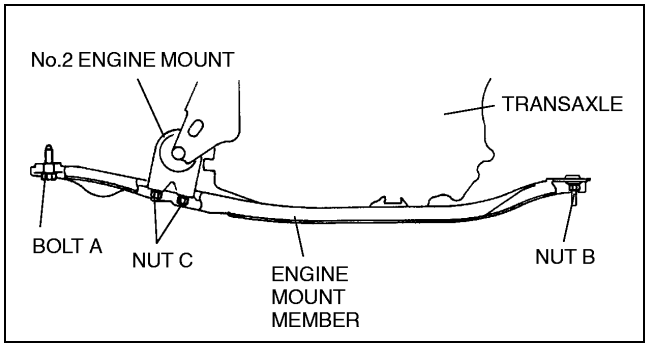
X3U515WA8

2. Put the No.2 engine mount stud bolts in the installation holes when installing the engine mount member.
3. Tighten bolt A and nut B.

   Tightening torque
   Bolt A: 67—89 N·m {6.8—9.1 kgf·m, 50—65 ft·lbf}
   Nut B: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Tighten nuts C.

   Tightening torque
   Nut C: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

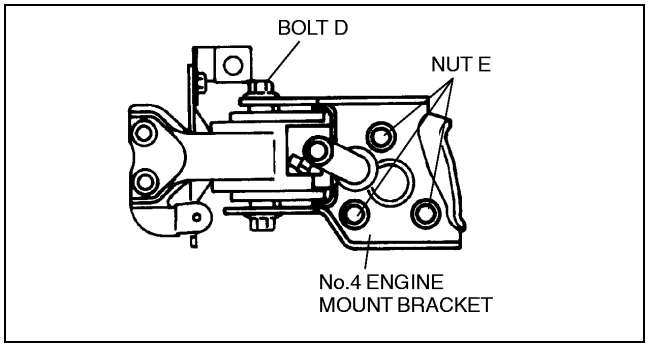


X3U515WA9

5. By aligning the holes with the stud bolts, install the No.4 engine mount bracket to the transaxle.
6. Align the hole of the No.4 engine mount bracket with the No.4 engine mount rubber on vehicle, and temporarily tighten bolt D.
7. Tighten nuts E, then bolt D.

   Tightening torque
   Bolt D and nut E: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

8. Remove the **SST** (49 E017 5A0).

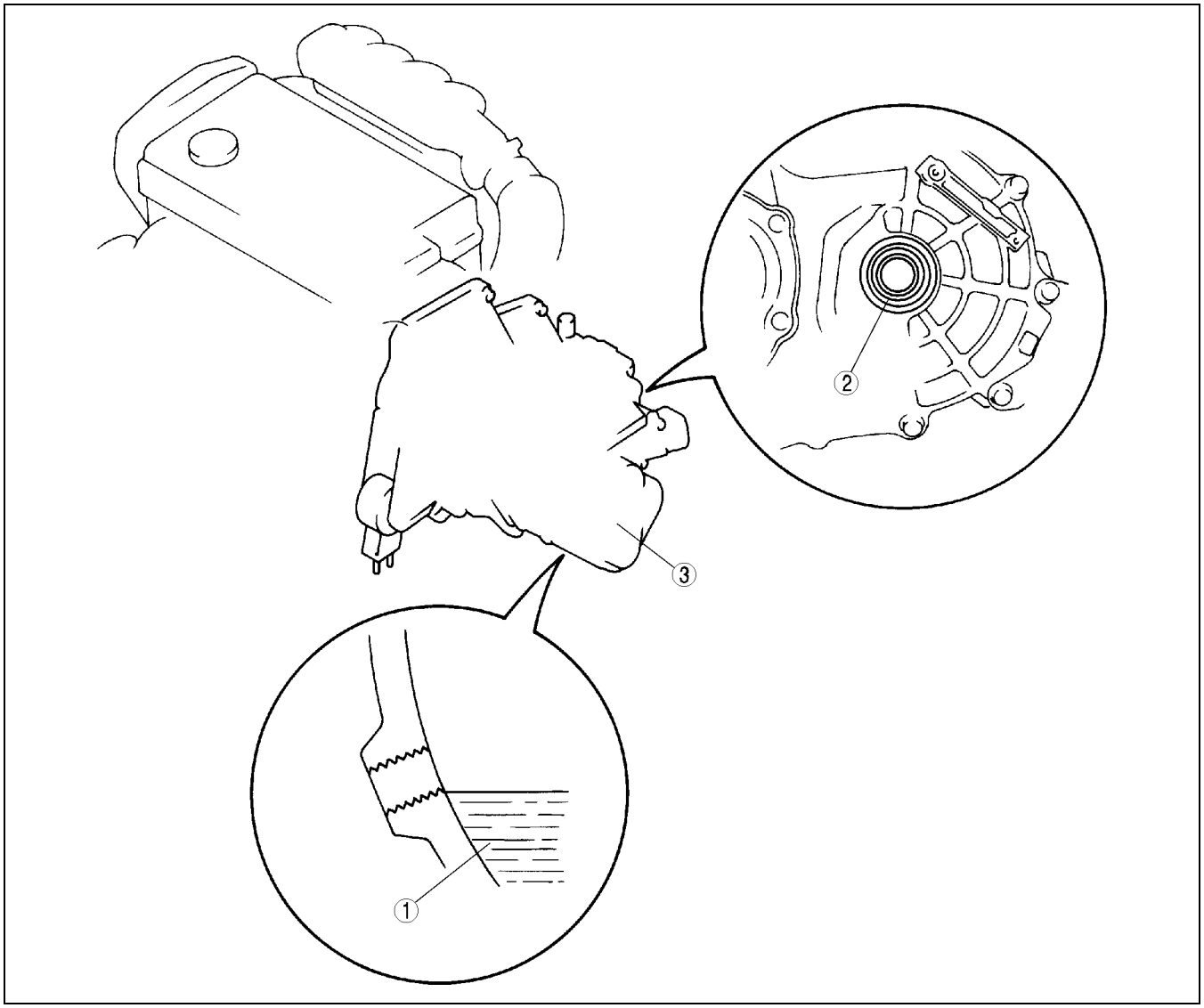


X3U515WB0

05–15B MANUAL TRANSAXLE [G15M-R]

MANUAL TRANSAXLE [G15M-R] LOCATION INDEX

A3U051501025W02



Z3U515W01

1	Transaxle oil (See 05–15B–2 TRANSAXLE OIL INSPECTION [G15M-R]) (See 05–15B–2 TRANSAXLE OIL REPLACEMENT [G15M-R].)

2	Oil seal (differential) (See 05–15B–2 OIL SEAL (DIFFERENTIAL) REPLACEMENT [G15M-R].)
3	Manual transaxle (See 05–15B–4 MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [G15M-R].)

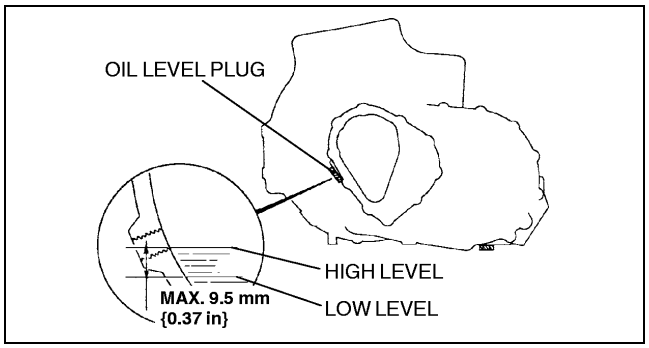
TRANSAXLE OIL INSPECTION [G15M-R]

A3U051527001W03

Note
- Park the vehicle on level ground.

1. Remove the oil level plug and the washer.
2. Verify that the oil is near the bottom of the plug port within the range shown in the figure.
   - If the oil level is low, add the specified type of oil to the bottom of the plug port through the oil level plug hole.

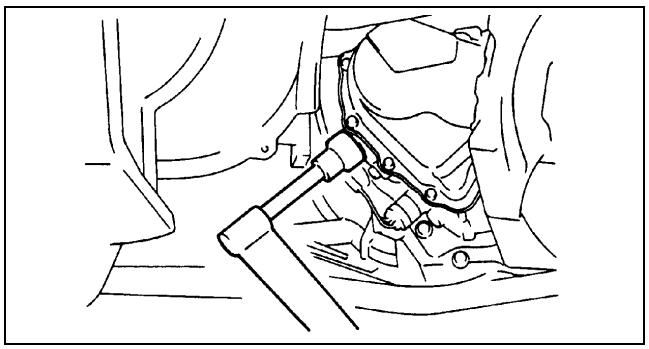
Specified oil
Grade: API service GL-4 or GL-5
Viscosity: SAE 75W—90 (All season) or SAE 80W—90 (Above 10 °C {50 °F})



X3U515WA0

3. 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}



U3U51502

TRANSAXLE OIL REPLACEMENT [G15M-R]

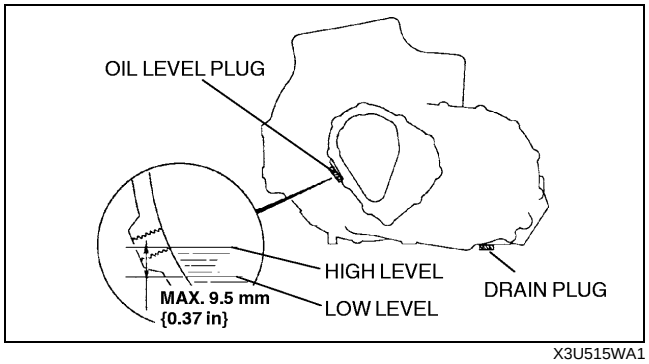
A3U051527001W04

1. Remove the drain plug and the washer.
2. Drain the oil into a 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 and the washer. 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
Viscosity: SAE 75W—90 (All season) or SAE 80W—90 (Above 10 °C {50 °F})
Capacity (approximate quantity)
2.68 L {2.83 US qt, 2.36 Imp qt}



X3U515WA1

5. Install a new washer and the oil level plug.

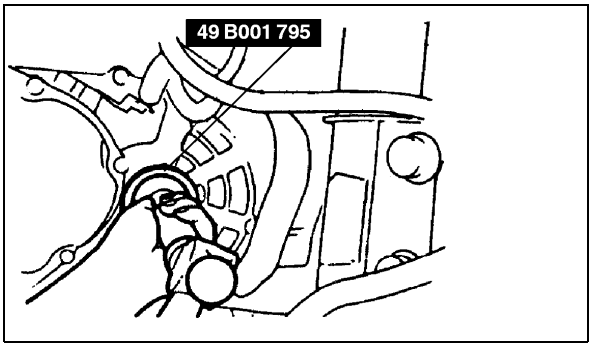
Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}

OIL SEAL (DIFFERENTIAL) REPLACEMENT [G15M-R]

A3U051527165W02

1. Drain the transaxle oil into a container.
2. Separate the drive shaft and joint shaft from the transaxle. (See 03–13–3 JOINT SHAFT REMOVAL/INSTALLATION.) (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
3. Remove the oil seal using a screwdriver and seal remover.

4. Using the **SST** and a hammer, tap the new oil seal in evenly until the **SST** contacts the transaxle case.
5. Coat the oil seal lip with transaxle oil.
6. Insert the drive shaft and joint shaft to the transaxle. (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION.) (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
7. Add the specified amount and type of transaxle oil. (See 05–15B–2 TRANSAXLE OIL REPLACEMENT [G15M-R].)

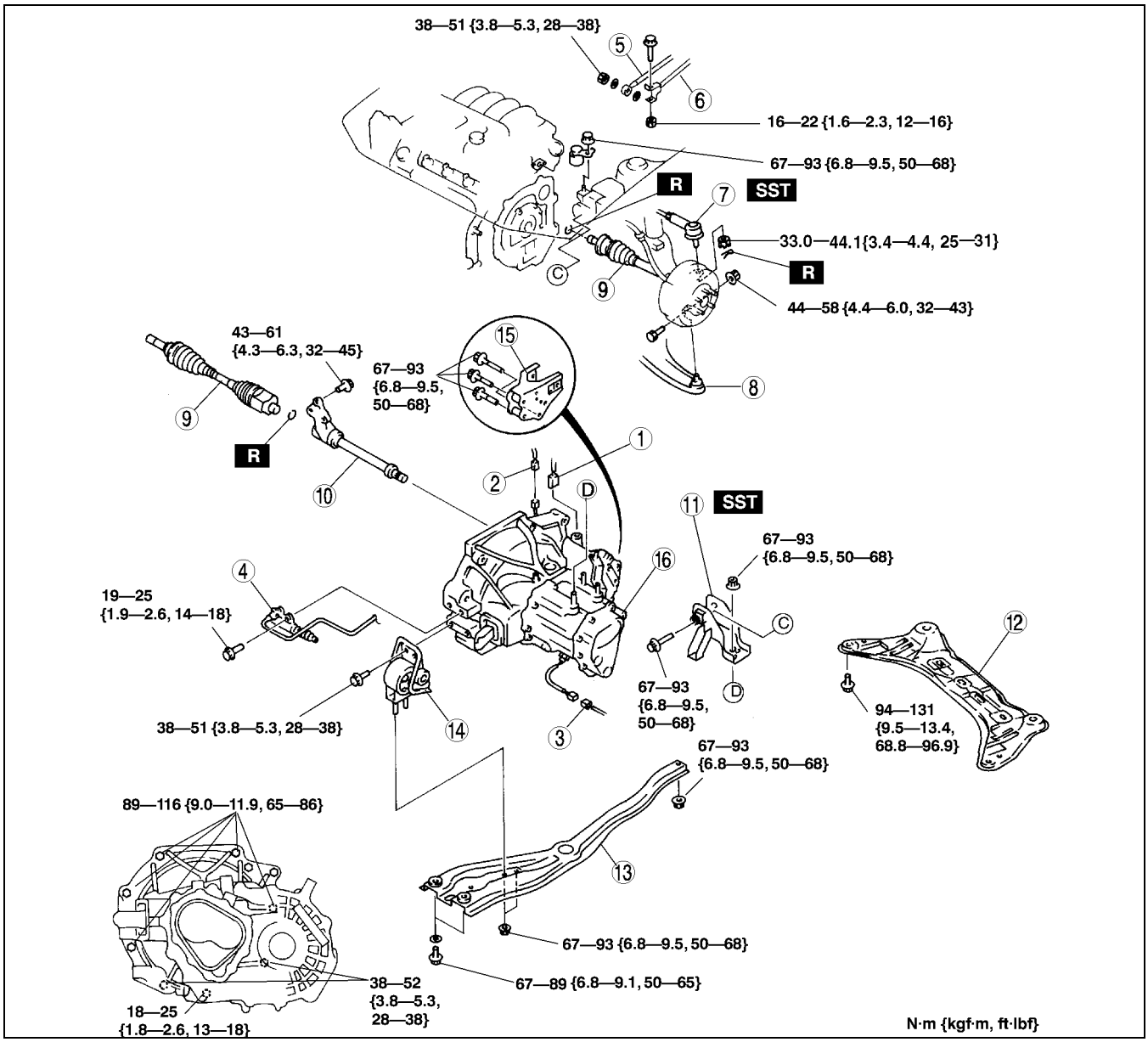


U3U51503

MANUAL TRANSAXLE (MTX) REMOVAL/INSTALLATION [G15M-R]

A3U051501029W02

1. Remove the battery, battery cover, and battery tray.
2. Remove the fresh-air duct and air cleaner component.
3. Remove the wheels and tires and splash shields.
4. Remove the EGR pipe, front pipe and TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
5. Drain the transaxle oil into a container.
6. Remove the starter. (See 01–19–1 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 05–15B–2 TRANSAXLE OIL REPLACEMENT [G15M-R].)
10. Warm up the engine and transaxle, inspect for oil leakage, and inspect the transaxle operation.



A3U0515W006

1	Speedometer sensor connector
2	Neutral switch connector
3	Back-up light switch connector
4	Clutch release cylinder
5	Extension bar
6	Change control rod

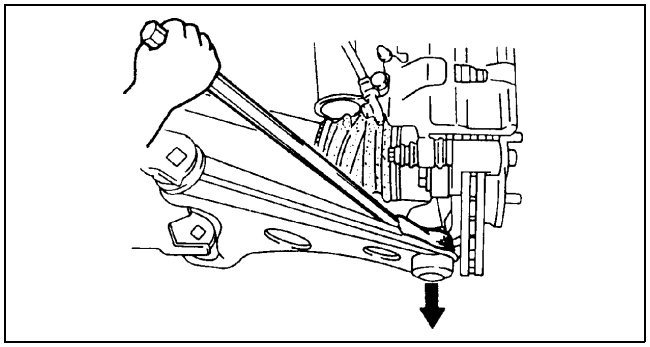
7	Tie-rod end ball joint (See 06–12–9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
8	Lower arm ball joint (See 05–15B–5 Lower Arm Ball Joint Removal Note.)
9	Drive shaft (See 03–13–9 DRIVE SHAFT REMOVAL/ INSTALLATION.)

10	Joint shaft (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION.)
11	No.4 engine mount bracket (See 05–15B–5 No.4 Engine Mount Bracket Removal Note.)
12	Transverse member (See 02–13–9 TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION.)
13	Engine mount member (See 05–15B–6 Engine Mount Member Installation Note.)
14	No.2 engine mount
15	No.1 engine mount bracket
16	MTX (See 05–15B–5 Manual Transaxle (MTX) Removal Note.) (See 05–15B–6 Manual Transaxle (MTX) Installation Note.)

Lower Arm Ball Joint Removal Note

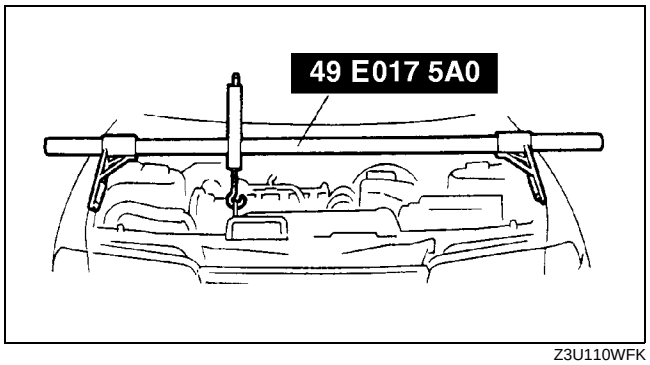
Caution
- **Wrap a rag around the ball joint dust seal to protect it from getting damages.**

1. Pry the lower arm out of the knuckle.



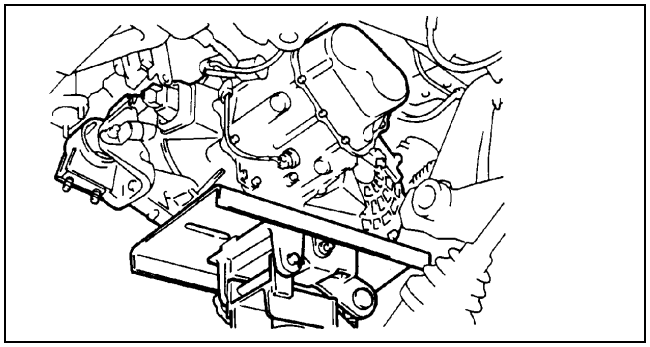
X3U515WA4

No.4 Engine Mount Bracket Removal Note
1. Support the engine using the **SST** before removing the No.4 engine mount bracket.
2. Remove the No.4 engine mount bracket.



Z3U110WFK

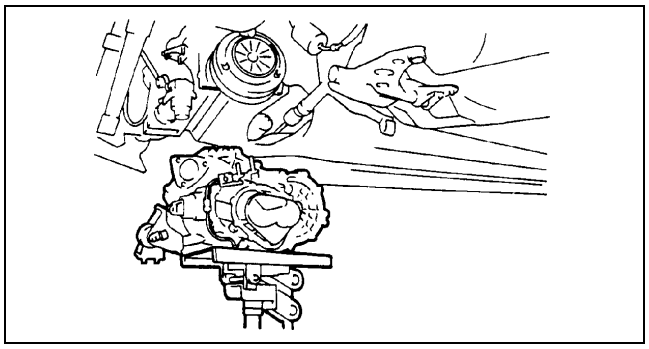
Manual Transaxle (MTX) Removal Note
1. Loosen the **SST** (49 E017 5A0) and lean the engine toward the transaxle.
2. Support the transaxle on a jack.
3. Remove the transaxle mounting bolts.
4. Remove the transaxle.



X3U515WA6

Manual Transaxle (MTX) Installation Note

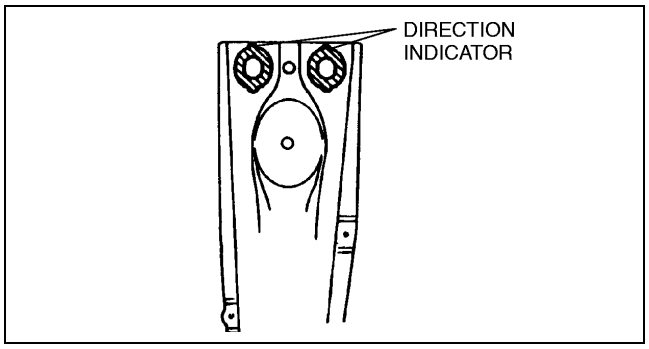
1. Set the transaxle on a jack and lift into place.
2. Install the transaxle mounting bolts.



X3U515WA7

Engine Mount Member Installation Note

1. Verify that the engine mount rubbers are installed as shown.
2. Put the No.2 engine mount stud bolts in the installation holes when installing the engine mount member.



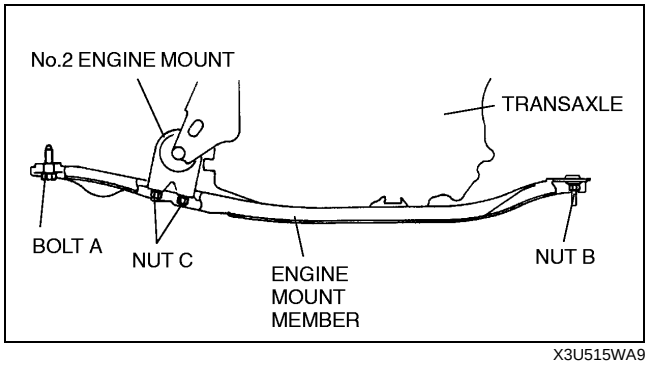
X3U515WA8

3. Tighten bolt A and nut B.

   Tightening torque
   Bolt A: 67—89 N·m {6.8—9.1 kgf·m, 50—65 ft·lbf}
   Nut B: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Tighten nuts C.

   Tightening torque
   Nut C: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

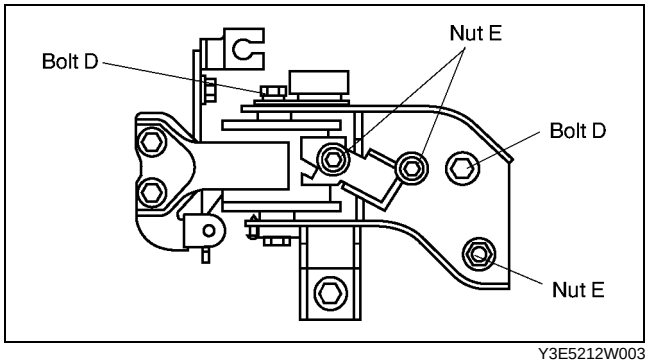


X3U515WA9

5. By aligning the holes with the stud bolts, install the No.4 engine mount bracket to the transaxle.
6. Align the hole of the No.4 engine mount bracket with the No.4 engine mount rubber on vehicle, and temporarily tighten bolt D.
7. Tighten nuts E, then bolt D.

   Tightening torque
   Bolt D and nut E: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

8. Remove the **SST** (49 E017 5A0).



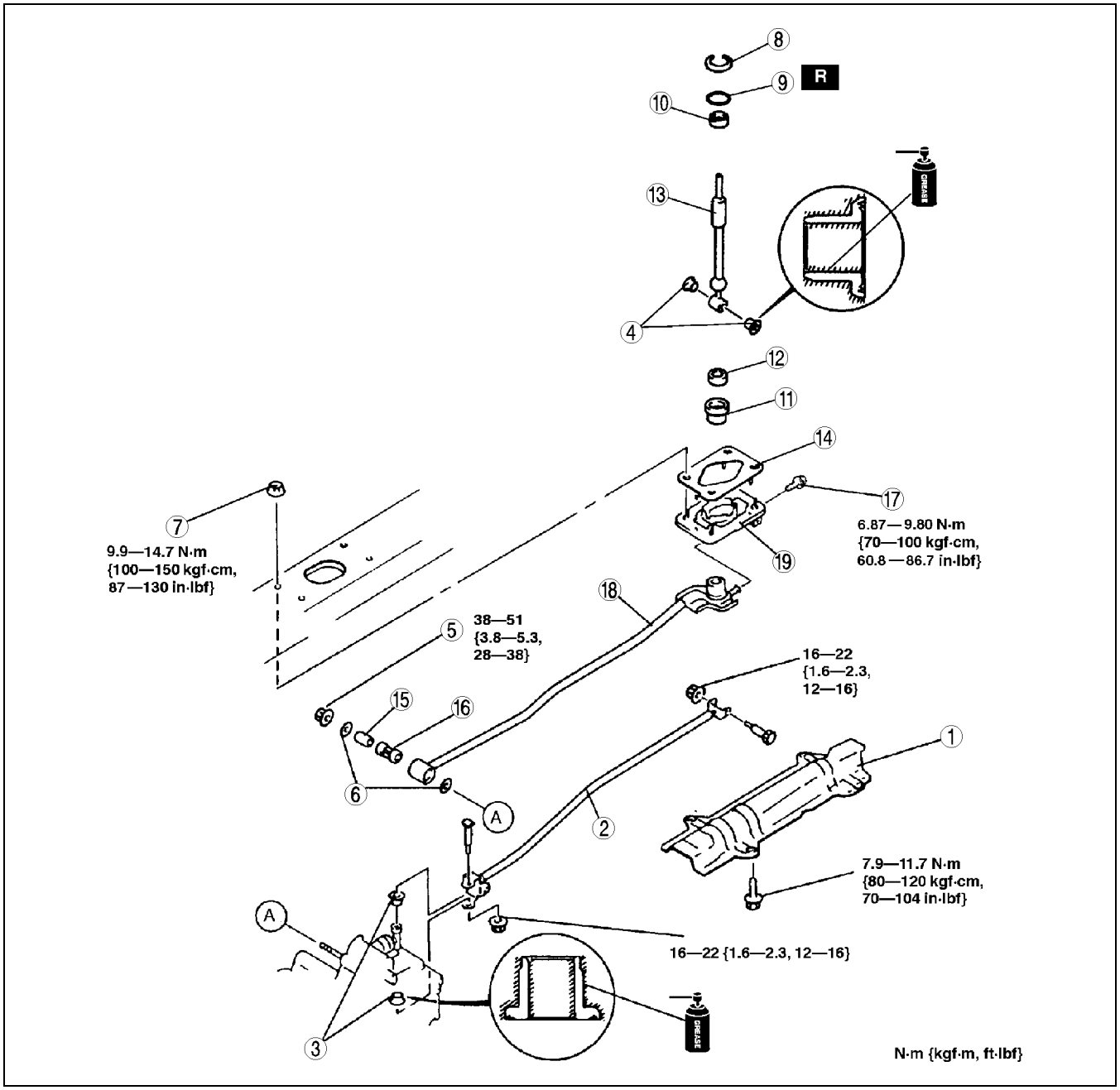
Y3E5212W003

05–16 MANUAL TRANSAXLE SHIFT MECHANISM

SHIFT MECHANISM REMOVAL/INSTALLATION

A3U051646010W01

1. Remove the front console. (See 09–17–5 CONSOLE REMOVAL/INSTALLATION.)
2. Remove the TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. After installation, verify that the gear shift lever operates smoothly when the clutch pedal is depressed.



Z3U516W01

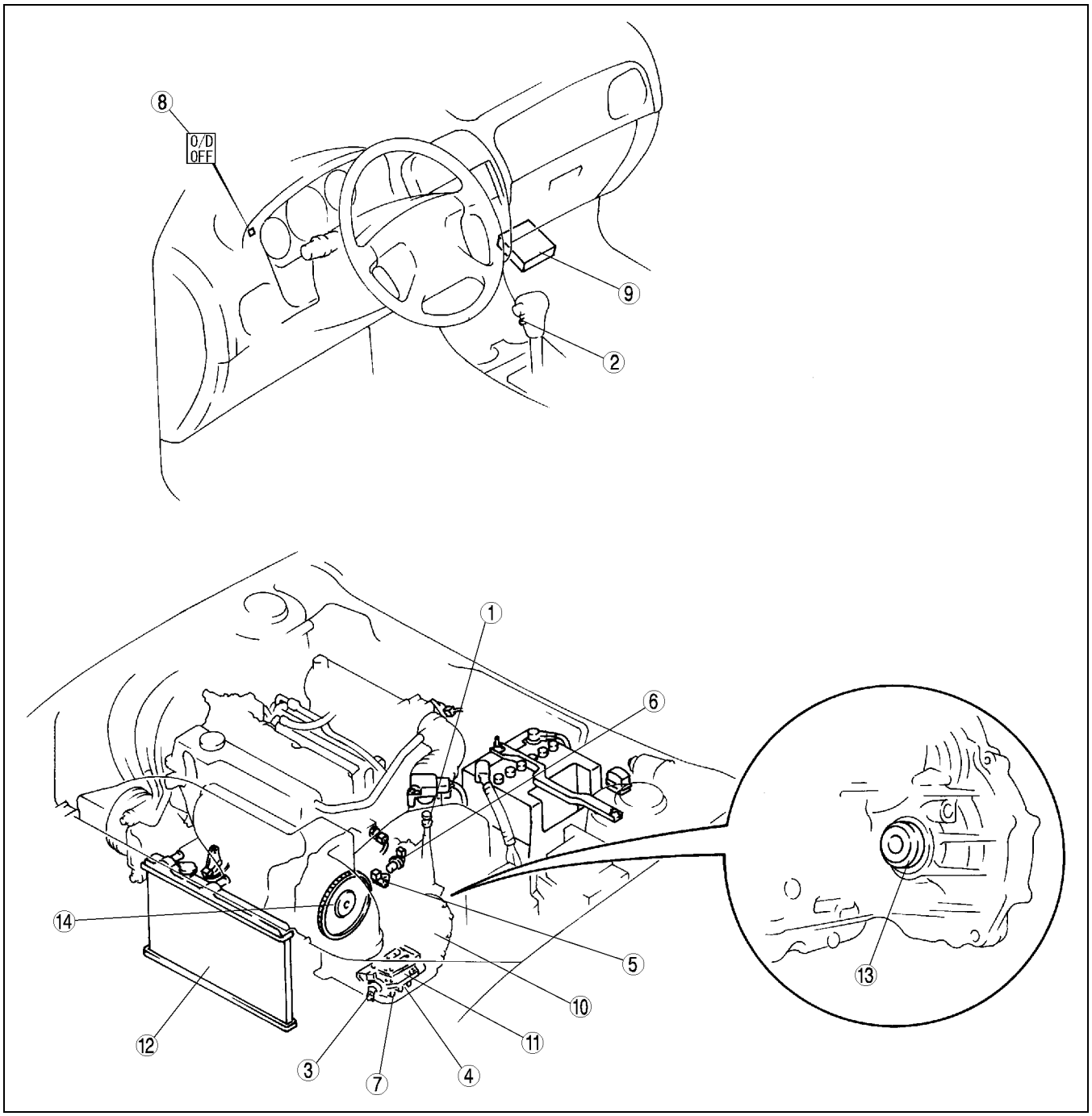
1	Heat insulator
2	Change control rod
3	Bushing
4	Bushing
5	Nut
6	Washer
7	Nut
8	Retaining ring
9	O-ring
10	Upper ball seat

11	Boot
12	Lower ball seat
13	Gear shift lever
14	Seal rubber
15	Pipe
16	Bushing
17	Bolt
18	Extension bar
19	Base plate

05–17 AUTOMATIC TRANSAXLE

AUTOMATIC TRANSAXLE LOCATION INDEX

A3U051701030W01



Z3U517W01

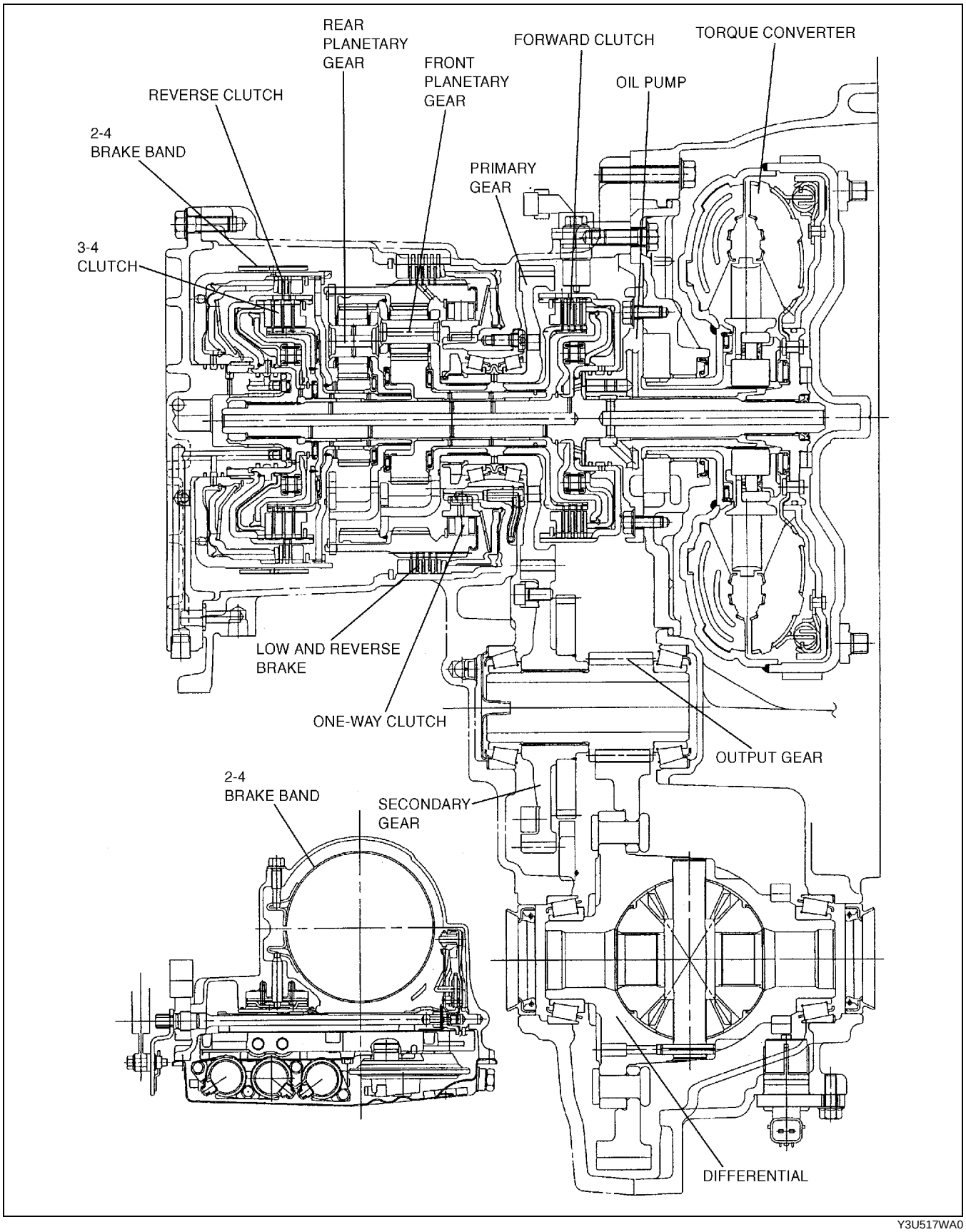
1	ATF (See 05–17–17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2	O/D OFF switch (See 05–17–19 O/D OFF SWITCH INSPECTION) (See 05–17–19 O/D OFF SWITCH REMOVAL/INSTALLATION)
3	TR switch (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION) (See 05–17–23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT)

4	TFT sensor (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION) (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)
5	Input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION) (See 05–17–26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION)
6	Vehicle speedometer sensor (without ABS) (See 05–17–28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX]) (See 05–17–27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX])

7	Solenoid valve (See 05–17–28 SOLENOID VALVES INSPECTION) (See 05–17–30 SOLENOID VALVES REMOVAL/INSTALLATION)
8	O/D OFF indicator light (See 05–17–30 O/D OFF INDICATOR LIGHT INSPECTION)
9	PCM (See 05–17–30 PCM REMOVAL/INSTALLATION)
10	Transaxle (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION)
11	Control valve body (See 05–17–36 CONTROL VALVE BODY REMOVAL/INSTALLATION)
12	Oil cooler (See 05–17–40 OIL COOLER FLUSHING) (See 05–17–41 OIL COOLER REMOVAL/INSTALLATION)
13	Oil seal (transaxle) (See 05–17–36 OIL SEAL (TRANSAXLE) REPLACEMENT)
14	Drive plate (See 05–17–46 DRIVE PLATE REMOVAL/INSTALLATION)

AUTOMATIC TRANSAXLE (ATX) CROSS-SECTIONAL VIEW

A3U051701030W02

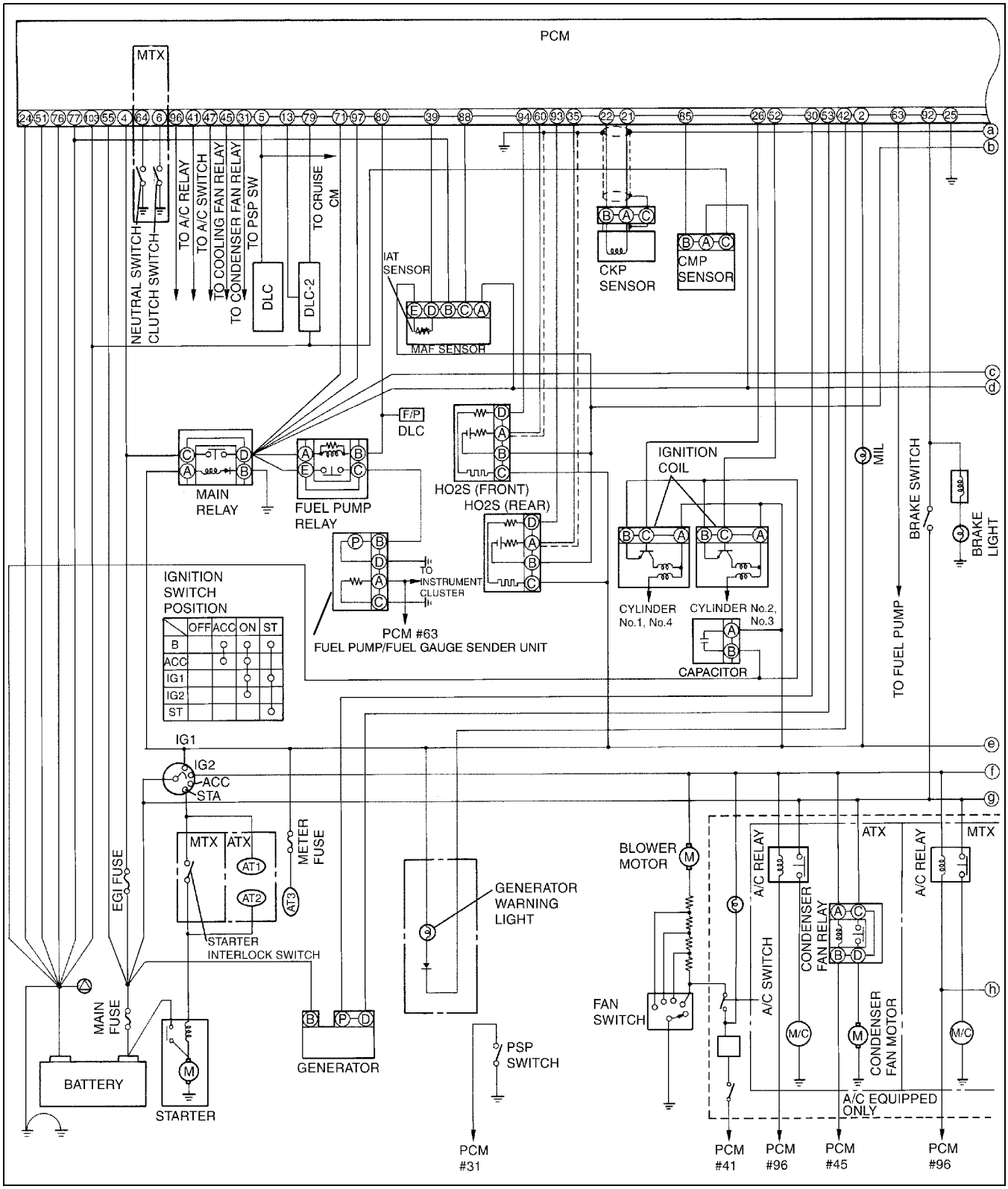


Y3U517WA0

SYSTEM WIRING DIAGRAM

A3U051701030W03

ZM Engine



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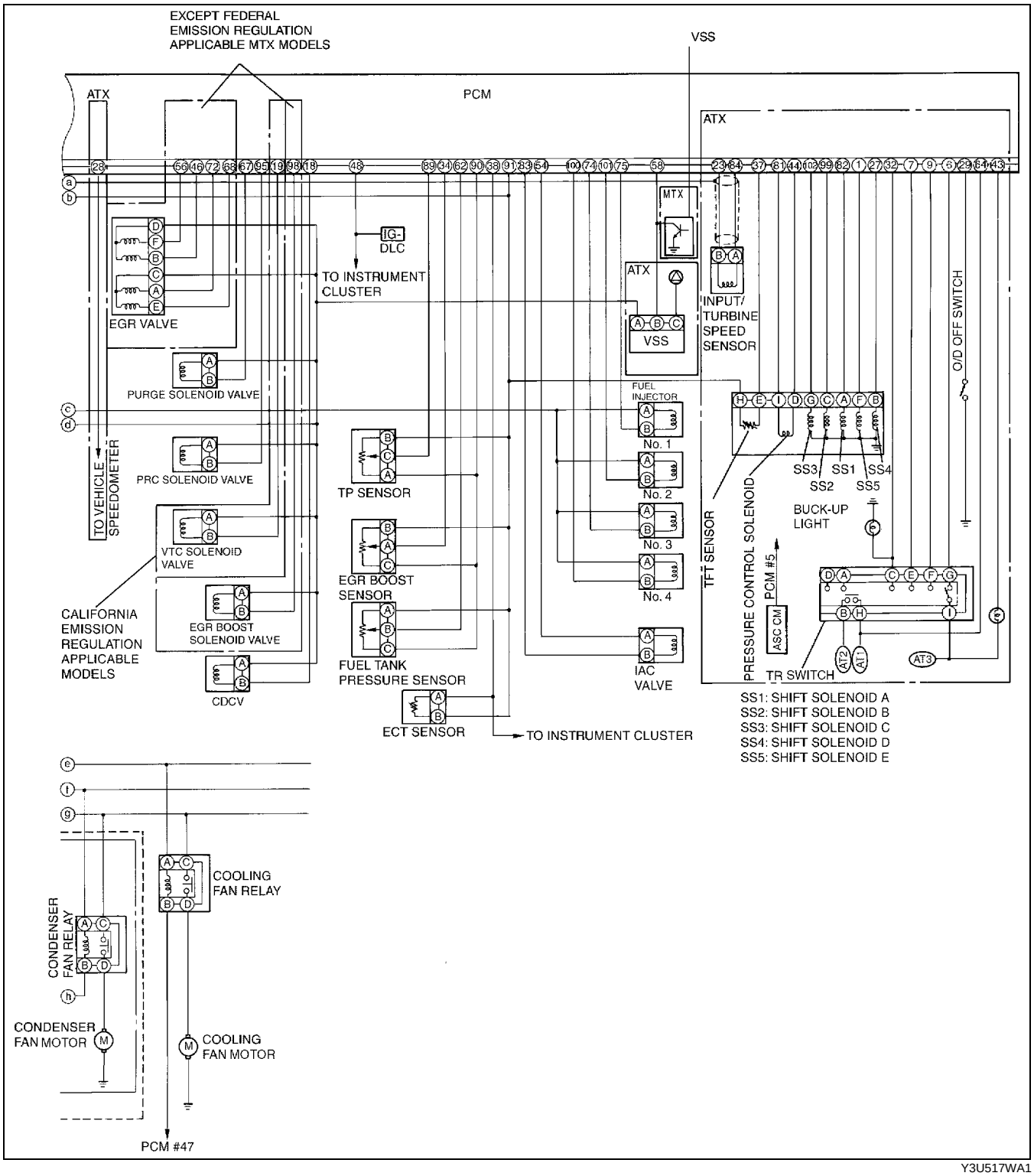
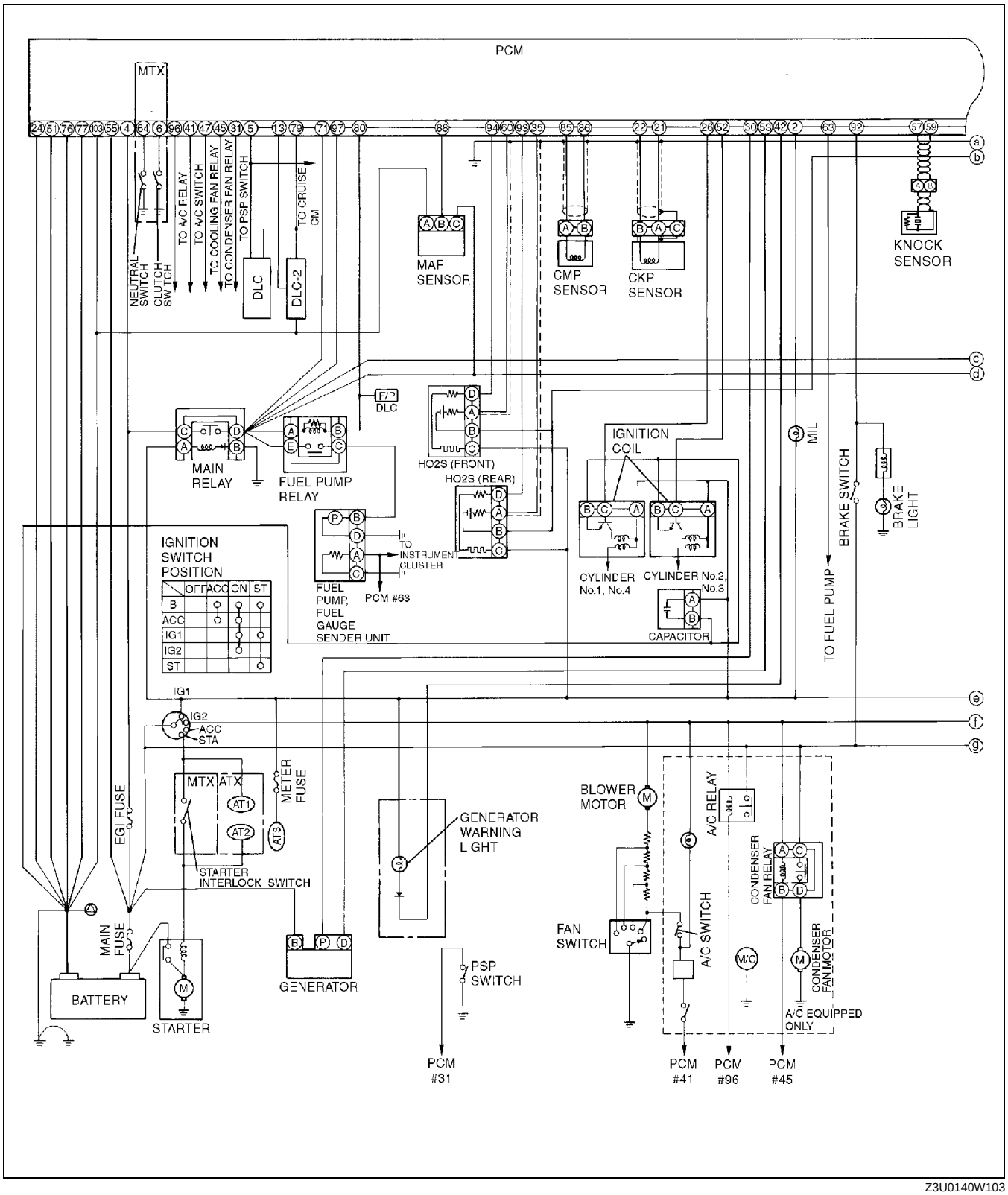

EXCEPT FEDERAL EMISSION REGULATION APPLICABLE MTX MODELS
VSS
ATX
PCM
ATX
MTX
IG-DLC
TO INSTRUMENT CLUSTER
ATX
VSS
INPUT/ TURBINE SPEED SENSOR
O/D OFF SWITCH
EGR VALVE
PURGE SOLENOID VALVE
FUEL INJECTOR
No. 1
No. 2
No. 3
No. 4
IAC VALVE
TO VEHICLE SPEEDOMETER
PRC SOLENOID VALVE
TP SENSOR
SS3 SS1 SS4
SS2 SS5
BUCK-UP LIGHT
VTC SOLENOID VALVE
EGR BOOST SENSOR
TFT SENSOR
PRESSURE CONTROL SOLENOID
PCM #5
ASC CM
CALIFORNIA EMISSION REGULATION APPLICABLE MODELS
EGR BOOST SOLENOID VALVE
FUEL TANK PRESSURE SENSOR
CDCV
ECT SENSOR
TO INSTRUMENT CLUSTER
TR SWITCH
AT2
AT1
AT3
SS1: SHIFT SOLENOID A
SS2: SHIFT SOLENOID B
SS3: SHIFT SOLENOID C
SS4: SHIFT SOLENOID D
SS5: SHIFT SOLENOID E
COOLING FAN RELAY
CONDENSER FAN RELAY
CONDENSER FAN MOTOR
COOLING FAN MOTOR
PCM #47

Y3U517WA1

FS Engine



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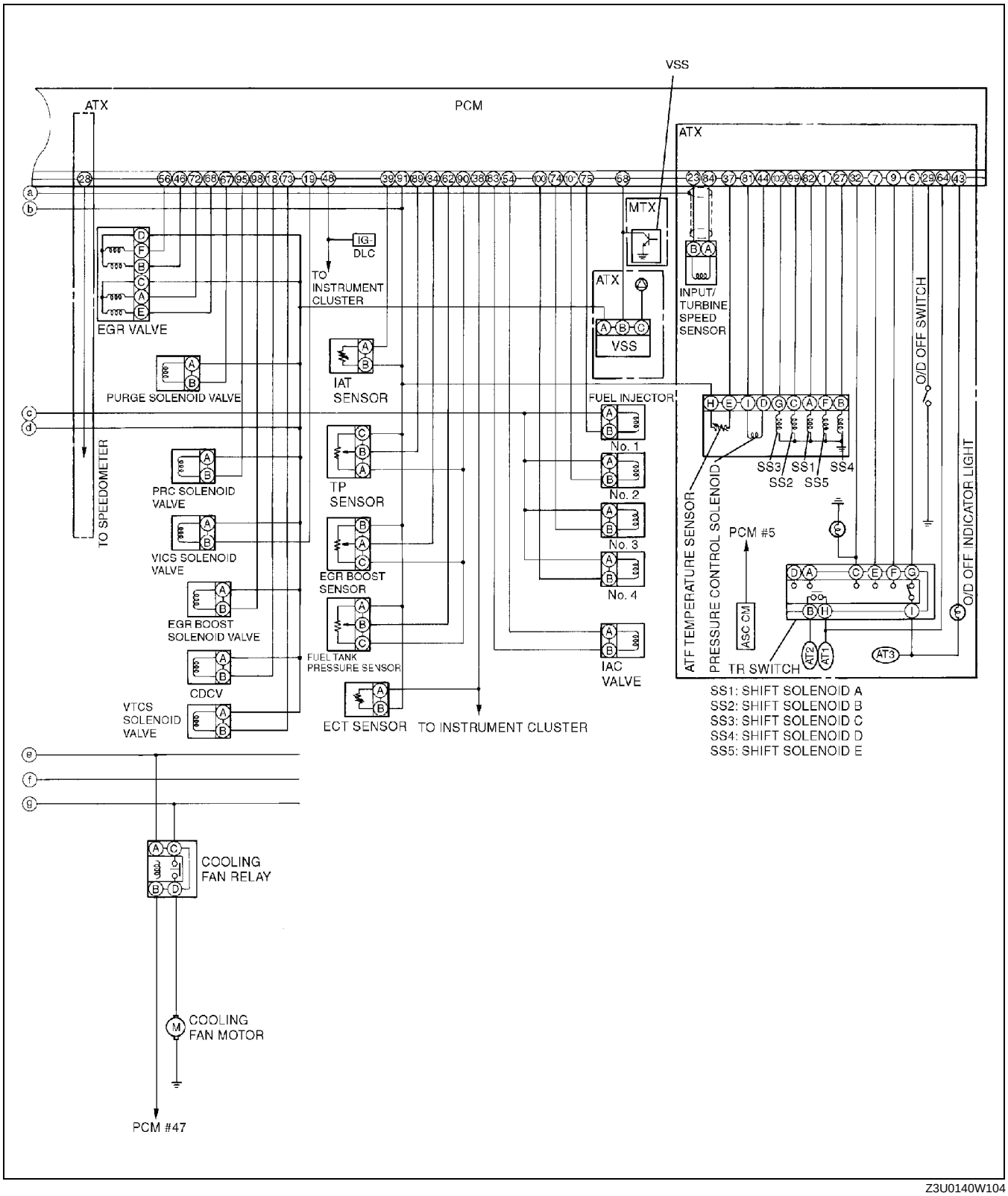
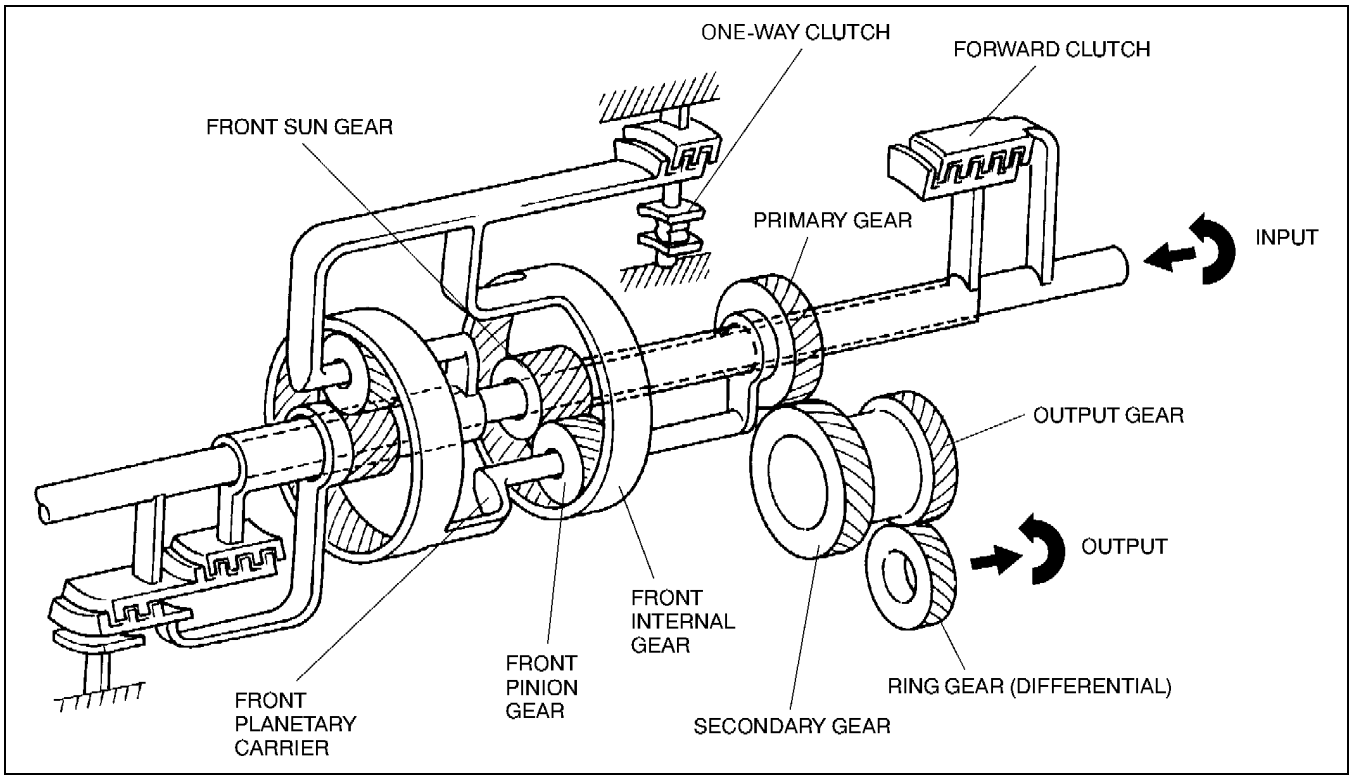


Z3U0140W104

AUTOMATIC TRANSAXLE (ATX) POWERTRAIN STRUCTURAL VIEW

A3U051701030W04



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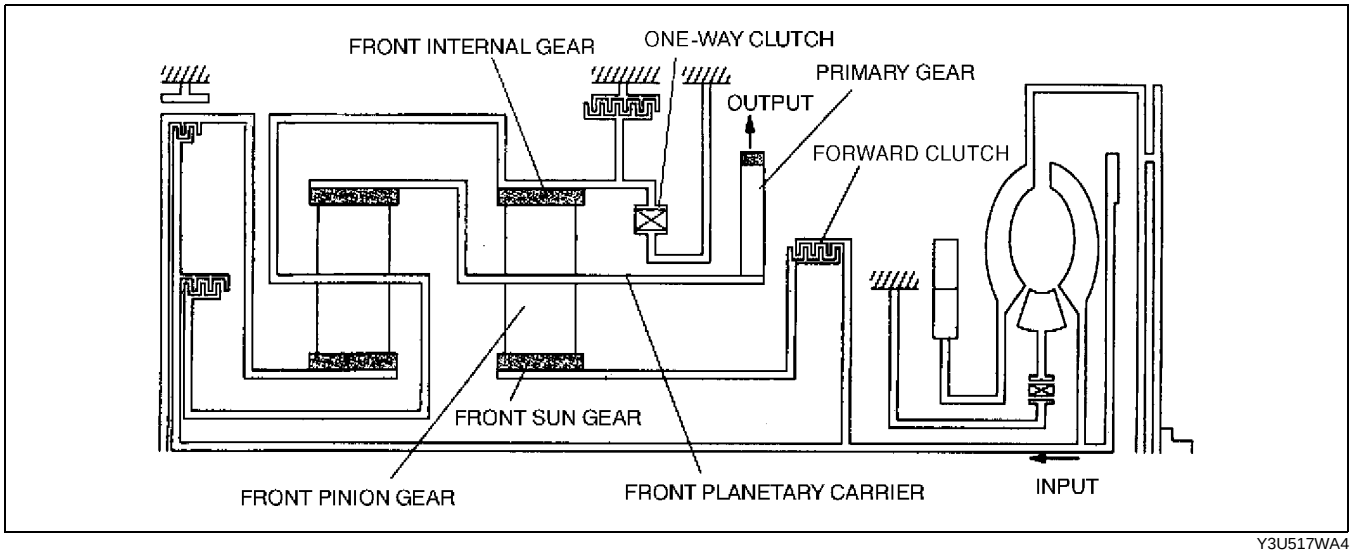


Y3U517WA4

EC-AT Operation Chart

Position/Range	Mode	Gear position		Shift pattern			Transaxle							Operation of shift solenoid				
										2–4 brake band				Solenoid valve (duty-cycle type)			Solenoid valve (ON/OFF type)	
				Shift	TCC	Engine brake	Forward clutch	3–4 clutch	Reverse clutch	Applied	Released	Low and reverse brake	One-way clutch	Shift solenoid A	Shift solenoid B	Shift solenoid C	Shift solenoid D	Shift solenoid E
P	–	Neutral	–	–										–	–	–	ON	OFF
R	–	Reverse	2.648	–		×			×			×		OPEN	OPEN	OPEN	OFF	OFF
N	–	Neutral	–	–										–	–	–	ON	OFF
D	*1 POWER/ NORMAL	1GR	2.816	↕			×						×*4	OPEN	CLOSE	CLOSE	OFF	OFF
		2GR	1.497	↕		×	×			×				OPEN	OPEN	CLOSE	OFF	OFF
		3GR	1.000	↕		×	×	×		×*5	×			OPEN	OPEN	OPEN	OFF	OFF
		4GR	0.725	↕		×		×		×				CLOSE	OPEN	OPEN	ON	OFF
		4GR *2 TCC ON	0.725	↕	×	×		×		×				CLOSE	OPEN	OPEN	ON	ON
2	–	2GR	1.497	↑		×	×			×				OPEN	OPEN	CLOSE	OFF	OFF
		3GR*3	1.000	↑		×	×	×		×*5	×			OPEN	OPEN	OPEN	OFF	OFF
		4GR*3	0.725	↑		×		×		×				CLOSE	OPEN	OPEN	ON	OFF
1	–	1GR	2.816	↑		×	×					×	×*4	OPEN	OPEN	CLOSE	ON	ON
		2GR*3	1.497	↑		×	×			×				OPEN	OPEN	CLOSE	OFF	OFF
		3GR*3	1.000	↑		×	×	×		×*5	×			OPEN	OPEN	OPEN	OFF	OFF
		4GR*3	0.725	↑		×		×		×				CLOSE	OPEN	OPEN	ON	OFF

*1: Automatically switches between POWER and NORMAL modes according to accelerator pedal depressing speed
*2: Performs TCC operation in NORMAL mode
*3: Engine overspeed protection
*4: Transmits the torque only when driving
*5: Indicates operation although the band servo remains deactivated due to the large area of the release pressure side.
×: Operating
✳: Transmits the torque only when driving
OPEN: Engages the line pressure to the clutch pressure (Solenoid de-energized)
CLOSE: Drains the clutch pressure (Solenoid energized)
ON: Engages the output port and the supply port (Solenoid reducing pressure)
OFF: Engages the output port and the drain port (Drains the output port)

Y3U517WAP

MECHANICAL SYSTEM TEST

A3U051701030W05

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 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–2 ENGINE COOLANT LEVEL INSPECTION.)
3. Inspect the engine oil. (See 01–11–2 ENGINE OIL INSPECTION.)
4. Inspect the ATF levels. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
5. Inspect the ignition timing. (See 01–10A–25 Ignition Timing Inspection.) (See 01–10B–25 Ignition Timing Inspection.)
6. Inspect the idle speed. (See 01–10A–26 Idle Speed Adjustment.) (See 01–10B–26 Idle Speed Adjustment.)

Line Pressure Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)

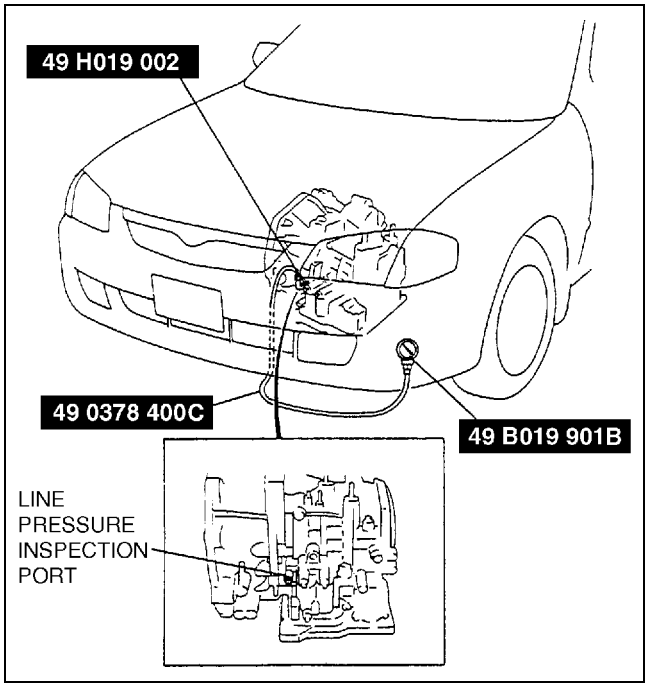
   Warning
   - **Removing the square-head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the square-head plug, allow the ATF to cool.**

2. Connect the **SSTs** (49 0378 400C, 49 B019 901B and 49 H019 002) to the line pressure inspection port.
3. Start the engine and shift the selector lever to D range and read the line pressure at idle.

   Warning
   - **Removing the SST when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the SST, allow the ATF to cool.**

4. Turn the engine off and remove the **SST** (49 B019 901B), and replace the gauge part of the **SST** (49 B019 902).

   Caution
   - **Do not maintain WOT in any position/ range for more than 5 seconds, or transaxle damage will occur.**



Z3U502W02

5. Start the engine and firmly depress the brake pedal with the left foot, and then depress the accelerator pedal to floor (WOT) with the right.
6. When the engine speed no longer increases, quickly read the line pressure and release the accelerator pedal.
7. Shift the selector lever to N position and let the engine idle for **1 minute** or more to cool the ATF.
8. Read the line pressure at idle and at the engine stall speed for the 2, and 1 ranges and R position in the same manner.

Line pressure specification

Position /range	Line pressure kPa {kgf/cm^2, psi}			
	Idle		Stall	
	ZM	FS	ZM	FS
D, 2, 1	330—470 {3.4—4.7, 49—66}		1,200—1,360 {12.3—13.8, 175—196}	1,160—1,320 {11.9—13.4, 170—190}
R	490—710 {5.0—7.2, 72—100}		1,470—1,690 {15.0—17.2, 214—244}	

9. Shift the selector lever to P position and turn off the engine.

   Warning
   - **Removing the SST when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the SST, allow the ATF to cool.**

10. Remove the **SST**.
11. Install a new square head plug in the inspection port.

    Tightening torque
    4.91—9.80 N·m {50—100 kgf·cm, 43.4—86.7 in·lbf}

Evaluation of line pressure test

Condition	Possible cause
Low pressure in all positions/ranges	• Worn oil pump • Oil leaking from oil pump, control valve body, and/or transaxle case • Pressure regulator valve stuck • Pressure control solenoid malfunction • Solenoid reducing valve stuck
Low pressure in D, 2, 1 only	• Oil leaking from forward clutch hydraulic circuit
Low pressure in 2 only	• Oil leaking from 2-4 brake band hydraulic circuit
Low pressure in 1, R only	• Oil leaking from low and reverse brake hydraulic circuit
Low pressure in R only	• Oil leaking from reverse clutch hydraulic circuit
Higher pressure in all positions/ranges	• Pressure control solenoid malfunction and/or open harness • Pressure regulator valve stuck • PCM malfunction

Stall Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)
2. Start the engine and shift the selector lever to R position.

Caution
- **Do not maintain WOT in any position/range for more than 5 seconds, or transaxle damage will occur.**

3. Firmly depress the brake pedal with the left foot, and depress the accelerator pedal to floor (WOT) with the right.
4. When the engine speed no longer increases, quickly read the engine speed and release the accelerator pedal.
5. Shift the selector lever to N position and let the engine idle for **1 minute** or more to cool the ATF.
6. Perform stall tests of D, 2, and 1 ranges in the same manner.

Engine stall speed
ZM engine: 2,300—2,600 rpm
FS engine: 2,200—2,500 rpm

7. Turn off the engine.

Evaluation of stall test

Condition	Possible cause	
Above specification	Insufficient line pressure, torque converter pressure	• Worn oil pump
		• Oil leaking from oil pump, control valve, and/or transaxle case
		• Pressure regulator valve sticking
		• Converter relief valve sticking
		• Pressure control solenoid malfunction
	In D, 2 and 1 ranges	• Forward clutch slipping
	In 2 range	• 2-4 brake band slipping
	In 1 range and R position	• Low and reverse brake slipping
	In R position	• Low and reverse brake slipping • Reverse clutch slipping Perform road test to determine whether problem is in low and reverse brake or reverse clutch • Engine braking felt in 1 range: Reverse clutch is defective. • Engine braking not felt in 1 range: Low and reverse brake is defective.
Below specification		• Engine lack of power

Time Lag Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)
2. Start the engine and warm up the engine until the ATF temperature reaches **60—70 °C {141— 158 °F}**.
3. Shift the selector lever from N position to D range.
4. Use a stopwatch to measure the time it takes from shifting until engagement is felt. Take 3 measurements for each test and average the results using the following formula.

Formula

$$\text{Average time lag} = \frac{\text{Time 1} + \text{Time 2} + \text{Time 3}}{3}$$

X3U517WD8

5. Perform the test for the following shifts in the same manner.
   - N position→R position

Average time lag
N position→D range: 0.4—0.7 sec
N position→R position: 0.4—0.7 sec

Evaluation of time lag test

Condition		Possible cause
N→D shift	More than specification	• Low line pressure • Forward clutch slipping • Oil leaking from forward clutch fluid circuit • Shift solenoid A not operating properly
	Less than specification	• Forward accumulator not operating properly • Shift solenoid A not operating properly • Excessive line pressure
N→R shift	More than specification	• Low line pressure • Low and reverse brake slipping • Reverse clutch slipping • Shift solenoid B not operating properly
	Less than specification	• Servo apply accumulator not operating properly • Shift solenoid B not operating properly • Excessive line pressure

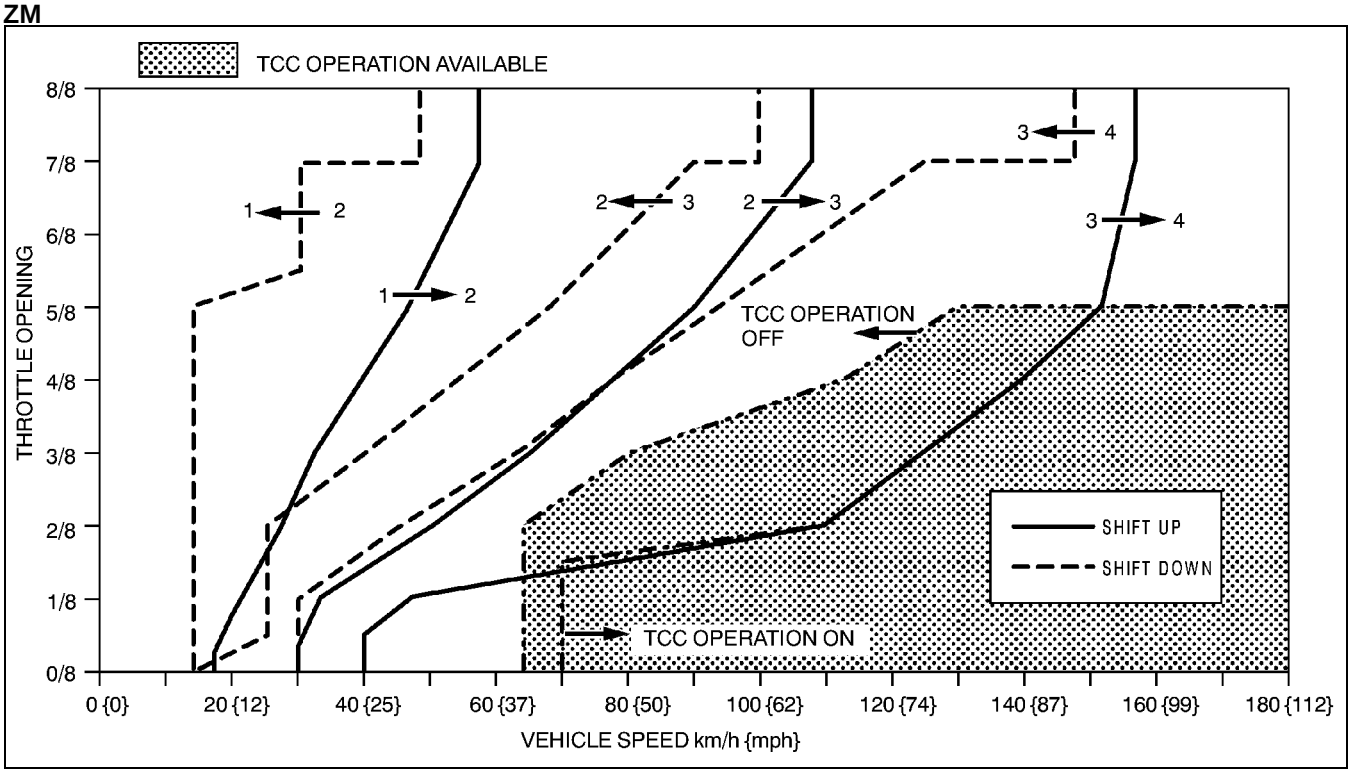
ROAD TEST

A3U051701030W06

Road Test Preparation

1. Inspect the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–2 ENGINE COOLANT LEVEL INSPECTION.)
2. Inspect the engine oil. (See 01–11–2 ENGINE OIL INSPECTION.)
3. Inspect the ATF levels. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
4. Inspect the ignition timing. (See 01–10A–25 Ignition Timing Inspection.) (See 01–10B–25 Ignition Timing Inspection.)
5. Inspect the idle speed. (See 01–10A–26 Idle Speed Adjustment.) (See 01–10B–26 Idle Speed Adjustment.)
6. Bring up the engine and transaxle to normal operating temperature.

Shift Diagram
D range (normal mode, O/D OFF switch OFF)
ZM



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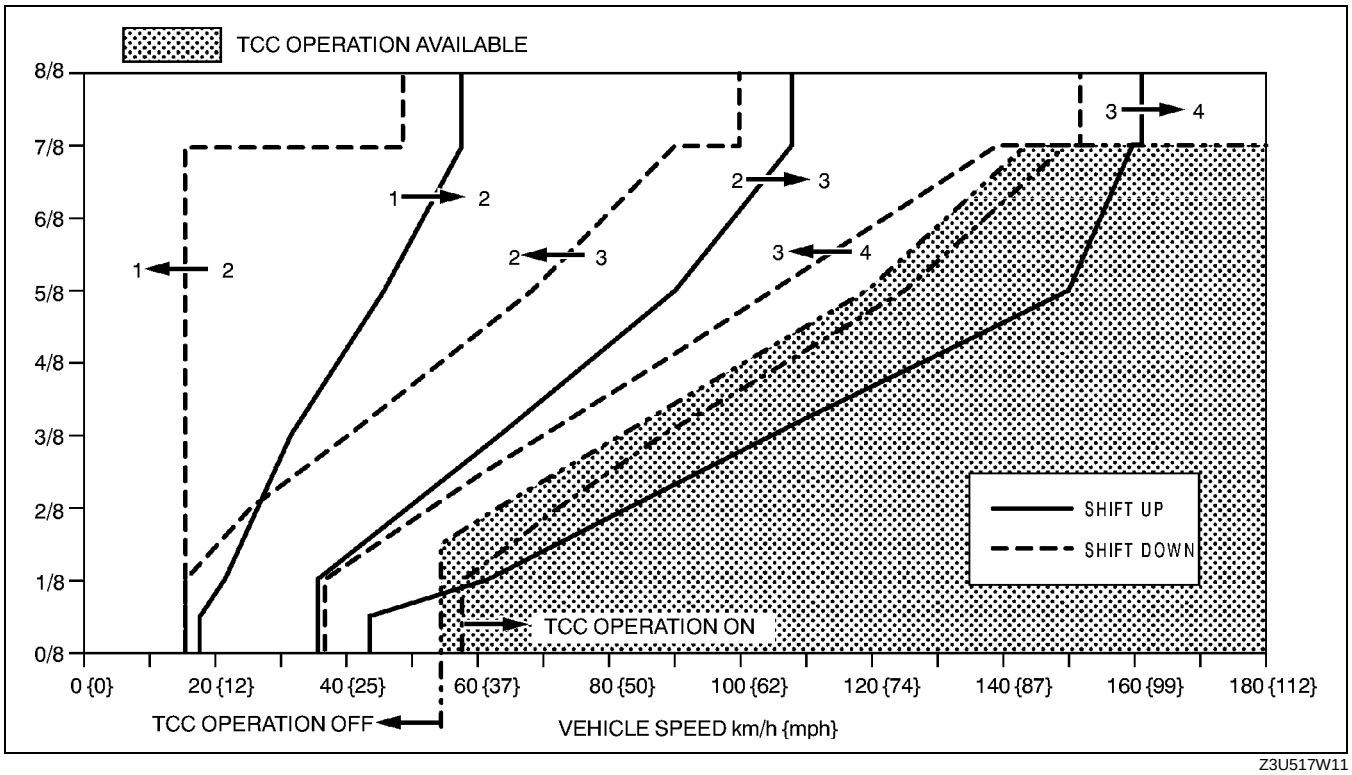
FS



Z3U517W11

Vehicle speed at shift point table

Range	Mode	Throttle condition	Shift	Vehicle speed km/h {mph}		Turbine speed (rpm)	
				ZM	FS	ZM	FS
D	Normal	WOT	$D_1 \rightarrow D_2$	56—62 {35—38}	56—62 {35—38}	5,750—6,300	5,750—6,300
			$D_2 \rightarrow D_3$	106—114 {66—70}	106—114 {66—70}	5,750—6,150	5,750—6,150
			$D_3 \rightarrow D_4$	154—164 {96—101}	158—168 {98—104}	5,600—5,900	5,750—6,050
		Half throttle	$D_1 \rightarrow D_2$	35—43 {22—26}	34—42 {22—26}	3,500—4,450	3,400—4,350
			$D_2 \rightarrow D_3$	69—86 {43—53}	68—85 {43—52}	3,750—4,650	3,650—4,650
			$D_3 \rightarrow D_4$	127—150 {79—93}	113—142 {71—88}	4,600—5,450	4,100—5,100
			TCC ON (D_4)	127—150 {79—93}	113—142 {71—88}	3,350—3,950	3,000—3,700
		CTP	$D_4 \rightarrow D_3$	27—33 {17—20}	33—39 {21—24}	750—850	900—1,000
			$D_3 \rightarrow D_2$	11—17 {7—10}	12—18 {8—11}	400—600	450—650
			$D_2 \rightarrow D_1$	11—17 {7—10}	12—18 {8—11}	600—900	700—950
			$D_3 \rightarrow D_1$	11—17 {7—10}	12—18 {8—11}	400—600	450—650
		Kickdown (WOT)	$D_4 \rightarrow D_3$	143—153 {89—94}	147—157 {92—97}	3,800—4,000	3,900—4,100
			$D_3 \rightarrow D_2$	96—104 {60—64}	96—104 {60—64}	3,500—3,750	3,500—3,750
			$D_2 \rightarrow D_1$	45—51 {28—31}	45—51 {28—31}	2,450—2,750	2,450—2,750
	Power	WOT	$D_1 \rightarrow D_2$	56—62 {35—38}	56—62 {35—38}	5,750—6,300	5,750—6,300
			$D_2 \rightarrow D_3$	106—114 {66—70}	106—114 {66—70}	5,750—6,150	5,750—6,150
			$D_3 \rightarrow D_4$	154—164 {96—101}	158—168 {98—104}	5,600—5,900	5,750—6,050
		Half throttle	$D_1 \rightarrow D_2$	35—43 {22—26}	34—42 {22—26}	3,500—4,450	3,400—4,350
			$D_2 \rightarrow D_3$	69—86 {43—53}	68—85 {43—52}	3,750—4,650	3,650—4,650
			$D_3 \rightarrow D_4$	127—150 {79—93}	113—142 {71—88}	4,600—5,450	4,100—5,100
		CTP	$D_4 \rightarrow D_3$	27—33 {17—20}	33—39 {21—24}	750—850	900—1,000
			$D_3 \rightarrow D_2$	11—17 {7—10}	12—18 {8—11}	400—600	450—650
			$D_2 \rightarrow D_1$	11—17 {7—10}	12—18 {8—11}	600—900	700—950
			$D_3 \rightarrow D_1$	11—17 {7—10}	12—18 {8—11}	400—600	450—650
		Kickdown (WOT)	$D_4 \rightarrow D_3$	143—153 {89—94}	147—157 {92—97}	3,800—4,000	3,900—4,100
			$D_3 \rightarrow D_2$	96—104 {60—64}	96—104 {60—64}	3,500—3,750	3,500—3,750
			$D_2 \rightarrow D_1$	45—51 {28—31}	45—51 {28—31}	2,450—2,750	2,450—2,750
2	—	—	$2_4 \rightarrow 2_3$	154—160 {96—99}	158—164 {98—101}	4,050—4,200	4,150—4,300
			$2_3 \rightarrow 2_2$	99—105 {62—65}	97—103 {61—63}	3,600—3,800	3,550—3,700
1	—	—	$1_4 \rightarrow 1_3$	154—160 {96—99}	158—164 {98—101}	4,050—4,200	4,150—4,300
			$1_3 \rightarrow 1_2$	99—105 {62—65}	97—103 {61—63}	3,600—3,800	3,550—3,700
			$1_2 \rightarrow 1_1$	42—48 {27—29}	42—48 {27—29}	2,300—2,600	2,300—2,600

D Range Test

1. Perform road test preparation. (See 05–17–14 Road Test Preparation.)
2. Shift the selector lever to D range.
3. Accelerate the vehicle at half and WOT.
4. Verify that 1→2, 2→3, and 3→4 upshifts and downshifts are obtained. The shift points must be as shown in the table below.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
5. Drive the vehicle in 4GR, 3GR, and 2GR and verify that kickdown occurs for 4→3, 3→2, 2→1 downshifts, and that the shift points are as shown in the table below.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
6. Decelerate the vehicle and verify that engine braking effect is felt in 2GR, 3GR and 4GR.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

7. Drive the vehicle and verify that TCC operation is obtained. The operation points must be as shown in the table below.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
8. Select O/D OFF mode.
9. Accelerate the vehicle to half throttle and WOT, and verify that 1→2 and 2→3 upshift and downshift are obtained. The shift points must be as shown in the table below.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
10. Drive the vehicle in 3GR, 2GR and verify that kickdown occurs for 3→2, 2→1, and that the shift points are as shown in the table below.
    - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
11. Decelerate the vehicle and verify that engine braking effect is felt in 2GR and 3GR.
    - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

2 Range Test

1. Perform road test preparation. (See 05–17–14 Road Test Preparation.)
2. Shift the selector lever to 2 range.
3. Accelerate the vehicle with half throttle and WOT, and verify that 2GR is held.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
4. Decelerate the vehicle and verify that engine braking effect is felt.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

1 Range Test

1. Perform road test preparation. (See 05–17–14 Road Test Preparation.)
2. Shift the selector lever to 1 range.
3. Accelerate the vehicle with half throttle and WOT, and verify that 1GR is held.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
4. Decelerate the vehicle and verify that engine braking effect is felt.
   - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

P Position Test

1. Shift into P position on a gentle slope. Release the brake and verify that the vehicle does not roll.
   - If the vehicle rolls, inspect the ATX. (See ATX Workshop Manual.)

AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION

A3U051719001W01

Automatic Transaxle Fluid (ATF) Condition Inspection

1. One way of determining whether the transaxle should be replaced is by noting:
   - If the ATF is muddy or varnished.
   - If the ATF smells strange or unusual.

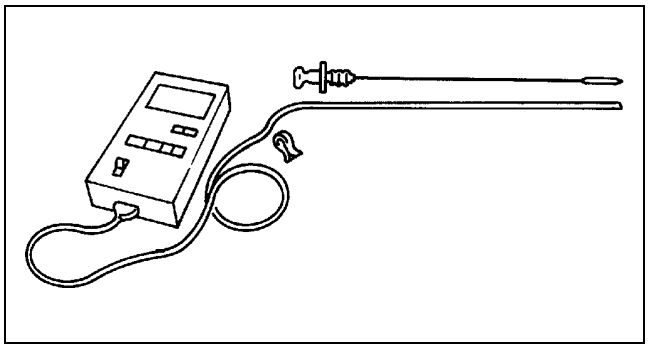
ATF condition

Condition			Possible cause
Clear red		Normal	—
Light red (pink)		Contaminated with water	• Broken oil cooler inside of radiator • Poor filler tube installation: Problem could be occurring to parts inside of transaxle by water contamination. • If necessary, replace transaxle.
Reddish brown	Has burnt smell and metal specks are found	Deteriorated ATF	Defect powertrain components inside of transaxle: Specks cause wide range of problems by plugging up oil pipe, control valve body and oil cooler in radiator. • When large amount of metal specks are found. Replace transaxle if necessary. • Implement flushing operation as there is a possibility to have specks plugging up oil pipe and/or oil cooler inside of radiator.
	Has no burnt smell	Normal	• Discoloration by oxidation.

Automatic Transaxle Fluid (ATF) Level Inspection

Caution
- **The ATF amount varies according to ATF 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.
3. Adjust the length or thermistor probe to measure the same depth as the oil dipstick and hold the probe with a paper holder.
4. Insert into the filler tube and measure the temperature.
5. Inspect the ATF level before warming up the engine. In this case, use the cool **(20 °C {68 °F})** range.
6. Warm up the engine until the ATF reaches **(60—70 °C {141—158 °F})**.
7. While depressing the brake pedal, shift the selector lever to each range (P—1), pausing momentarily in each range.
8. Shift back to P position.
9. While the engine is idling, verify that the ATF level is in the HOT **(65 °C {149 °F})** range. Add ATF to the specification, if necessary.



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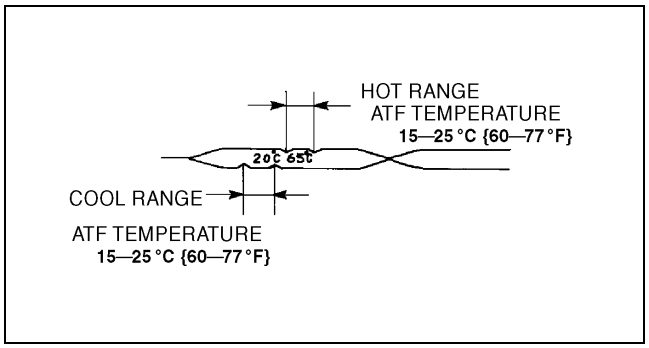
ATF type
M-V or equivalent (e.g. Dexron®III)



Y3U517WA5

AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT

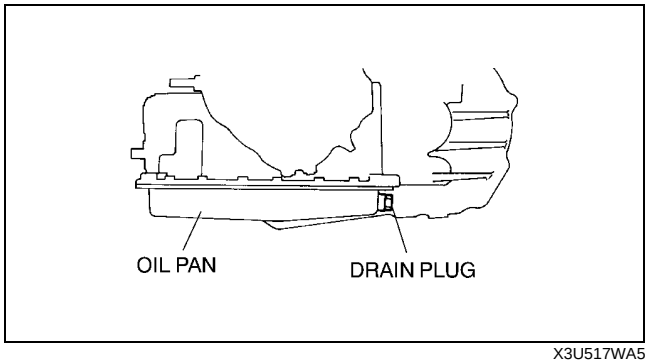
A3U051719001W02

Warning
- **When the transaxle and ATF are hot, they can badly burn you. Turn off the engine and wait until they are cool before changing the ATF.**

1. Remove the oil dipstick.
2. Remove the drain plug and washer.
3. Drain the ATF into a container.
4. Install a new washer and the drain plug.

Tightening torque
30—41 N·m {3.0—4.2 kgf·m, 22—30 ft·lbf}

5. Add the specified type of ATF through the oil filler tube until ATF level reaches lower notch of dipstick.



X3U517WA5

ATF type
M-V or equivalent (e.g. Dexron®III)

6. That the ATF level is in the HOT **(65 °C {149 °F})** range.
7. Add ATF to the specified level if necessary.

O/D OFF SWITCH INSPECTION

A3U051746040W01

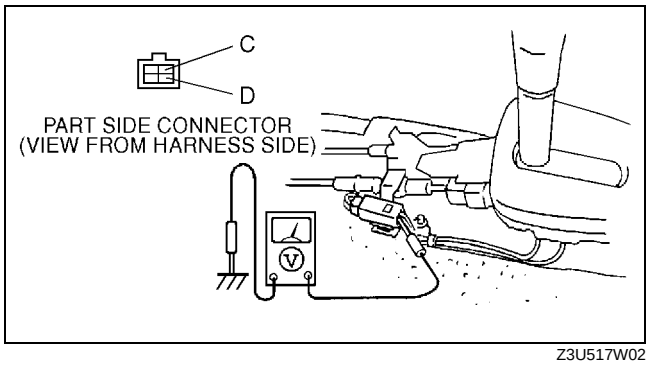
Inspection of Operation

1. Turn the ignition switch from OFF to ON.
2. Verify that the O/D OFF indicator light is not illuminated. Depress 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. (See 05–17–19 Inspection of Voltage.)

Inspection of Voltage

1. Turn the ignition switch at ON.
2. Measure the voltage at the O/D OFF switch connector.
   - If not as specified, inspect for continuity at the O/D OFF switch. (See 05–17–19 Inspection of Continuity.)

Position	Connector terminal	
	C	D
Normal	B+	0
Depressed	0	0



Z3U517W02

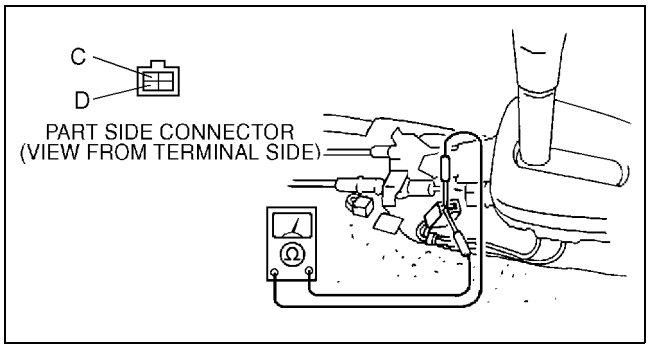
Inspection of Continuity

1. Inspect for continuity at the O/D OFF switch.
   - If the switch is okay, inspect the wiring harness. (O/D OFF switch — PCM, O/D OFF switch — Body ground)
   - If not as specified, replace the selector lever knob component. (See 05–18–8 SELECTOR LEVER DISASSEMBLY/ASSEMBLY.)

○——○ : Continuity

Position	Connector Terminal	
	C	D
Normal		
Depressed	○	○

X3U517WCN



Z3U517W03

O/D OFF SWITCH REMOVAL/INSTALLATION

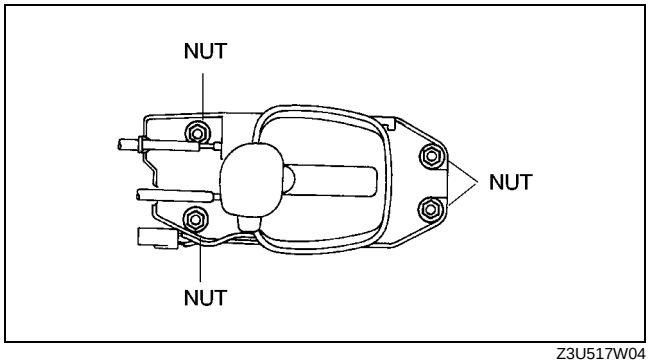
A3U051746040W02

1. Disconnect the negative battery cable.
2. Remove the center console.
3. Remove the selector lever nuts.
4. Disconnect the connector and remove the O/D OFF switch terminals. (See 05–18–8 Connector Disassembly Note.)
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 selector lever nuts.

   Tightening torque
   16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}



Z3U517W04

8. Install the O/D OFF switch terminals and connect the connector.
9. Install the center console.
10. Connect the negative battery cable.

TRANSAXLE RANGE (TR) SWITCH INSPECTION

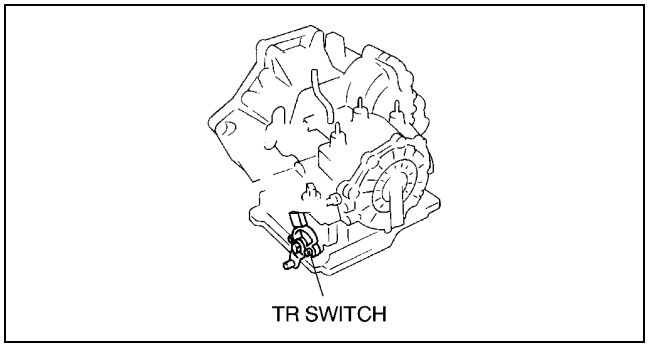
A3U051719440W01

Inspection of Operation

1. Verify that the starter operates only with the IG SW at the START position and the selector lever in P and N positions.
   - If not as specified, inspect for continuity at the TR switch. (See 05–17–20 Inspection of Continuity.)
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch at the ON position.
   - If not as specified, inspect for continuity at the TR switch. (See 05–17–20 Inspection of Continuity.)

Inspection of Continuity

1. Inspect for continuity at the TR switch.



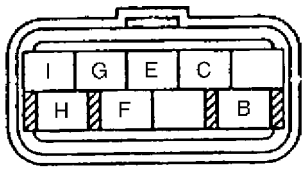
X3U517WA9

○——○ : Continuity

Position	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○	○						○	○
R			○						○
N		○		○				○	○
D							○		○
2						○			○
1					○				○

Z3U517W13

- If not as specified, replace or adjust the TR switch. (See 05–17–20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION.) (See 05–17–23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT.)



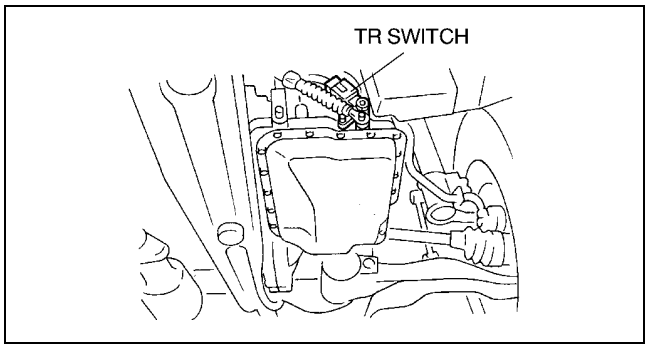
PART SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Z3U517W14

TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION

A3U051719440W02

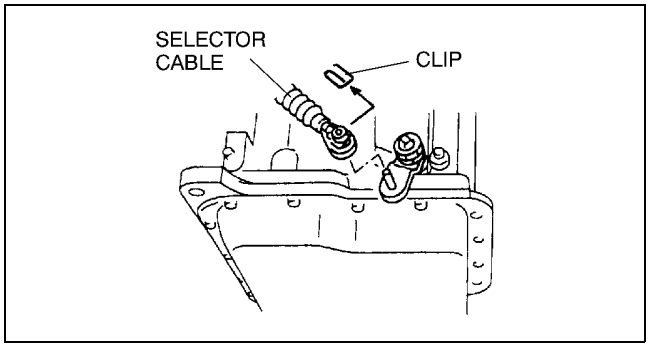
1. Disconnect the negative battery cable.
2. Remove the fresh-air duct and air cleaner component. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the splash shield.
4. Disconnect the TR switch connector.



X3U517WAB

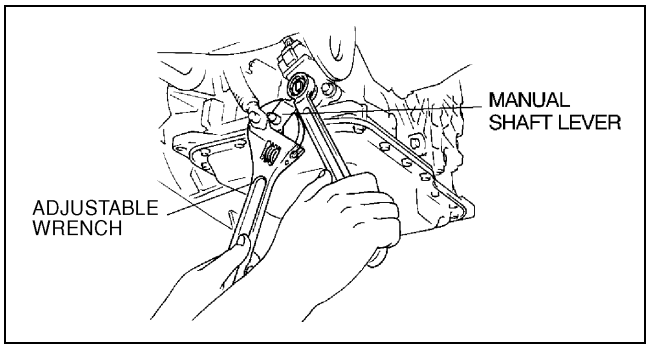
5. Remove the clip and disconnect the selector cable.

Caution
- **Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, or the transaxle may be damaged.**



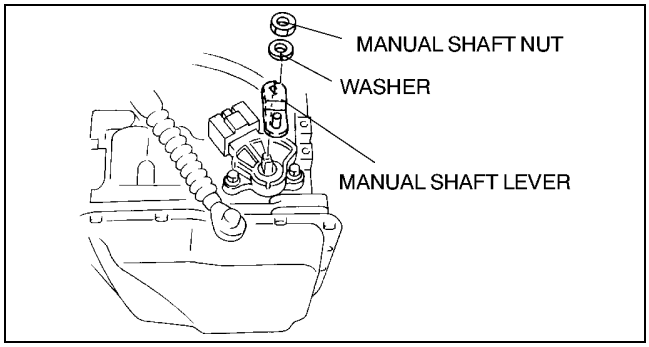
X3U517WAC

6. Set the adjustable wrench as shown to hold the manual shaft lever.
7. Remove the manual shaft nut and washer.



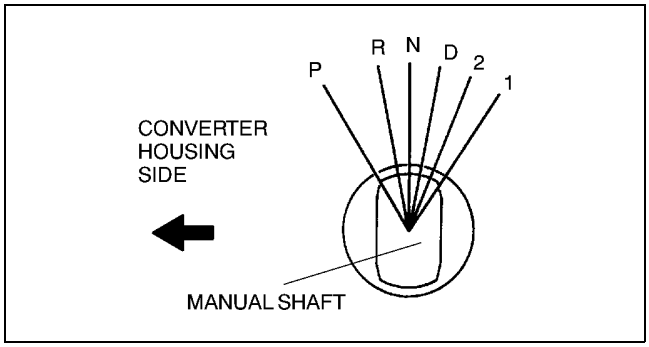
Y3U517WAM

8. Remove the manual shaft lever.
9. Remove the TR switch.



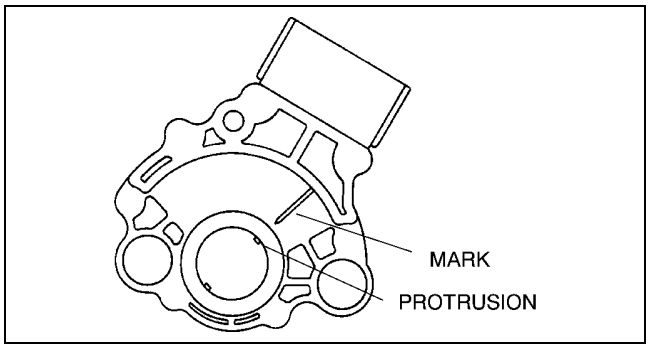
X3U517WAD

10. Rotate the manual shaft to the converter housing side fully, then return 2 notches to set the N position.



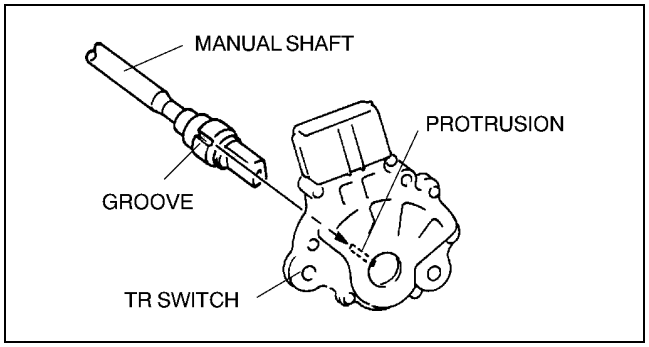
X3U517WAE

11. Align the protrusion and mark as shown.



X3U517WCW

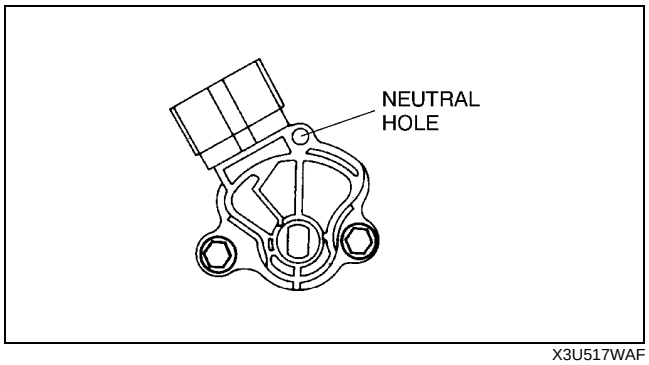
12. Install the TR switch while aligning the protrusion and groove as shown.



X3U517WCX

13. Turn the TR switch so that the neutral hole is in line with the flat, straight surfaces on either side of the manual shaft.
14. Hand-tighten the TR switch bolts.
15. Perform the TR switch adjustment. (See 05–17–23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT.)
16. Install the manual shaft lever and washer.

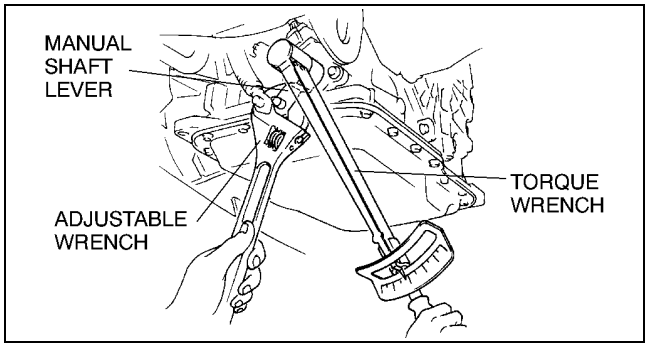
Caution
- **Do not use an impact wrench. Hold the manual shaft lever when tightening the manual shaft nut, or the transaxle may be damaged.**



X3U517WAF

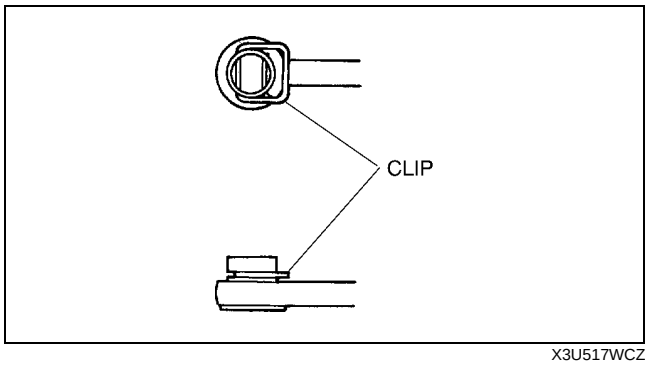
17. Set the adjustable wrench as shown to hold the manual shaft lever.
18. Tighten the manual shaft nut using a torque wrench.

Tightening torque
32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



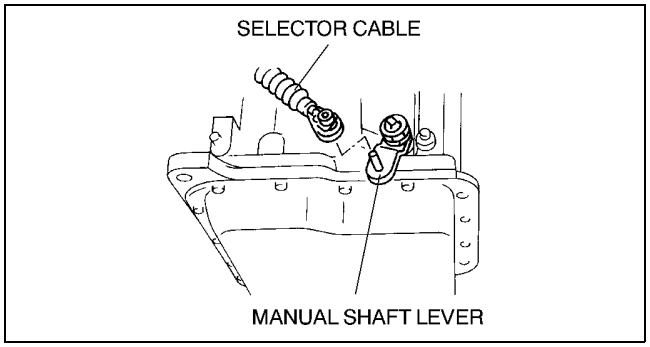
X3U517WAJ

19. Install the clip as shown in the figure.



X3U517WCZ

20. Verify that the selector lever range position and TR switch are aligned, then connect the selector cable.
21. Inspect for continuity at the TR switch. (See 05–17–20 Inspection of Continuity.)
22. Connect the TR switch connector.
23. Install the splash shield.
24. Install the air cleaner component and fresh-air duct. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
25. Connect the negative battery cable.
26. Inspect operation of the TR switch. (See 05–17–20 Inspection of Operation.)

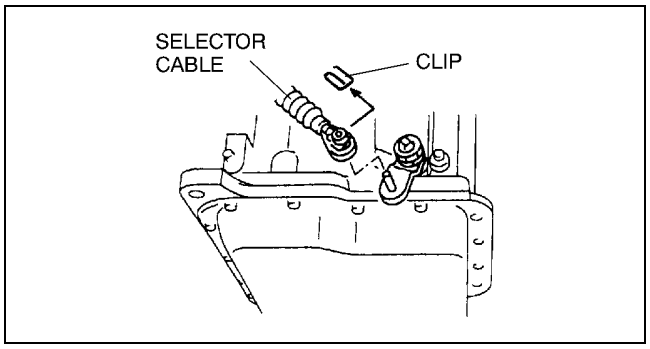


X3U517WAK

TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT

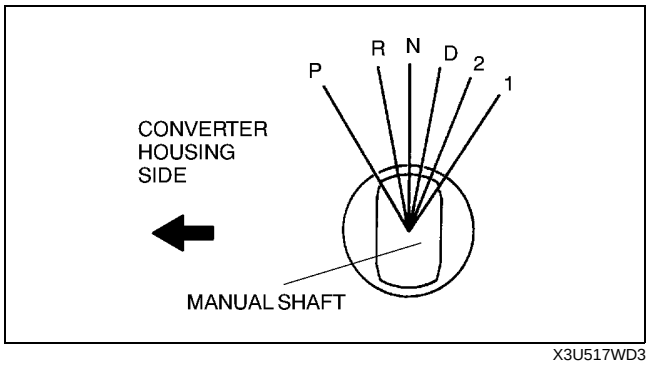
A3U051719440W03

1. Disconnect the negative battery cable.
2. Remove the fresh-air duct and air cleaner component. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the splash shield.
4. Remove the clip and disconnect the selector cable.



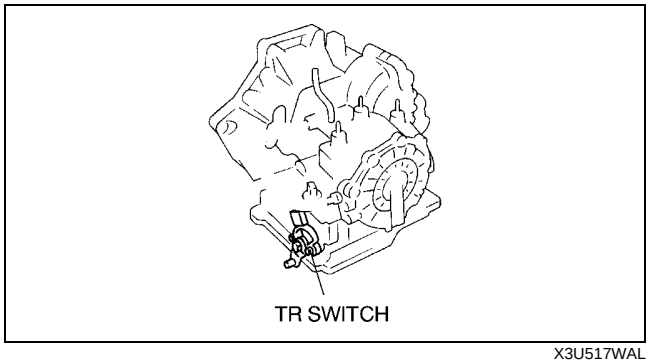
X3U517WD0

5. Rotate the manual shaft to the converter housing side fully, then return 2 notches to set the N position.



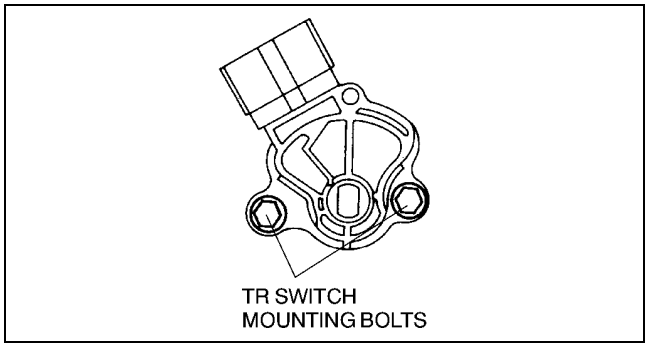
X3U517WD3

6. Disconnect the TR switch connector.



X3U517WAL

7. Loosen the TR switch mounting bolts.

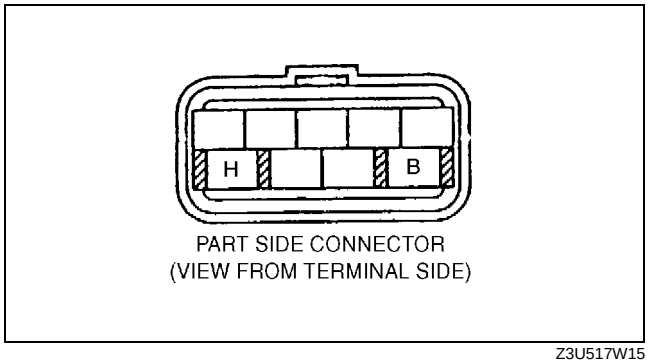


X3U517WAM

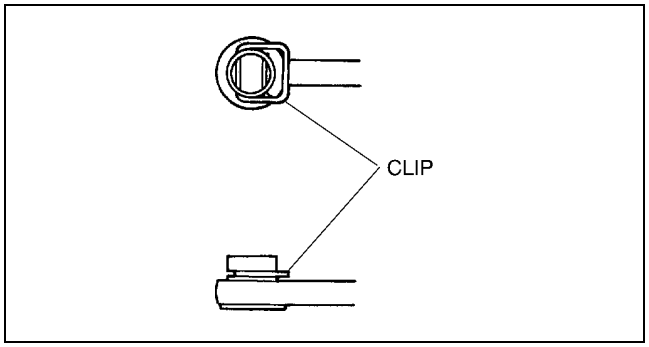
8. Connect an ohmmeter between terminals B and H.
9. Adjust the switch to the point where there is continuity between the terminals.
10. Tighten the TR switch mounting bolts.

    Tightening torque
    7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

11. Verify that the selector lever range position and TR switch are aligned.
12. Connect the TR switch connector.
13. Install the clip as shown in the figure.

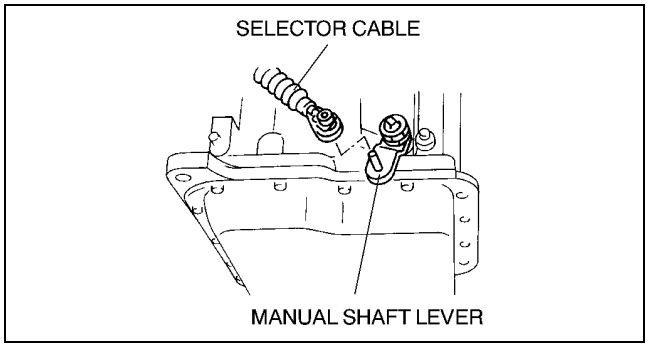


Z3U517W15



X3U517WD1

14. Connect the selector cable.
15. Install the splash shield.
16. Install the air cleaner component and fresh-air duct. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
17. Connect the negative battery cable.



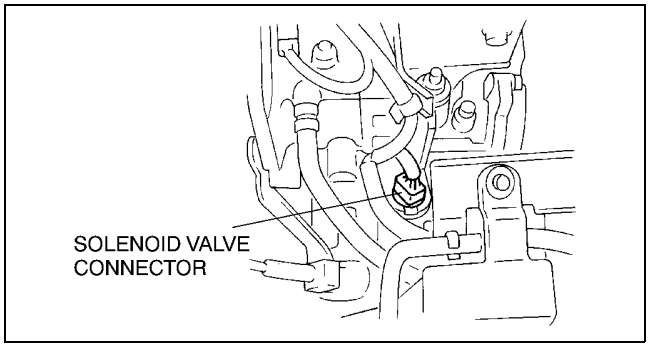
X3U517WD2

TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION

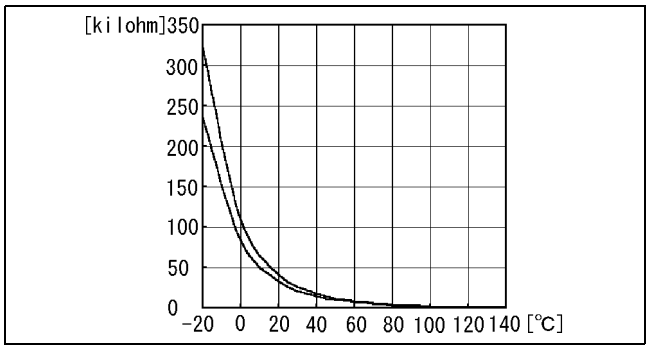
A3U051719010W01

1. Measure the resistance between the terminals E and H.
   - If it is out of specifications, replace the TFT sensor. (See 05–17–25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)

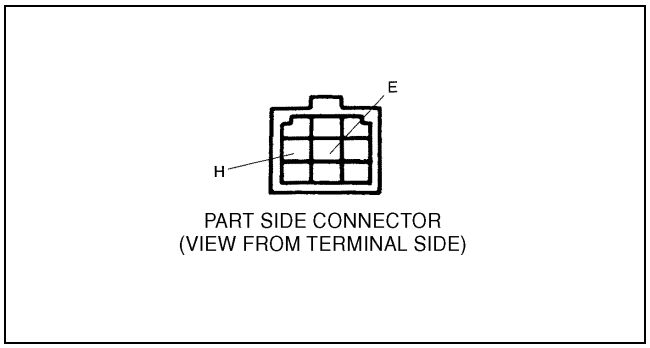
ATF temperature (°C {°F})	Resistance (kilohm}
–20 {–4}	236—324
0 {32}	84.3—110
20 {68}	33.5—42.0
40 {104}	14.7—17.9
60 {140}	7.08—8.17
80 {176}	3.61—4.15
100 {212}	1.96—2.24
120 {248}	1.13—1.28
130 {266}	0.87—0.98



X3U517WAP



Z3U517W12



Y3U517WAA

TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION

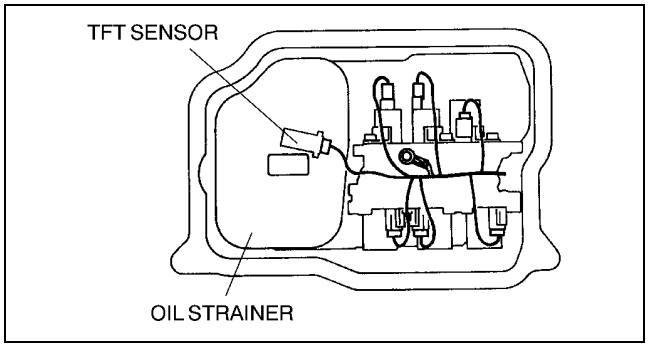
A3U051719010W02

Warning

- **When the transaxle and ATF are hot, they can badly burn. Turn off the engine and wait until they are cool before performing this procedure.**

1. Remove the oil pan. (See 05–17–36 On-vehicle Removal.)
2. Disconnect the TFT sensor connector.

3. Remove the TFT sensor.
4. Install a new TFT sensor.
5. Connect the TFT sensor connector.
6. Install the oil pan. (See 05–17–38 On-vehicle Installation.)
7. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)



X3U517WAR

INPUT/TURBINE SPEED SENSOR INSPECTION

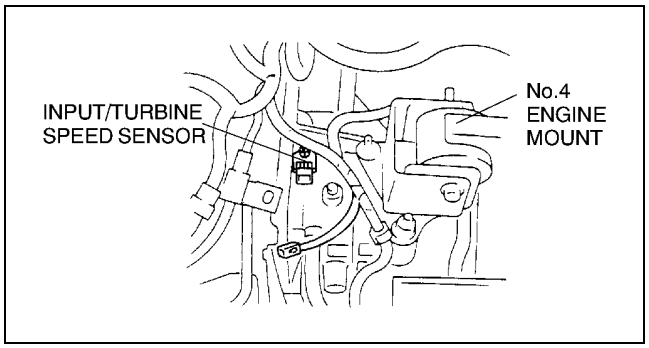
A3U051721550W01

Resistance Inspection

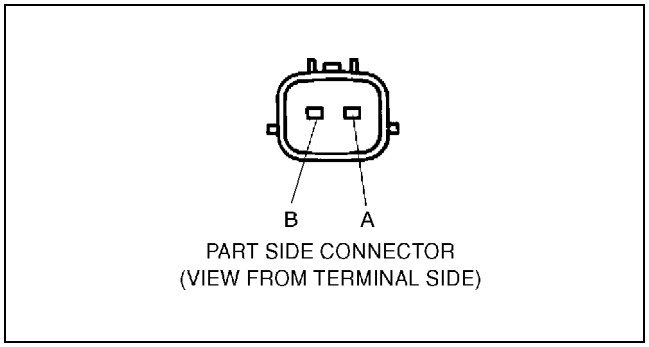
1. Measure the resistance between the terminals of the input/turbine speed sensor.

   Resistance
   250—600 ohms (ATF temperature:–40—160 °C {–40—320 °F})

   - If not as specified, replace the input/turbine speed sensor. (See 05–17–26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION.)



X3U517WAS



Z3U517W16

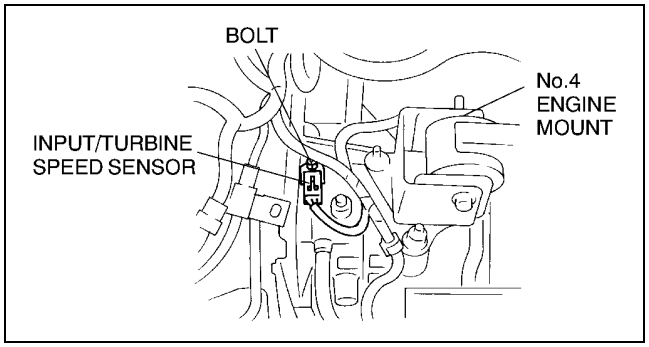
INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION

A3U051721550W02

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Disconnect the input/turbine speed sensor connector.
4. Remove the input/turbine speed sensor.
5. Apply ATF to a new O-ring and install it on a new input/turbine speed sensor.
6. Install the input/turbine speed sensor.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

7. Connect the input/turbine speed sensor connector.
8. Install the air cleaner component. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
9. Connect the negative battery cable.



X3U517WAU

VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX]

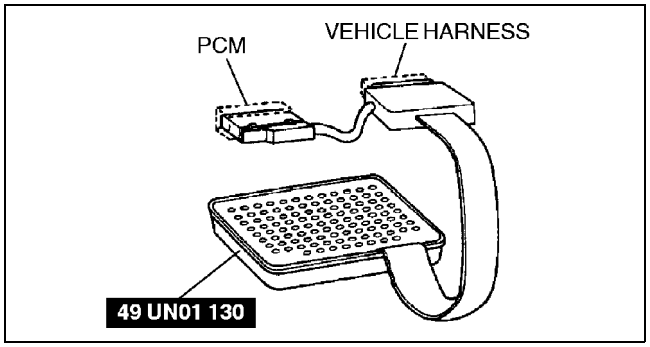
A3U051717401W01

Visual Inspection

1. Remove the VSS. (See 05–17–28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)
2. Make sure that the sensor is free of any metallic shavings or particles.
   - If any are found on the sensor, clean them off.
3. Install the VSS. (See 05–17–28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)

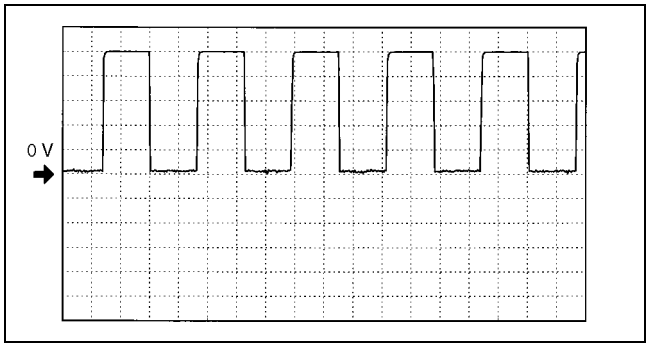
Wave profile Inspection

1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect WDS or equivalent to DLC-2 connector.
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
4. Connect osilloscope test leads to the following PCM connector terminals.
   - (+) lead: PCM terminal 58
   - (-) lead: PCM terminal 103
5. Start the engine.
6. Monitor VSS PID.



A3U0517W001

7. Inspect wave profile.
   - PCM terminal: 58 (+)-103(-)
   - Oscilloscope setting: 1 V/DIV(Y), 2.5 ms/DIV(X), DC range
   - Vehicle condition: drive the vehicle with 32 km/h{20 mph}
     — If wave profile or voltage are out of specifications, carry out the “Open Circuit Inspection” or “Short Circuit Inspection”



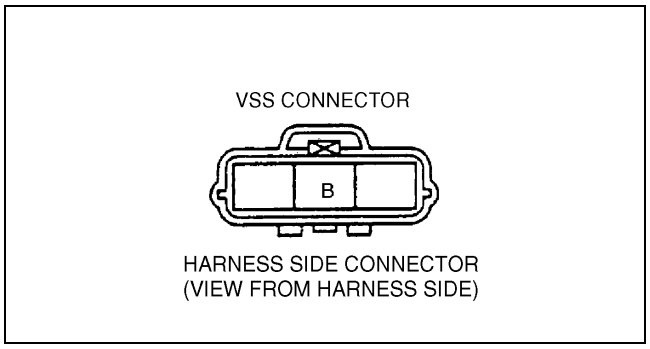
Z3U0140W013

Power Supply Voltage Inspection

1. Disconnect the VSS connector.
2. Turn the ignition switch to ON.
3. Measure voltage at VSS connector terminal B (wiring harness side).

Specification
4.5—5.5 V

- If voltage is okay, go to “See 05–17–27 Open Circuit Inspection” and “Short Circuit Inspection”.
- If voltage is wrong, repair wiring harness between VSS and PCM.



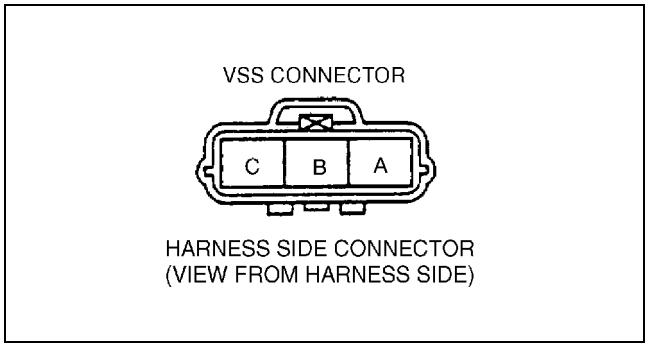
Y3U517WAE

Open Circuit Inspection

1. Inspect the following circuit for open.
   - Power circuit (VSS connector terminal A to main relay terminal D)
   - Ground circuit (VSS connector terminal C to GND)
   - If an open circuit or short circuit is found, repair the malfunctioning wiring harness.
   - If there are no open or short circuits, perform the sensor rotor inspection. (See 05–17–28 Sensor Rotor Inspection.)

Short Circuit Inspection

1. Inspect the following circuit for short.
   - Power circuit (VSS connector terminal A to main relay terminal D)
   - If an open circuit or short circuit is found, repair the malfunctioning wiring harness.
   - If there are no open or short circuits, perform the sensor rotor inspection. (See 05–17–28 Sensor Rotor Inspection.)



Z3U517W17

Sensor Rotor Inspection

1. Remove the VSS. (See 05–17–28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)
2. Shift the selector lever to N position.
3. Inspect sensor rotor surface via VSS installation hole while rotating the front tire manually.
   (1) Is sensor rotor free of damage and cracks?
   (2) Is sensor rotor free of any metallic shavings or particles?
      - If sensor rotor is okay, replace VSS.
      - If there is a problem, clean or replace the sensor rotor.

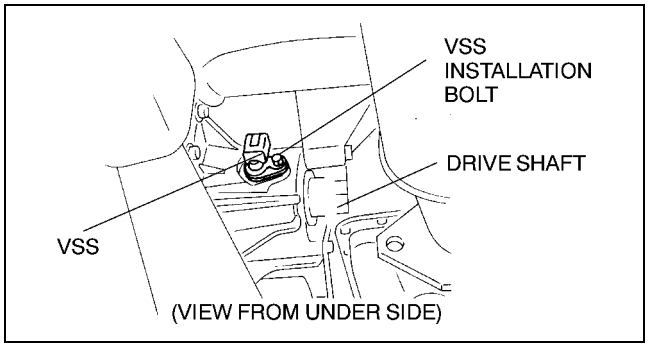
VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX]

A3U051717401W02

1. Disconnect the negative battery cable.
2. Disconnect the VSS connector.
3. Remove the VSS.
4. Apply ATF to a new O-ring and install it on a new VSS.
5. Install the VSS.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

6. Connect the VSS connector.
7. Connect the negative battery cable.



X3U517WAZ

SOLENOID VALVES INSPECTION

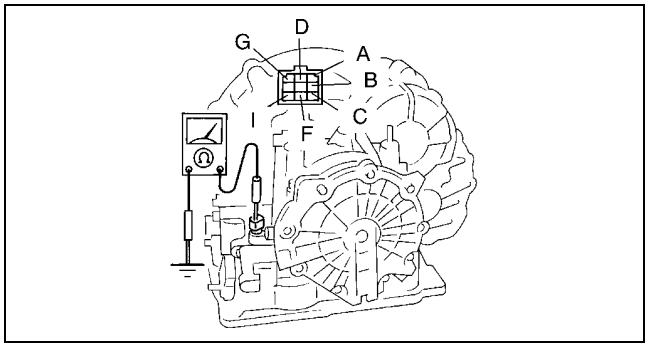
A3U051721280W01

Inspection of Resistance (On-vehicle)

1. Measure the resistances between the following terminals.
   - If any resistances are out of specifications, inspect the ground, then perform the operation and the part inspection.

ATF temperature: **–40—150 °C {–40—302 °F}**

Terminal	Solenoid valve	Resistance (ohm)
A-GND	Shift solenoid A	1.0—4.2
B-GND	Shift solenoid D	10.9—26.2
C-GND	Shift solenoid B	1.0—4.2
D-I	Pressure control solenoid	2.4—7.3
F-GND	Shift solenoid E	10.9—26.2
G-GND	Shift solenoid C	1.0—4.2

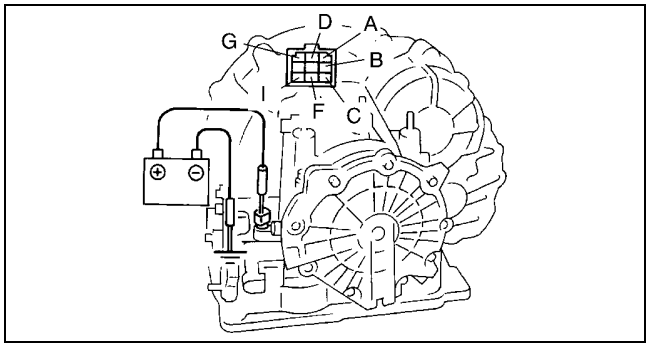


X3U517WB2

Inspection of Operation

Note
- When inspecting the pressure control solenoid, connect the GND connection to the GND terminal (I terminal) of the pressure control solenoid inside the solenoid valve connector.
- Do not apply voltage for more than **3 seconds**.

1. Apply B+ to terminal A, B, C, F, or G and battery negative voltage to GND, and verify that a click sound is heard from each solenoid.
   - If the click sound is not heard from each solenoid, replace solenoids.
2. Apply B+ to terminal D and battery negative voltage to terminal I, and verify that a click sound is heard from solenoid.
   - If the “click” is not heard, replace the solenoid valve. (See 05–17–30 SOLENOID VALVES REMOVAL/INSTALLATION.)

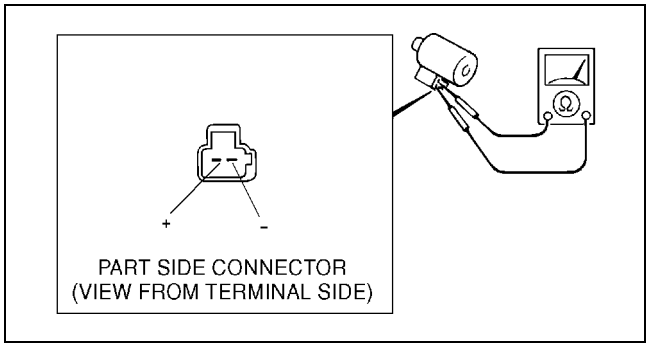


X3U517WB3

Resistance Inspection (Off-vehicle)
1. Measure the resistance of each solenoid valve individually.
   - If not as specified, replace the solenoid valve.

Pressure control solenoid

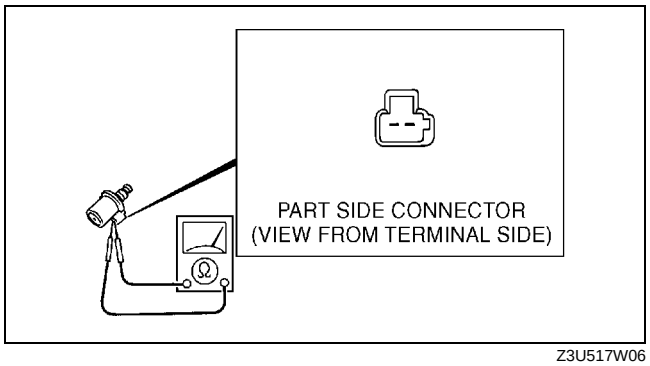
Resistance: 2.4—7.3 ohms



Z3U517W05

Shift solenoid A, B, C

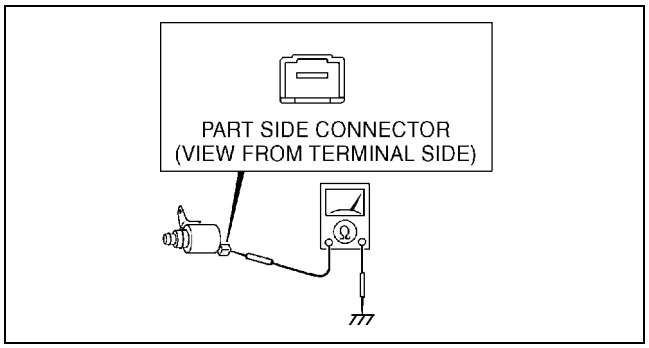
Resistance: 1.0—4.2 ohms



Z3U517W06

Shift solenoid D, E

Resistance: 10.9—26.2 ohms



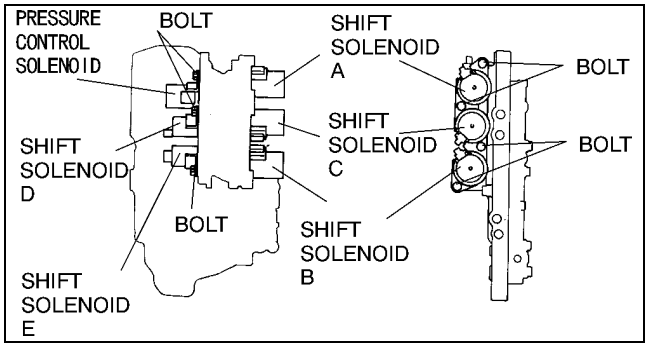
Z3U517W07

SOLENOID VALVES REMOVAL/INSTALLATION

A3U051721280W02

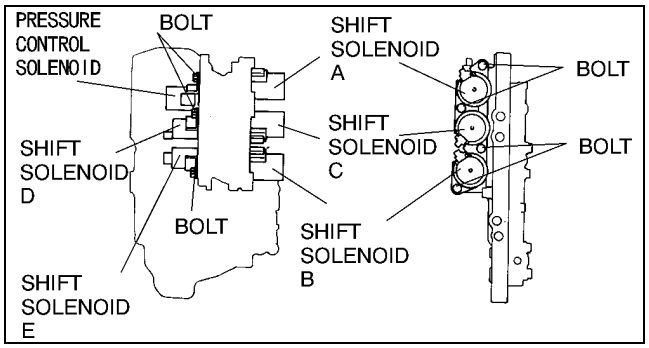
1. Remove the control valve body. (See 05–17–36 On-vehicle Removal.)
2. Remove the solenoid valve(s).
3. Apply ATF to a new O-ring and install it on the solenoid valve.
4. Install the solenoid valve in the control valve body.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U517WB7

5. Install the control valve body. (See 05–17–38 On-vehicle Installation.)
6. Add in ATF and, with the engine idling, inspect the ATF level and inspect for leakage. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.) (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
7. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)
8. Carry out the road test. (See 05–17–14 ROAD TEST.)



X3U517WB8

O/D OFF INDICATOR LIGHT INSPECTION

A3U051755480W01

Inspection of Operation

1. Turn the IG SW from OFF to ON.

Note
- The O/D OFF indicator light flashes when any malfunction exists in the EC-AT system components.

2. Verify that the O/D OFF indicator light is not illuminating.
3. Depress the switch and verify that the O/D OFF indicator light illuminates.
   - If the O/D OFF switch does not function, inspect the O/D OFF switch, and then inspect the terminal voltage of the O/D OFF indicator light.

PCM INSPECTION

A3U051718880W01

1. Inspect the PCM. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].)

PCM REMOVAL/INSTALLATION

A3U051718880W02

1. Remove and install the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].) (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)

AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION

A3U051701030W07

1. Drain the ATF. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2. Remove the tires and splash shield.
3. Remove the battery and battery carrier.
4. Remove the fresh-air duct and air cleaner component. (See 01–13A–5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
5. Remove the EGR pipe, front pipe and TWC. (See 01–15–1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)

Warning

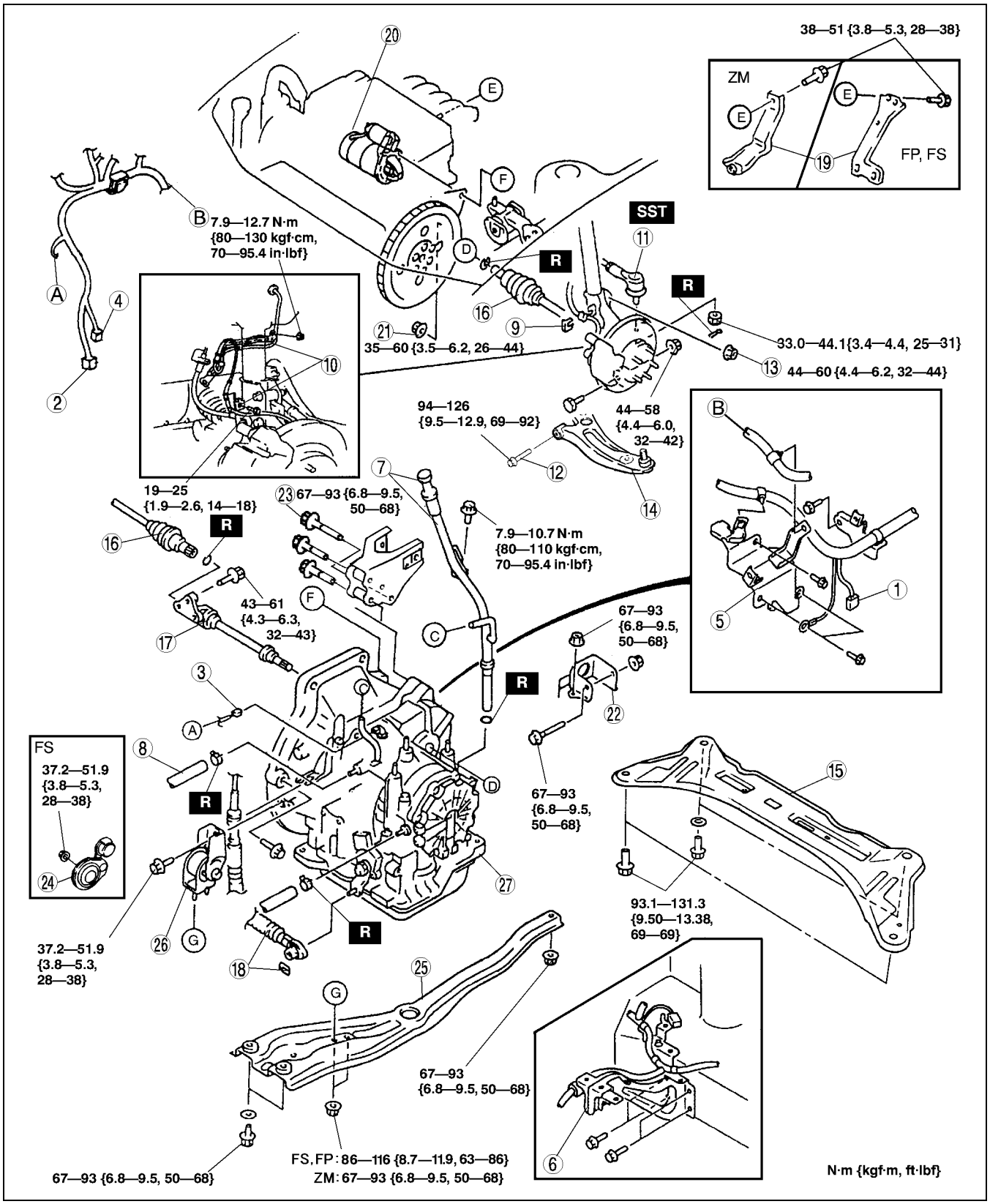
- **Improperly jacking a transaxle is dangerous. It can slip off the jack and may cause serious injury.**

6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. Add ATF to the specified level. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
9. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)

Service item	Test item		
	Line pressure test	Stall test	Time lag test
ATX replacement	×		
ATX overhaul	×	×	×
Torque converter replacement	×	×	
Oil pump replacement	×		
Clutch system replacement	×		

× : Test to be performed after the service work

10. Carry out the road test. (See 05–17–14 ROAD TEST.)



A3U0517W005

1	Vehicle speedometer sensor connector
2	TR switch connector
3	Input/turbine speed sensor connector
4	Transaxle connector
5	Harness bracket
6	Battery tray bracket

7	Oil dipstick and filler tube
8	Oil hose
9	Brake hose clip
10	ABS wheel speed sensor bracket
11	Tie rod end (See 06–12–9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)

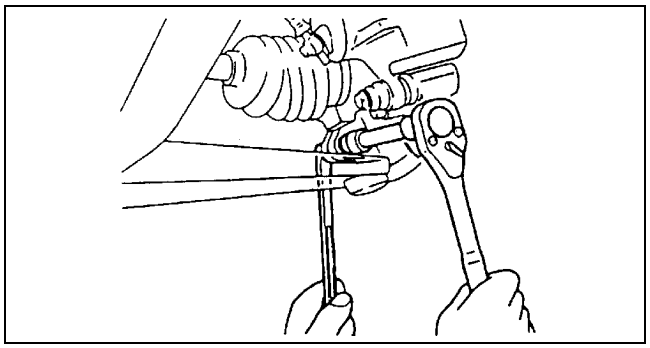
12	Bolt
13	Stabilizer control link nut
14	Lower arm (See 05–17–33 Lower Arm Removal Note.)
15	Transverse member (See 02–13–9 TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION.)
16	Drive shaft (See 03–13–9 DRIVE SHAFT REMOVAL/ INSTALLATION.)
17	Joint shaft (See 03–13–3 JOINT SHAFT REMOVAL/ INSTALLATION.)
18	Selector cable
19	Intake manifold stay
20	Starter
21	Torque converter installation nuts (See 05–17–34 Torque Converter Installation Nuts Removal Note.)
22	No.4 engine mount (See 05–17–34 No.4 Engine Mount Removal Note.) (See 05–17–35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
23	No.1 engine mount bolts
24	Roll damper (FS)
25	Engine mounting member (See 05–17–35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
26	No.2 engine mount (See 05–17–35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
27	Transaxle (See 05–17–34 Transaxle Removal Note.) (See 05–17–35 Transaxle Installation Note.)

Lower Arm Removal Note

1. Remove the clinch bolt from the lower arm ball joint.

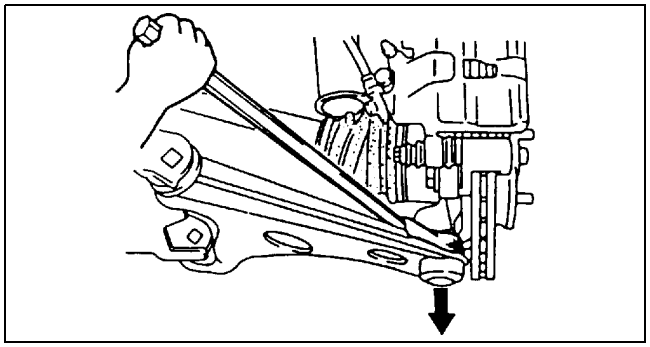
Caution

- **Wrap a rag around the ball joint dust seal to protect it from damage.**



Y3E5614W005

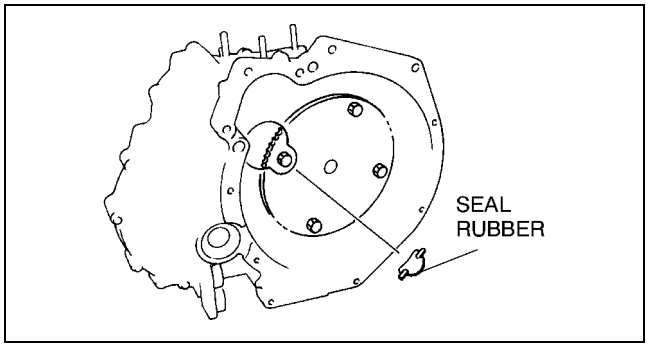
2. Pry the lower arm out of the knuckle.



Y3E5614W006

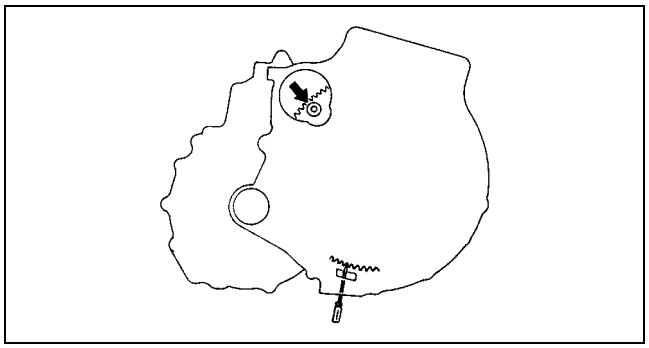
Torque Converter Installation Nuts Removal Note

1. Remove the seal rubber from the end plate.



Y3E5614W007

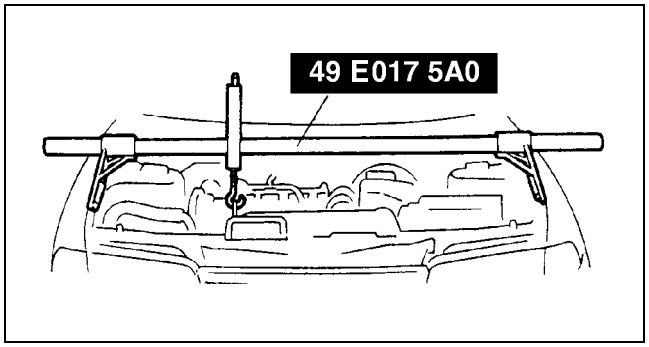
2. Remove the torque converter nuts.



Y3E5614W008

No.4 Engine Mount Removal Note

1. Support the engine by using the **SST** before removing the engine mounting member.
2. Remove the No.4 engine mount.



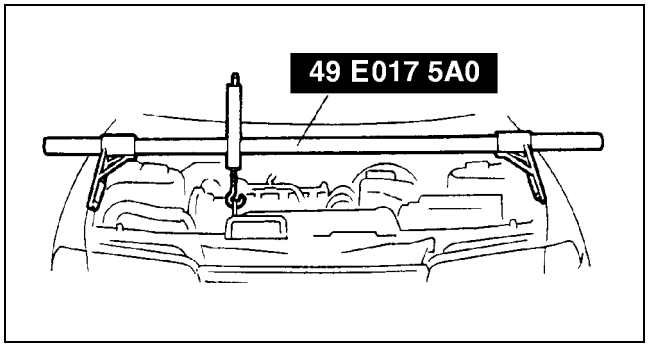
Z3U110WFK

Transaxle Removal Note

1. Loosen the **SST (engine support)** and lean the engine toward the transaxle.
2. Support the transaxle on a jack.

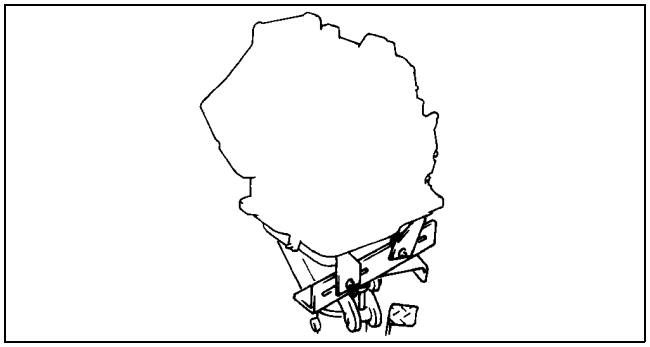
   Warning
   - **Do not allow the transaxle to fall from the jack.**

3. Remove the transaxle mounting bolts.



Z3U110WFK

4. Remove the transaxle.

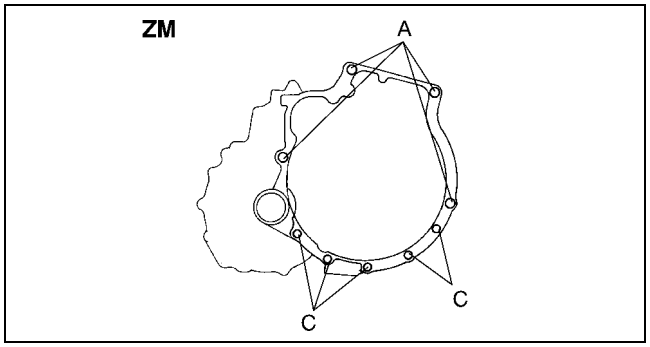


Y3E5614W010

Transaxle Installation Note

Warning
- **Do not allow the transaxle to fall from the jack.**

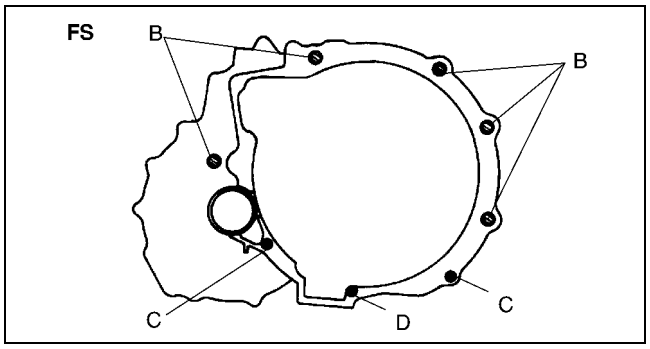
1. Set the transaxle on a jack and lift it.
2. Install the transaxle mounting bolts.



Y3E5614W011

Tightening torque
A: 64—89 N·m {6.5—9.1 kgf·m, 48—65 ft·lbf}
B: 90—116 N·m {9.1—11.9 kgf·m, 66—86 ft·lbf}
C: 38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}
D: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

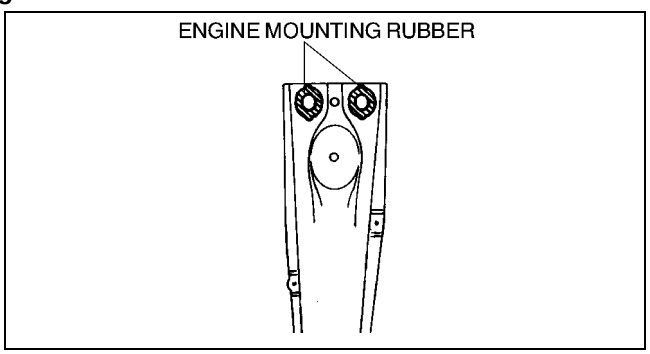
3. Tighten the **SST** (49 E017 5A0) so that the engine is located at the specified position.



Z3U517W08

No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note

1. Verify that the engine mounting rubber is installed as shown.
2. Install the No.2 engine mount to the transaxle.
3. Put the No.2 engine mount stud bolts in the installing holes when installing the engine mounting member.



Y3E5614W013

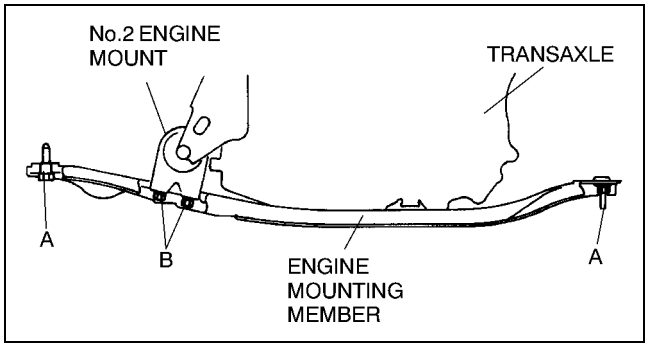
4. Install the bolts and nuts A, then the nuts B as shown.

Tightening torque
A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}
B (ZM): 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}
B (FS): 86—116 N·m {8.7—11.9 kgf·m, 63—86 ft·lbf}

5. Install the No.4 engine mount bracket by passing it through the stud bolt on the transaxle.
6. Match the positions of the No.4 engine mount bracket and the rubber, then temporarily tighten installation bolt A.
7. Tighten installation nut B, then tighten bolt A.

Tightening torque
A, B: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

8. Remove the **SST (49 E017 5A0).**



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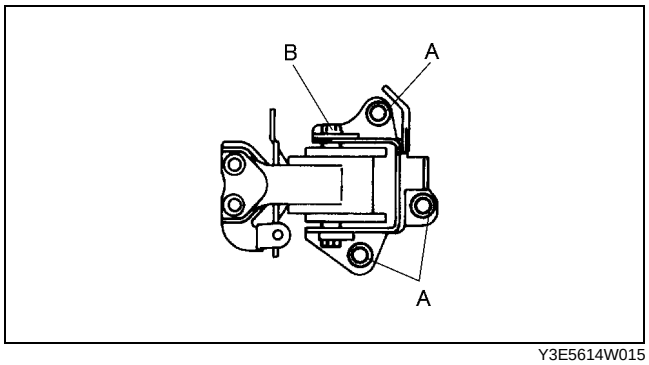


Y3E5614W015

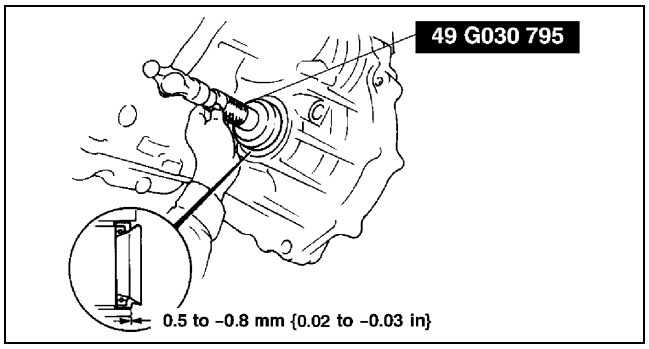
OIL SEAL (TRANSAXLE) REPLACEMENT

A3U051719240W01

1. Drain the ATF. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2. Remove the drive shaft. (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
3. Remove the oil seal.
4. Using the **SST** and a hammer, tap a new oil seal in evenly until the **SST** contacts the transaxle case.
5. Coat the lip of the oil seal with transaxle oil.

Caution
- **The oil seal is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the oil seal.**

6. Install the drive shaft. (See 03–13–9 DRIVE SHAFT REMOVAL/INSTALLATION.)
7. Add ATF to the specified level. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
8. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)



Y3U517WAL

CONTROL VALVE BODY REMOVAL/INSTALLATION

A3U051721100W01

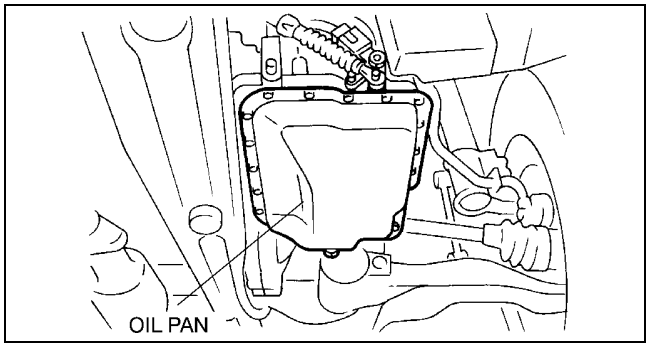
On-vehicle Removal

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.**

Caution
- **Clean the transaxle exterior throughout with a steam 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. Remove any old sealant from the transaxle case and oil pan, and clean with cleaning fluids.**

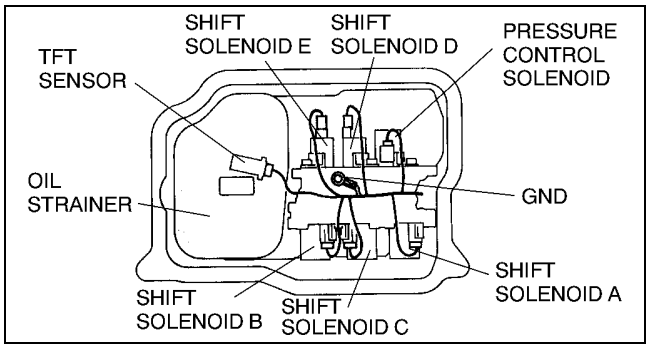
1. Disconnect the negative battery cable.
2. Drain the ATF into a separate suitable container. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)

3. Remove the splash shield.
4. Remove the oil pan.
5. Disconnect the solenoid connectors and TFT sensor connector and GND.



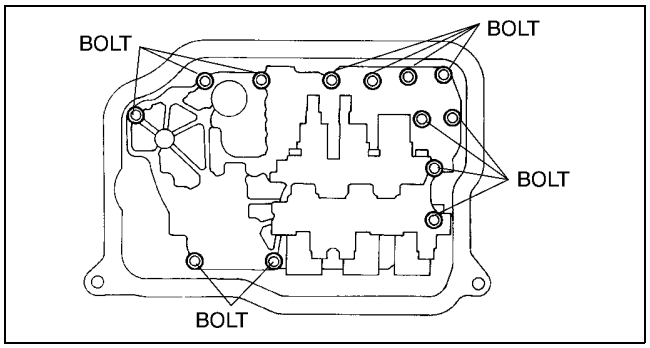
X3U517WBP

6. Remove the oil strainer.



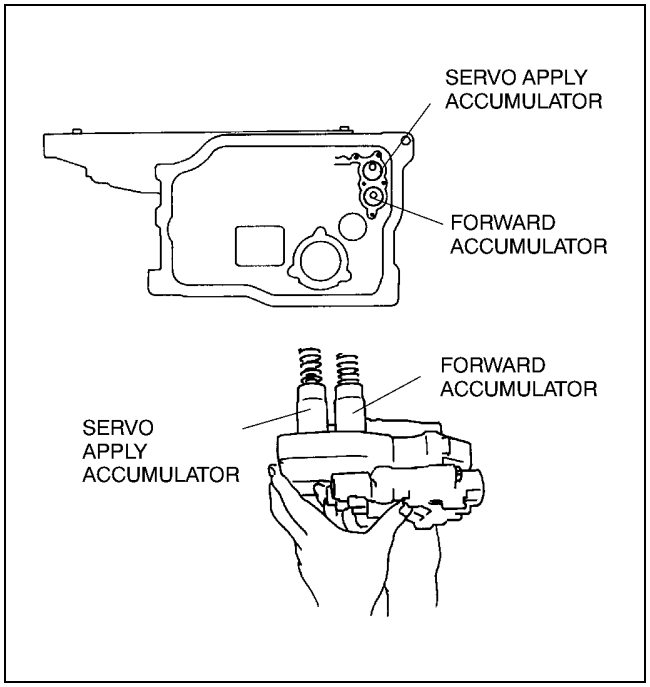
X3U517WBQ

7. Remove the control valve body component as shown.



X3U517WBR

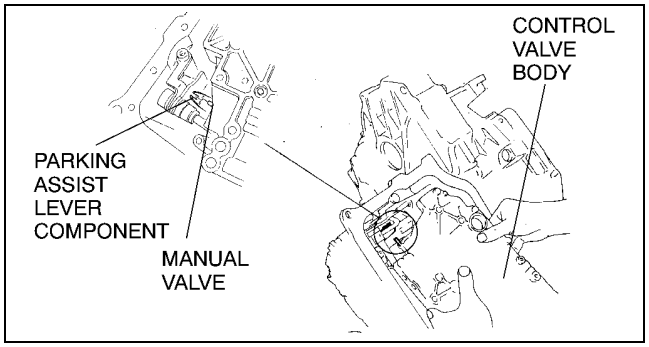
8. Remove the accumulators and accumulator springs.



X3U517WCU

On-vehicle Installation

Caution
- **Be sure to align the parking rod and the manual valve.**

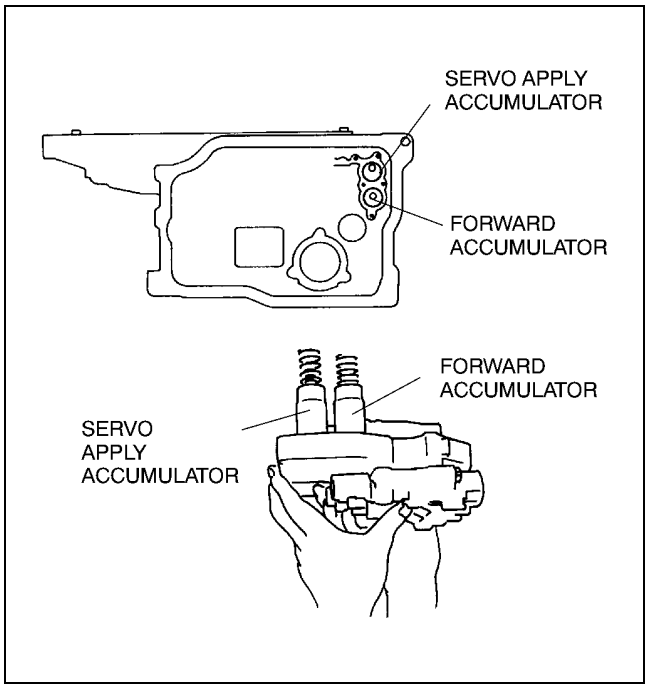


X3U517WBS

1. Install the accumulator springs and accumulator into the transaxle case.

Accumulator springs specification

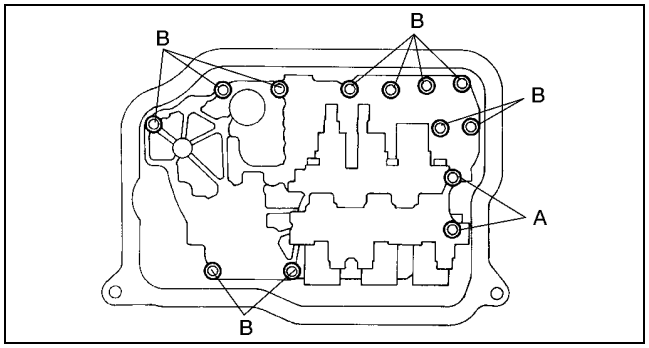
Spring	Outer diameter (mm {in})	Free length (mm {in})	No. of coils	Wire diameter (mm {in})
Servo apply accumulator large spring	21.0 {0.827}	67.8 {2.67}	10.3	3.5 {0.14}
Servo apply accumulator small spring	13.0 {0.512}	67.8 {2.67}	17.1	2.2 {0.087}
Forward accumulator large spring	21.0 {0.827}	75.0 {2.95}	10.7	2.3 {0.091}
Forward accumulator small spring	15.6 {0.614}	55.0 {2.17}	12.9	2.4 {0.094}



X3U517WBT

2. Install the control valve body component.

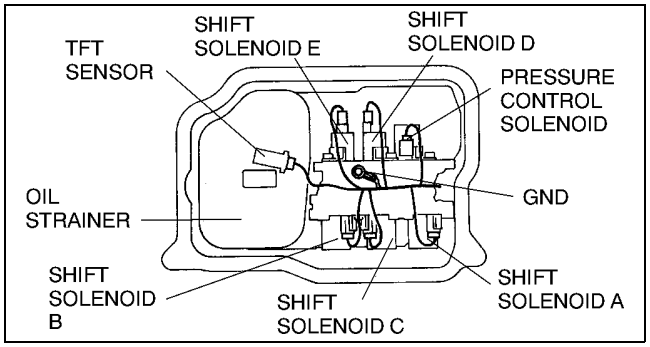
Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Bolt length (measured from below the head)
A: 70 mm {2.8 in}
B: 40 mm {1.6 in}



X3U517WBU

3. Install the oil strainer.

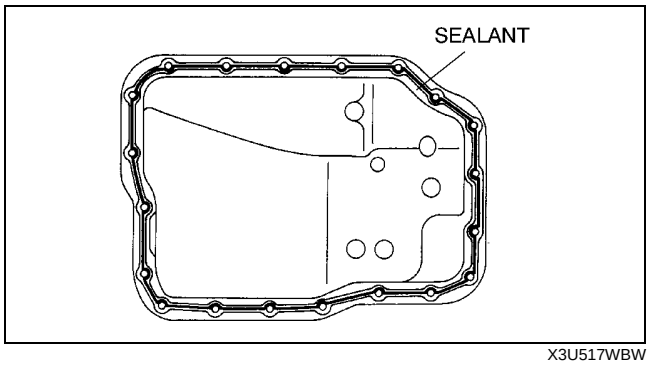
4. Match the harness colors, then connect the solenoid connectors and TFT sensor connector.



X3U517WBV

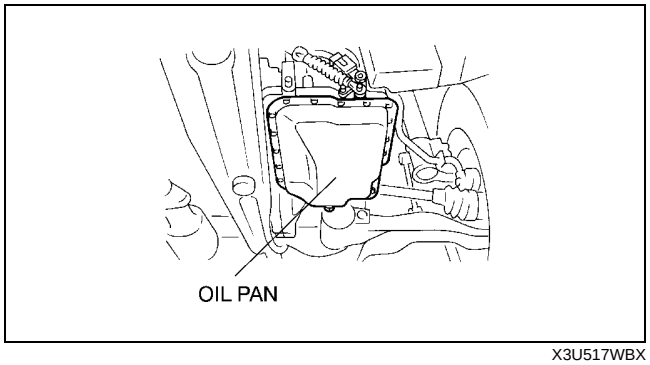
5. Apply a light coat of silicon sealant to the contact surfaces of the oil pan and transaxle case.
6. Install the oil pan.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U517WBW

7. Install the splash shield.
8. Connect the negative battery cable.
9. Add ATF, and with the engine idling, inspect the ATF level. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.) (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
10. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)
11. Carry out the road test. (See 05–17–14 ROAD TEST.)



X3U517WBX

OIL COOLER FLUSHING

A3U051719900W01

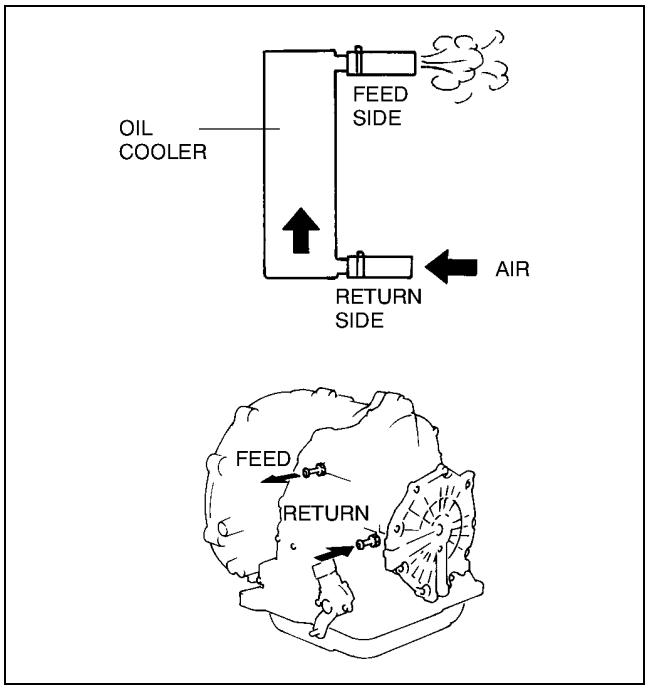
Note
- The contaminated cooler line (oil pipes and hoses) and auxiliary cooler (if equipped) must be flushed completely when ATX is overhauled or replaced.

1. Remove the two oil cooler line hoses and apply air pressure of **200 kPa {2.0 kgf/cm^2, 28 psi}** from the return hose (pipe) side.
   - If there is no ventilation, flush the oil cooler lines using the power-flushing tool. (See 05–17–40 Power Flushing)
   - If there is ventilation, go to next step.

Caution
- **Power flushing should be performed very carefully when removing the accumulated debris from the fluid baffle, otherwise the debris cannot be removed or the problem becomes even worse.**

Recommended Power-flushing Manufacturer

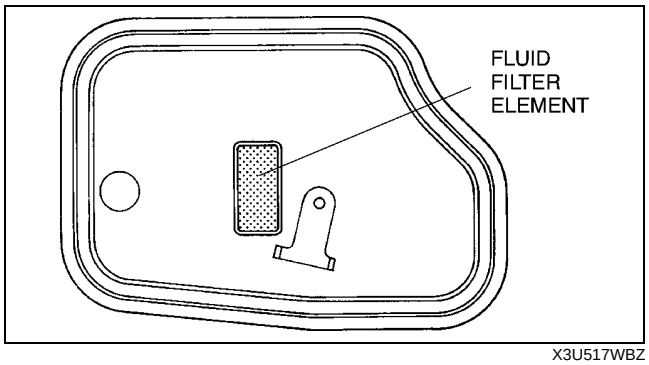
Manufacturer	Part number	Description
Kent Moore	J35944-AMAZ	Flushing kit or equivalent
OTC	60081	Portable torque converter, oil cooler cleaner or equivalent



X3U517WBY

2. Carry out the followings steps.
   (1) Remove the oil pan and inspect the fluid filter element from the front filter.
      - If the element is covered with too much debris or particles and cannot be seen, replace the oil cooler. (See 05–17–41 OIL COOLER REMOVAL/INSTALLATION.)
      - If the element can be seen, flush the oil cooler lines using the power-flushing tool.

Note
- Performing back and reverse power flushing **2 times** each does not work because debris or particles flow out from the feed pipe side of ATX.



X3U517WBZ

Power Flushing
Repair procedure
1. Before power flushing, inspect the hoses/lines and clamps. Power flushing must begin with back flushing followed by forward flushing to quickly dislodge the restriction.
   - If back flushing is not performed before forward flushing, the restriction could further reduce the ATF flow through the internal mesh type baffle of the cooler and flushing will not be effective or possible.

Inspecting oil lines & clamps
1. Be sure to Inspect the lines (hoses/pipes) for cuts, crimps (pinched), cracks or any other damage before reusing them.
   - If any problems exist, replace hoses and/or pipes.

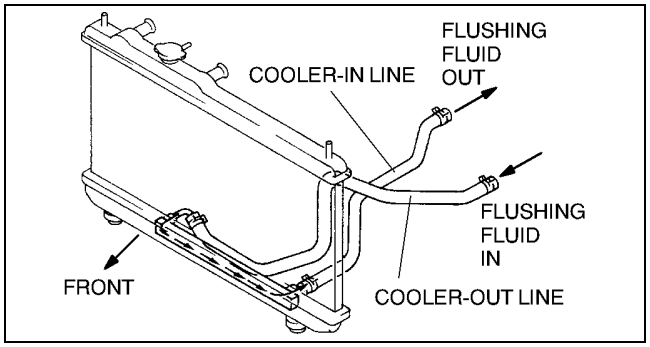
Caution
- **Always use new clamps when replacing hoses.**

Back flushing

1. Using the power flushing equipment manufacturer's instructions, connect equipment so the flushing fluid flows in the opposite direction of normal fluid flow.
2. Flush oil cooler/lines until discharge fluid is clean.

Caution

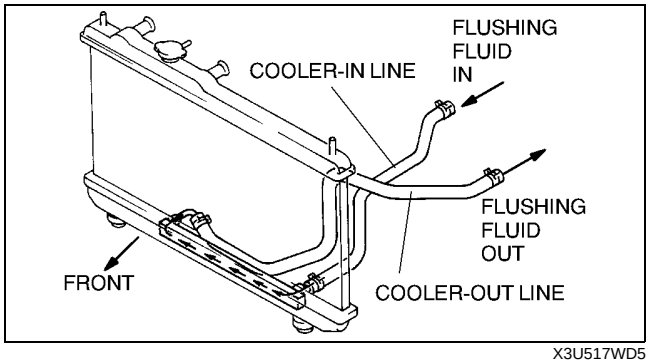
- **If the cooler can not be properly flushed using recommended equipment, send the radiator out for sublet cleaning or replace.**



X3U517WD4

Forward flushing

1. Connect power flushing equipment so the flushing fluid flows in the direction of normal fluid flow.
2. Flush oil cooler/lines until discharge fluid is clean.

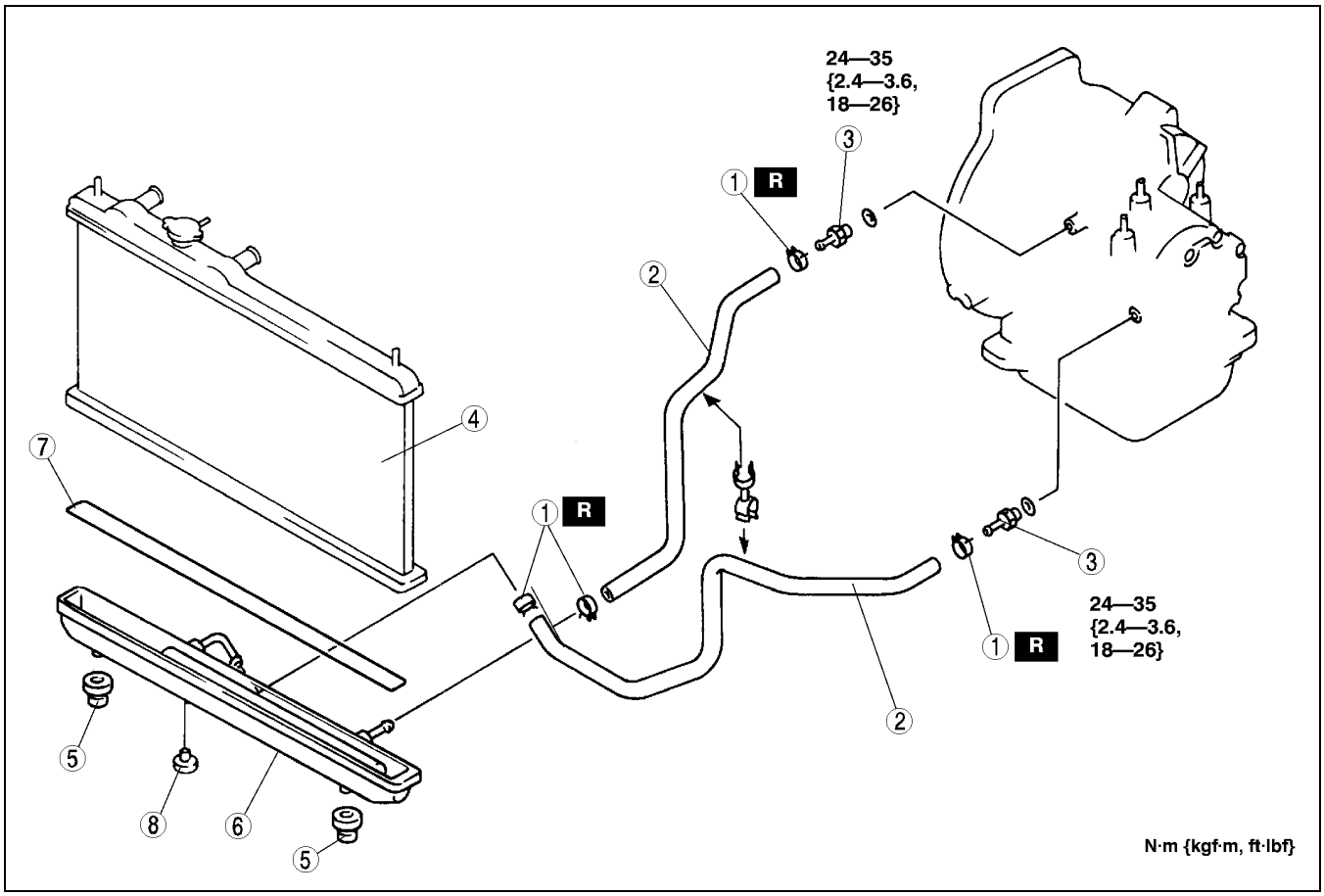


X3U517WD5

OIL COOLER REMOVAL/INSTALLATION

A3U051719900W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Add engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
4. Add ATF to the specified level. (See 05–17–18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
5. Inspect for the coolant and ATF leakage.
6. Carry out the mechanical system test. (See 05–17–11 MECHANICAL SYSTEM TEST.)
7. Carry out the road test. (See 05–17–14 ROAD TEST.)



X3U517WC0

1	Hose clamp
2	Oil hose (See 05–17–45 Oil Hose Installation Note.)
3	Connector bolt
4	Radiator (See 05–17–45 Radiator Installation Note.)
5	Mount rubber

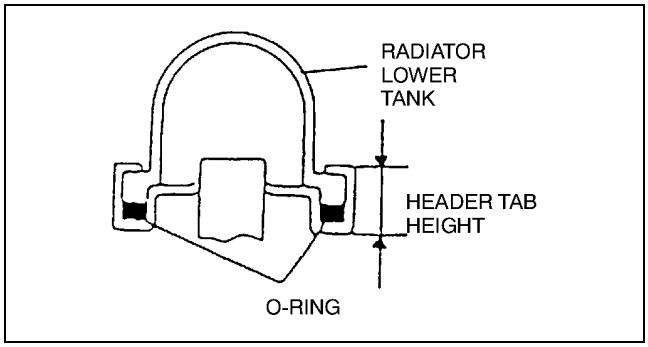
6	Radiator lower tank (in tank oil cooler) (See 05–17–42 Radiator Lower Tank (In Tank Oil Cooler) Removal Note.) (See 05–17–43 Radiator Lower Tank (In Tank Oil Cooler) Installation Note.)
7	O-ring
8	Drain cock

Radiator Lower Tank (In Tank Oil Cooler) Removal Note

1. Inspect the height of the header tabs.
2. Insert the end of a medium tip screwdriver between the end of the header tab and the lower tank.

Note

- Do not open more tabs than necessary for tank removal.

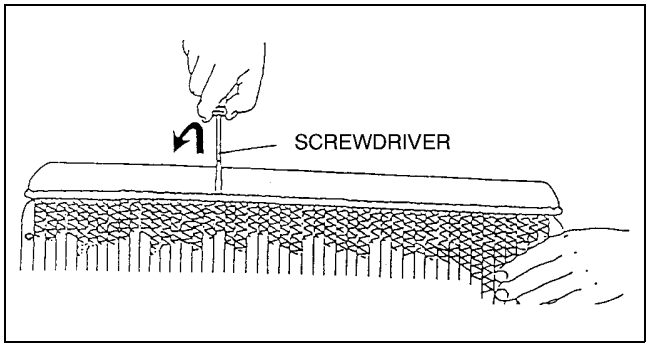


X3U517WC5

3. Pivot the screwdriver to pry the tab away from the tank and repeat the procedure for each tab.
4. Remove the radiator lower tank and O-ring (gasket) from the core header when all of the tabs are opened.

Note
- If any header tabs are missing from the core, replace the radiator.

5. Verify that the gasket surface of the radiator core header is clean and free of foreign material or damage.
6. Inspect the radiator lower tank for warping.
   - If it is warped, replace the radiator tank.



X3U517WC6

Radiator Lower Tank (In Tank Oil Cooler) Installation Note

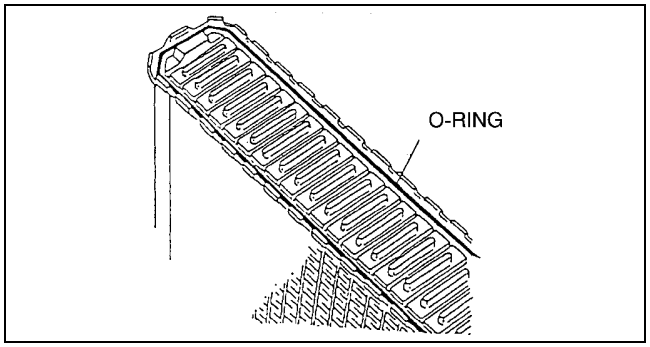
1. Install a new O-ring and ensure it is not twisted.

Note
- The old O-ring must be replaced.

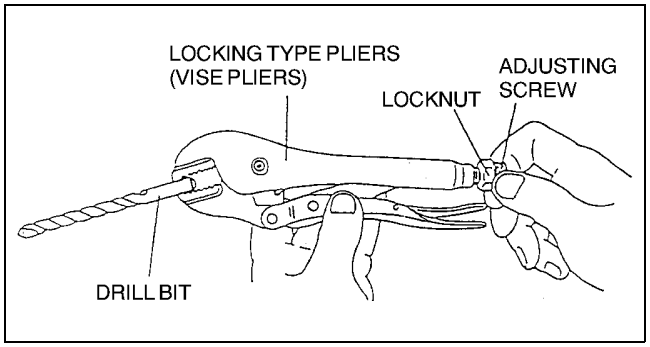
2. Position the radiator tank in the original direction to the core using care not to scratch the tank sealing surface with the header tabs.

Note
- Step 3 will set jaw opening to the correct specification.

3. With the jaws of locking-type pliers (vise grips) closed and locked, turn the adjusting screw to position the jaws against the drill bit with the diameter measured (height) in removal procedure.
   - Tighten the lock nut on the adjusting screw against the handle to lock the adjustment in place.

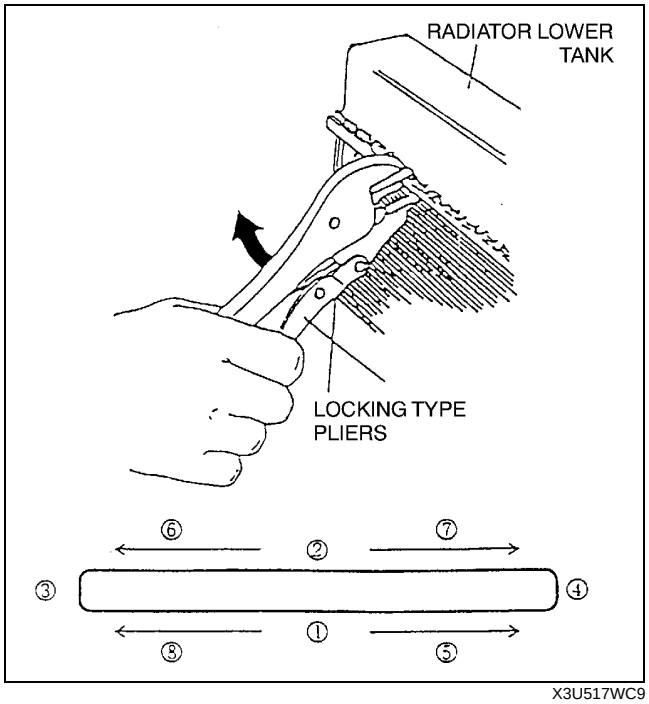


X3U517WC7



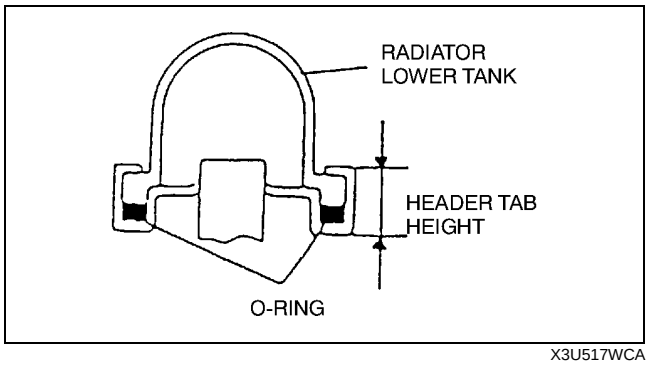
X3U517WC8

4. Squeeze the header tabs down in order as shown against the lip of radiator lower tank base with locking-type pliers while rotating the pliers toward the tank.



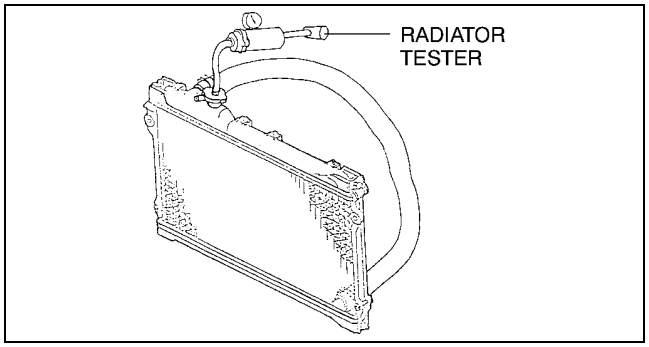
X3U517WC9

5. Verify the height of the header tabs is same as the height before removal.
6. Inspect for the leakage of radiator according to the following procedure.
   (1) Blind the radiator inlet and outlet.
   (2) Blind the ATF cooler inlet and outlet.
   (3) Connect a radiator tester.



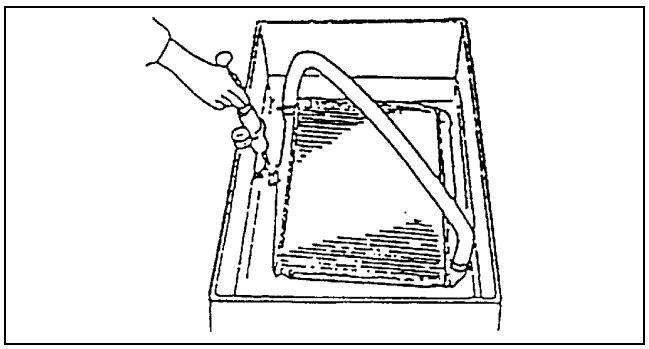
X3U517WCA

   (4) Apply pressure of **150 kPa {1.5 kgf/m^2, 21 psi}** and verify that the pressure is held.



X3U517WCB

   (5) Put the radiator into water slowly with the radiator tester connected.
   (6) Inspect for air leakage.

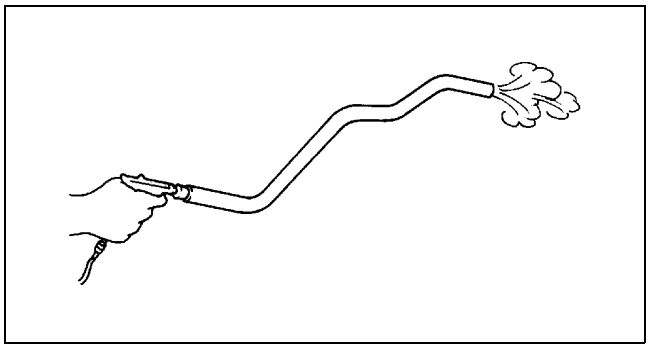

X3U517WCC

Radiator Installation Note

1. The ATX oil cooler flushing must be performed whenever a transaxle is removed for service because the existing fluid may be contaminated, and to prevent contamination of new fluid. The flushing must be performed after installation of the overhauled or replaced transaxle. (See 05–17–40 OIL COOLER FLUSHING)

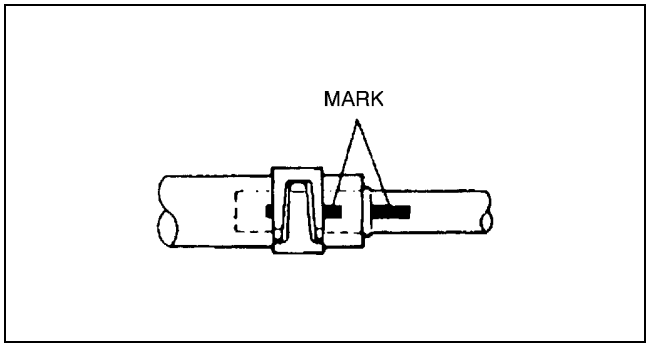
Oil Hose Installation Note

1. Apply compressed air to cooler-side opening more than **1 minute**, and blow any remaining grime and foreign material from the cooler pipes.



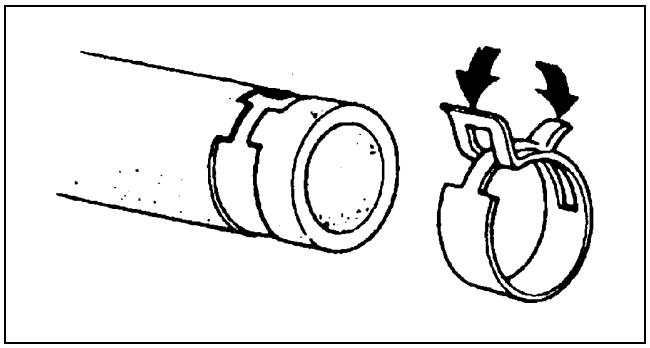
X3U517WC1

2. Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown.



Y3U517WAN

3. Install the hose clamp onto the hose.
   - If reusing the hose, install a new hose clamp exactly on the mark left by the previous hose clamp.
4. Verify that the hose clamp does not interfere with any other components.



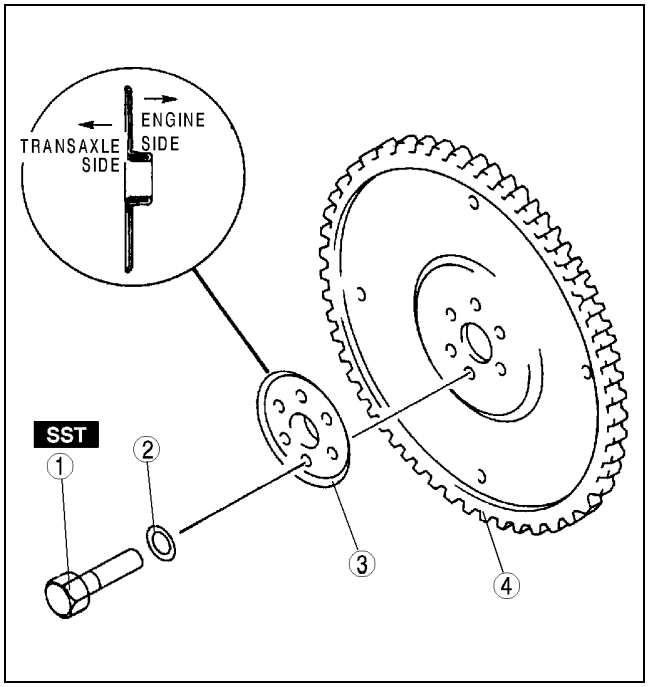
X3U517WC3

DRIVE PLATE REMOVAL/INSTALLATION

A3U051719020W01

1. Remove the transaxle. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/ INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Install the transaxle. (See 05–17–31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/ INSTALLATION.)

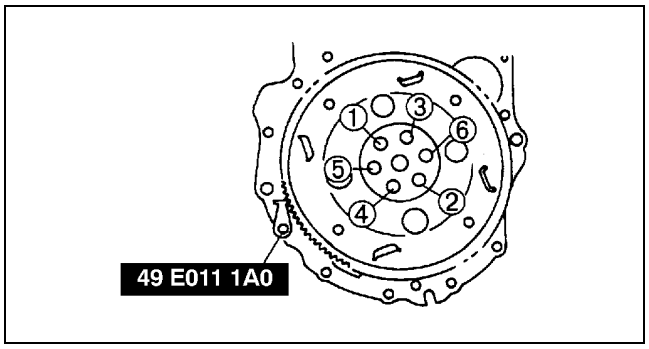
1	Drive plate mounting bolt (See 05–17–46 Drive Plate Mounting Bolts Removal Note.) (See 05–17–46 Drive Plate Mounting Bolts Installation Note.)
2	Washer
3	Adapter
4	Drive plate



X3U517WCD

Drive Plate Mounting Bolts Removal Note

1. Set the **SST** or equivalent against the drive plate.
2. Remove the drive plate mounting bolts.



X3U517WCE

Drive Plate Mounting Bolts Installation Note

Caution

- **If the bolts are reused, remove the oil sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.**

1. Remove the sealant from the bolts hole in the crankshaft and from the drive plate mounting bolts.

Note

- If all the previous sealant cannot be removed from a bolt, replace the bolts.
- Do not apply sealant if new bolts are used.

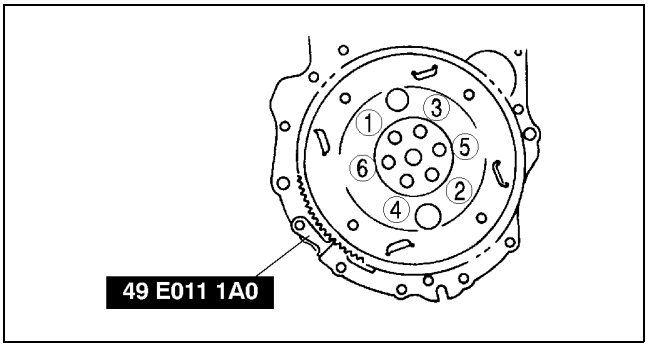
2. Install the drive plate.
3. Install the adapter.
4. Apply sealant to the drive plate mounting bolts and install them.
5. Set the **SST** or equivalent against the drive plate.

Caution

- **When installing sealant covered bolts tighten them immediately. Leaving these bolts in a half installed condition could cause them to be stuck that way, due to the natural hardening of the sealant.**

6. Tighten the drive plate installation bolts in 2 or 3 steps as shown.

Tightening torque
97—102 N·m {9.8—10.5 kgf·m,70.9—75.9 ft·lbf}

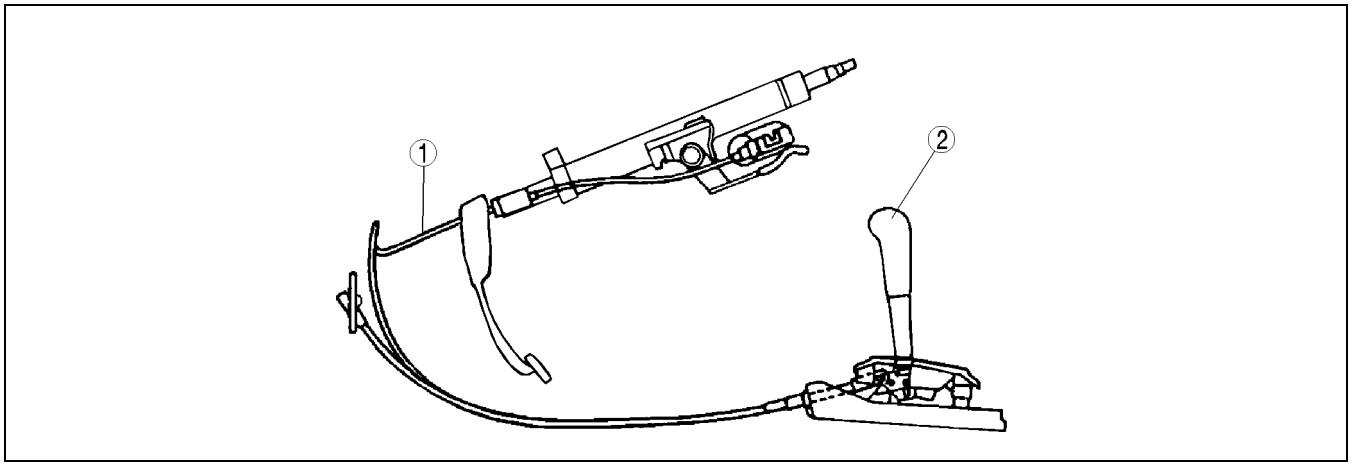


X3U517WCF

05–18 AUTOMATIC TRANSAXLE SHIFT MECHANISM

AUTOMATIC TRANSMISSION SHIFT MECHANISM LOCATION INDEX

A3U051864350W01



Z3U518W01

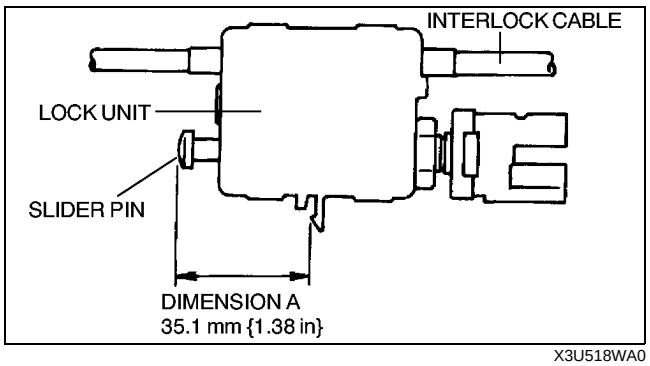
1	Interlock cable (See 05–18–1 INTERLOCK CABLE INSPECTION)

2	Selector lever (See 05–18–3 SELECTOR LEVER REMOVAL/INSTALLATION) (See 05–18–2 SELECTOR LEVER INSPECTION) (See 05–18–2 SELECTOR LEVER ADJUSTMENT) (See 05–18–8 SELECTOR LEVER DISASSEMBLY/ASSEMBLY)

INTERLOCK CABLE INSPECTION

A3U051846300W01

1. Remove the interlock cable and lock unit. (See 05–18–3 SELECTOR LEVER REMOVAL/INSTALLATION.)
   - If the slider pin protrusion is as specified below (dimension A), verify that the interlock cable moves freely in the lock unit.
   - If not as specified, replace the interlock cable.
2. Install the interlock cable and lock unit. (See 05–18–4 Interlock Cable and Lock Unit Installation Note.)

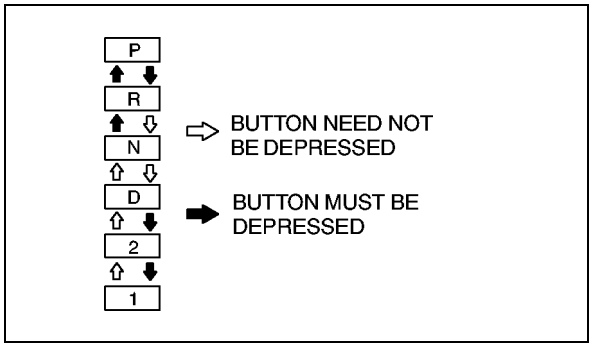


X3U518WA0

SELECTOR LEVER INSPECTION

A3U051846102W01

1. Turn the ignition switch to the ON position (engine off).
2. With the brake pedal depressed, verify that a “click” sound is heard at each range when shifted in the pattern shown.
3. Verify that the selector lever can only be shifted as shown.
4. Verify that a “click” sound is heard at each position when shifted from P position to 1 range.
5. Verify that the positions of the selector lever and the indicator are aligned.
6. Verify that the position of the selector lever and the selector illumination light correspond.
   - If not as specified, adjust the TR switch. (See 05–17–23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT.)
7. Verify that the vehicle operates in each selected range.

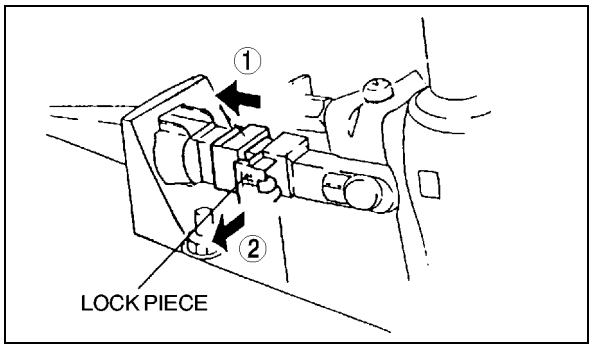


X3U518WA1

SELECTOR LEVER ADJUSTMENT

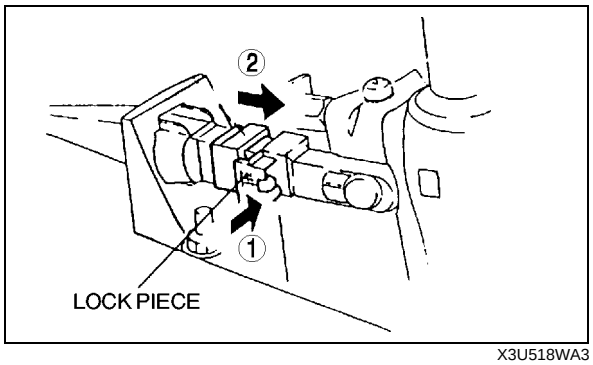
A3U051846102W02

1. Remove the center console.
2. Shift the selector lever to the P position.
3. Unlock the lock piece of the selector cable (selector lever side) in the order shown in the figure.
4. Verify that the manual shaft is at the P position.



X3U518WA2

5. Lock the lock piece of the selector cable (selector lever side) in the order shown in the figure.
6. Install the center console.
7. Shift the selector lever from P position to 1 range, and make sure that there are no other components in that area to interfere with the lever.

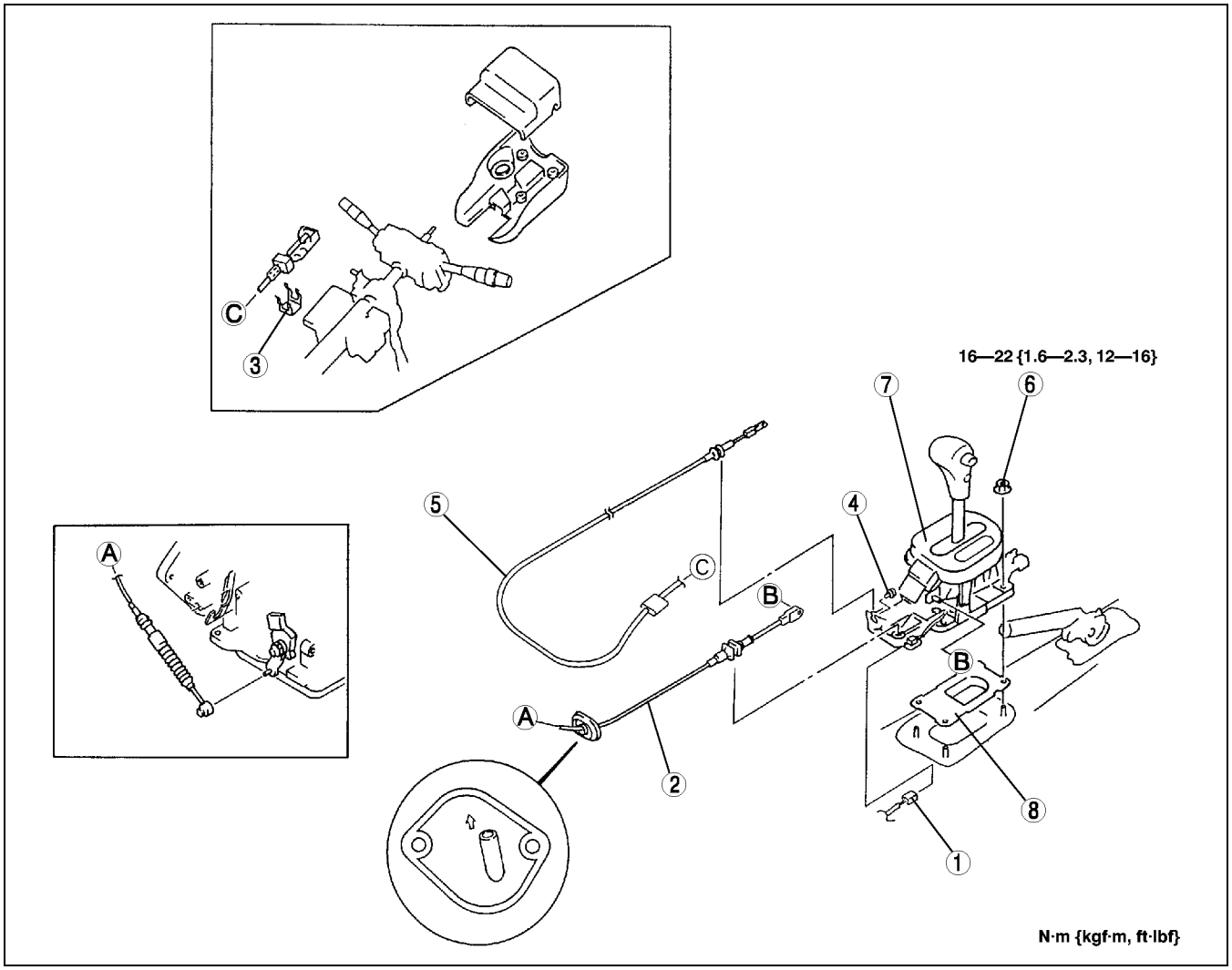


X3U518WA3

SELECTOR LEVER REMOVAL/INSTALLATION

A3U051846102W03

1. Disconnect the negative battery cable.
2. Remove the center console.
3. Disconnect the brake switch connector.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



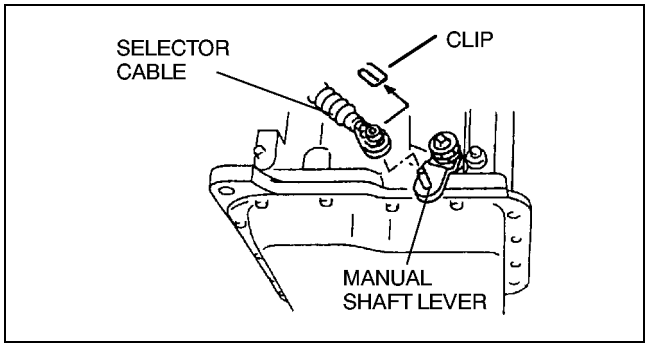
X3U518WA4

1	Connector
2	Selector cable (See 05–18–4 Selector Cable Removal Note.) (See 05–18–6 Selector Cable Installation Note.)
3	Clip
4	Clip

5	Interlock cable and lock unit (See 05–18–4 Interlock Cable and Lock Unit Installation Note.)
6	Nut
7	Selector lever
8	Seal rubber

Selector Cable Removal Note

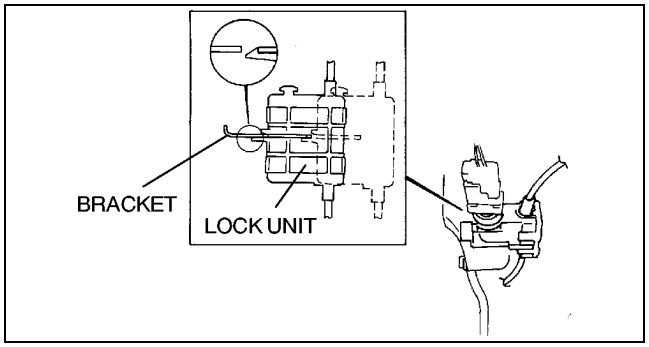
Note
- Remove the clip shown in the figure before removing the selector cable from manual shaft lever.



X3U518WAP

Interlock Cable and Lock Unit Installation Note

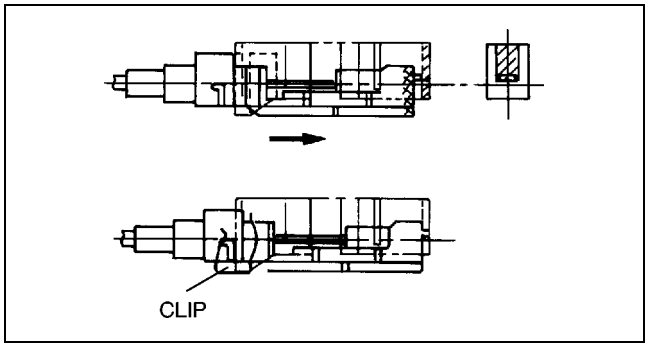
1. Verify that the ignition switch is at ACC position, and shift the selector lever to P position.
2. Press the lock unit onto the brake pedal stopper bracket.
3. From this position, slide the lock unit to fix the lock unit hook into the bracket hole securely as shown in the figure.
4. Install the interlock cable to the key cylinder.
5. Slide the outer casing to the key cylinder. Verify that the outer casing hook is secured in the cylinder hole.



X3U518WA5

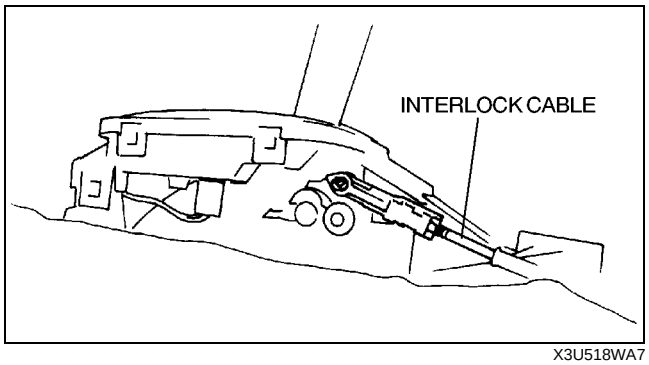
6. Insert the clip over the convex part of the outer casing.

Caution
- **Allowing the interlock cable to become bent or twisted during installation can affect the lock unit operation.**



X3U518WA6

7. Install the interlock cable end onto the cam pin on the selector lever.

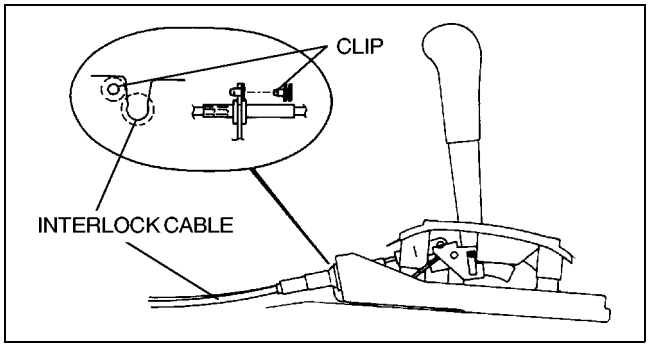


X3U518WA7

8. Fit the interlock cable in the U-groove in the selector lever base plate, and install the clip.

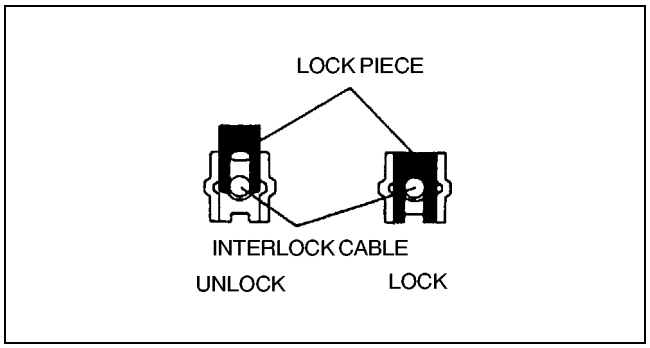
Note
- Steps 9—12 are for the interlock cable replacement only.

Caution
- **Applying load to the interlock cable while pressing the lock piece in can affect the lock unit operation.**



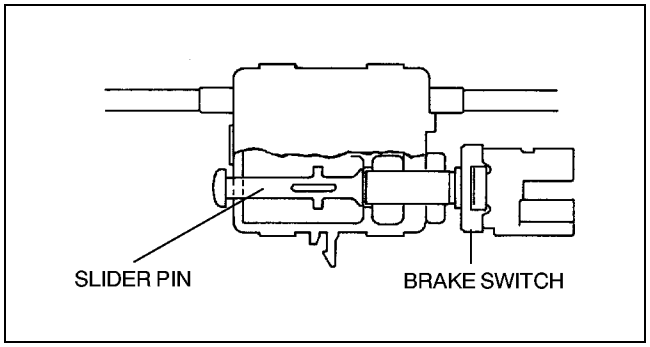
X3U518WA8

9. Press the interlock cable lock piece in until it is locked.



X3U518WA9

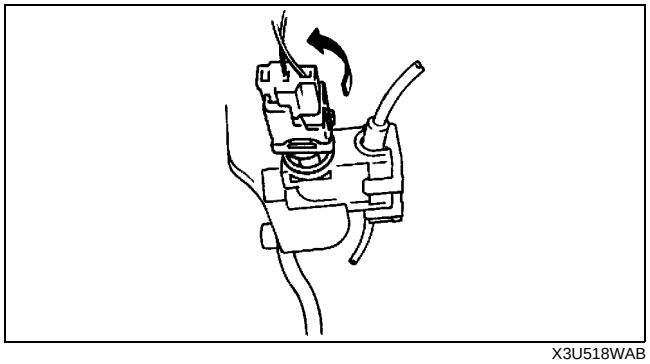
10. Screw the brake switch into the slider pin of the lock unit as far as possible.



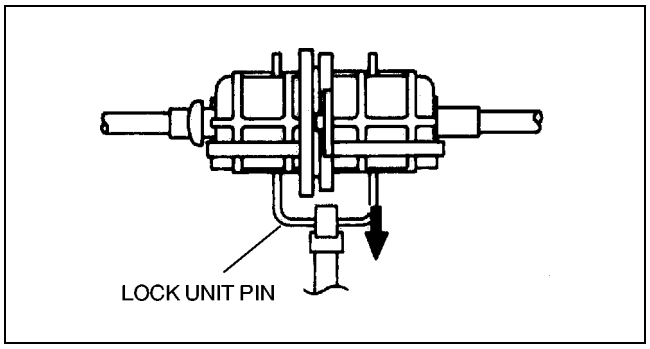
X3U518WAA

11. From this position, turn the brake switch counterclockwise **about 90 degrees**, then tighten the lock nut.

Tightening torque
13.8—17.6 N·m {140—180 kgf·cm, 122—156 in·lbf}


X3U518WAB

12. Remove the lock unit pin in the order shown in the figure.

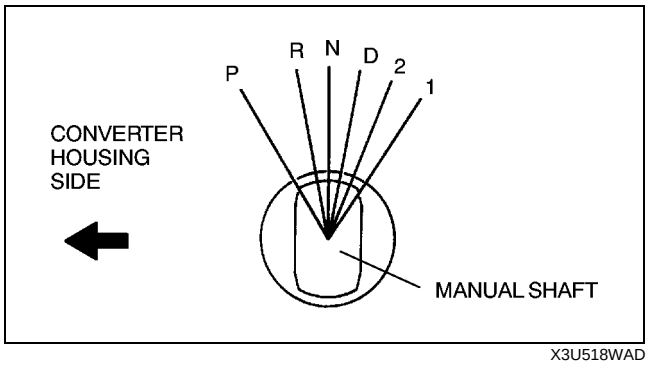


X3U518WAC

Selector Cable Installation Note

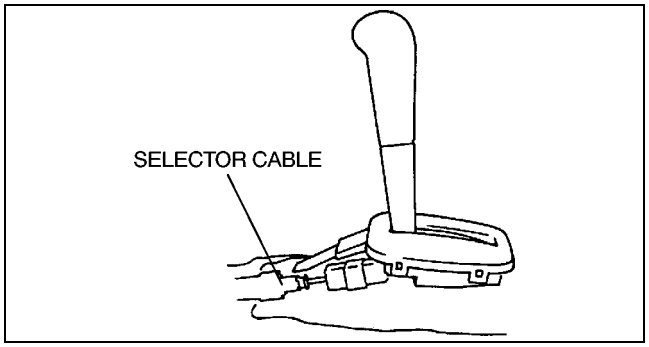
Caution
- **Do not apply load to the manual shaft after manual shaft is shifted to P position. Otherwise, the transaxle may be damaged.**

1. Turn the manual shaft to the converter housing side fully, to set the P position.



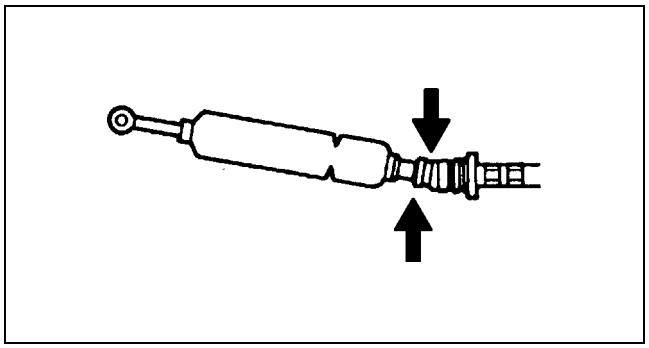
X3U518WAD

2. Install the selector cable to the selector lever.

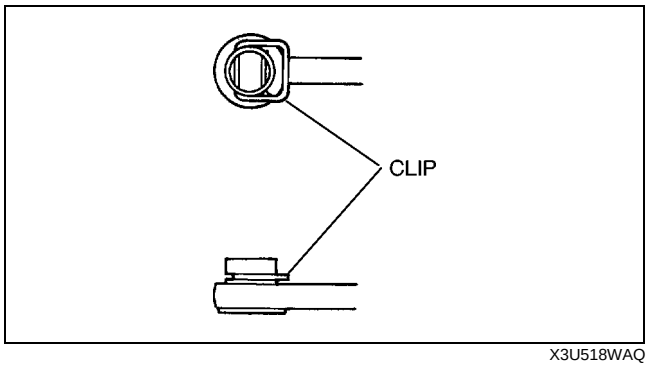


X3U518WAE

Caution
- **Bending the selector cable in the manner shown in the figure will damage the cable and it may become loose when shifted. When installing the selector cable, hold it straight.**


X3U518WAF

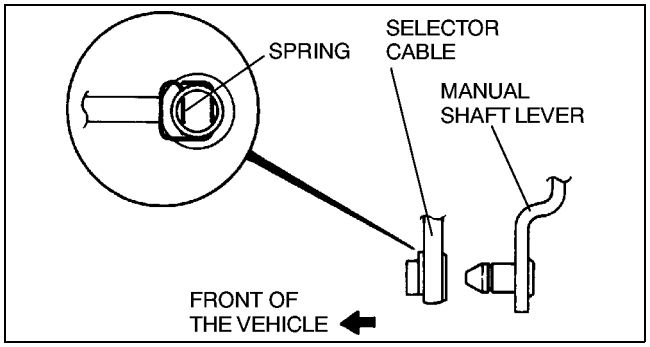
3. Install the clip as shown in the figure.



X3U518WAQ

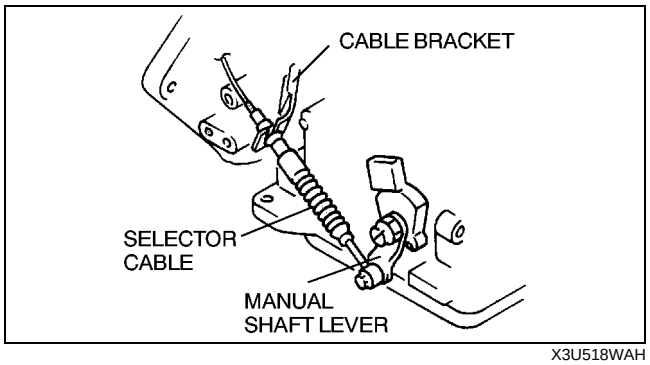
Note
- Install the selector cable to the manual shaft lever with the spring side of the selector cable end facing the front of the vehicle.

4. Install the selector cable to the manual shaft lever in such a way that the selector cable does not bear a load.
5. Confirm that the end of the manual shaft lever sticks out of the end of the selector cable.



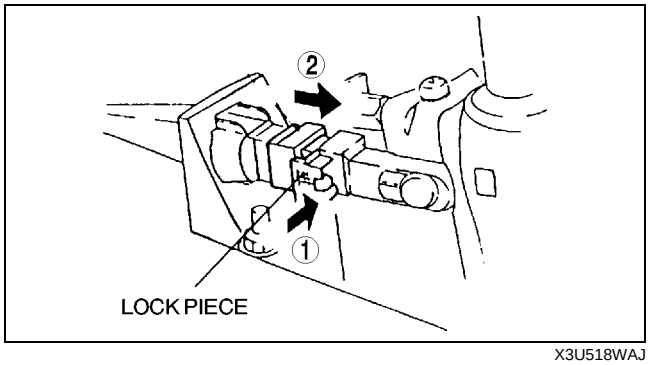
X3U518WAG

6. Install the selector cable to the cable bracket.
7. Verify that the selector lever is at P position.



X3U518WAH

8. Unlock the lock piece of the selector cable (selector lever side) in the order shown in the figure.
9. Shift the selector lever from P position to 1 range, and make sure that there are no other components in that area to interfere with the lever.

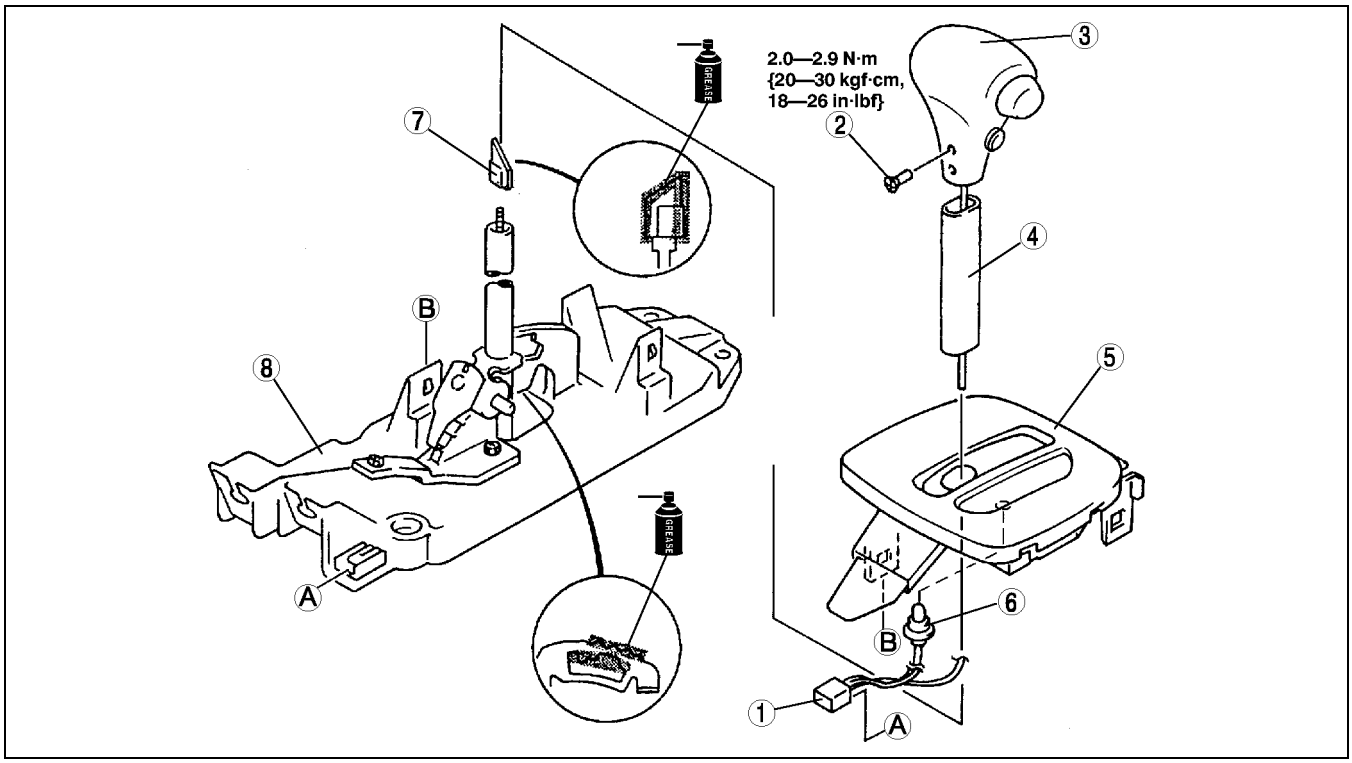


X3U518WAJ

SELECTOR LEVER DISASSEMBLY/ASSEMBLY

A3U051846102W04

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

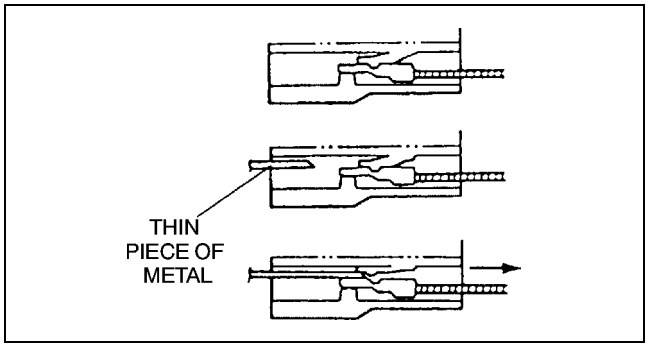


X3U518WAK

1	Connector (See 05–18–8 Connector Disassembly Note.)
2	Screw
3	Selector lever knob
4	Cover
5	Indicator panel
6	Selector illumination light
7	Cam (See 05–18–9 Cam Assembly Note.)
8	Selector lever

Connector Disassembly Note

1. Insert a thin piece of metal from the terminal side of the connector, and press down the terminal locking tab.
2. Pull the terminal out of the connector.



X3U518WAL

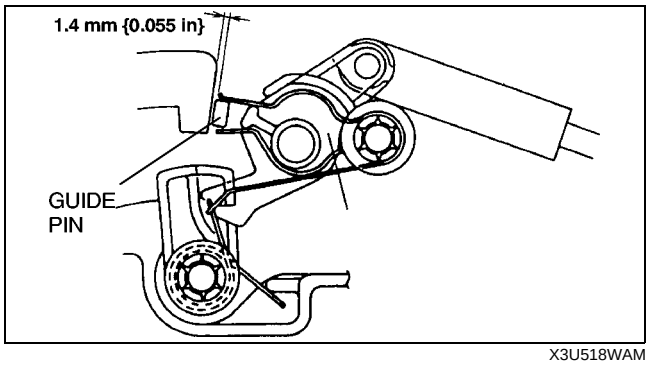
Cam Assembly Note

1. Loosely install the cam to the push rod.

Note

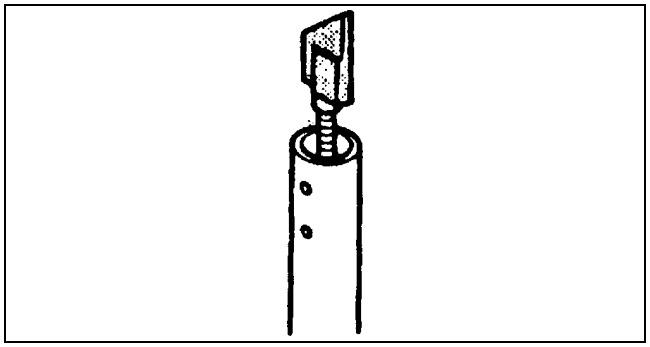
- Clearance can be reduced by turning the cam clockwise.

2. Adjust the clearance between the guide plate and the guide pin by turning the cam.
3. Install the selector lever knob and verify that the clearance is as specified.
   - If not, repeat from Step 2.
4. Remove the selector lever knob.



X3U518WAM

5. Apply grease to the cam as shown.



X3U518WAN

05–50 TECHNICAL DATA

TRANSMISSION/TRANSAXLE TECHNICAL DATA

A3U055001024W01

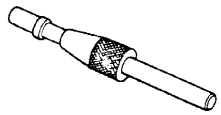
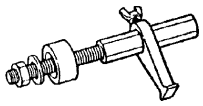
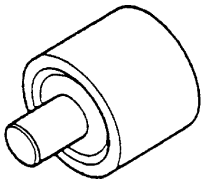
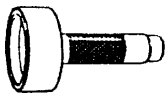
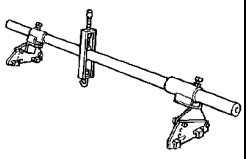
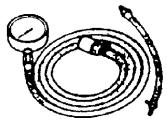
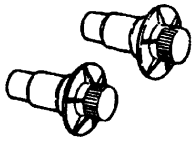
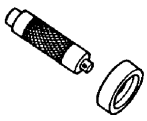
Item				Engine	
				ZM	FS
CLUTCH					
Clutch pedal	Full stroke		(mm {in})	130—140 {5.12—5.51}	
	Height (from set plate)		(mm {in})	210—215 {8.27—8.46}	
	Free play		(mm {in})	0.7—3.5 {0.03—0.13}	
Clutch cover	Diaphragm spring fingers	Depth	(mm {in})	0.5 {0.020}	
		Misalignment	(mm {in})	0.6 {0.024}	
	Maximum clearance of flatness of the pressure plate		(mm {in})	0.5 {0.020}	
Clutch disc	Minimum thickness		(mm {in})	0.3 {0.012}	
	Run out limit		(mm {in})	0.7 {0.028}	
Flywheel	Run out limit		(mm {in})	0.2 {0.008}	
MANUAL TRANSAXLE					
Transaxle type				**F25M-R**	**G15M-R**
Transaxle oil	Grade			API Service GL-4 or GL-5	
	Viscosity	All season		SAE 75W—90	
		Above 10 °C {50 °F}		SAE 80W—90	
	Capacity (Approx. quantity) (L {US qt, Imp qt})			2.68 {2.83, 2.36}	
AUTOMATIC TRANSAXLE					
Transaxle type				**FN4A-EL**	
Line pressure (kPa {kgf/cm^2, psi})	D, 2, 1 range	Idle		330—470 {3.4—4.7, 49—66}	
		Stall		1,200—1,360 {12.3—13.8, 175—196}	1,160—1,320 {11.9—13.4, 170—190}
	R position	Idle		490—710 {5.0—7.2, 72—100}	
		Stall		1,470—1,690 {15.0—17.2, 214—244}	
Engine stall speed (rpm)	D, 2, 1 range			2,300—2,600	2,200—2,500
	R position			2,300—2,600	2,200—2,500
Time lag (sec)	N→D			0.4—0.7	
	N→R			0.4—0.7	
Transaxle fluid temperature (TFT) sensor (kilohm)	–20 °C {–4 °F}			236—324	
	0 °C {32 °F}			84.3—110	
	20 °C {68 °F}			33.5—42.0	
	40 °C {104 °F}			14.7—17.9	
	60 °C {140 °F}			7.08—8.17	
	80 °C {176 °F}			3.61—4.15	
	100 °C {212 °F}			1.96—2.24	
	120 °C {248 °F}			1.13—1.28	
	130 °C {266 °F}			0.87—0.98	
Input/turbine speed sensor (ohm)	ATF temperature: –40—160 °C {–40—320 °F}			250—600	
Solenoid valve (ohm)	Shift solenoid A			1.0—4.2	
	Shift solenoid B			1.0—4.2	
	Shift solenoid C			1.0—4.2	
	Shift solenoid D			10.9—26.2	
	Shift solenoid E			10.9—26.2	
	Pressure control solenoid			2.4—7.3	

Item		Engine	
		ZM	FS
Automatic transaxle fluid (ATF)	Type	ATF M-V or equivalent (e.g. Dexron®III)	
	Capacity (Approx. quantity) (L {US qt, Imp qt})	7.2 {7.6, 6.3}	

05–60 SERVICE TOOLS

TRANSMISSION/TRANSAXLE SST

A3U056001024W01

49 0259 770B Flare nut wrench 	49 SE01 310A Clutch disc centering tool 	49 1285 071 Bearing puller 
49 E011 1A0 Ring gear brake set 	49 F028 202 Bush installer 	49 B001 797 Handle (Part of 49 B001 795) 
49 B001 795 Oil seal installer 	49 E017 5A0 Engine support 	49 0378 400C Oil pressure gauge set 
49 B019 901B Oil pressure gauge 	49 H019 002 Adapter 	49 G030 455 Diff. side gear holder 
49 G030 795 Oil seal installer 	418FS475 WDS 	—

STEERING

06
SECTION

06–10 GENERAL PROCEDURES

PRECAUTION (STEERING)

A3U061001034W01

Wheels and Tires Removal/Installation

1. 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}**.

Power Steering Components Removal/Installation

1. If any power steering fluid line has been disconnected anytime during the procedure, add ATF M-**III** or equivalent (e.g. Dexron®**III**), bleed the fluid lines, and inspect for leakage after the procedure has been completed.

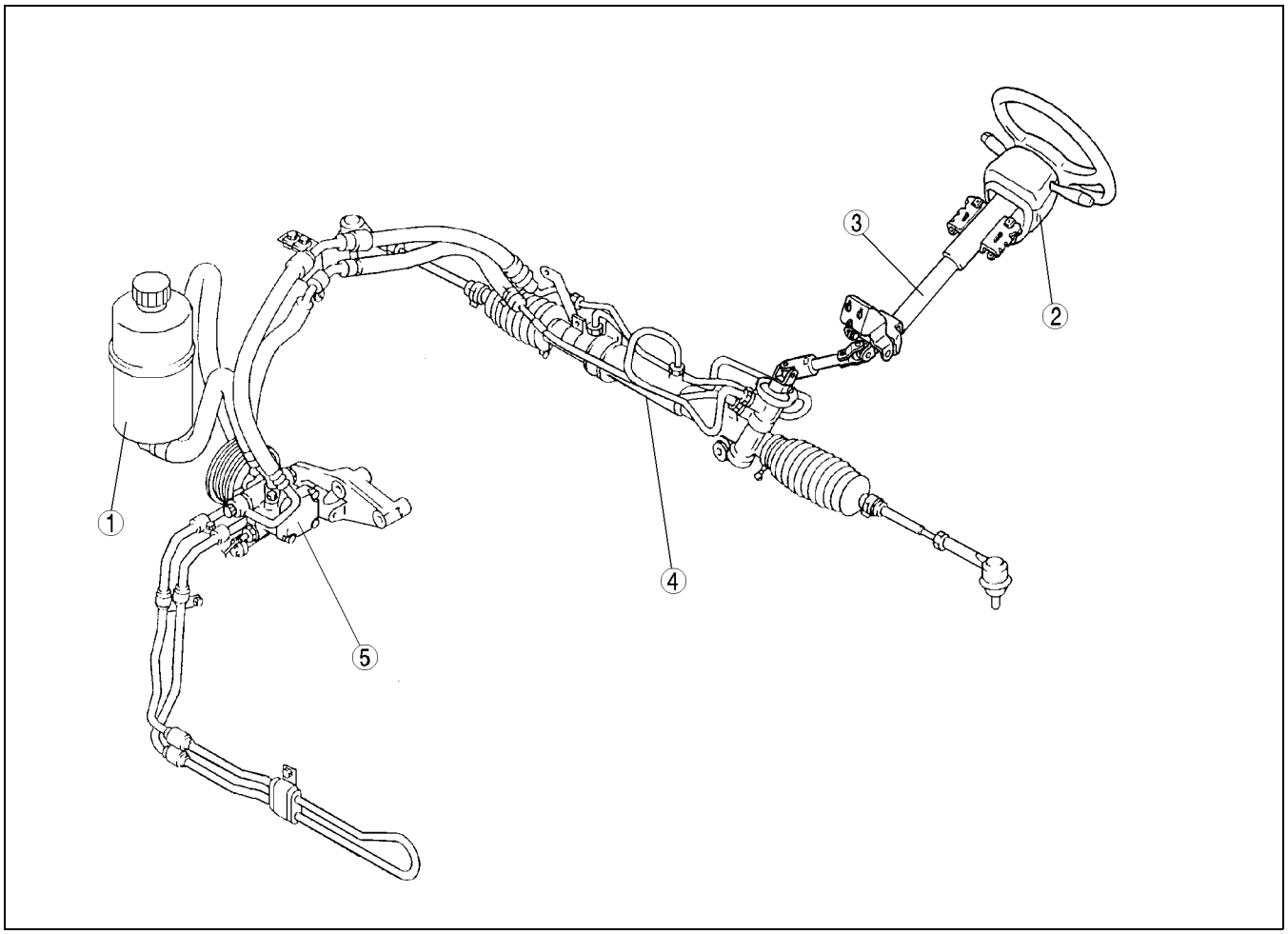
Connectors Disconnection/Connection

1. Disconnect the negative battery cable before doing any work that requires handling of connectors. Reconnect the negative battery cable only after the work is completed.

06–12 ENGINE SPEED SENSING POWER STEERING

ENGINE SPEED SENSING POWER STEERING LOCATION INDEX

A3U061201036W01



Z3U0612W011

1	Power steering fluid (See 06–12–3 POWER STEERING FLUID INSPECTION)
2	Steering wheel and column (See 06–12–5 STEERING WHEEL AND COLUMN INSPECTION) (See 06–12–6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION)
3	Steering shaft (See 06–12–8 STEERING SHAFT INSPECTION)
4	Steering gear and linkage (See 06–12–9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION) (See 06–12–11 STEERING GEAR AND LINKAGE DISASSEMBLY) (See 06–12–15 STEERING GEAR AND LINKAGE INSPECTION) (See 06–12–17 STEERING GEAR AND LINKAGE ASSEMBLY)
5	Power steering oil pump (See 06–12–23 POWER STEERING OIL PUMP REMOVAL/INSTALLATION) (See 06–12–25 POWER STEERING OIL PUMP (ZM) DISASSEMBLY/ASSEMBLY) (See 06–12–27 POWER STEERING OIL PUMP (FS) DISASSEMBLY/ASSEMBLY)

AIR BLEEDING

A3U061201036W02

1. Inspect the fluid level. (See 06–12–3 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. Reinspect the fluid level.
   - If it has dropped, add fluid.
5. Repeat Steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
   - Add fluid as necessary and repeat Steps 8 and 9.

POWER STEERING FLUID INSPECTION

A3U061232040W01

Fluid Level Inspection

1. Inspect the power steering fluid level.
   - Add fluid to the specified level as necessary.

Fluid specification
ATF M-III or equivalent (e.g. Dexron®III)

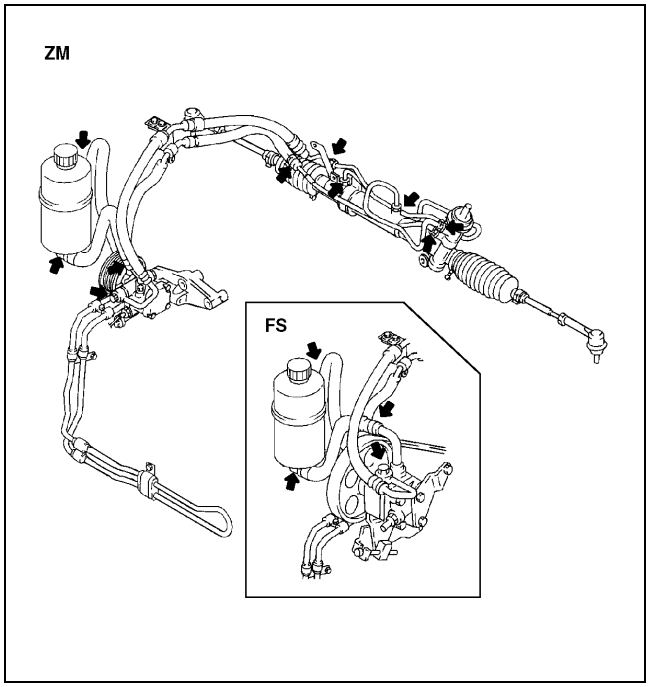
Fluid Leakage Inspection

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.**

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.
   - If fluid leakage is found, replace related pipe or hose.

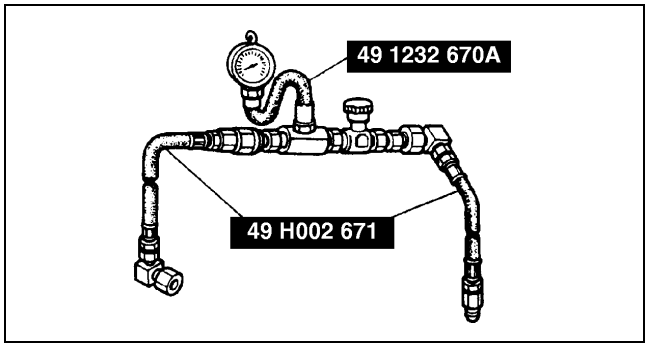


X3U612WBR

Fluid Pressure Inspection

1. Assemble the **SSTs** as shown in the figure.
2. Disconnect the pressure pipe from the oil pump, and connect the **SSTs**.

Tightening torque
30—44 N·m {3.0—4.5 kgf·m, 22—32 ft·lbf}



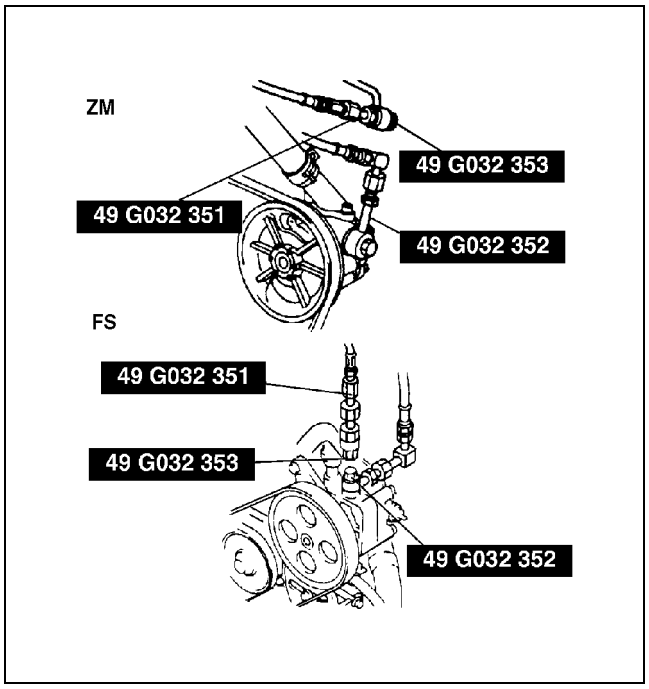
X3U612WA0

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 {123—140 °F}**.

Caution
- **If the valve is left closed for more than 5 seconds, the fluid temperature will rise 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.

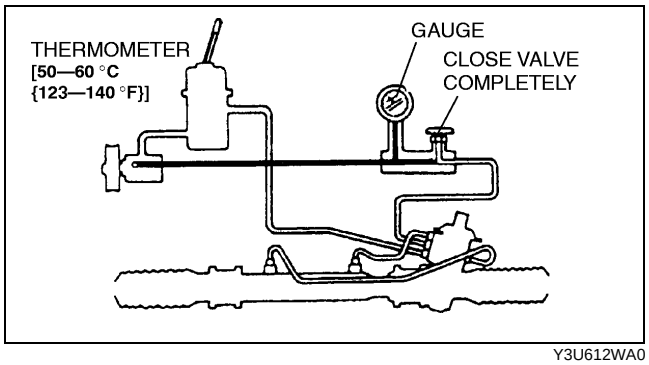
Oil pump fluid pressure
8.34—8.82 MPa {85.0—90.0 kgf/cm^2, 1,209—1,279 psi}



Z3U0612W002

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.



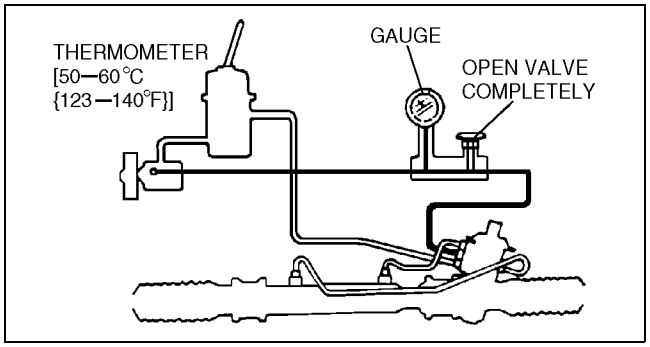
Y3U612WA0

Gear housing fluid pressure
8.34—8.82 MPa {85.0—90.0 kgf/cm^2, 1,209—1,279 psi}

8. Remove the **SSTs**. Install and tighten the pressure pipe to the specified torque.

   Tightening torque
   30—44 N·m {3.0—4.5 kgf·m, 22—32 ft·lbf}

9. Bleed the air from the system.



A3U0612W004

STEERING WHEEL AND COLUMN INSPECTION

A3U061232010W01

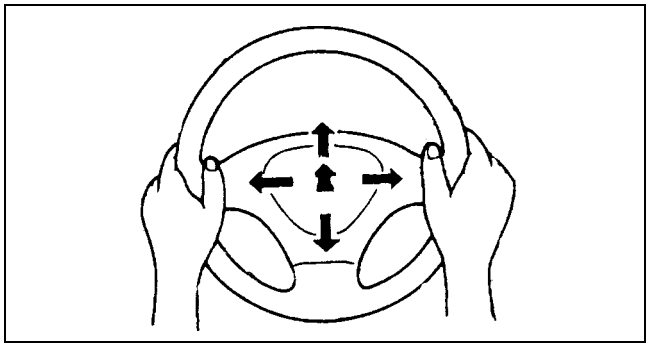
Steering Wheel Play Inspection

1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
   - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct as necessary.

   Play
   0—30 mm {0—1.18 in}

Steering Wheel Looseness Inspection

1. Move the steering wheel as shown in the figure to inspect for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.
   - Repair or replace as necessary.


A3U0612W017

Steering Wheel Effort Inspection

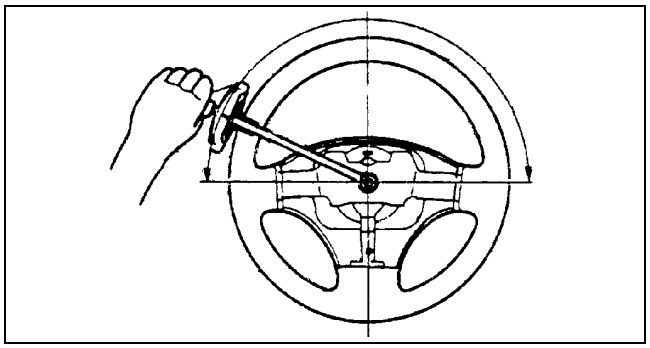
1. Inspect the following points:
   - Tire size and tire pressure
   - Fluid level
   - Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.

   Warning
   - **See 08-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION for removal/installation of the air bag module after inspection.**

3. Remove the air bag module.
4. Start the engine and warm the power steering fluid to **50—60 °C {123—140 °F}**.
5. Measure the steering wheel effort using a torque wrench.
   - If not within the specification, note the following:
     — Air in system
     — Fluid leakage at hose or connectors
     — Function of oil pump and steering gear

   Steering wheel effort
   7.8 N·m {80 kgf·cm, 69 in·lbf} max.

   Note
   - To determine whether the steering effort is satisfactory or not, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.

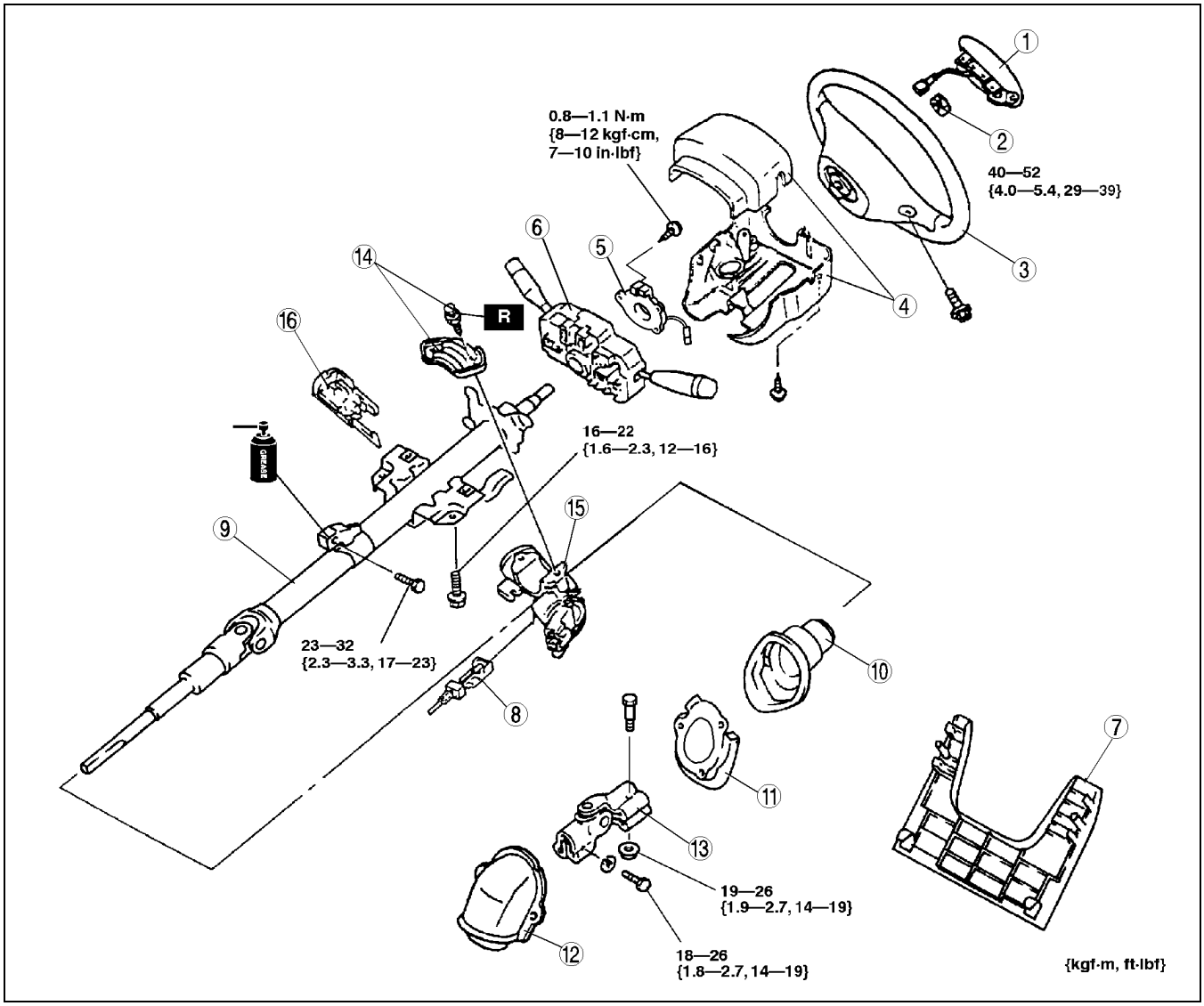

A3U0612W018

- The steering wheel effort varies with conditions as shown below.
  — Road conditions, such as dry or wet, and asphalt or concrete.
  — Tire conditions, such as brand, wear, and tire pressure.

STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

A3U061232010W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



A3U0612W016

1	Air bag module (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
2	Locknut
3	Steering wheel (See 06–12–7 Steering Wheel Removal Note) (See 06–12–8 Steering Wheel Installation Note)
4	Column cover
5	Clock spring (See 08–10–9 CLOCK SPRING REMOVAL/ INSTALLATION)
6	Combination switch
7	Lower panel
8	Key interlock cable

9	Steering shaft (See 06–12–8 Steering Shaft Installation Note)
10	Shaft seal
11	Set plate
12	Dust cover
13	Universal joint
14	Steering lock mounting bolts and bracket (See 06–12–7 Steering Lock Mounting Bolts and Bracket Removal Note) (See 06–12–7 Steering Lock Mounting Bolts and Bracket Installation Note)
15	Steering lock component
16	Cylinder outer component (See 06–12–7 Cylinder Outer Component Removal Note)

Steering Wheel Removal Note

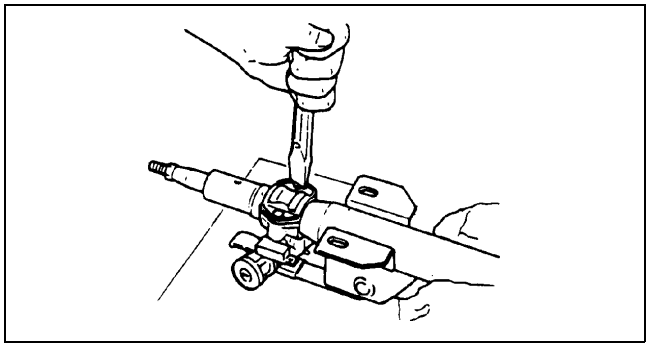
1. Set the vehicle in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

Caution

- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

Steering Lock Mounting Bolts and Bracket Removal Note

1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.



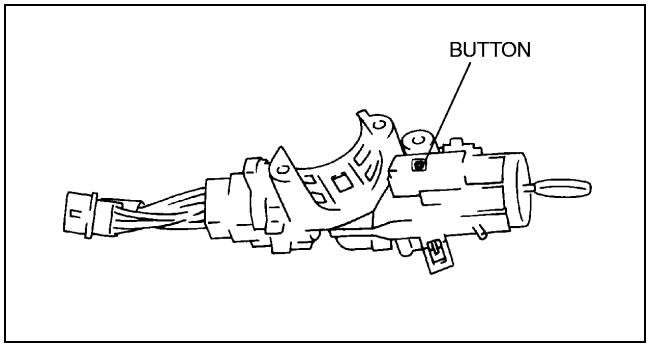
X3U612WA7

Cylinder Outer Component Removal Note

Caution

- **When replacing the cylinder outer component, the coil also must be replaced.**

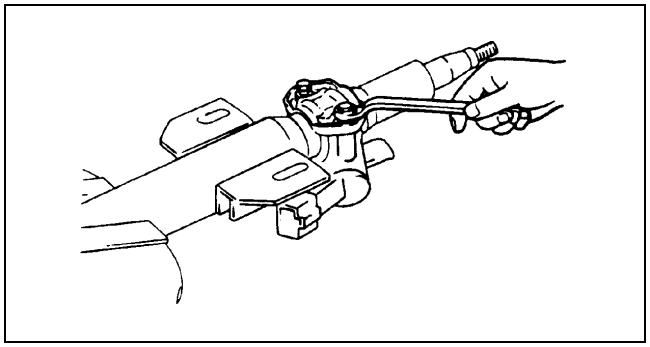
1. Set the key in the ACC position.
2. Keep pushing the button and remove the cylinder outer component.



X3U612WA8

Steering Lock Mounting Bolts and Bracket Installation Note

1. Assemble the steering lock component to the steering shaft.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.

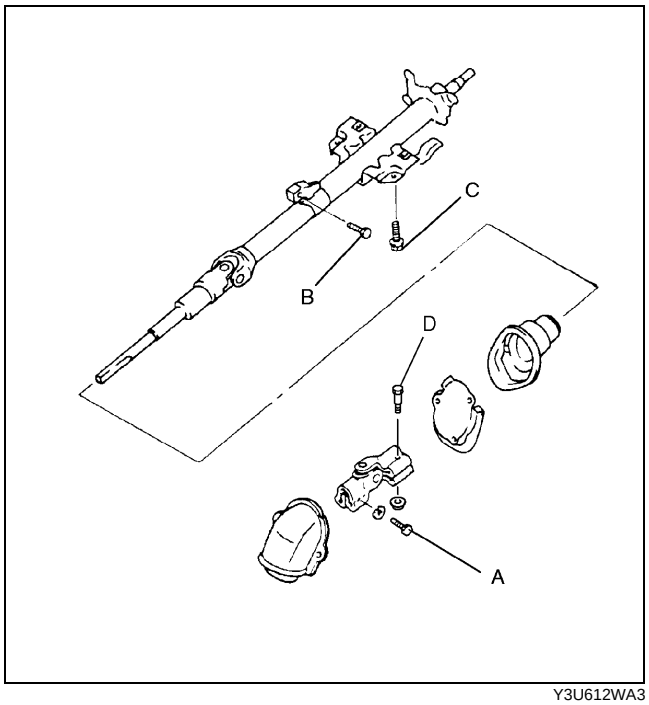


X3U612WA9

Steering Shaft Installation Note

Caution
- **Do not apply a shock in the axial direction of the shaft.**

1. Tighten bolt A.
2. Tighten bolt C.
3. Tighten bolt B.
4. Release the adjusting lever, and lower the steering shaft to the lowest position.
5. Tighten bolt D.



Y3U612WA3

Steering Wheel Installation Note

1. Set the wheels in the straight-ahead position, and install the steering wheel.

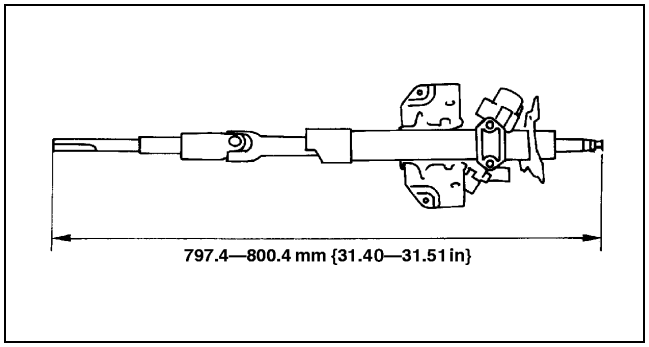
STEERING SHAFT INSPECTION

A3U061232100W01

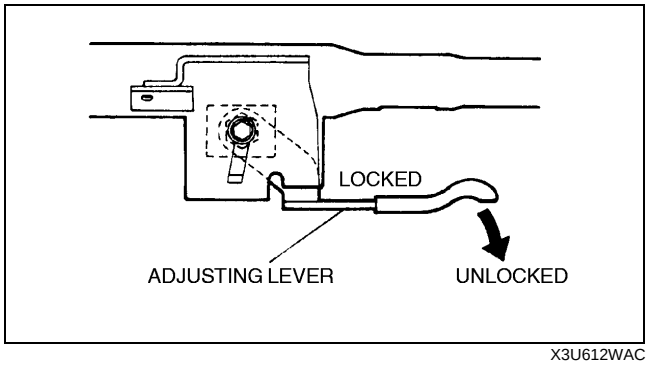
1. Inspect the following.
   (1) Column bearing for damage
   (2) Steering shaft length
      - Replace the steering shaft component as necessary.

   Length
   797.4—800.4 mm {31.40—31.51 in}

2. Tilt operation
   (1) Verify that the adjusting lever moves smoothly from unlock position to lock position.
   (2) Verify that the steering shaft is fixed firmly when the adjusting lever is locked.
      - Replace the steering shaft component as necessary.



Y3U612WA4

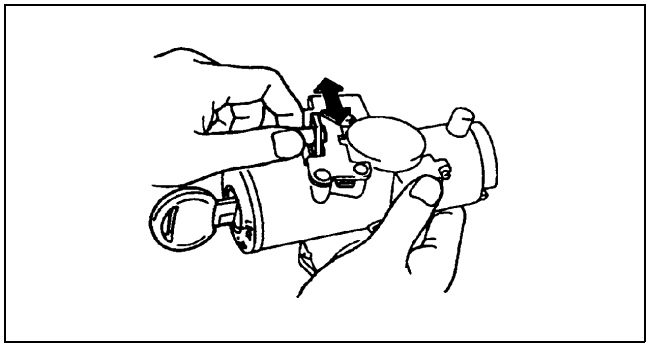


X3U612WAC

STEERING LOCK (ATX MODEL) INSPECTION

A3U061275990W01

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.
   - Replace the steering lock component as necessary.



X3U612WAD

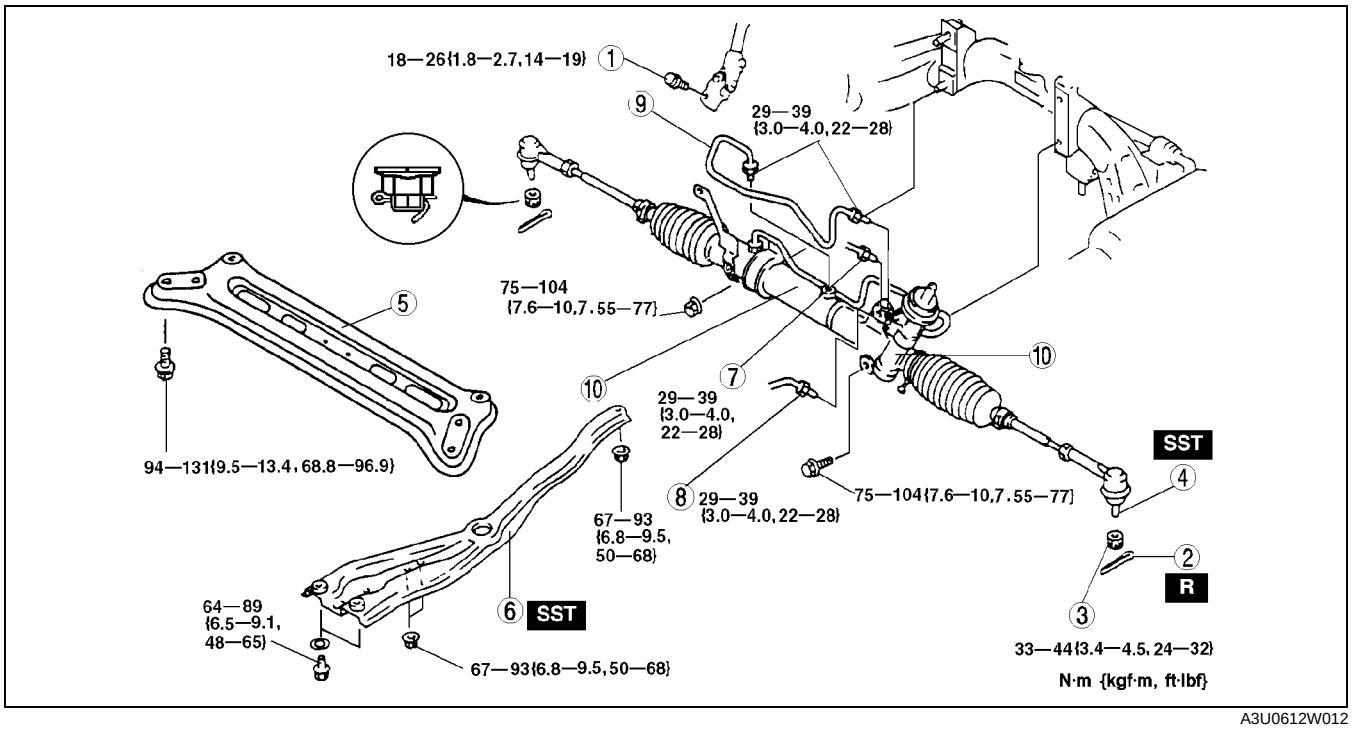
STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

A3U061232960W01

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.
3. After installation, inspect the toe-in. (See 02–11–1 FRONT WHEEL ALIGNMENT.)



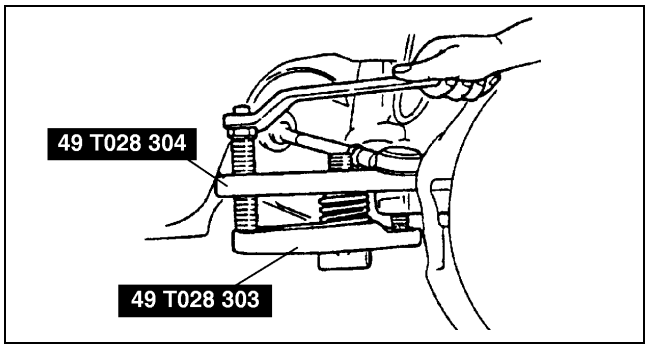
A3U0612W012

1	Bolt (intermediate shaft) (See 06–12–10 Bolt (Intermediate Shaft) Removal Note) (See 06–12–10 Bolt (Intermediate Shaft) Installation Note)
2	Cotter pin
3	Nut
4	Tie-rod end ball joint (See 06–12–10 Tie-rod End Ball Joint Removal Note)

5	Transverse member (ZM (ATX), FS)
6	Engine mount member (See 06–12–10 Engine Mount Member Removal Note)
7	Pressure pipe
8	Return pipe and clamp
9	Oil pipe
10	Steering gear and linkage (See 06–12–10 Steering Gear and Linkage Removal Note)

Tie-rod End Ball Joint Removal Note

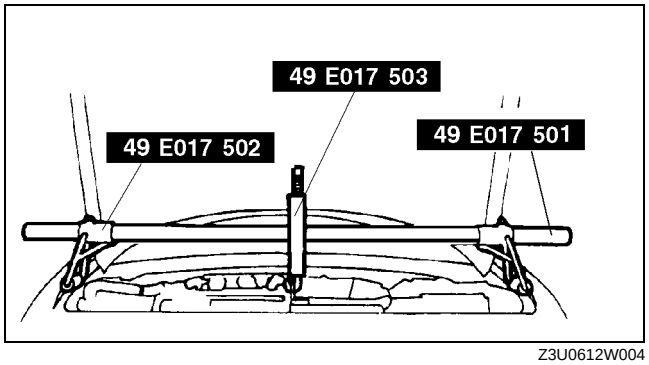
1. Remove the tie rod nut.
2. Separate the tie-rod end from the steering knuckle using the **SSTs**.



X3U612WAF

Engine Mount Member Removal Note

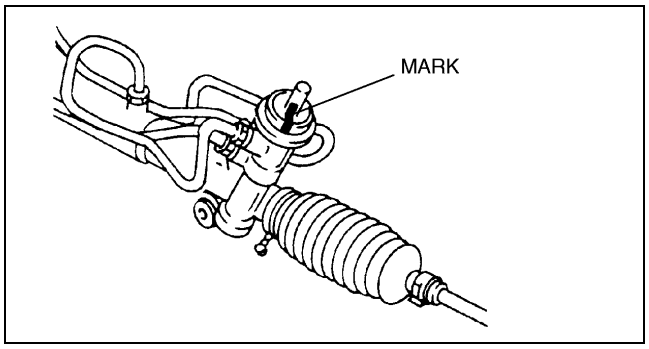
1. Set the **SSTs** as shown in the figure.
2. Remove the engine mount member.



Z3U0612W004

Bolt (Intermediate Shaft) Removal Note

1. Mark the pinion shaft and gear housing for proper installation.



Y3U612WA8

Steering Gear and Linkage Removal Note

1. Remove the steering gear and linkage by pulling it from the right side.

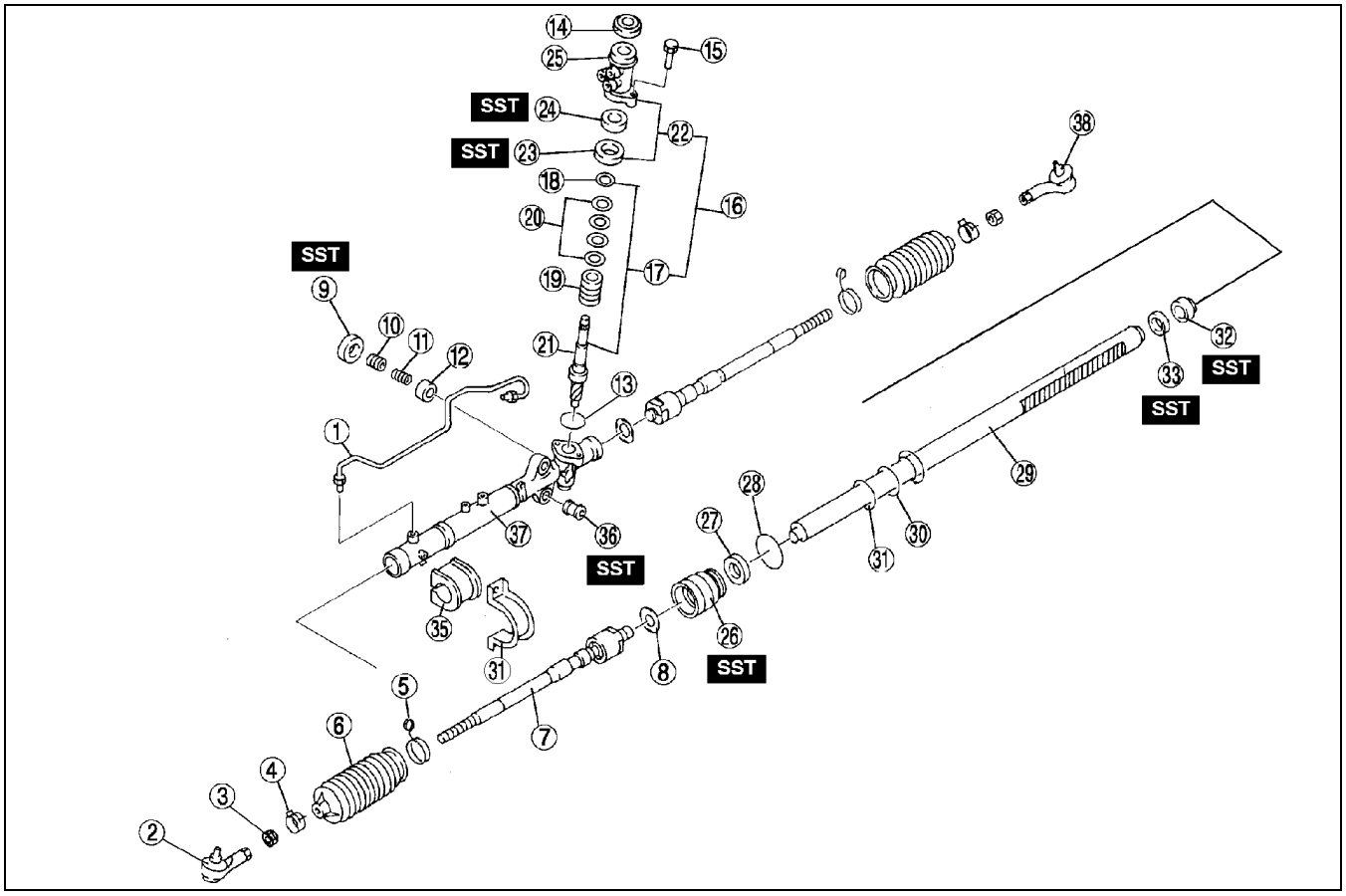
Bolt (Intermediate Shaft) Installation Note

1. Align the marks and install the intermediate shaft and bolt.

STEERING GEAR AND LINKAGE DISASSEMBLY

A3U061232960W02

1. Disassemble in the order indicated in the table.

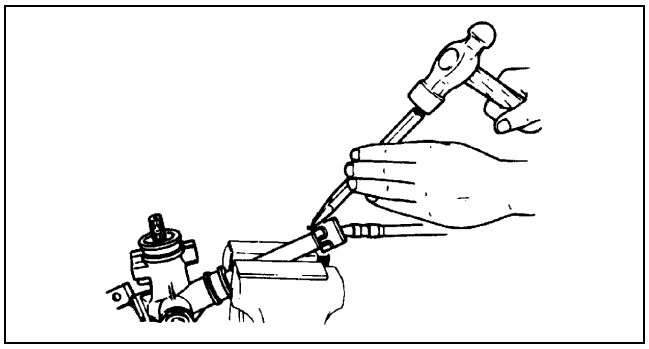


Z3U0612W013

1	Oil pipe
2	Tie-rod end
3	Locknut (Tie-rod end)
4	Boot band
5	Boot wire
6	Boot
7	Tie rod (See 06–12–12 Tie Rod Disassembly Note)
8	Washer
9	Locknut (Adjusting cover) (See 06–12–12 Locknut (Adjusting Cover) Disassembly Note)
10	Adjusting cover
11	Yoke spring
12	Support yoke
13	O-ring
14	Dust cover
15	Socket bolt
16	Pinion shaft and housing component (See 06–12–12 Pinion Shaft and Housing Component Disassembly Note)
17	Pinion shaft component (See 06–12–13 Pinion Shaft Component Disassembly Note)
18	Snap ring (See 06–12–13 Snap Ring Disassembly Note)
19	Control valve component
20	Seal ring
21	Pinion shaft
22	Valve housing component
23	Upper bearing (See 06–12–13 Upper Bearing Disassembly Note)
24	Oil seal
25	Valve housing
26	Holder (See 06–12–13 Holder Disassembly Note)
27	U-gasket
28	O-ring
29	Steering rack
30	Seal ring
31	O-ring
32	Inner guide (See 06–12–14 Inner Guide Disassembly Note)
33	Oil seal
34	Mounting bracket
35	Mount
36	Mounting rubber (See 06–12–14 Mounting Rubber Disassembly Note)
37	Gear housing
38	Tie-rod end boot (See 06–12–15 Tie-rod End Boot Disassembly Note)

Tie Rod Disassembly Note

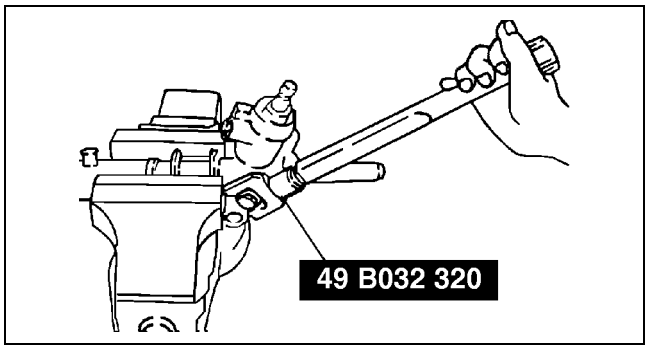
1. Unclamp the washer.
2. Remove the tie-rod.



X3U612WAK

Locknut (Adjusting Cover) Disassembly Note

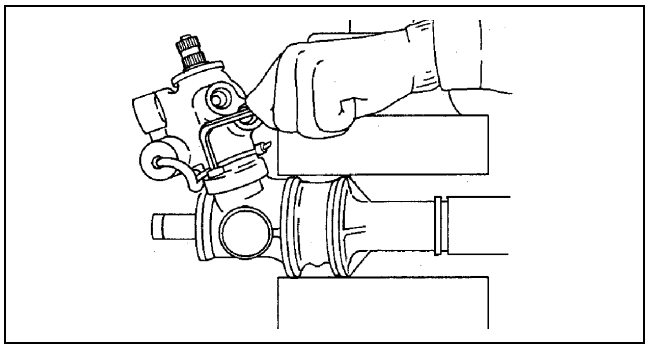
1. Remove the locknut using the **SST**.



A3U0612W009

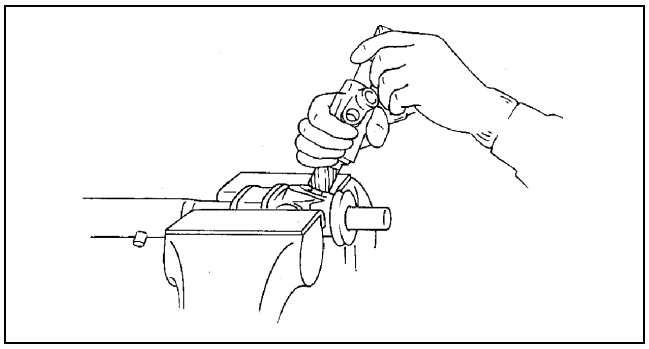
Pinion Shaft and Housing Component Disassembly Note

1. Remove the socket bolts (2 points) which fix the pinion shaft and housing.



X3U612WAM

2. Hold the pinion shaft as shown, and pull the pinion shaft out and housing component.



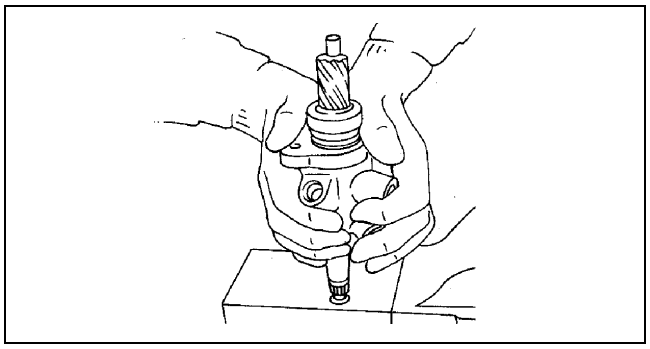
X3U612WAN

Pinion Shaft Component Disassembly Note

1. Push the pinion shaft component out from the valve housing as shown.

Note

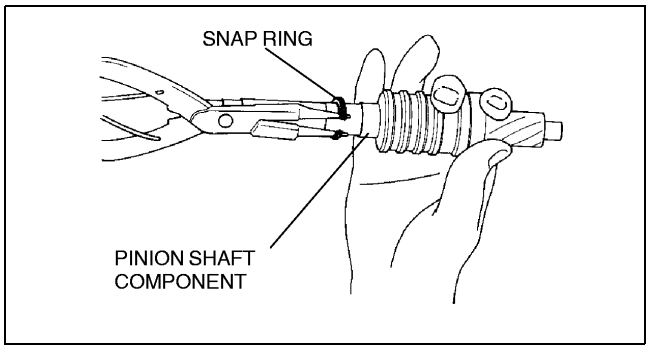
- If the pinion shaft does not come out easily, remove it using a press.



X3U612WAP

Snap Ring Disassembly Note

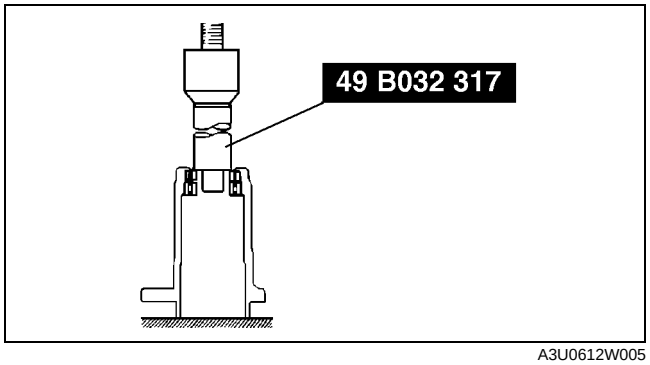
1. Carefully remove the snap ring without damaging the pinion shaft component.



X3U612WAQ

Upper Bearing Disassembly Note

1. Set the **SST** as shown.
2. Using a press, remove the oil seal and upper bearing without applying pressure to the edge of the valve housing.



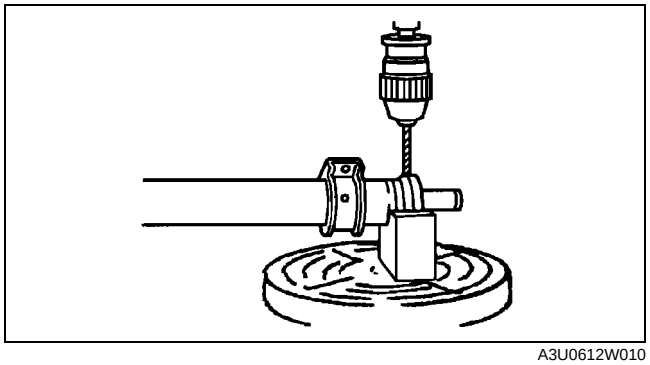
A3U0612W005

Holder Disassembly Note

1. Cut away the staked area using a drill.

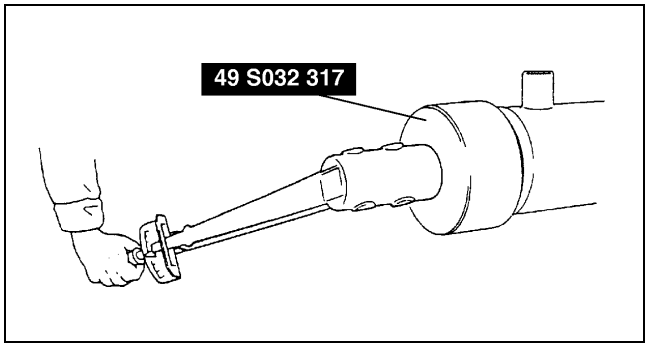
Caution

- **Carefully pull the holder out without damaging the U-gasket.**



A3U0612W010

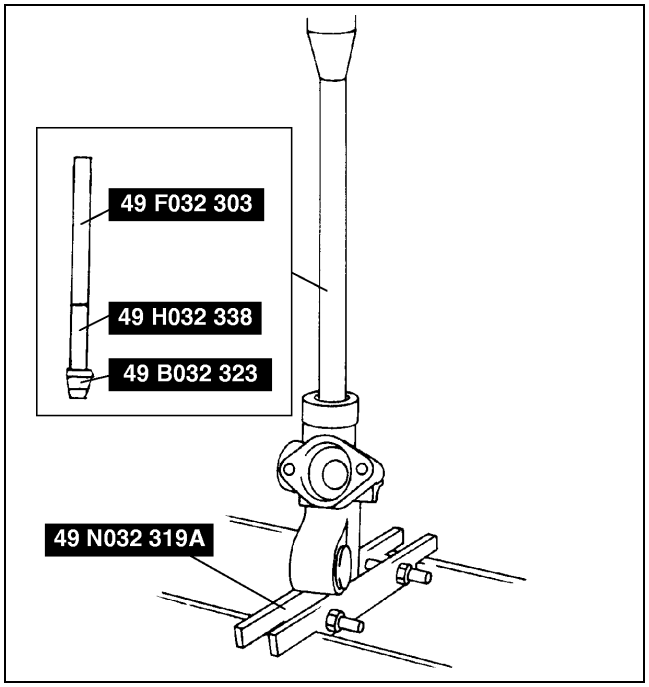
2. Disassemble the holder using the **SST**.



X3U612WAT

Inner Guide Disassembly Note

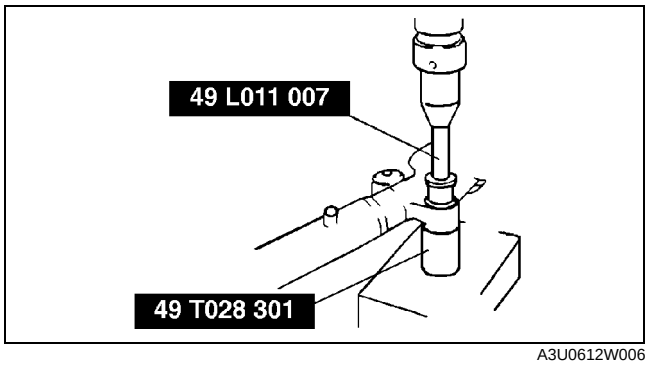
1. Set the **SSTs** into the valve side.
2. Install the **SST** to the gear housing.
3. Press the oil seal and inner guide out.



X3U612WAU

Mounting Rubber Disassembly Note

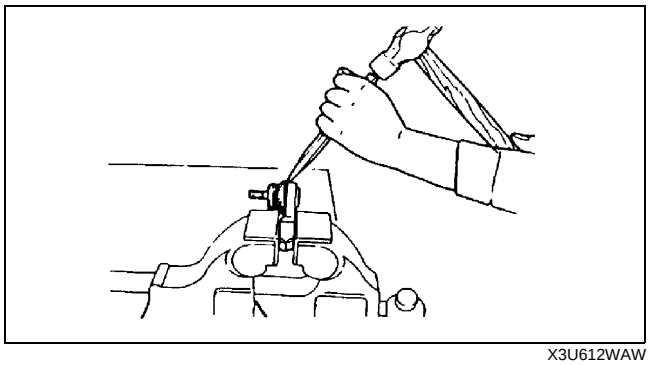
1. Press the mounting rubber out from the gear housing using the **SSTs** and a press.



A3U0612W006

Tie-rod End Boot Disassembly Note

1. Secure the tie-rod end in a vise.
2. Place a chisel against the boot and hold it at the angle shown.
3. Remove the boot by tapping it with a hammer.



X3U612WAW

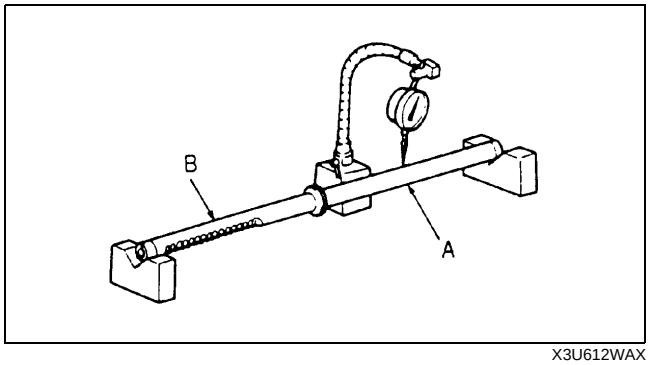
STEERING GEAR AND LINKAGE INSPECTION

A3U061232960W03

Rack Inspection

1. Inspect the rack for cracking, damage, and tooth wear.
   - Replace it as necessary.
2. Measure the runout of the rack.
   - If not within the specification, replace the rack.

   Runout
   Near point A: 0.15 mm {0.0059 in} max.
   Near point B: 0.20 mm {0.0079 in} max.

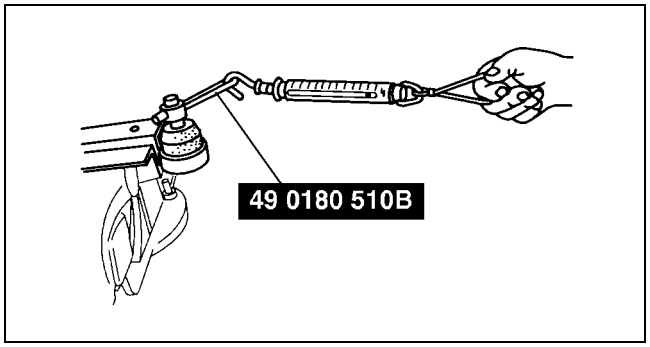


X3U612WAX

Tie-rod End Inspection

1. Inspect the tie-rod end for damage and boot cracks.
   - Replace it as necessary.
2. Inspect the ball joint for looseness.
   - Replace the tie-rod end as 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 the specification, replace the tie-rod end.

   Rotation torque
   0.35—2.54 N·m {3.5—26.0 kgf·cm, 3.1—22.5 in·lbf}
   Pull scale reading
   3.5—25.4 N {0.35—2.60 kgf, 0.78—5.72 lbf}

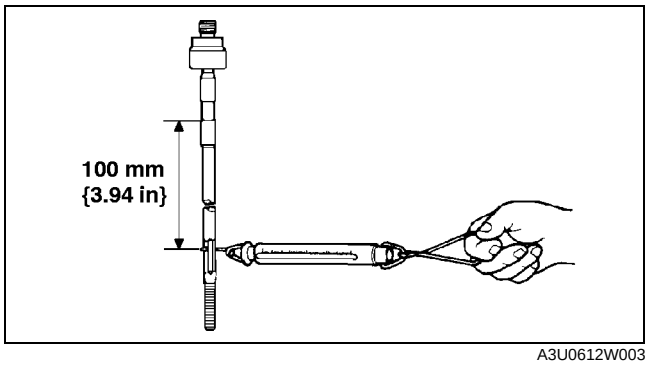


A3U0612W015

Tie Rod Inspection

1. Inspect the tie rod for bending and damage.
   - Replace it as necessary.
2. Inspect the ball joint for looseness.
   - Replace the tie rod as necessary.
3. Swing the tie-rod **5 times**.
4. Measure the swinging torque using a pull scale.
   - If not within the specification, replace the tie rod.

Swinging torque
0.1—3.8 N·m {1—39 kgf·cm, 1—33 in·lbf}
Pull scale reading
0.6—24.5 N·m {0.06—2.50 kgf, 0.14—5.50 lbf}

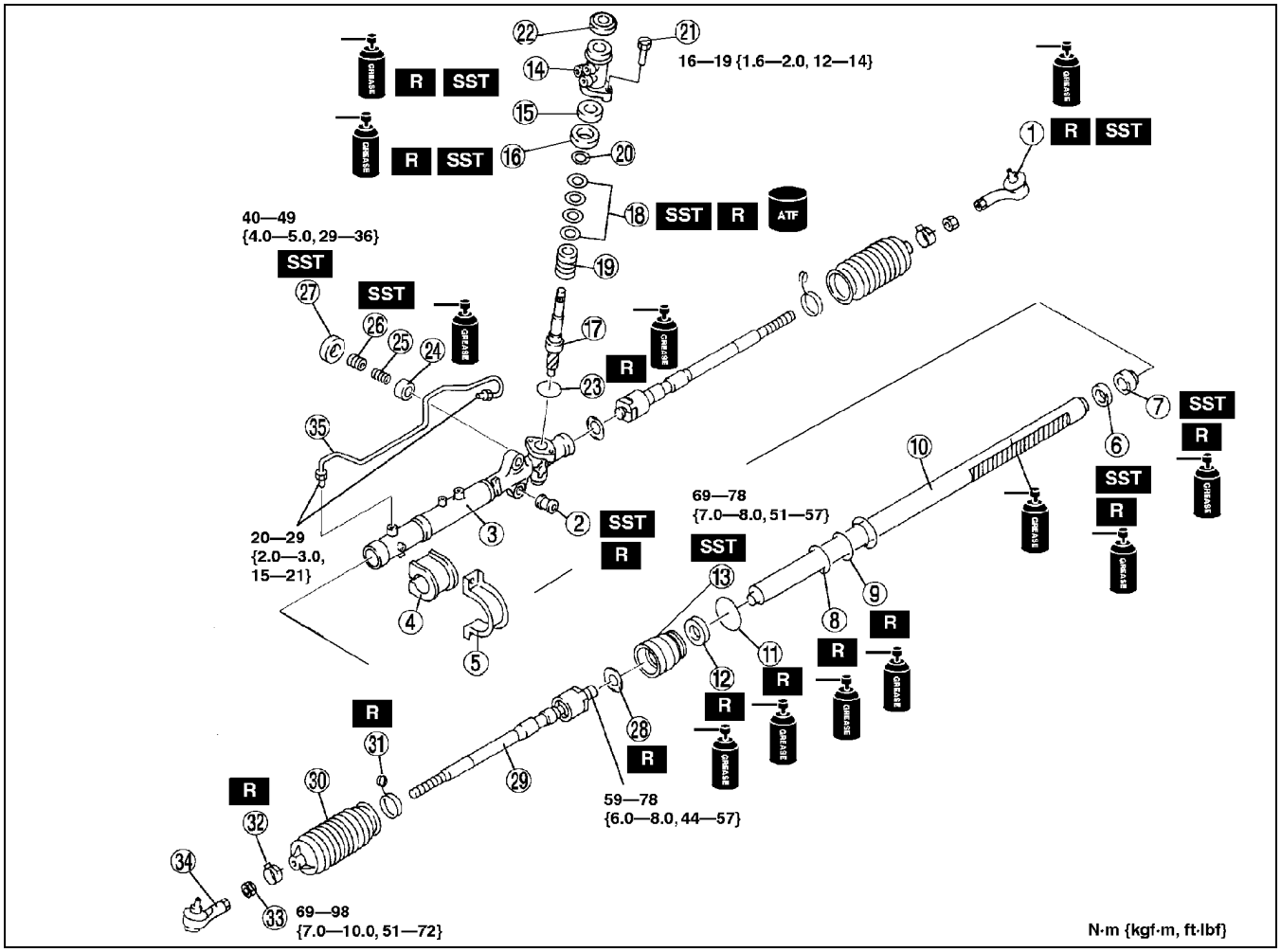


A3U0612W003

STEERING GEAR AND LINKAGE ASSEMBLY

A3U061232960W04

1. Assemble in the order indicated in the table.



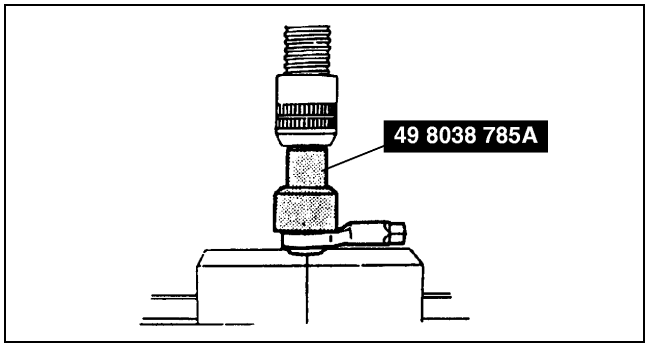
Z3U0612W014

1	Tie-rod end boot (See 06–12–18 Tie-rod End Boot Assembly Note)
2	Mounting rubber (See 06–12–18 Mounting Rubber Assembly Note)
3	Gear housing
4	Mount
5	Mounting bracket
6	Oil seal (See 06–12–19 Oil Seal Assembly Note 1)
7	Inner guide
8	O-ring
9	Seal ring
10	Steering rack
11	O-ring
12	U-gasket
13	Holder (See 06–12–20 Holder Assembly Note)
14	Valve housing
15	Oil seal (See 06–12–20 Oil Seal Assembly Note 2)
16	Upper bearing (See 06–12–21 Upper Bearing Assembly Note)

17	Pinion shaft
18	Seal ring (See 06–12–21 Seal Ring Assembly Note)
19	Control valve
20	Snap ring
21	Socket bolt
22	Dust cover
23	O-ring
24	Support yoke
25	Yoke spring
26	Adjusting cover (See 06–12–21 Adjusting Cover Assembly Note)
27	Locknut (Adjusting cover)
28	Washer
29	Tie-rod
30	Boot
31	Boot wire
32	Boot band
33	Locknut (Tie-rod End)
34	Tie-rod End
35	Oil pipe

Tie-rod End Boot Assembly Note

1. Wipe the grease off the ball joint.
2. Put a small amount of lithium-based grease into a new dust boot.
3. Install the dust boot onto the tie-rod end using the **SST** and a press.
4. Wipe away any excessive grease.

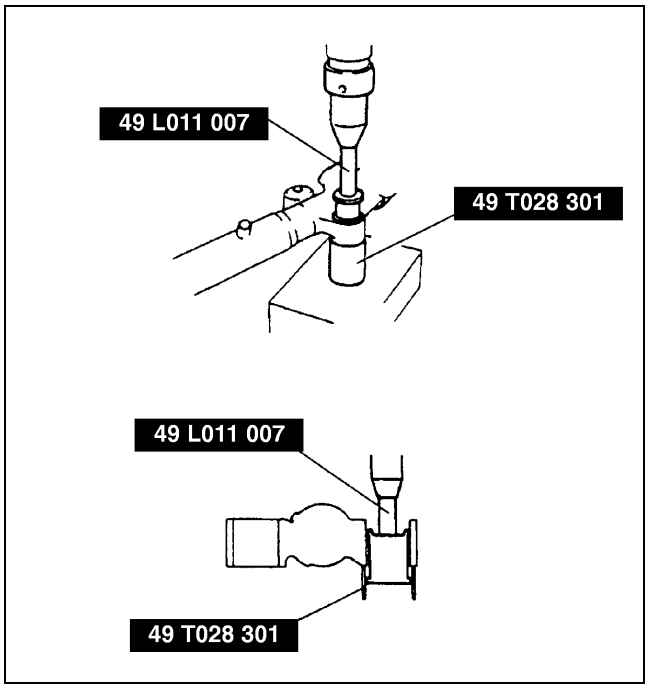


X3U612WB1

Mounting Rubber Assembly Note

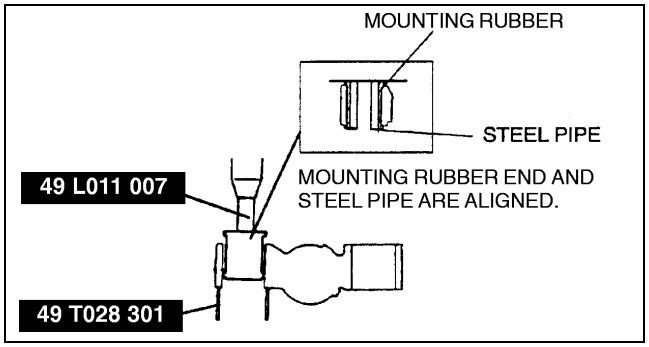
1. Apply soapy water to the rubber part of the mounting rubber.
2. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the **SSTs** and a press.

   Note
   - Mounting rubber end and steel plate shall be aligned.



X3U612WB2

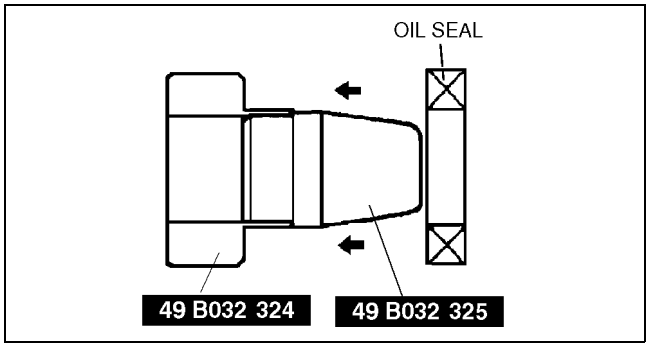
3. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes completely out the other side.



X3U612WB3

Oil Seal Assembly Note 1

1. Install a new O-ring and new seal ring to the rack piston.
2. After installing the seal ring, seat it properly at the piston circumference.
3. Install a new oil seal to the **SST** (49 B032 319) using the **SST** (49 B032 318).
4. Remove the **SST** (49 B032 318).

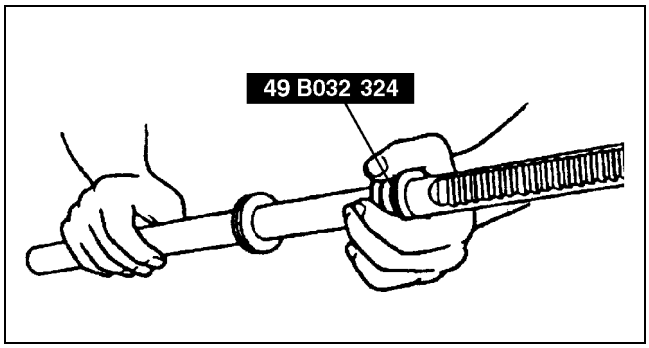


Z3U0612W005

5. Using the **SST**, place the oil seal at the edge of the steering rack's piston and remove the **SST**.
6. Install a new inner guide to the steering rack.

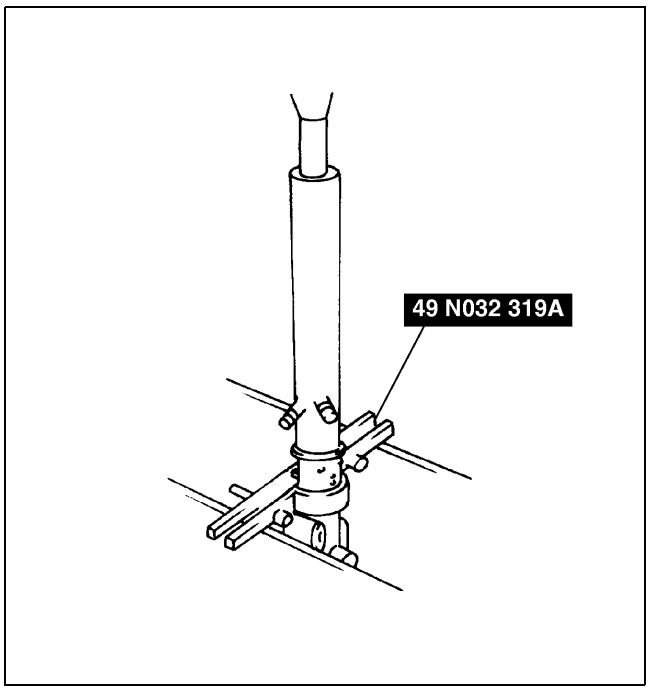
Caution

- **When pressing in, do not apply a load pressure of more than 39.2 MPa {400 kgf/cm^2, 5,690 psi}. Doing so will damage the oil seal and inner guide.**



Z3U0612W006

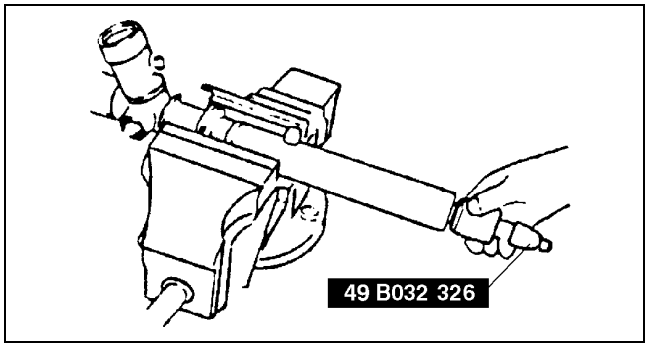
7. After installing the steering rack to the gear housing, press the oil seal and inner guide using the **SST** until the force required suddenly increases.



X3U612WB6

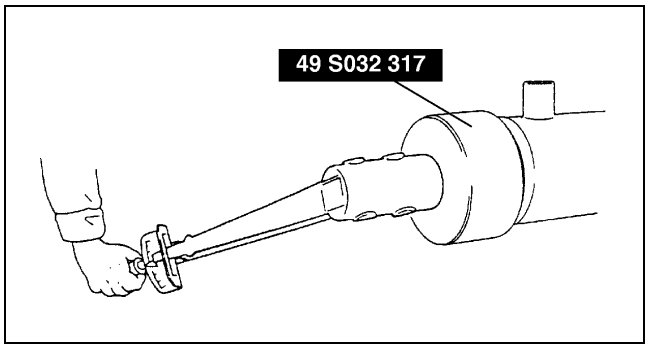
Holder Assembly Note

1. Apply grease to the U-gasket and O-ring.
2. Assemble the U-gasket and O-ring into the holder.
3. Assemble the **SST** to the steering rack.



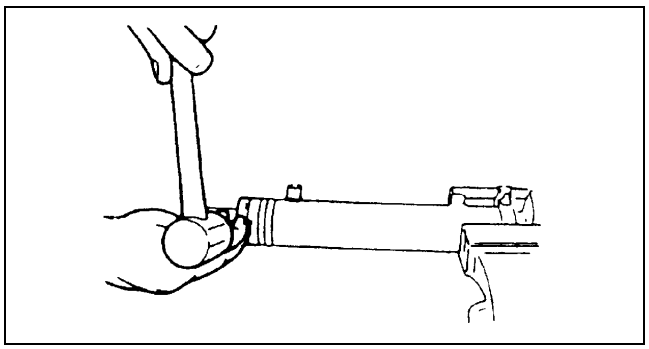
Z3U0612W007

4. Assemble the holder using the **SST**.



X3U612WB8

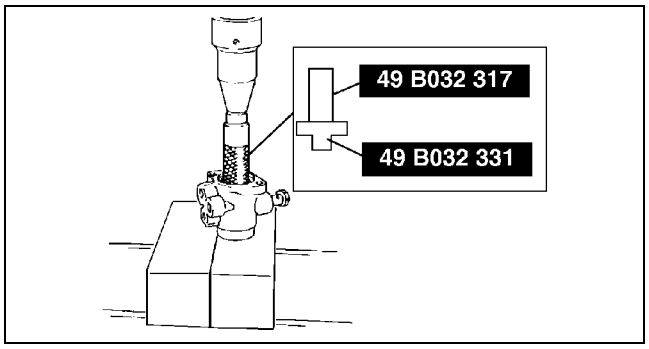
5. Stake the holder to the cylinder using a punch.



X3U612WB9

Oil Seal Assembly Note 2

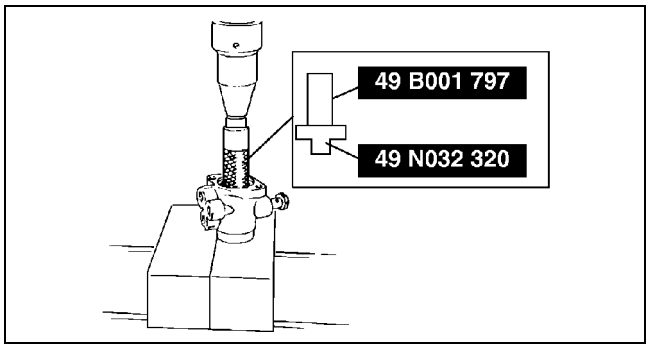
1. Apply grease to a new oil seal.
2. Press in the new oil seal using the **SSTs**.



A3U0612W014

Upper Bearing Assembly Note

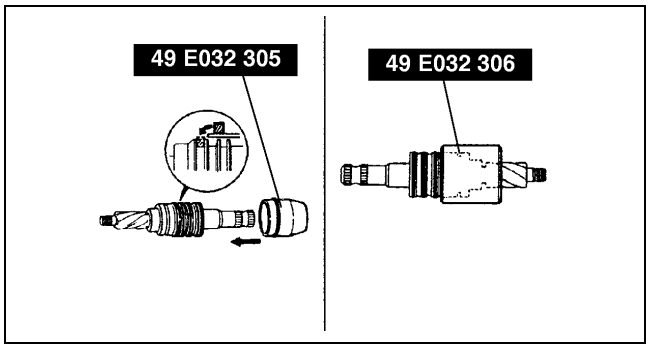
1. Apply grease to a new upper bearing.
2. Press in the new oil seal using the **SSTs**.



A3U0612W013

Seal Ring Assembly Note

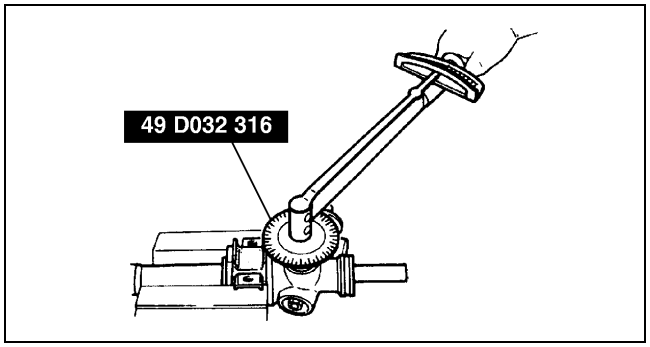
1. Install a new seal ring to the valve part of the pinion shaft using the **SST**.
2. After installing it, seat it properly using the **SST**.
3. Install the snap ring.



X3U612WBC

Adjusting Cover Assembly Note

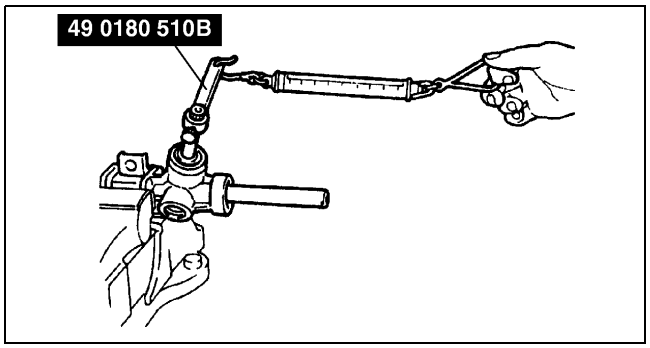
1. Set the rack to the center position.
2. Tighten the adjusting cover to **20 N·m {2.0 kgf·m, 14 ft·lbf} 3 times**, then return it **42°** using the **SST**.
3. Apply sealant to the threads of the locknut.
4. Attach the locknut.



X3U612WBD

5. Measure the pinion torque using the SST and a pull scale.
   - If not as specified, repeat Step 2 through 5.

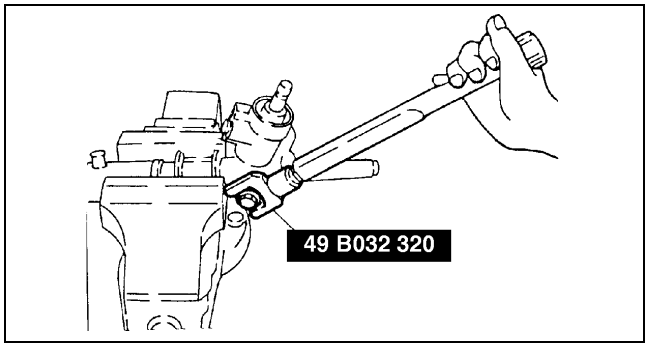
   Standard
   Center of rack ±90° 0.8—1.1 N·m {8—11 kgf·cm, 7—9 in·lbf} [Pull scale reading 8—11 N {0.8—1.1 kgf, 1.7—2.4 lbf}]



X3U612WBE

6. Install the locknut using the SST.

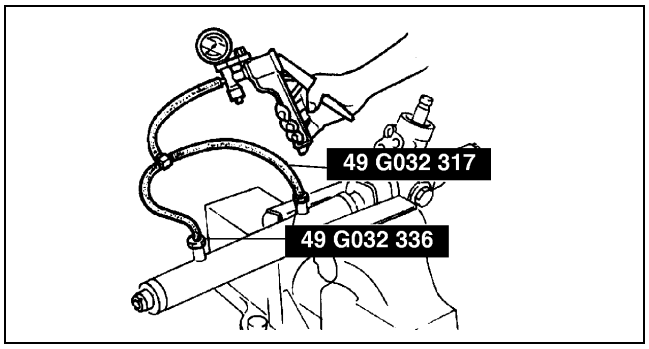
Tightening torque
40—49 N·m {4.0—5.0 kgf·m, 29—36 ft·lbf}



X3U612WBF

Hermetic Sealing Inspection

1. Connect the **SSTs** to the power cylinder section of the gear housing.
2. Apply **53.3 kPa {400 mmHg, 15.7 inHg}** vacuum with a vacuum pump and verify that it is held for at least **30 seconds**.
   - If the vacuum is not held, replace the oil seal.

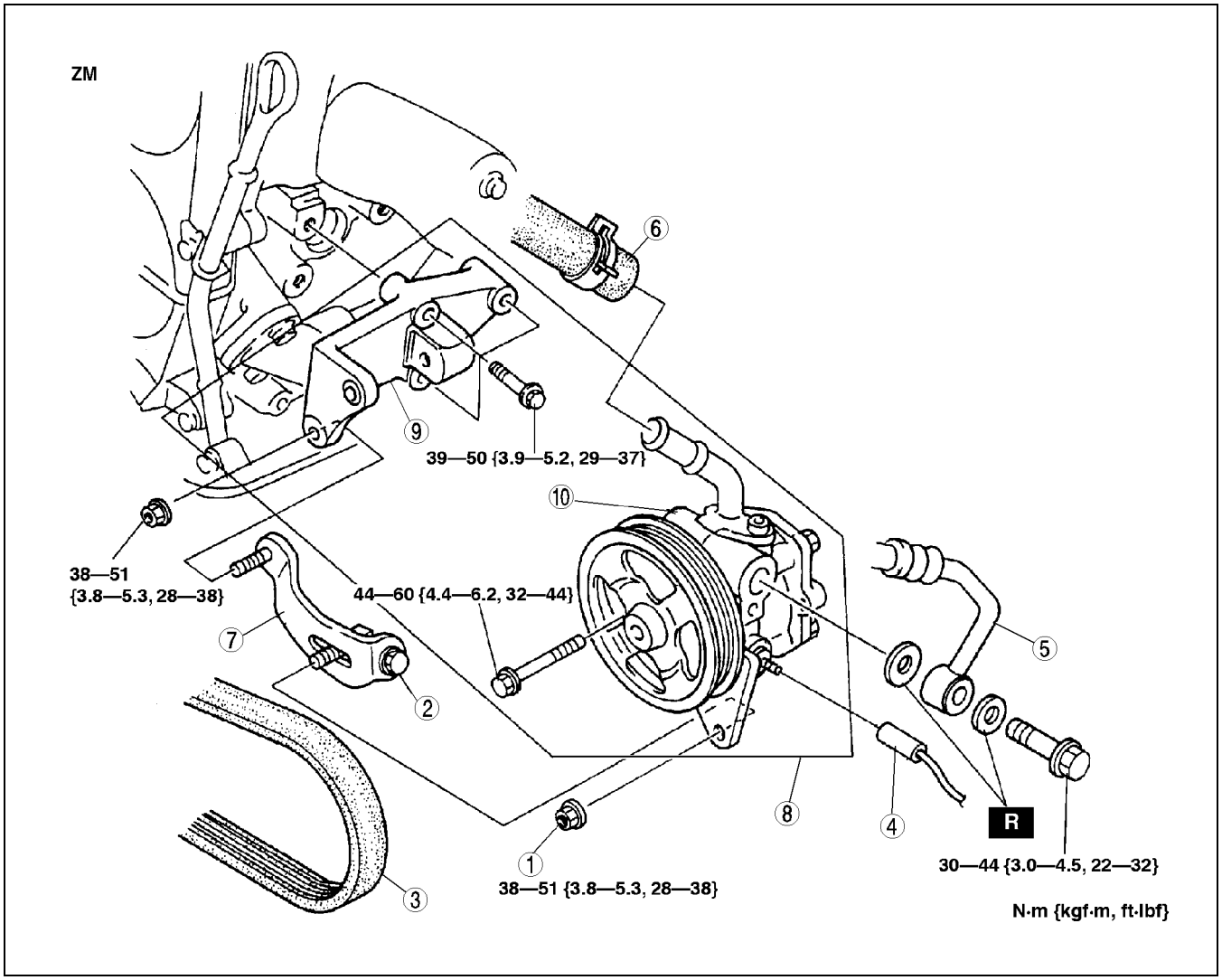


X3U612WBG

POWER STEERING OIL PUMP REMOVAL/INSTALLATION

A3U061232650W01

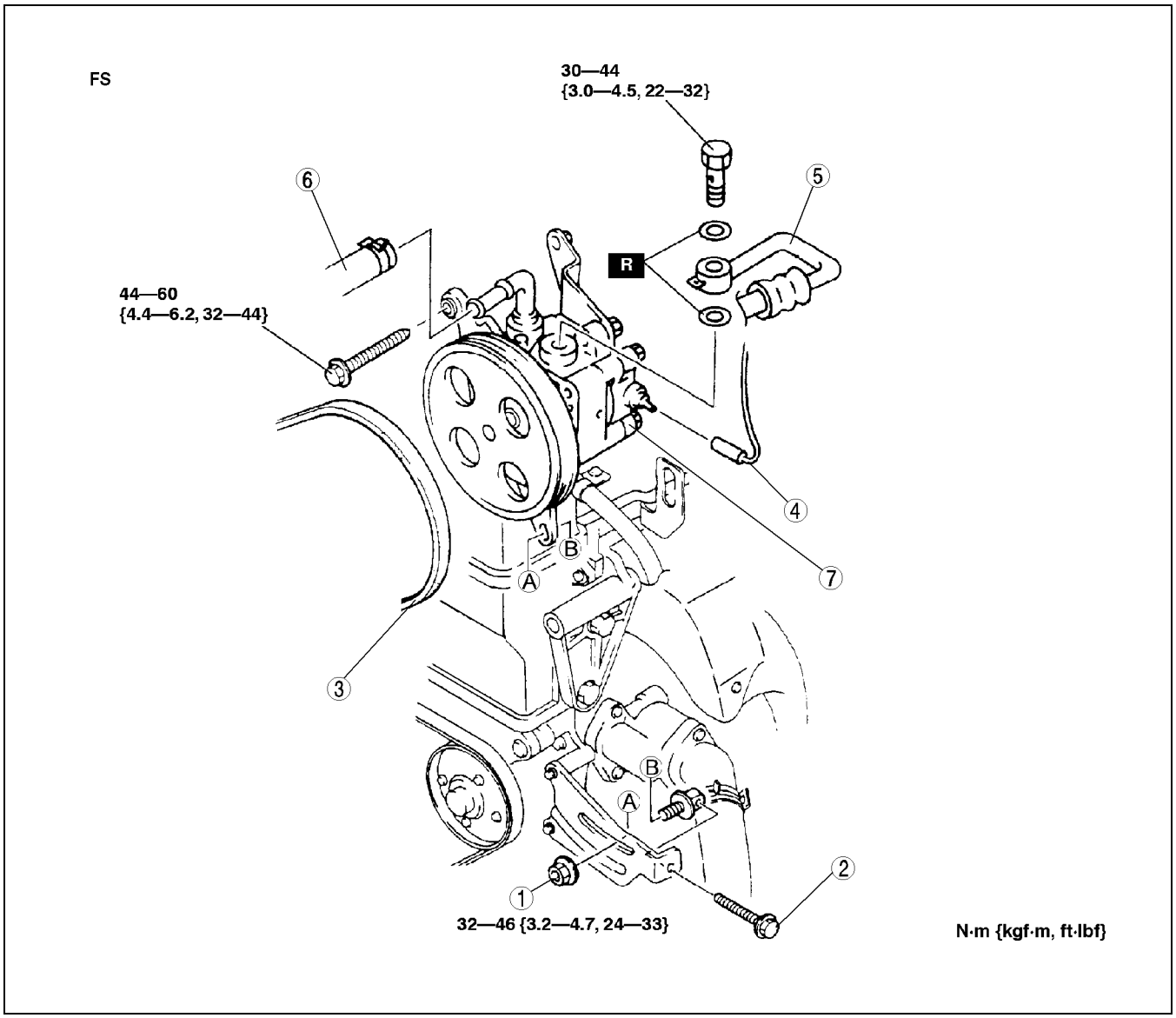
1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Adjust the drive belt. (See 01–10A–4 DRIVE BELT ADJUSTMENT [ZM].) (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)



Z3U0612W008

1	Locknut
2	Adjusting bolt
3	Drive belt
4	Pressure switch connector
5	Pressure pipe

6	Return hose
7	Bracket
8	Power steering oil pump, bracket
9	Oil pump bracket
10	Power steering oil pump



Z3U0612W009

1	Locknut
2	Adjusting bolt
3	Drive belt
4	Pressure switch connector

5	Pressure pipe
6	Return hose
7	Power steering oil pump and bracket

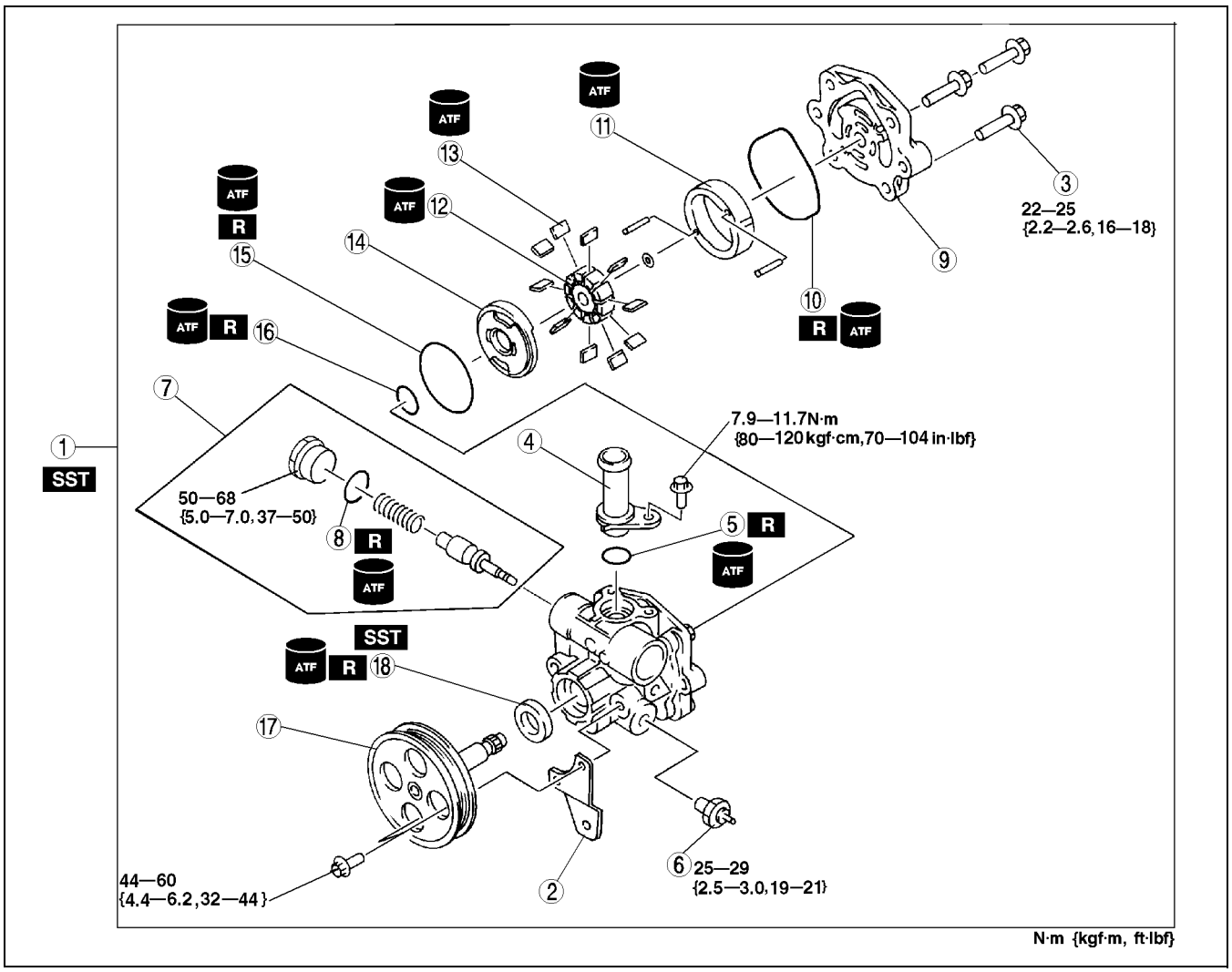
POWER STEERING OIL PUMP (ZM) DISASSEMBLY/ASSEMBLY

A3U061232650W02

Note

- The following procedure is for replacement of the O-ring and oil seal only. Replace the pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



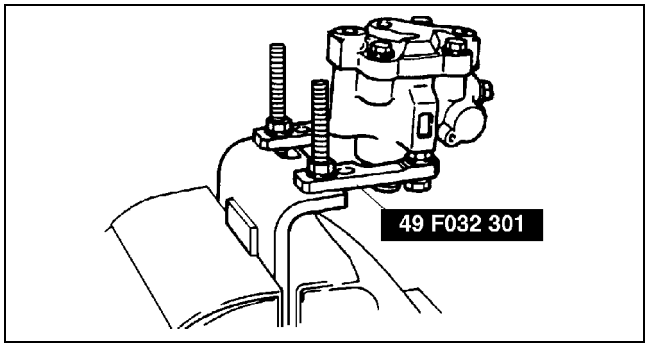
A3U0612W002

1	Power steering oil pump component (See 06–12–26 Power Steering Oil Pump Component Disassembly Note)
2	Front bracket
3	Bolt
4	Suction pipe
5	O-ring
6	Pressure switch component
7	Connector component
8	O-ring
9	Rear pump body (See 06–12–26 Rear Pump Body Assembly Note)

10	O-ring
11	Cam ring (See 06–12–26 Cam Ring Assembly Note)
12	Rotor
13	Vane (See 06–12–26 Vane Assembly Note)
14	Side plate
15	O-ring
16	O-ring
17	Shaft component
18	Oil seal (See 06–12–26 Oil Seal Assembly Note)

Power Steering Oil Pump Component Disassembly Note

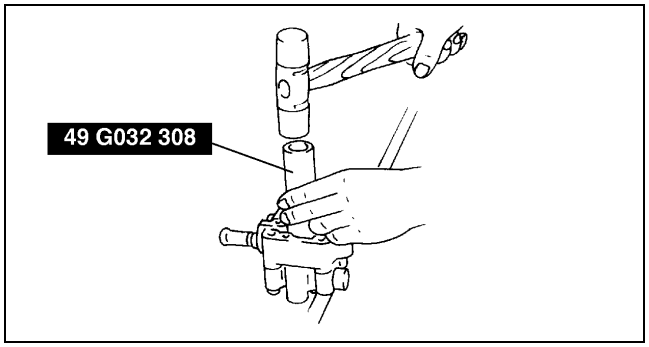
Caution
- **Use the SST to prevent damage to the pump when securing it in a vise.**



A3U0612W001

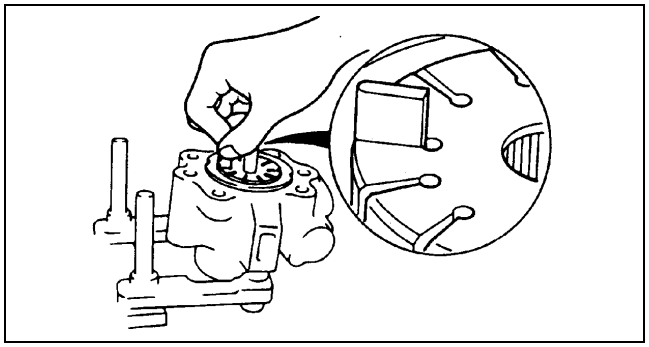
Oil Seal Assembly Note
1. Assemble the oil seal using the **SST** and a hammer.

Caution
- **The pump body should be positioned evenly.**

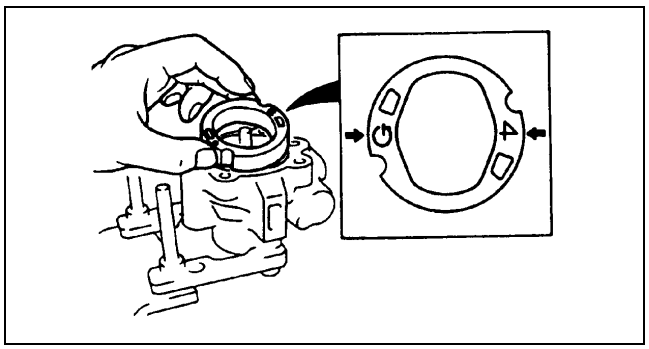


X3U612WBM

Vane Assembly Note
1. Place the vanes in the rotor with the rounded edges contacting the cam.


X3U612WBN

Cam Ring Assembly Note
1. Install the cam ring in the front pump body with the mark facing upward.


X3U612WBP

Rear Pump Body Assembly Note
1. After installing the rear body, manually turn the shaft to verify that it rotates smoothly.

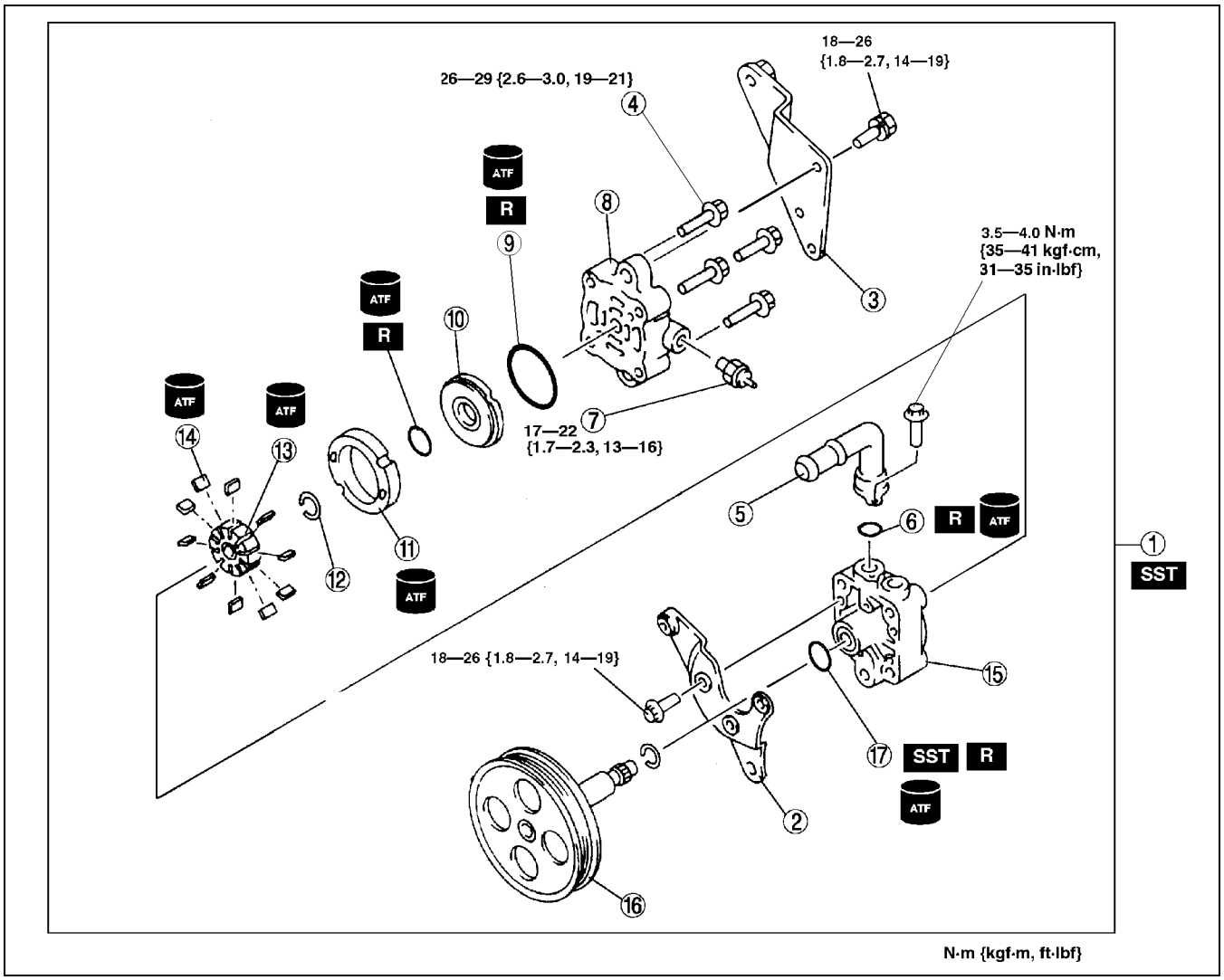
POWER STEERING OIL PUMP (FS) DISASSEMBLY/ASSEMBLY

A3U061232650W03

Note

- The following procedure is for replacement of the O-ring and oil seal only. Replace the pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



A3U0612W007

1	Power steering oil pump (See 06–12–26 Power Steering Oil Pump Component Disassembly Note)
2	Front bracket
3	Rear bracket
4	Bolt
5	Suction pipe
6	O-ring
7	Pressure switch component
8	Rear pump body (See 06–12–26 Rear Pump Body Assembly Note)
9	O-ring

10	Side plate
11	Cam ring (See 06–12–26 Cam Ring Assembly Note)
12	Backup ring
13	Rotor
14	Vane (See 06–12–26 Vane Assembly Note)
15	Front pump body
16	Shaft component
17	Oil seal (See 06–12–26 Oil Seal Assembly Note)

06–50 TECHNICAL DATA

STEERING TECHNICAL DATA

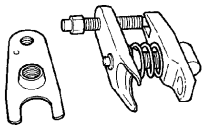
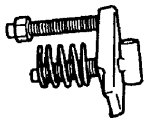
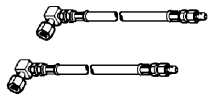
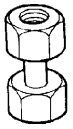
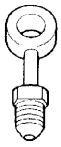
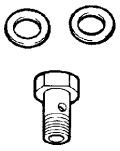
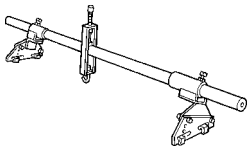
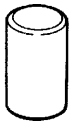
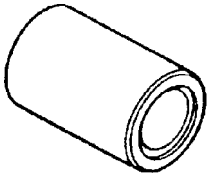
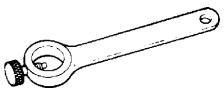
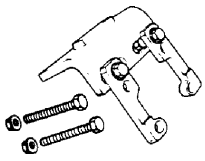
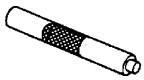
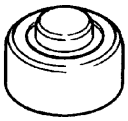
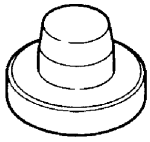
A3U065001034W01

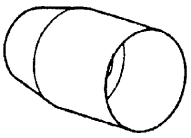
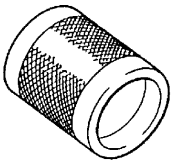
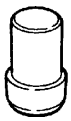
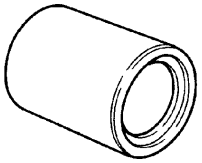
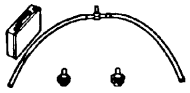
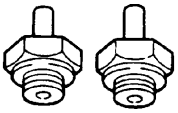
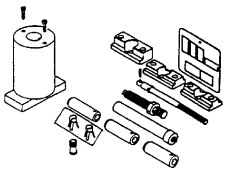
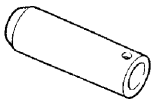
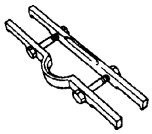
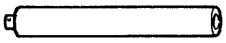
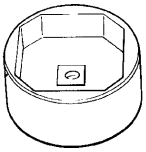
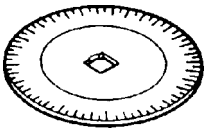
Item			Specification
ENGINE SPEED SENSING POWER STEERING			
Steering column and shaft	Length (mm {in})		797.4—800.4 {31.40—31.51}
Steering gear	Tie-rod end	Rotation torque (N·m {kgf·cm, in·lbf})	0.35—2.54 {3.5—26.0, 3.1—22.5}
		[Pull scale reading] (N {kgf, lbf})	3.5—25.4 {0.35—2.60, 0.78—5.72}
	Tie rod	Swinging torque (N·m {kgf·cm, in·lbf})	0.1—3.8 {1—39, 1—33}
		[Pull scale reading] (N {kgf, lbf})	0.6—24.5 {0.06—2.50, 0.14—5.50}
	Pinion shaft	Rotation torque (Center of rack ± 90°) (N·m {kgf·cm, in·lbf})	0.8—1.1 {8—11, 7—9}
		[Pull scale reading] (N {kgf, lbf})	8—11 {0.8—1.1, 1.7—2.4}
	Gear housing fluid pressure (MPa {kgf·cm^2, psi})		8.34—8.82 {85.0—90.0, 1,209—1,279}
Power steering oil pump	Oil pump fluid pressure (MPa {kgf·cm^2, psi})		8.34—8.82 {85.0—90.0, 1,209—1,279}
Power steering system	Fluid	Type	ATF M-**III** or equivalent (e.g. Dexron®**III**)
		Capacity (Approximate quantity) (L {US qt, Imp qt})	1.0 {1.1, 0.9}

06–60 SERVICE TOOLS

STEERING SST

A3U066001034W01

49 T028 3A0 Ball joint puller set 	49 T028 303 Body (Part of 49 T028 3A0) 	49 T028 304 Attachment (Part of 49 T028 3A0) 
49 1232 670B Power steering gauge set 	49 1232 672 Gauge (Part of 49 1232 670B) 	49 1232 673 Valve body (Part of 49 1232 670B) 
49 H002 671 Adapter 	49 G032 3A4 Power steering gauge adapter set 	49 G032 351 Adapter (Part of 49 G032 3A4) 
49 G032 352 Adapter (Part of 49 G032 3A4) 	49 G032 353 Bolt (Part of 49 G032 3A4) 	49 E017 5A0 Engine support 
49 B032 320 Wrench 	49 B032 317 Bearing & oil seal remover 	49 8038 785A Dust boot installer 
49 0180 510B Preload measuring attachment 	49 F032 301 Power steering pump hanger 	49 B001 797 Handle 
49 N032 320 Oil seal installer 	49 B032 331 Oil seal installer 	49 B032 323 Rod seal remover body 

49 E032 305 Slipper seal protector 	49 E032 306 Slipper seal former 	49 B032 325 Rod seal guide 
49 B032 326 Outer box protector 	49 B032 324 Rod seal protector body 	49 T028 301 Dust boot installer 
49 G032 3A1 Joint hose set 	49 G032 317 Hose (Part of 49 G032 3A1) 	49 B032 336 Adapter set 
49 L011 0A0B Piston pin setting tool set 	49 L011 007 Guide (Part of 49 L011 0A0B) 	49 G032 308 Oil seal installer 
49 F032 303 Handle 	49 N032 319A Support plate 	49 H032 338 Joint shaft 
49 S032 317 Socket wrench 	49 D032 316 protoractor 	—

HEATER, VENTILATION & AIR CONDITIONING (HVAC)

07
SECTION

07–03 SYMPTOM TROUBLESHOOTING

FOREWORD

A3U070301038W01

- See 00–00–1 HOW TO USE THIS MANUAL, Troubleshooting Procedure. Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures.
- The areas for inspection (steps) are given according to various circuit malfunctions. Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

TROUBLESHOOTING INDEX

A3U070301038W02

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Insufficient air (or no air) blown from vents.	• Problem with each vent and/or duct.	(See 07–03–2 NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS)
2	Amount of air blown from vents does not change.	• Malfunction in blower system.	(See 07–03–2 NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE)
3	Airflow mode does not change.	• Malfunction in heater unit and/or climate control unit airflow system.	(See 07–03–3 NO.3 AIRFLOW MODE DOES NOT CHANGE)
4	No temperature control with climate control unit.	• Malfunction in heater unit and/or climate control unit air mix system.	(See 07–03–4 NO.4 NO TEMPERATURE CONTROL WITH CLIMATE CONTROL UNIT)
5	Windshield fogged.	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.	(See 07–03–5 NO.5 WINDSHIELD FOGGED)
6	Air from vents not cold enough.	• Magnetic clutch operates but A/C system malfunctions.	(See 07–03–6 NO.6 AIR FROM VENTS NOT COLD ENOUGH)
7	No cool air.	• Magnetic clutch does not operate.	(See 07–03–9 NO.7 NO COOL AIR)
8	Noise while operating A/C system.	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.	(See 07–03–12 NO.8 NOISE WHILE OPERATING A/C SYSTEM)

NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS

A3U070301038W03

1	**Insufficient air (or no air) blown from vents.**
DESCRIPTION	• Problem with each vent and/or duct.
POSSIBLE CAUSE	• Malfunction in VENT mode system (Steps 1—4) • Malfunction in HEAT mode system (Step 5) • Malfunction in DEFROSTER mode system (Steps 6—8)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIRFLOW MODE CONTROL SYSTEM, STARTING FROM CLIMATE CONTROL UNIT** • When airflow mode control dial is operated, is appropriate resistance felt and can it be moved to its full range?	Yes	Go to next step.
		No	Go to Step 1 of troubleshooting index No. 3.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN VENT MODE OR ANOTHER MODES** • Does air blow out when in VENT mode?	Yes	Go to Step 5.
		No	Go to next step.
3	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to next step.
4	**VERIFY THAT DUCT IN DASHBOARD IS INSTALLED** • Is duct in dashboard properly installed?	Yes	Inspect duct for clogging, deformity and air leakage, then go to Step 9.
		No	Install duct securely in the proper position, then go to Step 9.
5	**CHECK TO SEE WHETHER MALFUNCTION IS IN HEAT MODE OR DEFROSTER MODE** • Does air blow out when in HEAT mode?	Yes	Go to next step.
		No	Inspect vent for clogging, then go to Step 9.
6	**INSPECT DEFROSTER MODE** • Does air blow out when in DEFROSTER mode?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	Go to next step.
7	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to next step.
8	**VERIFY THAT DEFROSTER DUCT IS INSTALLED** • Is defroster duct properly installed?	Yes	Inspect duct for clogging, deformity, and air leakage, then go to next step.
		No	Install duct securely in the proper position, then go to next step.
9	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does air blow out?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE

A3U070301038W04

2	**Amount of air blown from vents does not change.**
DESCRIPTION	• Malfunction in blower system.
POSSIBLE CAUSE	• Blower relay, blower motor, resistor, fan switch malfunction (Step 1) • Blower unit malfunction (Steps 2—4)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BLOWER SYSTEM** • Inspect the following systems and electrical parts. — Blower relay — Blower motor — Resistor — Fan switch — Related wiring harnesses • Are they okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning part, then go to Step 5.

STEP	INSPECTION		ACTION
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT OR ELSEWHERE** • Turn ignition switch to ON position. • Turn fan switch on. • Recirculate air inside vehicle. • 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 from 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 blower unit intake vent clogged?	Yes	Remove obstruction, then go to next step.
		No	Inspect if there are any obstructions in passage between blower unit and heater unit, then go to next step.
5	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does air blow out?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.3 AIRFLOW MODE DOES NOT CHANGE

A3U070301038W05

3	**Airflow mode does not change.**
DESCRIPTION	• Malfunction in heater unit and/or climate control unit airflow system.
POSSIBLE CAUSE	• Heater unit airflow mode link, airflow mode crank, airflow mode rod, airflow mode wire, wire clamp malfunction (Steps 1, 2) • Climate control unit rack-and-pinion, airflow mode wire malfunction (Step 3) • Malfunction in one or more heater unit doors (Steps 4, 5)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HEATER UNIT AIRFLOW MODE SYSTEM** • Inspect heater unit airflow mode links, airflow mode cranks, airflow mode rods, and wire clamp. — Is there grease on links and cranks? — Are links, cranks and rods installed securely and in the proper position? — Is wire clamp free of deformation? • Are above items okay?	Yes	Go to next step.
		No	Apply grease or install links, cranks and rods securely in their proper positions, repair or replace wire clamp, then go to Step 6.
2	**VERIFY THAT AIRFLOW MODE WIRE FROM HEATER UNIT IS POSITIONED SECURELY AND CORRECTLY** • Is airflow mode wire positioned securely and correctly in relation to the heater unit airflow mode links?	Yes	Go to next step.
		No	Adjust airflow mode wire or install correctly, then go to Step 6.
3	**INSPECT CLIMATE CONTROL UNIT** • Inspect climate control unit. — Is rack-and-pinion properly engaged? — Is airflow mode wire properly installed in correct direction on rack? • Are above items okay?	Yes	Go to next step.
		No	Properly engage rack-and-pinion or install airflow mode wire in correct direction, then go to Step 6.
4	**INSPECT HEATER UNIT AIRFLOW MODE DOORS** • Is there any foreign material or obstructions in any of heater unit doors?	Yes	Remove obstruction, then go to Step 6.
		No	Go to next step.
5	**VERIFY THAT ALL AIRFLOW MODE DOORS WITHIN HEATER UNIT IS POSITIONED SECURELY AND PROPERLY** • Are all doors within heater unit securely and properly positioned?	Yes	Inspect each door for cracks or damage, then go to next step.
		No	Install malfunction doors securely in proper position, then go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does airflow mode change?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.4 NO TEMPERATURE CONTROL WITH CLIMATE CONTROL UNIT

A3U070301038W06

4	**No temperature control with climate control unit.**
DESCRIPTION	• Malfunction in heater unit and/or climate control unit air mix system.
POSSIBLE CAUSE	• Heater unit air mix link, air mix crank, air mix rod, air mix wire, wire clamp malfunction (Steps 2, 3) • Climate control unit rack-and-pinion, air mix wire malfunction (Step 4) • Heater unit air mix door malfunction (Steps 5, 6) • Heater piping malfunction (Step 7)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COOLANT TEMPERATURE** • Is coolant sufficiently warmed up?	Yes	Go to next step.
		No	Warm engine up, then go to Step 8.
2	**INSPECT HEATER UNIT AIR MIX SYSTEM** • Inspect heater unit air mix links, air mix cranks, air mix rods, and wire clamp. — Is there grease on links and cranks? — Are links, cranks, and rods securely installed in their proper positions? — Is wire clamp free of deformation? • Are above items okay?	Yes	Go to next step.
		No	Apply grease or install links, cranks, and rods securely in their proper positions, repair or replace wire clamp, then go to Step 8.
3	**VERIFY THAT AIR MIX WIRE FROM HEATER UNIT IS POSITIONED SECURELY AND CORRECTLY** • Is air mix wire securely installed in the correct position in relation to heater unit air mix links?	Yes	Go to next step.
		No	Adjust air mix wire or install securely in correct position, then go to Step 8.
4	**INSPECT CLIMATE CONTROL UNIT** • Inspect climate control unit. — Is rack-and-pinion properly engaged? — Is air mix wire properly installed in correct position on rack? • Are above items okay?	Yes	Go to next step.
		No	Properly engage rack-and-pinion or install air mix wire in correct position, then go to Step 8.
5	**INSPECT HEATER UNIT** • Is there any foreign material or obstruction in heater unit air mix doors?	Yes	Remove obstruction, then go to Step 8.
		No	Go to next step.
6	**INSPECT HEATER UNIT AIR MIX DOORS** • Is heater unit air mix door securely and properly installed?	Yes	Inspect air mix door for cracks or damage, then go to next step.
		No	Install air mix door securely in proper position, then go to next step.
7	**INSPECT HEATER LINES** • Inspect heater lines. — Is heater piping free of damage and cracks? — Are heater piping connections free of engine coolant leakage? — Are heater piping connections securely tightened? — Are heater piping installation points on heater unit free of engine coolant leakage? • Are above items okay?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	If heater piping connections is loosed, tighten connections with specified torque. Repair or replace heater piping, then go to next step.
8	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does unit operate in every temperature setting?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.5 WINDSHIELD FOGGED

A3U070301038W07

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

5	**Windshield fogged.**
DESCRIPTION	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.
POSSIBLE CAUSE	• Climate control unit (B+ signal) system malfunction (Steps 2, 4, 5) • Air intake actuator malfunction (Steps 3, 7) • Climate control unit (RECIRCULATE, FRESH signal) system malfunction (Steps 9—11) • Malfunction in blower unit air intake doors (Steps 12, 13)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**COOL AIR BLOW OUT INSPECTION** • When both A/C and fan switch in climate control unit are on, does cool air blow out from front vent?	Yes	Go to next step.
		No	Go to Step 1 of troubleshooting index No.7.
2	**INSPECT CLIMATE CONTROL UNIT POWER SUPPLY FUSE FOR B+ SIGNAL** • Is climate control unit power supply fuse for B+ signal okay?	Yes	Go to next step.
		No	Inspect for a short to ground on blown fuse circuit. • Repair or replace as necessary. Install appropriate amperage fuse.
3	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. — Is there grease on link? — Is link securely and properly positioned? — Is link free of obstructions? • Are above items okay?	Yes	Go to next step.
		No	Apply grease or install link properly and securely, remove obstruction, then go to Step 14.
*4	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CLIMATE CONTROL UNIT FOR CONTINUITY** • Disconnect climate control unit connector (12-pin). • Turn ignition switch to ON position. • Test voltage at climate control unit connector terminal K (B+ signal). • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and climate control unit, then go to Step 14.
*5	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND GROUND FOR VOLTAGE** • Test voltage at climate control unit connector terminal E (Ground). • Is voltage **approximately 0V**?	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and ground, then go to Step 14.
6	**VERIFY WHETHER MALFUNCTION IS IN BLOWER UNIT AIR INTAKE DOOR OR ELSEWHERE** • Turn ignition switch to LOCK position. • Connect climate control unit connector (12-pin). • Remove air intake actuator. • Turn ignition switch to ON position. • Set fan switch to 4th position. • Does air intake mode (RECIRCULATE, FRESH) change smoothly when air intake link is operated by hand?	Yes	Go to next step.
		No	Go to Step 12.
7	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. (See 07–40–4 AIR INTAKE ACTUATOR INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Replace air intake actuator, go to Step 14.

STEP	INSPECTION		ACTION
8	**INSPECT AIR INTAKE SELECTOR SWITCH AND MICROSWITCH IN CLIMATE CONTROL UNIT** • Test voltage at climate control unit connector (12-pin) terminals A and I. • Is it okay?	Yes	Go to next step.
		No	Replace climate control unit, then go to Step 14.
*9	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR CONTINUITY** • Turn ignition switch to LOCK position. • Is there continuity between following climate control unit connector (12-pin) terminal and air intake actuator connector terminal? — Terminal A —Terminal F (FRESH signal) — Terminal I —Terminal A (RECIRCULATE signal)	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
*10	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO GROUND** • Is there continuity between following climate control unit connector (12-pin) terminal and ground? — Terminal A (FRESH signal) — Terminal I (RECIRCULATE signal)	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Go to next step.
*11	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO B+** • Turn ignition switch to ON position • Test voltage at following climate control unit connector (12-pin) terminal. — Terminal A (FRESH signal) — Terminal I (RECIRCULATE signal) • Is voltage **approximately 12 V**?	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Replace climate control unit, then go to Step 14.
12	**INSPECT BLOWER UNIT AIR INTAKE DOOR** • Is there any foreign material or obstruction in blower unit air intake door?	Yes	Remove obstruction, then go to Step 14.
		No	Go to next step.
13	**VERIFY THAT BLOWER UNIT AIR INTAKE DOOR IS POSITIONED SECURELY AND PROPERLY** • Is blower unit air intake door securely and properly positioned?	Yes	Inspect air intake door for cracks or damage, then go to next step.
		No	Install air intake door securely in proper position, then go to next step.
14	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does malfunction disappear?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.6 AIR FROM VENTS NOT COLD ENOUGH

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6	**Air from vents not cold enough.**
DESCRIPTION	• Magnetic clutch operates but A/C system malfunctions.
POSSIBLE CAUSE	• Drive belt malfunction (Step 2) • Malfunction in blower unit or condenser (Steps 4, 5) • Malfunction in receiver/drier or expansion valve (valve closes too much) (Steps 8, 9) • Malfunction in refrigerant lines (Steps 10, 11) • A/C compressor system malfunction, insufficient compressor oil (Steps 15, 16) • Over filling of compressor oil, malfunction in expansion valve or heater unit air mix link system (Steps 17—19)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01–10B–3 DRIVE BELT INSPECTION [FS]) • Is it okay?	Yes	Go to next step.
		No	Adjust or replace drive belt, then go to Step 20. (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS])

STEP	INSPECTION		ACTION
2	**INSPECT REFRIGERANT SYSTEM PERFORMANCE** • Perform refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST) • Is operation normal?	Yes	Operation is normal. (Recheck malfunction symptoms.)
		No	Go to next step.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT INTAKE AND CONDENSER OR ELSEWHERE** • Are refrigerant high-pressure and low-pressure values both high?	Yes	Go to next step.
		No	Go to Step 6.
4	**INSPECT BLOWER UNIT INTAKE** • Is blower unit intake clogged?	Yes	Remove obstruction, then go to Step 20. (If air does not reach evaporator within cooling unit, heat exchange does not occur and refrigerant pressure becomes high. Therefore, removal of obstruction is necessary.)
		No	Go to next step.
5	**INSPECT CONDENSER** • Inspect condenser. (See 07–11–13 CONDENSER INSPECTION) • Is it okay?	Yes	Adjust refrigerant to specified amount, then go to Step 20. (Excessive amount of refrigerant.)
		No	Replace condenser, or repair and clean condenser fins, then go to Step 20.
6	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE, RECEIVER/DRIER AND REFRIGERANT LINES OR ELSEWHERE** • Are refrigerant high-pressure and low-pressure values low?	Yes	Go to next step.
		No	Go to Step 14.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE AND RECEIVER/ DRIER OR ELSEWHERE** • Immediately after A/C compressor operates, does refrigerant high-pressure value momentarily rise to correct value, then fall and stay below it? (Is there negative pressure on low-pressure side?)	Yes	Go to next step.
		No	Go to Step 10.
8	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR RECEIVER/ DRIER** • 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 receiver/drier and vacuum refrigerant line **more than 30 minutes** by vacuum pump, add refrigerant to specified level, then go to Step 20. (Since water has intermixed in receiver/drier and it is saturated, replacement is necessary.)
9	**VERIFY THAT EXPANSION VALVE HEAT-SENSING TUBE WITHIN COOLING UNIT IS POSITIONED SECURELY AND CORRECTLY** • Is expansion valve heat-sensing tube within cooling unit securely installed in proper position?	Yes	Replace expansion valve, then go to Step 20. (Since valve closes too much, replacement is necessary.)
		No	Install heat-sensing tube securely in proper position, then go to Step 20.
10	**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	Go to next step.
		No	If piping or A/C component(s) are damaged or cracked, replace them. Then go to Step 20. If there is no damage, go to Step 13.

STEP	INSPECTION		ACTION
11	**INSPECT EVAPORATOR PIPING CONNECTIONS IN COOLING UNIT FOR GAS LEAKAGE** • Are piping connections for evaporator in cooling unit free of gas leakage?	Yes	If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard. Adjust refrigerant to specified amount, then go to Step 20.
		No	If piping is damaged or cracked, replace it. Then go to Step 20. If there is no damage, go to next step.
12	**INSPECT EVAPORATOR PIPING CONNECTIONS IN COOLING UNIT FOR LOOSE** • Are piping connections for evaporator in cooling unit loose?	Yes	Tighten connections with specified torque, adjust both compressor oil and refrigerant to specified amount, then go to Step 20.
		No	If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard. Replace O-ring on piping, adjust refrigerant to specified amount, then go to Step 20.
13	**INSPECT PIPING CONNECTIONS FOR LOOSE** • Are piping connections loose?	Yes	Tighten connections with specified torque, adjust both compressor oil and refrigerant to specified amount, then go to Step 20.
		No	If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard. Replace O-ring on piping, adjust refrigerant to specified amount, then go to Step 20.
14	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE, AIR MIX ACTUATOR AND COMPRESSOR OIL OR ELSEWHERE** • Does refrigerant high-pressure value hardly increase?	Yes	Go to next step. (Pressure hardly increases.)
		No	Go to Step 17.
15	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL AMOUNT AND A/C COMPRESSOR OR ELSEWHERE** • When engine is racing, does high-pressure value increase?	Yes	Return to Step 3.
		No	Go to next step.
16	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL AMOUNT OR A/C COMPRESSOR** • After compressor oil is replenished each **10 ml {10 cc, 0.34 fl oz}**, does high-pressure value increase?	Yes	Troubleshooting completed. (Explain to customer that cause was insufficient compressor oil.)
		No	Replace A/C compressor, then go to Step 20. (Cause is defective A/C compressor.)
17	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR ELSEWHERE** • Is only refrigerant low-pressure value high?	Yes	Go to Step 19.
		No	Go to next step.
18	**VERIFY THAT AIR MIX IS INSTALLED SECURELY AND PROPERLY** • Are heater unit air mix links, air mix cranks, and air mix rods securely and properly installed?	Yes	Set fan switch to 4th position. Turn A/C switch on. Set FRESH mode. Set temperature control to MAX COLD. Set VENT mode. (1)Start and run the engine at **1,500 rpm** for **10 minutes**. (2)Run the engine at idle for **1 minute**. (3)Within **12 seconds**, idle → **4,000 rpm** → idle. Perform cycle **5 times**. (4) Run the engine at idle for **30 seconds**. (5)Drain the compressor oil completely from the A/C compressor and verify the amount. • If there is **approximately 90 ml {90 cc, 3.0 fl oz}** of compressor oil, go to Step 20. • If there is **more than 90 ml {90 cc, 3.0 fl oz}** of compressor oil, remove surplus oil and fill A/C compressor with **90 ml {90 cc, 3.0 fl oz}** of compressor oil. Repeat Steps (1) to (5). (Cause is excessive amount of compressor oil.)
		No	Repair or install links, cranks and rods securely in proper position, then go to Step 20.

STEP	INSPECTION		ACTION
19	**VERIFY THAT EXPANSION VALVE HEAT-SENSING TUBE WITHIN COOLING UNIT IS POSITIONED SECURELY AND CORRECTLY** • Is expansion valve heat-sensing tube within cooling unit securely installed in proper position?	Yes	Replace expansion valve, then go to next step. (Since valve opens too much, replacement is necessary.)
		No	Install heat-sensing tube securely in proper position, then go to next step.
20	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does cool air blow out? (Are results of refrigerant system performance test okay?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.7 NO COOL AIR

A3U070301038W09

- 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	**No cool air.**
DESCRIPTION	• Magnetic clutch does not operate.
POSSIBLE CAUSE	• PCM A/C cut-off control system, coolant system malfunction (Steps 4, 17) • A/C amplifier, A/C switch malfunction (Steps 6—10) • PCM (A/C signal) system malfunction (Steps 11,12) • Refrigerant pressure switch, refrigerant system malfunction (Steps 13, 14) • PCM (IG1 signal) system malfunction (Steps 15, 16) • A/C compressor system malfunction (Step 18) • A/C relay system malfunction (Steps 19—21)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK AIRFLOW** • Does air blow out?	Yes	Go to next step.
		No	Go to Step 1 of troubleshooting indexes No. 1, 2.
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 Step 1 of troubleshooting index No. 6.
		No	Go to next step.
*3	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (BETWEEN A/C SWITCH AND FAN SWITCH)** • Turn both A/C switch and fan switch off. • Test voltage at climate control unit terminal D (A/C signal). • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and fan switch, then go to Step 22.
4	**CHECK FOR DTCS IN PCM** • Check the DTC for the PCM on-board diagnostic system. • Are any DTCs displayed? (See 01–03B–4 FOREWORD [FS]) (See 01–03A–4 FOREWORD [ZM])	Yes	Go to appropriate inspection procedure.
		No	Go to next step.
*5	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C AMPLIFIER SYSTEM OR ELSEWHERE** • Turn ignition switch to LOCK position. • Disconnect refrigerant pressure switch connector. • Turn ignition switch to ON position. • Set fan switch to 1st speed. • Test voltage at following terminal of refrigerant pressure switch connector (on wiring harness side). — Terminal A (A/C signal) • Is voltage **approximately 12 V** when A/C switch is off and **0 V** when it is on?	Yes	Go to Step 11.
		No	Reconnect refrigerant pressure switch connector, then go to next step.

STEP	INSPECTION		ACTION
*6	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C AMPLIFIER (LACK OF CONTINUITY OR SHORT TO GROUND) AND WIRING HARNESS (LACK OF CONTINUITY OR SHORT TO GROUND BETWEEN FUSE BLOCK AND A/C AMPLIFIER) OR ELSEWHERE** • Turn ignition switch to LOCK position. • Disconnect A/C amplifier connector. • Start engine. • Turn both A/C switch and fan switch on. • When A/C amplifier connector terminals B and C (on wiring harness side) are shorted, does cool air blow out?	Yes	Go to next step.
		No	Go to Step 8.
*7	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY OR SHORT TO GROUND) IS IN A/C AMPLIFIER OR WIRING HARNESS (BETWEEN FUSE BLOCK AND A/C AMPLIFIER)** • Turn ignition switch to ON position. • Test voltage at A/C amplifier connector terminal A (IG2 signal). • Is voltage **approximately 12 V**?	Yes	Inspect A/C amplifier, then go to Step 22.
		No	Repair wiring harness between fuse block and A/C amplifier, then go to Step 22.
*8	**INSPECT WIRING HARNESS BETWEEN REFRIGERANT PRESSURE SWITCH AND A/C AMPLIFIER FOR SHORT TO B+** • Test voltage at A/C amplifier connector terminal B (A/C signal). • Is voltage **approximately 12 V**?	Yes	Repair wiring harness between refrigerant pressure switch and A/C amplifier, then go to Step 22.
		No	Go to next step.
*9	**INSPECT WIRING HARNESS BETWEEN REFRIGERANT PRESSURE SWITCH AND A/C AMPLIFIER FOR CONTINUITY** • Turn ignition switch to LOCK position. • Disconnect refrigerant pressure switch connector. • Inspect for continuity between A/C amplifier connector terminal B (A/C signal) and refrigerant pressure switch connector terminal A. • Is there continuity?	Yes	Go to next step.
		No	Repair wiring harness between refrigerant pressure switch and A/C amplifier, then go to Step 22.
*10	**CHECK TO SEE WHETHER MALFUNCTION (SHORT TO B+) IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND A/C AMPLIFIER)** • Turn ignition switch to ON position. • Turn A/C switch on. • Turn fan switch off. • Test voltage at climate control unit connector terminal B (A/C signal). • Is voltage **approximately 12 V**?	Yes	Inspect wiring harness between A/C amplifier and climate control unit, then go to Step 22.
		No	Inspect climate control unit, then go to Step 22.
*11	**CHECK TO SEE WHETHER MALFUNCTION IS IN PCM (LACK OF CONTINUITY) AND WIRING HARNESS (BETWEEN PCM AND REFRIGERANT PRESSURE SWITCH) OR ANOTHER AREA** • Test voltage at refrigerant pressure switch connector (on wiring harness side) terminal B (A/C signal). • Turn ignition switch to ON position. • Is voltage **approximately 12 V**?	Yes	Go to Step 13.
		No	Go to next step.
*12	**CHECK TO SEE WHETHER MALFUNCTION IS IN PCM OR WIRING HARNESS (BETWEEN PCM AND REFRIGERANT PRESSURE SWITCH FOR CONTINUITY)** • Test voltage at PCM connector (96-pin) terminal (A/C signal terminal). • Is voltage **approximately 12 V**?	Yes	Repair wiring harness between PCM and refrigerant pressure switch, then go to Step 22.
		No	Inspect PCM, then go to Step 22.

STEP	INSPECTION		ACTION
13	**CHECK TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH OR ELSEWHERE** • When refrigerant pressure switch connector terminals A and B (on wiring harness side) are shorted, does cool air blow out?	Yes	Go to next step.
		No	Undo short, reconnect refrigerant pressure switch connector, then go to Step 15.
14	**INSPECT REFRIGERANT PRESSURE SWITCH** • Inspect refrigerant pressure switch. (See 07–40–9 REFRIGERANT PRESSURE SWITCH INSPECTION) • Is it okay?	Yes	If refrigerant amount empty, replace receiver/drier, vacuum refrigerant line **more than 30 minutes** by vaccum pump, and add refrigerant to specified level, then go to Step 21.
		No	Replace refrigerant pressure switch, then go to Step 22.
*15	**CHECK TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH SYSTEM OR ELSEWHERE** • Does magnetic clutch operate when terminal E of A/C relay connector is grounded?	Yes	Undo short, then go to next step.
		No	Go to Step 18.
*16	**INSPECT WIRING HARNESS BETWEEN A/C RELAY AND PCM FOR CONTINUITY** • Turn A/C switch off. • Test voltage at PCM connector (96-pin) terminal. • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between A/C relay and PCM, then go to Step 22.
*17	**INSPECT INPUT SIGNAL FOR PCM A/C CUT-OFF CONTROL** • Inspect the following input signal components: — Transaxle range switch and power steering pressure switch including PCM wiring harness (A/C cut-off control) • Are they okay?	Yes	Inspect coolant system operation. (See 01–03B–4 FOREWORD [FS]) (See 01–03A–4 FOREWORD [ZM])
		No	Inspect PCM.
*18	**CHECK TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH AND THERMAL PROTECTOR OR ELSEWHERE** • Test voltage at magnetic clutch stator and thermal protector terminal A (A/C control signal). • Is voltage **approximately 12 V**?	Yes	Inspect magnetic clutch, then go to Step 22.
		No	Go to next step.
19	**INSPECT A/C RELAY POWER SUPPLY FUSES** • Are A/C relay power supply fuses okay?	Yes	Go to next step.
		No	Inspect for a short to ground on blown fuse circuit. Repair or replace as necessary. Install appropriate amperage fuse.
*20	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND A/C RELAY FOR CONTINUITY** • Turn ignition switch to ON position. • Test voltage at the following A/C relay connector terminals: — Terminal A (IG2 signal) — Terminal C (A/C control signal) • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and A/C relay, then go to Step 22.
*21	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN A/C RELAY OR WIRING HARNESS (BETWEEN A/C RELAY AND MAGNETIC CLUTCH)** • Test voltage at A/C relay terminal D (A/C control signal). • Is voltage **approximately 12 V**?	Yes	Repair wiring harness between A/C relay and stator and thermal protector, then go to next step.
		No	Inspect A/C relay, then go to next step.
22	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does cool air blow out? (Is refrigerant system performance test result correct?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.8 NOISE WHILE OPERATING A/C SYSTEM

A3U070301038W10

8	**Noise while operating A/C system.**
DESCRIPTION	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.
POSSIBLE CAUSE	• Magnetic clutch operation noise (Step 4) • A/C compressor vane noise (Steps 5—13) • A/C compressor slippage noise (Steps 14—17) • Hose or refrigerant line interference noise (Step 18)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK A/C COMPRESSOR VANE NOISE** • Is there a jingling, popping, beeping, or buzzing sound (A/C compressor vane noise)?	Yes	Go to Step 5.
		No	Go to next step.
2	**INSPECT A/C COMPRESSOR SLIPPAGE NOISE** • Is there a squeaking or whirling sound (A/C compressor slippage noise)?	Yes	Go to Step 14.
		No	Go to next step.
3	**INSPECT A/C COMPRESSOR INTERFERENCE NOISE** • Is there a rattling or vibrating sound (interference noise)?	Yes	Go to Step 18.
		No	Go to next step.
4	**INSPECT MAGNETIC CLUTCH OPERATION NOISE** • Is there a clicking sound (magnetic clutch operation noise)?	Yes	Adjust clearance between pressure plate of magnetic clutch and A/C compressor pulley, then go to Step 19. (See 07–40–7 MAGNETIC CLUTCH ADJUSTMENT)
		No	Condition is normal. (Recheck malfunction symptoms.)
5	**INSPECT A/C COMPRESSOR NOISE TIME** • Is noise heard continuously for **more than 3 seconds** after A/C compressor comes on?	Yes	Go to next step.
		No	Condition is normal. (Noise occurs for **2—3 seconds** immediately after A/C compressor turns on.)
6	**INSPECT IDLE SPEED** • Inspect idle speed. (See 01–10B–26 Idle Speed Adjustment) • Is it okay?	Yes	Go to next step.
		No	Adjust idle speed, then go to Step 19.
7	**INSPECT REFRIGERANT AMOUNT** • Inspect refrigerant amount. • Is it okay?	Yes	Go to Step 10.
		No	Go to next step.
8	**INSPECT REFRIGERANT LINES** • Inspect refrigerant lines. — Is piping free of damage and cracks? — Are piping connections free of oil grime? (Visual inspection) — Are piping connections free of gas leakage? — Are piping installation points on condenser free of gas leakage? — Are piping installation points on receiver/ drier free of gas leakage? — Are piping installation points on A/C compressor free of gas leakage? — Are piping installation points on cooling unit free of gas leakage — Perform gas leak inspection using gas leak tester. • Are above items okay?	Yes	Go to next step.
		No	If piping or A/C component(s) is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace receiver/drier*, then go to Step 19.
9	**INSPECT EVAPORATOR PIPING CONNECTIONS IN COOLING UNIT FOR GAS LEAKAGE** • Are piping connections for evaporator in cooling unit free of gas leakage?	Yes	Adjust refrigerant amount to specified level, then go to Step 19.
		No	If piping is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace receiver/drier*, then go to Step 19.
10	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL OR ELSEWHERE** • Add **20 ml {20 cc, 0.8 fl oz}** of compressor oil. • Is noise heard when racing engine?	Yes	Go to next step.
		No	Troubleshooting completed. Explain repair to customer.

STEP	INSPECTION		ACTION
11	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Drain compressor oil. • Is it contaminated with metal particles?	Yes	Go to next step.
		No	Replace A/C compressor, then go to Step 19.
12	**CHECK TO SEE WHETHER MALFUNCTION IS SOMEWHERE IN A/C SYSTEM OR ELSEWHERE** • Is compressor oil whitish and mixed with water?	Yes	Replace entire A/C system (excluding heater), then go to Step 19.
		No	Go to next step.
13	**INSPECT A/C COMPRESSOR OIL** • Is compressor oil darker than normal and contaminated with aluminum chips?	Yes	Replace A/C compressor and receiver/drier, then go to Step 19. (Since A/C compressor may be worn and receiver/drier may be clogged, replacement of receiver/drier is necessary.)
		No	Condition is normal. Recheck malfunction symptoms.
14	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Is noise heard immediately after A/C compressor is stopped?	Yes	Replace A/C compressor, then go to Step 19. (A/C compressor discharge valve left open)
		No	Go to next step.
15	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01–10B–3 DRIVE BELT INSPECTION [FS]) • Is it okay?	Yes	Go to next step.
		No	Adjust or replace drive belt, then go to Step 19. (See 01–03B–4 FOREWORD [FS]) (See 01–03A–4 FOREWORD [ZM])
16	**INSPECT DRIVE BELT CONDITION** • Is drive belt worn? • Does it have foreign material imbedded in it, or have oil on it?	Yes	Remove obstruction, remove oil, or replace drive belt, then go to Step 19.
		No	Go to next step.
17	**INSPECT MAGNETIC CLUTCH** • Inspect magnetic clutch. (See 07–40–8 MAGNETIC CLUTCH INSPECTION) • Is it okay?	Yes	Replace A/C compressor (excluding pressure plate, A/C compressor pulley, and stator), then go to Step 19.
		No	Replace magnetic clutch, then go to Step 19.
18	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR REFRIGERANT LINES** • Is noise emitted from A/C compressor?	Yes	Visually inspect A/C compressor, replace appropriate parts if necessary, then go to next step.
		No	If noise is due to refrigerant lines, repair detached or missing clips, tighten loose bolts, then go to next step.
19	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Has A/C compressor noise stopped?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

* : If there is gas leakage, air enters into the A/C system. The desiccant within the receiver/drier absorbs the moisture from the air and becomes saturated. If the A/C system is used in this condition, the inside of the A/C compressor will begin to rust due to this moisture, which may cause lock up or noise to occur. Therefore, replacement of the receiver/drier is necessary.

07–10 REFRIGERANT SYSTEM

REFRIGERANT SYSTEM SERVICE WARNINGS

A3U071001039W01

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 leakage 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 marshal 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}.**

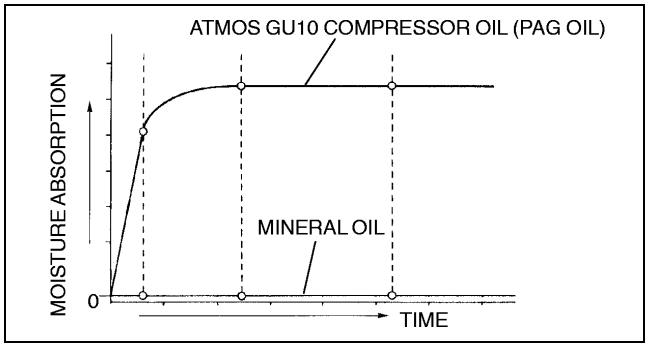
REFRIGERANT SYSTEM SERVICE CAUTIONS

A3U071001039W02

Handling Compressor Oil

- **Use only ATMOS GU10 compressor oil for this vehicle. Using a PAG oil other than ATMOS GU10 compressor oil can damage the A/C compressor.**
- **Do not spill ATMOS GU10 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.**

- **ATMOS GU10 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.**



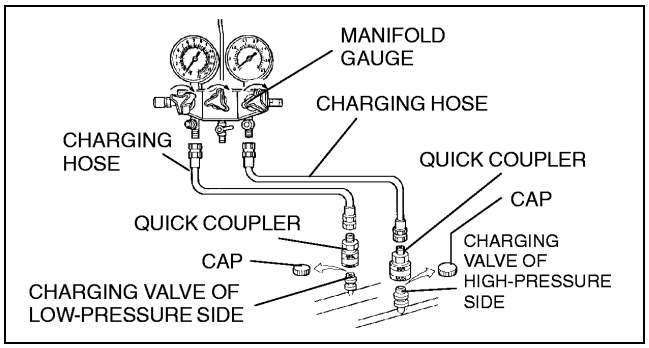
X3U710WA0

REFRIGERANT SYSTEM GENERAL PROCEDURES

A3U071001039W03

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. Remove the caps from the charging valves.
5. Connect the quick couplers to the charging valves.

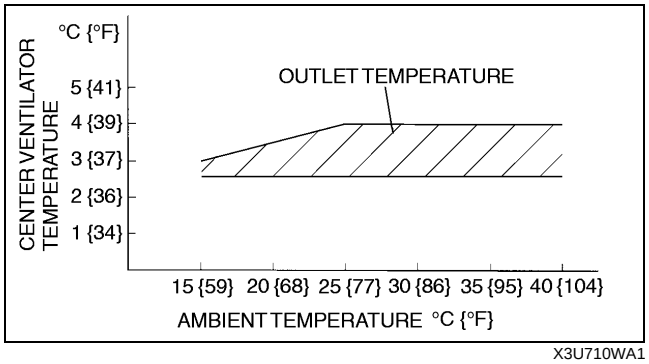


W6U710WA1

REFRIGERANT SYSTEM PERFORMANCE TEST

A3U071001039W04

1. Perform refrigerant pressure check. (See 07–10–3 REFRIGERANT PRESSURE CHECK.)
   - If they are correct, go to the next step.
   - If not as specified, troubleshoot refrigerant system. (See 07–03–1 TROUBLESHOOTING INDEX.)
2. Place a dry-bulb thermometer in the driver-side center ventilator outlet.
3. Close the hood.
4. Warm up the engine and run it at a constant **1,500 rpm.**
5. Set the fan switch to 4th position.
6. Turn the A/C switch on.
7. Set the RECIRCULATE mode.
8. Set the temperature control to MAX COLD.
9. Set the VENT mode.
10. Close all the doors and all the windows.
11. Wait until the air conditioner output temperature stabilizes. The output temperature is stable when the A/C compressor is repeatedly turned on and off based on the A/C compressor control of A/C amplifier.
12. Record driver-side center ventilator temperature.
13. Determine and record ambient temperature.
14. Verify that the temperature reading is in the shaded zone.
    - If the performance is not within the shaded zone, troubleshoot the refrigerant system. (See 07–03–1 TROUBLESHOOTING INDEX.)

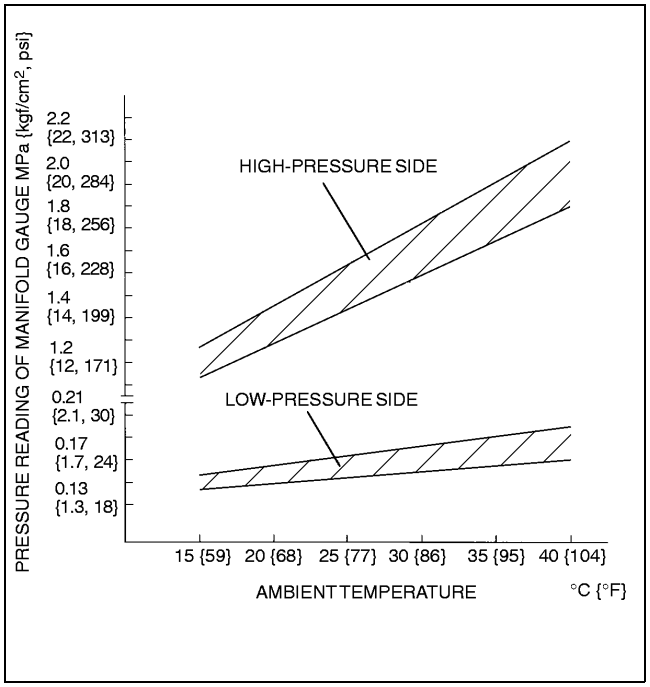


X3U710WA1

REFRIGERANT PRESSURE CHECK

A3U071078834W01

1. Install the manifold gauge set.
2. Close the hood.
3. Warm up the engine and run it at a constant **1,500 rpm**.
4. Set the fan switch to 4th position.
5. Turn the A/C switch on.
6. Set the RECIRCULATE mode.
7. Set the temperature control to MAX COLD.
8. Set the VENT mode.
9. Close all the doors and all the windows.
10. Measure the ambient temperature and the high- and low-pressure side readings of the manifold gauge.
    - If the high- and low-pressure side readings are in the shaded zone as shown in the figure, the refrigerant system is normal.
    - If the pressure is abnormal, see No.6 of symptom troubleshooting. (See 07–03–6 NO.6 AIR FROM VENTS NOT COLD ENOUGH.)



X3U710WA2

REFRIGERANT RECOVERY

A3U071078834W02

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.**

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer's instructions.

REFRIGERANT CHARGING

A3U071078834W03

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.**

Caution

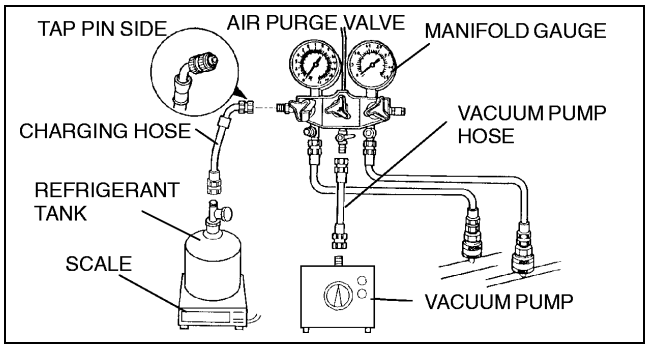
- **Do not exceed the specification when charging the system with refrigerant. Doing so will decrease the efficiency of the air conditioner or damage the refrigeration cycle parts.**

Charging Recycled R-134a Refrigerant

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer's instructions.

Charging New R-134a Refrigerant

1. Install the manifold gauge set.
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.

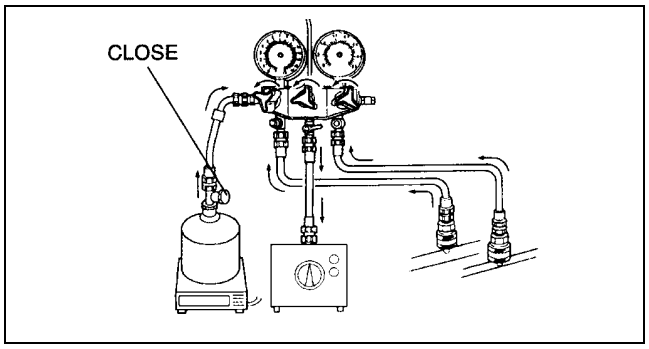


W6U710WA4

Caution

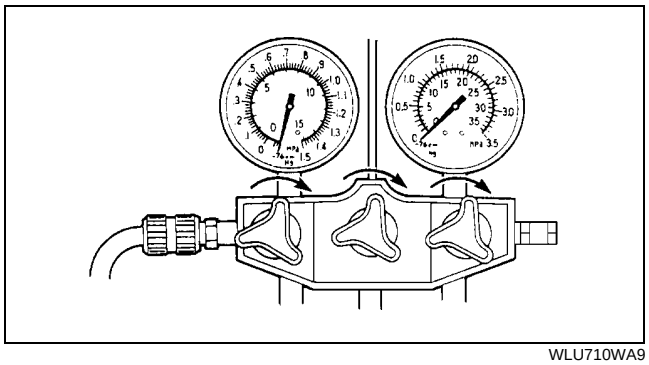
- **Close the manifold gauge valve immediately after stopping the vacuum pump. If the valve is left open, the vacuum pump oil will back flow into the refrigeration cycle and cause a decrease in the efficiency of the air conditioner.**

8. Start the vacuum pump and let it operate for **15 minutes**.



WLU710WA8

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. Inspect the high- and low-pressure side readings of the manifold gauge.
    - If the reading has changed, inspect for leakage and then repeat from Step 7.
    - If the reading has not changed, and go to next step.
12. Open the valve of the refrigerant tank.
13. Weigh the refrigerant tank.


WLU710WA9

Regular amount of refrigerant (approximate quantity)
600 g {21.2 oz}

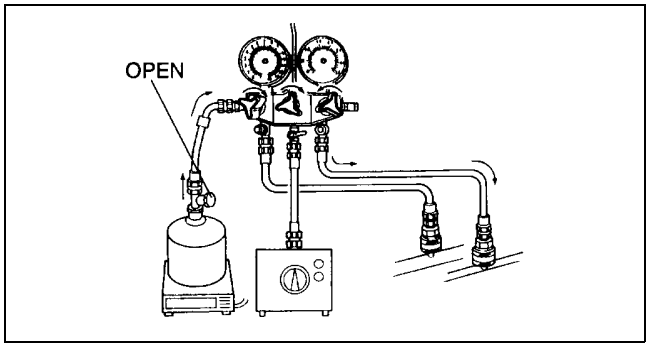
Warning

- **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.**

Caution

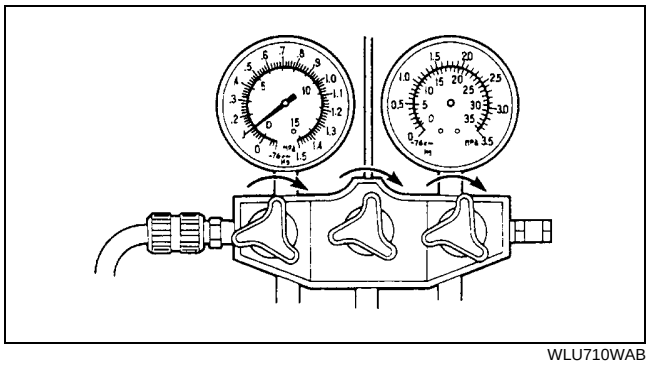
- **Always begin charging of refrigerant from the high-pressure side. If charging is begun from the low-pressure side, the vanes of the A/C compressor will not be released and abnormal noise may result.**

14. Open the high-pressure side valve of the manifold gauge.



WLU710WAA

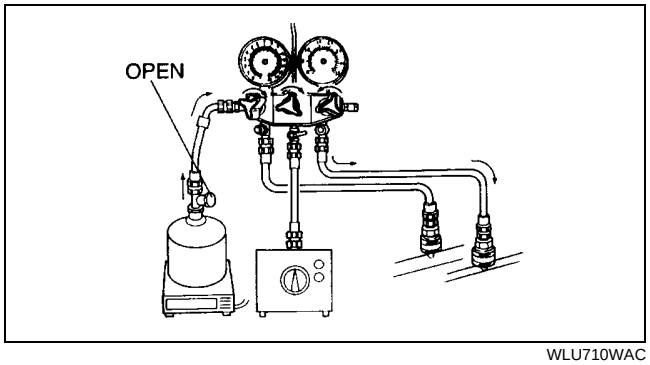
15. When the low-pressure side reading increases to **0.098 MPa {1.0 kgf/cm^2, 14 psi}**, close the high-pressure side valve of the manifold gauge.
16. Inspect for leakage from the cooler pipe/hose connections using a gas leak tester.
    - If there is no leakage, go to Step 18.
    - If leakage is found at a loose joint, tighten the joint, then go to the next step.
17. Inspect for leakage again.
    - If there is no leakage after tightening the joint, go to the next step.
    - If there is still a leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from Step 7.


WLU710WAB

Warning

- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

18. Open the high-pressure side valve of the manifold gauge and charge with refrigerant until the weight of refrigerant tank has decreased **300 g {10.6 oz}** from the amount in Step 13.

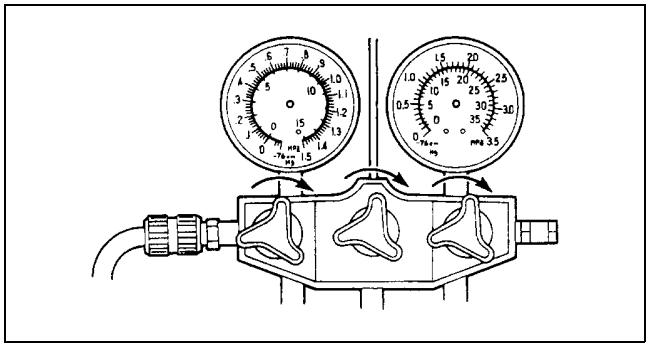


WLU710WAC

19. Close the high-pressure side valve of the manifold gauge.

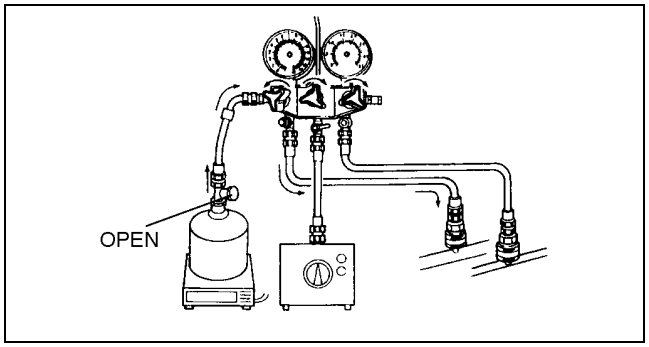
Warning

- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

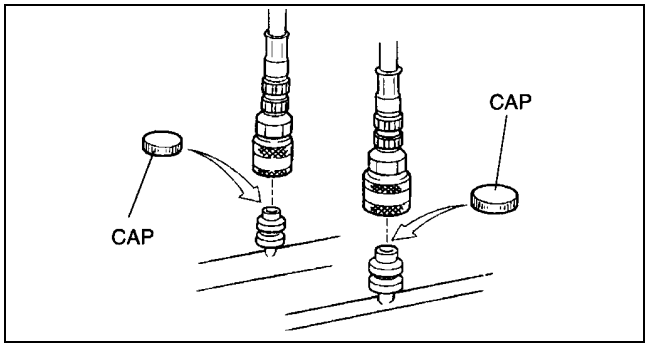

WLU710WAD

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 **600 g {21.2 oz}** from the amount in Step 13.
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. Inspect for leakage using a gas leak tester.
    - If there is no leakage, go to Step 26.
    - If leakage is found at a loose joint, tighten the joint, go to the next step.
25. Inspect for leakage again.
    - If there is no leakage after tightening the joint, and go to the next step.
    - If there is still leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from Step 7.
26. Disconnect the quick couplers from the charging valves.
27. Install the caps to the charging valves.



WLU710WAE

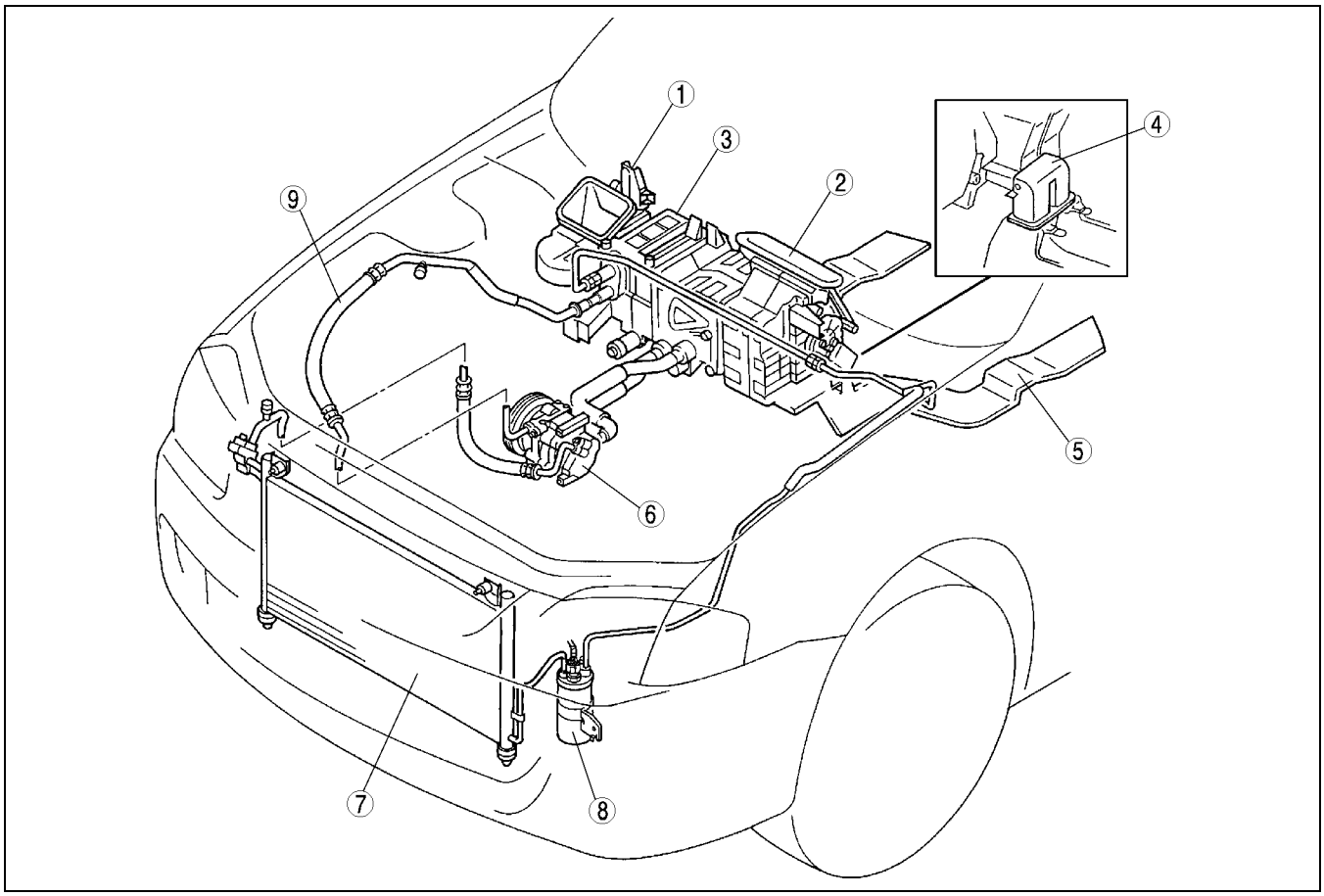


WLU710WAF

07–11 BASIC SYSTEM

BASIC SYSTEM LOCATION INDEX

A3U071101040W01



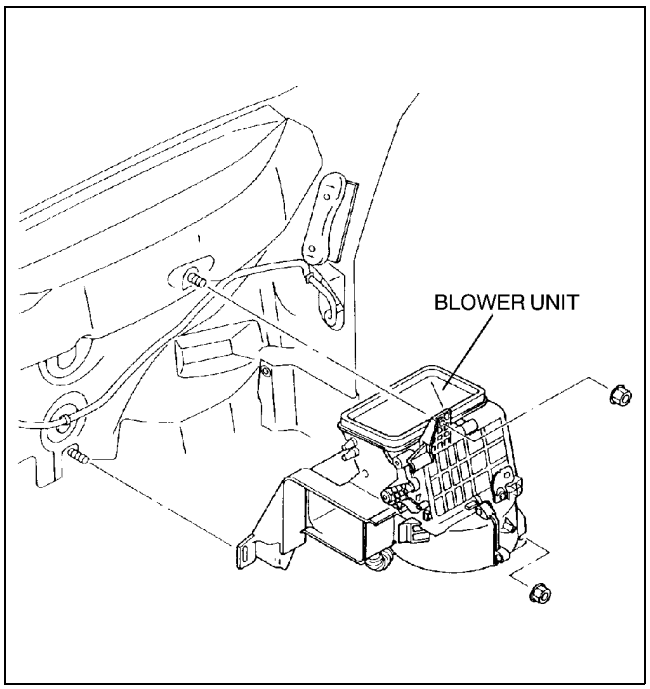
Z3U0711W001

1	Blower unit (See 07–11–3 BLOWER UNIT REMOVAL/ INSTALLATION) (See 07–11–3 BLOWER UNIT DISASSEMBLY/ ASSEMBLY)
2	Heater unit (See 07–11–7 HEATER UNIT REMOVAL/ INSTALLATION) (See 07–11–9 HEATER UNIT DISASSEMBLY/ ASSEMBLY)
3	Cooling unit (See 07–11–3 COOLING UNIT REMOVAL/ INSTALLATION) (See 07–11–4 COOLING UNIT DISASSEMBLY/ ASSEMBLY)
4	Rear duct (See 07–11–11 REAR DUCT REMOVAL/ INSTALLATION)
5	Rear heat duct (See 07–11–11 REAR HEAT DUCT REMOVAL/ INSTALLATION)
6	A/C compressor (See 07–11–11 A/C COMPRESSOR REMOVAL/ INSTALLATION)
7	Condenser (See 07–11–12 CONDENSER REMOVAL/ INSTALLATION) (See 07–11–13 CONDENSER INSPECTION)
8	Receiver/drier (See 07–11–13 RECEIVER/DRIER REMOVAL/ INSTALLATION)
9	Refrigerant lines (See 07–11–14 REFRIGERANT LINES REMOVAL/ INSTALLATION)

BLOWER UNIT REMOVAL/INSTALLATION

A3U071161140W01

1. Disconnect the negative battery cable.
2. Remove the dashboard. (See 09–17–1 DASHBOARD REMOVAL/INSTALLATION.)
3. Remove the cooling unit. (See 07–11–3 COOLING UNIT REMOVAL/INSTALLATION.)
4. Remove the blower unit.
5. Install in the reverse order of removal.



Z3U0711W002

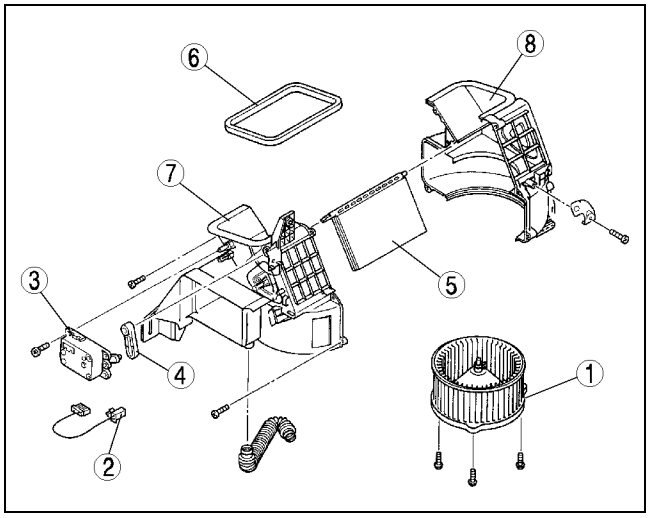
BLOWER UNIT DISASSEMBLY/ASSEMBLY

A3U071161140W02

1. Disassemble in the order indicated in the table.

1	Blower motor
2	Blower harness
3	Air intake actuator
4	Air intake crank
5	Air intake door
6	Polyurethane protector
7	Blower case (1)
8	Blower case (2)

2. Assemble in the reverse order of disassembly.



Z3U0711W003

COOLING UNIT REMOVAL/INSTALLATION

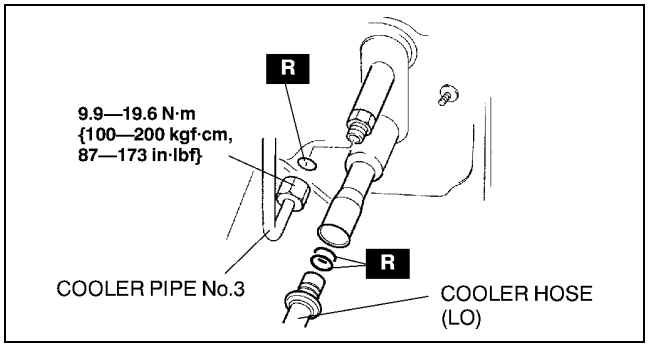
A3U071161520W01

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07–10–3 REFRIGERANT CHARGING.)
3. Remove the passenger-side lower panel.
4. Remove the glove compartment and glove compartment cover.

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 cooler pipe No.3 and cooler hose (LO). (See 07–11–15 Refrigerant Lines Removal Note.) (See 07–11–16 Refrigerant Lines Installation Note.)

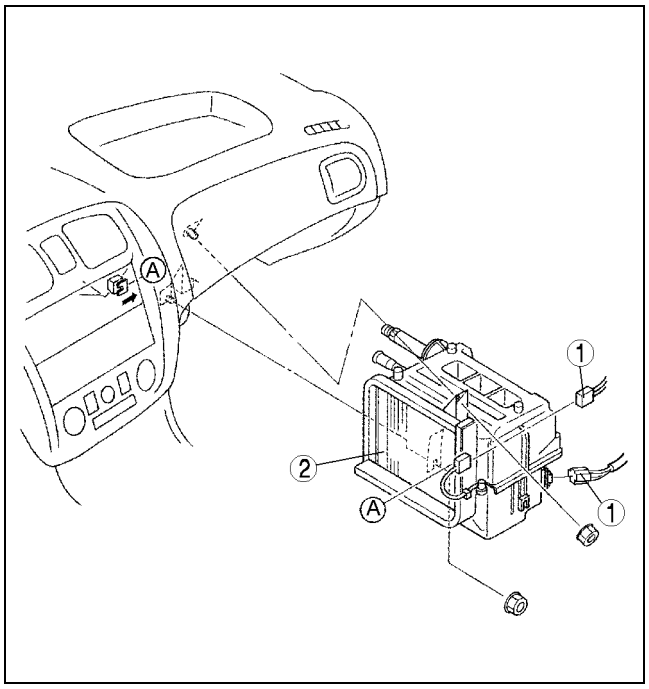


Z3U0711W004

6. Remove in the order indicated in the table. Do not allow compressor oil to spill.

1	Connector
2	Cooling unit (See 07–11–4 Cooling Unit Installation Note)

7. Install in the reverse order of removal.
8. Perform the refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



Z3U0711W005

Cooling Unit Installation Note

1. When installing a new cooling unit (evaporator), add a supplemental amount of ATMOS GU10 compressor oil into the refrigeration cycle.

   Supplemental amount (approximate quantity)
   30 ml {30 cc, 1.0 fl oz}

COOLING UNIT DISASSEMBLY/ASSEMBLY

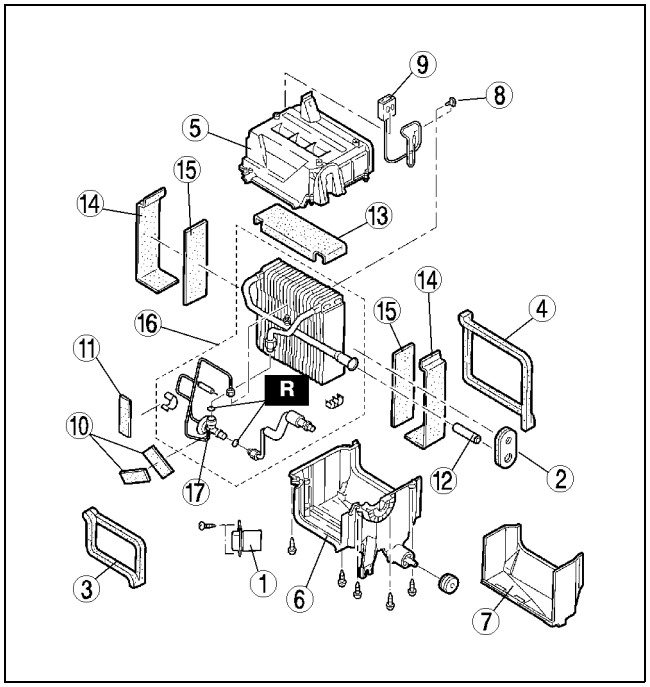
A3U071161520W02

1. Disassemble in the order indicated in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

1	Resistor
2	Polyurethane foam
3	Polyurethane protector (1)
4	Polyurethane protector (2)
5	Cooler case (1)
6	Cooler case (2)
7	Polyethylene foam (See 07–11–7 Polyethylene Foam Assembly Note)
8	Sensor clamp (See 07–11–7 Sensor Clamp Assembly Note)
9	A/C amplifier (See 07–11–6 A/C Amplifier Assembly Note)
10	Insulator (See 07–11–6 Insulator Assembly Note)
11	Adhesive sponge rubber (See 07–11–6 Adhesive Sponge Rubber Assembly Note)
12	Sponge rubber
13	Polyurethane protector (3)
14	Polyethylene protector
15	Polyurethane protector (4)
16	Evaporator (See 07–11–6 Evaporator Assembly Note)
17	Expansion valve (See 07–11–5 Expansion Valve Assembly Note)

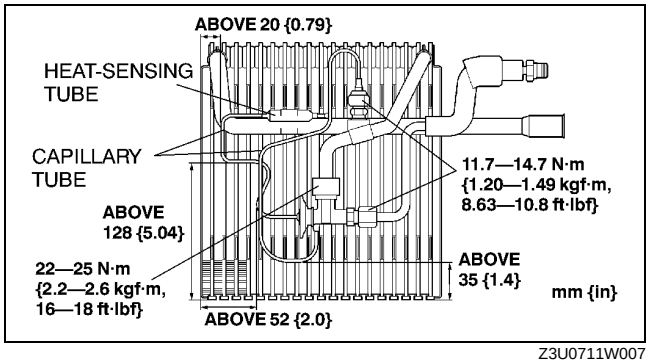


Z3U0711W006

2. Assemble in the reverse order of disassembly.

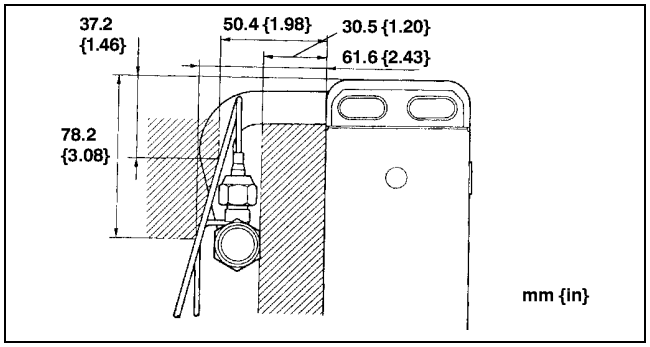
Expansion Valve Assembly Note

1. Apply compressor oil to the O-rings and connect the joint.
2. Tighten the nut of the joint by hand.
3. Tighten the joint with the specified torque with a spanner and torque wrench.
4. Assemble the heat-sensing tube as shown in the figure.
5. Route the capillary tube as shown in the figure.



Z3U0711W007

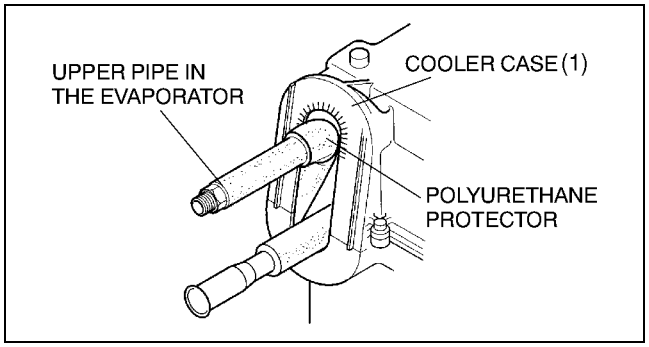
6. Verify that the capillary tube is not in the shaded zone



Z3U0711W008

Evaporator Assembly Note

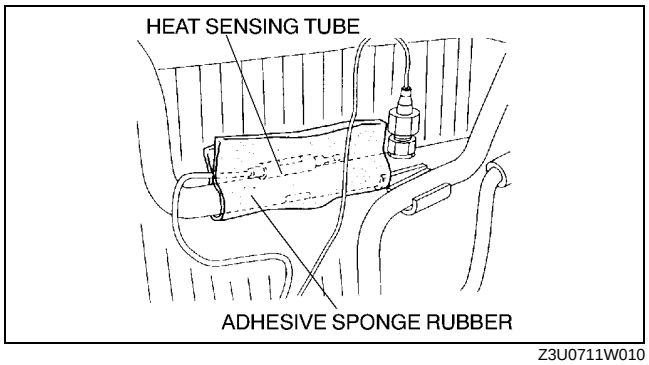
1. Verify that the dent caused by contact with the polyuretane protector and cooler case (1) in the shaded zone is **3 mm {0.12 in} or less**.



A3U0711W002

Adhesive Sponge Rubber Assembly Note

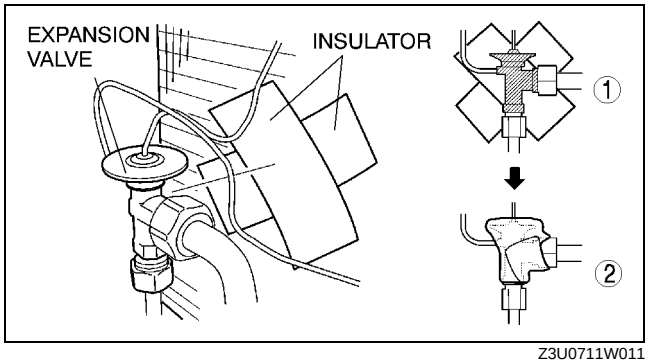
1. Attach the adhesive sponge rubber so that the heat sensing tube is hidden.



Z3U0711W010

Insulator Assembly Note

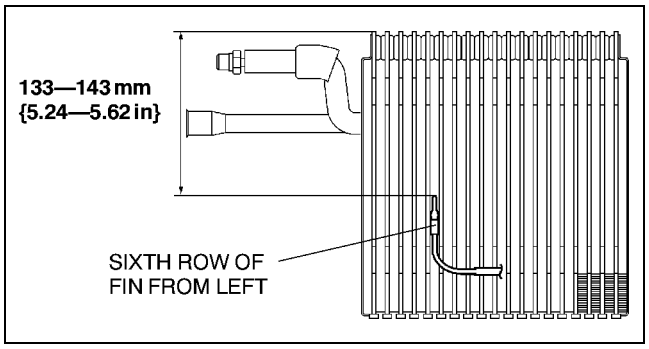
1. Make the two insulators cross.
2. Attach the insulator so that the shaded zone of expansion valve is hidden.



Z3U0711W011

A/C Amplifier Assembly Note

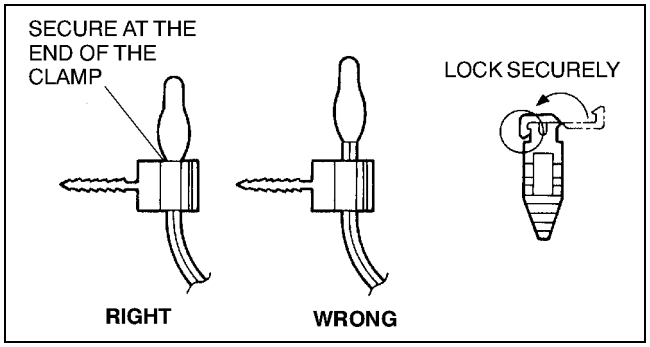
1. Assemble the evaporator temperature sensor as shown in the figure.



Z3U0711W012

Sensor Clamp Assembly Note

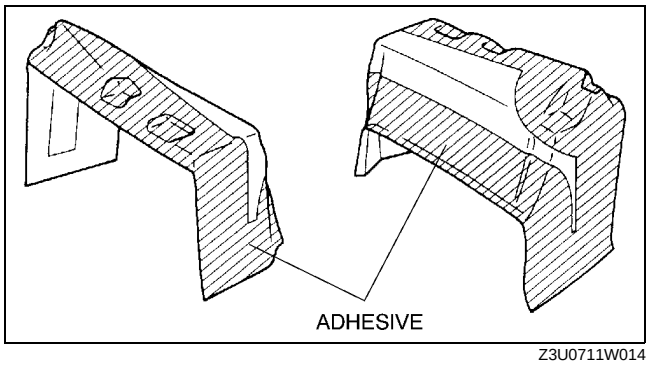
1. Assemble the sensor clamp as shown in the figure.



Z3U0711W013

Polyethylene Foam Assembly Note

1. Apply the adhesive to a range of **50 mm {1.97 in}** from the edge of polyethylene foam, and around the drain outlet. Apply the polyethylene foam to the cooler case (2).



Z3U0711W014

EVAPORATOR INSPECTION

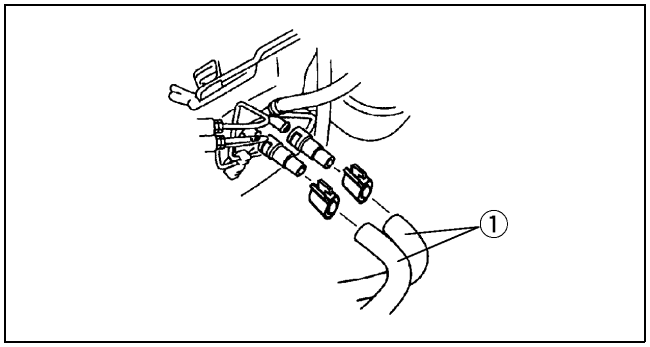
A3U071161810W01

1. Remove the cooling unit. (See 07–11–3 COOLING UNIT REMOVAL/INSTALLATION.)
2. Remove the evaporator from the cooling unit.
3. Inspect for cracks, damage, and oil leakage.
   - If any problems are found, replace the evaporator.
4. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.

HEATER UNIT REMOVAL/INSTALLATION

A3U071161130W01

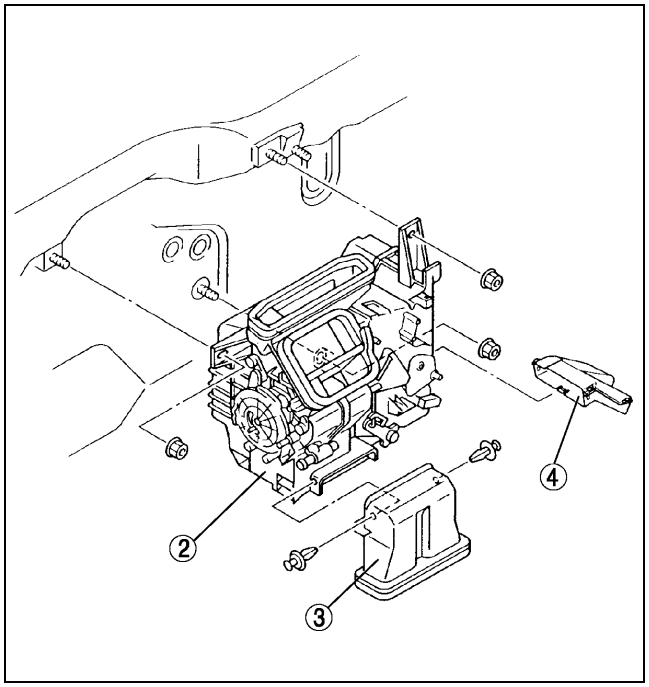
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the dashboard. (See 09–17–1 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove the cooling unit. (See 07–11–3 COOLING UNIT REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.



X3U711WAB

1	Heater hose
2	Heater unit
3	Rear duct
4	Heat duct

6. Install in the reverse order of removal.

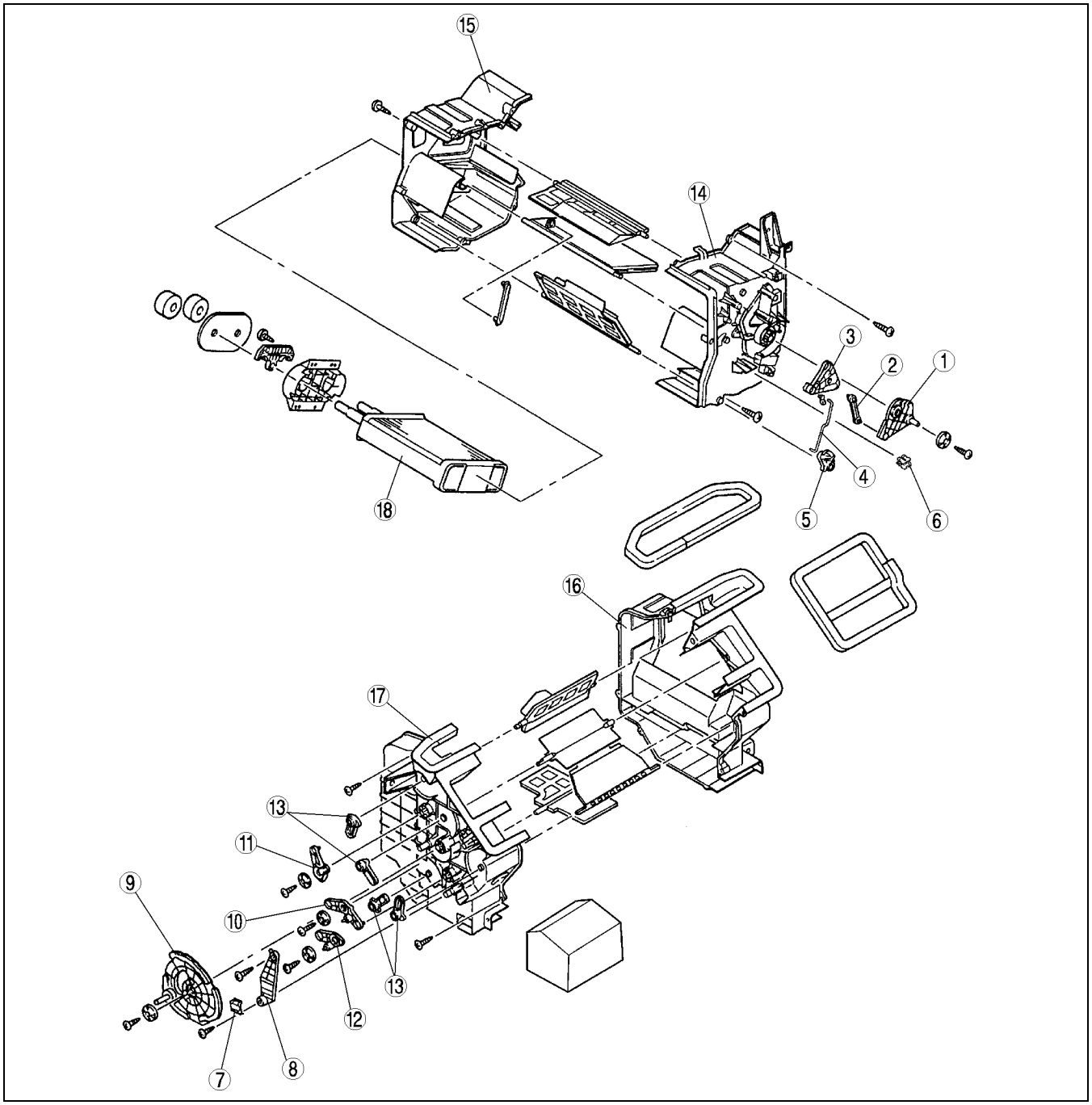


X3U711WAC

HEATER UNIT DISASSEMBLY/ASSEMBLY

A3U071161130W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



A3U0711W003

1	Air mix link
2	Air mix rod (2)
3	Air mix crank (1)
4	Air mix rod (1)
5	Air mix crank (2)
6	Wire clamp
7	Wire clamp
8	Bracket
9	Airflow mode main link (See 07–11–10 Airflow Mode Main Link Installation Note)

10	Airflow mode sub link (1)
11	Airflow mode sub link (2)
12	Airflow mode sub link (3)
13	Airflow mode crank
14	Heater case (1)
15	Heater case (2)
16	Heater case (3)
17	Heater case (4)
18	Heater core

HEATER CORE INSPECTION

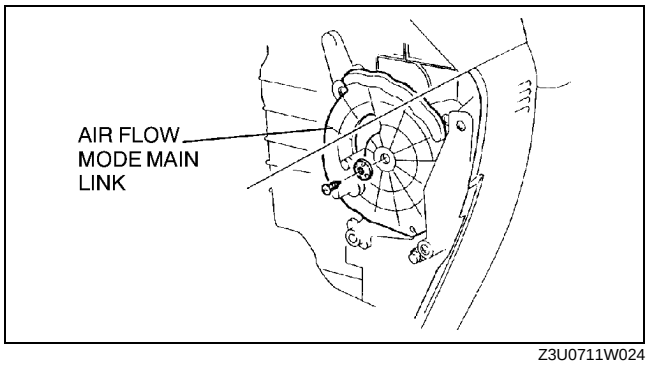
A3U071161910W01

1. Remove the heater unit. (See 07–11–7 HEATER UNIT REMOVAL/INSTALLATION.)
2. Remove the heater core from the heater unit.
3. Inspect for cracks, damage, and coolant leakage.
   - If any problems are found, replace the heater core.
4. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.
5. Verify that the heater core inlet and outlet are not distorted or damaged. Repair with pliers if necessary.

AIRFLOW MODE MAIN LINK REMOVAL/INSTALLATION

A3U071161030W01

1. Disconnect the airflow mode wire from the airflow mode main link.
2. Remove in the airflow mode main link. (See 07–11–10 Airflow Mode Main Link Installation Note)
3. Install in the reverse order of removal.
4. Adjust the airflow mode wire. (See 07–40–11 CLIMATE CONTROL UNIT WIRE ADJUSTMENT.)



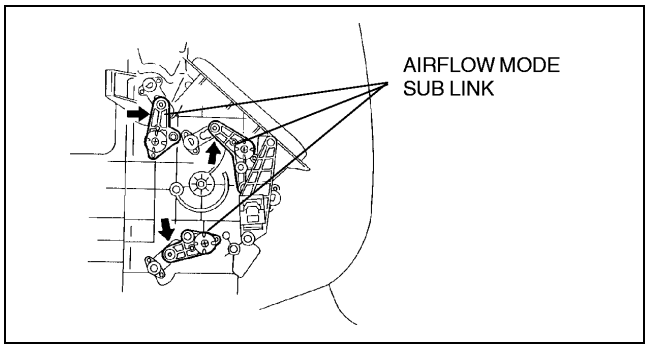
Z3U0711W024

Airflow Mode Main Link Installation Note

Caution

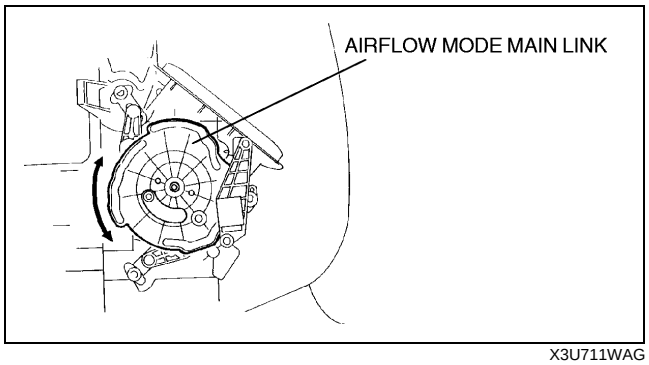
- **If any grease other than the specified grease is applied to the links, abnormal noise will occur or the links will not properly operate. Therefore, do not apply any grease to the links.**

1. Push and hold each airflow mode sub link in the direction shown by the arrow.



X3U711WAF

2. Set the airflow mode main link to the heater unit as shown in the figure.
3. Press the airflow mode main link lightly and rotate it in the direction shown by the arrow, then set the projections of each airflow mode sub link into the grooves of the airflow mode main link.
4. Rotate airflow mode main link and verify that each mode is accessed properly.

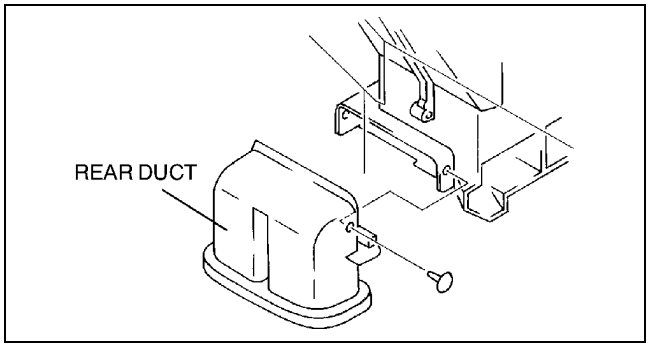


X3U711WAG

REAR DUCT REMOVAL/INSTALLATION

A3U071161271W01

1. Remove the side wall.
2. Remove in the rear duct.
3. Install in the reverse order of removal.



Z3U0711W025

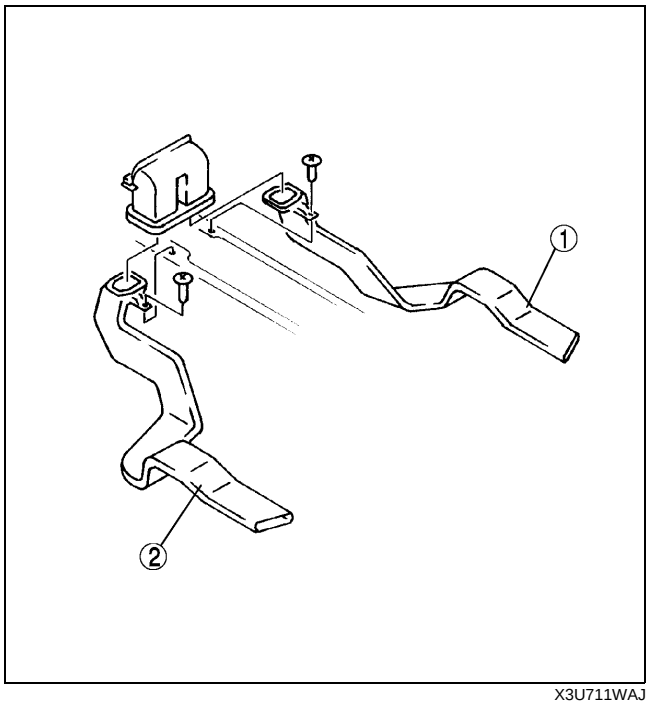
REAR HEAT DUCT REMOVAL/INSTALLATION

A3U071161273W01

1. Turn the floor covering over. (See 09–17–17 FLOOR COVERING REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	Rear heat duct (RH)
2	Rear heat duct (LH)

3. Install in the reverse order of removal.



X3U711WAJ

A/C COMPRESSOR REMOVAL/INSTALLATION

A3U071161450W01

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07–10–3 REFRIGERANT RECOVERY.) (See 07–10–3 REFRIGERANT CHARGING.)
3. Remove the splash shield (RH) and fresh-air duct.
4. Loosen the mounting bolts, nuts, and the adjusting lock bolt of the power steering oil pump.
5. Loosen the drive belt (P/S + A/C) and remove it. (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)

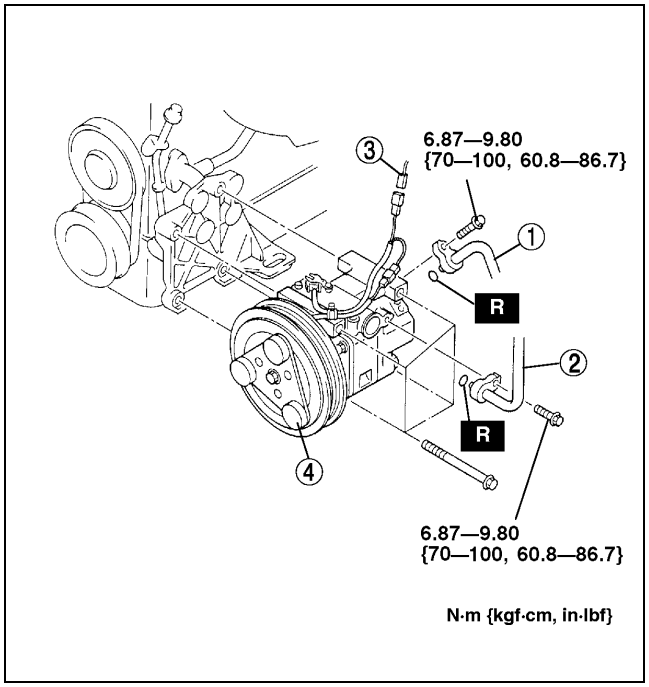
Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

6. Remove in the order indicated in the table. Do not allow compressor oil to spill.

1	Cooler hose (HI) (See 07–11–16 Refrigerant Lines Installation Note)
2	Cooler hose (LO) (See 07–11–16 Refrigerant Lines Installation Note)
3	Connector
4	A/C compressor (See 07–11–12 A/C Compressor Installation Note)

7. Install in the reverse order of removal.
8. Adjust the drive belt (P/S + A/C). (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS].)
9. Perform the refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



Y3U711WA1

A/C Compressor Installation Note

1. Remove the following amount of compressor oil from the new A/C compressor when replacing the A/C compressor.

   Compressor oil to be removed (approximate quantity)
   150 ml {150 cc, 5.07 fl oz} - [compressor oil from old A/C compressor + 15 ml {15 cc, 0.5 fl oz}]

CONDENSER REMOVAL/INSTALLATION

A3U071161480W01

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07–10–3 REFRIGERANT CHARGING.)
3. Pull up the coolant reservoir.
4. Remove the fresh-air duct, radiator bracket, air cleaner, resonance chamber, and mass airflow sensor connector.

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.**

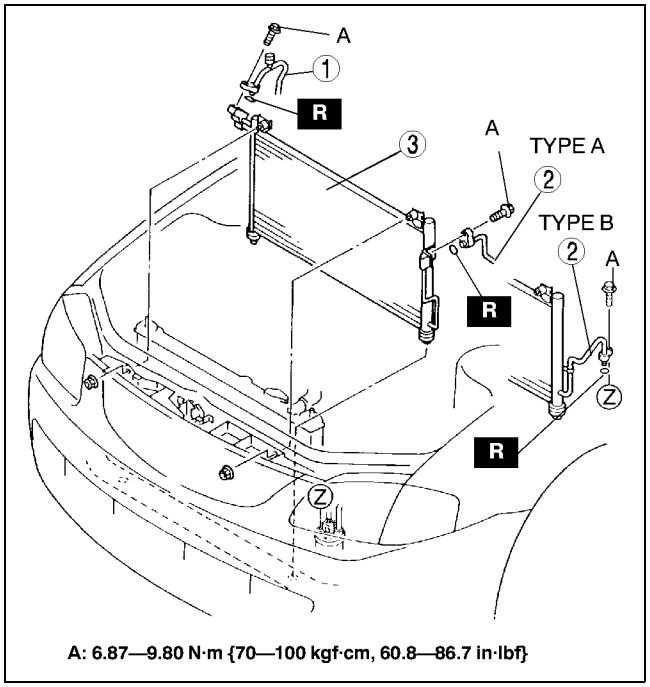
Note

- Two kinds of condensers are used:
  — TYPE A (condenser without pipe)
  — TYPE B (condenser with pipe)

5. Remove in the order indicated in the table. Do not allow compressor oil to spill.

1	Cooler hose (HI) (See 07–11–16 Refrigerant Lines Installation Note)
2	Cooler pipe No.1 (type A) or outlet pipe of condenser (type B) (See 07–11–16 Refrigerant Lines Installation Note)
3	Condenser (See 07–11–13 Condenser Installation Note)

6. Install in the reverse order of removal.
7. Perform the refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



Z3U0711W016

Condenser Installation Note

1. When installing a new condenser, add a supplemental amount of ATMOS GU10 compressor oil into the refrigeration cycle.

   Supplemental amount (approximate quantity)
   30 ml {30 cc, 1.0 fl oz}

CONDENSER INSPECTION

A3U071161480W02

1. Inspect for cracks, damage, and oil leakage.
   - If any are found, replace the condenser.
2. Inspect for fins clogged by dust.
   - If any are clogged, remove the dust from the fins.
3. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.

RECEIVER/DRIER REMOVAL/INSTALLATION

A3U071161501W01

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07–10–3 REFRIGERANT RECOVERY.) (See 07–10–3 REFRIGERANT CHARGING.)
3. Pull up the coolant reservoir.
4. Remove the fresh-air duct, air cleaner, and resonance chamber.

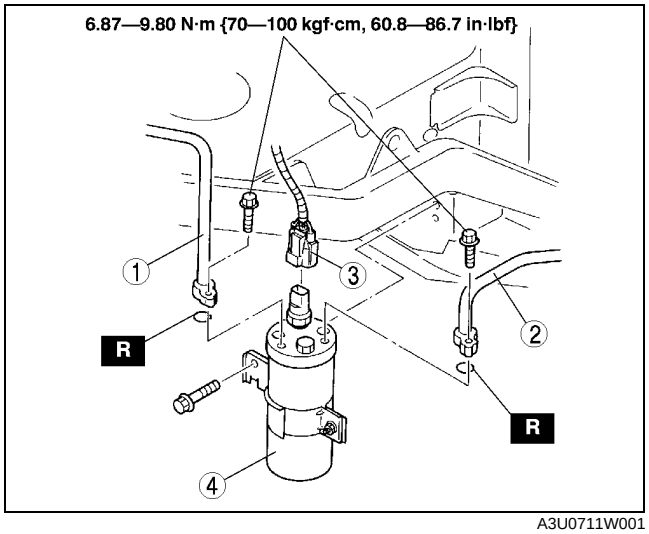
Caution

- **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. Remove in the order indicated in the table. Do not allow compressor oil to spill.

1	Cooler pipe No.2 (See 07–11–16 Refrigerant Lines Installation Note)
2	Cooler pipe No.1 (type A) or outlet pipe of condenser (type B) (See 07–11–16 Refrigerant Lines Installation Note)
3	Connector
4	Receiver/drier (See 07–11–14 Receiver/drier Installation Note)

6. Install in the reverse order of removal.
7. Perform the refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



A3U0711W001

Receiver/drier Installation Note

1. When installing a new receiver/drier, add a supplemental amount of ATMOS GU10 compressor oil into the refrigeration cycle.

   Supplemental amount (approximate quantity)
   10 ml {10 cc, 0.3 fl oz}

REFRIGERANT LINES REMOVAL/INSTALLATION

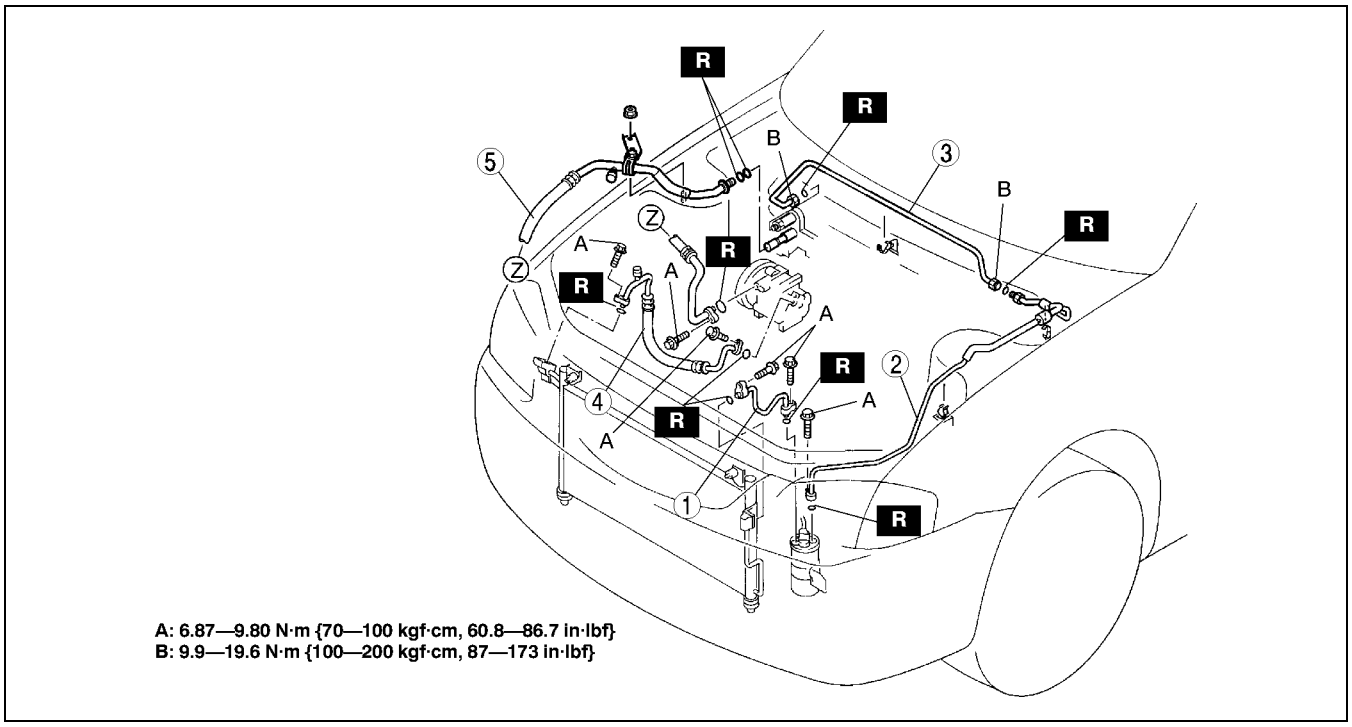
A3U071161460W01

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07–10–3 REFRIGERANT RECOVERY.) (See 07–10–3 REFRIGERANT CHARGING.)
3. Pull up the coolant reservoir.
4. Remove the fresh-air duct, radiator bracket, air cleaner, and resonance chamber.

   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. Remove in the order indicated in the table. Do not allow compressor oil to spill.
6. Install in the reverse order of removal.

7. Perform the refrigerant system performance test. (See 07–10–2 REFRIGERANT SYSTEM PERFORMANCE TEST.)

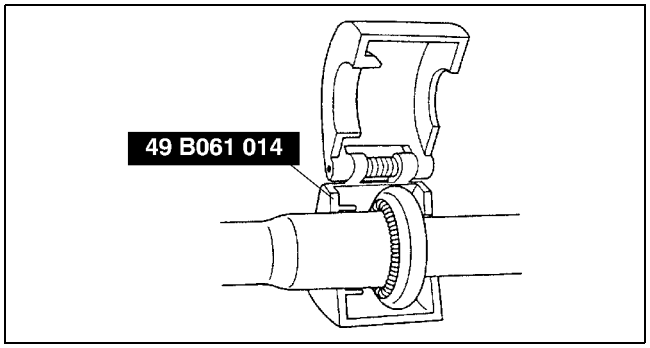


Z3U0711W018

1	Cooler pipe No.1 (type A only) (See 07–11–16 Refrigerant Lines Installation Note)
2	Cooler pipe No.2 (See 07–11–15 Refrigerant Lines Removal Note) (See 07–11–16 Refrigerant Lines Installation Note)
3	Cooler pipe No.3 (See 07–11–15 Refrigerant Lines Removal Note) (See 07–11–16 Refrigerant Lines Installation Note)
4	Cooler hose (HI) (See 07–11–16 Refrigerant Lines Installation Note)
5	Cooler hose (LO) (See 07–11–15 Refrigerant Lines Removal Note) (See 07–11–16 Refrigerant Lines Installation Note)

Refrigerant Lines Removal Note
Nut joint type
1. Loosen the nut using 2 spanners, then remove the cooler pipe or hose.

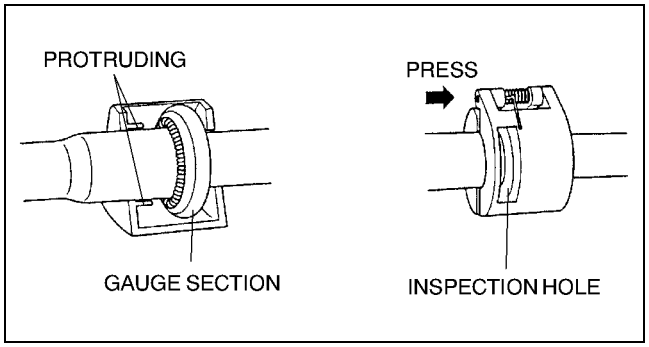
Spring-lock coupling type
1. Set the **SST**.



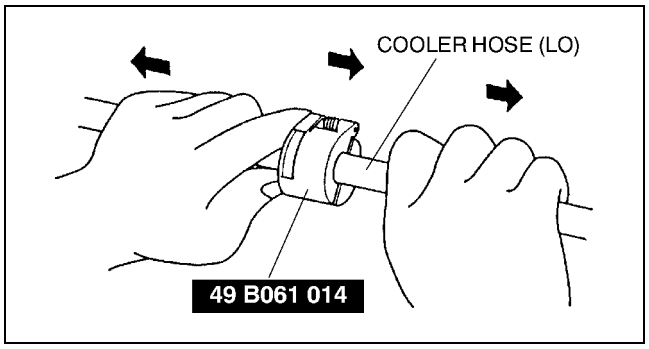
Z3U0711W019

2. While looking through the inspection hole of the **SST**, insert the protruding part of the **SST** until it makes contact with the gauge section.
3. Use the **SST** to disconnect the cooler hose (LO) from cooling unit by pulling the cooler hose (LO) side.

Note
- The cooler hose (LO) can be disconnected easily from cooling unit by pulling from the cooler hose (LO) while maintaining the pressure of the protruding part of the **SST**.



Z3U0711W020



Z3U0711W021

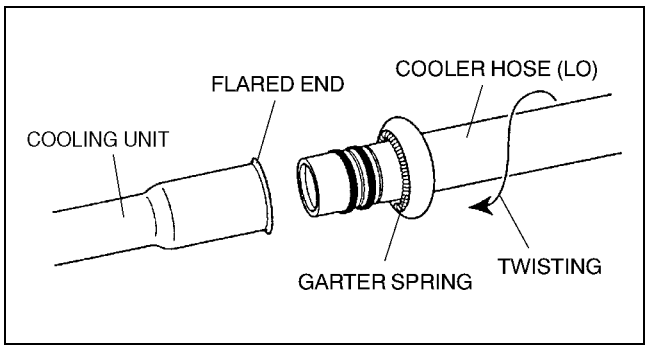
Refrigerant Lines Installation Note
1. When installing a new cooler pipe or hose, add a supplemental amount of ATMOS GU10 compressor oil into the refrigeration cycle.

   Supplemental amount (approximate quantity)
   5 ml {5 cc, 0.2 fl oz}

2. Apply compressor oil to the O-rings and connect the joints.
3. Tighten the joints.

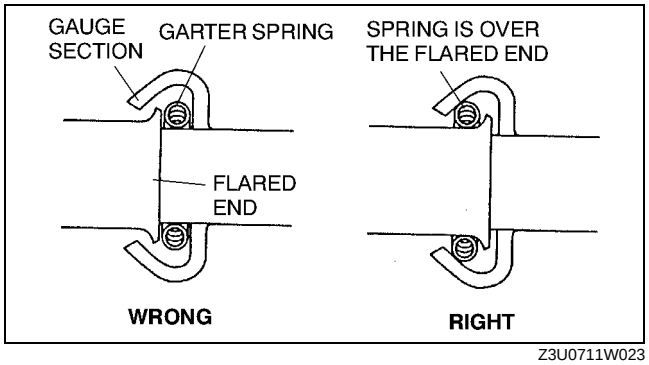
Nut or block joint type
1. Tighten the nut or bolt of the joint by hand.
2. Tighten the joint to the specified torque wrench.

Spring-lock coupling type
1. Connect the cooler hose (LO) by twisting it onto cooling unit until the garter spring at the cooler hose (LO) is over the flared end of cooling unit.



Z3U0711W022

Note
- When the cooler hose (LO) is replaced, the indicator ring comes out after connecting to indicate that it is locked.

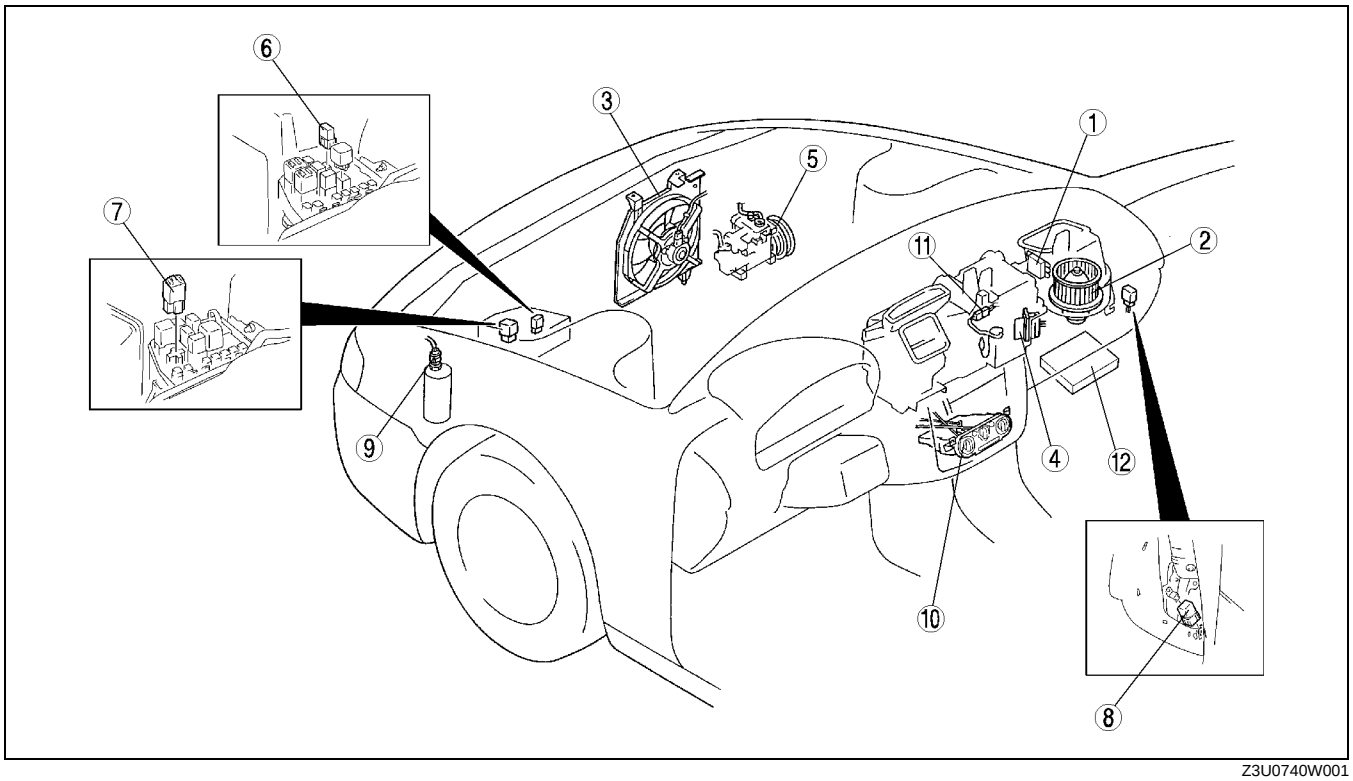


Z3U0711W023

07–40 CONTROL SYSTEM

CONTROL SYSTEM LOCATION INDEX

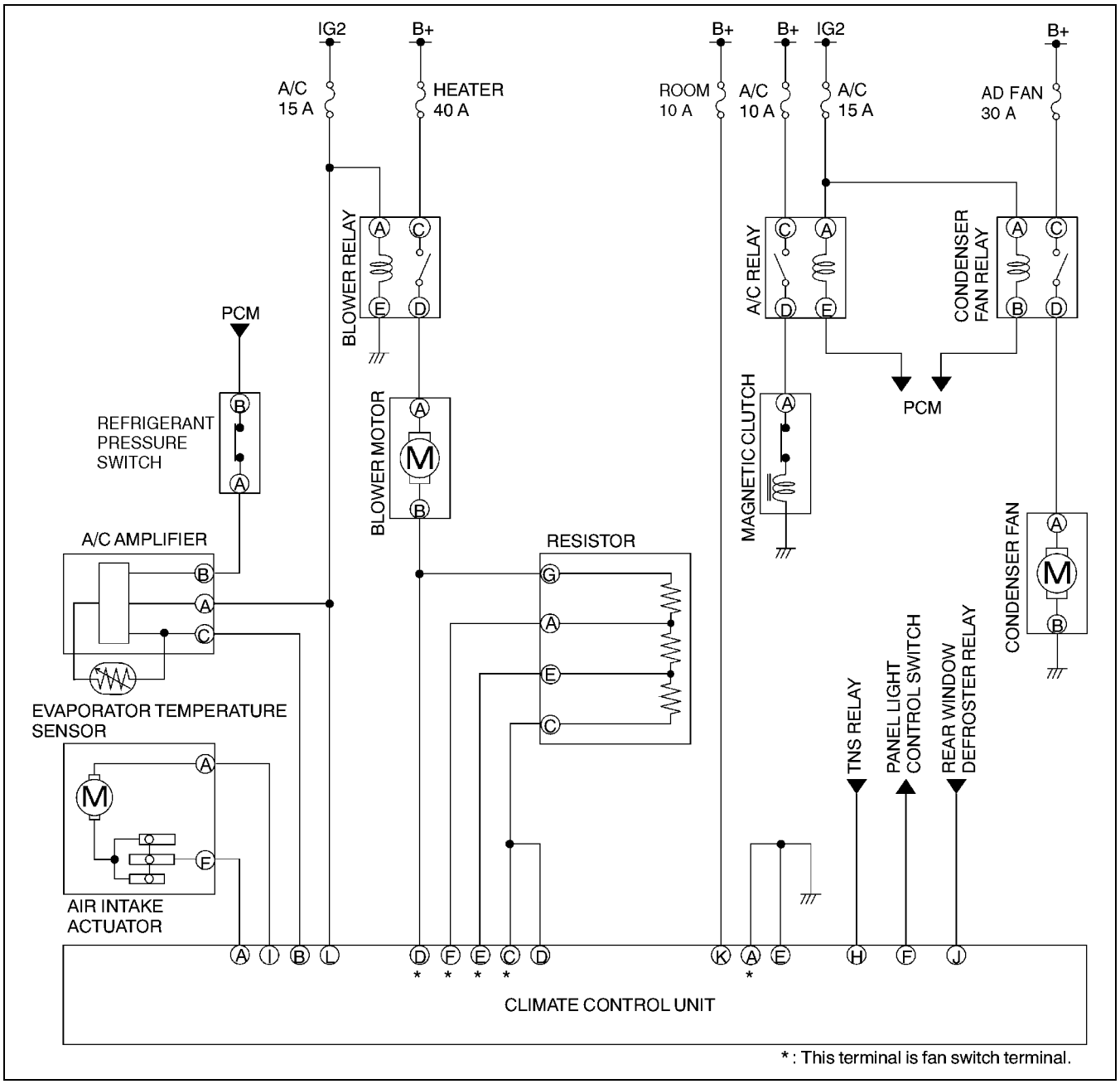
A3U074001070W01



Z3U0740W001

1	Air intake actuator (See 07–40–3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION) (See 07–40–4 AIR INTAKE ACTUATOR INSPECTION)
2	Blower motor (See 07–40–4 BLOWER MOTOR REMOVAL/INSTALLATION) (See 07–40–5 BLOWER MOTOR INSPECTION)
3	Condenser fan (See 07–40–5 CONDENSER FAN REMOVAL/INSTALLATION) (See 07–40–5 CONDENSER FAN INSPECTION)
4	Resistor (See 07–40–6 RESISTOR REMOVAL/INSTALLATION) (See 07–40–6 RESISTOR INSPECTION)
5	Magnetic clutch (See 07–40–6 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY) (See 07–40–7 MAGNETIC CLUTCH ADJUSTMENT) (See 07–40–8 MAGNETIC CLUTCH INSPECTION)
6	A/C relay (See 09–21–5 RELAY INSPECTION)
7	Condenser fan relay (See 09–21–5 RELAY INSPECTION)
8	Blower relay (See 09–21–5 RELAY INSPECTION)
9	Refrigerant pressure switch (See 07–40–9 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION) (See 07–40–9 REFRIGERANT PRESSURE SWITCH INSPECTION)
10	Climate control unit (See 07–40–9 CLIMATE CONTROL UNIT REMOVAL) (See 07–40–10 CLIMATE CONTROL UNIT INSTALLATION) (See 07–40–10 CLIMATE CONTROL UNIT DISASSEMBLY/ASSEMBLY) (See 07–40–11 CLIMATE CONTROL UNIT INSPECTION)
11	A/C amplifier (See 07–40–13 A/C AMPLIFIER INSPECTION)
12	PCM (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS]) (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM]) (See 01–40B–7 PCM INSPECTION [FS]) (See 01–40A–7 PCM INSPECTION [ZM])

System Wiring Diagram



Z3U0740W002

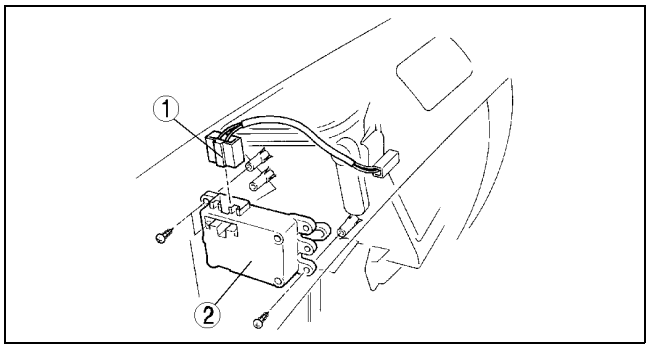
AIR INTAKE ACTUATOR REMOVAL/INSTALLATION

A3U074061060W01

1. Disconnect the negative battery cable.
2. Remove the cooling unit. (See 07–11–3 COOLING UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Air intake actuator

4. Install in the reverse order of removal.



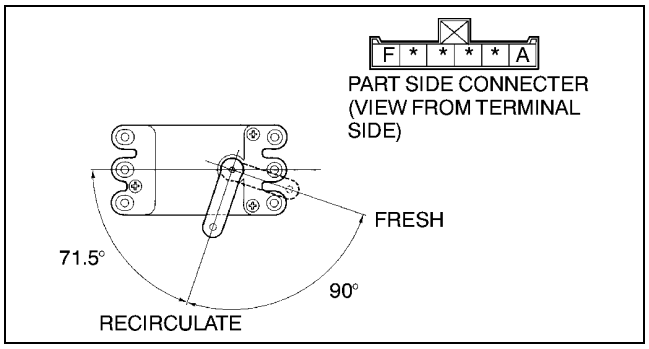
Z3U0740W003

AIR INTAKE ACTUATOR INSPECTION

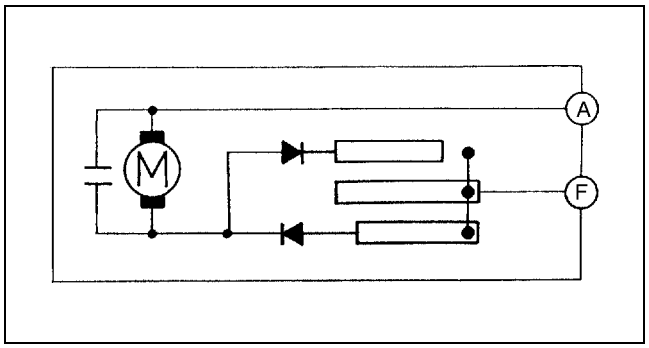
A3U074061060W02

1. Remove the air intake actuator. (See 07–40–3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION.)
2. Connect B+ to terminal A or F and ground to terminal F or A of the air intake actuator.
3. Verify that the air intake actuator operates as shown below.

Connection		Movement
B+	GND	
A	F	FRESH → RECIRCULATE
F	A	RECIRCULATE → FRESH



Z3U0740W004



Z3U0740W005

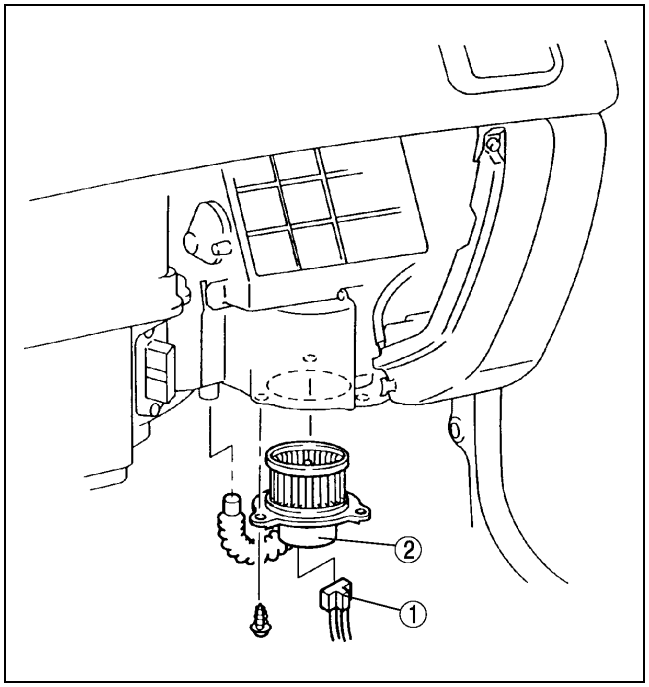
BLOWER MOTOR REMOVAL/INSTALLATION

A3U074061020W01

1. Disconnect the negative battery cable.
2. Remove the glove compartment.
3. Remove in the order indicated in the table.

1	Connector
2	Blower motor

4. Install in the reverse order of removal.

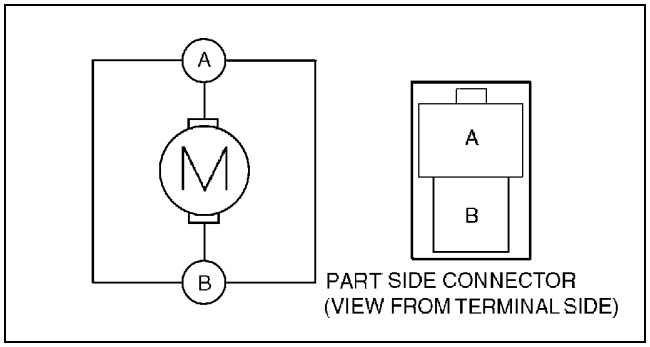


X3U740WA1

BLOWER MOTOR INSPECTION

A3U074061020W02

1. Disconnect the blower motor connector.
2. Connect B+ to terminal A and ground to terminal B of the blower motor and verify its operation.
   - If not as specified, replace the blower motor.



Y3U740WA0

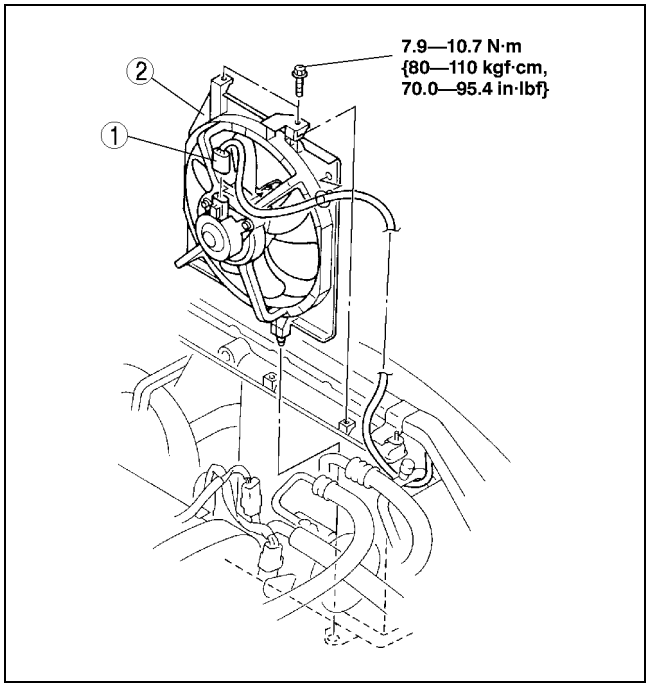
CONDENSER FAN REMOVAL/INSTALLATION

A3U074061710W01

1. Disconnect the negative battery cable.
2. Remove the fresh-air duct.
3. Remove in the order indicated in the table.

1	Connector
2	Condenser fan

4. Install in the reverse order of removal.

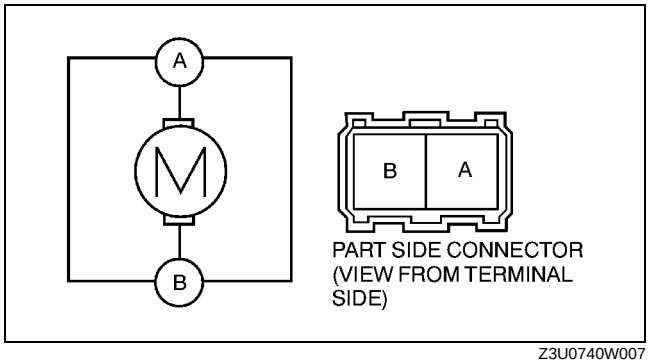


Z3U0740W006

CONDENSER FAN INSPECTION

A3U074061710W02

1. Disconnect the condenser fan connector.
2. Connect B+ to terminal A and ground to terminal B of the condenser fan and verify its operation.
   - If not as specified, replace the condenser fan.



Z3U0740W007

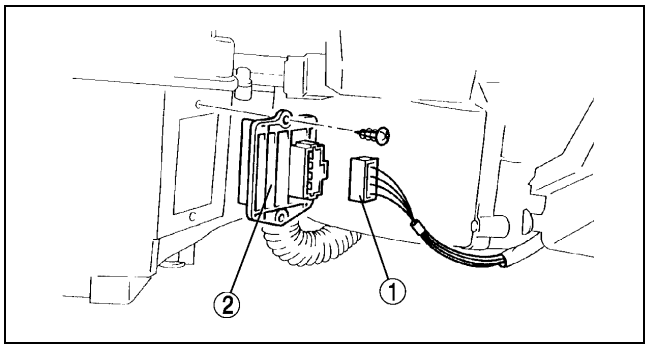
RESISTOR REMOVAL/INSTALLATION

A3U074061015W01

1. Disconnect the negative battery cable.
2. Remove the glove compartment.
3. Remove in the order indicated in the table.

1	Connector
2	Resistor

4. Install in the reverse order of removal.



X3U740WA5

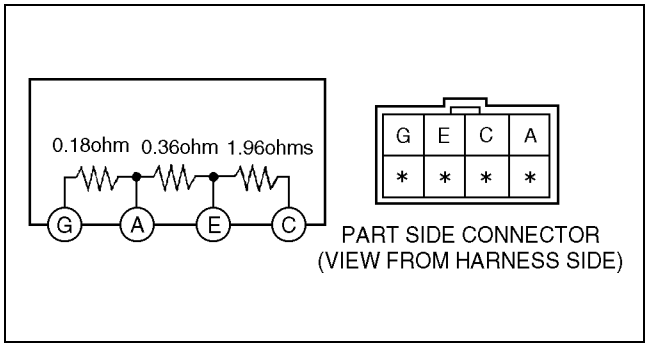
RESISTOR INSPECTION

A3U074061015W02

1. Remove the glove compartment.
2. Disconnect the resistor connector.
3. Verify that the resistance between the terminals of the resistor is as indicated in the table.

Terminal	Resistance (ohm)
G-A	0.17—0.19
G-E	0.51—0.58
G-C	2.35—2.70

- If not as specified, replace the resistor.



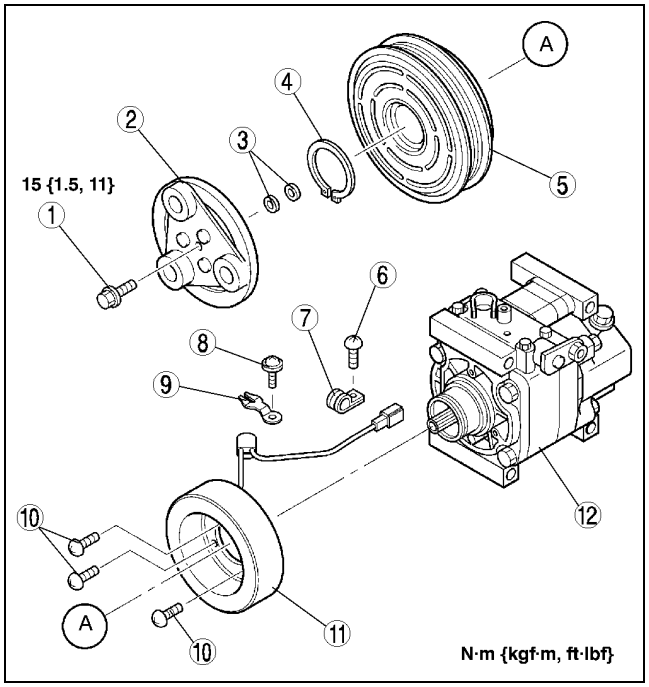
Z6E8540W002

MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY

A3U074061010W01

1. Disassemble in the order indicated in the table.

1	Bolt (See 07–40–7 Bolt Removal/Installation Note)
2	Pressure plate
3	Shim
4	Snap ring (See 07–40–7 Snap Ring Installation Note)
5	A/C compressor pulley
6	Screw (See 07–40–7 Screw Installation Note)
7	Clip
8	Screw (See 07–40–7 Screw Installation Note)
9	Clamp (See 07–40–7 Clamp Installation Note)
10	Screw (See 07–40–7 Screw Installation Note)
11	Stator and thermal protector (See 07–40–7 Stator and Thermal Protector Removal Note) (See 07–40–7 Stator and Thermal Protector Installation Note)
12	A/C compressor body

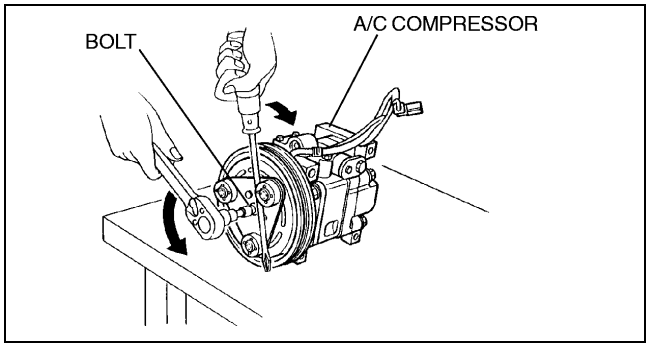


Z3U0740W009

2. Assemble in the reverse order of disassembly.
3. Adjust the magnetic clutch clearance. (See 07–40–7 MAGNETIC CLUTCH ADJUSTMENT.)

Bolt Removal/Installation Note

1. When removing or installing the bolt, hold the pressure plate in place as shown in the figure.
2. When installing a new A/C compressor body, replace the bolt.



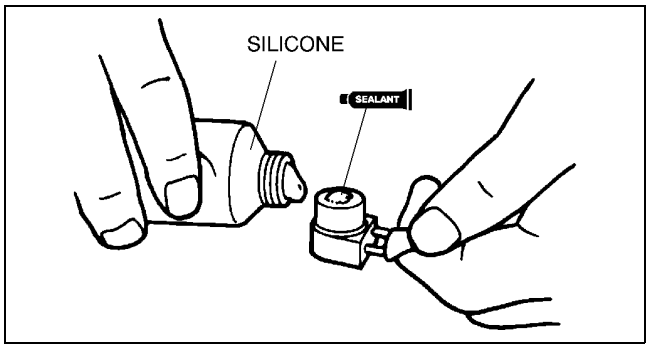
X3U740WA8

Stator and Thermal Protector Removal Note

1. After removing the thermal protector, completely remove the silicone adhering to the A/C compressor side.

Stator and Thermal Protector Installation Note

1. Apply **approximately 1 g {0.04 oz}** of silicone (Shin-Etsu Silicone KE-347W or similar)



Z3U0740W010

Screw Installation Note

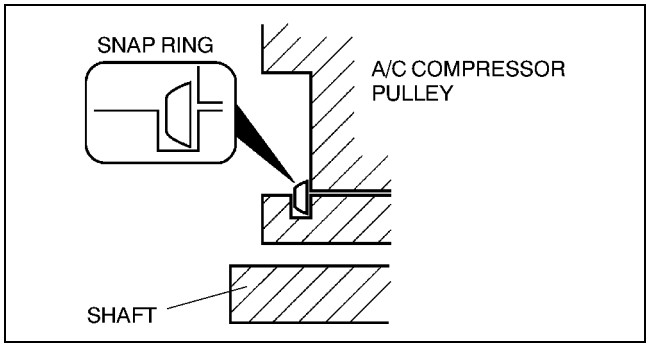
1. When installing a new stator and thermal protector, replace the screw.

Clamp Installation Note

1. When installing a new stator and thermal protector, replace the clamp.

Snap Ring Installation Note

1. When installing a new pressure plate, A/C compressor pulley, stator and thermal protector, or A/C compressor body, replace the snap ring.



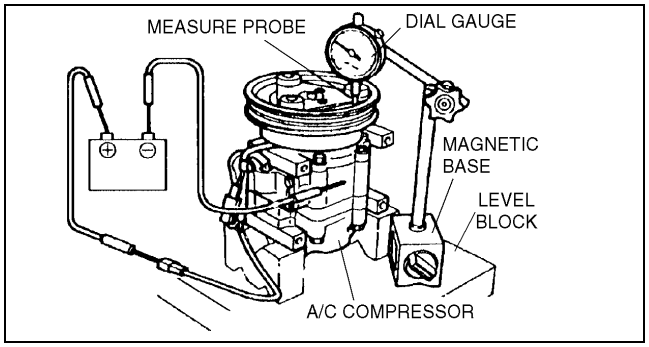
Z3U0740W011

MAGNETIC CLUTCH ADJUSTMENT

A3U074061010W02

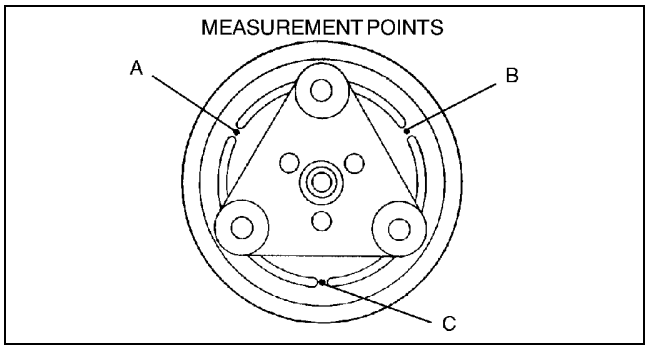
1. Set the A/C compressor on a level block.
2. Turn on the magnetic clutch by connecting the B+ to the magnetic clutch connector terminal and the ground to the A/C compressor body.

3. Fix a dial gauge on a magnetic base and set the measuring probe onto point A on the pressure plate surface.
4. Turn off the magnetic clutch by disconnecting the ground from the A/C compressor body, then measure the dial gauge readings.



X3U740WA9

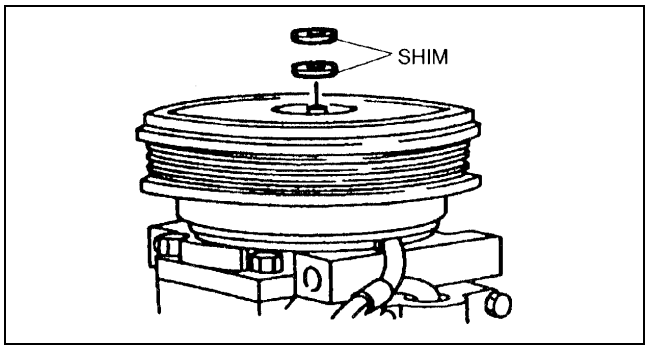
5. Measure the clearance for points B and C on the pressure plate surface by repeating the above Steps 2 through 4.



Z3U0740W020

6. Verify that the clearance is within the specification.
   - If not within the specification, remove the pressure plate and adjust the clearance by changing the shim (**0.2 mm {0.008 in}, 0.5 mm {0.02 in}**) or the number of shims. (See 07–40–6 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY.)

   Clearance
   0.4—0.6 mm {0.016—0.023 in}

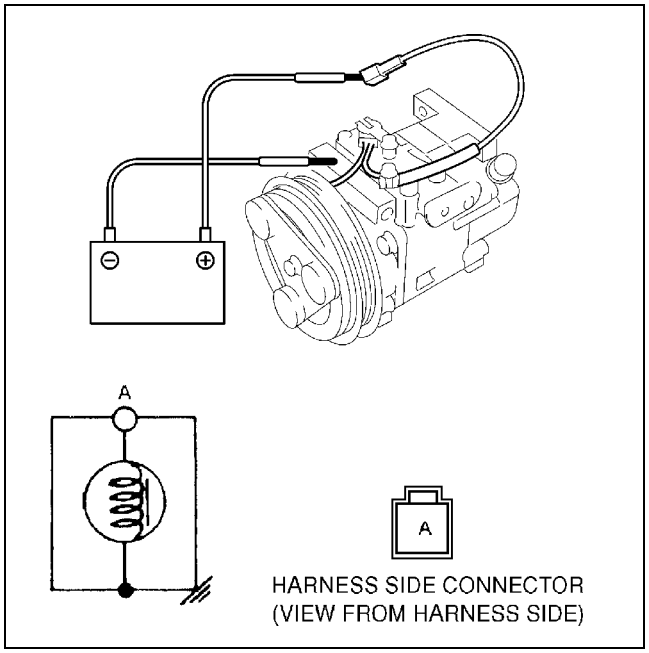


X3U740WAB

MAGNETIC CLUTCH INSPECTION

A3U074061010W03

1. Disconnect the magnetic clutch connector.
2. Connect B+ to terminal A of magnetic clutch and ground to the A/C compressor body.
3. Verify that the magnetic clutch operates.
   - If not as specified, replace the stator and thermal protector.

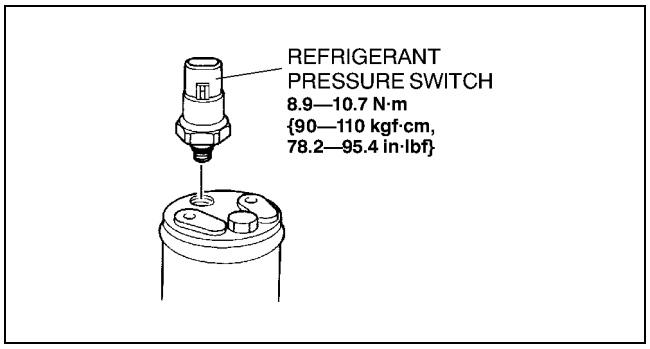


Z3U0740W012

REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION

A3U074061503W01

1. Disconnect the negative battery cable.
2. Remove the receiver/drier. (See 07–11–13 RECEIVER/DRIER REMOVAL/INSTALLATION.)
3. Remove the refrigerant pressure switch. (See 07–40–9 Refrigerant Pressure Switch Installation Note)
4. Install in the reverse order of removal.



A3U0740W001

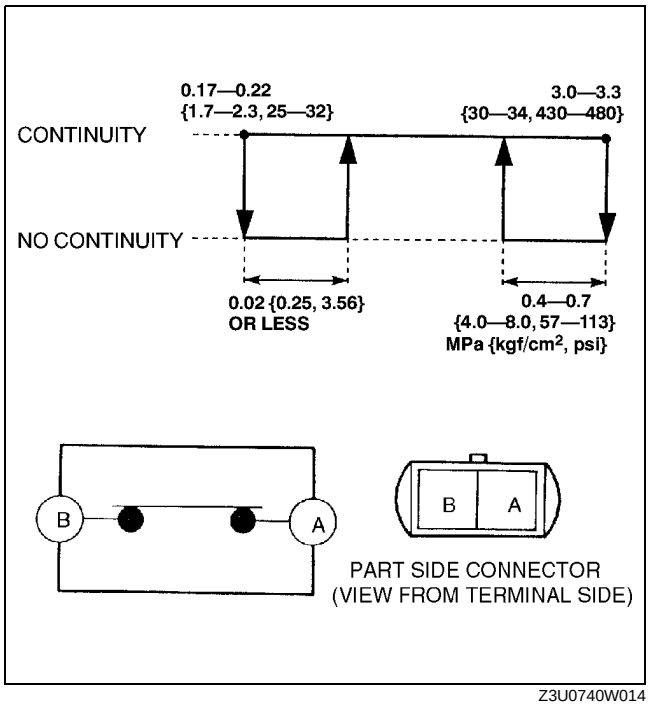
Refrigerant Pressure Switch Installation Note

1. Apply compressor oil to the O-ring and connect the joint.

REFRIGERANT PRESSURE SWITCH INSPECTION

A3U074061503W02

1. Install the manifold gauge set.
2. Disconnect the refrigerant pressure switch connector.
3. Verify the high-pressure side reading of the manifold gauge and continuity between the terminals of the refrigerant pressure switch.
   - If not as specified, replace the refrigerant pressure switch.

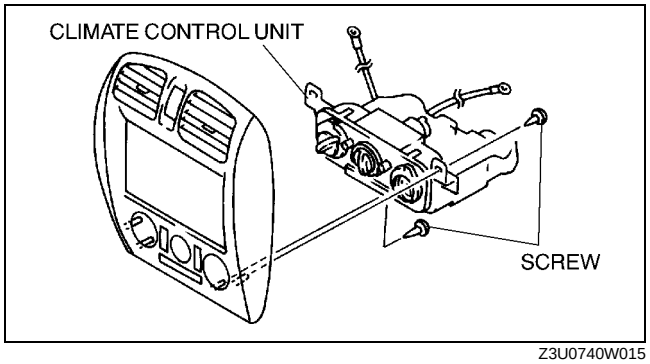


Z3U0740W014

CLIMATE CONTROL UNIT REMOVAL

A3U074061190W01

1. Disconnect the negative battery cable.
2. Disconnect the air mix and airflow mode wires from each wire clamp and link.
3. Remove the center panel. (See 09–17–4 CENTER PANEL REMOVAL/INSTALLATION.)
4. Remove the screws and the climate control unit.

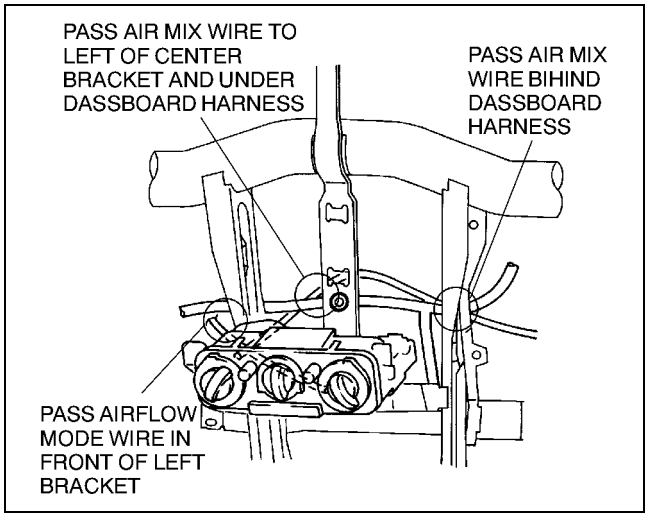


Z3U0740W015

CLIMATE CONTROL UNIT INSTALLATION

A3U074061190W02

1. Install the climate control unit to the center panel.
2. Pass each wire through the following routes then connect to each unit.
3. Connect the climate control unit connectors.
4. Install the center panel.
5. Adjust the climate control unit wire. (See 07–40–11 CLIMATE CONTROL UNIT WIRE ADJUSTMENT.)
6. Connect the negative battery cable.



Z3U0740W016

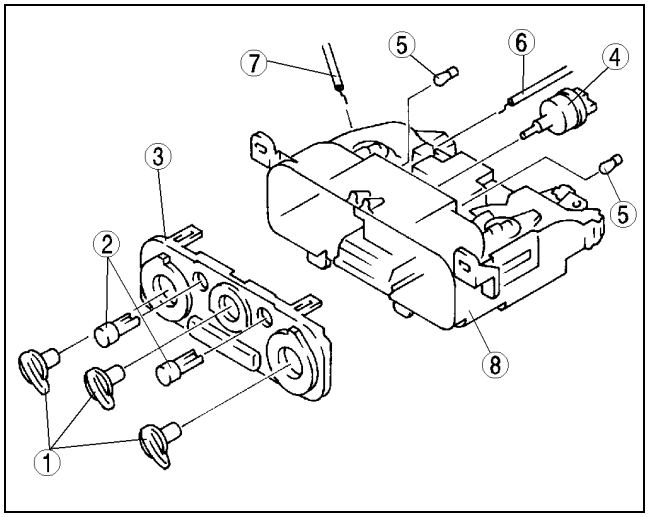
CLIMATE CONTROL UNIT DISASSEMBLY/ASSEMBLY

A3U074061190W03

1. Disassemble in the order indicated in the table.

1	Dial
2	Knob
3	Panel
4	Fan switch
5	Illumination bulb
6	Air mix wire (See 07–40–10 Wire Disassembly Note) (See 07–40–11 Wire Assembly Note)
7	Airflow mode wire (See 07–40–10 Wire Disassembly Note) (See 07–40–11 Wire Assembly Note)
8	Body

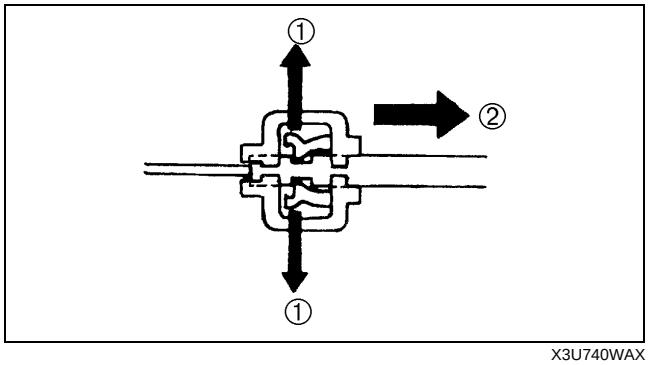
2. Assemble in the reverse order of disassembly.



Y3E8540W028

Wire Disassembly Note

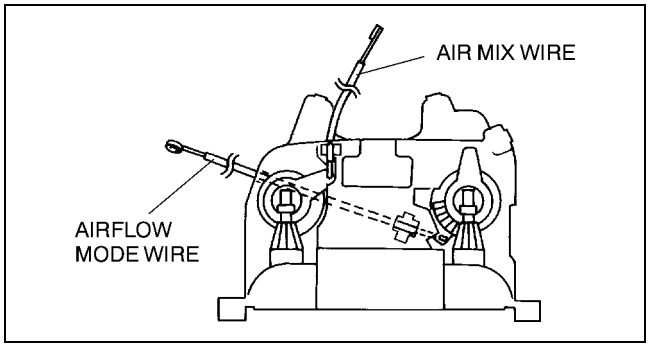
1. Disassemble the wires in the order indicated in the table.



X3U740WAX

Wire Assembly Note

1. Assemble the wires in the order indicated in the table.



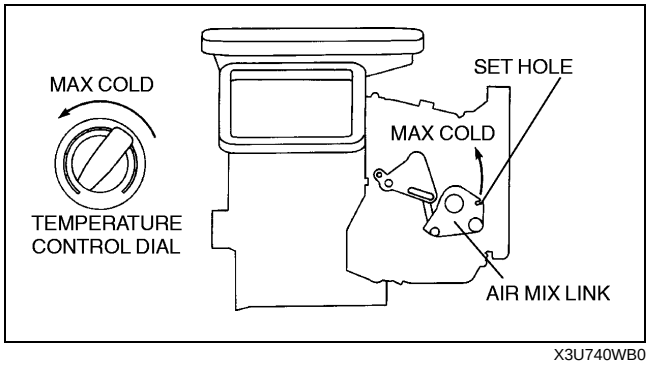
Z3U0740W018

CLIMATE CONTROL UNIT WIRE ADJUSTMENT

A3U074061190W04

Air Mix Wire

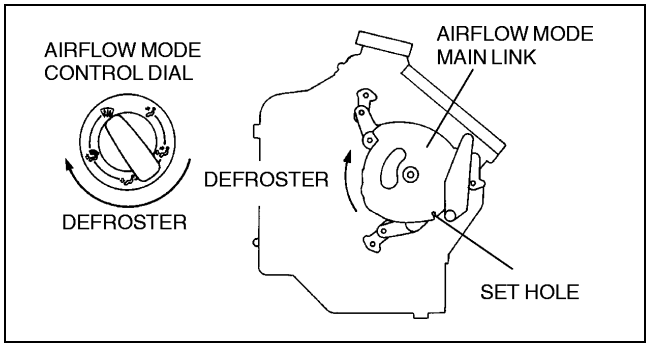
1. Set the temperature control dial at max cold.
2. Set the air mix link to max cold in the direction shown by the arrow and insert a screwdriver at the set hole.
3. Connect the air mix wire to air mix link.
4. Clamp the air mix wire to wire clamp.
5. Verify that the temperature control dial moves its full stroke.



X3U740WB0

Airflow Mode Wire

1. Set the airflow mode control dial at defroster.
2. Set the airflow mode main link to defroster in the direction shown by the arrow and insert a screwdriver at the set hole.
3. Connect the airflow mode wire to airflow mode main link.
4. Clamp the airflow mode wire to wire clamp.
5. Verify that the airflow mode control dial moves its full stroke.



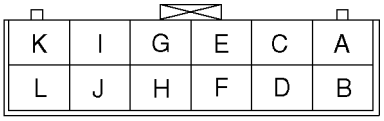
X3U740WB1

CLIMATE CONTROL UNIT INSPECTION

A3U074061190W05

1. Remove the climate control unit.
2. Connect the climate control unit connector.
3. Turn the ignition switch to ON position.
4. Measure the voltage at each climate control unit terminal and refer to the terminal voltage list.
   - If not as specified, inspect the parts listed under “Action” and the related wiring harness.
     — If there is any malfunction, replace the climate control unit.

Terminal voltage list (Reference)



PART SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y3E8540W027

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
A	Fresh signal	Air intake actuator	RECIRCULATE	0.3	• Inspect air intake actuator • Inspect related harness
			FRESH	11.3	
B	A/C signal	A/C amplifier	Fan switch ON, A/C switch ON	1.45	• Inspect for continuity or short circuit (Climate control unit—A/C amplifier: B—C) • Inspect A/C amplifier
			Fan switch OFF	10.3	
C	—	—	—	—	—
D	A/C signal	Fan switch	Fan switch OFF	B+	• Inspect for continuity or short circuit (Climate control unit—Fan switch, Resistor: D—C, C) • Inspect fan switch • Inspect resistor • Inspect related harness
			Fan switch 1st	0.12	
			Fan switch 2nd	0.65	
			Fan switch 3rd	0.60	
			Fan switch 4th	0.30	
E	GND	Ground	Under any condition	Below 1.0	• Inspect for continuity (A/C amplifier—Ground: E—GND) • Inspect related harness
F	TNS signal	Panel light control switch	Light switch ON and panel light control switch at max. illumination	0.2	• Inspect for continuity or short circuit (Climate control unit—Panel light control switch: F—C) • Inspect panel light control switch • Inspect related harness
			Light switch ON and panel light control switch at min. illumination	9.7	
			Light switch OFF	0.1	
G	—	—	—	—	—
H	TNS signal	TNS relay	Light switch ON	B+	• Inspect for continuity or short circuit (Climate control unit—TNS relay: H—C) • Inspect TNS relay • Inspect headlight switch • Inspect related harness
			Light switch OFF	Below 1.0	• Inspect for short circuit (Climate control unit—TNS relay: H—C) • Inspect TNS relay • Inspect headlight switch
I	Recirculate signal	Air intake actuator	RECIRCULATE	11.3	• Inspect air intake actuator • Inspect related harness
			FRESH	0.3	
J	Rear window defroster relay control signal	Rear window defroster relay	Rear window defroster switch ON	0.1	• Inspect for continuity or short circuit (Climate control unit—Rear window defroster relay: J—E) • Inspect rear window defroster relay • Inspect related harness
			Rear window defroster switch OFF	B+	
K	Power supply	ROOM 10 A fuse	Under any condition	B+	• Inspect ROOM 10 A fuse • Inspect related harness

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
L	IG2	A/C 15 A fuse	Ignition switch at ON position	B+	• Inspect for continuity (Climate control unit—Fuse : L—A/C 15 A fuse) • Inspect A/C 15 A fuse • Inspect related harness
			Ignition switch at LOCK position	0.1	• Inspect for short circuit (Climate control unit—Fuse: L—A/C 15 A fuse)

Fan switch

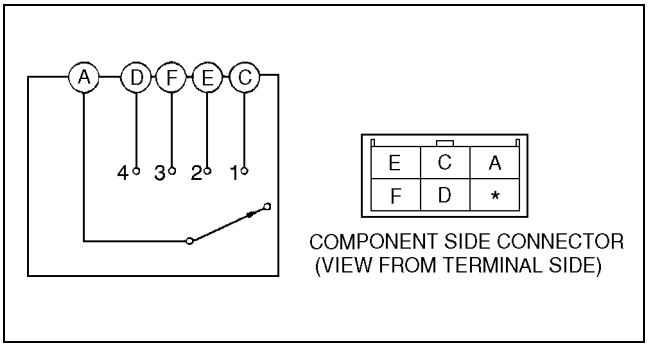
1. Remove the climate control unit.
2. Inspect for continuity between the fan switch terminals using an ohmmeter.

○—○ : Continuity

Switch position	Terminal				
	A	C	E	F	D
0					
1	○	○			
2	○		○		
3	○			○	
4	○				○

Y3E8540W026

- If not as specified, replace the fan switch.



Y3E8540W025

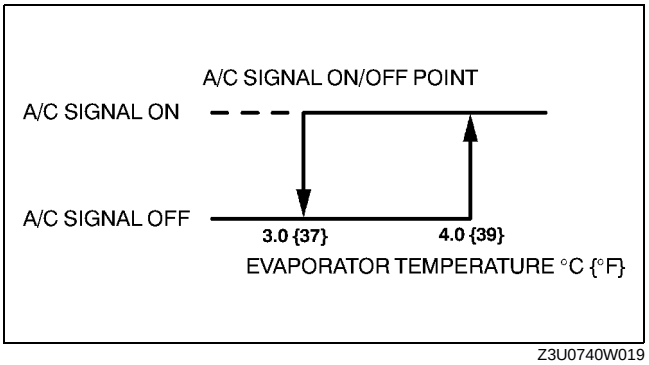
A/C AMPLIFIER INSPECTION

A3U074061790W01

Note

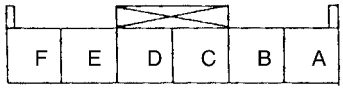
- A/C amplifier controls A/C signal as shown in the figure at right.

1. Remove the glove compartment.
2. Pull out the A/C amplifier with the connector still connected.
3. Turn the ignition switch to ON position.
4. Measure the voltage at each A/C amplifier terminal or climate control unit terminal and refer to the terminal voltage list.
   - If not as specified, inspect the parts listed under “Action” and the related wiring harness.
   - If there is no malfunction under “Action”, replace the A/C amplifier.



Z3U0740W019

Terminal Voltage List (Reference)



PART SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y3E8540W024

Terminal	Signal	Connected to	Test condition	Voltage (V)	Action
A	IG2	A/C 15 A fuse	Ignition switch at ON position	B+	• Inspect for continuity or short circuit (Fuse —A/C amplifier:A/C 15 A fuse —A) • Inspect A/C 15 A fuse • Inspect related harness
			Ignition switch at LOCK position	Below 1.0	
B	A/C signal	Refrigerant pressure switch	Fan switch at 1st position, A/C switch ON	0.6	• Inspect for continuity or short circuit (PCM—Refrigerant pressure switch:4F—B) (Refrigerant pressure switch—A/C amplifier:A—B) • Inspect terminal voltage of A/C amplifier (C) • Inspect refrigerant pressure switch • Inspect PCM (See 01–40B–7 PCM INSPECTION [FS]) (See 01–40A–7 PCM INSPECTION [ZM]) • Inspect related harness
			Fan switch OFF	12	
C	A/C switch	A/C switch	Fan switch OFF	11.5	• Inspect for short circuit (A/C amplifier—climate control unit: C—B) • Inspect terminal voltage of A/C amplifier (A)
			Fan switch at 1st position, A/C switch ON	0.6	• Inspect for continuity or short circuit (A/C amplifier—climate control unit: C—B) (climate control unit—fan switch:A—C) • Inspect A/C switch • Inspect fan switch
D	—	—	—	—	—
E	—	—	—	—	—
F	—	—	—	—	—

07–50 TECHNICAL DATA

HVAC TECHNICAL DATA

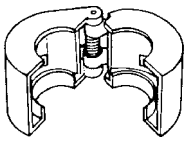
A3U075001038W01

Item			Specification
REFRIGERANT SYSTEM			
Refrigerant	Type		R-134a
	Regular amount (approximate quantity) (g {oz})		600 {21.2}
BASIC SYSTEM			
A/C compressor	Lubricating oil	Type	ATMOS GU10
		Sealed volume (approximate quantity) (ml {cc, fl oz}/rev)	150 {150, 5.07}
CONTROL SYSTEM			
Magnetic clutch	Clearance (mm {in})		0.4—0.6 {0.016—0.023}

07–60 SERVICE TOOLS

HVAC SST

A3U076001038W01

49 B061 014 Spring lock coupling disconnect tool 	—	—

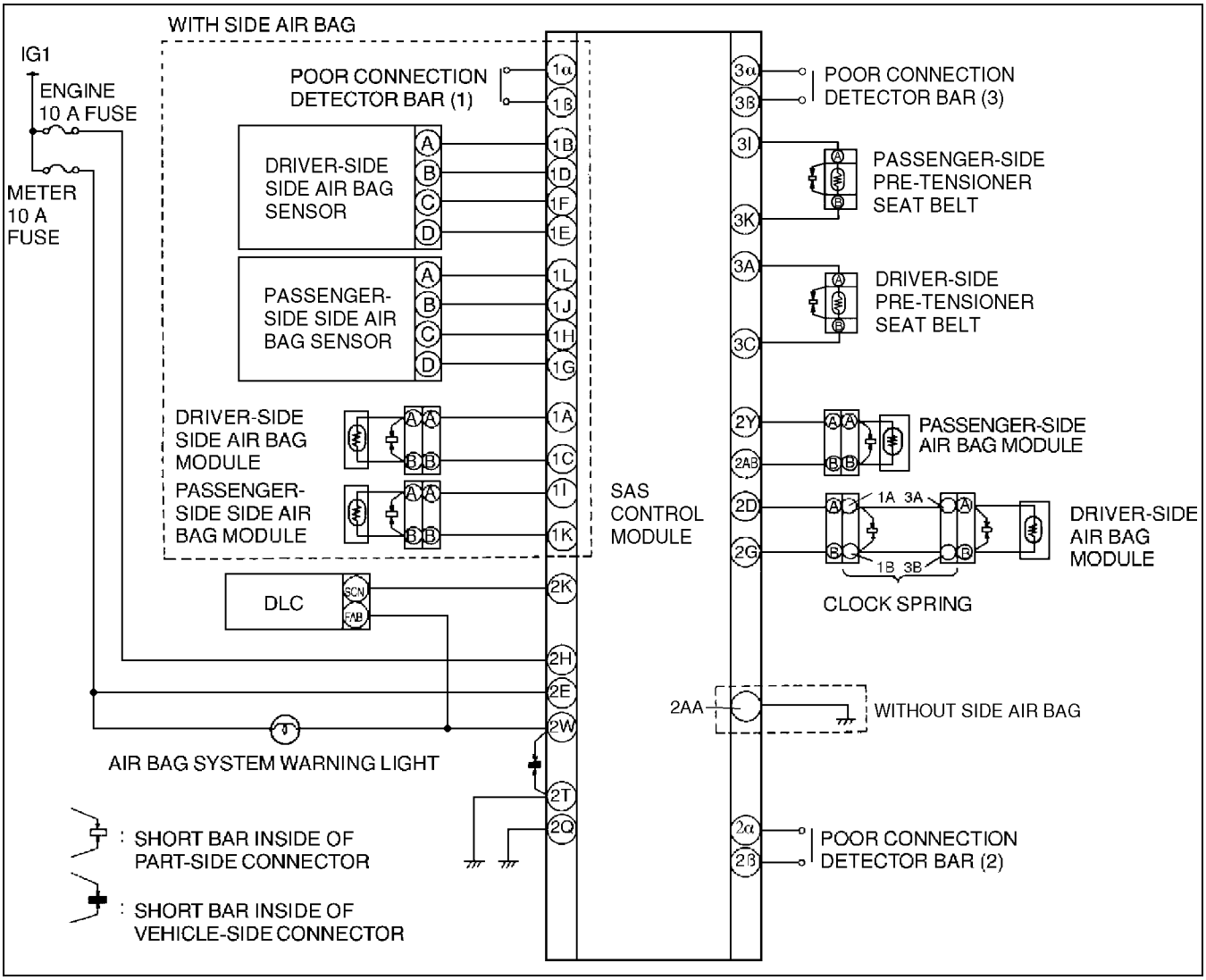
RESTRAINTS

08
SECTION

08–02 ON-BOARD DIAGNOSTIC

AIR BAG SYSTEM WIRING DIAGRAM

A3U080201046W01



Z3U0802W001

FOREWORD

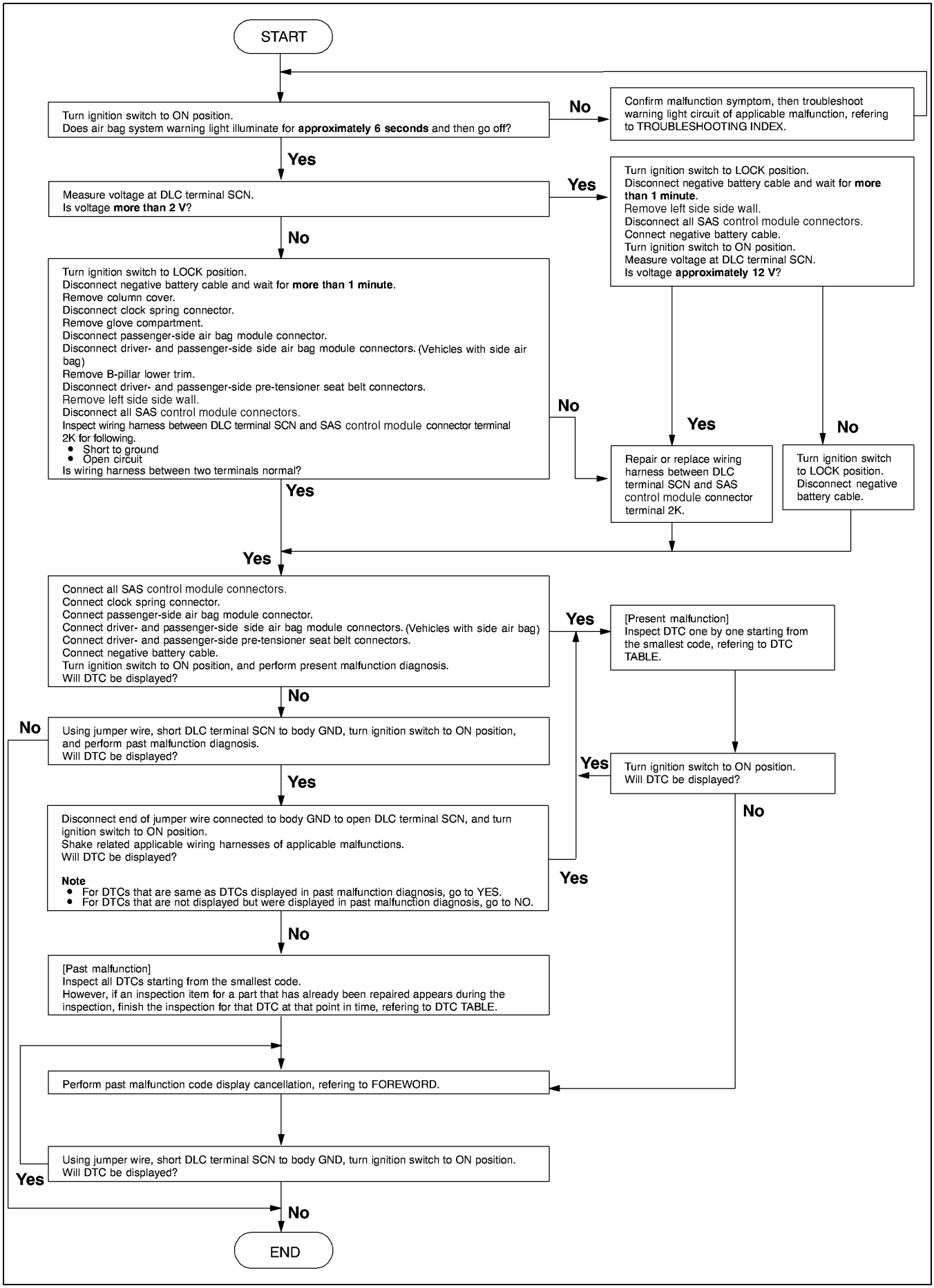
A3U080201046W02

- Use the following flowchart to verify the cause of the trouble.

Flowchart

Note

- While performing the inspection of the past malfunction code, the applicable DTCs may be added to memory by removing or disconnecting the related parts. Inspect only the DTCs that were indicated before inspecting.
- When DTCs of present malfunction are no longer output after present and/or past malfunctions have been repaired, be sure to perform past malfunction display cancellation to prevent repair of malfunctions that have already been repaired.

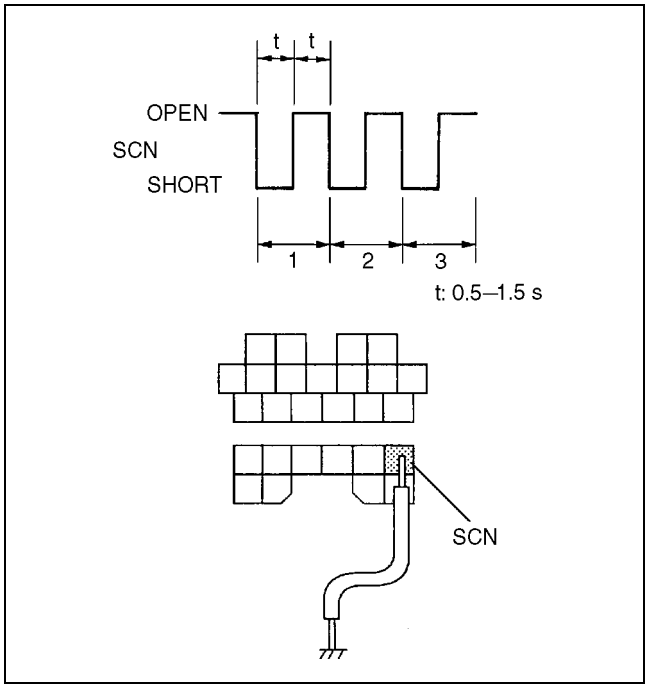


Z3U0802W002

Post-repair Operation
Past malfunction code display cancellation

Caution
- **Connecting the wrong DLC terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

1. Turn the ignition switch to the ON position.
2. Wait until the air bag system warning light illuminates **approximately 6 seconds** and goes off.
3. Perform both the following steps alternately **three times** each at **0.5—1.5 seconds** intervals.
   (1) Use a jumper wire to short the DLC terminal SCN to body GND.
   (2) Disconnect the jumper wire from body GND.
4. If the DTCs are displayed, wait until they disappear.
5. Using a jumper wire, short the DLC terminal SCN to body GND to verify that the DTCs of the past malfunction are not displayed.
   - If the DTCs are still displayed, perform the past malfunction display cancellation again.
6. Turn the ignition switch to the LOCK position.
7. Disconnect the jumper wire from the DLC.



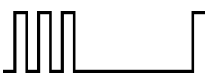
ZLU0802W001

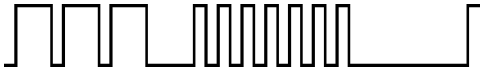
DTC TABLE

A3U080201046W03

- DTCs are common for present and past malfunction diagnosis.

Note
- When DTCs not shown in the DTC table are displayed, replace the SAS control module.
- After a new SAS control module is installed, the air bag system warning light continuously flashes when the ignition switch is turned to 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 ON position, inspect and repair the air bag system warning light circuitry and then confirm that the air bag system warning light is operational.

DTC	Output signal	Malfunction location	Page
01		SAS control module connector poor connection	(See 08–02–6 DTC 01)
02		SAS control module	(See 08–02–7 DTC 02)
03		Power supply of SAS control module	(See 08–02–8 DTC 03)
06		Driver-side air bag module system	(See 08–02–9 DTC 06)

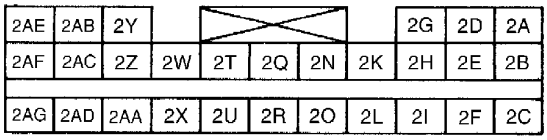
DTC	Output signal	Malfunction location	Page
07		Passenger-side air bag module system	(See 08–02–12 DTC 07)
11		Driver-side pre-tensioner seat belt system	(See 08–02–13 DTC 11)
12		Passenger-side pre-tensioner seat belt system	(See 08–02–15 DTC 12)
22		Driver-side side air bag sensor system (Internal circuit abnormal)	(See 08–02–17 DTC 22)
25		Driver-side side air bag sensor system (Communication error)	(See 08–02–20 DTC 25)
26		Driver-side side air bag module system	(See 08–02–22 DTC 26)
32		Passenger-side side air bag sensor system (Internal circuit abnormal)	(See 08–02–25 DTC 32)
35		Passenger-side side air bag sensor system (Communication error)	(See 08–02–28 DTC 35)
37		Passenger-side side air bag module system	(See 08–02–30 DTC 37)
91		Air bag system warning light system	(See 08–02–33 DTC 91)
-	Continuously flashes	Deployment authorization standby code	—

DTC 01

A3U080201046W04

DTC 01	SAS control module connector poor connection
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • There is no continuity between poor connection detector bar terminals of SAS control module. • Terminal 2AA of SAS control module connector is open. (Vehicles without side air bag)
POSSIBLE CAUSE	• Poor connection of any SAS control module connectors. • Malfunction of any SAS control module connectors. • Open or short circuit in wiring harness between SAS control module and ground. • SAS control module malfunction.

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT ALL SAS CONTROL MODULE CONNECTORS ARE CONNECTED WITH SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove left side side wall. • Are all SAS control module connectors securely connected?	Yes	Go to next step.
		No	Reconnect connector properly.
2	**INSPECT ALL SAS CONTROL MODULE CONNECTORS** • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Disconnect all SAS control module connectors. • Are poor connection detector bars of all SAS control module connectors okay?	Yes	Go to next step.
		No	Replace wiring harnesses.

STEP	INSPECTION		ACTION
3	• Is vehicle equipped with side air bag?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Go to next step.
4	**VERIFY THAT TERMINAL 2AA OF SAS CONTROL MODULE CONNECTOR IS GROUNDED** • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harness okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

DTC 02

A3U080201046W05

DTC 02	SAS control module
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Malfunction in SAS control module inner circuit.
POSSIBLE CAUSE	• SAS control module malfunction.

Diagnostic procedure

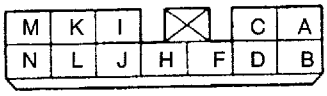
ACTION
• Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION)

DTC 03

A3U080201046W06

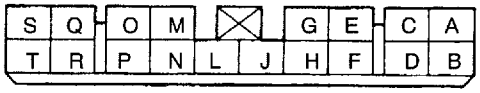
DTC 03	Power supply of SAS control module
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure** • Voltage detected at SAS control module terminals 2E and 2H is **9 V or less**.
POSSIBLE CAUSE	**Note** • DTC 03 is indicated when voltages in both of following wiring harnesses drop simultaneously. — Wiring harness between fuse block connector (JB–01) terminal B and SAS control module connector terminal 2E. — Wiring harness between fuse block connector (JB–02) terminal D and SAS control module connector terminal 2H. • Weak battery. • Malfunction in wiring harness between battery and SAS control module. • SAS control module malfunction.

FUSE BLOCK CONNECTOR (JB-01)



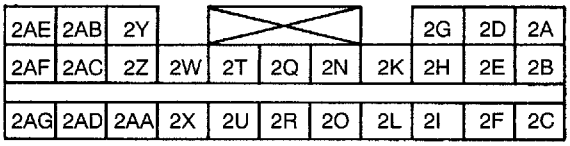
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

FUSE BLOCK CONNECTOR (JB-02)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** • Measure voltage of battery. • Is voltage **more than 9 V**?	Yes	Go to next step.
		No	Battery is weak. Inspect charge/discharge system. (See 01–17–1 BATTERY INSPECTION)
2	**INSPECT WIRING HARNESS BETWEEN BATTERY AND FUSE BLOCK** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Remove fuse block without disconnecting connectors. • Turn ignition switch to ON position. • Measure voltage at terminals B (JB–01) and D (JB–02) of fuse block connectors. • Is voltage of at least either terminal **more than 9 V**?	Yes	Go to next step.
		No	Repair wiring harnesses. (Battery—fuse block)

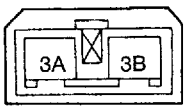
STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Connect negative battery cable. • Turn ignition switch to ON position. • Measure voltage at terminals 2E and 2H of SAS control module connector. • Is voltage of at least either terminal **more than 9 V**?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness. (Fuse block-SAS control module)

DTC 06

A3U080201046W07

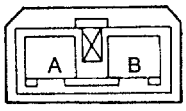
DTC 06	Driver-side air bag module system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Resistance detected between terminals 2D and 2G of SAS control module is other than **1.85—3.46 ohm**. • Short circuit in wiring harness related SAS control module terminal 2D or 2G.
POSSIBLE CAUSE	• Driver-side air bag module malfunction. • Clock spring malfunction. • Malfunction of connectors between clock spring and SAS control module. • Open or short circuit in wiring harness between clock spring and SAS control module. • SAS control module malfunction.

CLOCK SPRING



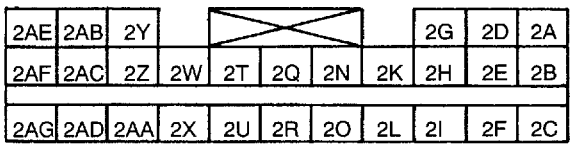
COMPONENT SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

CLOCK SPRING CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SEPARATOR* OF CLOCK SPRING** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION) • Is separator* of clock spring okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 6.
		No	Replace clock spring. (See 08–10–9 CLOCK SPRING REMOVAL/ INSTALLATION)
2	**VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE AIR BAG MODULE OR OTHER PARTS** • Connect leads of **SST** (Fuel And Thermometer checker) or apply **2 ohms** resistor to clock spring terminals 3A and 3B. • Set resistance of **SST** (Fuel And Thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 06 indicated?	Yes	Go to next step.
		No	Replace driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
3	**INSPECT SEPARATOR* OF CLOCK SPRING CONNECTOR** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Is separator* of clock spring connector okay?	Yes	Go to next step.
		No	Replace wiring harness.
4	**VERIFY WHETHER MALFUNCTION IS IN CLOCK SPRING OR OTHER PARTS** • Connect leads of **SST** (Fuel And Thermometer checker) or apply **2 ohms** resistor clock spring connector terminals A and B. • Set resistance of **SST** (Fuel And Thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 06 indicated?	Yes	Go to next step.
		No	Replace clock spring. (See 08–10–9 CLOCK SPRING REMOVAL/ INSTALLATION)

STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN CLOCK SPRING AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Are wiring harnesses okay?	Yes	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Replace wiring harnesses.
6	**INSPECT SEPARATOR* OF CLOCK SPRING CONNECTOR** • Remove column cover. • Disconnect clock spring connector. • Is separator* of clock spring connector okay?	Yes	Go to next step.
		No	Replace wiring harness.
7	**INSPECT CLOCK SPRING** • Remove clock spring. (See 08–10–9 CLOCK SPRING REMOVAL/ INSTALLATION) • Inspect clock spring. (See 08–10–10 CLOCK SPRING INSPECTION) • Is clock spring okay?	Yes	Go to next step.
		No	Replace wiring harness.
8	**INSPECT WIRING HARNESS BETWEEN CLOCK SPRING AND SAS CONTROL MODULE** • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect wiring harness between terminal 2D of SAS control module connector and terminal A of clock spring connector, and between terminal 2G 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?	Yes	Replace driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
		No	Replace wiring harness.

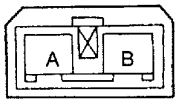
* : Consists of 2 parts of female connector that separate the short bar from the terminal when connected to the male connector.

DTC 07

A3U080201046W08

DTC 07	Passenger-side air bag module system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Resistance detected between terminals 2Y and 2AB of SAS control module is other than **1.63—2.71 ohm**. • Short circuit in wiring harness related SAS control module terminal 2Y or 2AB.
POSSIBLE CAUSE	• Passenger-side air bag module malfunction. • Malfunction of connectors between passenger-side air bag module and SAS control module. • Open or short circuit in wiring harness between passenger-side air bag module and SAS control module. • SAS control module malfunction.

PASSENGER-SIDE AIR BAG MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR

2AE	2AB	2Y					2G	2D	2A	
2AF	2AC	2Z	2W	2T	2Q	2N	2K	2H	2E	2B
2AG	2AD	2AA	2X	2U	2R	2O	2L	2I	2F	2C

HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SEPARATOR* OF PASSENGER-SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Is separator* of passenger-side air bag module connector okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 3.
		No	Replace wiring harness.
2	**VERIFY WHETHER MALFUNCTION IS IN PASSENGER-SIDE AIR BAG MODULE OR OTHER PARTS** • Connect leads of **SST** (Fuel And Thermometer checker) or apply **2 ohms** resistor to passenger-side air bag module connector terminals A and B. • Set resistance of **SST** (Fuel And Thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 07 indicated?	Yes	Go to next step.
		No	Replace passenger-side air bag module. (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE AIR BAG MODULE AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect wiring harness between terminal 2Y of SAS control module connector and terminal A of passenger-side air bag module connector, and between terminal 2AB 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?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION) **Past malfunction diagnosis:** • Replace passenger-side air bag module. (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
		No	Replace wiring harness.

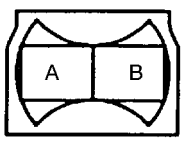
* : Consists of the 2 parts of the female connector that separate the short bar from the terminal when connected to the male connector.

DTC 11

A3U080201046W09

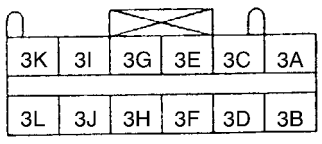
DTC 11	Driver-side pre-tensioner seat belt system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Abnormal resistance (other than **1.83—2.81 ohm**) detected in driver-side pre-tensioner seat belt circuit. • Short circuit in wiring harness related terminal 3A or 3C of SAS control module.
POSSIBLE CAUSE	• Driver-side pre-tensioner seat belt malfunction. • Malfunction of connectors between driver-side pre-tensioner seat belt and SAS control module. • Open or short circuit in wiring harness between driver-side pre-tensioner seat belt and SAS control module. • SAS control module malfunction.

DRIVER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

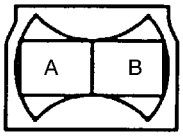
STEP	INSPECTION		ACTION
1	**INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove driver-side B-pillar lower trim. • Disconnect driver-side pre-tensioner seat belt connector. • Is there cracking or chipping in driver-side pre-tensioner seat belt connector?	Yes	Replace wiring harness.
		No	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 3.
2	**VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE PRE-TENSIONER SEAT BELT OR OTHER PARTS** • Connect leads of **SST** (Fuel and thermometer checker) or apply **2 ohms** resistor to driver-side pre-tensioner seat belt connector terminals A and B. • Set resistance of **SST** (Fuel and thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 11 indicated?	Yes	Go to next step.
		No	Replace driver-side pre-tensioner seat belt.
3	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE PRE-TENSIONER SEAT BELT AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove passenger-side B-pillar lower trim. • Disconnect passenger-side pre-tensioner seat belt connector. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect wiring harness between SAS control module connector terminal 3A and driver-side pre-tensioner seat belt connector terminal A, and between SAS control module connector terminal 3C and driver-side pre-tensioner seat belt connector terminal B for following. — Short to ground — Short to power supply — Open circuit • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Replace driver-side pre-tensioner seat belt.
		No	Replace wiring harness.

DTC 12

A3U080201046W10

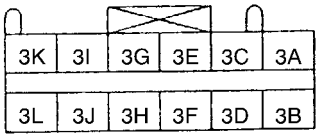
DTC 12	Passenger-side pre-tensioner seat belt system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Abnormal resistance (other than **1.83—2.81 ohm**) detected in passenger-side pre-tensioner seat belt circuit. • Short circuit in wiring harness related terminal 3I or 3K of SAS control module.
POSSIBLE CAUSE	• Passenger-side pre-tensioner seat belt malfunction. • Malfunction of connectors between passenger-side pre-tensioner seat belt and SAS control module. • Open or short circuit in wiring harness between passenger-side pre-tensioner seat belt and SAS control module. • SAS control module malfunction.

PASSENGER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PASSENGER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove passenger-side B-pillar lower trim. • Disconnect passenger-side pre-tensioner seat belt connector. • Is there cracking or chipping in passenger-side pre-tensioner seat belt connector?	Yes	Replace wiring harness.
		No	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 3.
2	**VERIFY WHETHER MALFUNCTION IS IN PASSENGER-SIDE PRE-TENSIONER SEAT BELT OR OTHER PARTS** • Connect leads of **SST** (Fuel and thermometer checker) or apply **2 ohms** resistor to passenger-side pre-tensioner seat belt connector terminals A and B. • Set resistance of **SST** (Fuel and thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 12 indicated?	Yes	Go to next step.
		No	Replace passenger-side pre-tensioner seat belt.

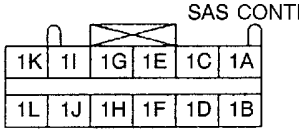
STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN PASSENEGER-SIDE PRE-TENSIONER SEAT BELT AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove driver-side B-pillar lower trim. • Disconnect driver-side pre-tensioner seat belt connector. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect wiring harness between SAS control module connector terminal 3I and passenger-side pre-tensioner seat belt connector terminal A, and between SAS control module connector terminal 3K and passenger-side pre-tensioner seat belt connector terminal B for following. — Short to ground — Short to power supply — Open circuit • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Replace passenger-side pre-tensioner seat belt.
		No	Replace wiring harness.

DTC 22

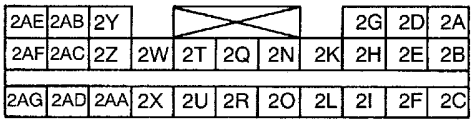
A3U080201046W11

DTC 22	Driver-side side air bag sensor system (Internal circuit abnormal)
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Malfunction in wiring harness between driver-side side air bag sensor and SAS control module. • Malfunction in driver-side side air bag sensor circuit. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Driver-side side air bag sensor malfunction. • Open or short circuit in wiring harness between driver-side side air bag sensor and SAS control module. • SAS control module malfunction. **Vehicles 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.

SAS CONTROL MODULE CONNECTOR

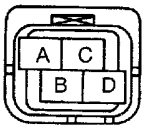


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



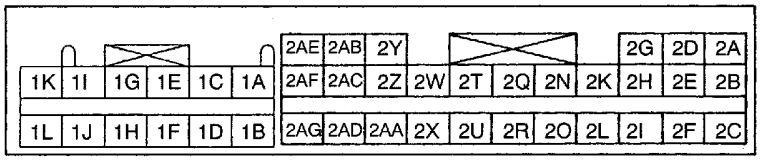
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

DRIVER-SIDE SIDE AIR BAG SENSOR CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE



COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

08–02

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to Step 6.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 1B of SAS control module connector and terminal A of driver-side side air bag sensor connector, between terminal 1D of SAS control module connector and terminal B of driver-side side air bag sensor connector, between terminal 1F of SAS control module connector and terminal C of driver-side side air bag sensor connector, and between terminal 1E of SAS control module connector and terminal D of driver-side side air bag sensor connector for following. — Short to ground — Short to power supply — Open circuit • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Replace driver-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Replace wiring harness.
3	**INSPECT GROUND CIRCUIT IN SAS CONTROL MODULE** • Is there continuity between terminal 1F and 2Q of SAS control module?	Yes	Go to next step.
		No	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
4	**INSPECT POWER SUPPLY CIRCUIT OF DRIVER-SIDE SIDE AIR BAG SENSOR** • Connect all SAS control module connectors. • Connect clock spring connector. • Connect passenger-side air bag module connector. • Connect driver- and passenger-side side air bag module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connectors. • Connect negative battery cable. • Turn ignition switch to ON position. • Measure voltage at terminal A of driver-side side air bag sensor connector. • Is voltage **approximately 5 V**?	Yes	Replace driver-side side air bag sensor, then go to next step. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)

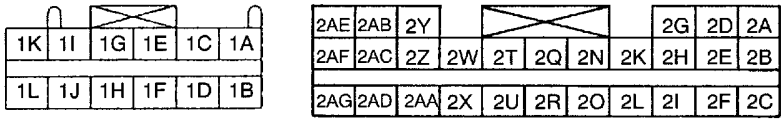
STEP	INSPECTION		ACTION
5	**VERIFY WHETHER SAS CONTROL MODULE IS MALFUNCTIONING OR NOT** • Connect driver-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 22 indicated?	Yes	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Complete inspection by DTC.
6	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

DTC 25

A3U080201046W12

DTC 25	Driver-side side air bag sensor system (Communication error)
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Malfunction in wiring harness between driver-side side air bag sensor and SAS control module. • Malfunction in driver-side side air bag sensor circuit. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Driver-side side air bag sensor malfunction. • Open or short circuit in wiring harness between driver-side side air bag sensor and SAS control module. • SAS control module malfunction. **Vehicles 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.

SAS CONTROL MODULE CONNECTOR

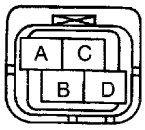


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

DRIVER-SIDE SIDE AIR BAG SENSOR

COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

DRIVER-SIDE SIDE AIR BAG SENSOR CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to Step 5.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect following wiring harness between SAS control module connector and driver-side side air bag sensor connector terminals (harness side) for short to ground, short to power suppiy, and open circuit: — 1B and A — 1D and B — 1F and C — 1E and D • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION
		No	Replace wiring harness.
3	**INSPECT DRIVER-SIDE SIDE AIR BAG SENSOR** • Measure resistance between terminals C and D of driver-side side air bag sensor. • Is resistance **approximately 1 kilohm**?	Yes	Replace SAS control module, then go to next step. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION
		No	Replace driver-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
4	**VERIFY WHETHER DRIVER-SIDE SIDE AIR BAG SENSOR IS MALFUNCTIONING OR NOT** • Connect all SAS control module connectors and driver-side side air bag sensor connector. • Connect clock spring connector. Connect passenger-side air bag module connector. • Connect driver- and passenger-side side air bag module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connectors. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 25 indicated?	Yes	Replace driver-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Complete inspection by DTC.

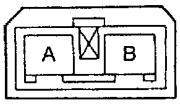
STEP	INSPECTION		ACTION
5	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

DTC 26

A3U080201046W13

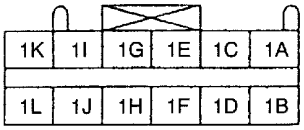
DTC 26	Driver-side side air bag module system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Resistance detected between terminals 1A and 1C of SAS control module is other than **1.63—2.71 ohm**. • Short circuit in wiring harness related terminal 1A or 1C of SAS control module. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Driver-side side air bag module malfunction. • Malfunction of connectors between driver-side side air bag module and SAS control module. • Open or short circuit in wiring harness between driver-side side air bag module and SAS control module. • SAS control module malfunction. **Vehicles 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.

DRIVER-SIDE SIDE AIR BAG MODULE CONNECTOR

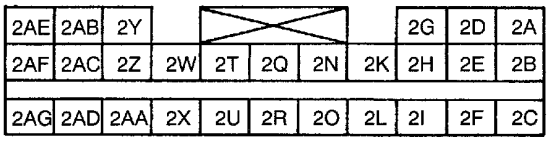


HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to Step 5.
2	**INSPECT SEPARATOR* OF DRIVER-SIDE SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Disconnect driver-side side air bag module connector. • Is separator* of driver-side side air bag module connector okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 3.
		No	Replace wiring harness.
3	**VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE SIDE AIR BAG MODULE OR OTHER PARTS** • Connect leads of **SST** (Fuel And Thermometer checker) or apply **2 ohms** resistor to driver-side side air bag module connector terminals A and B. • Set resistance of **SST** (Fuel And Thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 26 indicated?	Yes	Go to next step.
		No	Replace driver-side side air bag module. (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION)

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG MODULE AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect passenger-side side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect following wiring harness between SAS control module connector and driver-side side air bag module connector terminals (harness side) for short to ground, short to power suppiy, and open circuit: — 1A and A — 1C and B • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Remove SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Replace driver-side side air bag module. (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION)
		No	Replace wiring harness.
5	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

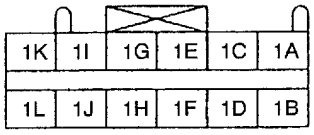
* : Consists of the 2 parts of the female connector that separate the short bar from the terminal when connected to the male connector.

DTC 32

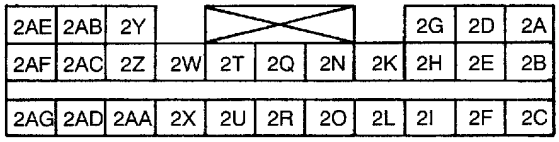
A3U080201046W14

DTC 32	Passenger-side side air bag sensor system (Internal circuit abnormal)
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Malfunction in wiring harness between passenger-side side air bag sensor and SAS control module. • Malfunction in passenger-side side air bag sensor circuit. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Passenger-side side air bag sensor malfunction. • Open or short circuit in wiring harness between passenger-side side air bag sensor and SAS control module. • SAS control module malfunction. **Vehicles 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.

SAS CONTROL MODULE CONNECTOR

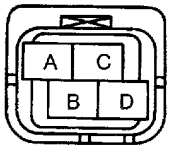


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



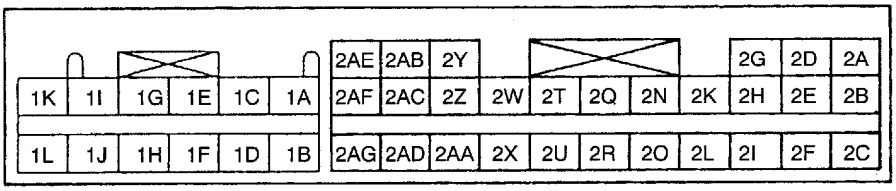
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

PASSENGER-SIDE SIDE AIR BAG SENSOR CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE



COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to Step 6.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG SENSOR AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect passenger-side side air bag sensor connector. • Inspect wiring harness between terminal 1L of SAS control module connector and terminal A of passenger-side side air bag sensor connector, between terminal 1J of SAS control module connector and terminal B of passenger-side side air bag sensor connector, between terminal 1H of SAS control module connector and terminal C of passenger-side side air bag sensor connector, and between terminal 1G of SAS control module connector and terminal D of passenger-side side air bag sensor connector for following. — Short to ground — Short to power supply — Open circuit • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Replace passenger-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Replace wiring harness.
3	**INSPECT GROUND CIRCUIT IN SAS CONTROL MODULE** • Is there continuity between terminal 1H and 2Q of SAS control module?	Yes	Go to next step.
		No	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
4	**INSPECT POWER SUPPLY CIRCUIT OF PASSENGER-SIDE SIDE AIR BAG SENSOR** • Connect all SAS control module connectors. • Connect clock spring connector. • Connect passenger-side air bag module connector. • Connect driver- and passenger-side side air bag module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connrctors. • Connect negative battery cable. • Turn ignition switch to ON position. • Measure voltage at terminal A of passenger-side side air bag sensor connector. • Is voltage **approximately 5 V**?	Yes	Replace passenger-side side air bag sensor, then go to next step. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)

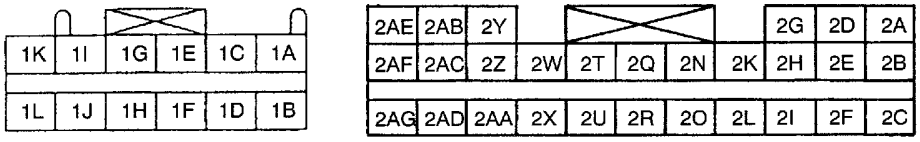
STEP	INSPECTION		ACTION
5	**VERIFY WHETHER SAS CONTROL MODULE IS MALFUNCTIONING OR NOT** • Connect passenger-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 32 indicated?	Yes	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Complete inspection by DTC.
6	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. (Vehicles with passenger-side air bag) • Disconnect passenger-side air bag module connector. (Vehicles with passenger-side air bag) • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

DTC 35

A3U080201046W15

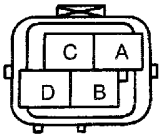
DTC 35	Passenger-side side air bag sensor system (Communication error)
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Malfunction in wiring harness between passenger-side side air bag sensor and SAS control module. • Malfunction in passenger-side side air bag sensor circuit. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Passenger-side side air bag sensor malfunction. • Open or short circuit in wiring harness between passenger-side side air bag sensor and SAS control module. • SAS control module malfunction. **Vehicles 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.

SAS CONTROL MODULE CONNECTOR



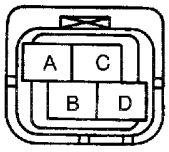
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

PASSENGER-SIDE SIDE AIR BAG SENSOR



COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

PASSENGER-SIDE SIDE AIR BAG SENSOR CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to Step 5.

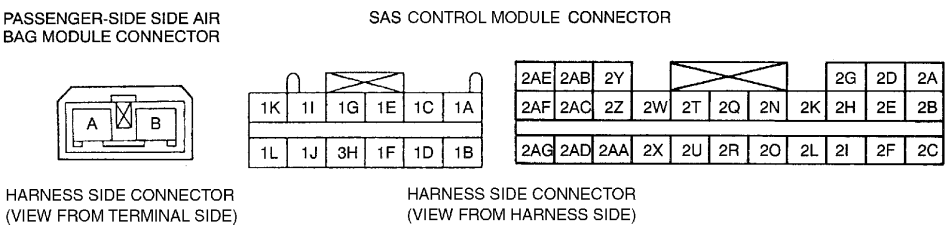
STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG SENSOR AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect passenger-side side air bag sensor connector. • Inspect following wiring harness between SAS control module connector and passenger-side side air bag sensor connector terminals (harness side) for short to ground, short to power suppiy, and open circuit: — 1L and A — 1J and B — 1H and C — 1G and D • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION
		No	Replace wiring harness.
3	**INSPECT PASSENGER-SIDE SIDE AIR BAG SENSOR** • Measure resistance between terminals C and D of passenger-side side air bag sensor. • Is resistance **approximately 1 kilohm**?	Yes	Replace SAS control module, then go to next step. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Replace passenger-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
4	**VERIFY WHETHER PASSENGER-SIDE SIDE AIR BAG SENSOR IS MALFUNCTIONING OR NOT** • Connect all SAS control module connectors and passenger-side side air bag sensor connector. • Connect clock spring connector. • Connect passenger-side air bag module connector. • Connect driver- and passenger-side side air bag module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connectors. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 35 indicated?	Yes	Replace passenger-side side air bag sensor. (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION)
		No	Complete inspection by DTC.

STEP	INSPECTION		ACTION
5	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

DTC 37

A3U080201046W16

DTC 37	Passenger-side side air bag module system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** **Note** • For vehicles without side air bag, DTC 22, 25, 26, 32, 35, or 37 may be indicated concurrently. In such a case, perform only the smallest DTC troubleshooting among them. **Vehicles with side air bag** • Resistance detected between terminals 1I and 1K of SAS control module is other than **1.63—2.71 ohm**. • Short circuit in wiring harness related terminal 1I or 1K of SAS control module. **Vehicles without side air bag** • Terminal 2AA of SAS control module connector is open.
POSSIBLE CAUSE	**Vehicles with side air bag** • Passenger-side side air bag module malfunction. • Malfunction of connectors between passenger-side side air bag module and SAS control module. • Open or short circuit in wiring harness between passenger-side side air bag module and SAS control module. • SAS control module malfunction. **Vehicles 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 5.
2	**INSPECT SEPARATOR* OF PASSENGER-SIDE SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Disconnect passenger-side side air bag module connector. • Is separator* of passenger-side side air bag module connector okay?	Yes	**Present malfunction diagnosis:** • Go to next step. **Past malfunction diagnosis:** • Go to Step 3.
		No	Replace wiring harness.
3	**VERIFY WHETHER MALFUNCTION IS IN PASSENGER-SIDE SIDE AIR BAG MODULE OR OTHER PARTS** • Connect leads of **SST** (Fuel And Thermometer checker) or apply **2 ohms** resistor to passenger-side side air bag module connector terminals A and B. • Set resistance of **SST** (Fuel And Thermometer checker) to **2 ohms**. • Connect negative battery cable. • Turn ignition switch to ON position. • Is DTC 37 indicated?	Yes	Go to next step.
		No	Replace passenger-side side air bag module. (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION)

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG MODULE AND SAS CONTROL MODULE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver-side side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect following wiring harness between SAS control module connector and passenger-side side air bag module connector terminals (harness side) for short to ground, short to power suppiy, and open circuit: — 1I and A — 1K and B • Are wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Remove SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Replace passenger-side side air bag module. (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION)
		No	Replace wiring harness.
5	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 2AA IS GROUNDED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove B-pillar lower trims. • Disconnect driver-and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal 2AA of SAS control module connector and ground for following. — Short to power supply — Open circuit • Is wiring harnesses okay?	Yes	**Present malfunction diagnosis:** • Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION) **Past malfunction diagnosis:** • Complete inspection by DTC.
		No	Replace wiring harness.

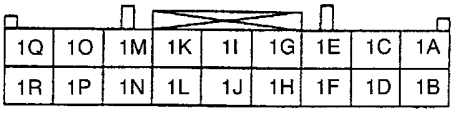
* : Consists of the 2 parts of the female connector that separate the short bar from the terminal when connected to the male connector.

DTC 91

A3U080201046W17

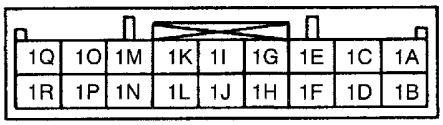
DTC 91	Air bag system warning light system
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding DTC outline before performing inspection. Performing inspection with only detection conditions may cause injury due to operating error or damage the system. When performing inspection, always follow diagnostic procedure.** • Malfunction in air bag system warning light circuit.
POSSIBLE CAUSE	• Air bag system warning light bulb malfunction. • METER 10 A fuse malfunction. • Instrument cluster malfunction. • Malfunction of connectors between instrument cluster and SAS control module. • Open or short circuit in wiring harness between METER 10 A fuse and instrument cluster. • Open or short circuit in wiring harness between instrument cluster and SAS control module. • SAS control module malfunction.

INSTRUMENT CLUSTER CONNECTOR



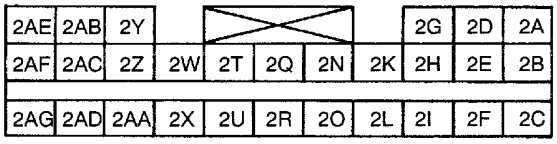
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

INSTRUMENT CLUSTER



COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

SAS CONTROL MODULE CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

08–02

Diagnostic procedure

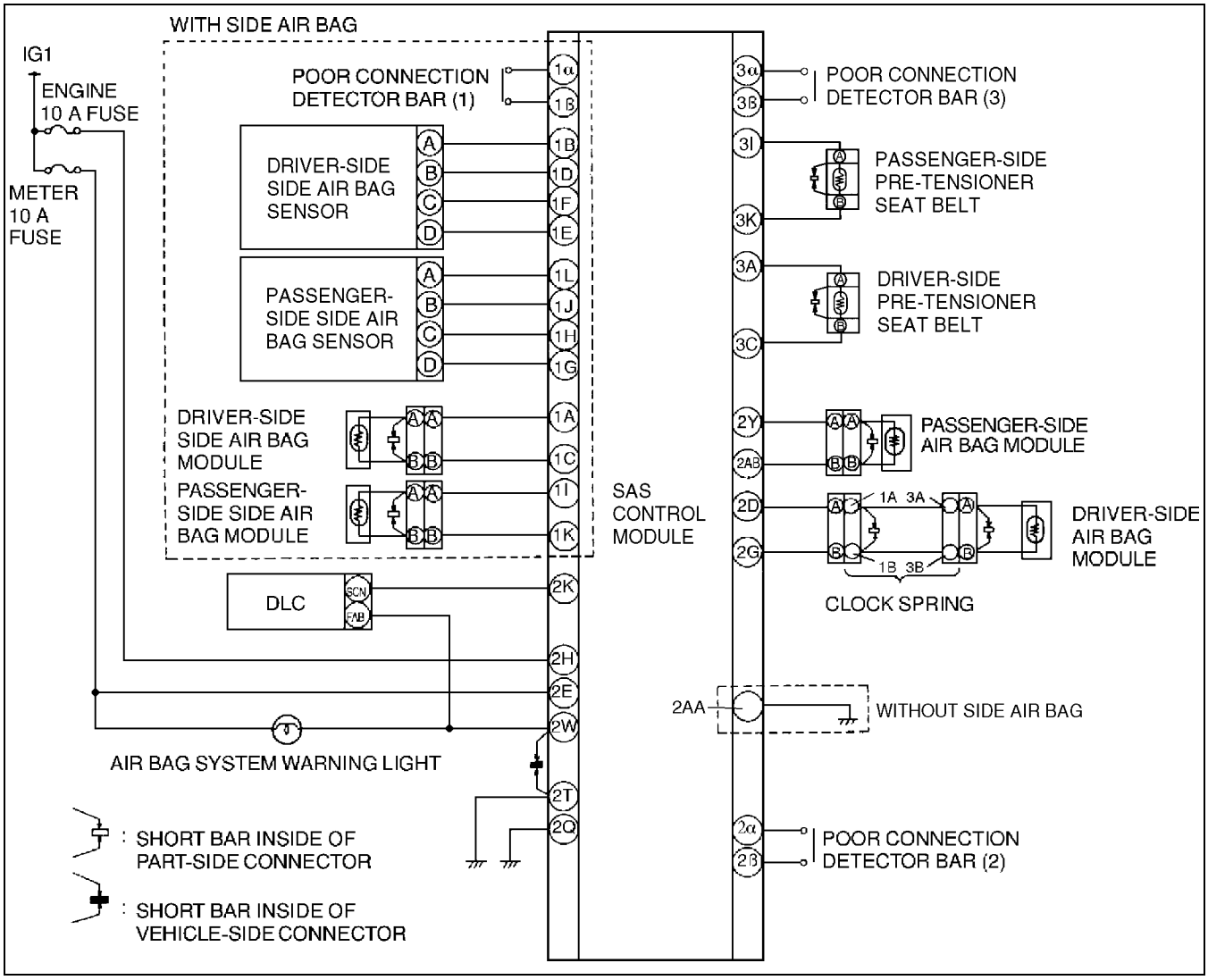
STEP	INSPECTION		ACTION
1	• Is this present malfunction diagnosis?	Yes	Replace SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Go to next step.
2	**INSPECT METER 10 A FUSE** • Turn ignition switch to LOCK position. • Disconnect negative battery cable. • Remove METER 10 A fuse. • Is fuse okay?	Yes	Reinstall METER 10 A fuse, then go to next step.
		No	Replace METER 10 A fuse.
3	**INSPECT AIR BAG SYSTEM WARNING LIGHT BULB** • Remove instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) • Remove air bag system warning light bulb. • Is bulb okay?	Yes	Reinstall air bag system warning light bulb, then go to next step.
		No	Replace air bag system warning light bulb.
4	**INSPECT INSTRUMENT CLUSTER** • Is there continuity between instrument cluster terminals 1J and 1R?	Yes	Go to next step.
		No	**With tachometer** • Replace speedometer and tachometer. **Without tachometer** • Replace speedometer. (See 09–22–3 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

STEP	INSPECTION		ACTION
5	**INSPECT FOR CONTINUITY BETWEEN METER 10 A FUSE AND INSTRUMENT CLUSTER** • Connect negative battery cable. • Turn ignition switch to ON position. • Measure voltage at instrument cluster connector terminal 1J. • Is voltage **more than 9 V**?	Yes	Go to next step.
		No	Replace wiring harness.
6	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND SAS CONTROL MODULE** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar trims. • Disconnect driver- and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Inspect wiring harness between instrument cluster connector terminal 1R and SAS control module connector terminal 2W for following. — Short to ground — Short to power supply — Open circuit • Is wiring harness okay?	Yes	Go to next step.
		No	Replace wiring harness.
7	**INSPECT WIRING HARNESS BETWEEN DLC AND SAS CONTROL MODULE** • Inspect wiring harness between FAB terminal of DLC and terminal 2W of SAS control module connector for following. — Short to ground — Short to power supply • Is wiring harness okay?	Yes	Complete inspection by DTC.
		No	Replace wiring harness.

08–03 SYMPTOM TROUBLESHOOTING

AIR BAG SYSTEM WIRING DIAGRAM

A3U080301046W01



Z3U0802W001

FOREWORD

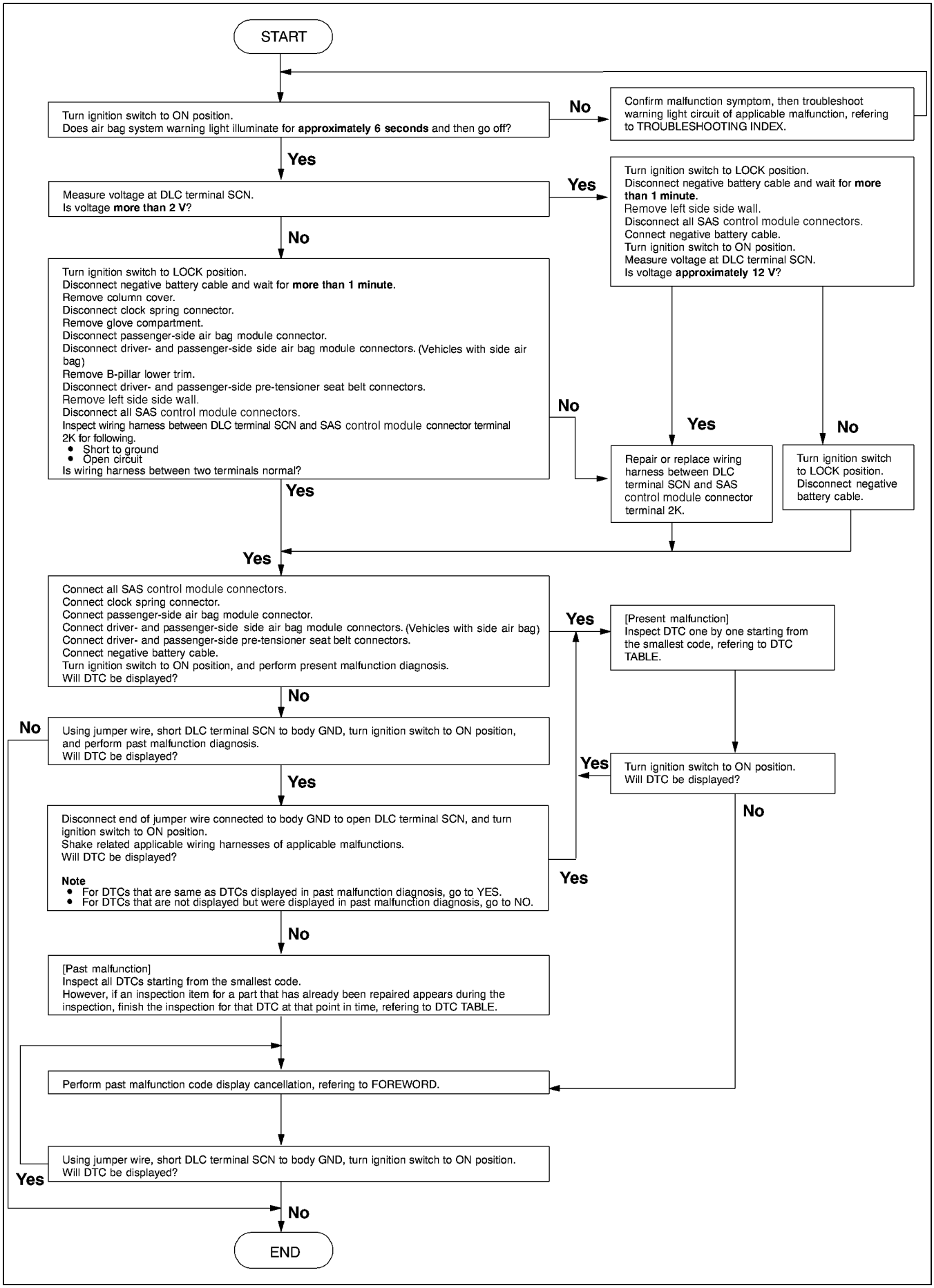
A3U080301046W02

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00–00–5 Troubleshooting Procedure.)
- Use the following flowchart to verify the cause of the trouble.

Flowchart

Note

- While performing the inspection of the past malfunction code, the applicable DTCs may be added to memory by removing or disconnecting the related parts. Inspect only the DTCs that were indicated before inspecting.
- When DTCs of present malfunction are no longer output after present and/or past malfunctions have been repaired, be sure to perform past malfunction display cancellation to prevent repair of malfunctions that have already been repaired.



Z3U0802W002

TROUBLESHOOTING INDEX

A3U080301046W03

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

No.	Malfunction symptom	Description	Page
1	Air bag system warning light does not illuminate when ignition switch is turned to ON position.	Malfunction in air bag system warning circuit (open circuit or short to power supply).	(See 08–03–4 NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH IS TURNED TO ON POSITION)
2	Air bag system warning light illuminates immediately after ignition switch is turned to ON position and remains illuminated.	Malfunction in air bag system warning circuit (short to ground).	(See 08–03–6 NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES IMMEDIATELY AFTER IGNITION SWITCH IS TURNED TO ON POSITION AND REMAINS ILLUMINATED)

Note

- The following may be the cause of trouble if the symptom does not go away after the symptom troubleshooting steps are followed.
  - — Simultaneous poor contact at short connector terminals B and P between METER 10 A fuse and SAS control module, and between ENGINE 10 A fuse and SAS control module.
  - — Simultaneous poor contact at SAS control module connector terminals 2T and 2Q.
  - — Simultaneous poor contact at SAS control module connector terminals 2E and 2H.
  - — Poor contacts in wiring harness between SAS control module connector terminal 2T and ground, and between SAS control module connector terminal 2Q and ground at the same time.
  - — Poor contacts or short circuits in wiring harness between METER 10 A fuse and SAS control module, and between ENGINE 10 A fuse and SAS control module at the same time.

NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH IS TURNED TO ON POSITION

A3U080301046W04

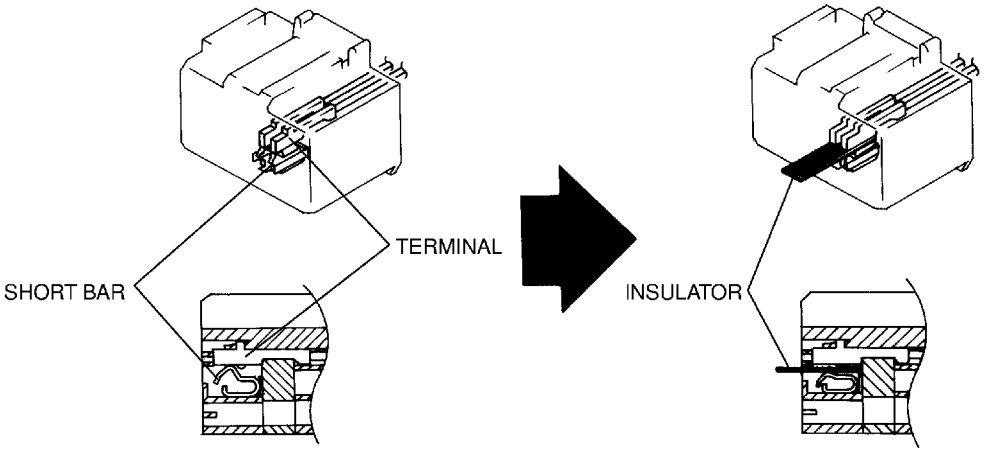
1	Air bag system warning light does not illuminate when ignition switch is turned to ON position.

TROUBLESHOOTING HINTS

- Malfunction in air bag system warning light circuit
  - — Instrument cluster (print plate) malfunction
  - — Air bag system warning light bulb malfunction
  - — Poor contact in instrument cluster connector
  - — Open or short circuit in wiring harness between instrument cluster and SAS control module
  - — SAS control module malfunction

Note

- When inserting insulator between SAS control module connector terminals and short bar, insert it as shown in the figure.



- When performing an asterisked(*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover the poor contact points which may be the cause of intermittent malfunctions.
- If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT OTHER WARNING AND INDICATOR LIGHTS 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 instrument cluster power supply system and ground system, then go to Step 6.
2	**INSPECT AIR BAG SYSTEM WARNING LIGHT BULB** • Disconnect negative battery cable. • Remove instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) • Is air bag system warning light bulb functional?	Yes	Reinstall it properly, then go to next step.
		No	Replace bulb, then go to Step 6.
* 3	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR CONTINUITY** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar trims. • Disconnect driver- and passenger-side pre-tensioner seat belt connectors. • Remove left side side wall. • Disconnect all SAS control module connectors. • Is there continuity between SAS control module connector terminal 2W and instrument cluster connector terminal 1R?	Yes	Go to next step.
		No	Replace wiring harness, then go to Step 6.
* 4	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR SHORT TO POWER SUPPLY** • Connect negative battery cable. **Caution** • **Be sure not to cause damage to short bar when inserting insulator. If short bar is damaged, you may not be able to properly inspect connection of SAS control module connector.** • Insert insulator between SAS control module connector terminals 2W and 2T so short bar cannot function. • Turn ignition switch to ON position. • Measure voltage at instrument cluster connector terminal 1R. • Is voltage **more than approximately 9 V**?	Yes	Replace wiring harness, then go to Step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**VERIFY WHETHER MALFUNCTION IS IN PRINT PLATE IN INSTRUMENT CLUSTER** • Is there continuity between terminals 1J and 1R of print plate on instrument cluster?	Yes	Replace SAS control module, then go to next step. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
		No	Replace instrument cluster, then go to next step. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION)
6	**VERIFY WHETHER MALFUNCTION SYMPTOM OCCURS AFTER REPAIR OR NOT** • Connect all SAS control module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connectors. • Connect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Connect passenger-side air bag module connector. • Connect clock spring connector. • Connect instrument cluster connector. • Connect negative battery cable. • Turn ignition switch to ON position. • Does air bag system warning light operate properly?	Yes	Complete troubleshooting, then explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES IMMEDIATELY AFTER IGNITION SWITCH IS TURNED TO ON POSITION AND REMAINS ILLUMINATED

A3U080301046W05

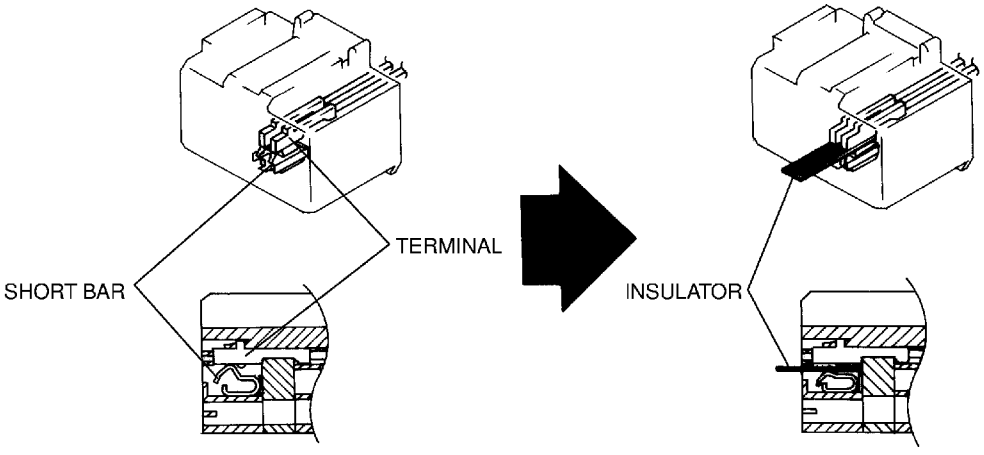
2	**Air bag system warning light illuminates immediately after ignition switch is turned to ON position and remains illuminated.**

TROUBLESHOOTING HINTS

- Malfunction in air bag system warning light circuit
  - — Instrument cluster (print plate) malfunction
  - — Malfunction of short bar between SAS control module connector terminals 2W and 2T
  - — No connection in SAS control module connector
  - — Short circuit in wiring harness between instrument cluster and SAS control module
  - — SAS control module malfunction

Note

- When inserting insulator between SAS control module connector terminals and short bar, insert it as shown in the figure.



- When performing an asterisked(*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover the poor contact points which may be the cause of intermittent malfunctions.
- If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

Diagnostic procedure

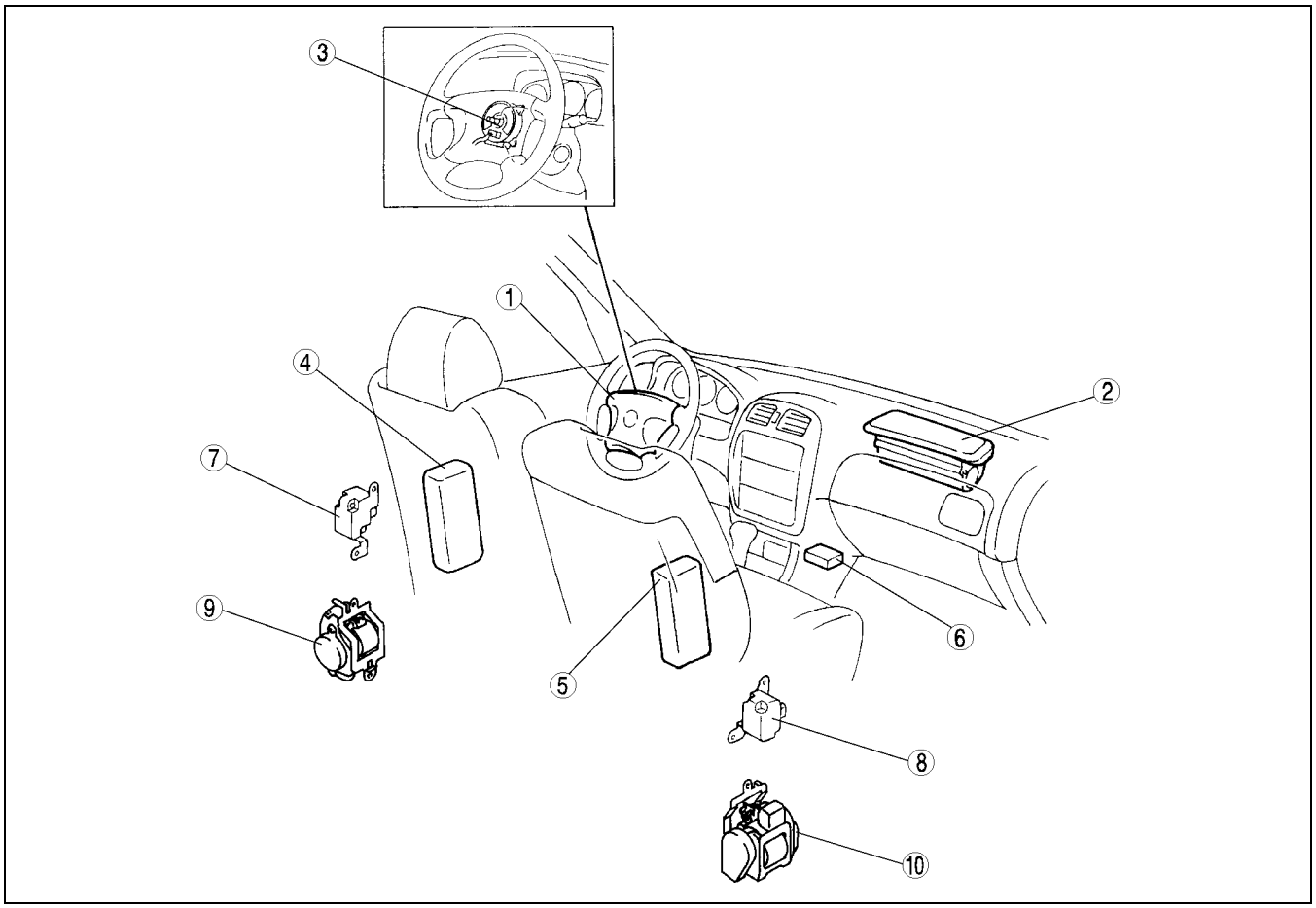
STEP	INSPECTION		ACTION
1	**VERIFY THAT SAS CONTROL MODULE CONNECTOR IS CONNECTED** **Warning** • **Handling air bag system components improperly can accidentally deploy air bag modules and pre-tensioner seat belts, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling air bag system components. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS)** • Turn ignition switch to LOCK position. • Disconnect negative battery cable and wait for **more than 1 minute**. • Remove left side side wall. • Are all SAS control module connectors securely connected?	Yes	Go to next step.
		No	Reconnect connector properly, then go to Step 6.
2	**INSPECT SAS CONTROL MODULE TERMINALS 2W AND 2T** • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Remove B-pillar trims. • Disconnect driver- and passenger-side pre-tensioner seat belt connectors. • Disconnect all SAS control module connectors. • Is short bar between SAS control module connector terminals 2W and 2T bent?	Yes	Replace wiring harness, then go to Step 6.
		No	Go to next step.
3	**INSPECT SHORT BAR HOOK OF SAS CONTROL MODULE** • Is short bar hook of SAS control module okay?	Yes	Go to next step.
		No	Replace SAS control module, then go to Step 6. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)
* 4	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR SHORT TO GROUND** • Remove instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) **Caution** • **Be sure not to cause damage to short bar when inserting insulator. If short bar is damaged, you may not be able to properly inspect connection of SAS control module connector.** • Insert insulator between SAS control module connector terminals 2W and 2T so short bar cannot function. • Is there continuity between SAS (control module) connector terminal 2W and ground?	Yes	Replace wiring harness, then go to Step 6.
		No	Go to next step.
5	**INSPECT FOR SHORT TO GROUND IN INSTRUMENT CLUSTER CIRCUIT** • Is there continuity between terminal 1R and any of following terminals of print plate on instrument cluster? — Terminal 1D — Terminal 1A — Terminal 2B (Without ABS or ABS/TCS)	Yes	Replace instrument cluster, then go to next step. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION)
		No	Replace SAS control module, then go to next step. (See 08–10–12 SAS CONTROL MODULE REMOVAL/ INSTALLATION)

STEP	INSPECTION		ACTION
6	**VERIFY WHETHER MALFUNCTION SYMPTOM OCCURS AFTER REPAIR OR NOT** • Connect all SAS control module connectors. • Connect driver- and passenger-side pre-tensioner seat belt connectors. • Connect driver- and passenger-side side air bag module connectors. (Vehicles with side air bag) • Connect passenger-side air bag module connector. • Connect clock spring connector. • Connect instrument cluster connector. • Connect negative battery cable. • Turn ignition switch to ON position. • Does air bag system warning light operate properly?	Yes	Complete troubleshooting, then explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

08–10 AIR BAG SYSTEM

LOCATION INDEX

A3U081001046W01



Z3U0810W007

1	Driver-side air bag module (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
2	Passenger-side air bag module (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
3	Clock spring (See 08–10–8 CLOCK SPRING ADJUSTMENT) (See 08–10–9 CLOCK SPRING REMOVAL/ INSTALLATION) (See 08–10–10 CLOCK SPRING INSPECTION)
4	Driver-side side air bag module (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
5	Passenger-side side air bag module (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

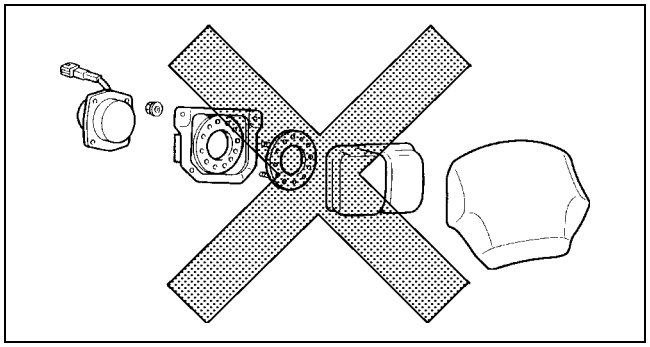
6	SAS control module (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION) (See 08–10–12 SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION)
7	Driver-side side air bag sensor (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
8	Passenger-side side air bag sensor (See 08–10–10 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
9	Driver-side pre-tensioner seat belt (See 08–11–1 FRONT SEAT BELT REMOVAL/ INSTALLATION)
10	Passenger-side pre-tensioner seat belt (See 08–11–1 FRONT SEAT BELT REMOVAL/ INSTALLATION)

AIR BAG SYSTEM SERVICE WARNINGS

A3U081001046W02

Component Disassembly

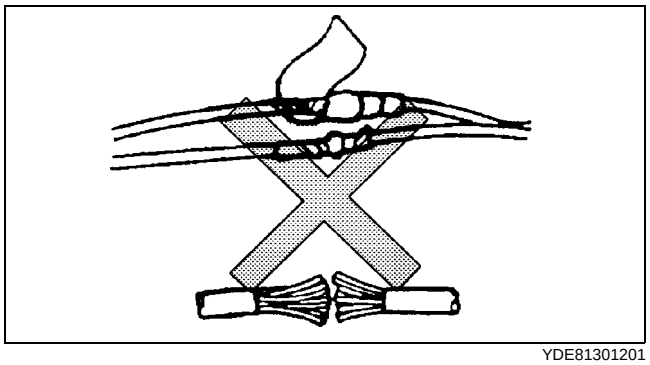
- **Disassembling and reassembling the components of the air bag system can render the system inoperative, which may result in serious injury or death in the event of an accident. Do not disassemble any air bag system component.**



YDE81301200

Wiring Harness Repair

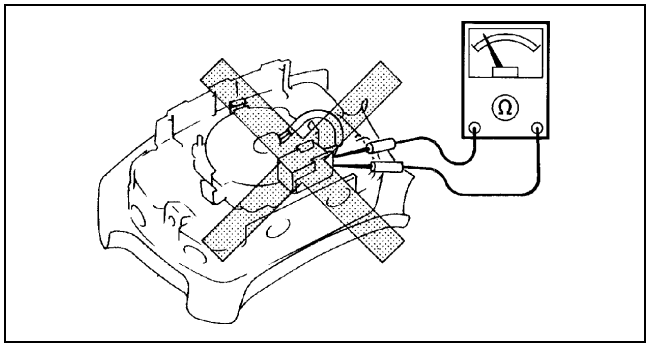
- **Incorrectly repairing an air bag system wiring harness can accidentally deploy the air bag module or pre-tensioner seat belt, which can cause serious injury. If a problem is found in the system wiring, replace the wiring harness. Do not try to repair it.**



YDE81301201

Air Bag Module Inspection

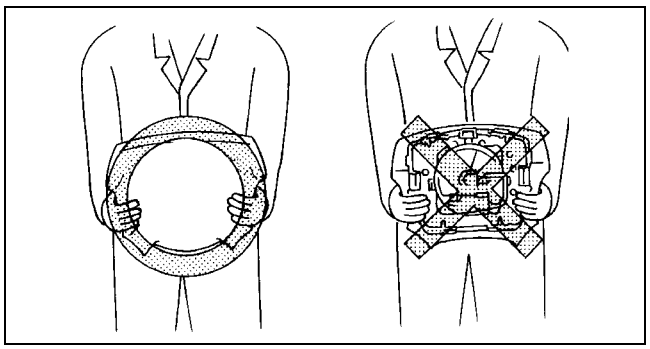
- **Inspecting an air bag module using an ohmmeter can deploy the air bag module, which may cause serious injury. Do not use an ohmmeter to inspect an air bag module. Always use the on-board diagnostic function to diagnose the air bag module for malfunctions. (See 08–02–**2 FOREWORD**.)**



X3U810WA2

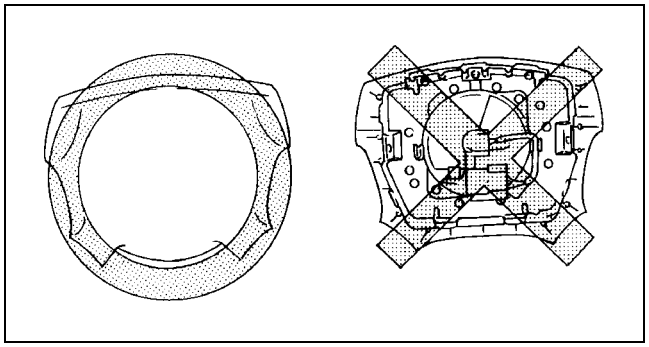
Air Bag Module Handling

- **A live (undeployed) air bag module may accidentally deploy when it is handled and cause serious injury. When carrying a live (undeployed) air bag module, point the front surface away from your body to lessen the chance of injury in case it deploys.**



YDE81301004

- **A live (undeployed) 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.**



YDE81301005

Side Air Bag Module Handling

- **When the side air bag module deploys due to a collision, the interior of 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 the seat back (pad, frame, trim) with new parts. After service, confirm that the seat operates normally and that the harness is positioned properly.**

SAS Control Module Handling

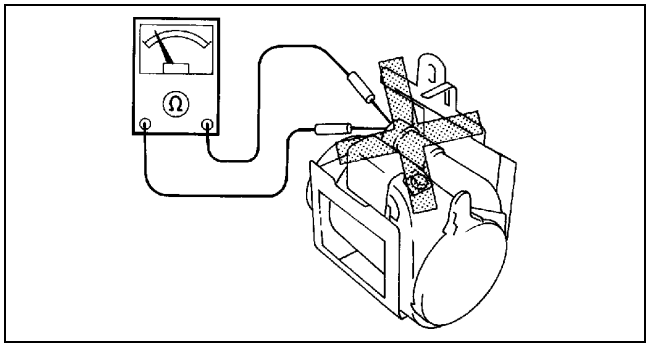
- **Disconnecting the SAS control module connector or removing the SAS control module with the ignition switch at ON position can cause the air bag modules to deploy, which may seriously injure you. Before disconnecting the SAS control module connector or removing the SAS control module, turn the ignition switch to LOCK 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.**
- **Connecting the SAS control module connector without firmly installing the SAS control module to the vehicle is dangerous. The crash sensor inside the control module may 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 connector, firmly mount the control module to the vehicle.**
- **For vehicles with a single point sensor, once an air bag module 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 single point 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 part. The side air bag sensor cannot be bench-checked or self-checked.**

Pre-tensioner Seat Belt Inspection

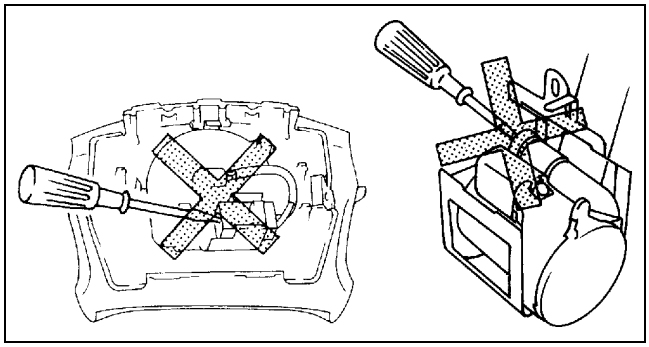
- **Inspecting a pre-tensioner seat belt using an ohmmeter can deploy the pre-tensioner seat belt, which can cause serious injury. Do not use an ohmmeter to inspect the pre-tensioner seat belt. Always use the on-board diagnostic to diagnose the pre-tensioner seat belt for malfunctions.**



Z3U0810W003

Component Handling

- **Oil, grease, water, etc. on components may cause the air bag modules and pre-tensioner seat belt to fail to deploy in an accident, which may cause serious injury. Do not allow oil, grease, water, etc., on components.**
- **Inserting a screwdriver, etc. into the connector of an air bag module or a pre-tensioner seat belt may damage the connector and cause the air bag module to deploy improperly, which may cause serious injury. Do not insert any foreign objects into the connector.**



Z3U0810W004

Component Reuse

- **Even if an air bag module or a pre-tensioner seat belt does not deploy in a collision and does not have any external signs of damage, it may have been damaged internally, which may cause improper operation. Improper operation may cause serious injury. Always self-check the undamaged air bag module or pre-tensioner seat belt to determine whether it can be reused. (See 08–02–**2 FOREWORD**.)**

DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

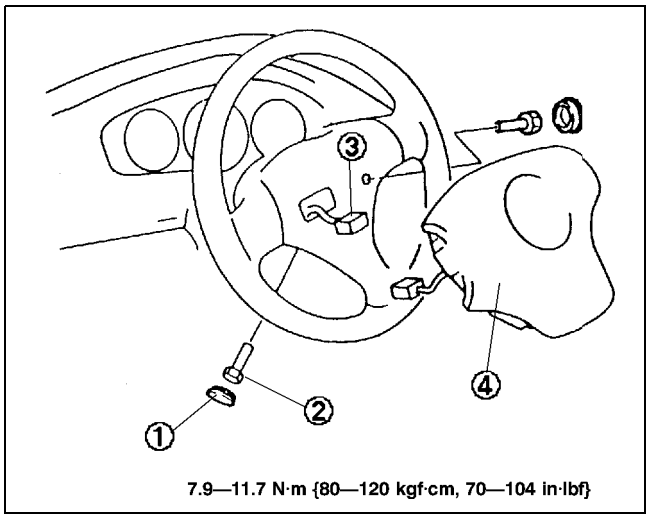
A3U081057010W01

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 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove in the order indicated in the table.

1	Cover
2	Bolt
3	Connector (See 08–10–6 Connector Installation Note)
4	Driver-side air bag module

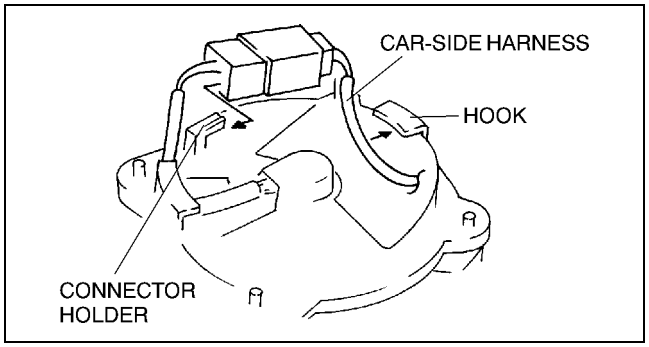


A3U0810W101

4. Install in the reverse order of removal.
5. Turn the ignition switch to ON position.
6. 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 function. (See 08–02–2 FOREWORD.)

Connector Installation Note

1. Install the connector and secure the car-side harness onto the hook as shown in the figure.



A3U0810W002

PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

A3U081057050W01

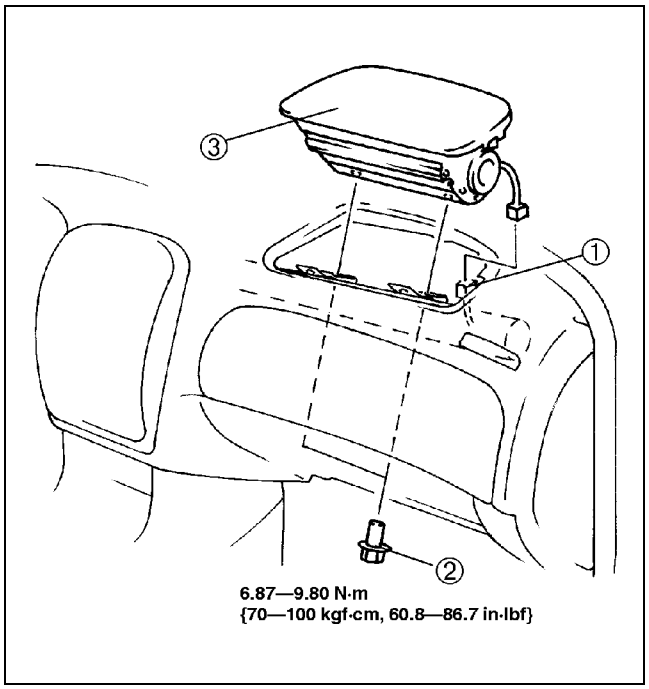
Warning

- **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 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove the glove compartment.
4. Remove in the order indicated in the table.

1	Connector (See 08–10–6 Connector Installation Note)
2	Bolt
3	Passenger-side air bag module

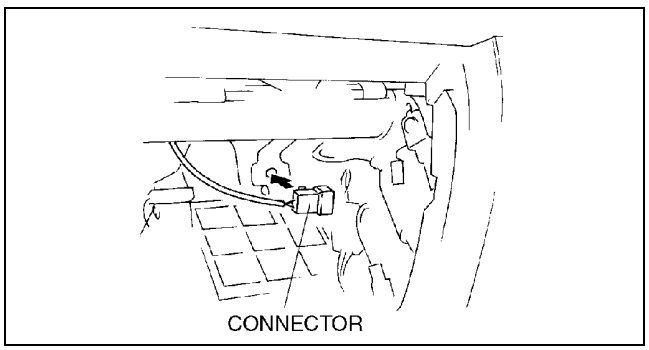
5. Install in the reverse order of removal.
6. Turn the ignition switch to ON position.
7. Verify that the air bag system warning light illuminates for **approximately 6 seconds** and then goes off.
   - If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic function. (See 08–02–2 FOREWORD.)



X3U810WAA

Connector Installation Note

1. Install the connector as shown in the figure.



Y3U810WAN

SIDE AIR BAG MODULE REMOVAL/INSTALLATION

A3U081000147W01

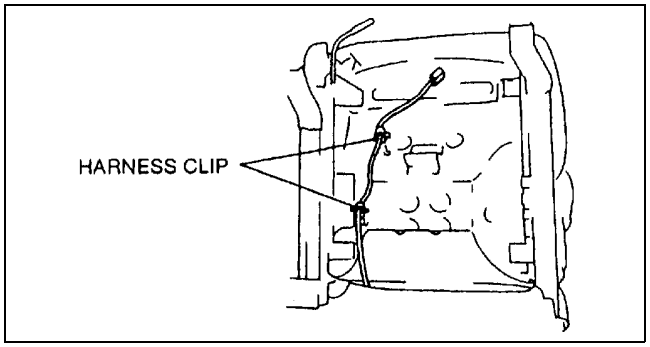
Warning

- **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 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Warning

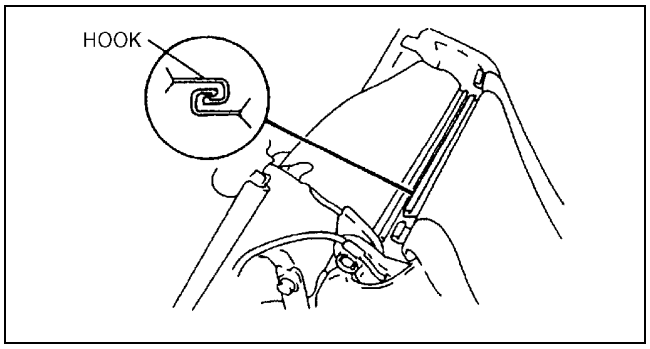
- **If the side air bag module is installed with a foreign body in the seat back, the debris may be scattered when the side air bag module operates (deploys), causing injury. Verify that there is no foreign body in the seat back before installing the side air bag module.**

1. Remove the front seat. (See 09–13–1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Remove the harness clips.



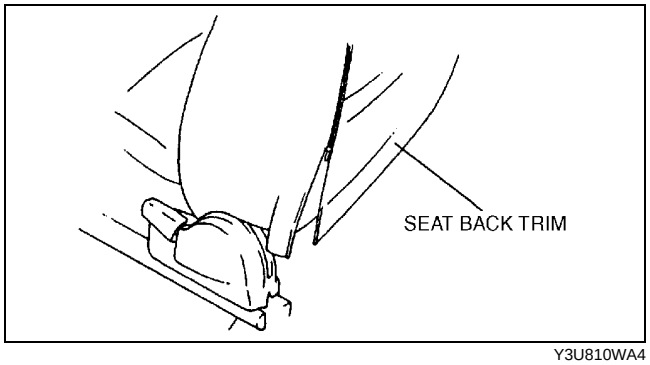
Y3U810WA2

3. Undo the hook on the seat back cushion.



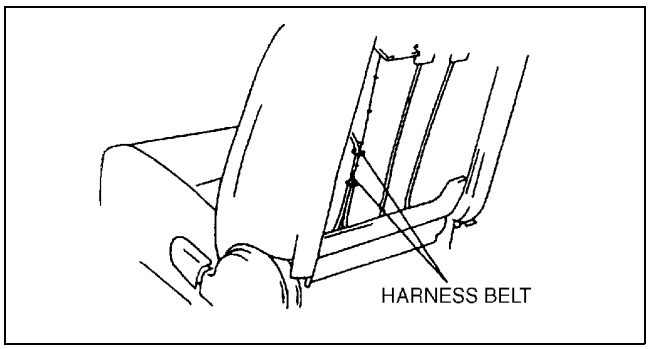
Y3U810WA3

4. Unzip the seat back trim.



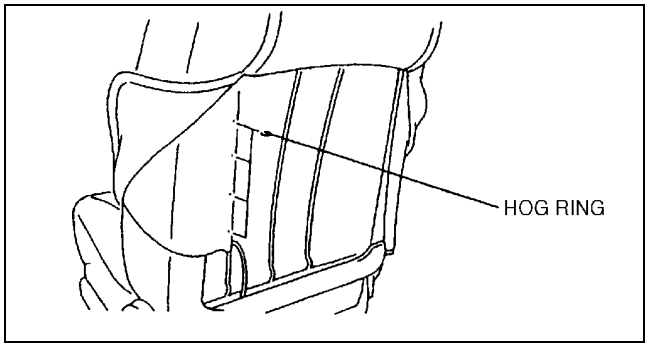
Y3U810WA4

5. Remove the harness belts.



Y3U810WA5

6. Remove the hog rings.
7. Turn over the seat back cushion.

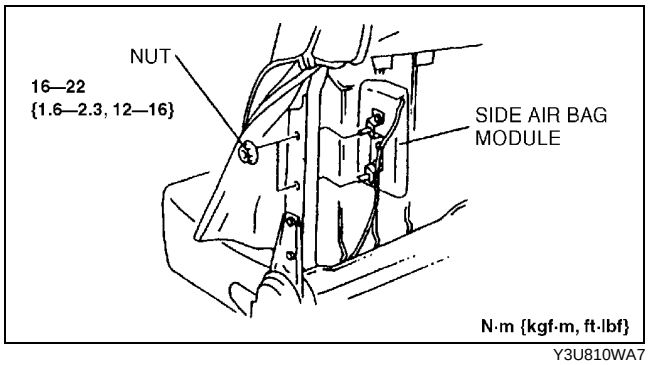


Y3U810WA6

8. Remove the nuts to remove the side air bag module.

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 of the seat.**



Y3U810WA7

9. Install in the reverse order of removal.
10. Turn the ignition switch to ON position.
11. 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 function. (See 08–02–2 FOREWORD.)

CLOCK SPRING ADJUSTMENT

A3U081066123W01

Note

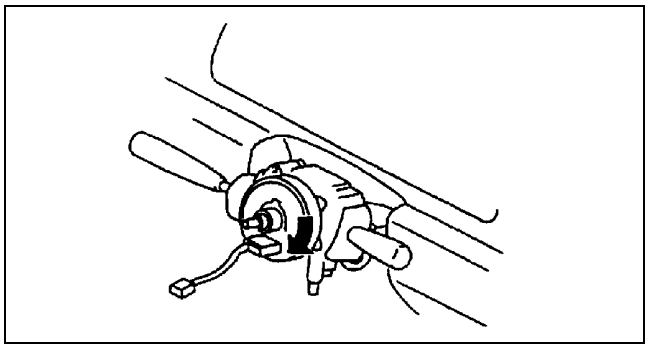
- The adjustment procedure is also specified on the caution label of the clock spring.

1. Set the front wheels straight ahead.

Caution

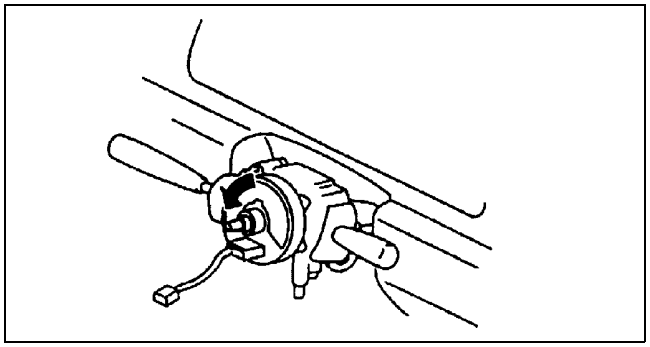
- **The clock spring will break if over-wound. Do not forcibly turn the clock spring when turning it.**

2. Turn the clock spring clockwise until it stops.



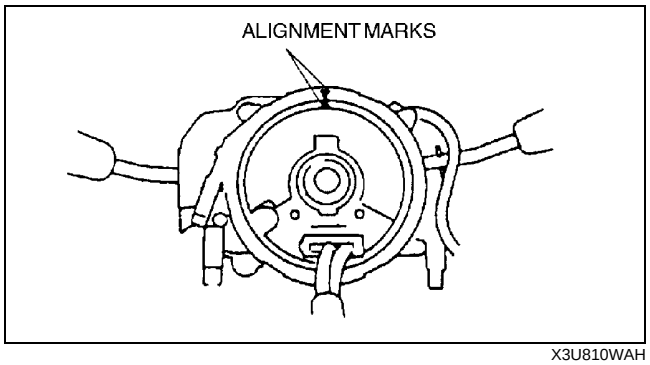
X3U810WAF

3. Turn the clock spring counterclockwise **2 3/4 turns**.



X3U810WAG

4. Align the mark on the clock spring with the mark on the outer housing.



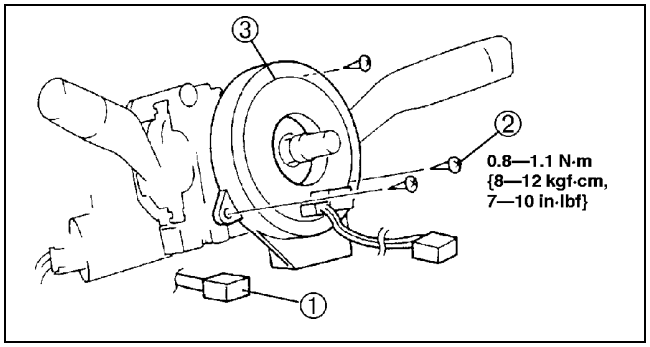
X3U810WAH

CLOCK SPRING REMOVAL/INSTALLATION

A3U081066123W02

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the steering wheel. (See 06–12–6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
4. Remove the column cover.
5. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Clock spring



X3U810WAE

6. Install in the reverse order of removal.

CLOCK SPRING INSPECTION

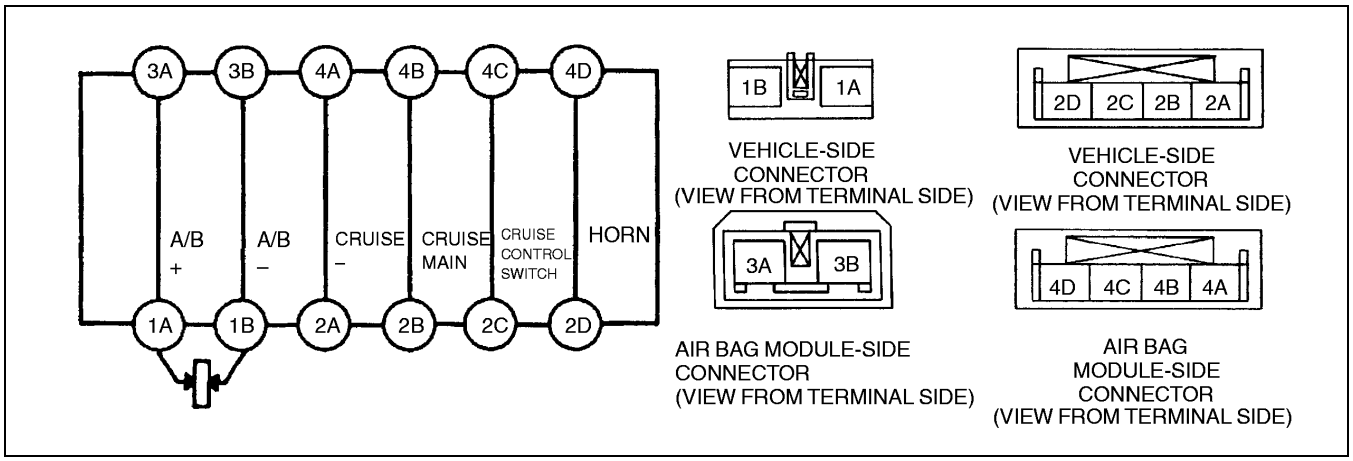
A3U081066123W03

1. Remove the clock spring. (See 08–10–9 CLOCK SPRING REMOVAL/INSTALLATION.)
2. Inspect for continuity between the clock spring terminals using an ohmmeter.
   - If not as specified, replace the clock spring.

○—○ : Continuity

Test condition	Terminal											
	1A	1B	2A	2B	2C	2D	3A	3B	4A	4B	4C	4D
Constant	○	○					○	○				
			○						○			
				○						○		
					○						○	
						○						○

X3U810WAJ



Y3U810WA8

Note

- When the vehicle-side connector of clock spring is disconnected, the terminals 1A and 1B are shorted to prevent unexpected deployment of the air bag module. When it is connected, the terminals are open.

SIDE AIR BAG SENSOR REMOVAL/INSTALLATION

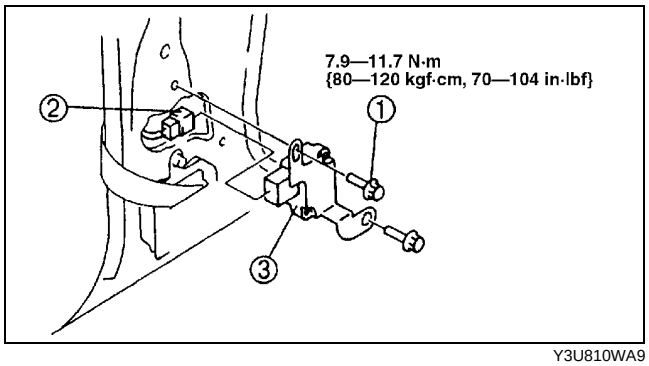
A3U081000146W01

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 side air bag sensor. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove the B-pillar lower trim. (See 09–17–10 B-PILLAR LOWER TRIM REMOVAL.)
4. Remove in the order indicated in the table.

1	Bolt
2	Connector (See 08–10–11 Connector Removal Note) (See 08–10–11 Connector Installation Note)
3	Side air bag sensor



Y3U810WA9

5. Install in the reverse order of removal.

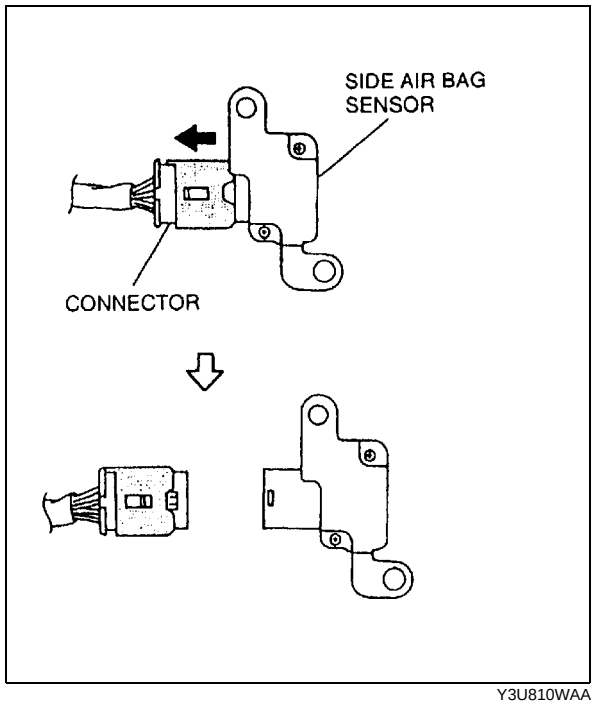
Note

- When a new side air bag sensor has been installed, perform the air bag module deployment authorization procedure. (See 08–10–13 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT AUTHORIZATION PROCEDURES.)

6. Turn the ignition switch to ON position.
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 function. (See 08–02–2 FOREWORD.)

Connector Removal Note

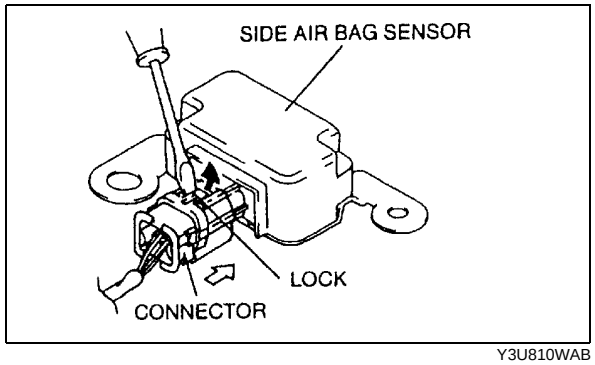
1. Slide the connector cover toward the harness and then disconnect the connector from the side air bag sensor.



Y3U810WAA

Connector Installation Note

1. Attach the connector to the side air bag sensor.
2. Connect the connector by attaching it to the side air bag sensor while lifting up the lock on the connector with a flathead screwdriver.



Y3U810WAB

SAS CONTROL MODULE REMOVAL/INSTALLATION

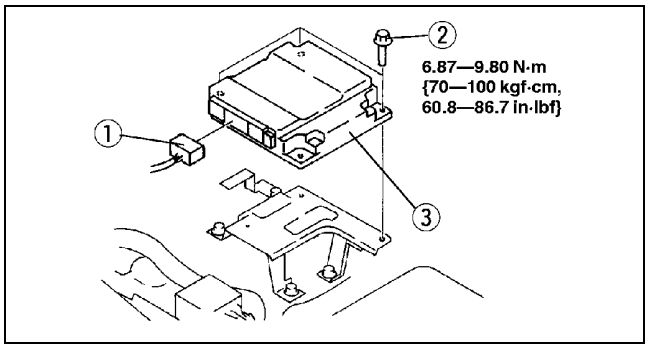
A3U081057030W01

Warning

- **Handling the SAS control module improperly can accidentally deploy the air bag modules, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the SAS control module. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove the side walls.
4. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	SAS control module



X3U810WAC

5. Install in the reverse order of removal.
6. Turn the ignition switch to ON position.
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 function. (See 08–02–2 FOREWORD.)

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 module deployment authorization procedure. (See 08–10–13 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT AUTHORIZATION PROCEDURES.)

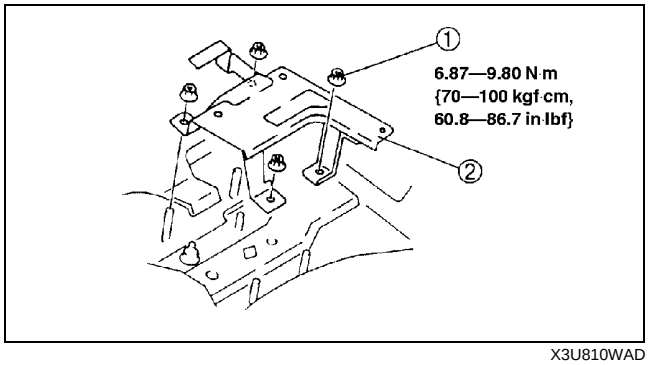
SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION

A3U081057030W02

1. Remove the SAS control module. (See 08–10–12 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	Nut
2	SAS control module bracket

3. Install in the reverse order of removal.



X3U810WAD

AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT AUTHORIZATION PROCEDURES

A3U081057000W01

Note

- When replacing both the SAS control module and side air bag sensor together, perform only “After Replacing SAS Control Module”

After Replacing SAS Control Module

1. Install a new SAS control module.
   (1) Turn the ignition switch to ON position.
   (2) Verify that the air bag system warning light illuminates for **approximately 6 seconds**, goes off, and then flashes continuously.
      - If the air bag system warning light does not flash continuously and indicates a DTC, inspect the system using the on-board diagnostic function. (See 08–02–2 FOREWORD.) When the malfunctions have been repaired and the air bag system warning light flashes continuously, turn the ignition switch to LOCK position. Wait for **approximately 1 second or more** and then turn the ignition switch back to ON position.
      - If the air bag system warning light flashes continuously, turn the ignition switch to LOCK position. Wait for **approximately 1 second or more** and then turn the ignition switch back to ON position.
2. 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.

After Replacing Side Air Bag Sensor

1. Install a new side air bag sensor.
2. Turn the ignition switch to ON position.
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 MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES

A3U081057000W02

Warning

- **A live (undeployed) air bag module and pre-tensioner seat belt may accidentally deploy when it is disposed of and cause serious injury. Do not dispose of a live (undeployed) air bag module. If the SSTs (Deployment tool and Adapter harness) are not available, consult the nearest Mazda representative for assistance.**

Caution

- **Deploying the air bag modules inside the vehicle may cause damage to the vehicle interior. When the vehicle is not to be scrapped, always deploy the air bag modules and pre-tensioner seat belts outside the vehicle.**

- When the vehicle is to be scrapped, deploy the air bag modules and pre-tensioner seat belts inside the vehicle. (See 08–10–13 Deployment Procedure for Inside of Vehicle.)
- When the vehicle is not to be scrapped, deploy the air bag modules and pre-tensioner seat belts outside the vehicle. (See 08–10–16 Deployment Procedure for Outside of Vehicle.)

Note

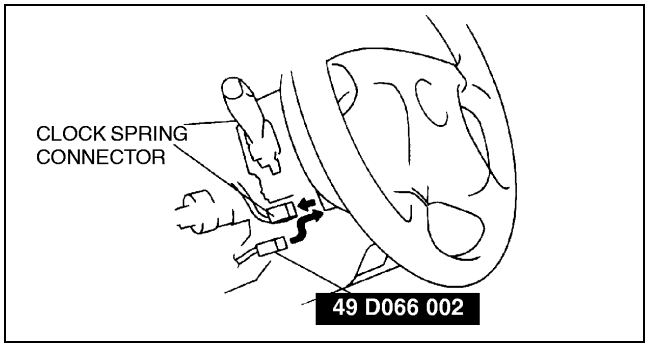
- When disposing of a deployed air bag module, refer to air bag module and pre-tensioner seat belt disposal procedure. (See 08–10–23 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES.)

Deployment Procedure for Inside of Vehicle

1. Inspect the **SST** (Deployment tool). (See 08–10–24 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Move the vehicle to an open space, away from strong winds, and close all of the vehicle's doors and windows.
3. Turn the ignition switch to LOCK position.
4. Disconnect the negative battery cable and wait for **more than 1 minute**.
5. Follow the appropriate procedure for deploying the driver-side air bag module, passenger-side air bag module, or side air bag module.

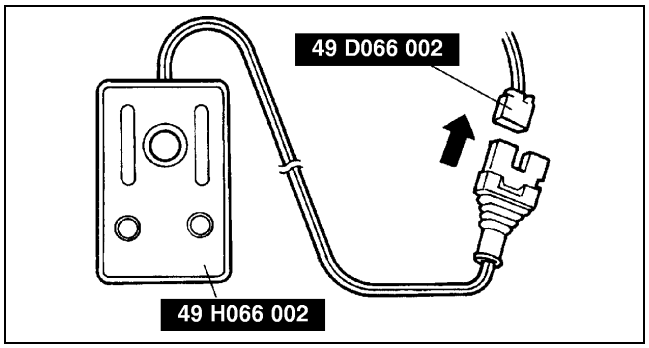
Driver-side air bag module

1. Remove the column cover.
2. Disconnect the clock spring connector.
3. Connect the **SST** (Adapter harness) to the clock spring as shown in the figure.



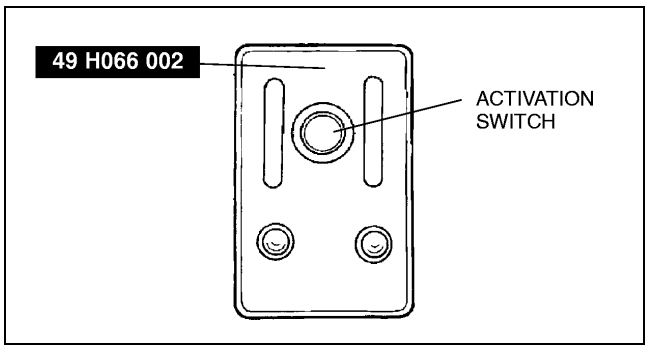
X3U810WAL

4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect the red clip of the **SST** (Deployment tool) to the positive battery terminal and the black clip to the negative battery terminal.
6. Verify that the red light on the **SST** (Deployment tool) is illuminated.
7. Make sure all persons are standing **at least 6 m {20 ft}** away from the vehicle.



X3U810WAM

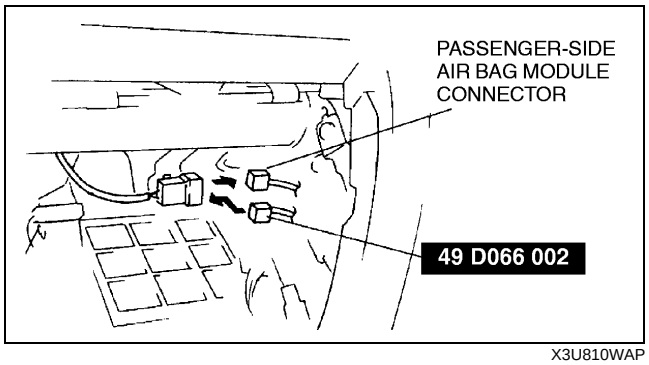
8. Press the activation switch on the **SST** (Deployment tool) to deploy the driver-side air bag module.



X3U810WAN

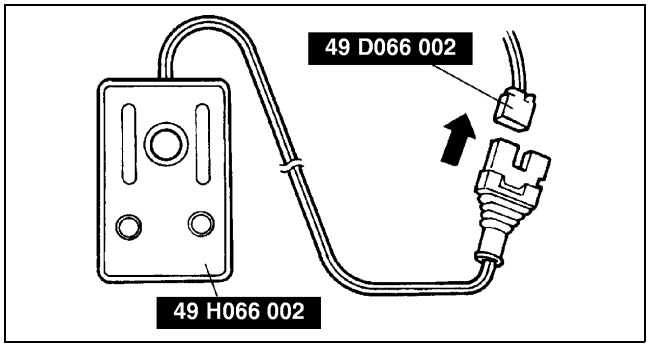
Passenger-side air bag module

1. Remove the glove compartment.
2. Disconnect the passenger-side air bag module connector.
3. Connect the **SST** (Adapter harness) to the passenger-side air bag module as shown in the figure.



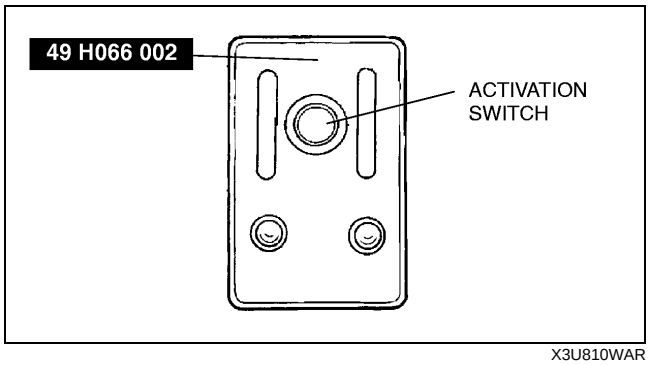
X3U810WAP

4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect the red clip of the **SST** (Deployment tool) to the positive battery terminal and the black clip to the negative battery terminal.
6. Verify that the red light on the **SST** (Deployment tool) is illuminated.
7. Make sure all persons are standing **at least 6 m {20 ft}** away from the vehicle.



X3U810WAQ

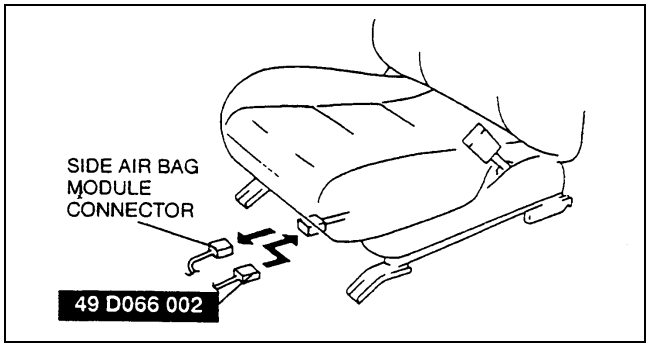
8. Press the activation switch on the **SST** (Deployment tool) to deploy the passenger-side air bag module.



X3U810WAR

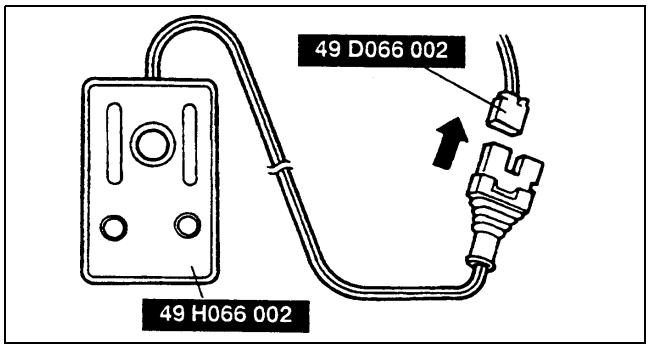
Side air bag module

1. Disconnect the side air bag module connector.
2. Connect the **SST** (Adapter harness) to the side air bag module.



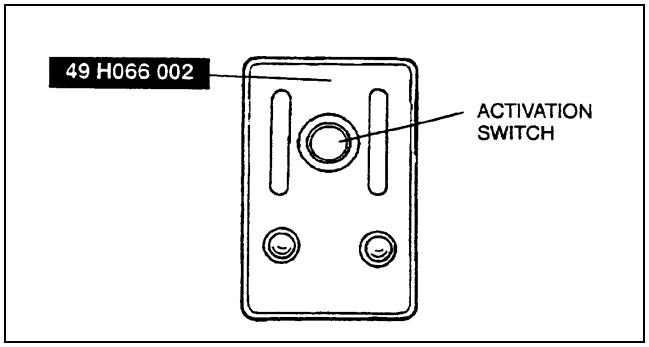
Y3U810WAC

3. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
4. Connect the red clip of the **SST** (Deployment tool) to the positive battery terminal and the black clip to the negative battery terminal.
5. Verify that the red light on the **SST** (Deployment tool) is illuminated.
6. Make sure all persons are standing **at lest 6 m {20ft}** from the vehicle.



Y3U810WAD

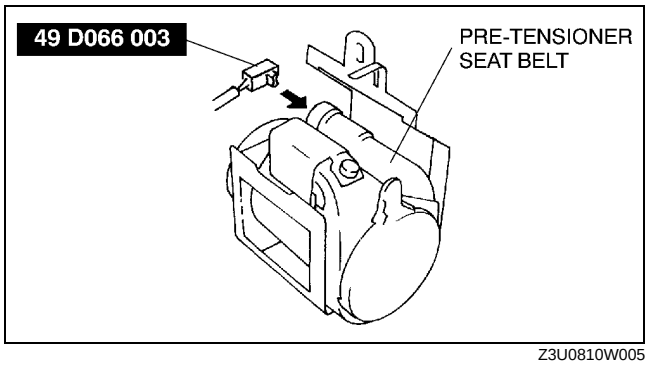
7. Press the activation switch on the **SST** (Deployment tool) to deploy the side air bag module.



Y3U810WAE

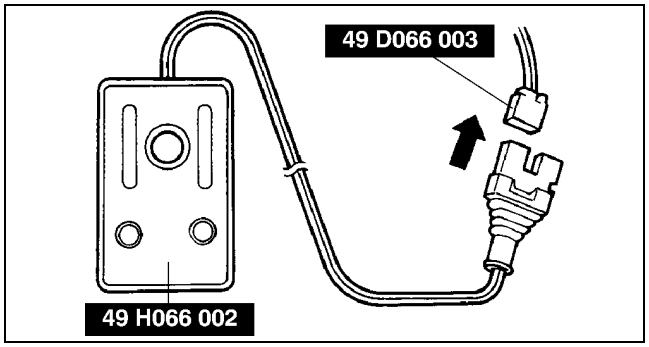
Pre-tensioner seat belt

1. Remove the B-pillar lower trim.
2. Remove the pre-tensioner seat belt and connect the **SST** (49 D066 003) to it as shown in the figure.
3. Install the pre-tensioner seat belt.



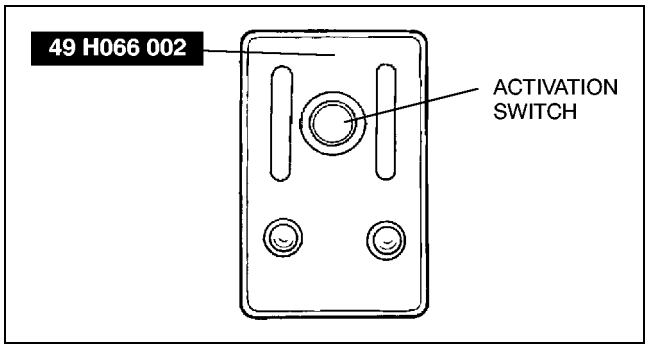
Z3U0810W005

4. Connect the **SST** (49 H066 002) to the **SST** (49 D066 003).
5. Connect the red clip of the **SST** (49 H066 002) to the positive battery terminal and the black clip to the negative battery terminal.
6. Verify that the red light on the **SST** (49 H066 002) is illuminated.
7. Make sure all persons are standing **at least 6 m {20 ft}** from the vehicle.



XME8126W005

8. Press the activation switch on the **SST** (49 H066 002) to deploy the pre-tensioner seat belt.



YMU810WBB

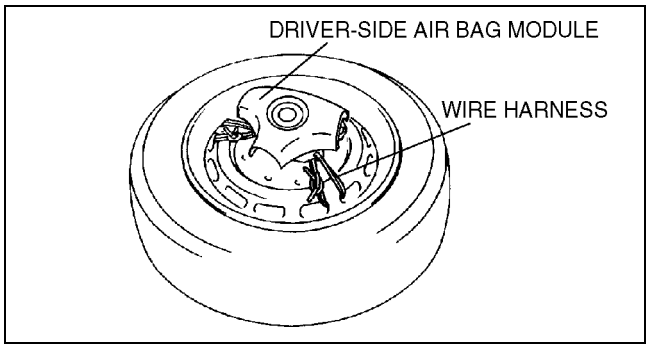
Deployment Procedure for Outside of Vehicle

1. Inspect the **SST** (Deployment tool). (See 08–10–24 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Turn the ignition switch to LOCK position.
3. Disconnect the negative battery cable and wait for **more than 1 minute**.
4. Follow the appropriate procedure for deploying the driver-side air bag module, passenger-side air bag module, or side air bag module.

Driver-side air bag module

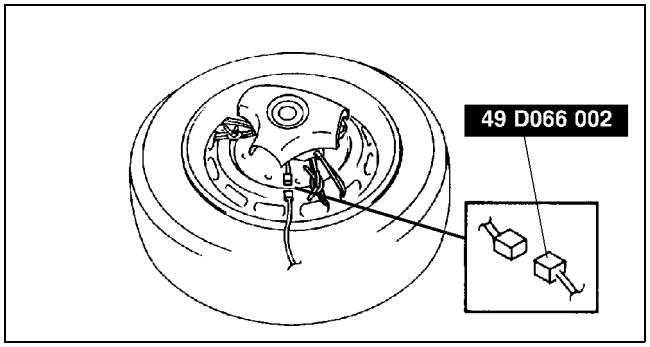
1. Remove the driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
2. Place the driver-side air bag module on the center of the wheel with the module facing up. See the illustration below.
   - To secure the air bag module to the wheel, wrap the wire harness through the wheel and the bolt installation hole **at least 4 times**.

   Warning
   - **If the air bag module is not properly installed to the wheel, serious injury may occur when the module is deployed. When installing the air bag module to the wheel, make sure the module is facing up.**



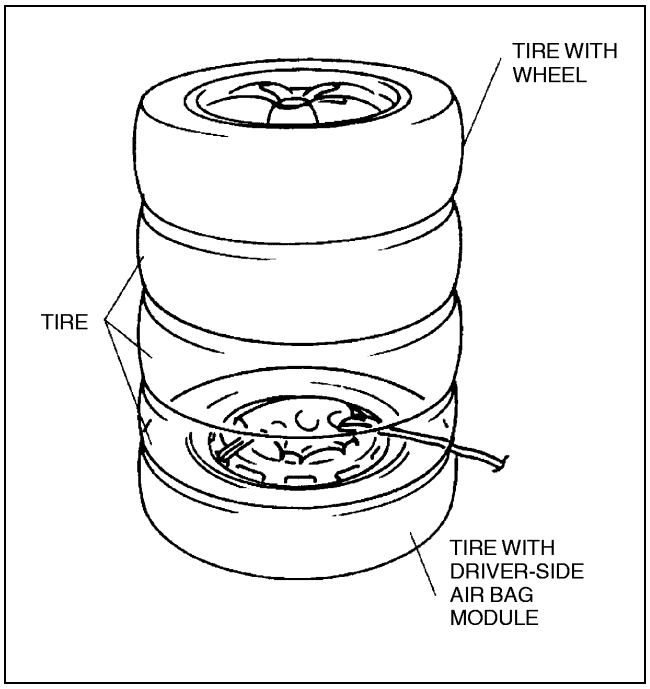
A3U0810W102

3. Connect the **SST** (Adapter harness) to the driver-side air bag module as shown in the figure.



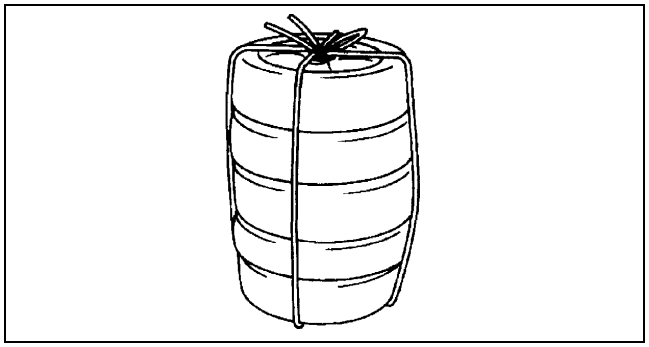
A3U0810W103

4. Stack 3 tires on top of the tire with the air bag module. Stack another tire that has a wheel on top of the 4 tires.



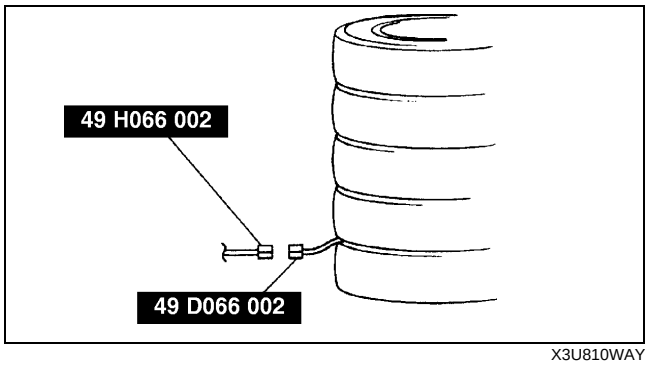
X3U810WAW

5. Tie all tires together with wire.



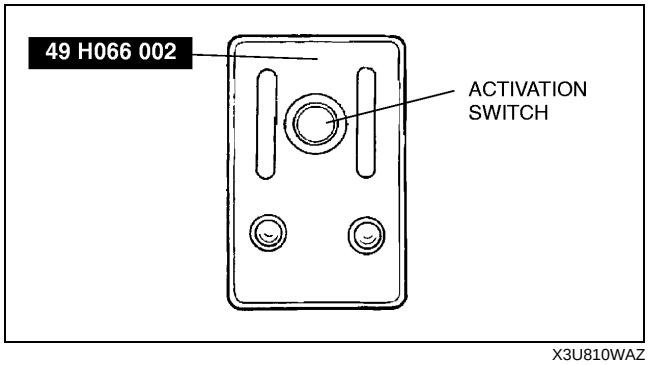
X3U810WAX

6. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
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}** away from the tires.



X3U810WAY

10. Press the activation switch on the **SST** (Deployment tool) to deploy the driver-side air bag module.



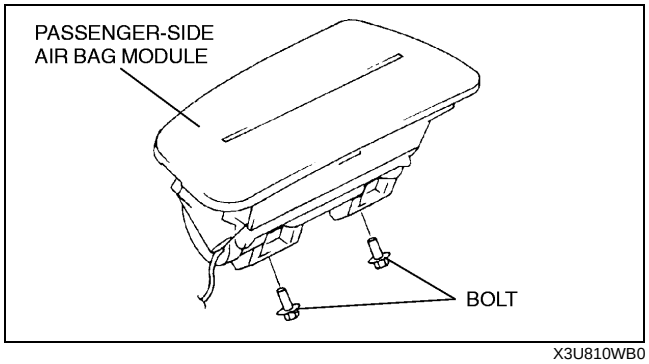
X3U810WAZ

Passenger-side air bag module

1. Remove the passenger-side air bag module. (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the bolts to the passenger-side air bag module.

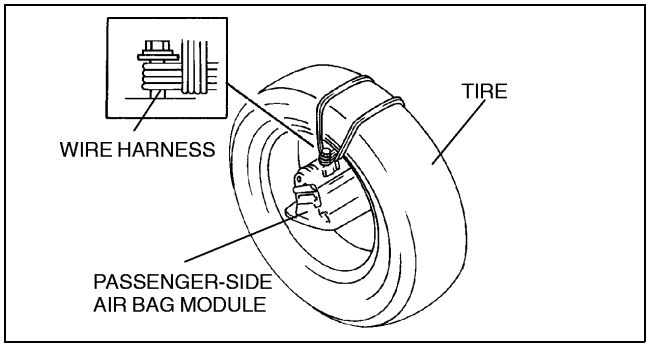
Warning

- **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.**



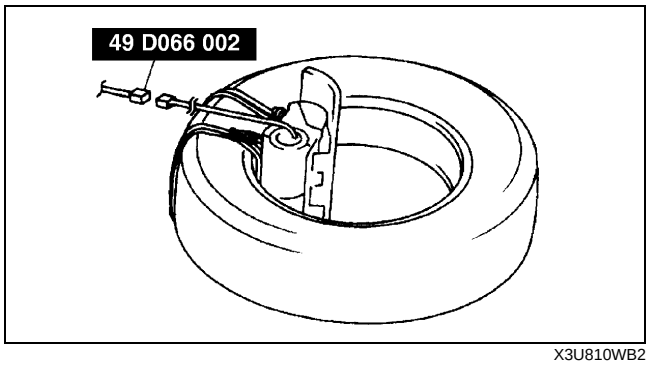
X3U810WB0

3. Tie the passenger-side air bag module to a tire with the module facing the center of the tire. Wrap the wire harness through the tire and around the bolts **at least four times**.



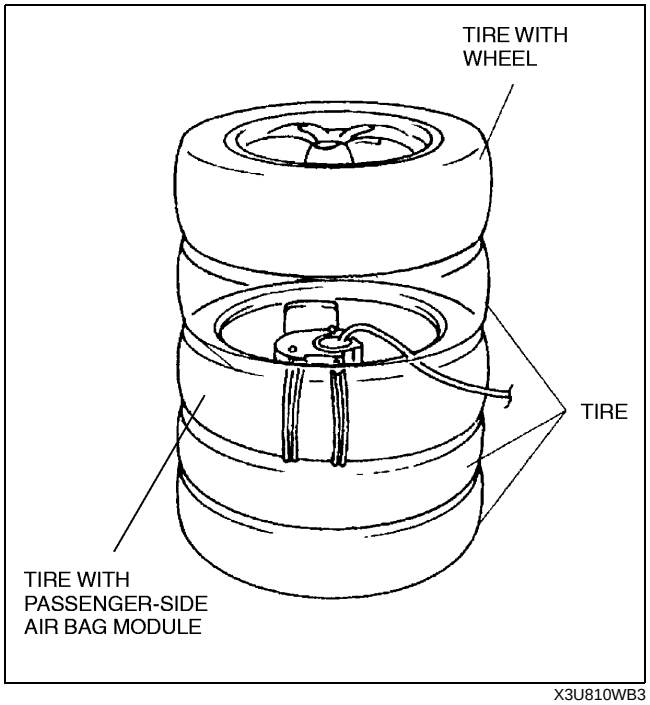
X3U810WB1

4. Connect the **SST** (Adapter harness) to the passenger-side air bag module as shown in the figure.



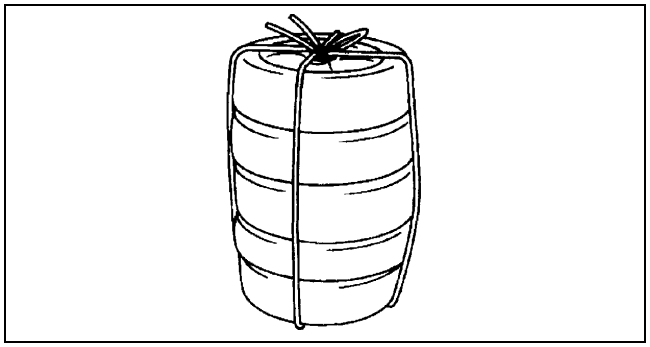
X3U810WB2

5. Stack the tire with the passenger-side air bag module on top of 2 tires. Stack a tire on top of the 3 tires. Stack another tire that has a wheel on top of the 4 tires.



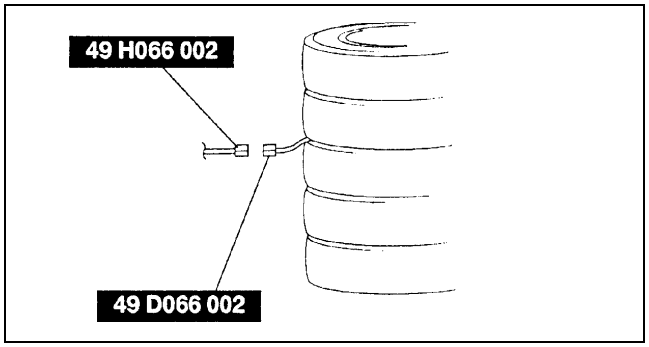
X3U810WB3

6. Tie all tires together with wire.



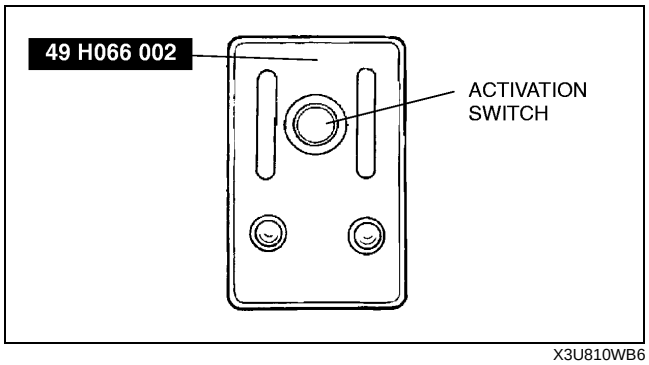
X3U810WB4

7. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
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.
10. Make sure all persons are standing **at least 6 m {20 ft}** away from the tires.



X3U810WB5

11. Press the activation switch on the **SST** (Deployment tool) to deploy the passenger-side air bag module.



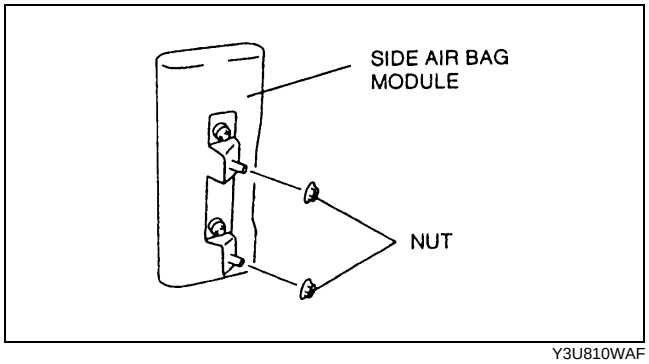
X3U810WB6

Side air bag module

1. Remove the side air bag module. (See 08–10–7 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the nuts to the side air bag module.

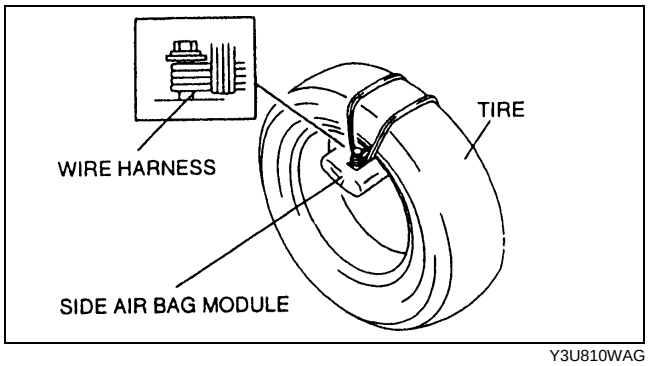
Warning

- **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.**



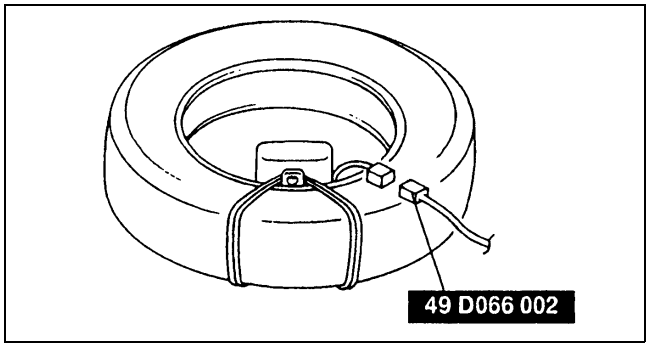
Y3U810WAF

3. Tie the side air bag module to the tire with the module facing the center of the tire. Wrap the wire harness through the tire and around the nuts **at least 4 times**.



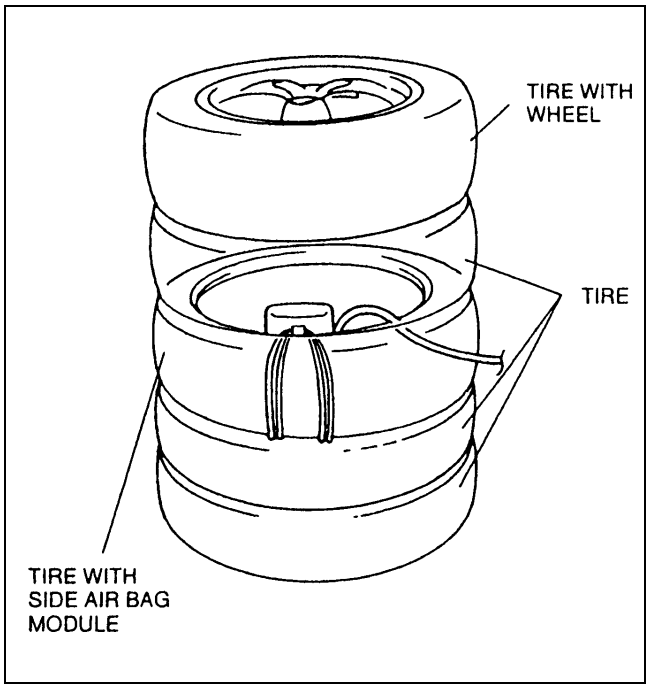
Y3U810WAG

4. Connect the **SST** (Adapter harness) to the side air bag module as shown in the figure.



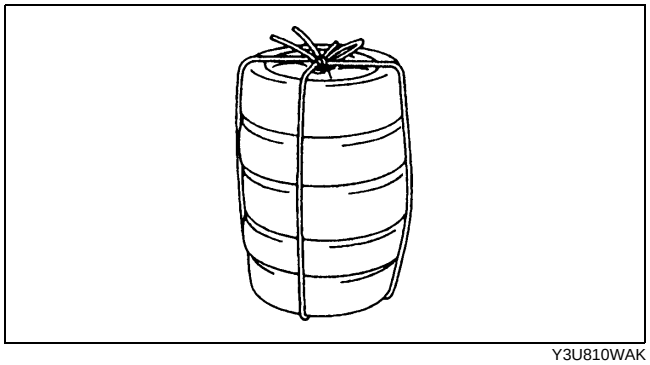
Y3U810WAH

5. Stack the tire with the side air bag module on top of 2 tires. Stack a tire on top of 3 tires. Stack another tire that has a wheel on top of the 4 tires.



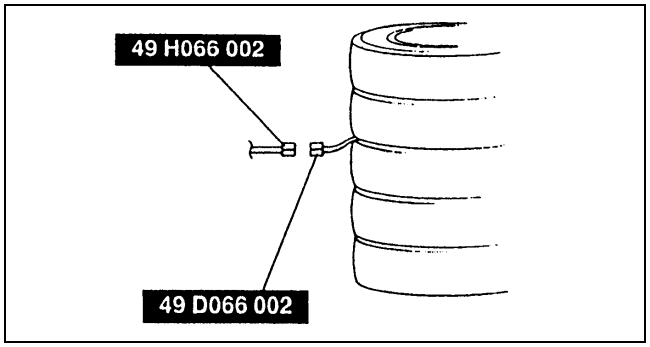
Y3U810WAJ

6. Tie all tires together with wire.



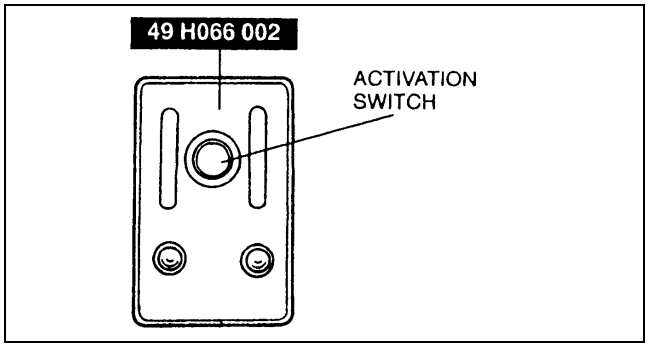
Y3U810WAK

7. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
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.
10. Make sure all persons are standing **at least 6 m {20ft}** from the tires.



Y3U810WAL

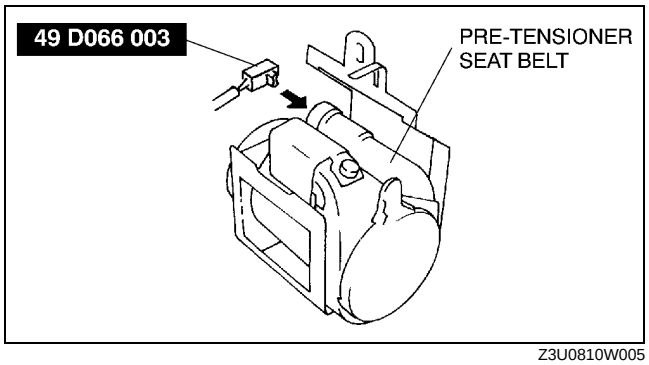
11. Press the activation switch on the **SST** (Deployment tool) to deploy the side air bag module.



Y3U810WAM

Pre-tensioner seat belt

1. Remove the pre-tensioner seat belt.
2. Connect the **SST** (49 D066 003) to the pre-tensioner seat belt as shown in the figure.

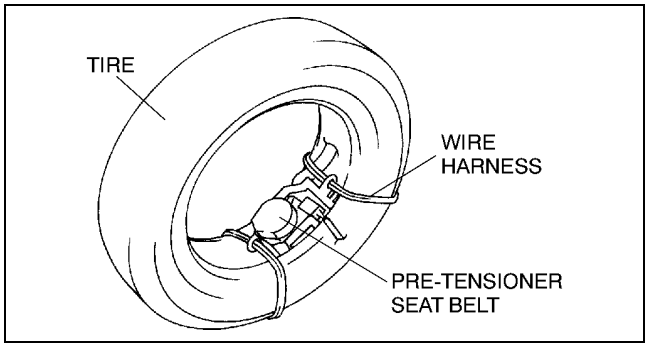


Z3U0810W005

Warning

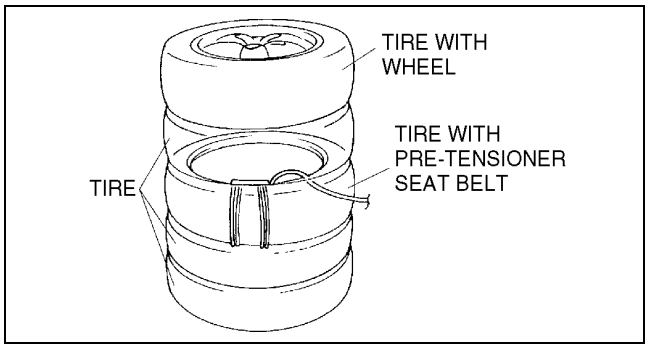
- **If the pre-tensioner seat belt is not properly installed to the tire, serious injury may occur when the pre-tensioner part is deployed. When installing the pre-tensioner seat belt to the tire, make sure the pre-tensioner part is inside the tire.**

3. With the pre-tensioner part inside the tire, tie the pre-tensioner seat belt to the tire. Wrap the wire harness through the tire and around the pre-tensioner seat belt **at least four times**.



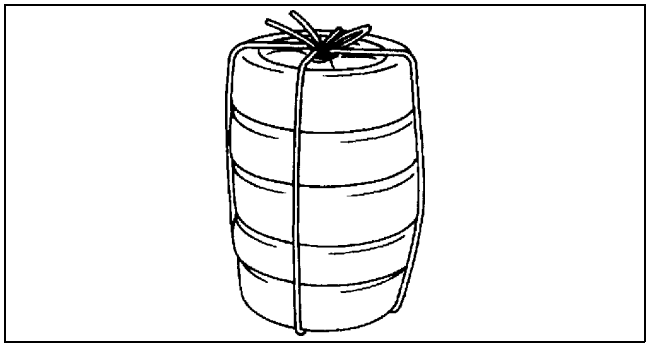
Z3U0810W006

4. Stack the tire with the pre-tensioner seat belt on top of two tires. Stack a tire on top of the three tires. Stack another tire that has a wheel on top of the four tires.



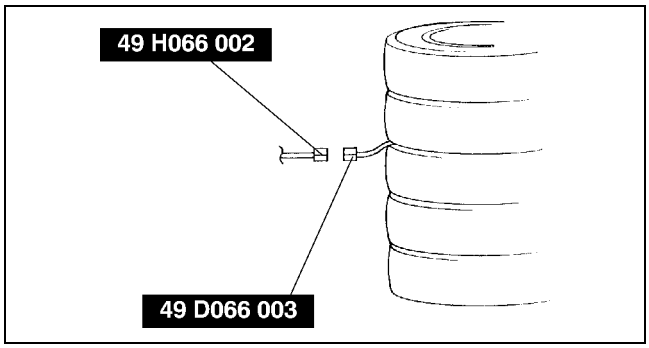
YLE8130W201

5. Tie all tires together with wire.



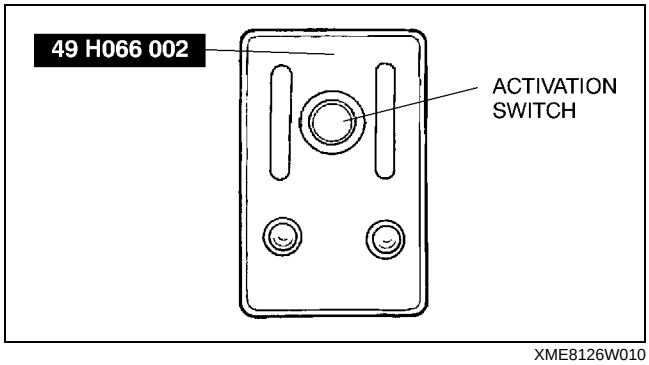
XME8126W008

6. Connect the **SST** (49 H066 002) to the **SST** (49 D066 003).
7. Connect the red clip of the **SST** (49 H066 002) to the positive battery terminal and the black clip to the negative battery terminal.
8. Verify that the red light on the **SST** (49 H066 002) is illuminated.
9. Make sure all persons are standing **at least 6 m {20 ft}** from the vehicle.



XME8126W009

10. Press the activation switch on the **SST** (49 H066 002) to deploy the pre-tensioner seat belt.



XME8126W010

AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES

A3U081057000W03

Warning

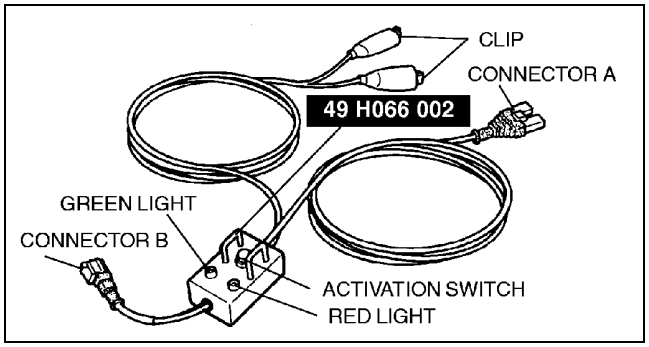
- **Before scrapping a vehicle with a live (undeployed) air bag module and pre-tensioner seat belt, deploy the air bag module. Never dispose of a live (undeployed) air bag module and pre-tensioner seat belt.**
- **The air bag module and pre-tensioner seat belt are very hot immediately after it is deployed. You can get burned. Do not touch the air bag module and pre-tensioner seat belt for at least 15 minutes after deployment.**
- **Pouring water on the deployed air bag module and pre-tensioner seat belt are dangerous. The water will mix with the residual gases to form a gas that can make breathing difficult. Do not pour water on the deployed air bag module and pre-tensioner seat belt.**
- **The deployed air bag module and pre-tensioner seat belt may contain deposits of sodium hydroxide, a caustic by product of the gas-generated combustion. If this substance gets into your eyes or on your hands, it can cause irritation and itching. When handling the deployed air bag module and pre-tensioner seat belt, wear gloves and safety glasses.**

1. Put on gloves and safety glasses.
2. Put the deployed air bag module or pre-tensioner seat belt in a plastic bag, seal it, and then dispose of it.
3. Wash your hands after removing your gloves.

INSPECTION OF SST (DEPLOYMENT TOOL)

- Use the **SST** (Deployment tool) to deploy a live (undeployed) air bag module before disposing of it.
- Before using the **SST** (Deployment tool), inspect its operation.

A3U081001078W01

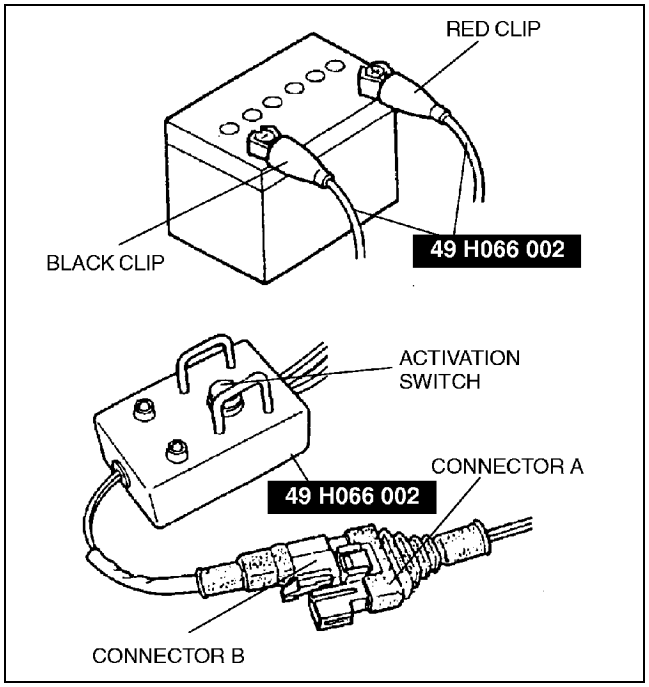


X3U810WB7

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 module 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



X3U810WB8

08–11 SEAT BELT

FRONT SEAT BELT REMOVAL/INSTALLATION

A3U081157630W01

Warning

- **Handling the front seat belt (pre-tensioner seat belt) or the side air bag sensor improperly can accidentally deploy the pre-tensioner or the side air bag module, which may seriously injure you. Read SERVICE WARNINGS before handling the front seat belt or working around the B-pillar areas. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Note

- The side air bag sensor is located in the B-pillar.

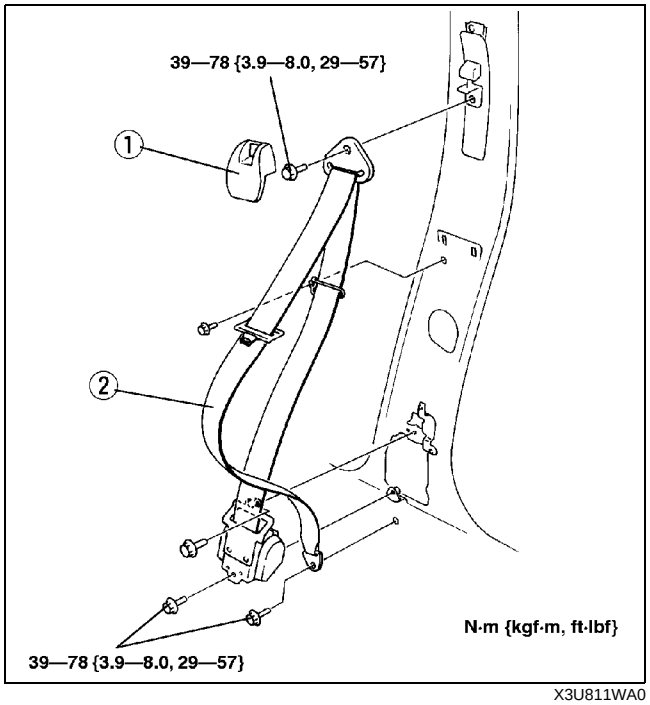
Caution

- **The ELR has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Disconnect the negative battery cable.
2. Remove the B-pillar lower trim. (See 09–17–10 B-PILLAR LOWER TRIM REMOVAL.) (See 09–17–11 B-PILLAR LOWER TRIM INSTALLATION.)
3. Remove in the order indicated in the table.

1	Anchor cover
2	Front seat belt

4. Install in the reverse order of removal.



X3U811WA0

REAR SEAT BELT REMOVAL/INSTALLATION

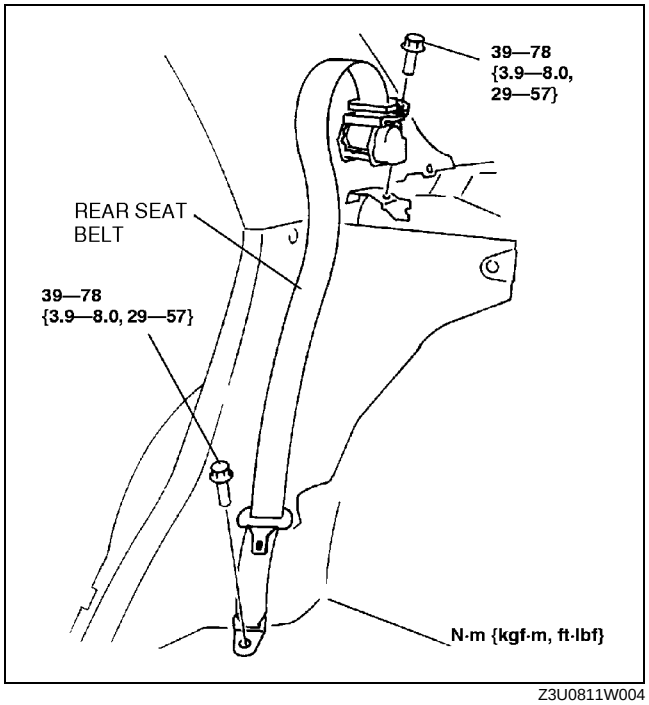
A3U081157730W01

Caution

- **The ELR has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

4SD

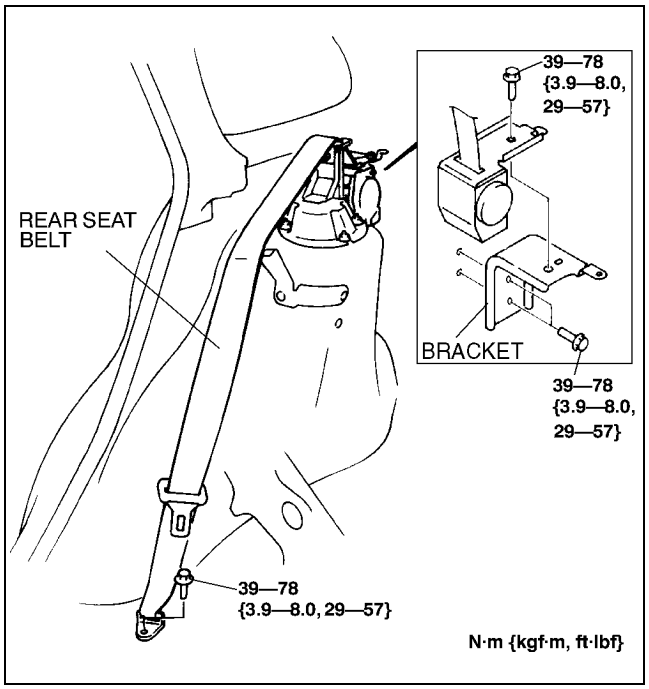
1. Remove the rear package trim.
2. Remove the bolts, then remove the rear seat belt.
3. Install in the reverse order of removal.



Z3U0811W004

5HB

1. Remove the trunk side trim.
2. Remove the bolts, then remove the rear seat belt.
3. Install in the reverse order of removal.



A3U0811W001

REAR CENTER SEAT BELT REMOVAL/INSTALLATION

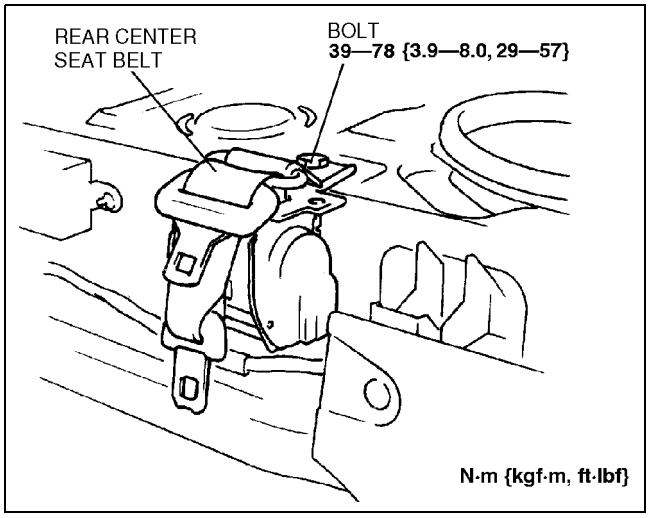
A3U081157730W02

Caution

- **The ELR has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

4SD

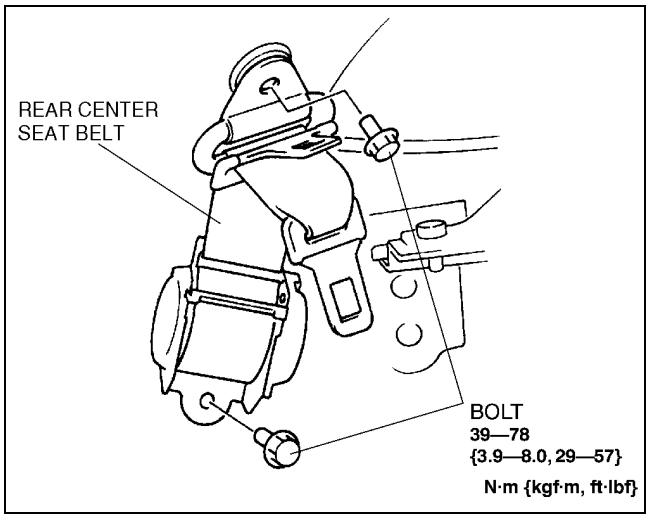
1. Remove the rear package trim.
2. Remove the bolt, then remove the rear center seat belt.
3. Install in the reverse order of removal.



Z3U0811W002

5HB

1. Remove the trunk side trim.
2. Remove the bolts, then remove the rear center seat belt.
3. Install in the reverse order of removal.



A3U0811W002

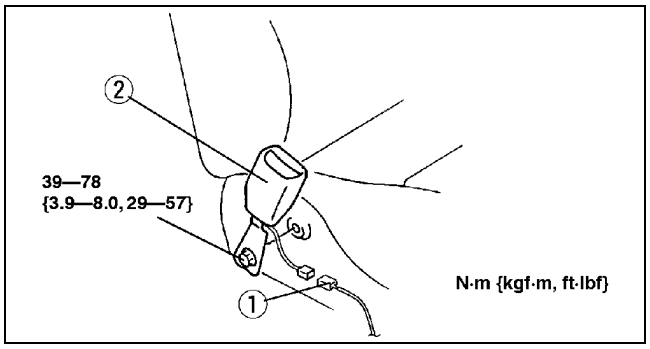
FRONT BUCKLE REMOVAL/INSTALLATION

A3U081157620W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Connector
2	Front buckle

3. Install in the reverse order of removal.

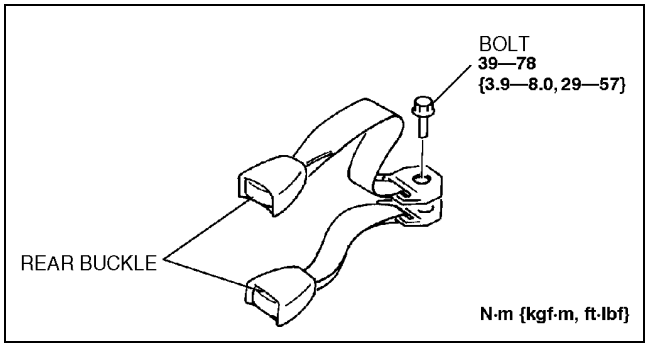


X3U811WA3

REAR BUCKLE REMOVAL/INSTALLATION

A3U081157720W01

1. For 4SD, remove the rear seat cushion. For 5HB, lift up the rear seat cushion.
2. Remove the bolt, then remove the rear buckle.
3. Install in the reverse order of removal.



Z3U0811W001

SEAT BELT INSPECTION

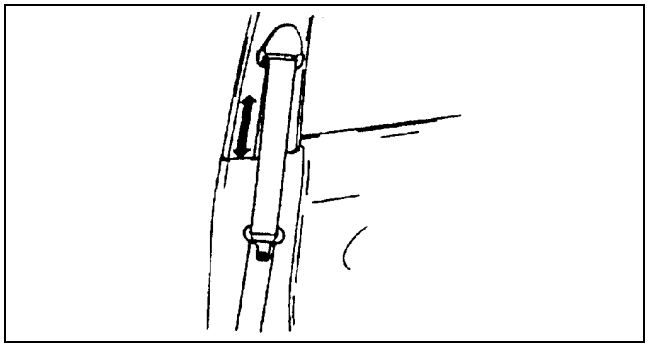
A3U081157630W02

Belt

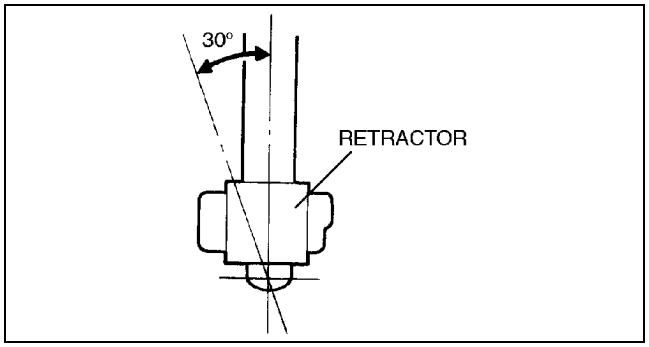
1. Confirm that the seat belt is installed correctly.
2. Inspect the seat belt for damage and deformation of metal parts.
   - If any damage is found, replace as necessary.
3. Replace the seat belt if there is any faulty area.

ELR

1. Verify that the belt can be pulled out smoothly, and that it moves smoothly when wound.
   - If not as specified, replace the seat belt.
2. Verify that the retractor locks when the belt is pulled quickly.
   - If not as specified, replace the seat belt.
3. Remove the retractor. (See 08–11–1 FRONT SEAT BELT REMOVAL/INSTALLATION.) (See 08–11–2 REAR SEAT BELT REMOVAL/ INSTALLATION.) (See 08–11–3 REAR CENTER SEAT BELT REMOVAL/INSTALLATION.)
4. Hold the retractor as it would be installed.
5. Slowly incline the retractor while pulling out the belt.
6. Verify that the retractor lks at approximately 30° inclination.
   - If not as specified, replace the seat belt.



X3U811WA5



X3U811WA6

ALR

1. Pull the belt out fully and the lock mode changes from ELR to ALR.
2. Verify that 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 the above Step 1.
   - If not as specified, replace the seat belt.
3. Verify that the belt locks when pulled.
   - If not as specified, replace the seat belt.
4. Verify that the lock mode changes to ELR when the belt fully retracts.
   - If not as specified, replace the seat belt.

BUCKLE SWITCH INSPECTION

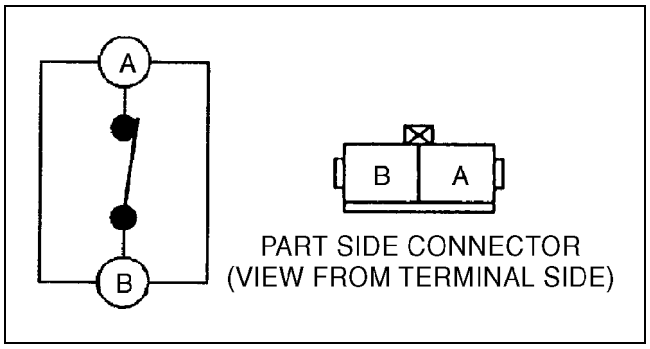
A3U081157620W02

1. Disconnect the negative battery cable.
2. Disconnect the buckle switch connector.
3. Inspect for continuity between the buckle switch terminals using an ohmmeter.
   - If not as specified, replace the front buckle.

O—O : Continuity

Seat belt	Terminal	
	A	B
Fastened		
Unfastened	O	O

X3U811WA7



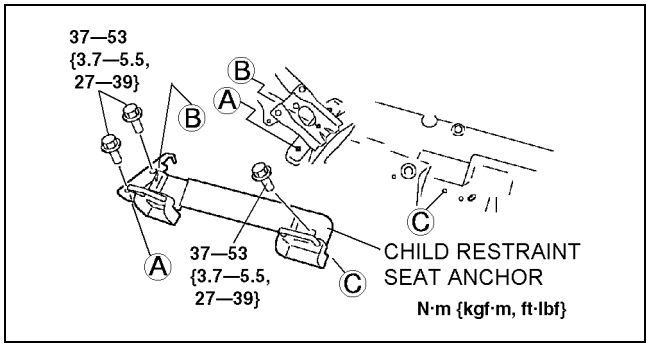
Y3U811WA0

CHILD RESTRAINT SEAT ANCHOR REMOVAL/INSTALLATION

A3U081157770W01

ISOFIX Anchor

1. Fold down the rear seat back.
2. Remove the tire house trim.
3. Remove the child restraint seat anchor.
4. Install in the reverse order of removal.

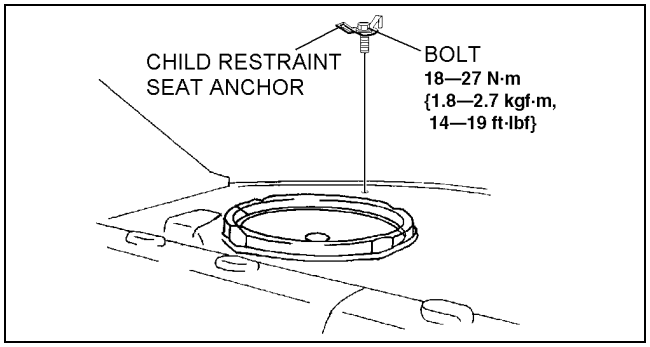


Z3U0811W003

Tether Anchor

4SD

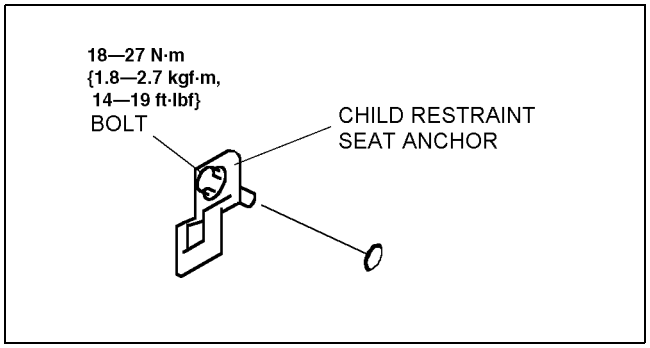
1. Remove the rear package trim.
2. Remove the bolt, then child restraint seat anchor.
3. Install in the reverse order of removal.



A3U0811W004

5HB

1. Remove the trunk end trim.
2. Remove the bolt, then child restraint seat anchor.
3. Install in the reverse order of removal.

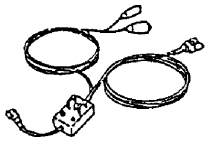
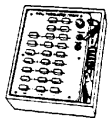
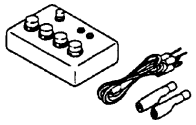
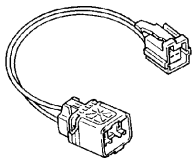


A3U0811W005

08–60 SERVICE TOOLS

RESTRAINTS SST

A3U086001045W01

49 H066 002 Deployment tool 	49 0839 285 Fuel and Thermometer checker (Old) 	49 N088 0A0 Fuel and Thermometer checker (New) 
49 D066 002 Adapter harness 	49 D066 003 Adapter harness 	—

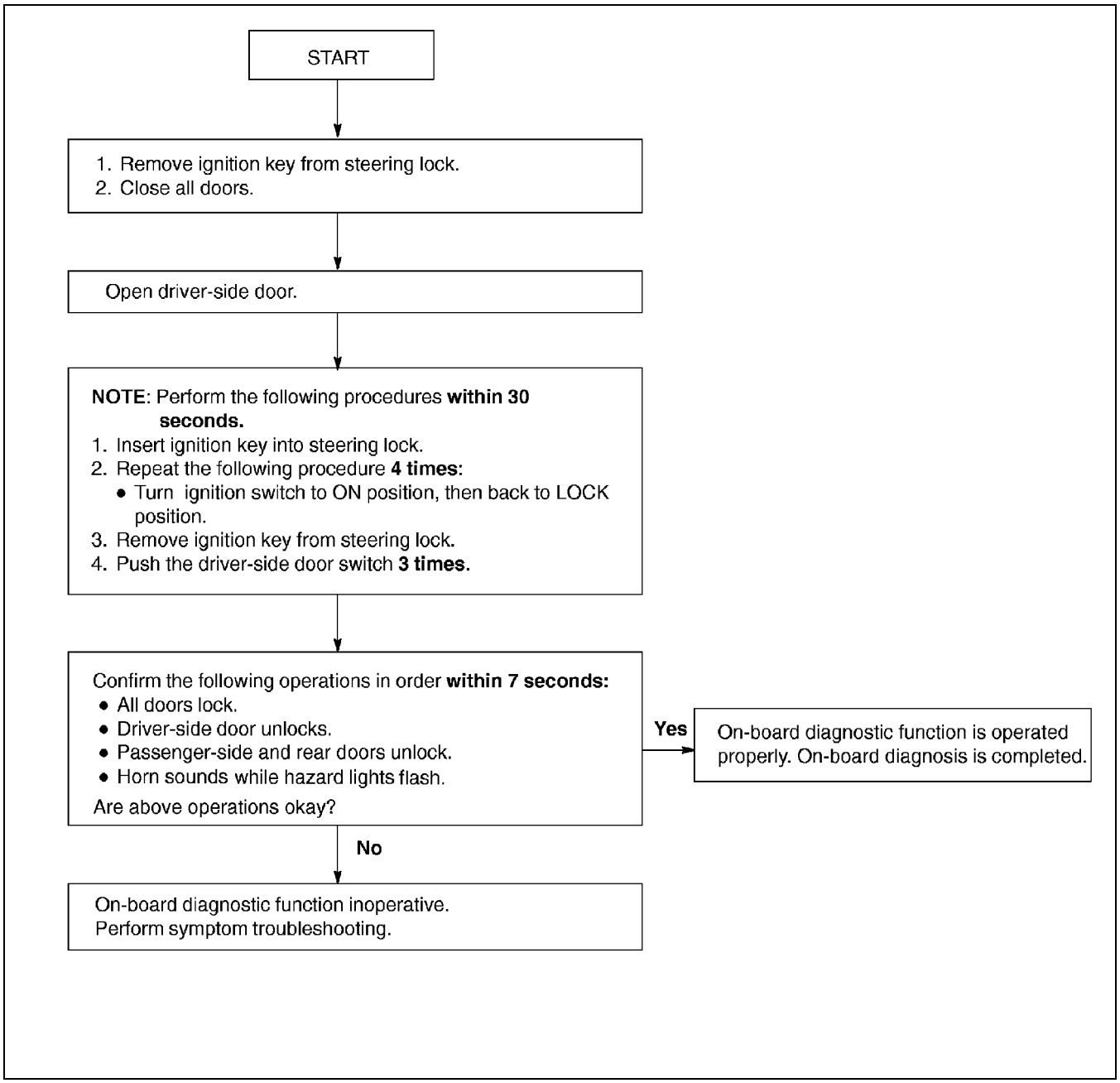
BODY & ACCESSORIES

09
SECTION

09–02A ON-BOARD DIAGNOSTIC [POWER DOOR LOCK SYSTEM]

ON-BOARD DIAGNOSTIC FUNCTION [KEYLESS ENTRY SYSTEM]

A3U090269000W01



Z3U0902W002

09–02B ON-BOARD DIAGNOSTIC [AUDIO]

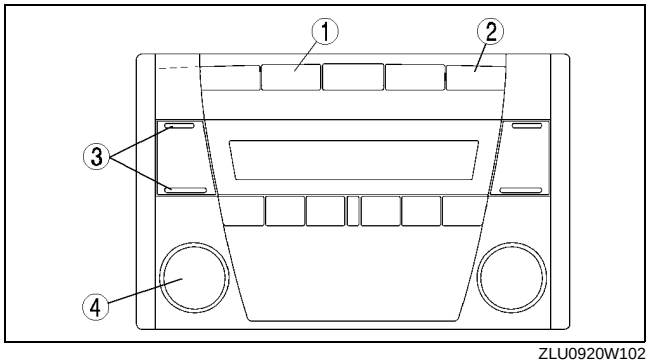
STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE

A3U090266900W01

Note
- All DTCs displayed in the on-board diagnostic test mode should be entered on the Audio Exchange Order Form.

1. Turn the ignition switch to the ACC or ON position.
2. First press the POWER button and hold it, then press the AM button and CLOCK button for **2 seconds or more**.

1	AM button
2	CLOCK button
3	SEEK button
4	POWER button



ZLU0920W102

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

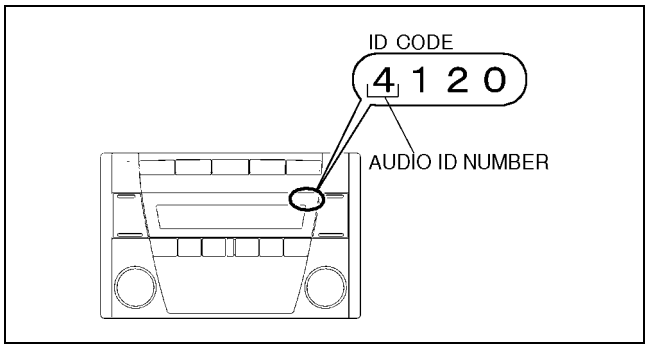
A3U090266900W02

Note
- When asking the supplier (service center) for repair or replacement, verify which supplier the module belongs to and enter on the Audio Exchange Order Form. (See Warranty Bulletin Category AD, number 32.) Use the table and illustration below to determine the audio supplier.

Identification With Printed Numbers/Label
Base unit

1. To identify 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.

Audio ID number	Supplier name
1	Panasonic
2	Clarion
4	FMS Audio



YLE8175W002

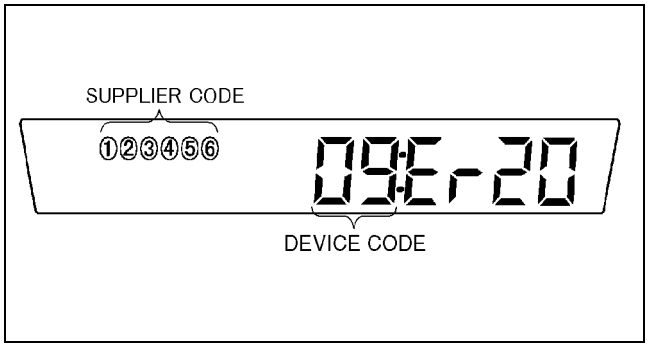
Upper/lower module

1. Remove the audio unit.
2. Verify the supplier name written on 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.

Note
- When no DTCs are in the memory, device code and supplier codes will not be displayed.



Z3U0920W003

Device code	Part 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

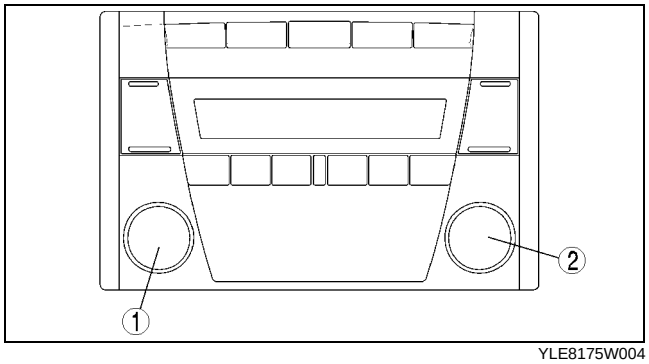
Supplier code	Supplier name
1	FMS Audio
2	Panasonic
3	Clarion

DTC CLEARING PROCEDURE

A3U090266900W03

1. Start the on-board diagnostic test mode.
2. First press the POWER button and hold it, then press AUDIO CONT button for **2 seconds or more**.

1	POWER button
2	AUDIO CONT button



YLE8175W004

Caution
- **Before clearing the DTCs, be sure to enter all of them displayed in the on-board diagnostic test mode on the Audio Exchange Order Form.**

3. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

DTC TABLE

A3U090266900W04

Screen display		Malfunction location	Page
DTC	Output signal		
09:Er22	—	Base unit (peripheral circuit)	(See 09–02B–3 DTC 09:ER22)
09:Er20	—	Power supply circuit of base unit	(See 09–02B–4 DTC 09:ER20)
00:Er10	—	Cassette deck—base unit communication line	(See 09–02B–5 DTC 00:ER10)
03:Er10	—	CD player—base unit communication line	(See 09–02B–5 DTC 03:ER10)
05:Er10	—	CD changer (external type)—base unit communication line	(See 09–02B–6 DTC 05:ER10)
06:Er10	—	CD changer (upper module)—base unit communication line	(See 09–02B–6 DTC 06:ER10)
07:Er10	—	MD player—base unit communication line	(See 09–02B–7 DTC 07:ER10)
03:Er01	—	CD player	(See 09–02B–7 DTC 03:ER01)
03:Er02	CHECK*1 CD*2	CD player	(See 09–02B–8 DTC 03:ER02)
03:Er07	CHECK*1 CD*2	CD player	(See 09–02B–8 DTC 03:ER07)
00:Er01	—	Cassette deck	(See 09–02B–9 DTC 00:ER01)
00:Er03	—	Cassette deck	(See 09–02B–9 DTC 00:ER03)
00:Er04	CHECK*1 TAPE*2	Cassette tape	(See 09–02B–9 DTC 00:ER04)
05:Er01	—	CD changer (external type)	(See 09–02B–10 DTC 05:ER01)
05:Er07	CHECK*1 CD*2	CD changer (external type)	(See 09–02B–10 DTC 05:ER07)
06:Er01	—	CD changer (upper module)	(See 09–02B–11 DTC 06:ER01)
06:Er02	CHECK*1 CD*2	CD changer (upper module)	(See 09–02B–11 DTC 06:ER02)
06:Er07	CHECK*1 CD*2	CD changer (upper module)	(See 09–02B–12 DTC 06:ER07)
07:Er01	—	MD player	(See 09–02B–12 DTC 07:ER01)
07:Er02	CHECK*1 MD*2	MD player	(See 09–02B–13 DTC 07:ER02)
07:Er07	CHECK*1 MD*2	MD player	(See 09–02B–13 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

A3U090266900W05

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

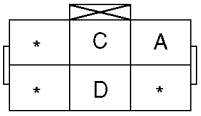
INSPECTION		ACTION
INSPECT BASE UNIT • Clear DTC. • Turn on radio and operate it for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 09:Er22 displayed?	Yes	Replace base unit.
	No	Troubleshooting completed.

DTC 09:ER20

A3U090266900W06

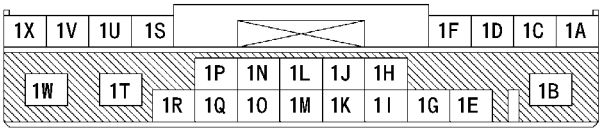
DTC 09:Er20	Power supply circuit of base unit
DETECTION CONDITION	• Voltage detected at base unit terminals 1B and 1R is **less than 8.5 V**, **or more than 16 V (must not be 16V)**.
POSSIBLE CAUSE	• Weak battery • Malfunction in wiring harness between battery and base unit

FUSE BLOCK CONNECTOR
(JB-01)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

BASE UNIT CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** • Turn headlights ON then OFF to remove surface charge. • Measure battery voltage. • Is voltage less than **8.5 V**?	Yes	Battery is weak. • Inspect charge/discharge system.
		No	Go to next step.
2	**INSPECT BATTERY** • Engine running. • Measure battery voltage. • Is voltage greater than **16 V**?	Yes	Battery is overcharging. • Inspect charge/discharge system.
		No	Go to next step.
3	**INSPECT WIRING HARNESS BETWEEN BATTERY AND FUSE BLOCK** • Measure voltage at fuse block connector (JB-01) terminals A and D. • Is voltage **8.5 V —16 V**?	Yes	Go to next step.
		No	Repair wiring harness between battery and fuse block.
4	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND BASE UNIT** • Measure voltage at base unit connector terminals 1B and 1R. • Is voltage **8.5 V —16 V**?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and base unit.
5	**INSPECT BASE UNIT** • Clear DTC. • Turn ignition switch to ACC or ON position and hold for **30 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 09:Er20 displayed?	Yes	Replace base unit.
		No	Troubleshooting completed.

DTC 00:ER10

A3U090266900W07

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.
3	**INSPECT CASSETTE DECK (LOWER MODULE)** • Clear DTC. • Turn ignition switch to ACC or ON position and hold for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 00:Er10 displayed?	Yes	Replace base unit and cassette deck (lower module).
		No	Troubleshooting completed.

DTC 03:ER10

A3U090266900W08

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**. • Start on-board diagnostic test mode. • Is DTC 03:Er10 displayed?	Yes	Replace base unit and CD player (upper module).
		No	Troubleshooting completed.

DTC 05:ER10

A3U090266900W09

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 connection. • Are connectors securely connected?	Yes	Go to next step.
		No	Reconnect connector, then go to next step.
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	Replace base unit and CD changer (external type).
		No	Troubleshooting completed.

DTC 06:ER10

A3U090266900W10

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	Replace base unit and CD changer (upper module).
		No	Troubleshooting completed.

DTC 07:ER10

A3U090266900W11

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	Replace base unit and MD player (lower module).
		No	Troubleshooting completed.

DTC 03:ER01

A3U090266900W12

DTC 03:Er01	CD player (upper module)
DETECTION CONDITION	• CD player (upper module) cannot perform insert and eject commands.
POSSIBLE CAUSE	• Defective CD (broken or 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	Replace CD player (upper module).
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD player (upper module).
		No	Troubleshooting completed.

DTC 03:ER02

A3U090266900W13

DTC 03:Er02	CD player (upper module)
DETECTION CONDITION	**Note** • When error occurs, error message “CHECK CD” is displayed in the LCD. • Cannot 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 tracks?	Yes	Go to Step 3.	
		No	Not able to change particular tracks.	Go to next step.
			Not able to change any tracks.	Change CD and perform tracks-change again. • If CD player changes tracks, then go to Step 3. • If not, replace CD player (upper module).
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD player (upper module).	
		No	Troubleshooting completed.	

DTC 03:ER07

A3U090266900W14

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? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD player (upper module).
		No	Troubleshooting completed.

DTC 00:ER01

A3U090266900W15

DTC 00:Er01	Cassette deck (lower module)
DETECTION CONDITION	• Cassette deck (lower module) cannot 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	Replace cassette deck (lower module).
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, then 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	Replace cassette deck (lower module).
		No	Troubleshooting completed.

DTC 00:ER03

A3U090266900W16

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, then 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	Replace cassette deck (lower module).
		No	Troubleshooting completed.

DTC 00:ER04

A3U090266900W17

DTC 00:Er04	Cassette tape
DETECTION CONDITION	**Note** • When error occurs, error message “CHECK TAPE” is displayed in the LCD. • Cassette tape is worn out.
POSSIBLE CAUSE	• Tape wear • 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	Replace cassette tape, then 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:Er04 displayed?	Yes	Replace cassette deck (lower module).
		No	Troubleshooting completed.

DTC 05:ER01

A3U090266900W18

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? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, then 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. • Start on-board diagnostic test mode. • Is DTC 05:Er01 displayed?	Yes	Replace CD changer (external type).	
		No	Troubleshooting completed.	

DTC 05:ER07

A3U090266900W19

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? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD changer (external type).	
		No	Troubleshooting completed.	

DTC 06:ER01

A3U090266900W20

DTC 06:Er01	CD changer (upper module)
DETECTION CONDITION	• CD changer (upper module) cannot perform insert, eject, and 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	Replace CD changer (upper module).
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD changer (upper module).
		No	Troubleshooting completed.

DTC 06:ER02

A3U090266900W21

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 tracks?	Yes	Go to Step 3.	
		No	Not able to change particular tracks.	Go to next step.
			Not able to change any tracks.	Change CD and perform tracks-change again. • If CD changer changes tracks, then go to Step 3. • If not, replace CD changer (upper module).
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD changer (upper module).	
		No	Troubleshooting completed.	

DTC 06:ER07

A3U090266900W22

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? **Note** • In some cases, not all CD-R/CD-RW will play.	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, then 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	Replace CD changer (upper module).	
		No	Troubleshooting completed.	

DTC 07:ER01

A3U090266900W23

DTC 07:Er01	MD player (lower module)
DETECTION CONDITION	• MD player (lower module) cannot perform insert and eject commands.
POSSIBLE CAUSE	• Defective MD (broken or 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	Replace MD player (lower module).
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, then 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	Replace MD player (lower module).
		No	Troubleshooting completed.

DTC 07:ER02

A3U090266900W24

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 tracks?	Yes	Go to Step 3.	
		No	Not able to change particular tracks.	Go to next step.
			Not able to change any tracks.	Change MD and perform tracks-change again. • If MD player changes tracks, then go to Step 3. • If not, replace MD player (lower module).
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, then 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	Replace MD player (lower module).	
		No	Troubleshooting completed.	

09–02B

DTC 07:ER07

A3U090266900W25

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

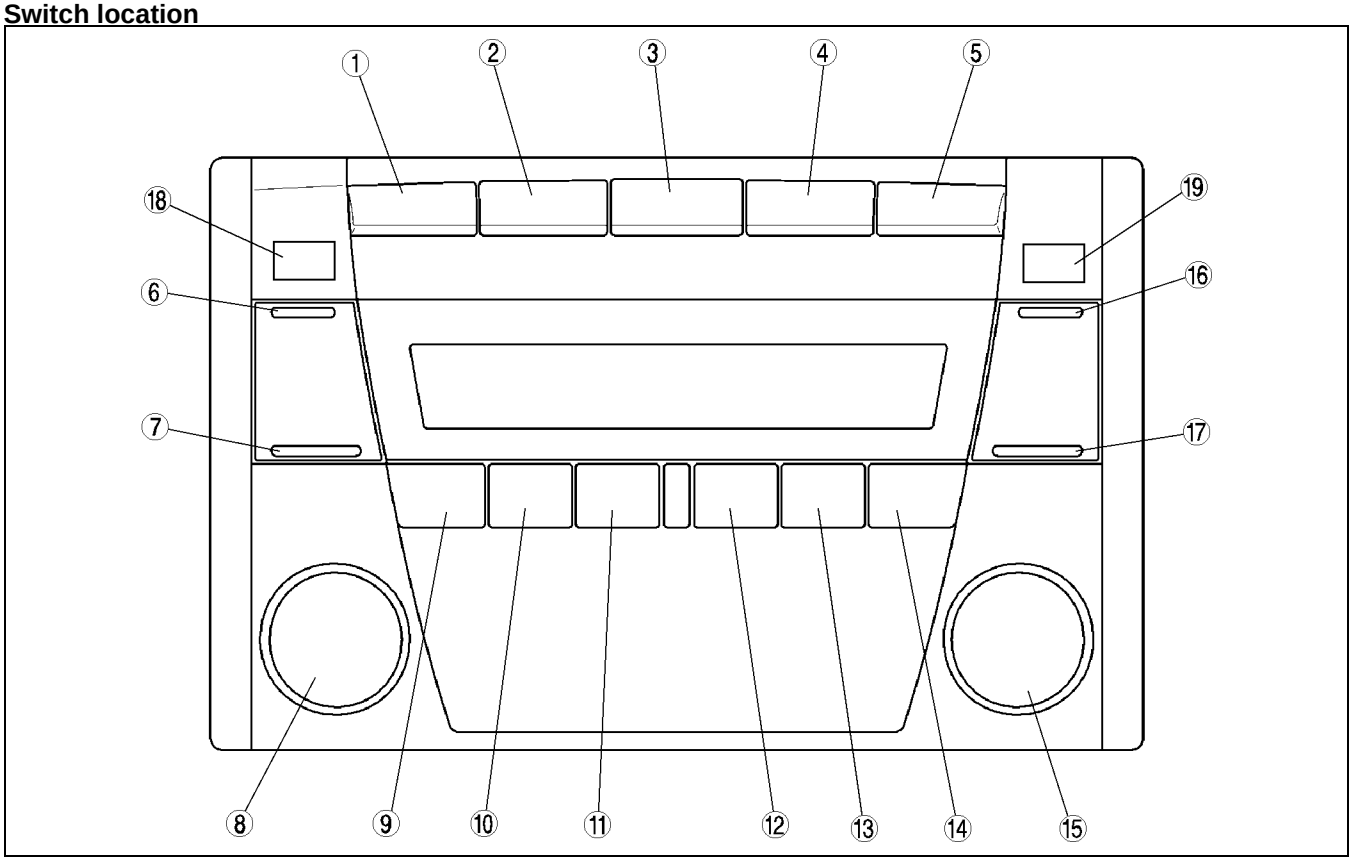
Diagnostic procedure

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, then 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	Replace MD player (lower module).
		No	Troubleshooting completed.

DIAGNOSTIC ASSIST FUNCTION

A3U090266900W26

Structural View
Switch location



Z3U0920W004

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/TURN button
16	SCAN button
17	AUTO-M button
18	LOAD button (CD changer)
19	EJECT button (CD player and CD changer)

LCD inspection

1. With audio on, first press the POWER button and hold it, then 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.		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 and hold it, then press the CLOCK button for **approximately 1 second**.
2. Inspect the button according to the following table:

Note

- The button inspection mode is designed for base unit button. The following lower module button cannot be inspected in this mode. (A buzz will not sound.)
  - — Cassete deck: DOLBY button, EJECT button
  - — MD player: DISP button, EJECT button

Inspection	Display	Action	
• Start button inspection mode. • Press the all buttons.	—	Buzzer sounds.	Button is okay.
		Buzzer does 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 and hold it, then 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. Right rear package speaker (4SD) or rear door speaker (5HB) 4. Left rear package speaker (4SD) or rear door speaker (5HB)	—	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 and hold it, then press the preset button “2” for **approximately 1 second**.
2. Inspect the radio reception condition according to the following table:

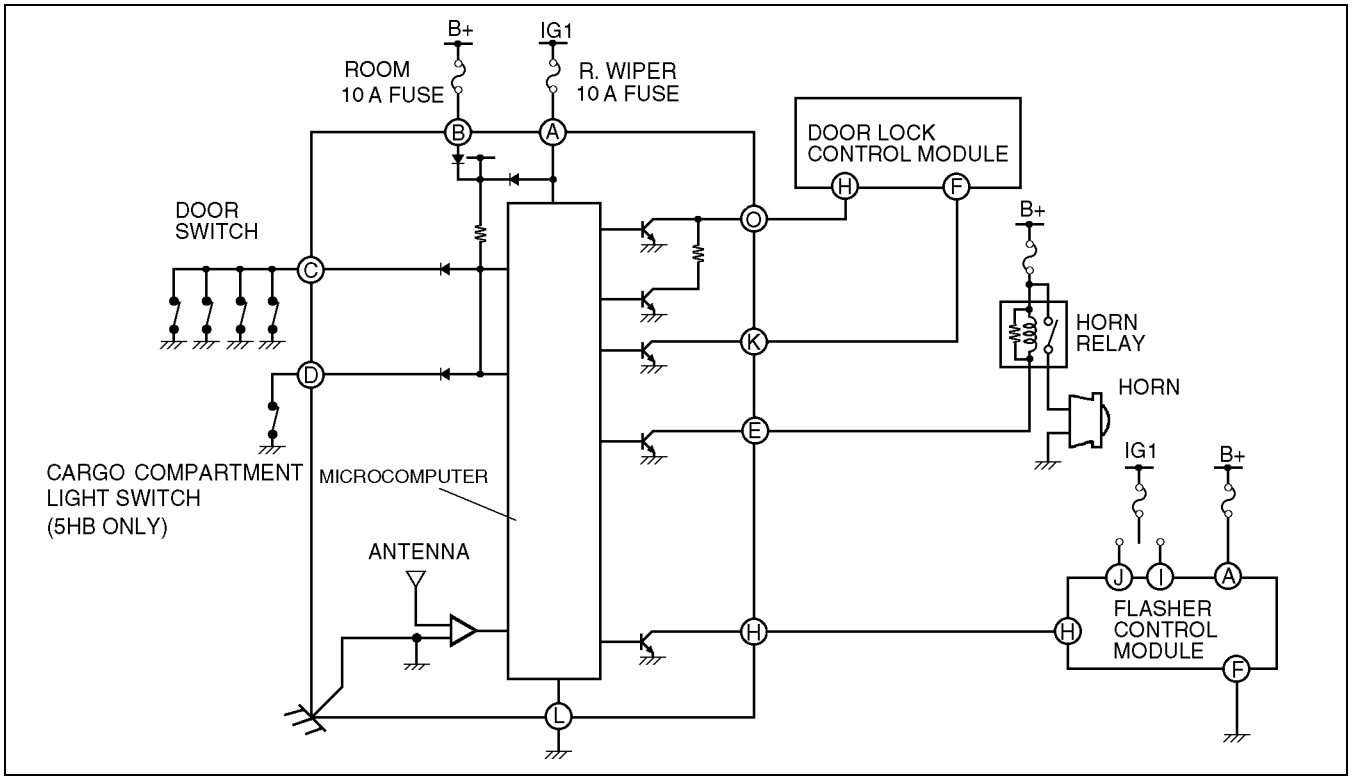
Inspection	Display	Action
Start radio reception condition inspection mode.	NORMAL  5 GRADUATIONS OR ABOVE	Antenna, antenna feeder, and base unit are okay.
	 3–4 GRADUATIONS	Change frequency (channel) and inspect again.
	MALFUNCTIONING  2 GRADUATIONS OR BELOW	Inspect antenna and antenna feeder. • If either one of 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.

09–03 SYMPTOM TROUBLESHOOTING

KEYLESS ENTRY SYSTEM WIRING DIAGRAM

A3U090369000W01

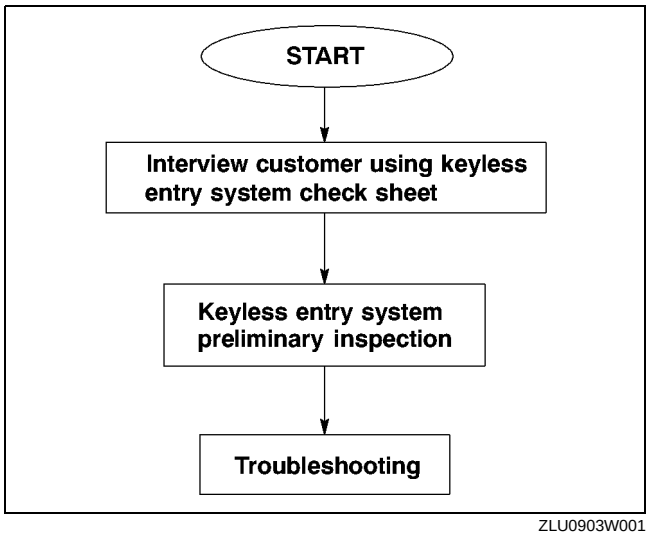


A3U0903W001

FOREWORD

- Go to symptom troubleshooting after identifying the specific malfunction by performing a keyless entry system preliminary inspection.

A3U090369000W02



ZLU0903W001

KEYLESS ENTRY SYSTEM CHECK SHEET

A3U090369000W03

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 by following the check sheet below.

Perform the following inspection with customer:

Q1. What’s the customer’s complaint?

☐ Power door lock system does not operate with transmitter (door does not lock/unlock).

☐ Other _____

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 **2.5 m {8.2 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 the ON position.
- Keyless entry system does not work from excessive distances (**more than 2.5 m {8.2 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 preinspection.

Z3U0903W003

KEYLESS ENTRY SYSTEM PREINSPECTION

A3U090369000W04

1. Perform the following pre-inspection before troubleshooting.

STEP	INSPECTION		ACTION
1	• Is the system an after-market one?	Yes	Perform troubleshooting according to after-market keyless entry system manual.
		No	Go to next step.
2	• Did customer activate keyless entry system when ignition switch was in LOCK position?	Yes	Go to next step.
		No	Explain to customer that system does not work when ignition switch is in ON position. Turn ignition switch to LOCK position, then go to next step.
3	• Did customer use keyless entry system in particular area, such as being near TV towers, power plants, power lines or factories?	Yes	Attempt to lock/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.
4	• Are any of the following after-market electrical parts on the vehicle? — Cellular phone — Radio-wave equipment — Remote engine starter — TV, etc.	Yes	Disconnect after-market electrical part connectors and attempt to lock/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.
5	• Perform on-board diagnostic function. (See 09–02A–2 ON-BOARD DIAGNOSTIC FUNCTION [KEYLESS ENTRY SYSTEM]) • Does on-board diagnostic function work?	Yes	Go to next step.
		No	Go to Step 7.
6	• Attempt to reprogram keyless control module ID code. • Can keyless control module ID code be reprogrammed?	Yes	System is normal now.
		No	Go to Step 1 of troubleshooting No.3.
7	• Did any on-board diagnostic functions work?	Yes	Go to Step 1 of troubleshooting No.1.
		No	Go to Step 1 of troubleshooting No.2.

TROUBLESHOOTING INDEX

A3U090369000W05

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	One or more on-board diagnostic functions inoperative.	• Malfunction in horn system, hazard warning light system, door lock linkage system, door lock switch system or driver's door key cylinder switch system.	(See 09–03–4 NO.1 ONE OR MORE ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE)
2	All on-board diagnostic functions inoperative.	• Malfunction in keyless control module power supply circuit, door switch circuit, cargo compartment light switch circuit (5HB) or keyless control module ground circuit.	(See 09–03–6 NO.2 ALL ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE)
3	Transmitter ID code cannot be reprogrammed.	• Malfunction in transmitter battery, transmitter, keyless control module bracket, keyless control module bracket ground screw or keyless control module circuit.	(See 09–03–7 NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED)

NO.1 ONE OR MORE ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE

A3U090369000W06

- 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, make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

1	One or more on-board diagnostic functions inoperative
DESCRIPTION	• Malfunction in horn system, hazard light system, door lock linkage system, door lock switch system or driver's door key cylinder switch system.
POSSIBLE CAUSE	• Malfunction in horn system — Horn circuit malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and horn relay • Malfunction in hazard light system — Hazard light circuit — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and flasher control module • Malfunction in door lock linkage • Malfunction in door lock switch system • Malfunction in keyless control module door unlock signal circuit — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and door lock control module • Malfunction in driver-side door key cylinder switch system • Malfunction in keyless control module door lock/unlock signal circuit — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and door lock control module

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK HORN, AND HAZARD WARNING LIGHT OPERATION DURING ON-BOARD DIAGNOSIS** • Did all of the following items work during on-board diagnostic function operation? — Horns sounded intermittently — Hazard warning lights flashed	Yes	Go to Step 8.
		No	Go to next step.
2	**CHECK HORN OPERATION DURING ON-BOARD DIAGNOSIS** • Did horns sound intermittently during on-board diagnostic function operation?	Yes	Go to Step 5.
		No	Go to next step.
3	**INSPECT HORN CIRCUIT** • Do horns sound when depressing horn switch on vehicle?	Yes	Go to next step.
		No	Inspect horn circuit.
*4	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND HORN RELAY) OR KEYLESS CONTROL MODULE** • Measure voltage at keyless control module connector terminal E during on-board diagnostic function operation. — **B+→below 1.0 V→B+→below 1.0 V→B+** • Is voltage as above?	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Inspect wiring harness between keyless control module and horn relay. • If wiring harness is OK, replace keyless control module and reprogram transmitter ID code, then go to Step 16. • If wiring harness malfunctions, repair wiring harness, then go to Step 16.
5	**CHECK HAZARD WARNING LIGHT OPERATION DURING ON-BOARD DIAGNOSIS** • Did hazard warning lights flash during on-board diagnostic function operation?	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Go to next step.
6	**INSPECT HAZARD WARNING LIGHT CIRCUIT** • Do hazard warning lights flash when hazard warning switch is on?	Yes	Go to next step.
		No	Inspect hazard light circuit.
*7	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND FLASHER CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure voltage at keyless control module connector terminal H during on-board diagnostic function operation. — **Alternates between B+ and below 1.0 V** • Is voltage as above?	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Inspect wiring harness between keyless control module and flasher control module. • If wiring harness is OK, replace keyless control module and reprogram transmitter ID code, then go to Step 16. • If wiring harness malfunctions, repair wiring harness, then go to Step 16.

STEP	INSPECTION		ACTION
8	**MAKE SURE THAT ALL DOORS LOCK AND UNLOCK DURING ON-BOARD DIAGNOSIS** • Did all of the following items work during on-board diagnostic function operation? — All doors unlocked and locked — Driver-side door unlocked	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Go to next step.
9	**INSPECT DOOR LOCK LINKAGE** • Operate inner door lock knob and make sure door locks and unlocks manually. • Does every door lock system work?	Yes	Go to next step.
		No	Inspect door lock linkage.
10	**MAKE SURE THAT ALL DOORS UNLOCK DURING ON-BOARD DIAGNOSIS** • Did all doors unlock during on-board diagnostic function operation?	Yes	Go to Step 13.
		No	Go to next step.
11	**CHECK TO SEE WHETHER MALFUNCTION IS IN DRIVER'S DOOR LOCK SWITCH SYSTEM OR ELSEWHERE** • Do all doors unlock when door lock switch UNLOCK button is pressed?	Yes	Go to next step.
		No	Inspect power door lock system.
*12	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND DOOR LOCK CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure voltage at keyless control module connector terminal K during on-board diagnostic function operation. — All doors unlocked: **5 V→below 1.0 V→5 V** • Is voltage as above?	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Inspect wiring harness between keyless control module and door lock control module. • If wiring harness is OK, replace keyless control module and reprogram transmitter ID code, then go to Step 16. • If wiring harness malfunctions, repair wiring harness, then go to Step 16.
13	**MAKE SURE THAT ALL DOORS LOCK AND DRIVER'S DOOR UNLOCKS DURING ON-BOARD DIAGNOSIS** • Did all of the following items work during on-board diagnostic function operation? — All doors locked — Driver-side door unlocked	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Go to next step.
14	**CHECK TO SEE WHETHER MALFUNCTION IS IN DRIVER'S DOOR KEY CYLINDER SWITCH SYSTEM OR ELSEWHERE** • Do all of the following items work when inserting ignition key into driver-side door key cylinder and operating ignition key? — All doors locked — Driver-side door unlocked	Yes	Go to next step.
		No	Inspect power door lock system.
*15	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND DOOR LOCK CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure voltage at keyless control module connector terminal O during on-board diagnostic function operation. — All doors locked: **5 V→2.5 V→5 V** — Driver-side door unlocked: **5 V→ below 1.0 V→5 V** • Is voltage as above?	Yes	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	Inspect wiring harness between keyless control module and door lock control module. • If wiring harness is OK, replace keyless control module and reprogram transmitter ID code, then go to next step. • If wiring harness malfunction, repair wiring harness, then go to next step.
16	**RECHECK MALFUNCTION SYMPTOM AFTER REPAIR** • Does keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 ALL ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE

A3U090369000W07

- 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, make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

2	All on-board diagnostic functions inoperative
DESCRIPTION	• Malfunction in keyless control module power supply circuit, door switch circuit, cargo compartment light switch circuit (5HB) or keyless control module ground circuit.
POSSIBLE CAUSE	• Malfunction in IG1, B+ signal circuit of keyless control module — Keyless control module power supply fuse malfunction — Malfunction in wiring harness between keyless control module power supply fuse(s) and keyless control module itself • Malfunction in keyless control module door open/closed signal circuit — Door switch system malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and door switch • Malfunction in keyless control module's liftgate open/closed signal circuit (5HB) — Cargo compartment light switch system malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and cargo compartment light switch • Malfunction in keyless control module GND signal circuit — Malfunction in wiring harness between keyless control module and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT KEYLESS CONTROL MODULE POWER SUPPLY FUSES** • Are keyless control module power supply fuses okay?	Yes	Go to next step.
		No	Check for a short to ground on blown fuse circuit. Repair or replace as necessary. Install appropriate amperage fuse.
2	**INSPECT DOOR SWITCH INSTALLATION** • Are door switches installed securely?	Yes	Go to next step.
		No	Install door switches securely, then go back to Step 5 of keyless entry system preliminary inspection.
*3	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN FUSE BLOCK AND KEYLESS CONTROL MODULE) OR ELSEWHERE** • Turn ignition switch to ON position. • Measure voltage at following keyless control module terminals: — IG1 signal (Terminal A) — B+ signal (Terminal B) • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between fuse block and keyless control module, then go to Step 8.
*4	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO B+ BETWEEN FUSE BLOCK AND KEYLESS CONTROL MODULE, OR BETWEEN KEYLESS CONTROL MODULE AND GROUND) OR ELSEWHERE** • Turn ignition switch to LOCK position. • Disconnect keyless control module connector. • Measure voltage at following keyless control module connector terminal: — IG1 signal (Terminal A) • Is voltage **approximately 12 V**?	Yes	Repair malfunctioning wiring harness, then go to Step 8.
		No	Go to next step.
*5	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN KEYLESS CONTROL MODULE AND GROUND) OR ELSEWHERE** • Is there continuity between keyless control module connector terminal L and ground?	Yes	Go to next step.
		No	Repair wiring harness between keyless control module and ground, then go to Step 8.
6	**CHECK FOR CHECK CODE 04 IN INSTRUMENT CLUSTER** • Inspect door switch using instrument cluster input/output check mode. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE) • Does DTC 04 function properly?	Yes	Go to next step.
		No	Repair door switch system using DTC 04 inspection procedure, then go to Step 8.

STEP	INSPECTION		ACTION
7	**INSPECT KEYLESS CONTROL MODULE OR WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND DOOR SWITCHES, CARGO COMPARTMENT LIGHT SWITCH FOR CONTINUITY)** • Open the driver-side door. • Open the liftgate. • Is there continuity between keyless control module connector terminal C, D and ground?	Yes	Replace keyless control module and reprogram keyless control module ID code, then go to next step.
		No	Repair wiring harness between keyless control module and door switches, cargo compartment light switch then go to next step.
8	**RECHECK MALFUNCTION SYMPTOM AFTER REPAIR** • Does keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED

A3U090369000W08

3	**Transmitter ID code cannot be reprogrammed**
DESCRIPTION	• Malfunction in transmitter battery, transmitter keyless control module bracket, keyless control module bracket ground screw or keyless control module circuit.
POSSIBLE CAUSE	• Malfunction in transmitter battery, transmitter, keyless control module bracket, keyless control module bracket ground screw or keyless control module circuit — Transmitter battery, transmitter, keyless control module bracket, keyless control module bracket ground screw or keyless control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TRANSMITTER BATTERY INSTALLATION AND TYPE** • Visually inspect transmitter battery. • Are below 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), then go to Step 8.
2	**INSPECT TRANSMITTER BATTERY TERMINALS FOR RUST AND POOR CONNECTION** • Visually inspect transmitter. — Is there rust on transmitter battery terminals (positive or negative pole)? — Is there poor connection between terminals and battery?	Yes	Replace transmitter battery or repair transmitter battery terminal, then go to Step 8.
		No	Go to next step.
3	**INSPECT TRANSMITTER BATTERY** • Inspect transmitter battery. • Is battery voltage normal?	Yes	Go to next step.
		No	Replace transmitter battery, then go to Step 8.
4	**INSPECT KEYLESS CONTROL MODULE BRACKET INSTALLATION** • Is keyless control module bracket installed securely?	Yes	Go to next step.
		No	Install bracket securely, then go back to Step 6 of keyless entry system preliminary inspection.
5	**INSPECT GROUND SCREW INSTALLATION BETWEEN KEYLESS CONTROL MODULE AND KEYLESS CONTROL MODULE BRACKET** • Are keyless control module and keyless control module bracket connected securely to ground screw?	Yes	Go to next step.
		No	Install screw securely, then go back to Step 6 of keyless entry system preliminary inspection.
6	**CHECK TO SEE WHETHER MALFUNCTION IS IN TRANSMITTER BATTERY OR ELSEWHERE** • Replace with a known good transmitter battery. • Does keyless entry system operate properly?	Yes	Replace transmitter battery, then go to Step 8.
		No	Go to next step.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN TRANSMITTER OR KEYLESS CONTROL MODULE** • Reprogram keyless control module ID code using another known good transmitter. • Does keyless entry system operate properly?	Yes	Replace transmitter and reprogram transmitter ID code, then go to next step.
		No	Replace keyless control module and reprogram keyless control module ID code, then go to next step.
8	**RECHECK MALFUNCTION SYMPTOM AFTER REPAIR** • Does keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

09–10 BODY PANELS

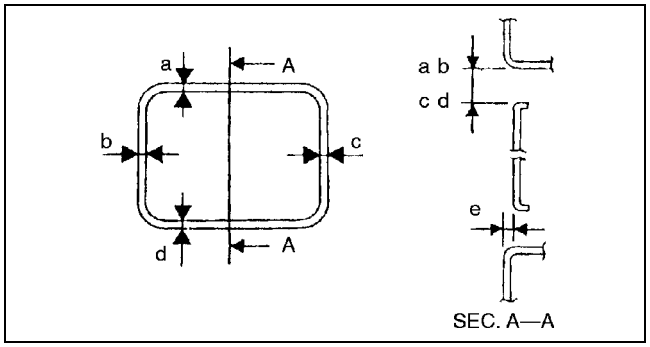
FUEL-FILLER LID ADJUSTMENT

1. Measure the gap and height between the fuel-filler lid and the body.
   - If not as specified, loosen the fuel-filler lid installation bolts, and reposition the fuel-filler lid.

   Clearance
   a: 2.1—4.1 mm {0.09—0.16 in}
   b: 2.5—4.5 mm {0.10—0.17 in}
   c: 2.5—4.5 mm {0.10—0.17 in}
   d: 2.3—4.3 mm {0.10—0.16 in}
   e: –0.5—1.5 mm {–0.020—0.059 in}

2. Tighten the bolts.

A3U091042410W01

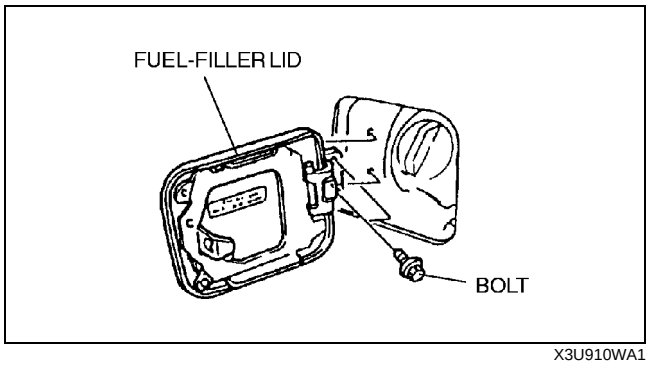


X3U910WA0

FUEL-FILLER LID REMOVAL/INSTALLATION

1. Remove the bolts, then remove the fuel-filler lid.
2. Install in the reverse order of removal.
3. Adjust the fuel-filler lid. (See 09–10–1 FUEL-FILLER LID ADJUSTMENT.)

A3U091042410W02



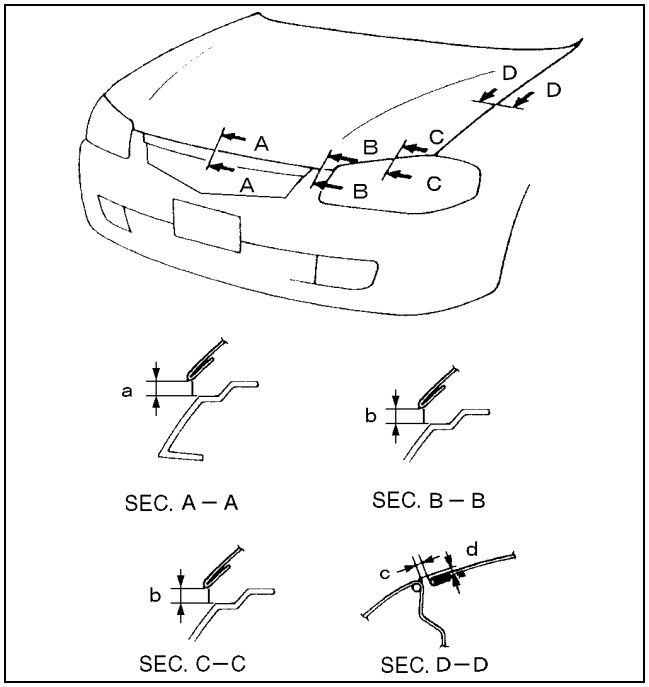
X3U910WA1

HOOD ADJUSTMENT

A3U091052310W01

1. Measure the gap and height between the bonnet and the body.
   - If not as specified, adjust the gap and height.

   Clearance
   a: 3.7—8.3 mm {0.15—0.33 in}
   b: 4.0—8.0 mm {–0.16—0.32 in}
   c: 3.0—5.0 mm {0.12—0.20 in}
   d:–1.0—1.0 mm {–0.04—0.04 in}



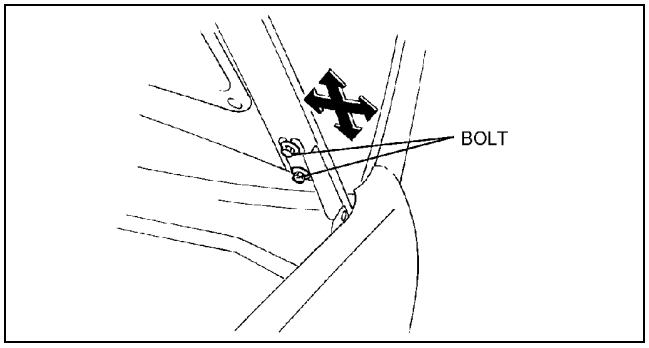
Y3E7710W001

Gap Adjustment

1. Loosen the bonnet installation bolts and reposition the bonnet.

   Tightening torque
   18.6—28.4 N·m {1.9—2.9 kgf·m, 13—20 ft·lbf}

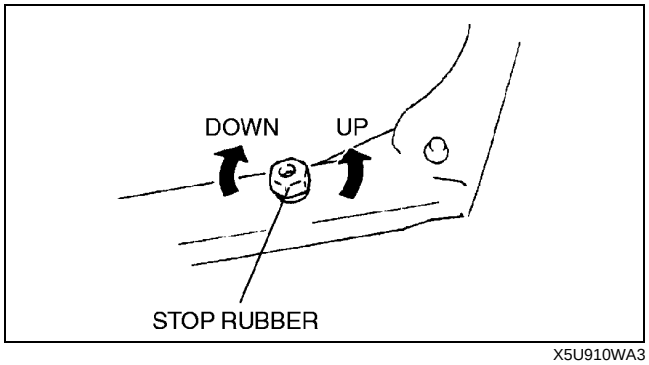
2. Tighten the bolts.



Y3E7710W002

Height Adjustment

1. Turn the stop rubber to adjust the height of the bonnet.



X5U910WA3

HOOD REMOVAL/INSTALLATION

A3U091052310W02

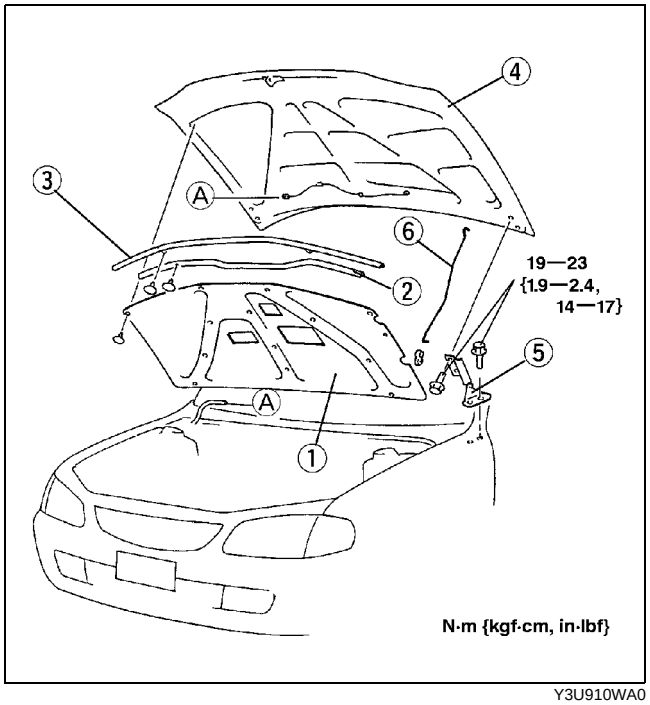
Warning

- **Removing the hood without supporting it can be dangerous. The hood may fall and injure you. Always perform these procedures together with at least another person.**

1. Disconnect the windshield washer hose.
2. To remove the hood hinge, remove the front fender panel. (See 09–10–8 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Hood insulator (FP)
2	Shroud seal weatherstrip
3	Parting seal weatherstrip
4	Hood
5	Hood hinge
6	Hood stay

4. Install in the reverse order of removal.
5. Adjust the hood. (See 09–10–2 HOOD ADJUSTMENT.)



Y3U910WA0

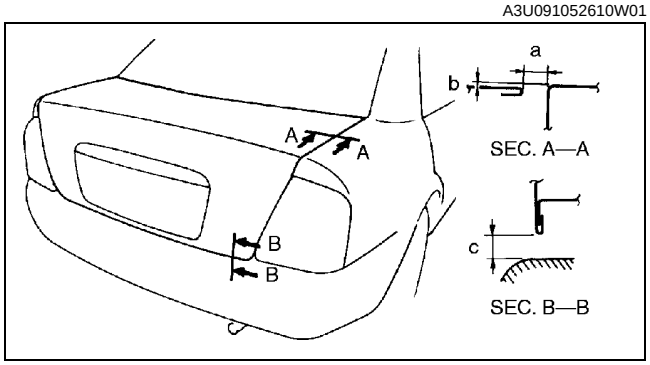
TRUNK LID ADJUSTMENT

A3U091052610W01

1. Measure the gap between the trunk lid and the body panel.
   - If not as specified, loosen the trunk lid hinge installation nuts and reposition the trunk lid.

   Clearance
   a: 3.3—5.3 mm {0.13—0.20 in}
   b: –1.0—1.0 mm {–0.040—0.039 in}
   c: 5.0—11.0 mm {0.20—0.43 in}

2. Tighten the nuts.



X3U910WA6

TRUNK LID REMOVAL/INSTALLATION

A3U091052610W02

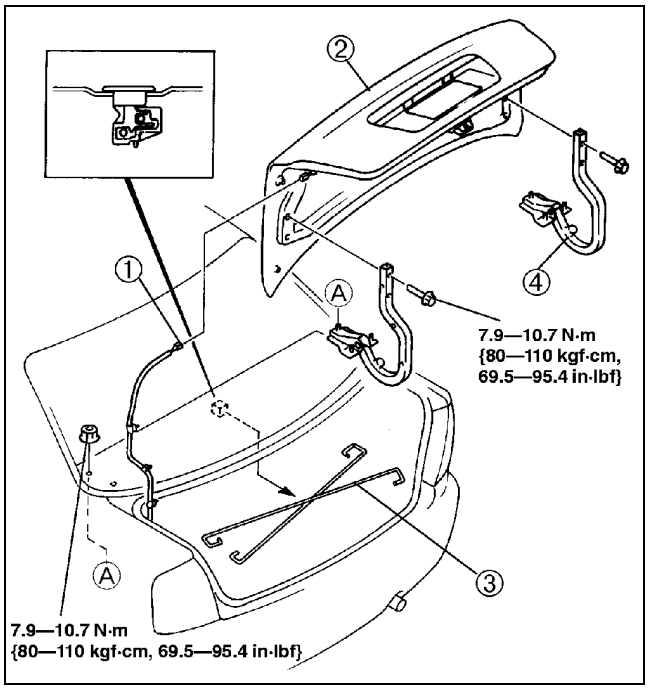
Warning

- **Removing the trunk lid without supporting it can be dangerous. The trunk lid may fall and injure you. Always perform these procedures together with at least 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.

1	Connector
2	Trunk lid
3	Balance spring (See 09–10–4 Balance Spring Removal Note)
4	Trunk lid hinge

4. Install in the reverse order of removal.
5. Adjust the trunk lid. (See 09–10–3 TRUNK LID ADJUSTMENT.)



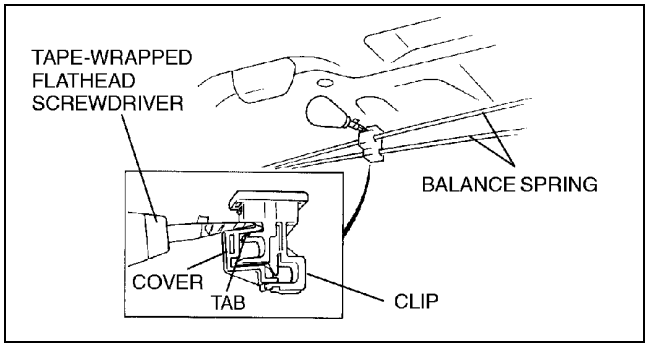
X3U910WA7

Balance Spring Removal Note

Note

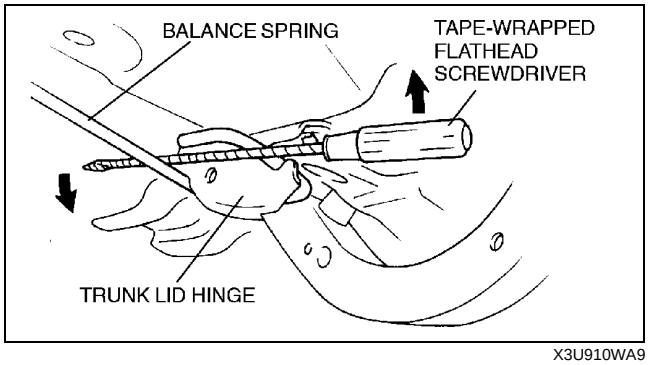
- The balance springs are under high tension.

1. Push the tab of the clip to open the cover using a tape-wrapped flathead screwdriver.
2. Remove the balance springs from the clip.



Y3U910WA3

3. Remove the balance spring from the trunk lid hinge using a tape-wrapped flathead screwdriver.



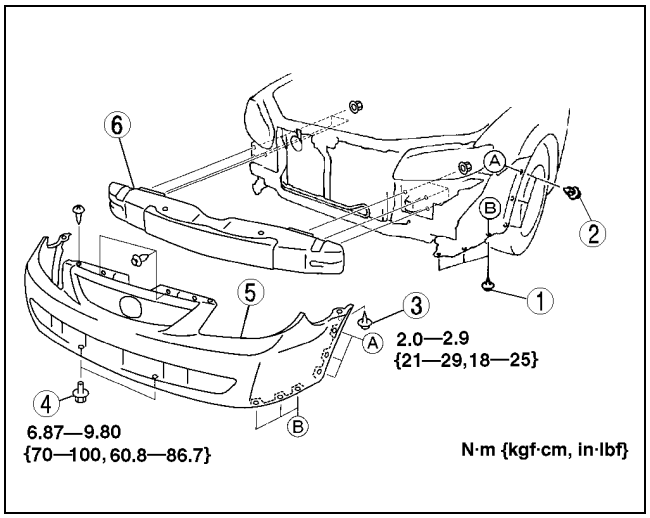
X3U910WA9

FRONT BUMPER REMOVAL/INSTALLATION

A3U091050031W01

1. Disconnect the negative battery cable.
2. Disconnect the front fog light connector.
3. To remove the bumper reinforcement, remove the front bumper and washer tank, then remove the bumper reinforcement installation nuts.
4. Remove in the order indicated in the table.

1	Screw A
2	Fastener
3	Screw B
4	Bolt
5	Front bumper (See 09–10–5 Front Bumper Removal Note.) (See 09–10–6 Front Bumper Installation Note.)
6	Front bumper reinforcement



Z3U0910W004

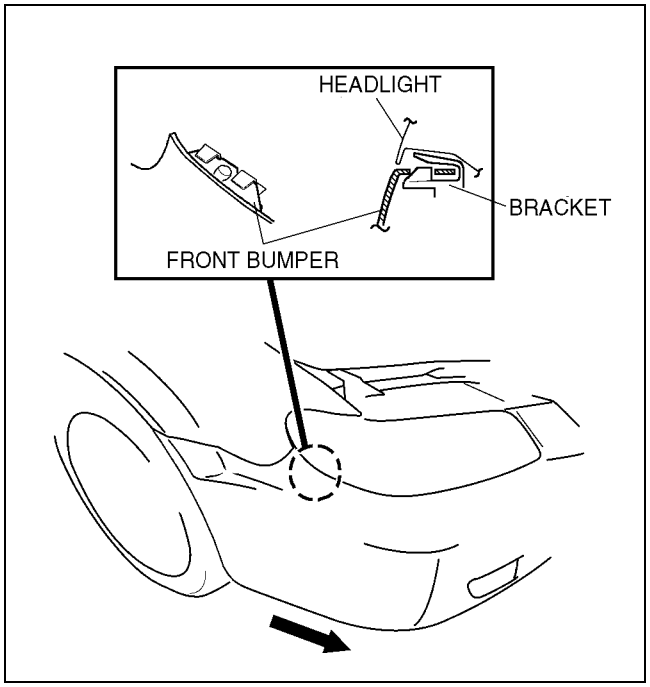
5. Install in the reverse order of removal.
6. Adjust the front fog light aiming. (See 09–18–9 FRONT FOG LIGHT ADJUSTMENT.)

Front Bumper Removal Note

1. While supporting the connection between the front bumper and bracket, pull the front bumper forward to disengage the connection.

   Note
   - The connection between the front bumper and bracket does not disengage until the front bumper is pulled forward. Be sure to pull the front bumper forward to disengage it from the bracket.

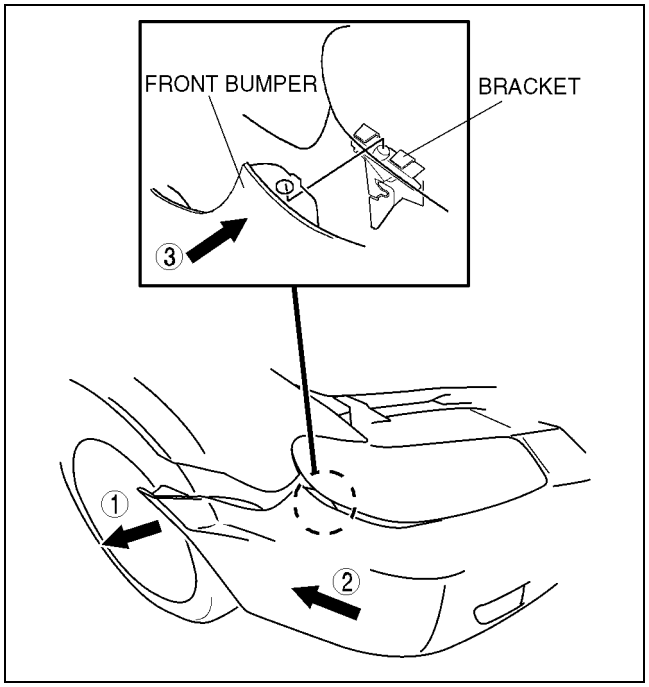
2. Remove the front bumper.



Y3E7726W004

Front Bumper Installation Note

1. Spread the front bumper ends (wheel arches) apart.
2. Attach the front bumper to the body.
3. Press the front bumper connection portion into the body to engage with the bracket.



Y3E7726W005

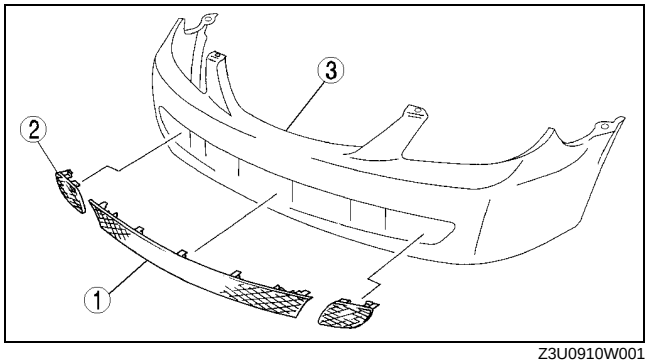
FRONT BUMPER DISASSEMBLY/ASSEMBLY

A3U091050031W02

1. Remove the radiator grille.
2. Disassemble in the order indicated in the table.

1	Front bumper mesh (See 09–10–6 Front Bumper Mesh Removal Note.)
2	Hole cover (See 09–10–7 Hole Cover Removal Note.)
3	Front bumper fascia

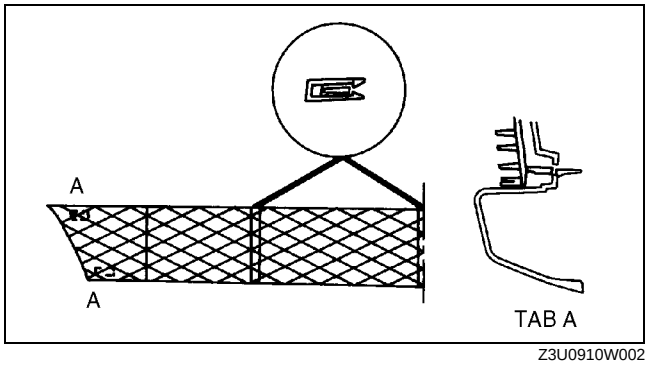
3. Assemble in the reverse order of disassembly.



Z3U0910W001

Front Bumper Mesh Removal Note

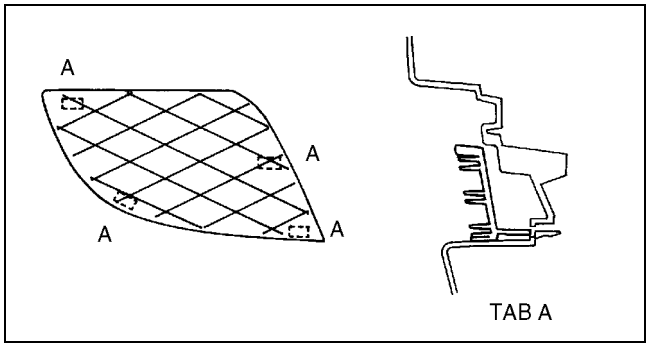
1. Push the tabs of front bumper mesh forward from the back of the front bumper fascia to unhook the front bumper mesh.



Z3U0910W002

Hole Cover Removal Note

1. Push the tabs on the hole cover forward from the back of the front bumper fascia to unhook the front bumper mesh.



Z3U0910W003

REAR BUMPER REMOVAL/INSTALLATION

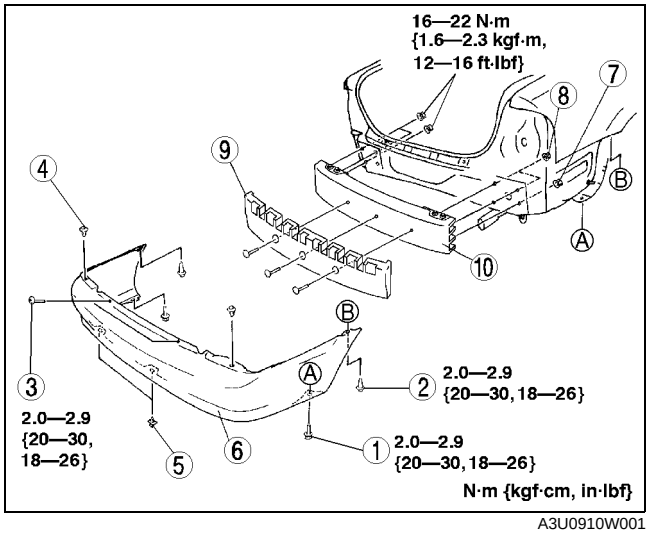
A3U091050221W01

4SD

1. Disconnect the negative battery cable.
2. Remove the rear combination lights. (See 09–18–10 REAR COMBINATION LIGHT REMOVAL/ INSTALLATION.)
3. Remove in the order indicated in the table.

1	Bolt A
2	Screw
3	Bolt B
4	Fastener A
5	Fastener B
6	Rear bumper fascia
7	Nut A
8	Nut B
9	Energy absorption foam
10	Rear bumper reinforcement

4. Install in the reverse order of removal.



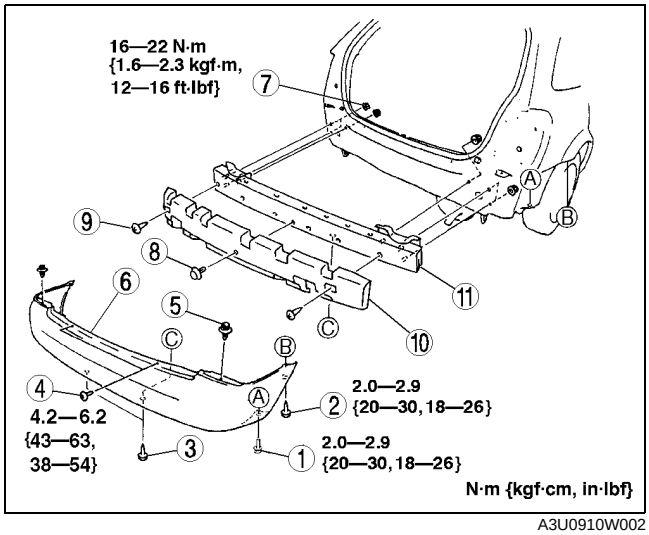
A3U0910W001

5HB

1. Disconnect the negative battery cable.
2. Remove the rear combination lights. (See 09–18–10 REAR COMBINATION LIGHT REMOVAL/ INSTALLATION.)
3. Remove in the order indicated in the table.

1	Bolt A
2	Screw
3	Fastener A
4	Bolt B
5	Fastener B
6	Rear bumper fascia
7	Nut
8	Fastener C
9	Fastener D
10	Energy absorption foam
11	Rear bumper reinforcement

4. Install in the reverse order of removal.



A3U0910W002

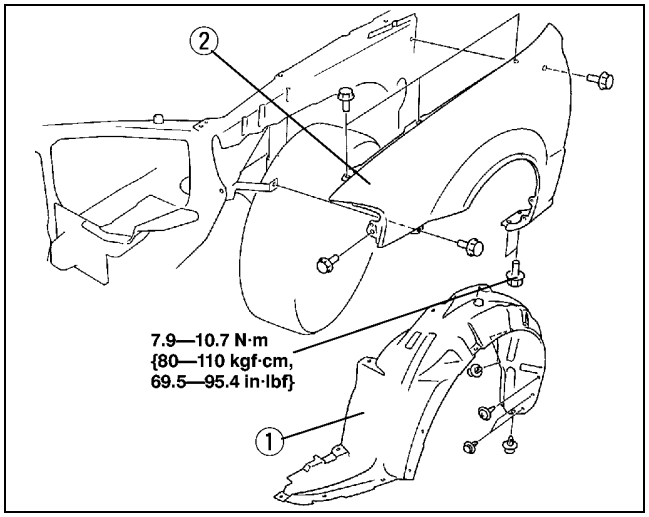
FRONT FENDER PANEL REMOVAL/INSTALLATION

A3U091052110W01

1. Disconnect the negative battery cable.
2. Remove the front combination light. (See 09–18–5 FRONT COMBINATION LIGHT REMOVAL/ INSTALLATION.)
3. Remove in the order indicated in the table.

1	Mud guard
2	Front fender panel

4. Install in the reverse order of removal.
5. Adjust the headlight aiming. (See 09–18–5 HEADLIGHT ADJUSTMENT.)



X3U910WAD

09–11 DOORS AND LIFTGATE

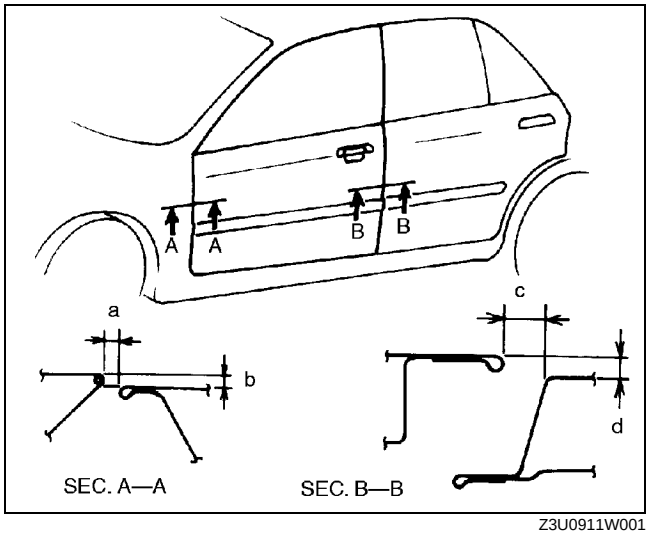
FRONT DOOR ADJUSTMENT

A3U091158010W01

1. Measure the gap and height between the front door and the body.
   - If not as specified, loosen the door hinge installation bolts or the door lock striker installation screws, and reposition the door. (See 09–11–1 FRONT DOOR REMOVAL/INSTALLATION.) (See 09–14–7 DOOR LOCK STRIKER REMOVAL/INSTALLATION.)

   Clearance
   a: 3.0—5.0 mm {0.12—0.19 in}
   b: –1.0—1.0 mm {–0.040—0.039 in}
   c: 3.5—5.5 mm {0.14—0.21 in}
   d: –1.0—0.5 mm {–0.040—0.019 in}

2. Tighten the bolts or screws.



Z3U0911W001

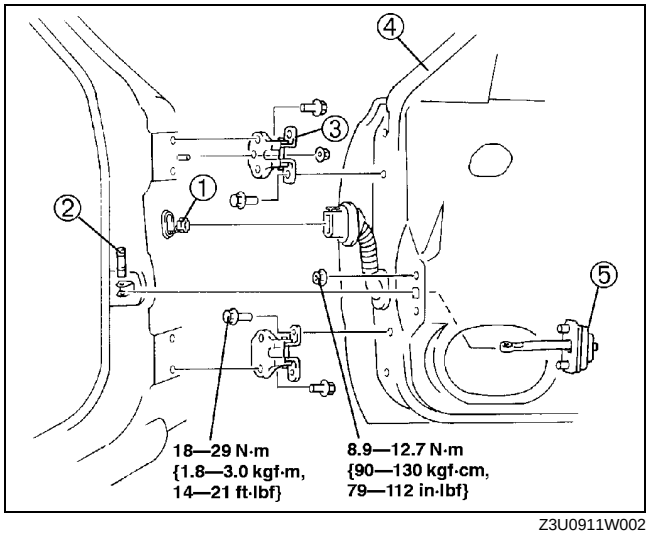
FRONT DOOR REMOVAL/INSTALLATION

A3U091158010W02

1. Disconnect the negative battery cable.
2. To remove the front door hinge, remove the front fender panel. (See 09–10–8 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. To remove the checker, remove the door speaker. (See 09–20–3 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Connector (See 09–11–2 Connector Removal Note) (See 09–11–2 Connector Installation Note)
2	Checker pin
3	Front door hinge
4	Front door
5	Checker

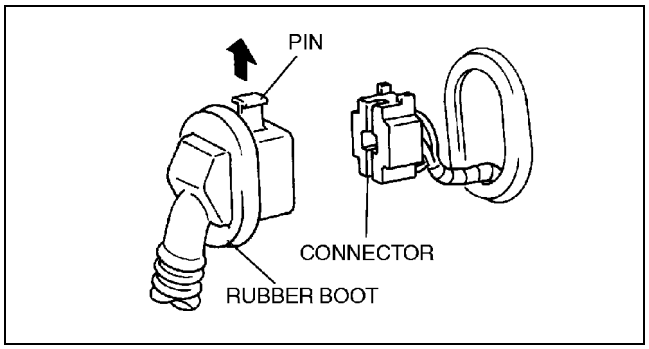
5. Install in the reverse order of removal.
6. Adjust the front door. (See 09–11–1 FRONT DOOR ADJUSTMENT.)



Z3U0911W002

Connector Removal Note

1. Push the rubber boot backward.
2. Pull the pin up.
3. Remove the rubber boot from the connector.



X3U911WA2

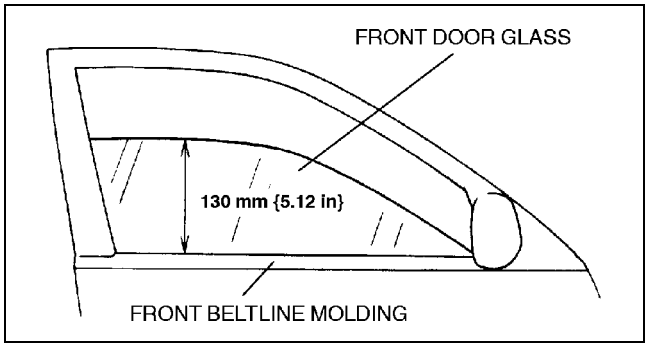
Connector Installation Note

1. Connect the connector and the rubber boot.
2. Push the pin down.
3. Install the rubber boot on the body.

FRONT DOOR DISASSEMBLY/ASSEMBLY

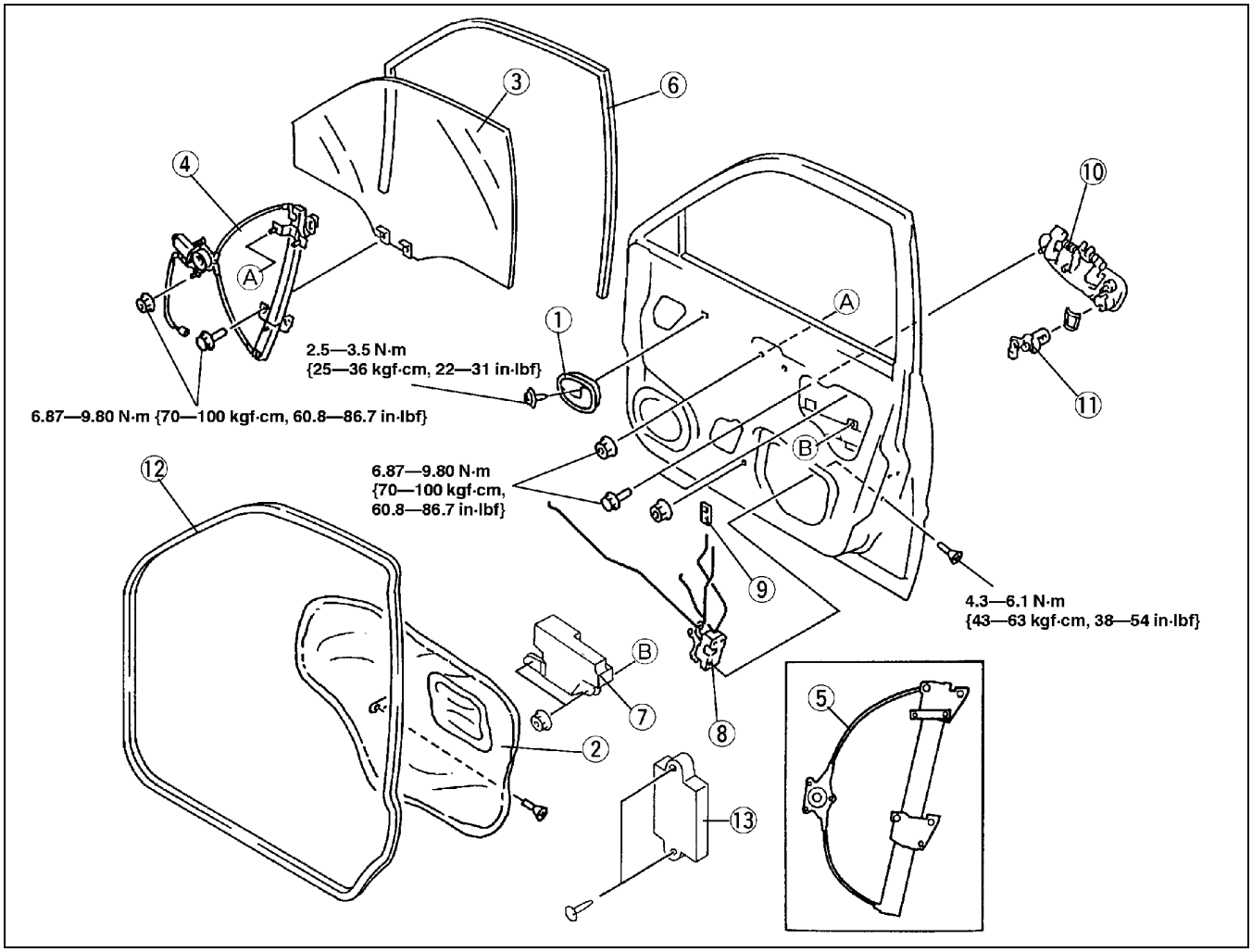
1. Lower or raise the front door glass so that the distance from the top of the front door glass at the rear end to the upper part of the front beltline molding is **130 mm {5.12 in}**.
2. Disconnect the negative battery cable.
3. Remove the front door trim. (See 09–17–9 FRONT DOOR TRIM REMOVAL/ INSTALLATION.)

A3U091158010W03



Y3U911W01

4. Disassemble in the order indicated in the table.
5. Assemble in the reverse order of disassembly.



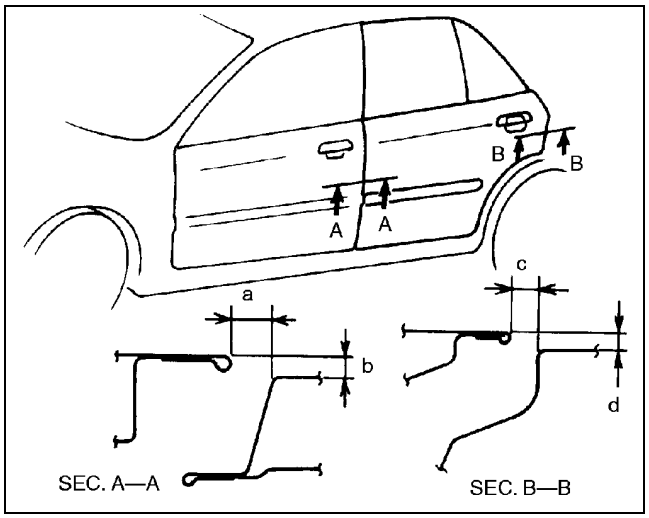
X3U911WA3

1	Inner handle
2	Door screen
3	Front door glass
4	Front power window regulator
5	Front manual window regulator
6	Glass run channel
7	Crush pad A

8	Front door lock
9	Door lock knob
10	Outer handle
11	Door key cylinder
12	Door weatherstrip
13	Crush pad B

REAR DOOR ADJUSTMENT

A3U091172010W01



Z3U0911W004

1. Measure the gap and height between the rear door and the body.
   - If not as specified, loosen the door hinge installation bolts or the door lock striker installation screws, and reposition the door. (See 09–11–4 REAR DOOR REMOVAL/ INSTALLATION.) (See 09–14–7 DOOR LOCK STRIKER REMOVAL/ INSTALLATION.)

   Clearance
   a: 3.5—5.5 mm {0.14—0.21 in}
   b: –1.0—0.5 mm {–0.040—0.019 in}
   c: 3.0—5.0 mm {0.12—0.19 in}
   d: –1.0—1.0 mm {–0.040—0.039 in}

2. Tighten the bolts or screws.

REAR DOOR REMOVAL/INSTALLATION

A3U091172010W02

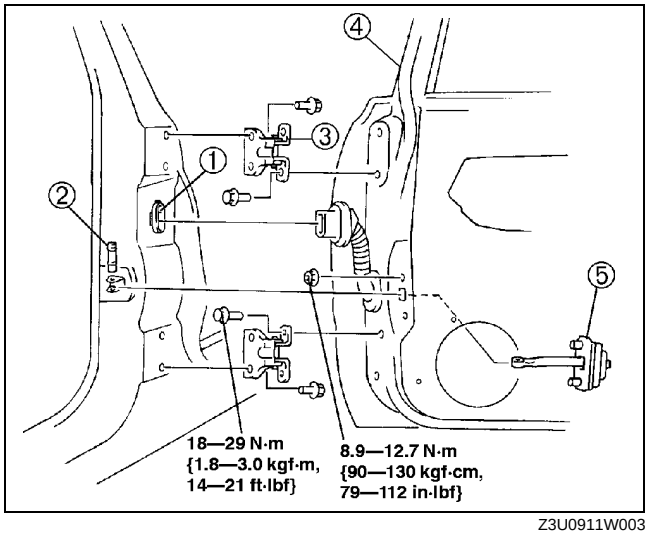
Warning
- **Handling the side air bag sensor improperly can accidentally deploy the side air bag module, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before working around the B-pillar areas. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Note
- The side air bag sensor is located in the B-pillar.

1. Disconnect the negative battery cable.
2. To remove the checker, turn the door screen over.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector (See 09–11–5 Connector Removal Note) (See 09–11–5 Connector Installation Note)
2	Checker pin
3	Rear door hinge
4	Rear door
5	Checker

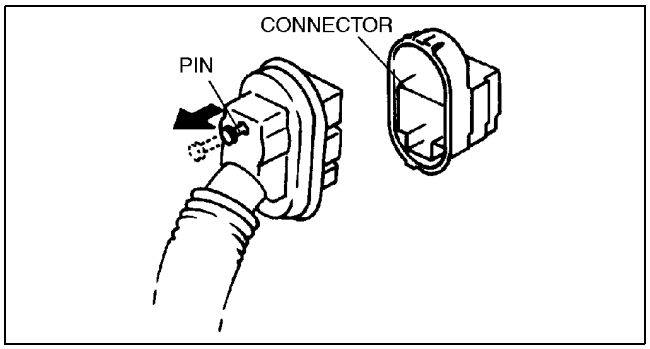
5. Adjust the rear door. (See 09–11–4 REAR DOOR ADJUSTMENT.)



Z3U0911W003

Connector Removal Note

1. Pull the pin outward.
2. Disconnect the connector.



X3U911WA6

Connector Installation Note

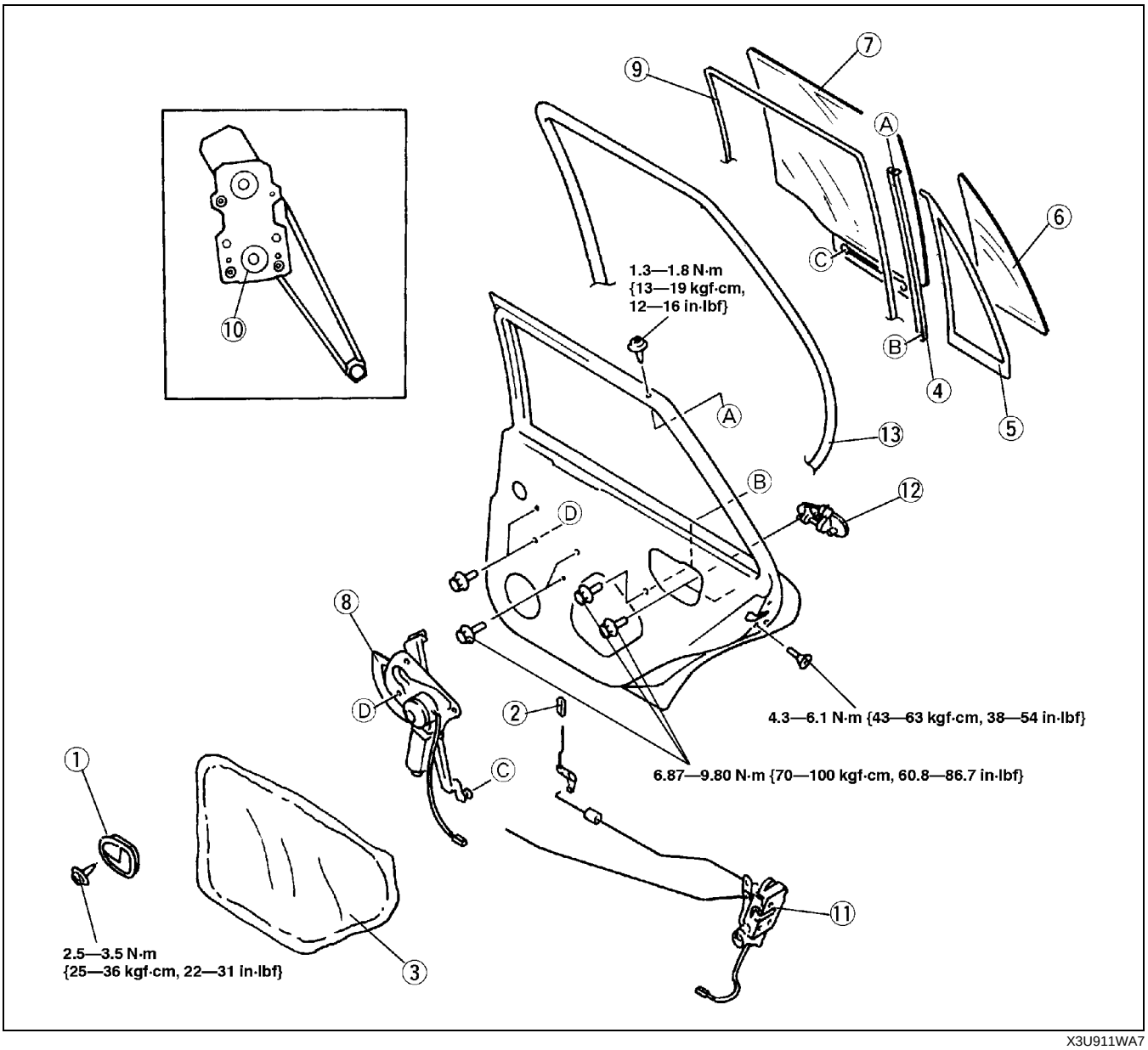
1. Push the pin in.
2. Connect the connector.
3. Push the pin in again.

REAR DOOR DISASSEMBLY/ASSEMBLY

A3U091172010W03

1. Open the rear door glass completely.
2. Disconnect the negative battery cable.
3. Remove the rear door trim. (See 09–17–9 REAR DOOR TRIM REMOVAL/INSTALLATION.)
4. Disassemble in the order indicated in the table.

5. Assemble in the reverse order of disassembly.



X3U911WA7

1	Inner handle
2	Door lock knob
3	Door screen
4	Glass guide
5	Door quarter window glass weatherstrip
6	Door quarter window glass
7	Rear door glass

8	Rear power window regulator
9	Glass run channel
10	Rear manual window regulator
11	Rear door lock
12	Outer handle
13	Door weatherstrip

LIFTGATE REMOVAL/INSTALLATION

A3U091162010W01

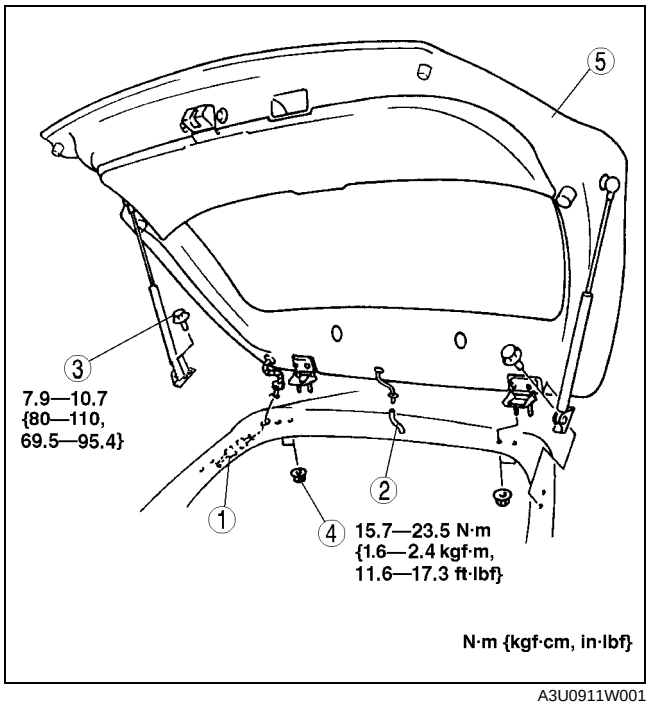
Warning

- **Removing the stay damper without supporting the liftgate can be dangerous. The liftgate may fall and injure you. Open the liftgate fully and support it before removing the stay damper.**

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Rear washer hose
3	Bolt
4	Nut
5	Liftgate

4. Install in the reverse order of removal.
5. Adjust the liftgate. (See09–11–9 LIFTGATE ADJUSTMENT)

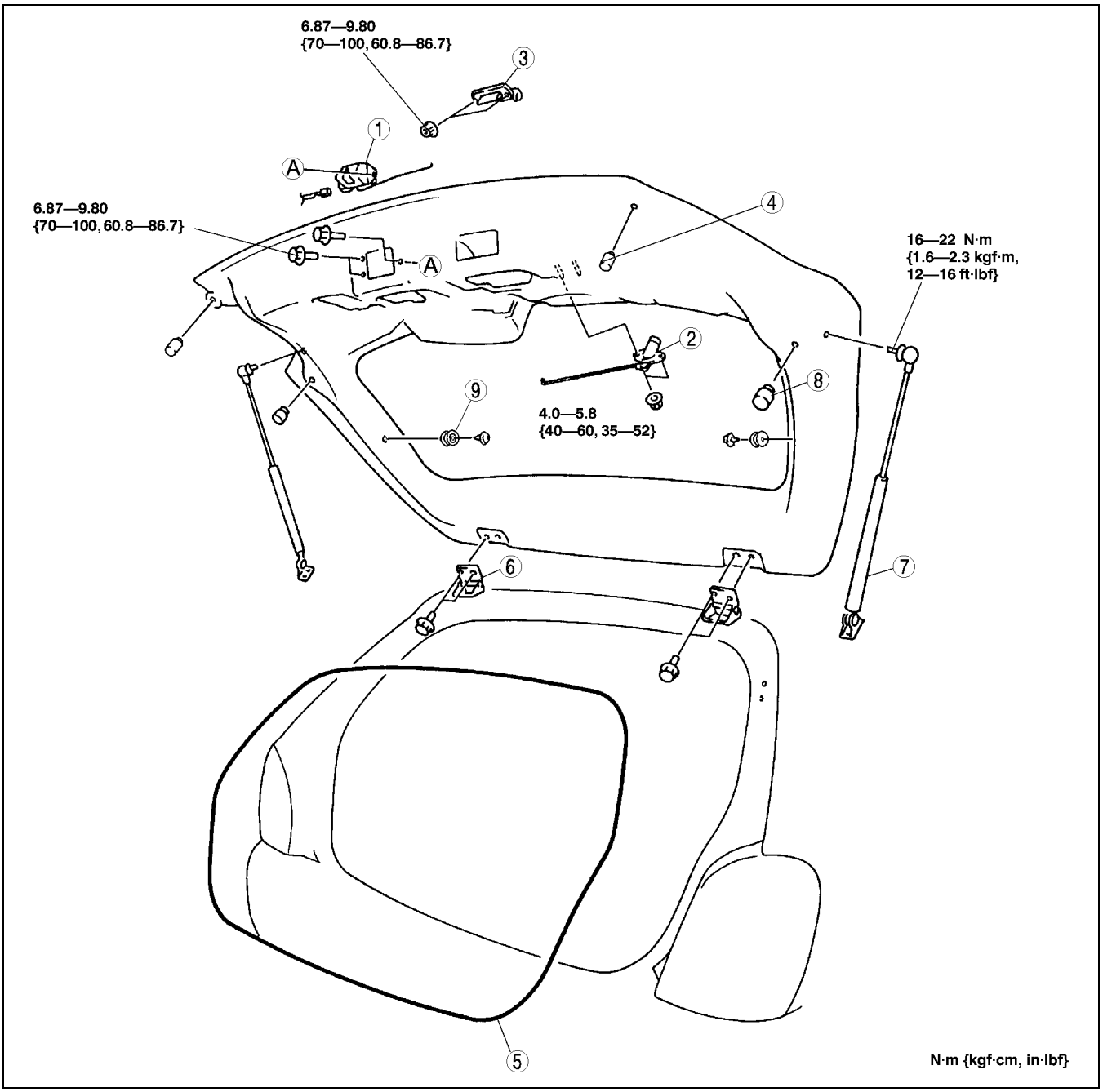


A3U0911W001

LIFTGATE DISASSEMBLY/ASSEMBLY

A3U091162010W02

1. Disconnect the negative battery cable.
2. Remove the liftgate trim.
3. Disassemble in the order indicated in the table.
4. Assemble in the reverse order of disassembly.



A3U0911W002

1	Liftgate lock
2	Liftgate lock cylinder
3	Liftgate outer handle
4	Stop rubber A
5	Liftgate weatherstrip

6	Liftgate hinge
7	Stay damper
8	Stop rubber B
9	Strap hanger

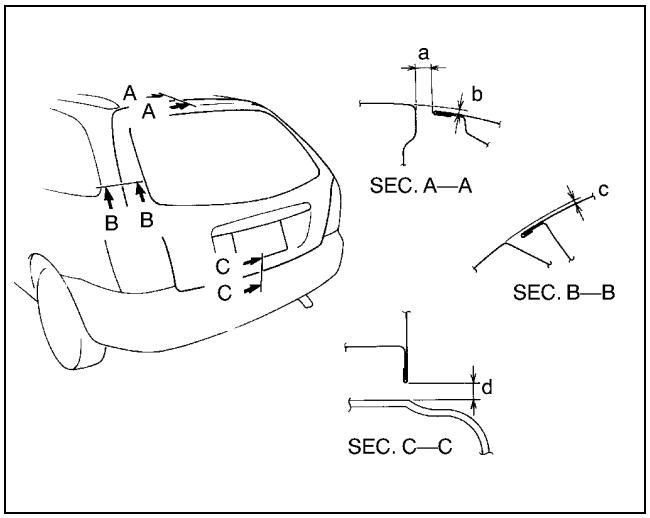
LIFTGATE ADJUSTMENT

A3U091162010W03

1. Measure the gap and height between the liftgate and the body.
2. To measure the distance d, measure **within 484 mm {19.1 in}** right and left from the center of the liftgate.

   Clearance
   a: 7.5—9.5 mm {0.30—0.37 in}
   b: -0.5—1.5 mm {-0.019—0.059 in}
   c: -0.7—1.7 mm {-0.027—0.066 in}
   d: 4.3—10.3 mm {0.17—0.41 in}

3. Loosen the liftgate hinge installation bolts or the liftgate striker installation screws, and reposition the liftgate.
4. Tighten the bolts or screws.



A3U0911W004

STAY DAMPER DISPOSAL

A3U091162620W01

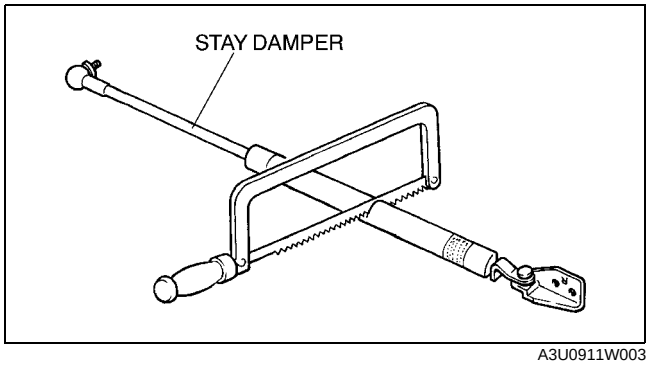
Warning

- **Sawing through the stay damper body can cause metal shavings and filings to fly out, causing injury to the eyes. Wear protective eye wear whenever sawing through a stay damper before discarding it.**

Note

- The gas in the stay damper is colorless, odorless, and non-toxic.

1. Lay the stay damper flat.
2. Saw through the stay damper body using a hacksaw.
3. Allow the gas to escape from the stay damper.
4. Discard the stay damper.



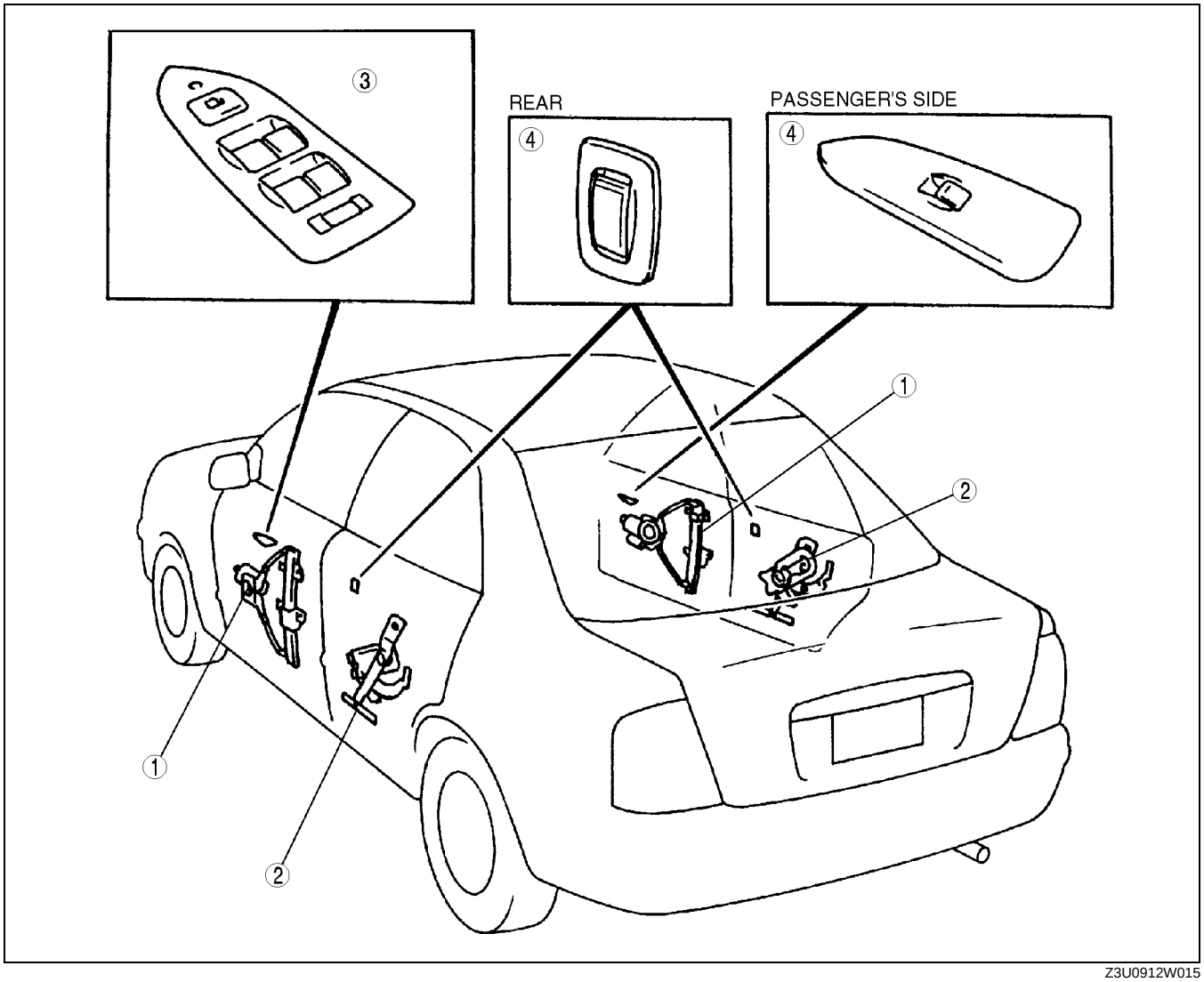
A3U0911W003

09–12 GLASS/WINDOWS/MIRRORS

LOCATION INDEX

A3U091201048W01

Power Window System

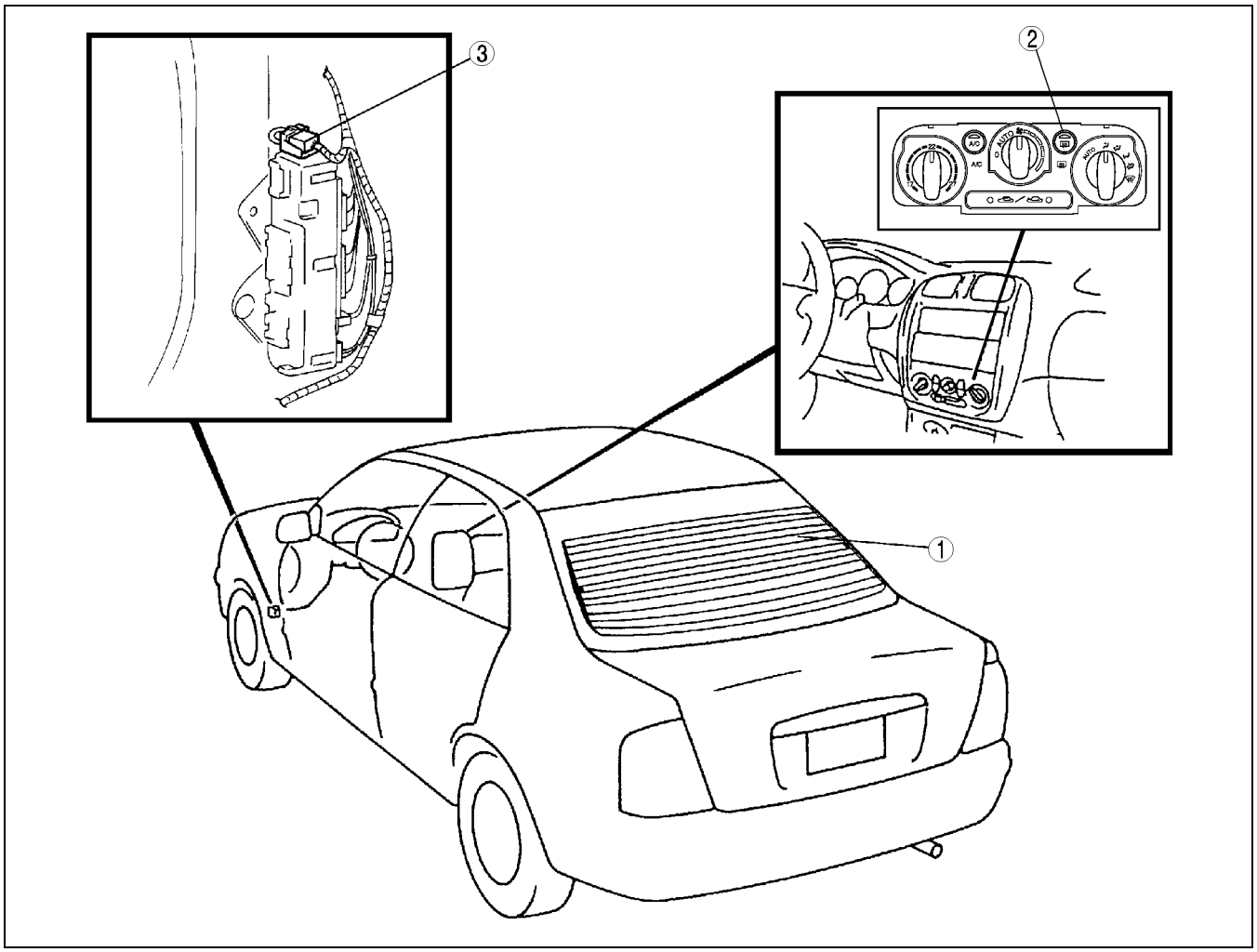


Z3U0912W015

1	Front power window regulator (See 09–12–5 POWER WINDOW MOTOR INSPECTION) (See 09–12–5 FRONT POWER WINDOW REGULATOR REMOVAL/INSTALLATION) (See 09–12–5 FRONT POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY)
2	Rear power window regulator (See 09–12–5 POWER WINDOW MOTOR INSPECTION) (See 09–12–6 REAR POWER WINDOW REGULATOR REMOVAL/INSTALLATION) (See 09–12–6 REAR POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY)

3	Power window main switch (See 09–12–8 POWER WINDOW MAIN SWITCH INSPECTION) (See 09–12–7 POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION)
4	Power window subswitch (See 09–12–10 POWER WINDOW SUBSWITCH INSPECTION) (See 09–12–9 POWER WINDOW SUBSWITCH REMOVAL/INSTALLATION)

Rear Window Defroster



Z3U0912W016

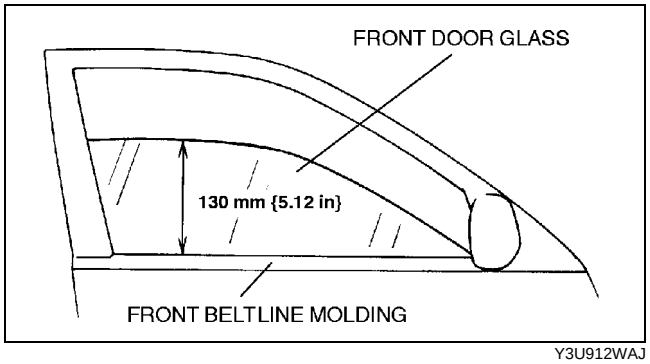
1	Filament (See 09–12–27 FILAMENT INSPECTION) (See 09–12–28 FILAMENT REPAIR)

2	Rear window defroster switch (See 07–40–10 CLIMATE CONTROL UNIT DISASSEMBLY/ASSEMBLY) (See 07–40–11 CLIMATE CONTROL UNIT INSPECTION)
3	Rear window defroster relay (See 09–21–5 RELAY INSPECTION)

FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION

1. Lower or raise the front door glass so that the distance from the top of the front door glass at the rear end to the upper part of the front beltline molding is **130 mm {5.12 in}**.
2. Disconnect the negative battery cable.
3. Remove the front door trim. (See 09–17–9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove the inner handle.

A3U091258510W01

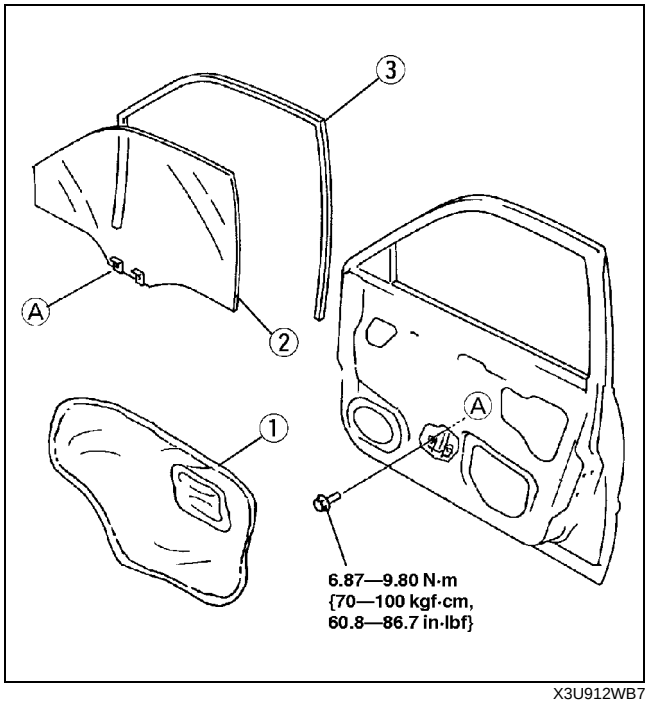


Y3U912WAJ

5. Remove in the order indicated in the table.

1	Door screen
2	Front door glass
3	Glass run channel

6. Install in the reverse order of removal.



X3U912WB7

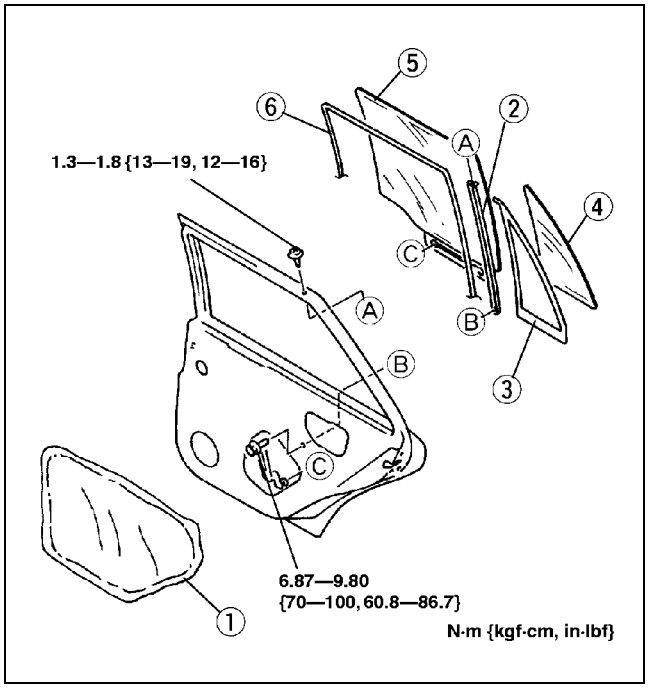
REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION

A3U091272510W01

1. Open the rear door glass completely.
2. Disconnect the negative battery cable.
3. Remove the rear door trim. (See 09–17–9 REAR DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove the inner handle.
5. Remove in the order indicated in the table.

1	Door screen
2	Glass guide
3	Door quarter window glass weatherstrip
4	Door quarter window glass
5	Rear door glass
6	Glass run channel

6. Install in the reverse order of removal.



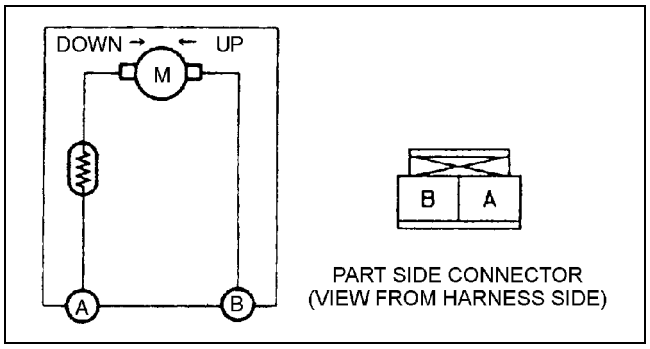
X3U912WB8

POWER WINDOW MOTOR INSPECTION

A3U091258581W01

1. Remove the power window motor. (See 09–12–5 FRONT POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY.) (See 09–12–6 REAR POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY.)
2. Apply battery positive voltage to the power window motor terminals and inspect the operation of the power window motor.
   - If not as specified, replace the power window motor.

Terminal		Motor operation
A	B	
GND	B+	UP
B+	GND	DOWN



Y3U912WA0

FRONT POWER WINDOW REGULATOR REMOVAL/INSTALLATION

A3U091258560W01

1. Disconnect the negative battery cable.
2. Remove the front door glass. (See 09–12–3 FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
3. Disconnect the front power window regulator connector.
4. Remove the bolts and the nuts, then remove the front power window regulator.

   Tightening torque
   6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}

5. Install in the reverse order of removal.

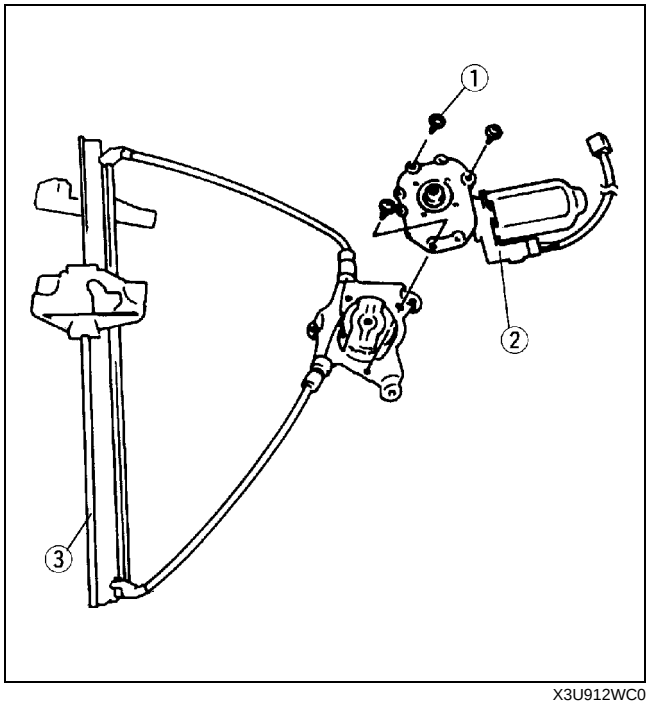
FRONT POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY

A3U091258560W02

1. Disassemble in the order indicated in the table.

1	Screw
2	Power window motor (See 09–12–6 Power Window Motor Disassembly Note)
3	Frame

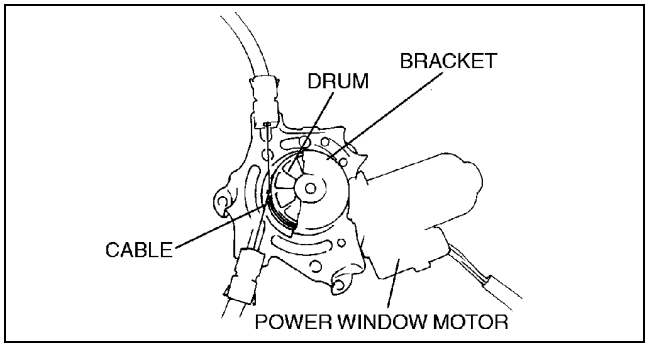
2. Assemble in the reverse order of disassembly.



X3U912WC0

Power Window Motor Disassembly Note

1. Hold the drum and the cable with the bracket to prevent them from being pulled out with the power window motor.



X3U912WC1

FRONT MANUAL WINDOW REGULATOR REMOVAL/INSTALLATION

A3U091258561W01

1. Remove the front door glass. (See 09–12–3 FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
2. Remove the bolts and the nuts, then remove the front manual window regulator.

   Tightening torque
   6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}

3. Install in the reverse order of removal.

REAR POWER WINDOW REGULATOR REMOVAL/INSTALLATION

A3U091272560W01

1. Disconnect the negative battery cable.
2. Remove the rear door glass. (See 09–12–4 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
3. Disconnect the rear power window regulator.
4. Remove the bolts, then remove the rear power window regulator.

   Tightening torque
   6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}

5. Install in the reverse order of removal.

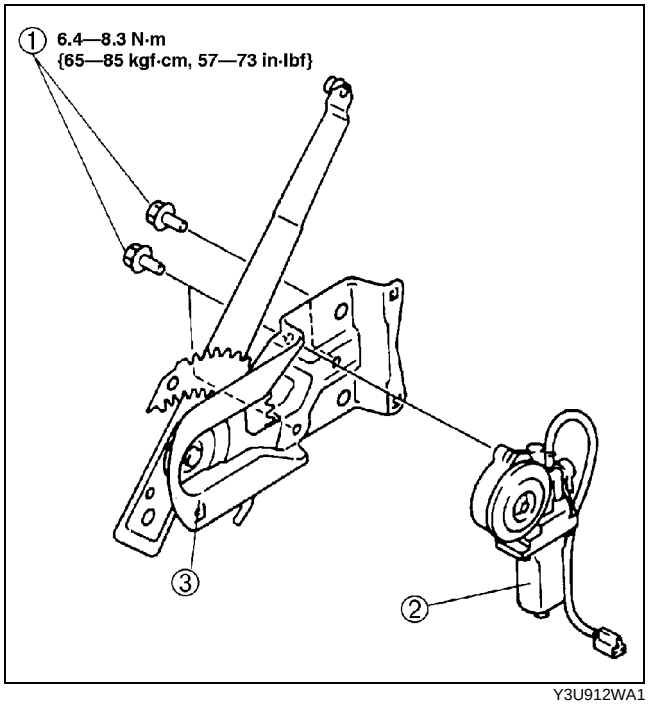
REAR POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY

A3U091272560W02

1. Disassemble in the order indicated in the table.

1	Bolt
2	Power window motor (See 09–12–7 Power Window Motor Disassembly Note) (See 09–12–7 Power Window Motor Assembly Note)
3	Frame

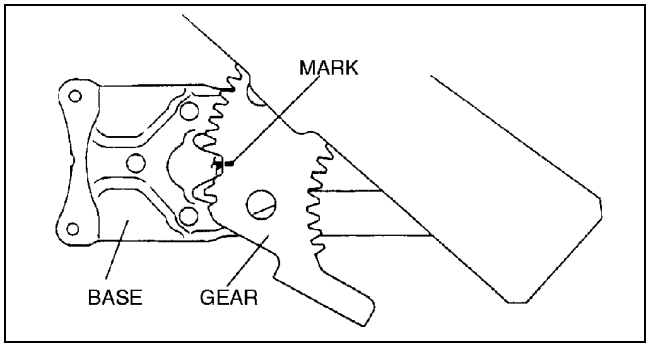
2. Assemble in the reverse order of disassembly.



Y3U912WA1

Power Window Motor Disassembly Note

1. Make marks on the gear and the base before disassembling the power window motor.



X3U912WC3

Power Window Motor Assembly Note

1. Align the marks on the gear and the base before assembling the power window motor.

REAR MANUAL WINDOW REGULATOR REMOVAL/INSTALLATION

A3U091272561W01

1. Remove the rear door glass. (See 09–12–4 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
2. Remove the bolts, then remove the rear manual window regulator.

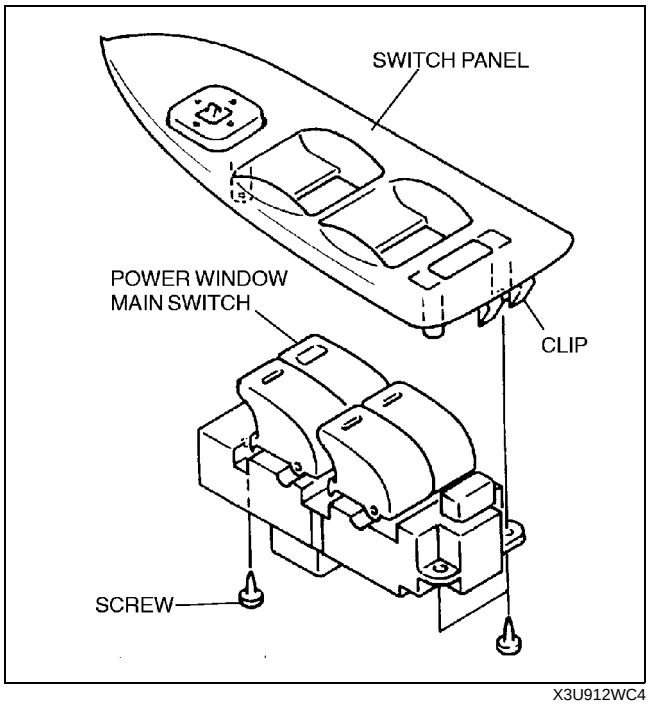
   Tightening torque
   6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}

3. Install in the reverse order of removal.

POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION

A3U091266350W01

1. Disconnect the negative battery cable.
2. Remove the driver-side front door trim. (See 09–17–9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Push out the clip from the reverse side of the trim, and remove the switch panel.
4. Remove the screw, and remove the power window main switch.
5. Install in the reverse order of removal.



X3U912WC4

POWER WINDOW MAIN SWITCH INSPECTION

A3U091266350W02

1. Remove the power window main switch. (See 09–12–7 POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION.)
2. When inspecting the passenger's side and the rear, turn the power-cut switch to ON.
3. Inspect for continuity between the power window main switch terminals using an ohmmeter.
   - If not as specified, replace the power window main switch.

Driver's side

○—○ : Continuity

Switch position	Terminal			
	F	H	J	L
CLOSE	○	○	○	○
OFF		○	○	○
MANUAL OPEN AUTO OPEN	○	○		○

Z3U0912W003

Passenger's side

○—○ : Continuity

Switch position	Terminal			
	F	H	B	D
CLOSE	○	○	○	○
OFF		○	○	○
OPEN	○	○		○

Z3U0912W004

Rear left

○—○ : Continuity

Switch position	Terminal			
	F	H	I	K
CLOSE	○	○	○	○
OFF		○	○	○
OPEN	○	○		○

Z3U0912W005

Rear right

○—○ : Continuity

Switch position	Terminal			
	F	H	A	C
CLOSE	○	○	○	○
OFF		○	○	○
OPEN	○	○		○

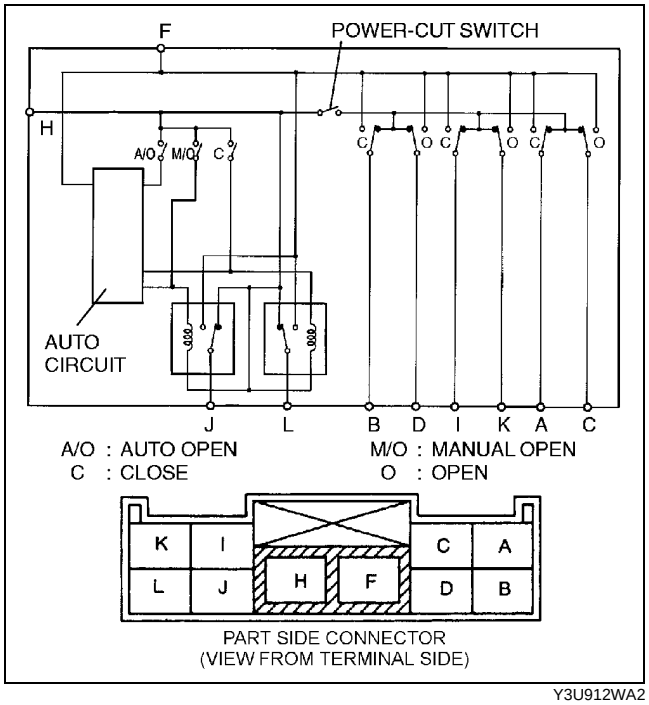
Z3U0912W006

Power-cut switch

○—○ : Continuity

Switch position	Terminal								
	H	J	L	B	D	I	K	A	C
ON	○	○	○	○	○	○	○	○	○
OFF	○	○	○	○	○	○	○	○	○

Z3U0912W007



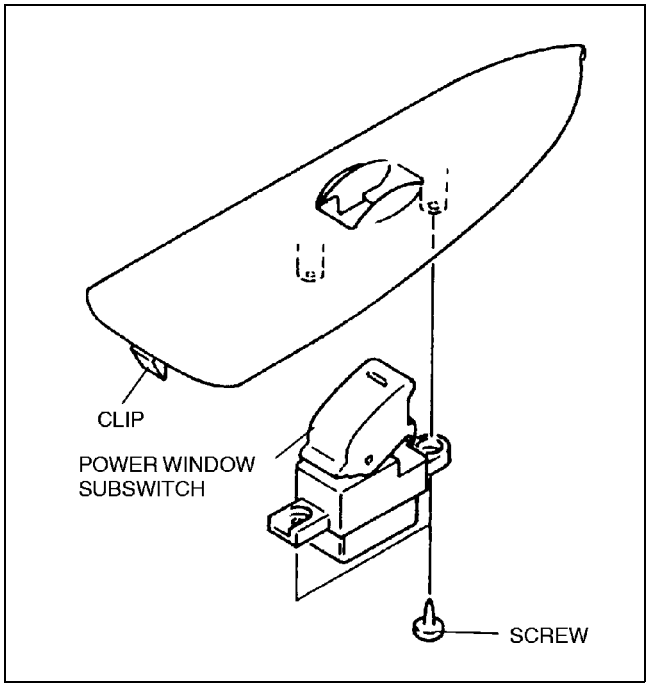
Y3U912WA2

POWER WINDOW SUBSWITCH REMOVAL/INSTALLATION

A3U091266370W01

Passenger's side

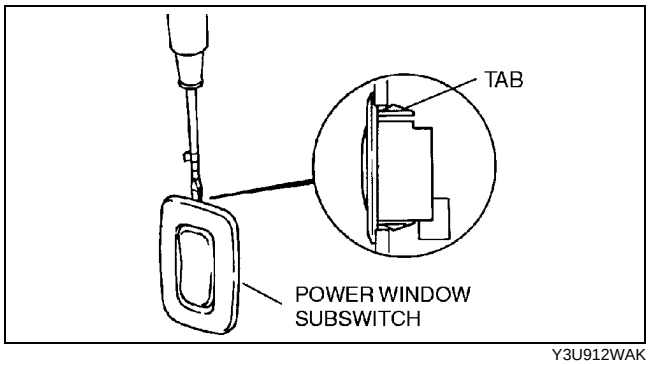
1. Disconnect the negative battery cable.
2. Remove the passenger-side front door trim. (See 09–17–9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Push out the clip from the reverse side of the trim, and remove the switch panel.
4. Remove the screw, and remove the power window subswitch.
5. Install in the reverse order of removal.



X3U912WD0

Rear

1. Disconnect the negative battery cable.
2. Remove the tab by inserting a tape-wrapped, flathead screwdriver between the switch and the rear door trim.
3. Disconnect the connector, and remove the power window subswitch.
4. Install in the reverse order of removal.



Y3U912WAK

POWER WINDOW SUBSWITCH INSPECTION

A3U091266370W02

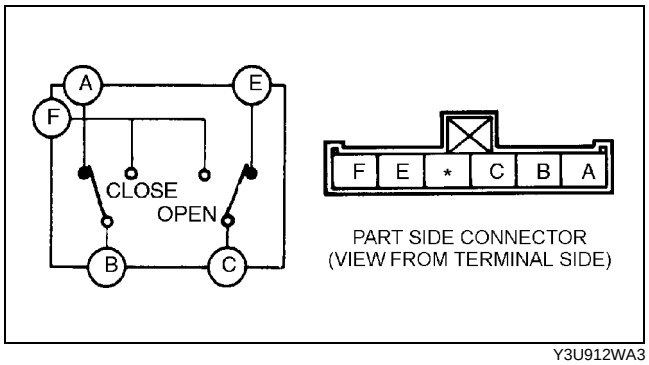
1. If inspecting the passenger's side, remove the switch panel.
2. If inspecting the rear, remove the power window subswitch.
3. Inspect for continuity between the power window subswitch terminals using an ohmmeter.
   - If not as specified, replace the power window subswitch.

Passenger's side

○—○ : Continuity

Switch position	Terminal				
	A	B	C	E	F
CLOSE		○	○—○	○	○
OFF	○—○		○—○		
OPEN	○—○		○		○

Z3U0912W008



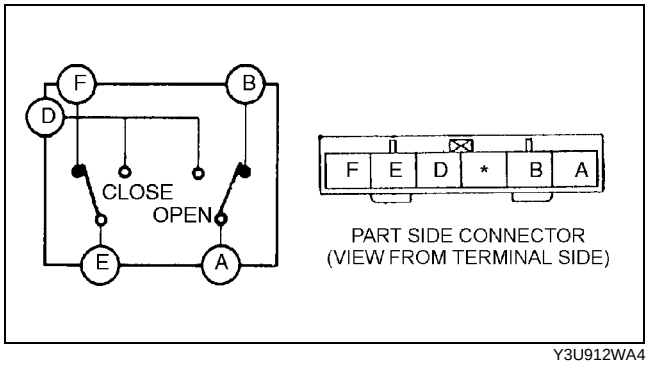
Y3U912WA3

Rear

○—○ : Continuity

Switch position	Terminal				
	A	B	D	E	F
CLOSE	○—○		○—○		
OFF	○—○			○—○	
OPEN	○		○	○—○	

Z3U0912W009

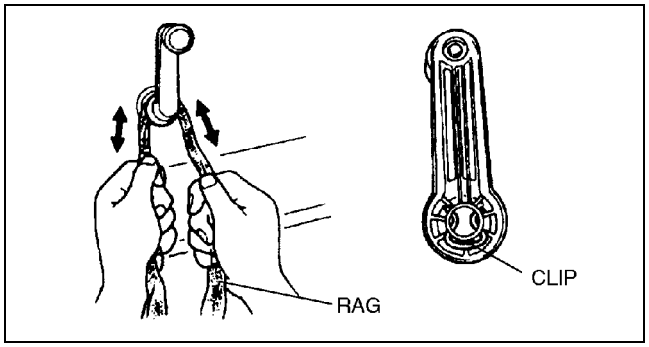


Y3U912WA4

REGULATOR HANDLE REMOVAL

A3U091258580W01

1. Remove the regulator handle clip using a rag as shown.

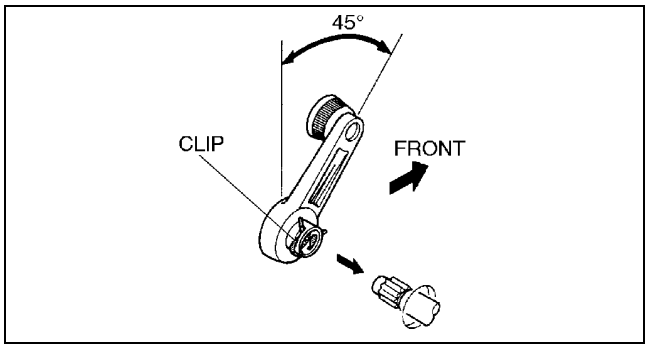


X3U912WD5

REGULATOR HANDLE INSTALLATION

A3U091258580W02

1. Install the clip in the regulator handle.
2. Close the door glass fully and push the regulator handle on as shown.



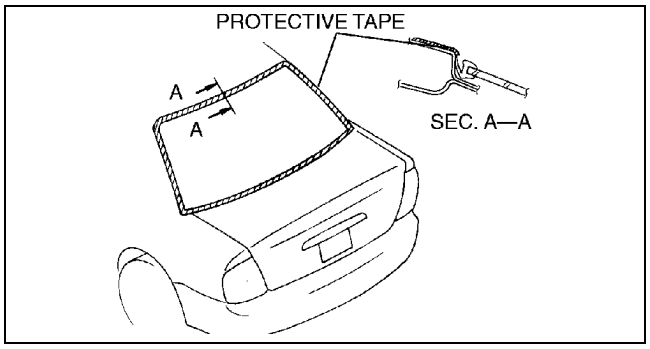
Z3U0912W002

REAR WINDOW GLASS REMOVAL

A3U091263931W01

4SD

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Apply protective tape along the edge of body to protect it from damage.



X3U912WAP

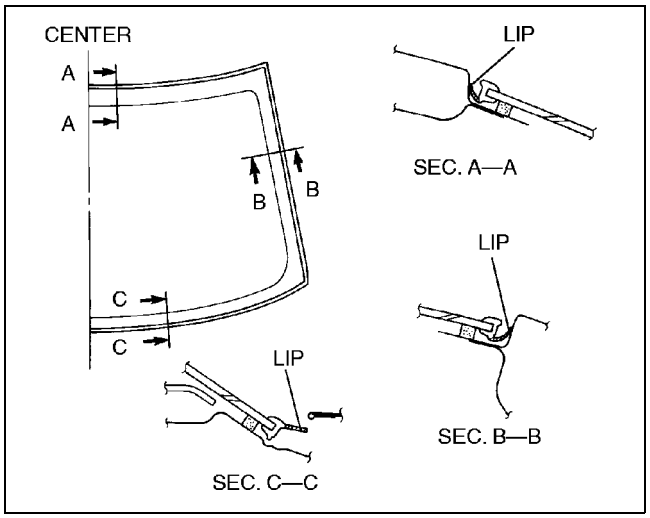
3. Remove the lip of the rear window molding using a razor.

Warning

- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Note

- The rear window molding is a replacement part.



A3U0912W0101

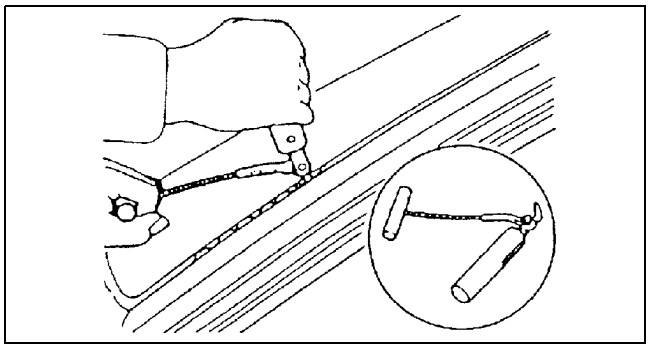
Not Reusing Rear Window Glass

1. Use a tool like that shown in the figure, and insert the blade into the sealant.

Note

- For the areas of the sealant that are difficult to cut, use the **SST** (piano wire) and follow the procedures under “Reusing rear window glass”.

2. Pull through the sealant around the edge of the glass.
3. Remove the glass.



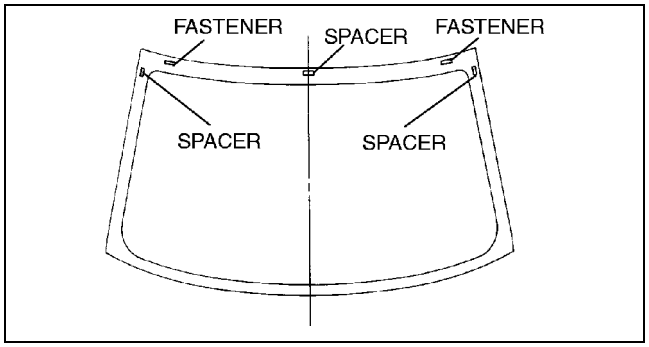
X3U912WAR

Reusing Rear Window Glass

Note

- Before removing the rear window glass from the body, mark the position of the rear window glass by affixing tape to the windshield and body panel.

1. Use an awl to saw through the sealant, except where there are fasteners and spacers, from the inside of the vehicle.

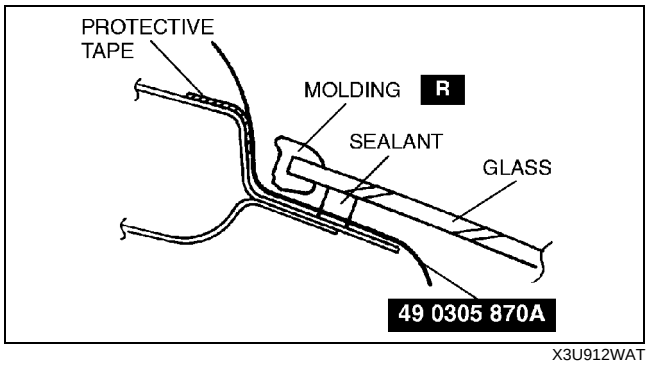


X3U912WAS

2. Pass the **SST** (piano wire) through the hole.

   Warning
   - **Using a SST (piano wire) with bare hands can cause injury. Always wear gloves when using a SST (piano wire).**

3. Wind each end of the wire around a bar.

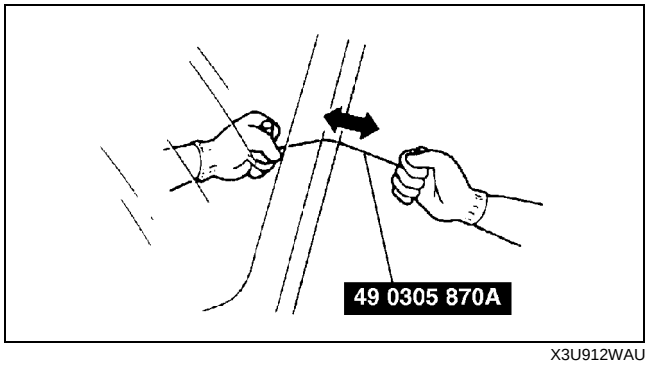


X3U912WAT

4. Working with another person, saw through the sealant around the edge of the glass, being careful not to damage the body.

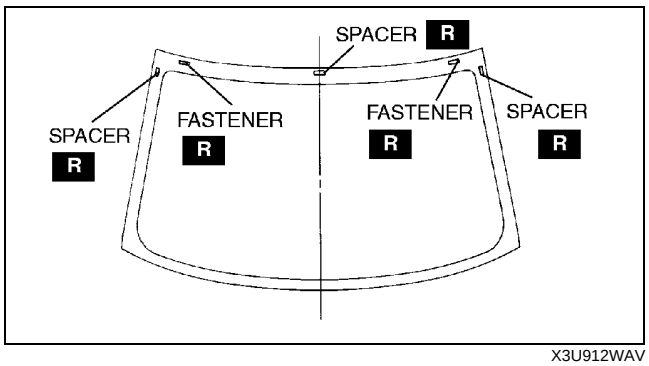
   Note
   - Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

5. Remove the rear window glass.



X3U912WAU

6. Remove the spacers and fasteners.
7. Remove the rear window molding from the rear window glass.

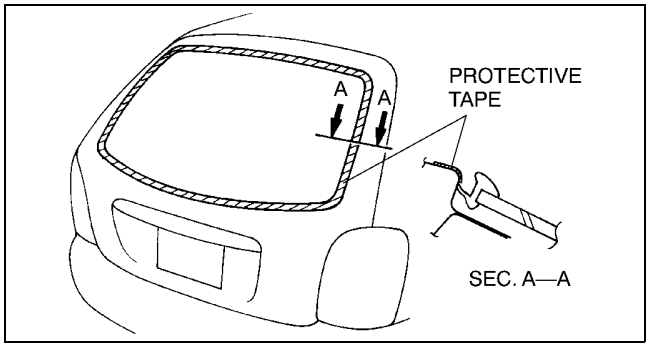


X3U912WAV

5HB

1. Remove the rear wiper arm and blade. (See 09–19–12 REAR WIPER ARM AND BLADE REMOVAL/ INSTALLATION.)
2. Remove the liftgate trim.
3. Remove the rear spoiler.

4. Apply protective tape along the edge of body to protect it from damage.



A3U0912W009

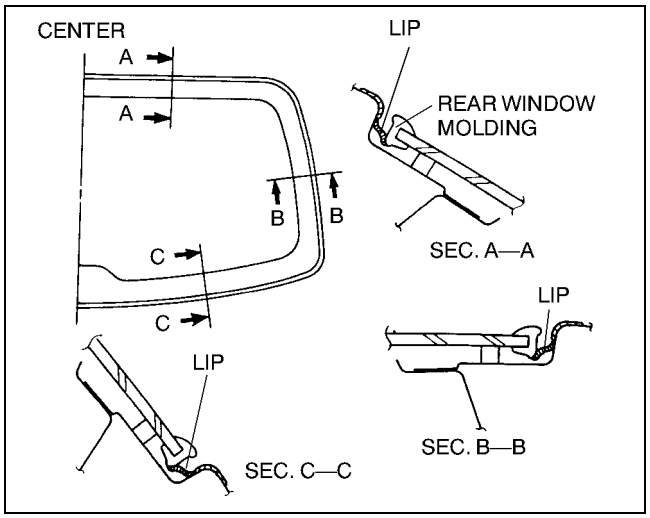
5. Remove the lip of the rear window molding using a razor.

Warning

- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Note

- The rear window molding is a replacement part.



A3U0912W010

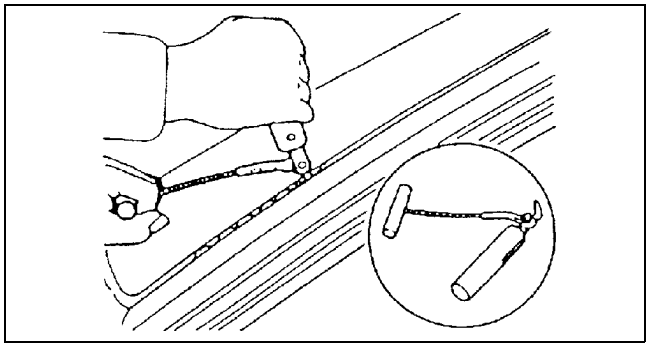
Not Reusing Rear Window Glass

1. Use a tool like that shown in the figure, and insert the blade into the sealant.

Note

- For the areas of the sealant that are difficult to cut, use the **SST** (piano wire) and follow the procedures under “Reusing rear window glass”.

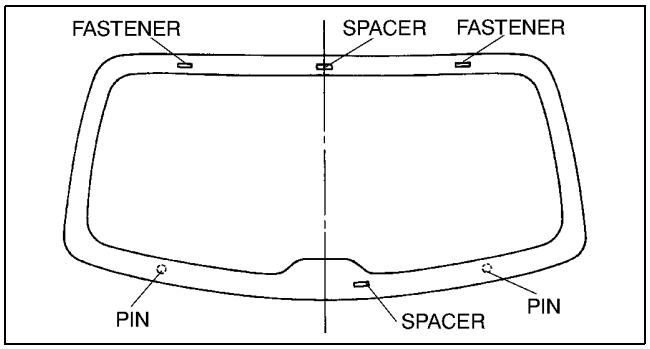
2. Pull through the sealant around the edge of the glass.
3. Remove the glass.



X3U912WAR

Reusing Rear Window Glass

1. Use an awl to saw through the sealant, except where there are fasteners and spacers, from the inside of the vehicle.

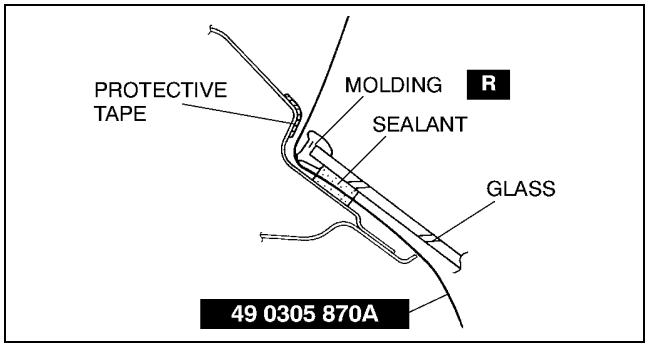


A3U0912W011

2. Pass the **SST** (piano wire) through the hole.

Warning
- **Using a SST (piano wire) with bare hands can cause injury. Always wear gloves when using a SST (piano wire).**

3. Wind each end of the **SST** (piano wire) around a bar.

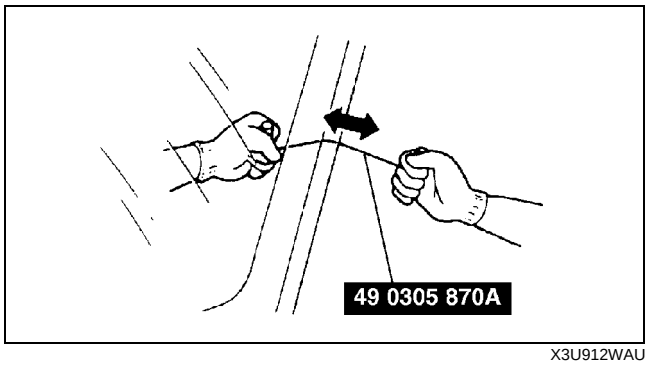


A3U0912W012

4. Working with another person, saw through the sealant around the edge of the glass, being careful not to damage the body.

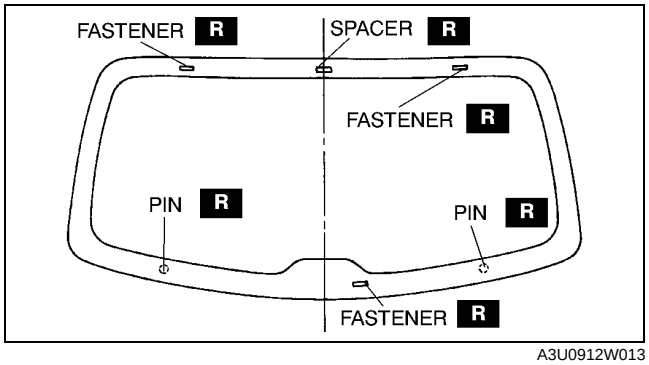
Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

5. Remove the rear window glass.



X3U912WAU

6. Remove the pins, fasteners and spacers.
7. Remove the rear window molding from the rear window glass.



A3U0912W013

REAR WINDOW GLASS INSTALLATION

A3U091263931W02

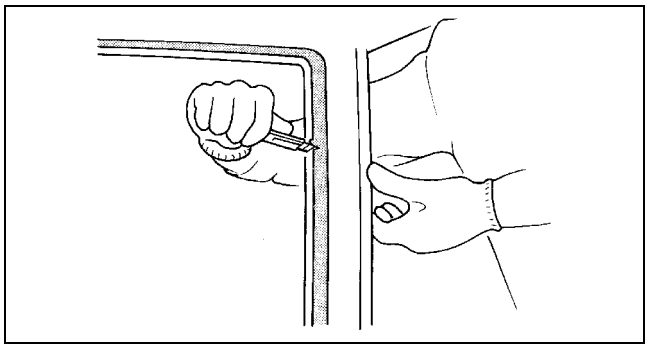
4SD

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 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 degreasing, and allow it **30 minutes** to dry. Then put on new sealant to create a **2 mm {0.08 in}** layer.

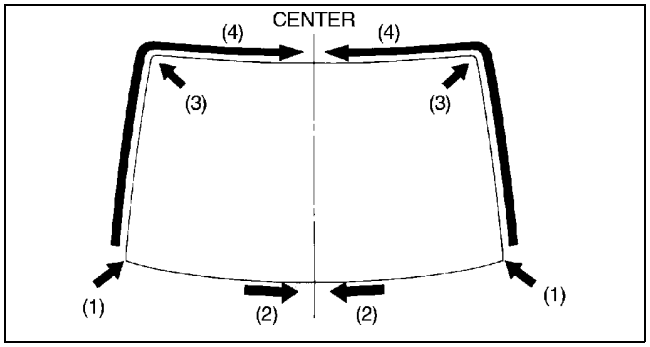
Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Clean and degrease an **approximately 50.0 mm {1.97 in}** wide strip around the circumference of the glass and the bonding area on the body.



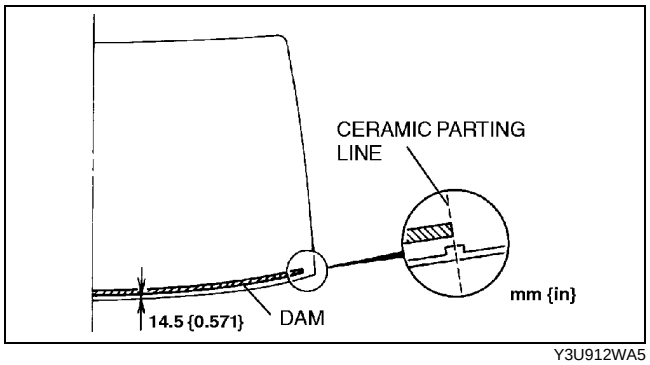
WSXWXX0003J

3. Align the lower corners of the molding and glass. (1)
4. Install the lower, starting from the outer ends and moving inward. (2)
5. Align the marking of the molding with the ceramic parting line on the glass. (3)
6. Install the sides and upper, starting from the lower edge and moving upward and inward, being careful not to pull out the corners. (4)



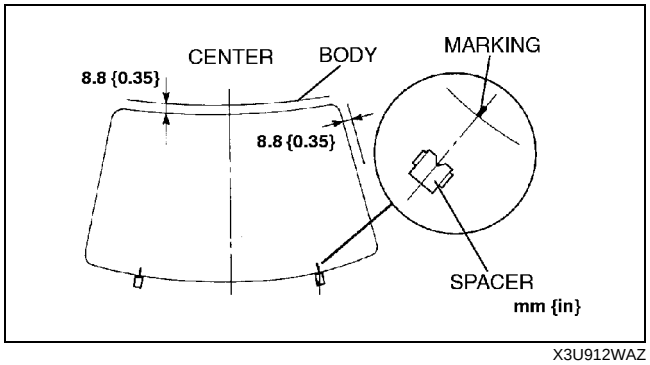
X3U912WAX

7. Securely bond a dam on the lower side of the glass **14.5 mm {0.571 in}** from the edge.
8. Install spacers into the hole.
9. Temporarily install the glass onto the body and adjust the glass-to-body clearance.
10. Make a marks on the glass directly above the V-notch of the spacers.



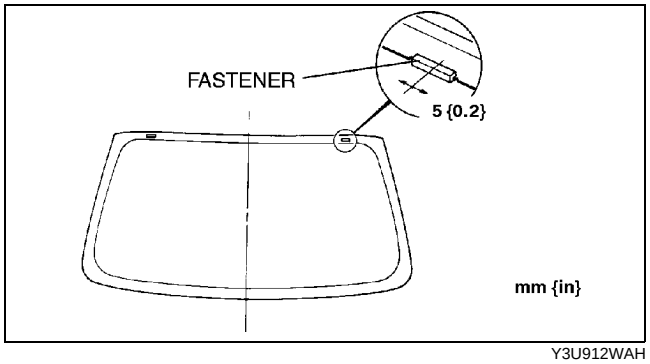
Y3U912WA5

11. Verify that the gap along the upper and side edge is **8.8 mm {0.35 in}**.
12. Remove the windshield.



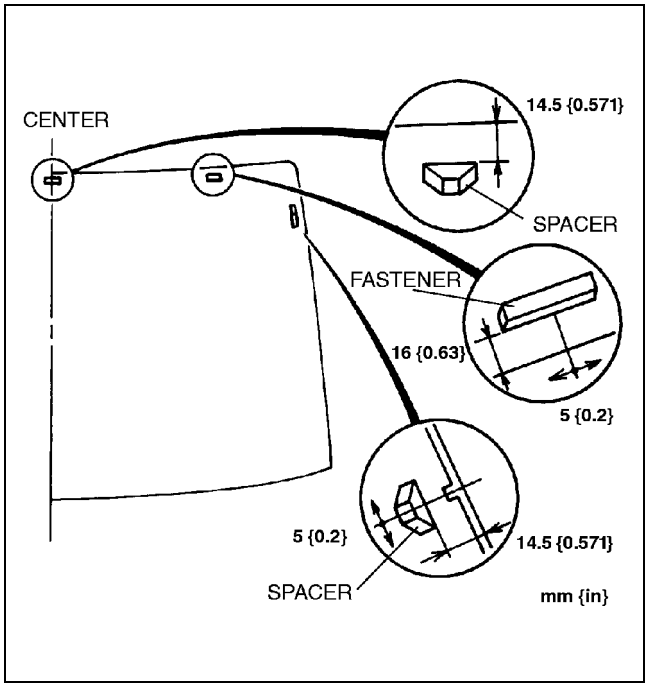
X3U912WAZ

13. Install the fasteners on the body as shown.



Y3U912WAH

14. Install the fasteners and spacers onto the glass as shown.



Y3U912WA6

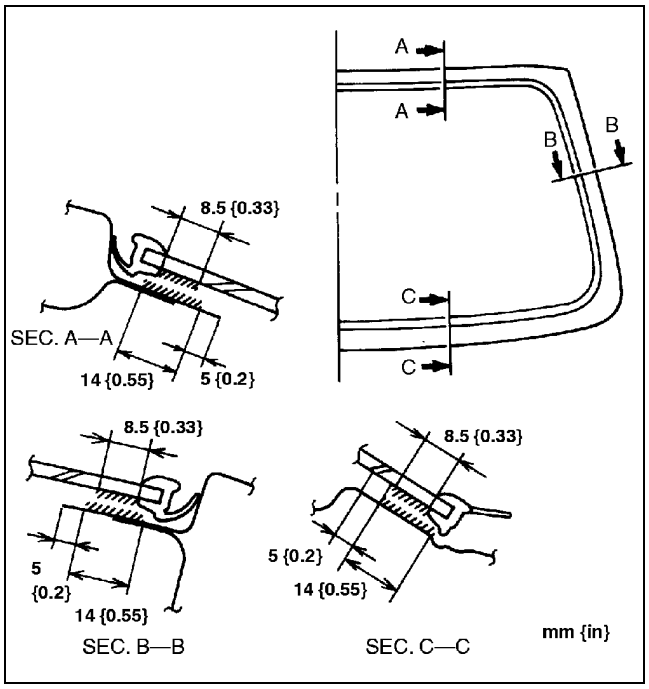
15. Use a brush to apply primer to the bonding area of the glass and body within the region shown.

Caution

- **Keep the area free of dirt and grease, and do not touch the surface, otherwise the primer may not properly bond to the surface of the glass and body, which may cause leaks to occur.**

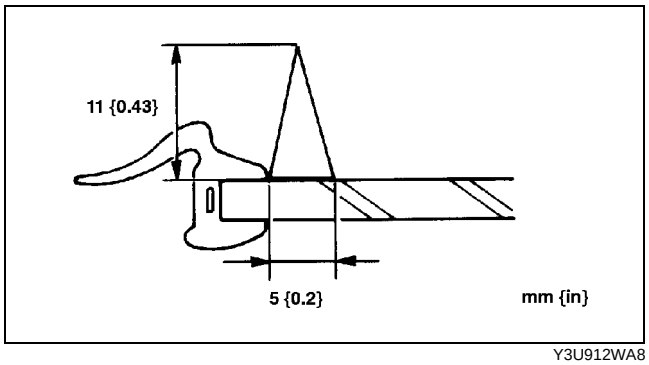
Note

- Use only glass primer on the glass, and body primer on the body and molding. Allow it to dry for **approximately 30 minutes**.



Y3U912WA7

16. Once the primer is dry, apply sealant measuring **11.0 mm {0.433 in}** in height and **5.0 mm {0.20 in}** in width around the entire circumference to fill the gap between the dam and the edge of the glass.
17. Align the marks on the glass with the V-notches in the spacers and install the glass onto the body.
18. Press firmly inward on the glass to compress the sealant.



Y3U912WA8

19. Verify that the gap along the upper and side edge is **8.8 mm {0.35 in}**.

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

20. Install the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)

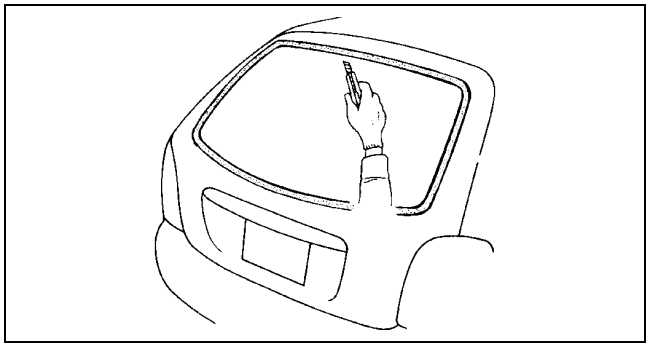
5HB

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 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 degreasing, and allow it **30 minutes** to dry. Then put on new sealant to create a **2 mm {0.08 in}** layer.

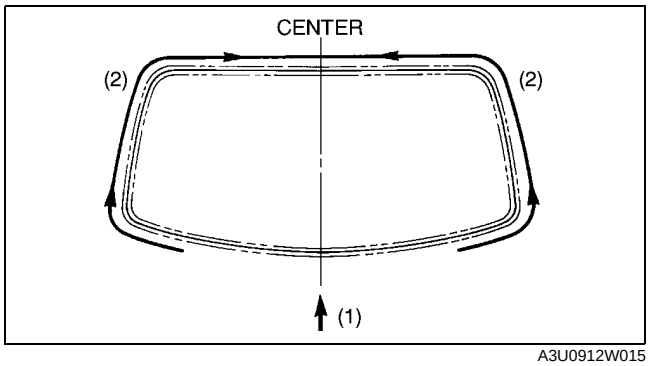
Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Clean and degrease the ceramic parting of the glass and the bonding area on the body.



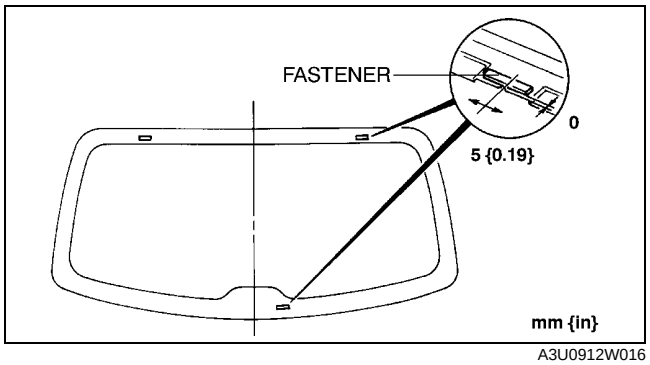
A3U0912W014

3. Align the weld joint of the molding with lower center of the glass. (1)
4. Install the molding around the entire circumference of the glass (2).



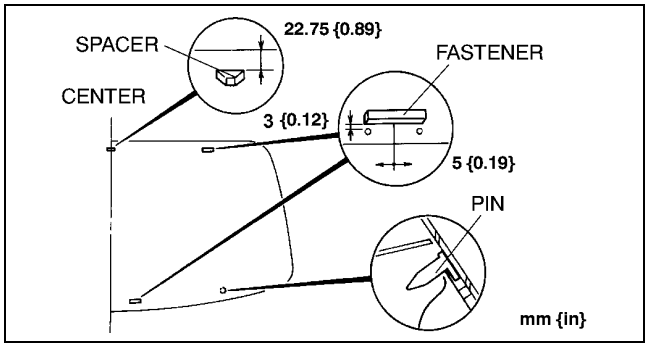
A3U0912W015

5. Install the fasteners onto the body as shown.



A3U0912W016

6. Install the spacer, pins and fasteners onto the glass as shown.



A3U0912W017

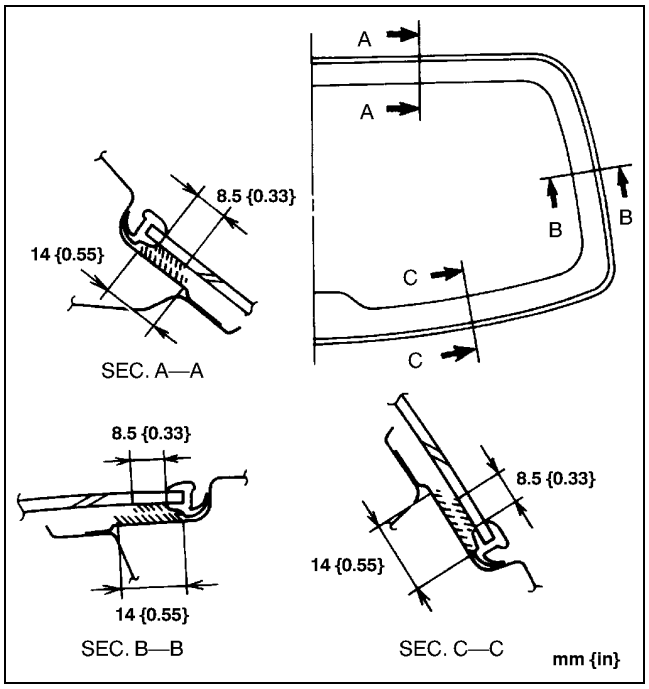
7. Use a brush to apply primer to the bonding area of the glass and body within the region shown.

Caution

- **Keep the area free of dirt and grease, and do not touch the surface, otherwise the primer may not properly bond to the surface of the glass and body, which may cause leaks to occur.**

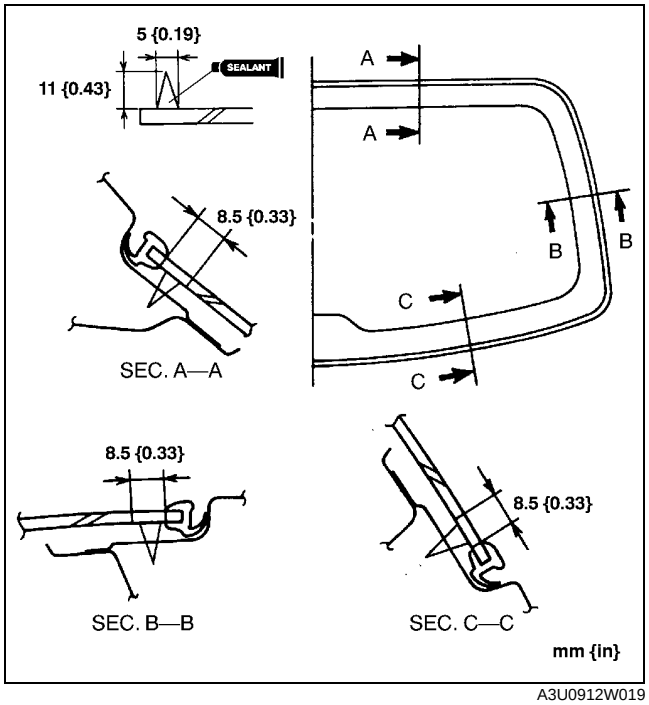
Note

- Use only glass primer on the glass, and body primer on the body and molding. Allow it to dry for **approximately 30 minutes**.



A3U0912W018

8. Once the primer is dry, apply sealant measuring **11.0 mm {0.433 in}** in height and **5.0 mm {0.20 in}** in width around the entire circumference to fill the gap between the dam and the edge of the glass.
9. Align the pins and install the glass onto the body.



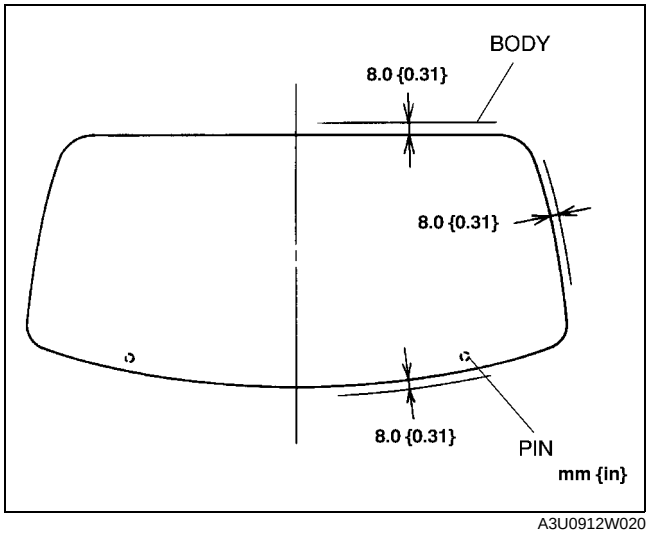
A3U0912W019

10. Verify that the gap along the upper, side and lower edge is **8.8 mm {0.35 in}**.
11. Press firmly inward on the glass to compress the 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

12. Install the rear spoiler.
13. Install the liftgate trim.



A3U0912W020

WINDSHIELD REMOVAL

A3U091263900W01

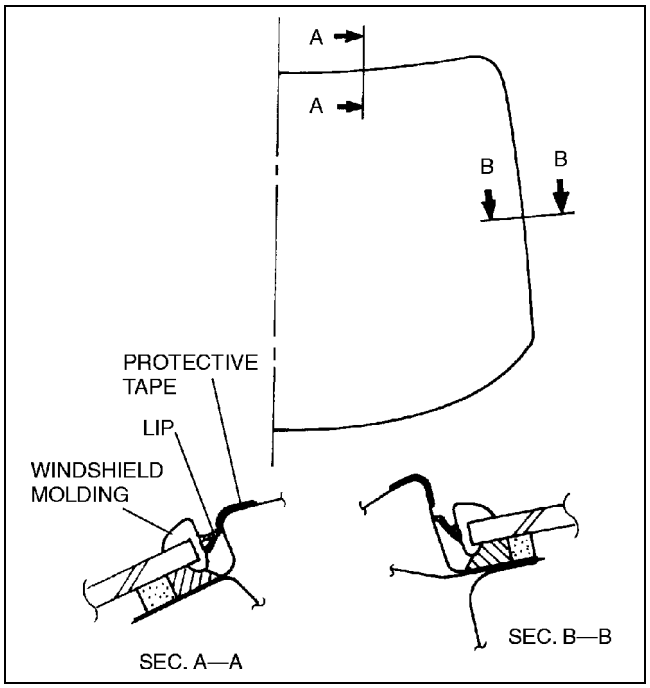
1. Remove the rearview mirror. (See 09–12–30 REARVIEW MIRROR REMOVAL.)
2. Remove the cowl grille. (See 09–16–1 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
4. Apply protective tape along the edge of the body to protect it from damage.
5. Apply protective tape to the dashboard to protect it from damage.
6. Cut the lip of the windshield molding using a razor.

Warning

- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Note

- The windshield molding is a replacement part.



X3U912WA7

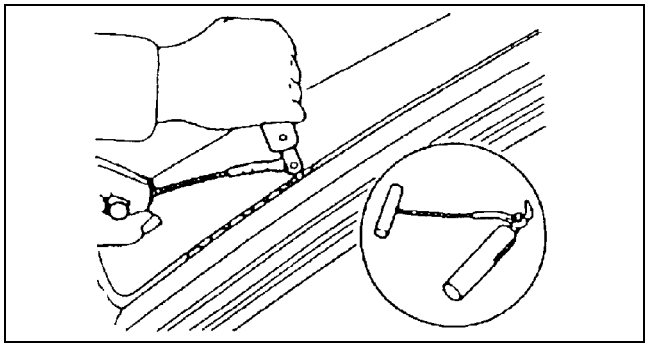
Not Reusing Windshield

1. Remove the base. (See 09–12–31 BASE REMOVAL.)

2. Use a tool like that shown in the figure, and insert the blade into the sealant.

Note
- For the areas of the sealant that are difficult to cut, use the **SST** (piano wire) and follow the procedures under “Reusing Windshield”.

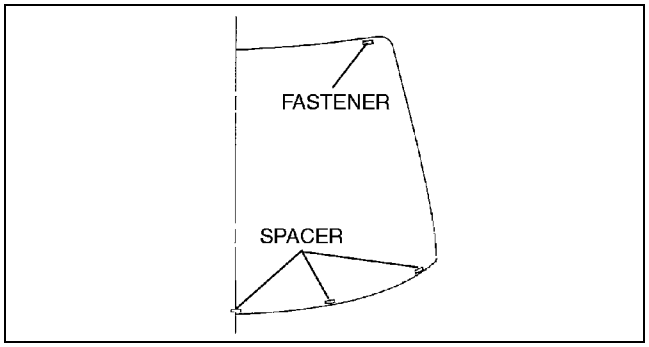
3. Pull through the sealant around the edge of the glass.
4. Remove the glass.


X3U912WA8

Reusing Windshield

Note
- Before removing the windshield from the body, mark the position of the windshield by affixing tape to the windshield and body panel.

1. Make a hole through the sealant except fasteners and spacers from the inside of the vehicle using an awl.

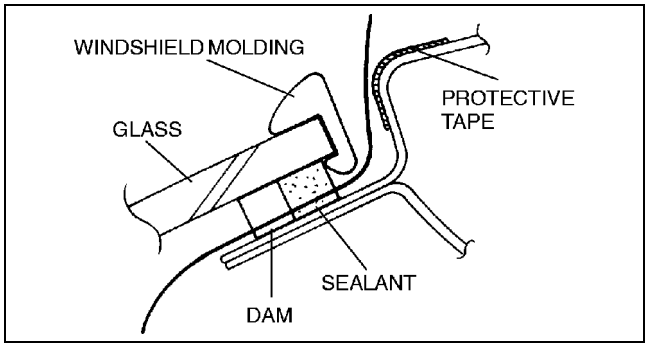


X3U912WA9

2. Pass the **SST** (piano wire) through the hole.

Warning
- **Using a SST (piano wire) with bare hands can cause injury. Always wear gloves when using a SST (piano wire).**

3. Wind each end of the **SST** (piano wire) around a bar.

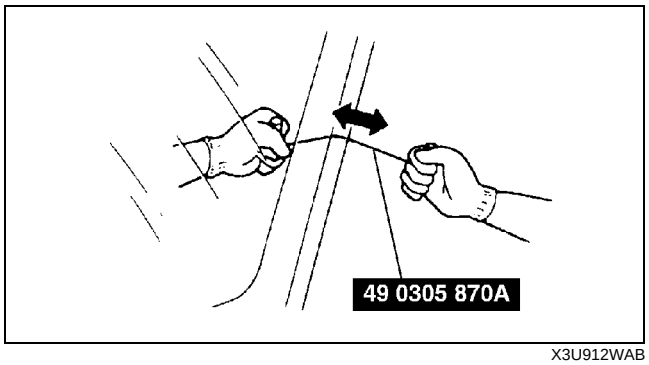


X3U912WAA

4. Working with another person, saw through the sealant around the edge of the glass.

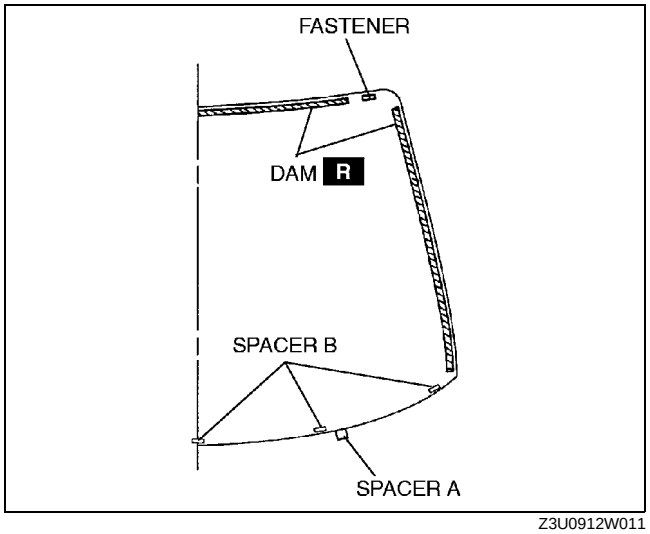
Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

5. Remove the windshield.



X3U912WAB

6. Remove the dam from the windshield.
7. Remove the fasteners.
8. Remove spacers A and B.



Z3U0912W011

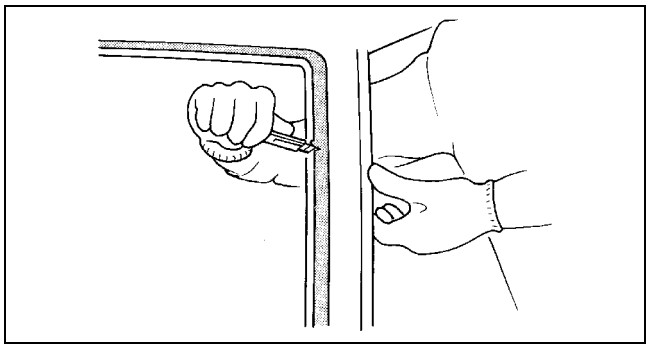
WINDSHIELD INSTALLATION

A3U091263900W02

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 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 degreasing, and allow it **30 minutes** to dry. Then put on new sealant to create **2 mm {0.08 in}** layer.

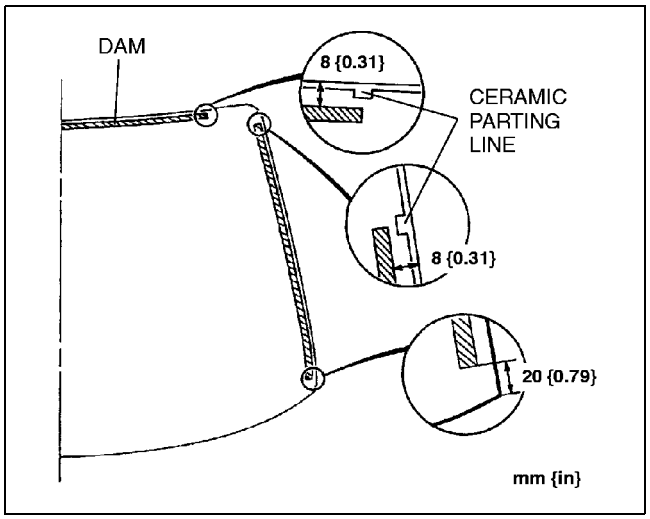
Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**



WSXWXX0003J

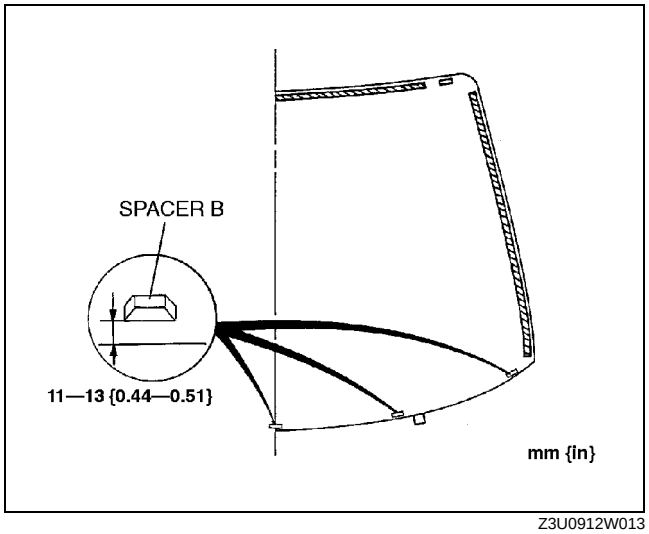
2. Clean and degrease an **approximately 50.0 mm {1.97 in}** wide strip around the circumference of the glass and the bonding area on the body.

3. Securely bond a dam along the circumference of the glass **8.0 mm {0.31 in}** from the edge.



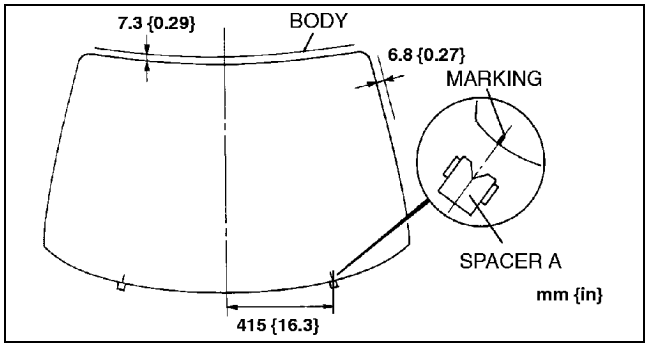
Z3U0912W012

4. Install the spacers B on the glass as shown.



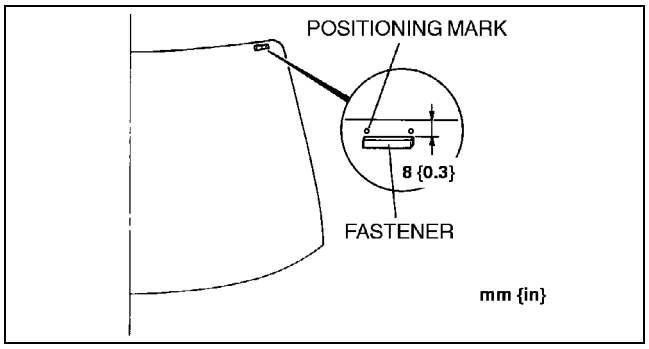
Z3U0912W013

5. Install spacers A into the hole.
6. Temporarily install the glass onto the body and adjust the glass-to-body clearance.
7. Make a mark on the glass directly above the V-notch of spacers A.
8. Verify that the gap along the upper edge is **7.3 mm {0.29 in}**, and that the side edge is **6.8 mm {0.27 in}**.
9. Remove the windshield.



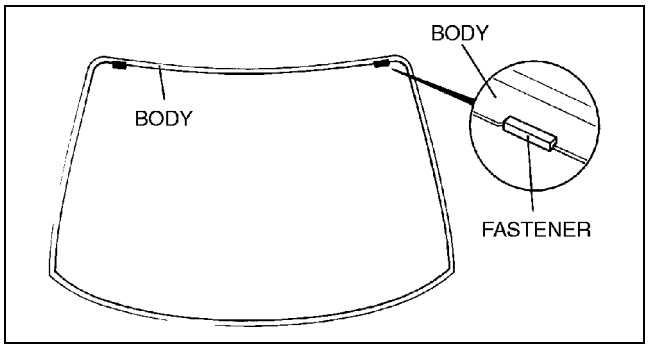
X3U912WAG

10. Install the fasteners on the glass marks as shown.



Y3U912WAA

11. Install the fasteners on the body as shown.



X3U912WAH

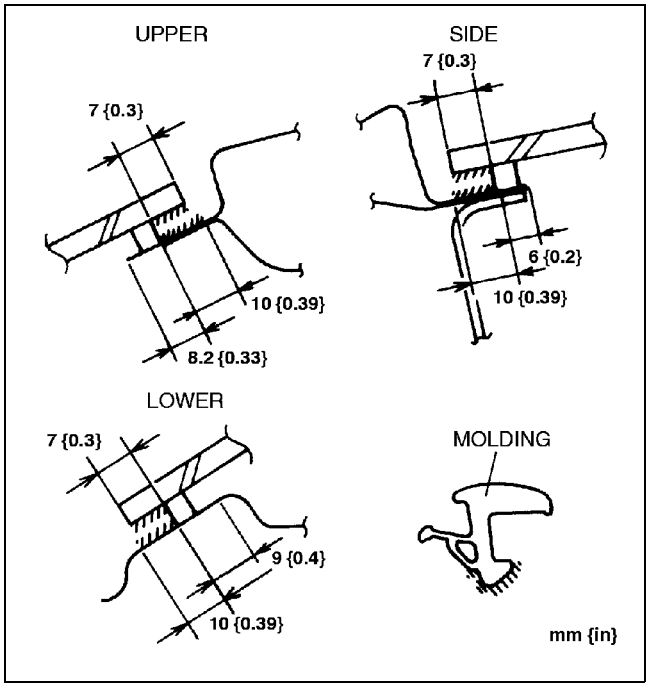
12. Use a brush to apply primer to the bonding area of the glass, the body, and the molding within the area shown.

Caution

- **Keep the area free of dirt and grease, and do not touch the surface, otherwise the primer may not properly bond to the surface of the glass and body, which may cause leaks to occur.**

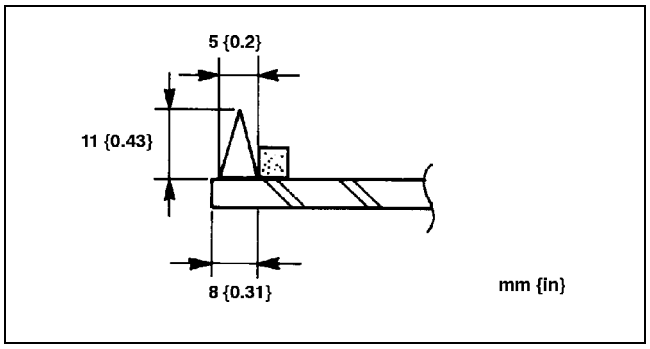
Note

- Use only glass primer on the glass, and body primer on the body and the molding. Allow it to dry for **approximately 30 minutes**.



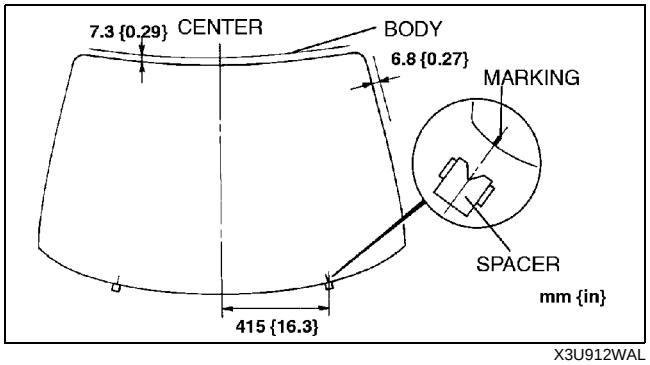
Y3U912WAB

13. Once the primer is dry, apply sealant around the entire circumference to fill the gap between the dam and the edge of the glass measuring **11.0 mm {0.433 in}** high and **5.0 mm {0.20 in}** wide.
14. Align the glass marks with the V-notches in the spacers and install the glass onto the body.
15. Press firmly inward on the glass to compress the sealant.



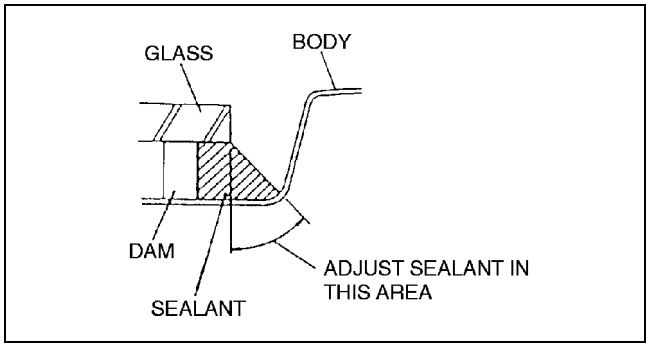
Y3U912WAC

16. Verify that the gap along the upper edge is **7.3 mm {0.29 in}** and side edge is **6.8 mm {0.27 in}**.



X3U912WAL

17. 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.



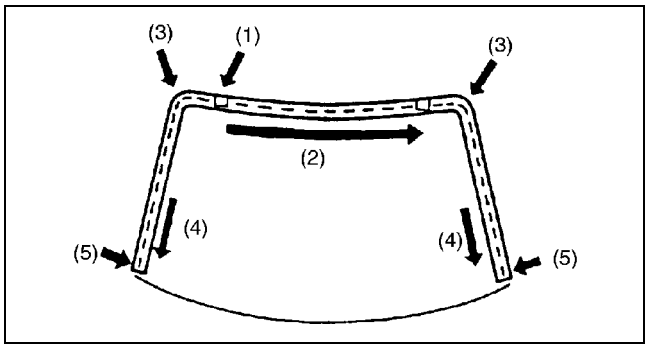
X3U912WAM

18. Before the surface of the sealant has hardened, install the windshield molding.

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

19. Align the marking on the molding with the inner side of the body groove. (1)
20. Install the upper edge starting from the outer ends and moving inward. (2)
21. Install the corners. (3)
22. Install the windshield molding installation clips to the cowl grille hole. (4)
23. Install the sides, starting from the upper edge and moving downward, being careful not to pull out the corners. (5)
24. Use isopropyl alcohol to remove any excess sealant.
25. Install the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)



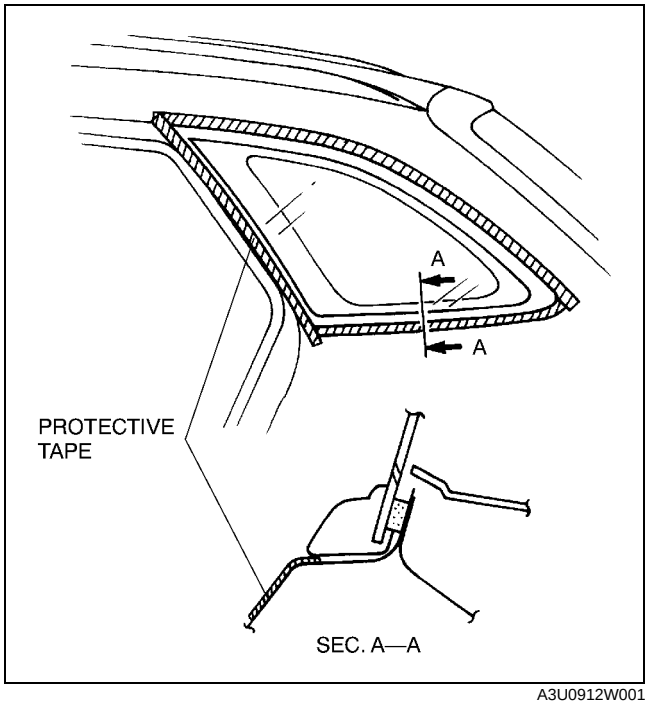
X3U912WAN

26. Install the cowl grille. (See 09–16–1 COWL GRILLE REMOVAL/INSTALLATION.)
27. Install the base. (See 09–12–31 BASE INSTALLATION.)
28. Install the rearview mirror. (See 09–12–31 REARVIEW MIRROR INSTALLATION.)

QUARTER WINDOW GLASS REMOVAL

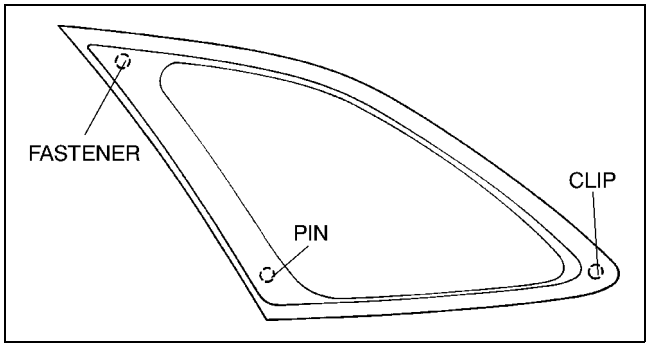
A3U091262580W01

1. Remove the C-pillar trim. (See 09–17–11 C-PILLAR TRIM REMOVAL/INSTALLATION.)
2. Apply protective tape along the edge of body and quarter window glass.



A3U0912W001

3. Make a hole through the sealant except fastener, pin and clip from the inside of the vehicle using an awl.

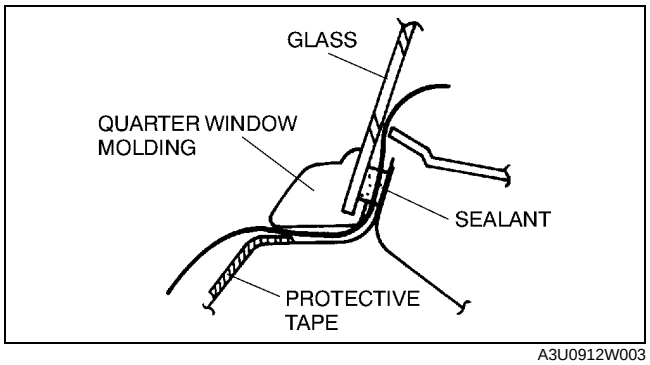


A3U0912W002

4. Pass the **SST** (piano wire) through the hole.

Warning
- **Using a SST (piano wire) with bare hands can cause injury. Always wear gloves when using a SST (piano wire).**

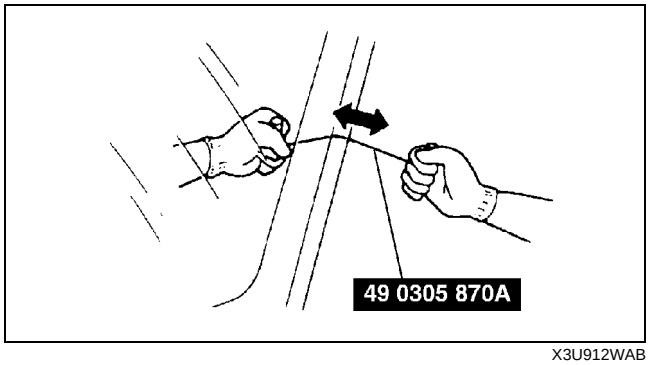
5. Wind each end of the **SST** (piano wire) around a bar.



A3U0912W003

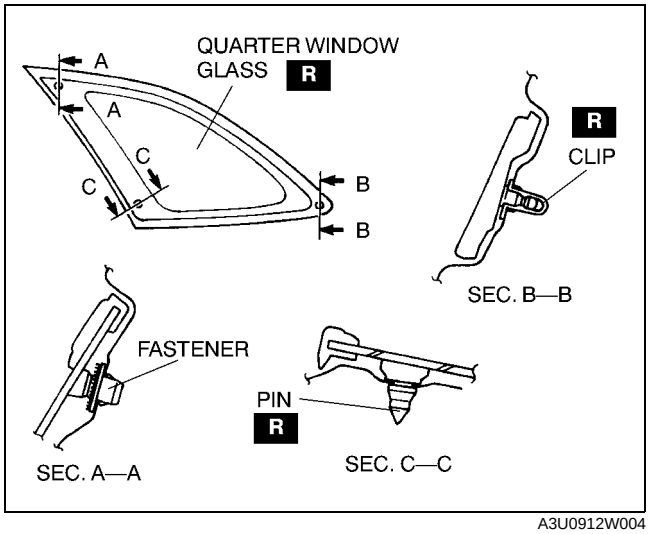
6. Working with another person, saw through the sealant around the edge of the glass, being careful to not damage the vehicle body.

Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.



X3U912WAB

7. Pull the quarter window glass, then disengage the fastener, pin and clip.
8. Remove the fastener and pin from the body.



A3U0912W004

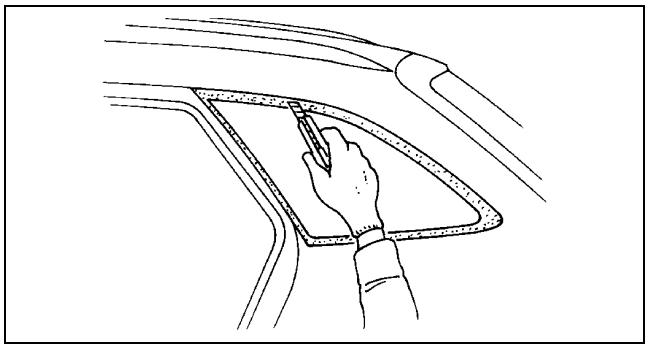
QUARTER WINDOW GLASS INSTALLATION

A3U091262580W02

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 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 degreasing, and allow it **30 minutes** to dry. Then put on new sealant to create **2 mm {0.08 in}** layer.

Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**



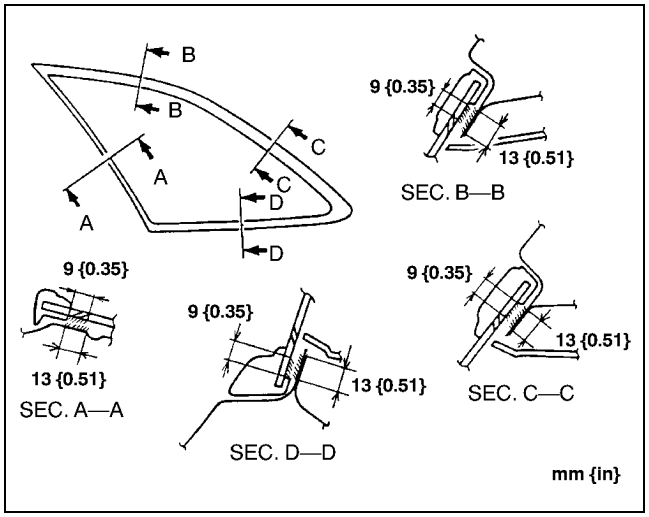
A3U0912W005

2. Clean and degrease the ceramic part of the glass and around the circumference of the bonding area on the body.

3. Use a brush to apply primer to the bonding area of the glass and body, within the region shown.

Caution
- **Keep the area free of dirt and grease, and do not touch the surface or primer may not properly bond to the surface of the glass and body, which may cause leaks to occur.**

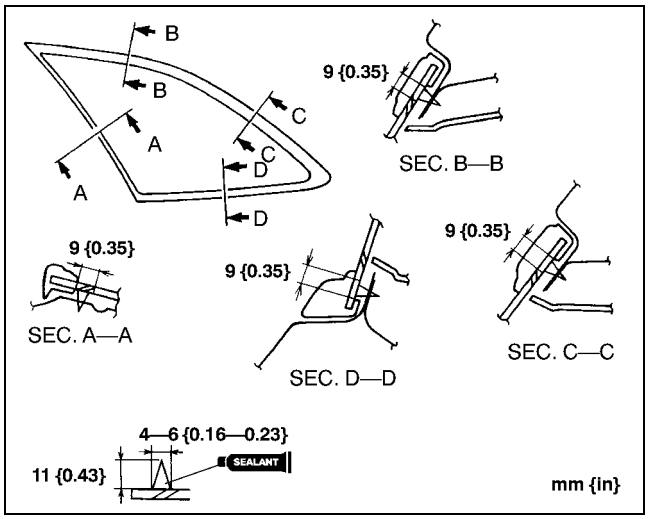
Note
- Use only glass primer on the glass, and body primer on the body. Allow it to dry for **approximately 30 minutes**.



A3U0912W006

4. Once the primer is dry, apply sealant around the entire circumference to fill the gap between the dam and the edge of the glass measuring **11.0 mm {0.433 in}** high and **5.0 mm {0.20 in}** wide.
5. Align the fasteners and install the glass onto the body.
6. Verify the clearance as shown.

Clearance
a: 0 mm {0 in}
b: 2.0 mm {0.08 in}



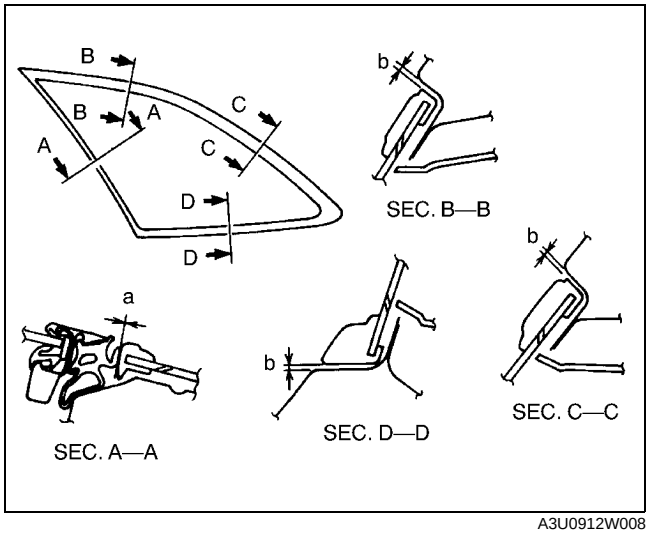
A3U0912W007

7. Press firmly inward on the glass to compress the 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

8. Check for water leaks. If a leak is found, wipe the water off well and repeat the installation.
9. Install the C-pillar trim. (See 09–17–11 C-PILLAR TRIM REMOVAL/INSTALLATION.)



A3U0912W008

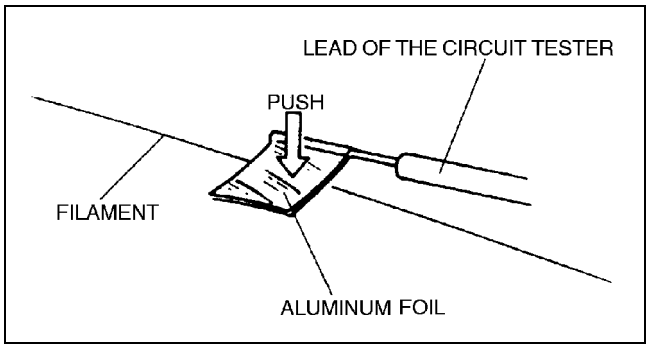
FILAMENT INSPECTION

A3U091263931W03

1. Turn the ignition switch to ON position.
2. Turn the rear window defroster switch to ON.
3. Connect the positive (+) lead of the voltmeter to the positive side of each filament and the negative (–) lead to ground.

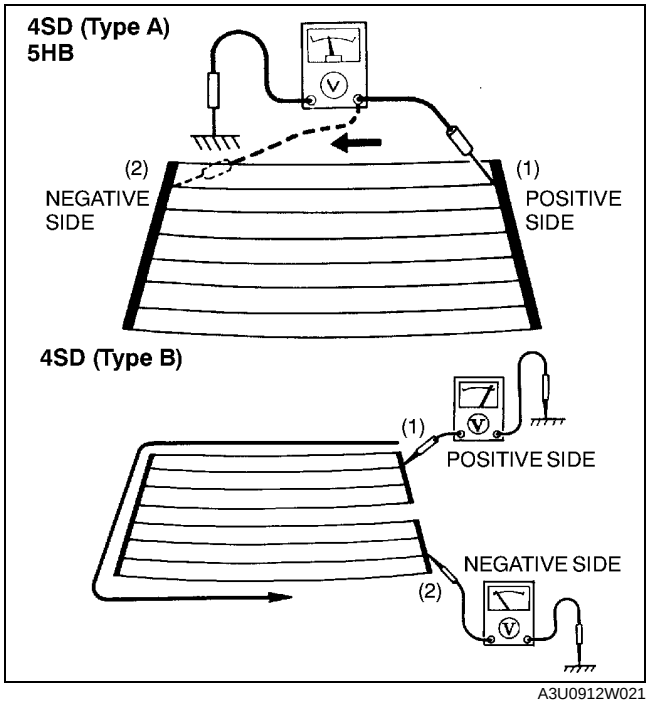
Caution
- **Directly touching the rear window defroster filament with the lead of the circuit tester will damage it. Wrap aluminum foil around the end of the lead and test the filament by touching it with the foil.**

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.



X3U912WA1

Measurement place	Voltage (Reference value)
(1)→(2)	Approx. 12 V→ Approx. 0 V

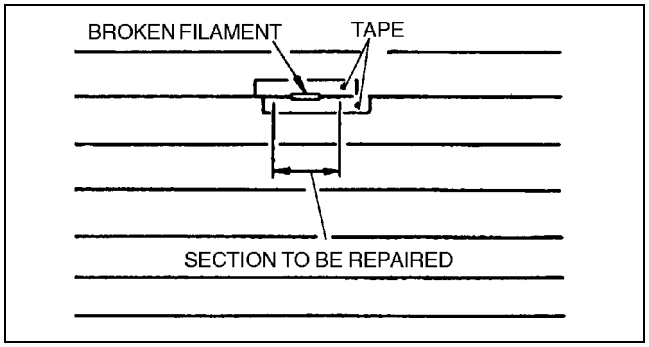


A3U0912W021

FILAMENT REPAIR

A3U091263931W04

1. Use isopropyl alcohol to clean around the damaged section of the filament.
2. Attach tape above and below the damaged section of the filament.
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.
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.



X3U912WA4

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.**

REAR WINDOW DEFROSTER SWITCH INSPECTION

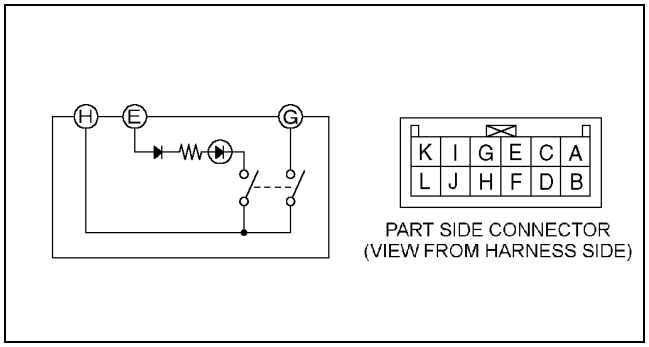
A3U091266460W01

1. Remove the climate control unit. (See 07–40–9 CLIMATE CONTROL UNIT REMOVAL.)
2. Inspect for continuity between the rear window defroster switch terminals using an ohmmeter.

○—○ : Continuity

Switch position	Terminal	
	E	J
OFF		
ON	○	○

Z3U0912W019



Z3U0912W018

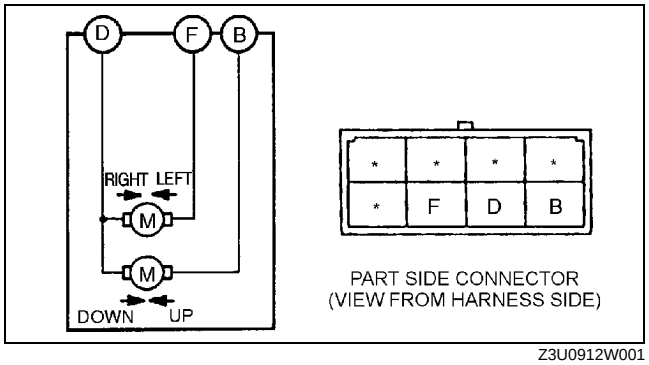
3. Connect battery positive voltage to terminal L and ground to terminal E.
4. Turn the rear window defroster switch to ON.
5. Verify that the LED illuminates.
   - If not as specified, replace the climate control unit.

POWER OUTSIDE MIRROR INSPECTION

A3U091269110W01

1. Disconnect the power outside mirror connector. (See 09–12–28 POWER OUTSIDE MIRROR REMOVAL/INSTALLATION.)
2. Apply battery positive voltage to the power outside mirror and inspect the operation of the power outside mirror.
   - If not as specified, replace the power outside mirror.

Terminal		Mirror operation
B+	GND	
B	D	Up
D	B	Down
F	D	Left
D	F	Right



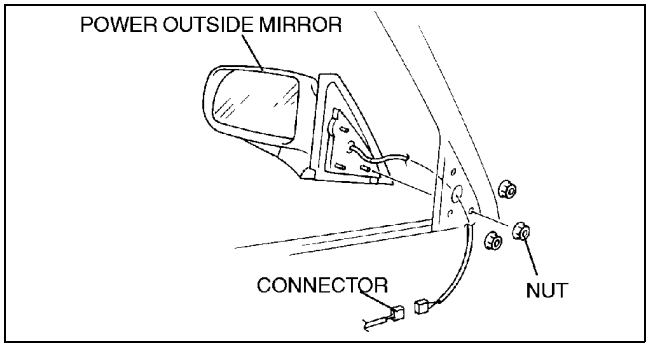
Z3U0912W001

POWER OUTSIDE MIRROR REMOVAL/INSTALLATION

A3U091269110W02

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 door screen.
4. Disconnect the connector.

5. Remove the nuts, and then remove the power outside mirror.
6. Install in the reverse order of removal.

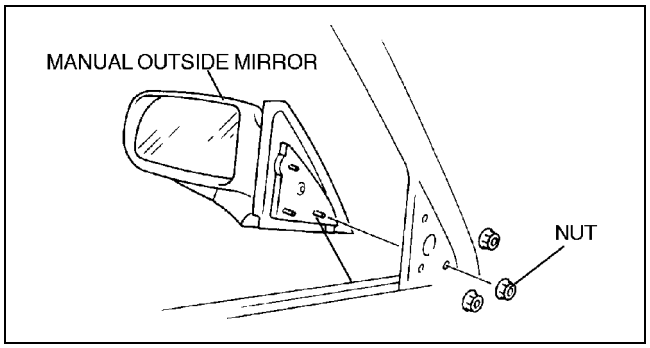


X3U912WD8

MANUAL OUTSIDE MIRROR REMOVAL/INSTALLATION

A3U091269100W01

1. Remove the inner garnish.
2. Remove the nuts, and then remove the manual outside mirror.
3. Install in the reverse order of removal.

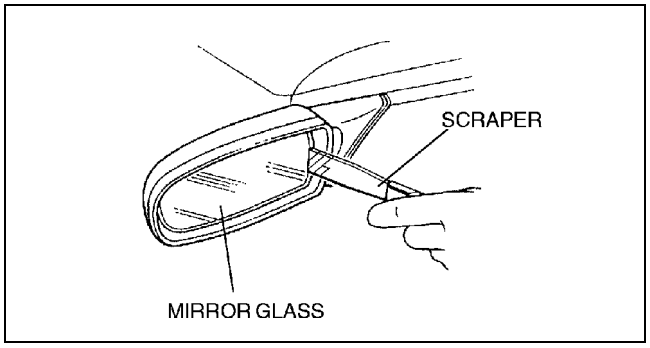


X3U912WD7

OUTSIDE MIRROR GLASS REMOVAL

A3U091269111W01

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 tape-wrapped scraper between the mirror glass and the frame, and pry the glass loose.

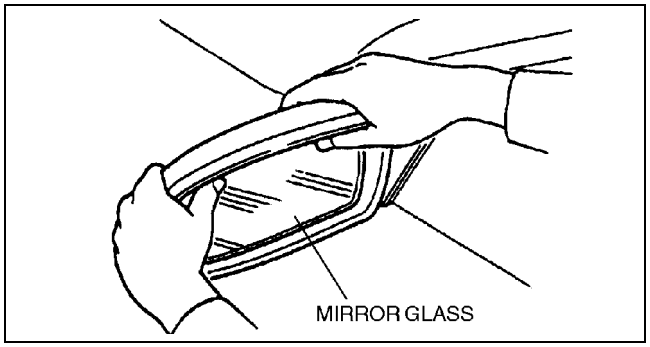


X3U912WD9

OUTSIDE MIRROR GLASS INSTALLATION

A3U091269111W02

1. Clean and degrease the adhesion surface of the mirror glass.
2. Stick double-sided adhesive tape onto the back of the mirror glass.
3. Warm up the frame using a hot air blower.
4. Remove the paper backing from the double-sided adhesive tape on the back of the mirror glass.
5. Insert the mirror glass into the frame, then press lightly on the glass to secure it.

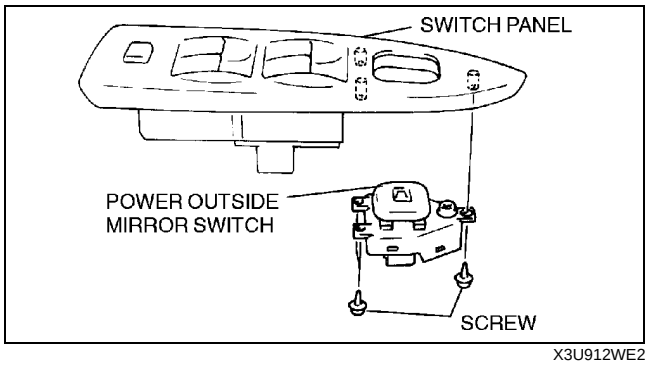


X3U912WE0

POWER OUTSIDE MIRROR SWITCH REMOVAL/INSTALLATION

A3U091266600W01

1. Disconnect the negative battery cable.
2. Remove the driver-side front door trim. (See 09–17–9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Push the clip from the reverse side of the trim to remove the switch panel.
4. Disconnect the connector.
5. Remove the screws, and then remove the power outside mirror switch.
6. Install in the reverse order of removal.



X3U912WE2

POWER OUTSIDE MIRROR SWITCH INSPECTION

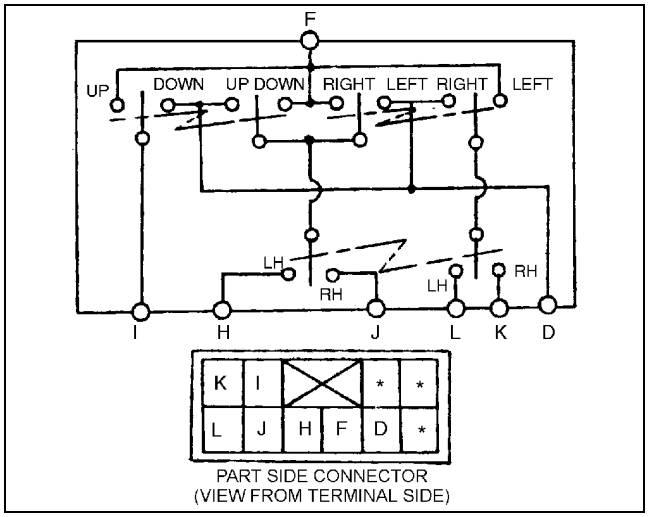
A3U091266600W02

1. Remove the power outside mirror switch. (See 09–12–30 POWER OUTSIDE MIRROR SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the power outside mirror switch terminals using an ohmmeter.
   - If not as specified, replace the power outside mirror switch.

○—○ : Continuity

Switch position	Operation	Terminal						
		F	D	H	L	J	K	I
LH	Up	○		○				○
			○					
	Down	○		○				
			○					○
	Left	○			○			
			○	○				
	Right	○		○				
			○		○			
RH	Up	○						○
			○			○		
	Down	○				○		
			○					○
	Left	○				○	○	
			○					
	Right	○				○		
			○				○	

X3U912WE3

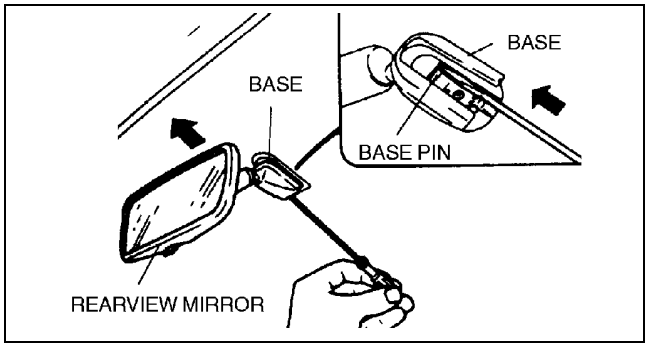


Z3U0912W014

REARVIEW MIRROR REMOVAL

A3U091269220W01

1. Insert a flathead screwdriver between the mirror and the base.
2. Push the base pin down to remove the rearview mirror.

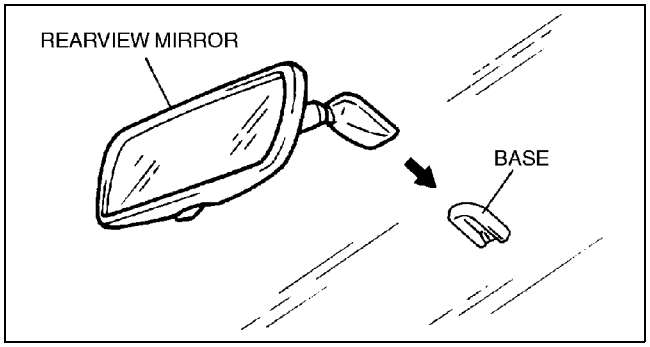


X3U912WE5

REARVIEW MIRROR INSTALLATION

A3U091269220W02

1. Install the rearview mirror onto the base.



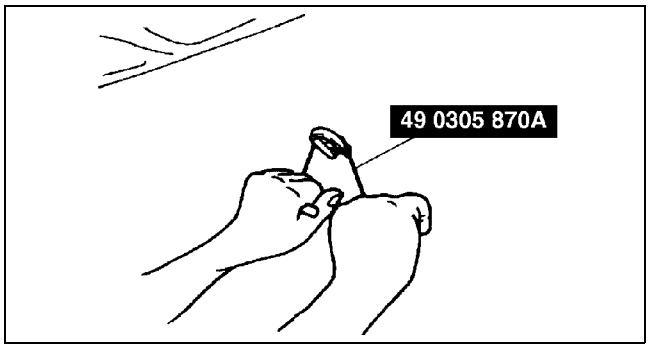
X3U912WE6

BASE REMOVAL

A3U091269240W01

1. Remove the rearview mirror.
2. Wind each end of a wire around a bar.
3. Saw through the sealant to remove the base.

Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.



X3U912WE7

BASE INSTALLATION

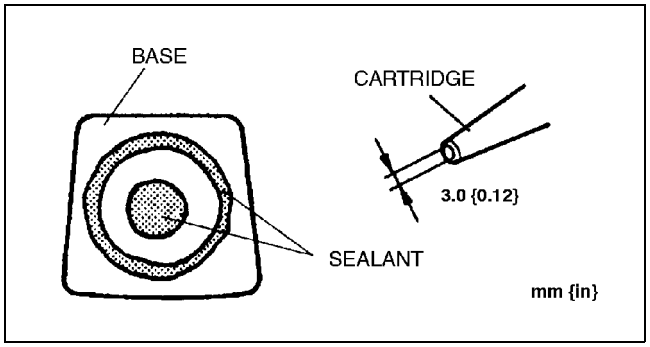
A3U091269240W02

1. Cut away all of the original sealant using a razor.
2. Clean and degrease the ceramic coating on the glass and the base.
3. Apply primer to the bonding area of the glass and the base.

Caution
- **Keep the area free of dirt and grease, and do not touch the surface, otherwise the primer may not properly bond to the surface of the glass.**

4. Apply a height of **3.0 mm {0.12in}** sealant to the base.

Note
- Use only glass primer on the glass, and body primer on the base. Allow the primer to dry for **approximately 30 minutes**.

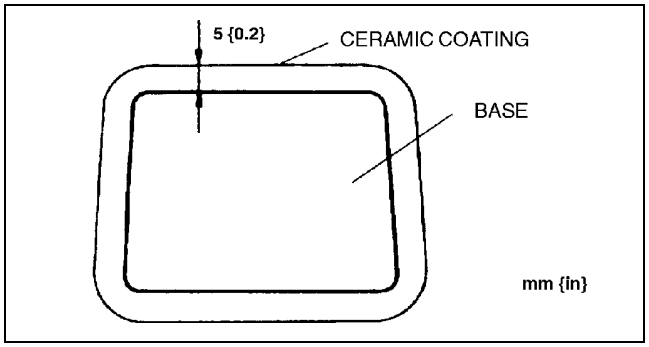


X3U912WE8

5. Center the base in the ceramic coating and press it onto the glass.
6. Use isopropyl alcohol to remove any excess repair 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



X3U912WE9

7. Install the rearview mirror.

09–13 SEATS

FRONT SEAT REMOVAL/INSTALLATION

A3U091357100W01

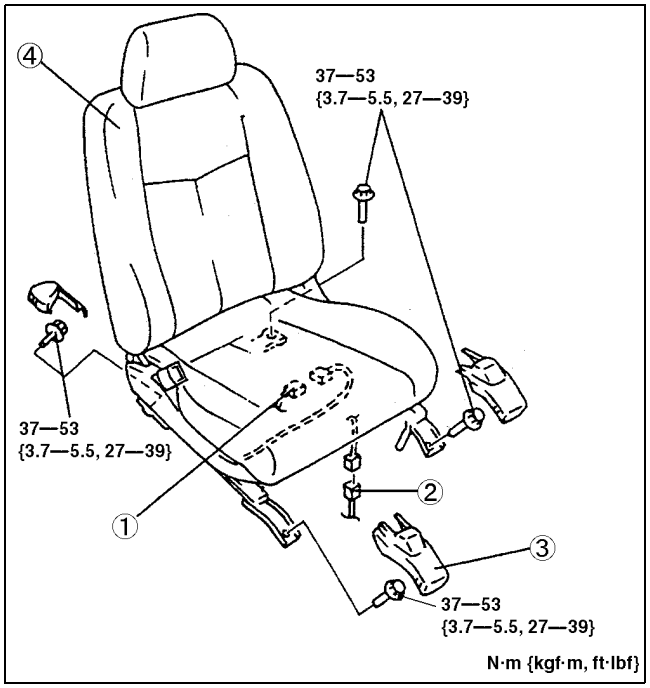
Warning

- **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 08–10–3 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.

1	Side air bag module connector (Vehicles with side air bag) (See 09–13–1 Side Air Bag Module Connector Removal Note) (See 09–13–2 Side Air Bag Module Connector Installation Note)
2	Buckle switch connector (See 09–13–2 Buckle Switch Connector Installation Note)
3	Cover
4	Front seat

4. Install in the reverse order of removal.



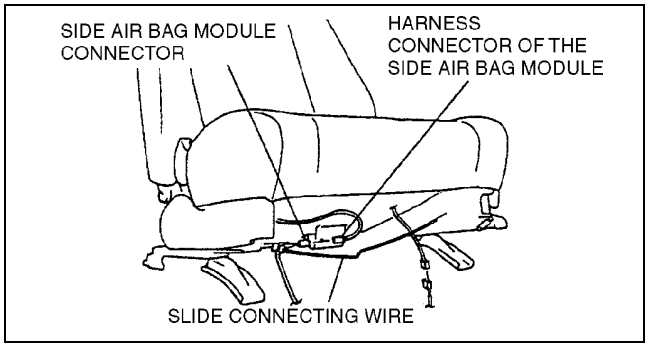
Z3U0913W001

Side Air Bag Module Connector Removal Note

1. Remove the connector from the seat cushion frame, then disconnect the side air bag module connector.

Side Air Bag Module Connector Installation Note

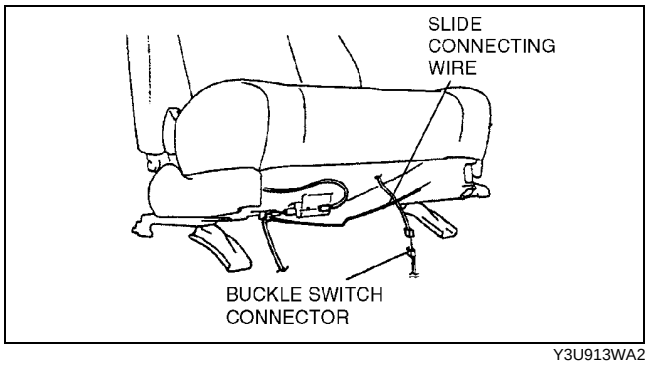
1. Be sure to pass the side air bag module connector (vehicle-side harness connector) under the slide connecting wire before connecting it to the harness connector of the side air bag module.
2. After connecting the connectors, secure them to the seat cushion frame.



Y3U913WA1

Buckle Switch Connector Installation Note

1. Be sure to pass the harness connector of the buckle switch under the slide connecting wire before connecting it to the buckle switch connector (vehicle-side harness connector).



Y3U913WA2

FRONT SEAT DISASSEMBLY/ASSEMBLY

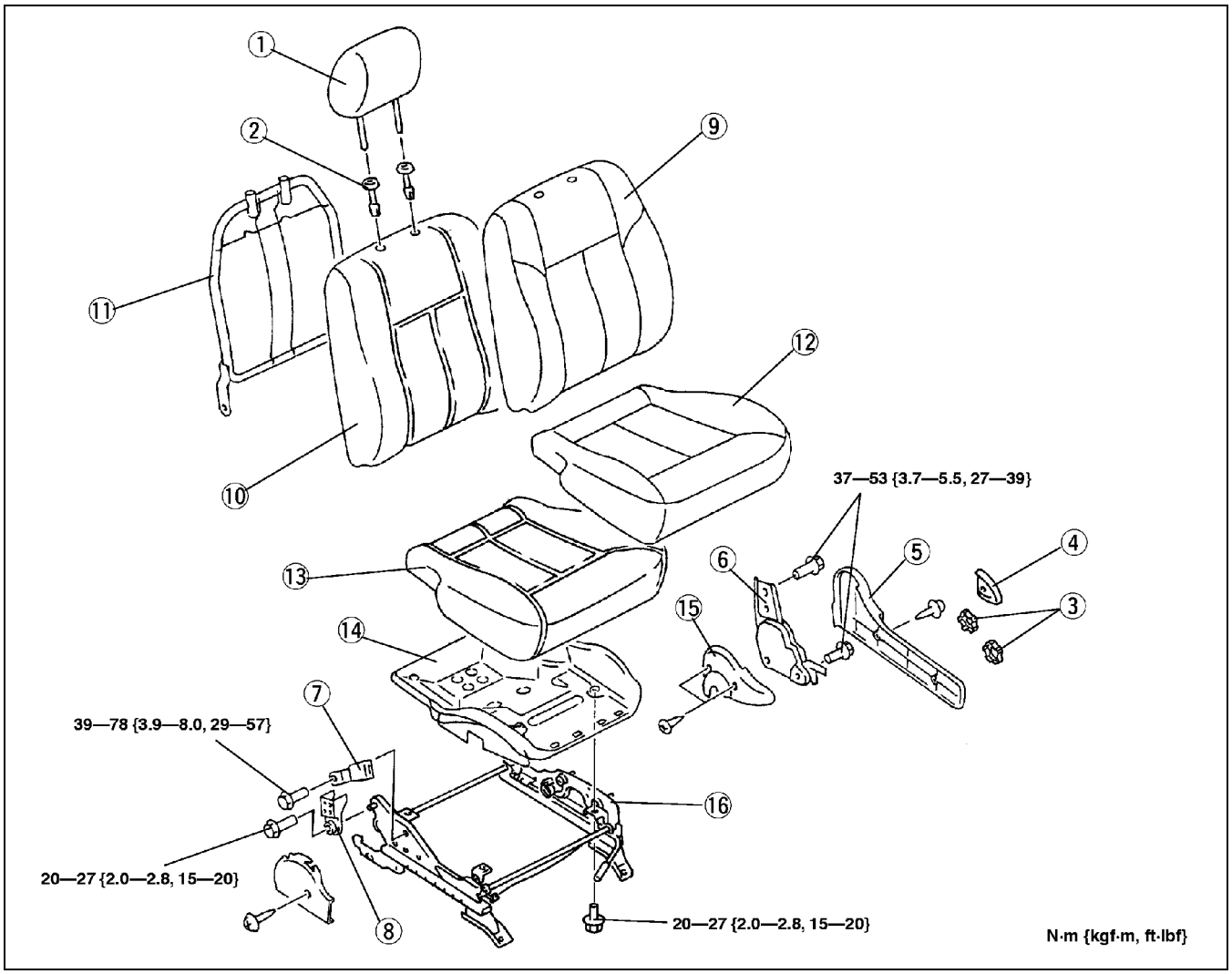
A3U091357100W02

Driver's 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 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the driver-side side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



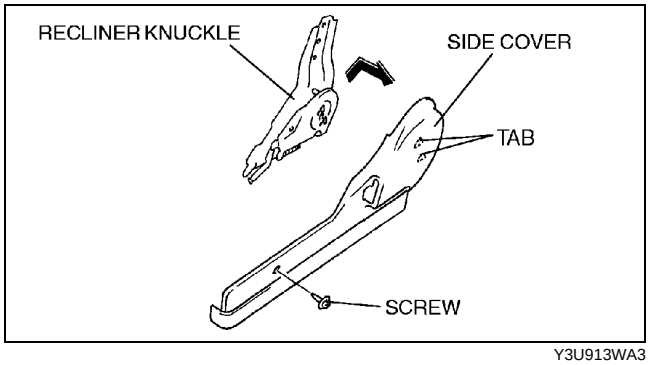
X3U913WA5

1	Headrest
2	Pole guide
3	Tilt dial
4	Recliner lever
5	Side cover (See 09–13–3 Side cover removal note)
6	Recliner knuckle
7	Front buckle
8	Hinge cover

9	Seat back trim
10	Seat back pad
11	Seat back frame
12	Seat cushion trim
13	Seat cushion pad
14	Seat cushion frame
15	Reverse cover
16	Slide adjuster

Side cover removal note

1. Remove the screws.
2. Lift the side cover up in the direction of the arrow, then unhook it from the recliner knuckle.



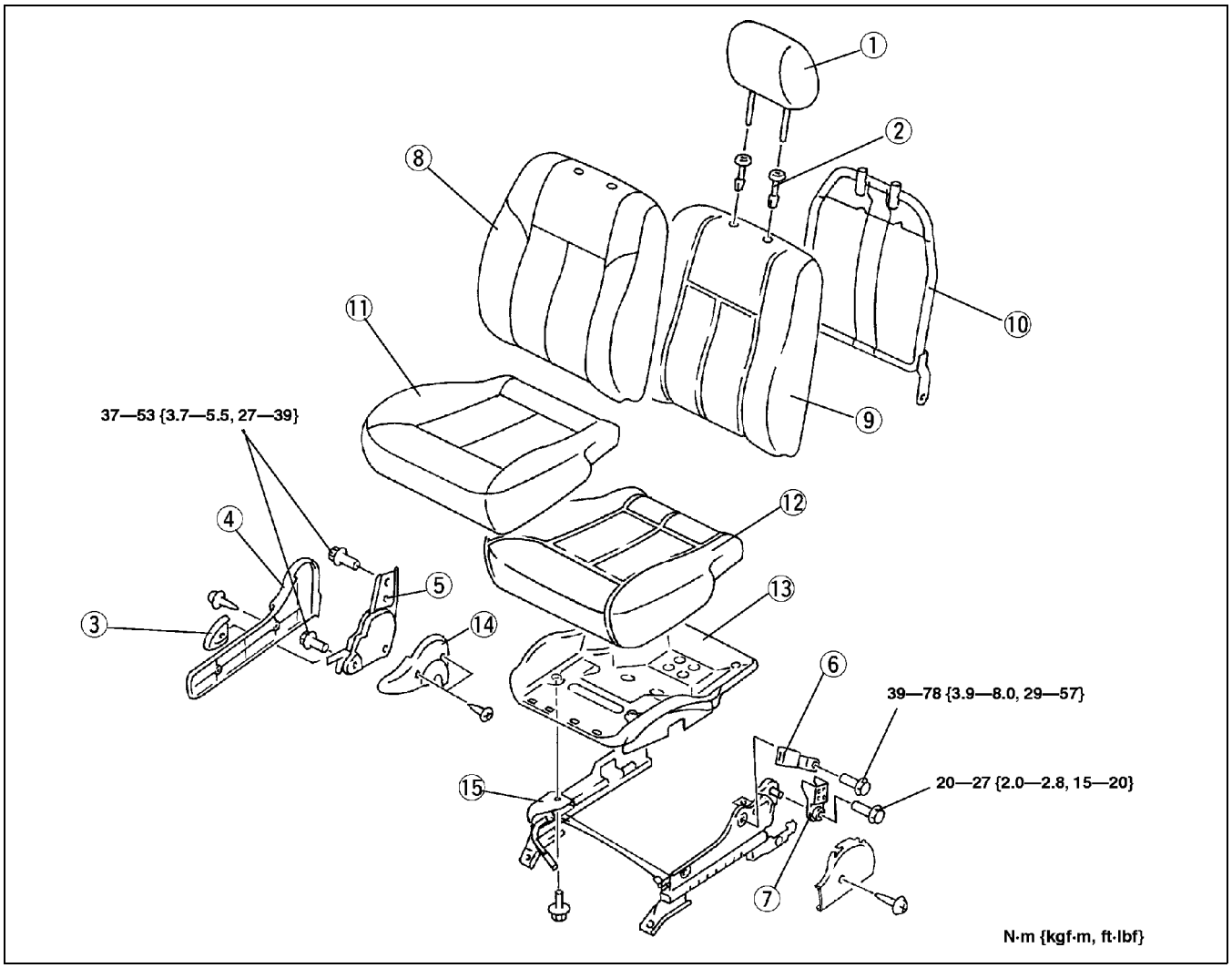
Y3U913WA3

Passenger's Seat

Warning

- **Handling the front seat (side air bag) improperly can accidently deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seat. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the passenger-side side air bag module. (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



X3U913WA6

1	Headrest
2	Pole guide
3	Recliner lever
4	Side cover (See 09–13–3 Side cover removal note)
5	Recliner knuckle
6	Front buckle
7	Hinge cover

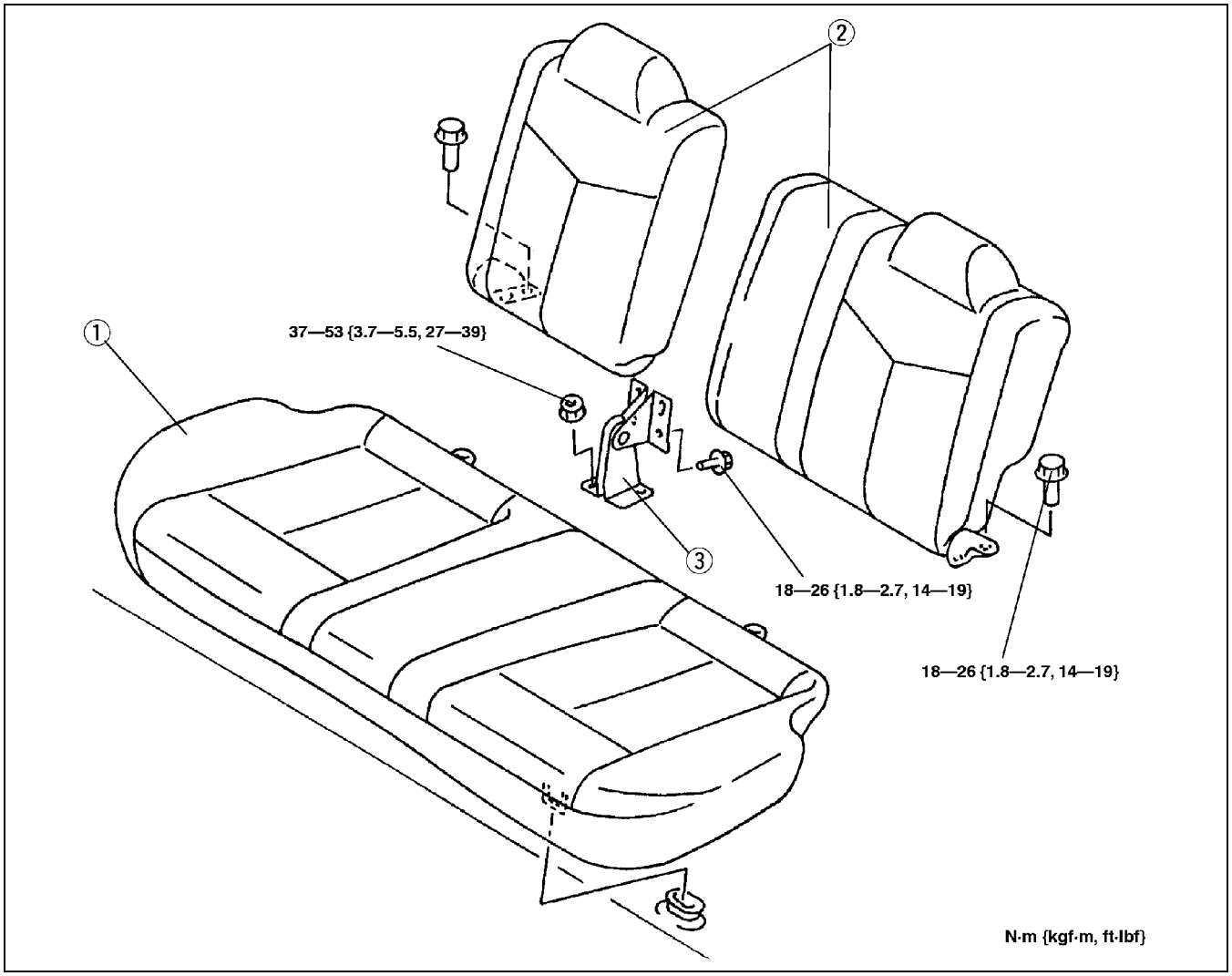
8	Seat back trim
9	Seat back pad
10	Seat back frame
11	Seat cushion trim
12	Seat cushion pad
13	Seat cushion frame
14	Reverse cover
15	Slide adjuster

REAR SEAT REMOVAL/INSTALLATION

A3U091357200W01

4SD

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



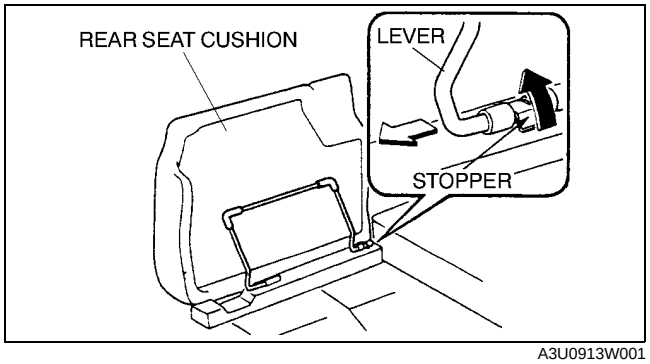
X3U913WA9

1	Rear seat cushion
2	Rear seat back
3	Center hinge

5HB

Rear seat cushion

1. Lift up the rear seat cushion.
2. Pull the stopper to release the lever, and remove the rear seat cushion.
3. Install in the reverse order of removal.



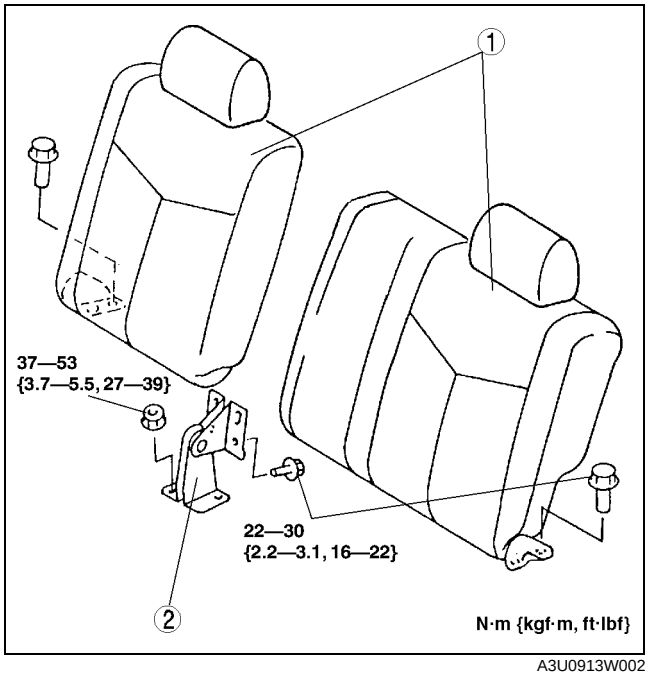
A3U0913W001

Rear seat back

1. Lift up the rear seat cushion.
2. Remove the service hole cover.
3. Remove in the order indicated in the table.

1	Rear seat back
2	Center hinge

4. Install in the reverse order of removal.



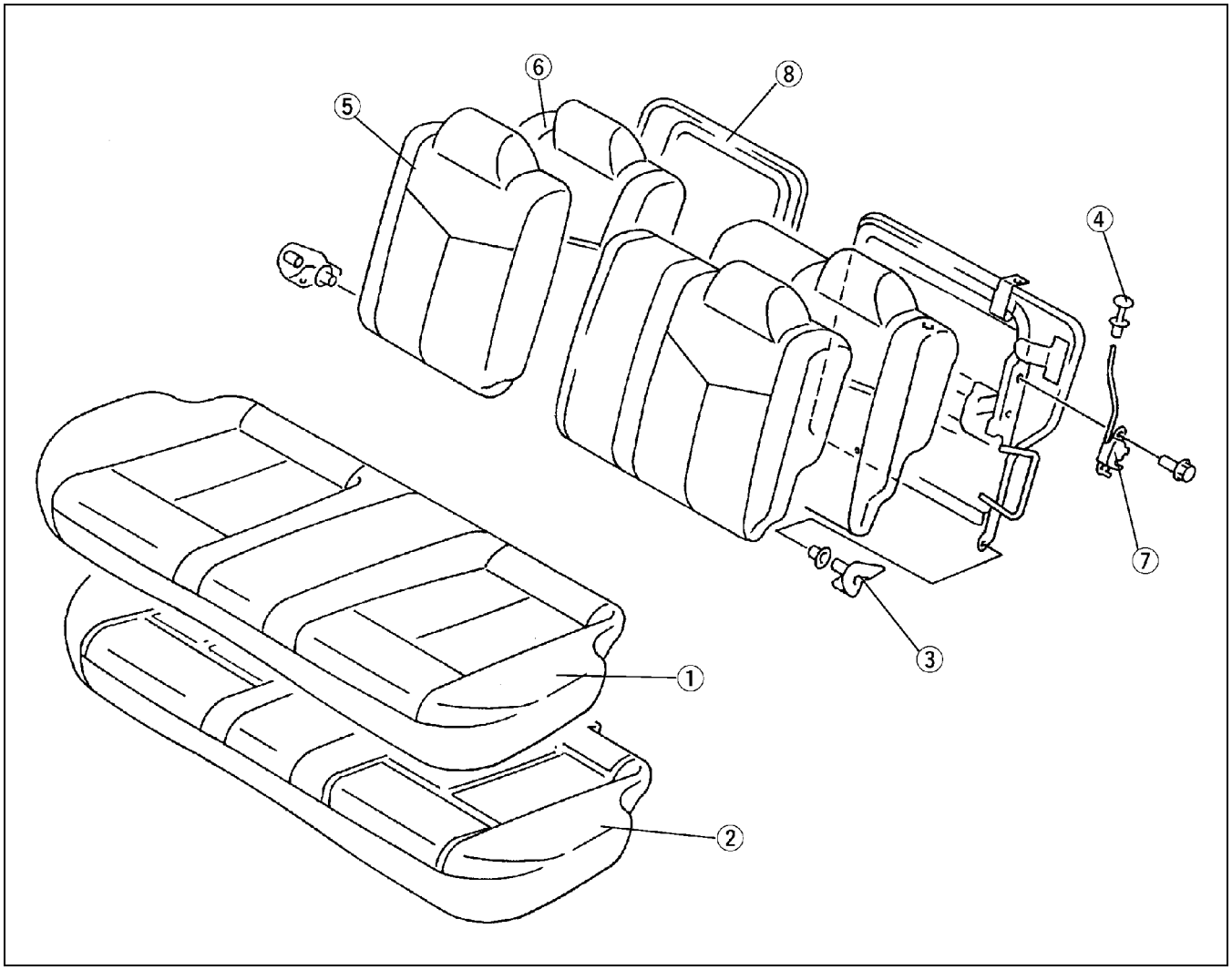
A3U0913W002

REAR SEAT DISASSEMBLY/ASSEMBLY

A3U091357200W02

4SD

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



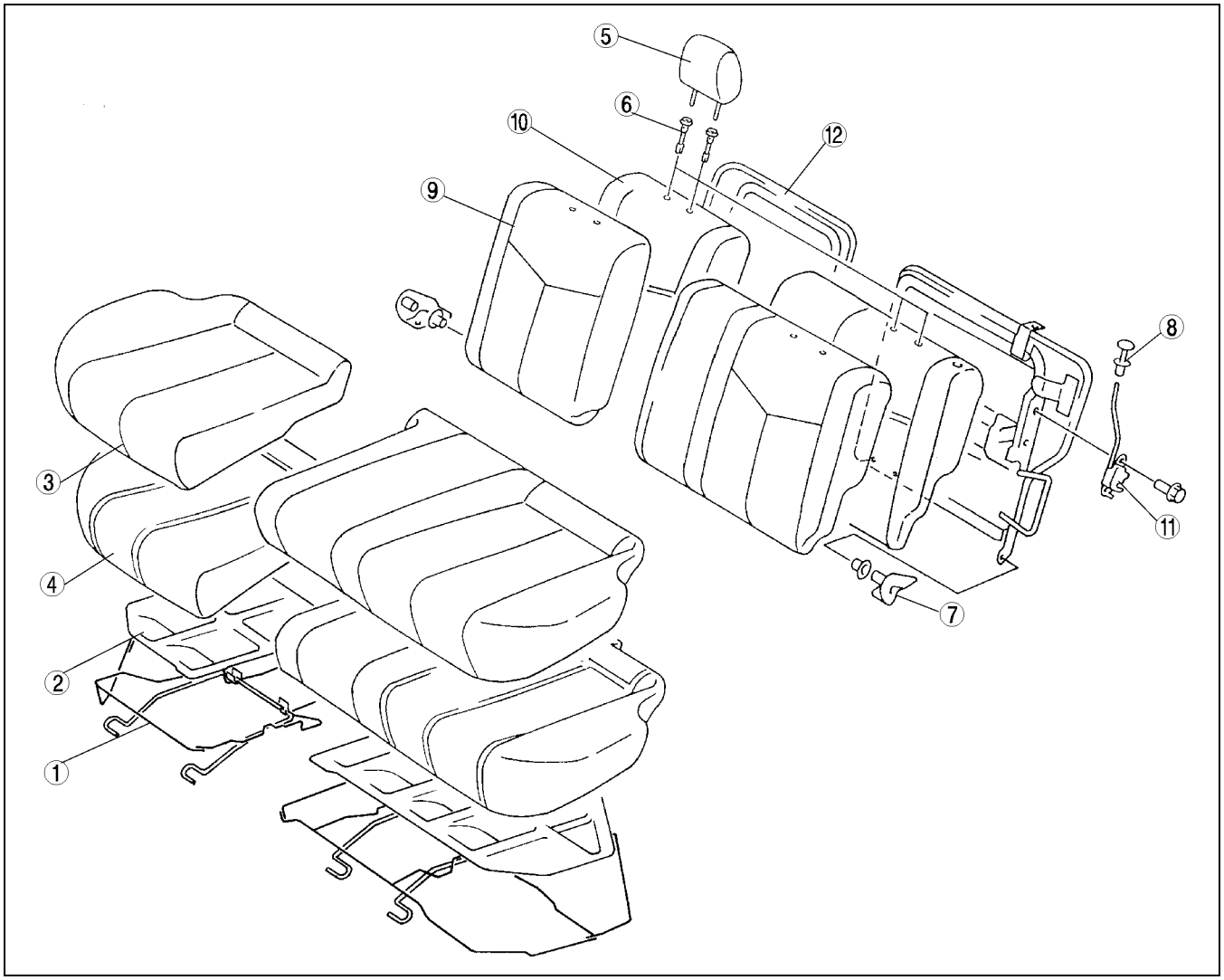
X3U913WAB

1	Seat cushion trim
2	Seat cushion pad
3	Side hinge
4	Recliner knob

5	Seat back trim
6	Seat back pad
7	Rear back catch
8	Seat back frame

5HB

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



A3U0913W003

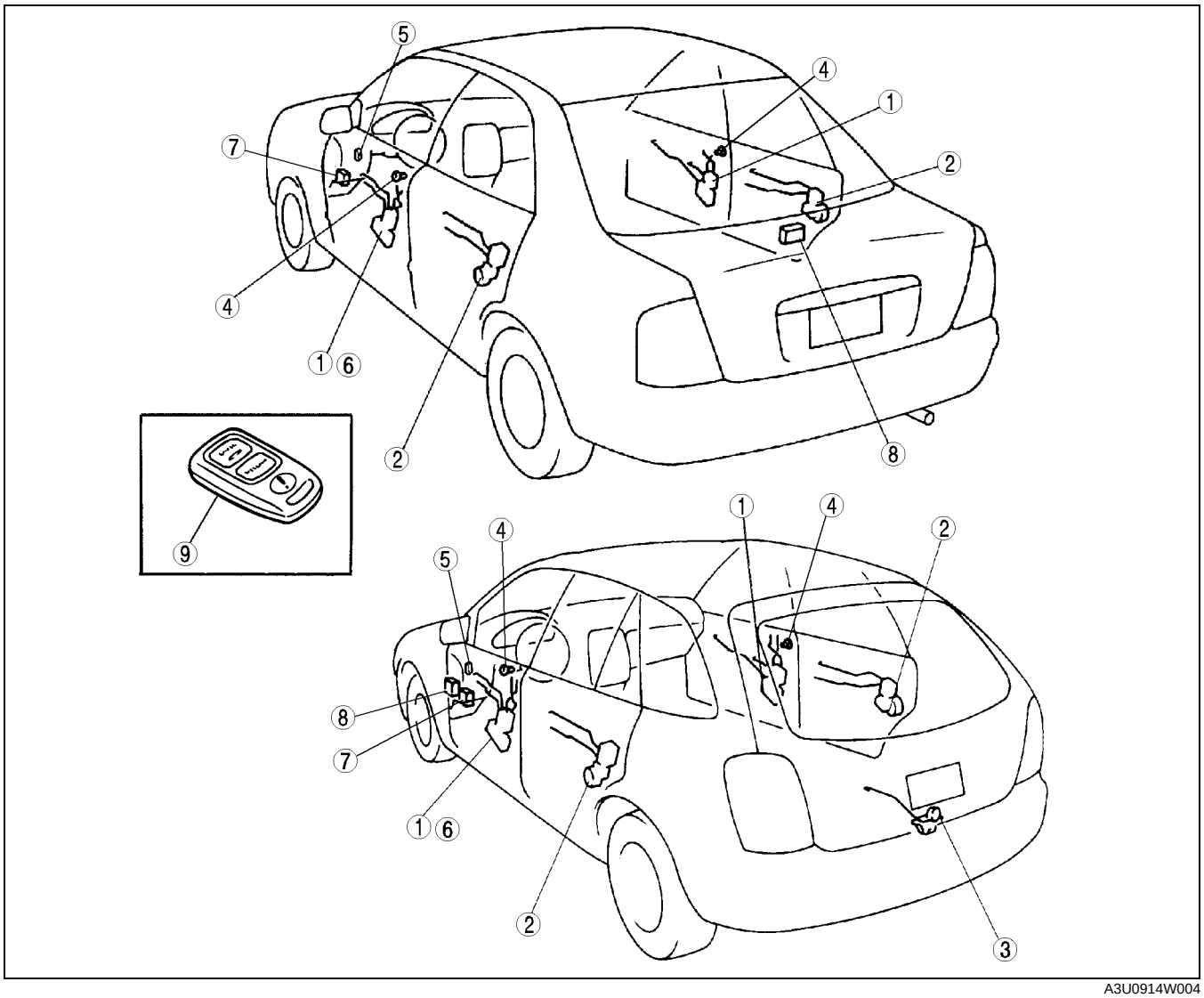
1	Seat cushion frame
2	Seat cushion pad cover
3	Seat cushion trim
4	Seat cushion pad
5	Headrest
6	Pole guide

7	Side hinge
8	Recliner knob
9	Seat back trim
10	Seat back pad
11	Rear back catch
12	Seat back frame

09–14 SECURITY AND LOCKS

LOCATION INDEX

A3U091466000W01



A3U0914W004

1	Front door lock actuator (See 09–14–3 FRONT DOOR LOCK ACTUATOR INSPECTION) (See 09–14–3 FRONT DOOR LOCK ACTUATOR REMOVAL/INSTALLATION)
2	Rear door lock actuator (See 09–14–5 REAR DOOR LOCK ACTUATOR INSPECTION) (See 09–14–5 REAR DOOR LOCK ACTUATOR REMOVAL/INSTALLATION)
3	Liftgate lock actuator (See 09–14–5 LIFTGATE LOCK ACTUATOR INSPECTION) (See 09–14–5 LIFTGATE LOCK ACTUATOR REMOVAL/INSTALLATION)
4	Door key cylinder switch (See 09–14–6 DOOR KEY CYLINDER SWITCH INSPECTION) (See 09–14–6 DOOR KEY CYLINDER SWITCH REMOVAL/INSTALLATION)
5	Door lock switch (See 09–14–6 DOOR LOCK SWITCH INSPECTION) (See 09–14–7 DOOR LOCK SWITCH REMOVAL/INSTALLATION)
6	Door lock-link switch (See 09–14–4 DOOR LOCK-LINK SWITCH INSPECTION) (See 09–14–4 DOOR LOCK-LINK SWITCH REMOVAL/INSTALLATION)
7	Door lock control module (See 09–14–8 DOOR LOCK CONTROL MODULE INSPECTION) (See 09–14–10 DOOR LOCK CONTROL MODULE REMOVAL/INSTALLATION)
8	Keyless control module (See 09–14–11 KEYLESS CONTROL MODULE INSPECTION) (See 09–14–12 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION)
9	Transmitter (See 09–14–15 TRANSMITTER BATTERY INSPECTION) (See 09–14–15 TRANSMITTER BATTERY REPLACEMENT)

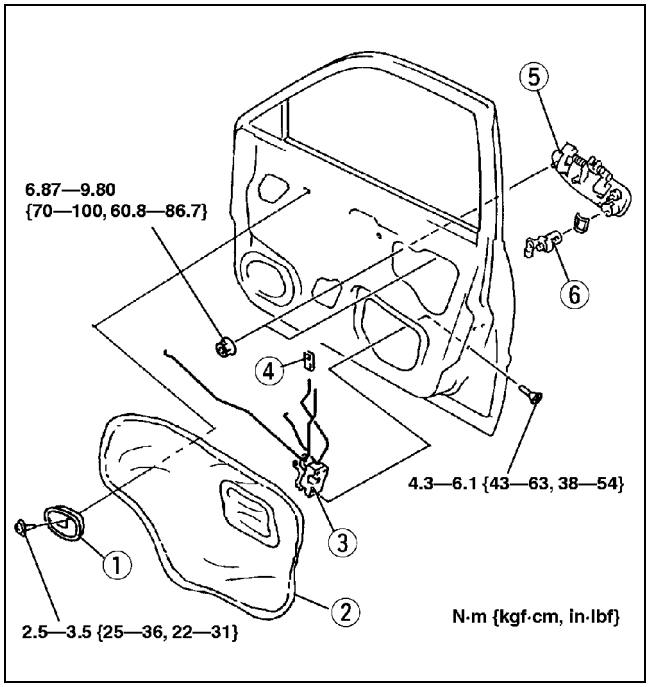
FRONT DOOR LOCK AND OPENER REMOVAL/INSTALLATION

A3U091458311W01

1. Close the front door glass completely.
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.

1	Inner handle
2	Door screen
3	Front door lock
4	Door lock knob
5	Outer handle
6	Door key cylinder

5. Install in the reverse order of removal.



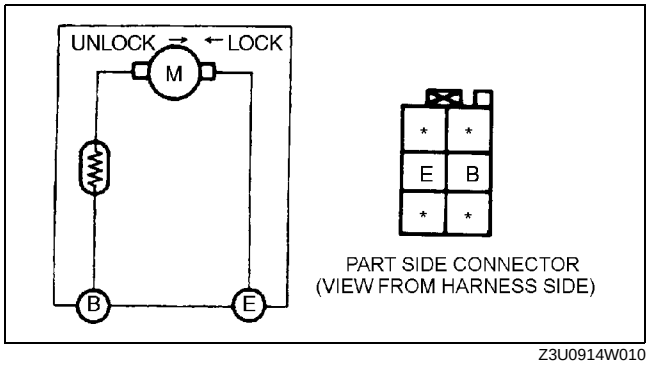
X3U914WA0

FRONT DOOR LOCK ACTUATOR INSPECTION

A3U091458310W01

1. Remove the front door trim.
2. Turn the door screen over.
3. Disconnect the front door lock actuator connector.
4. Apply battery positive voltage to the front door lock actuator terminals and inspect the operation of the front door lock actuator.
   - If not as specified, replace the front door lock.

Connection		Actuator operation
B+	GND	
E	B	Lock
B	E	Unlock



Z3U0914W010

FRONT DOOR LOCK ACTUATOR REMOVAL/INSTALLATION

A3U091458310W02

1. Disconnect the negative battery cable.
2. Remove the door screen. (See 09–14–3 FRONT DOOR LOCK AND OPENER REMOVAL/INSTALLATION.)
3. Disconnect the front door lock actuator connector.
4. Disconnect the rods from the outer handle and the door key cylinder.
5. Remove the screws, and then remove the front door lock.
6. Remove the screws, and then remove the front door lock actuator from the front door lock.
7. Install in the reverse order of removal.

DOOR LOCK-LINK SWITCH INSPECTION

A3U091458211W01

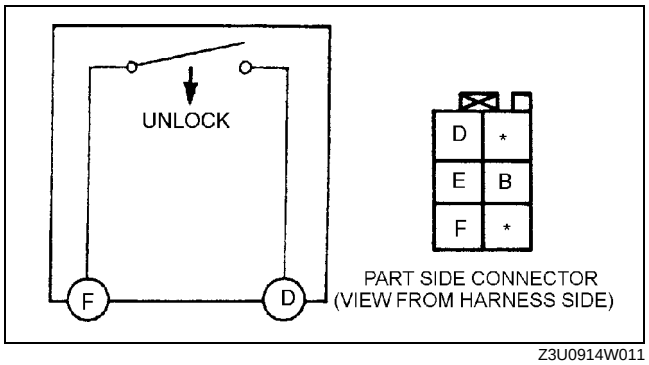
Note
- The door lock-link switch is together with the driver-side door lock actuator.

1. Remove the driver-side door trim.
2. Turn the door screen over.
3. Disconnect the door lock-link switch connector.
4. Inspect for continuity between the door lock-link switch terminals using an ohmmeter.
   - If not as specified, replace the door lock actuator.

○—○ : Continuity

Lock knob position	Terminal	
	F	D
Lock		
Unlock	○	○

Z3U0914W012



Z3U0914W011

DOOR LOCK-LINK SWITCH REMOVAL/INSTALLATION

A3U091458211W02

Note
- The door lock-link switch is together with the driver-side door lock actuator.

1. Remove the driver-side door lock actuator. (See 09–14–3 FRONT DOOR LOCK ACTUATOR REMOVAL/INSTALLATION.)

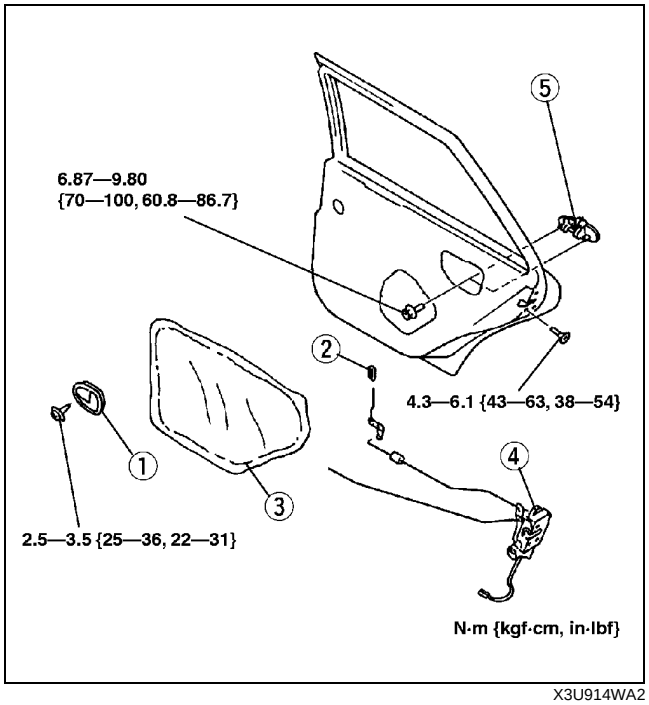
REAR DOOR LOCK AND OPENER REMOVAL/INSTALLATION

A3U091472311W01

1. Close the rear door glass completely.
2. Disconnect the negative battery cable.
3. Remove the rear door trim. (See 09–17–9 REAR DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Inner handle
2	Door lock knob
3	Door screen
4	Rear door lock
5	Outer handle

5. Install in the reverse order of removal.



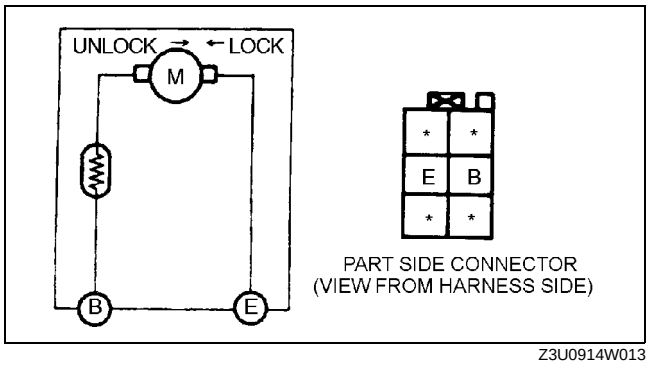
X3U914WA2

REAR DOOR LOCK ACTUATOR INSPECTION

A3U091472310W01

1. Remove the rear door trim.
2. Turn the door screen over.
3. Disconnect the rear door lock actuator connector.
4. Apply battery positive voltage to the rear door lock actuator terminals and inspect the operation of the rear door lock actuator.
   - If not as specified, replace the rear door lock.

Connection		Actuator operation
B+	GND	
E	B	Lock
B	E	Unlock



Z3U0914W013

REAR DOOR LOCK ACTUATOR REMOVAL/INSTALLATION

A3U091472310W02

1. Disconnect the negative battery cable.
2. Remove the door screen. (See 09–14–4 REAR DOOR LOCK AND OPENER REMOVAL/INSTALLATION.)
3. Disconnect the rear door lock actuator connector.
4. Disconnect the rod from the outer handle.
5. Remove the screws, and then remove the rear door lock.
6. Remove the screws, and then remove the rear door lock actuator from the rear door lock.
7. Install in the reverse order of removal.

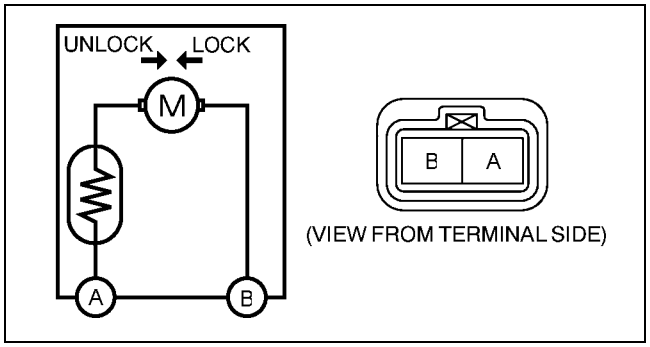
09–14

LIFTGATE LOCK ACTUATOR INSPECTION

A3U091462310W01

1. Disconnect the liftgate lock actuator connector.
2. Apply battery positive voltage to the liftgate lock actuator terminals and inspect the operation of the liftgate lock actuator.
   - If not as specified, replace the liftgate lock.

Connection		Actuator operation
B+	GND	
B	A	Lock
A	B	Unlock

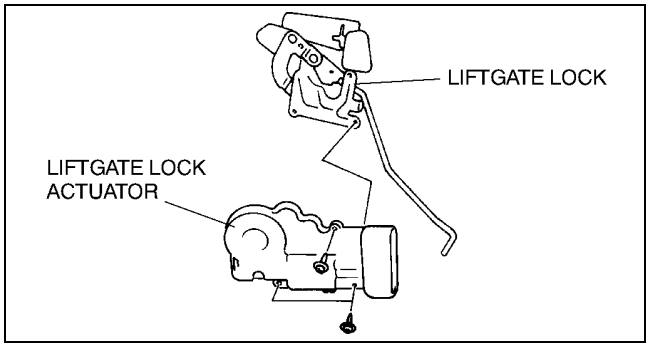


A3U0914W003

LIFTGATE LOCK ACTUATOR REMOVAL/INSTALLATION

A3U091462310W02

1. Disconnect the negative battery cable.
2. Remove the liftgate lock.
3. Remove the screws, then remove the liftgate lock actuator.
4. Install in the reverse order of removal.



A3U0914W002

DOOR KEY CYLINDER SWITCH INSPECTION

A3U091475911W01

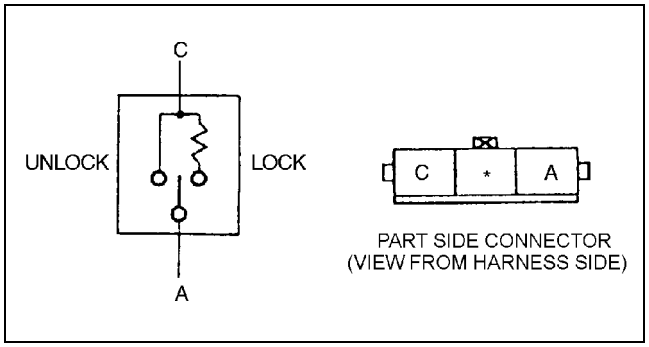
1. Raise the door glass completely.
2. Disconnect the negative battery cable.
3. Remove the passenger-side front door trim.
4. Remove the door screen.
5. Disconnect the door key cylinder switch connector.
6. Inspect for continuity between the door key cylinder switch terminals using an ohmmeter.
   - If not as specified, replace the door key cylinder switch.

○—○ : Continuity ○WW○ : Resistance

Key cylinder position	Terminal	
	A	C
Neutral		
Lock	○—WW—○	R
Unlock	○——○	

R: 950—1050 Ω

X3U914WC7

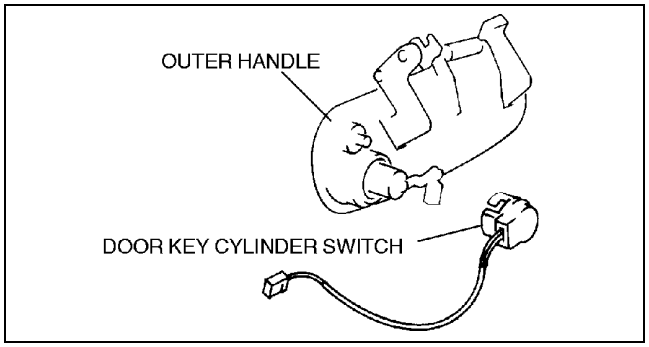


Z3U0914W014

DOOR KEY CYLINDER SWITCH REMOVAL/INSTALLATION

A3U091475911W02

1. Close the door glass completely.
2. Disconnect the negative battery cable.
3. Remove the passenger-side front door trim.
4. Remove the door screen.
5. Release the outer handle and the door key cylinder installation rods.
6. Disconnect the door key cylinder switch connector.
7. Remove the door key cylinder switch.
8. Install in the reverse order of removal.



X3U914WA5

DOOR LOCK SWITCH INSPECTION

A3U091466210W01

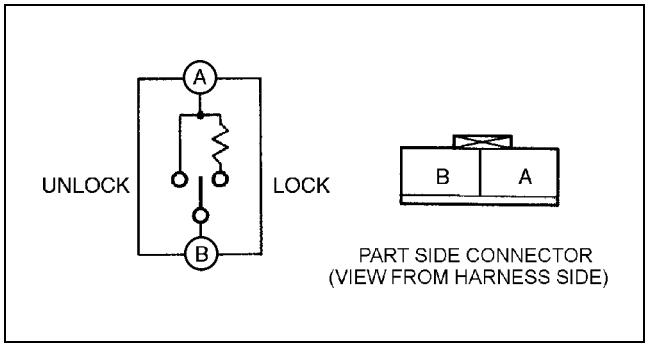
1. Remove the door lock switch.
2. Inspect for continuity between the door lock switch terminals using an ohmmeter.
   - If not as specified, replace the door lock switch.

○—○ : Continuity ○WW○ : Resistance

Switch position	Terminal	
	A	B
Lock	○—WW—○	R
Unlock	○——○	

R: 950—1050 Ω

X3U914WA7

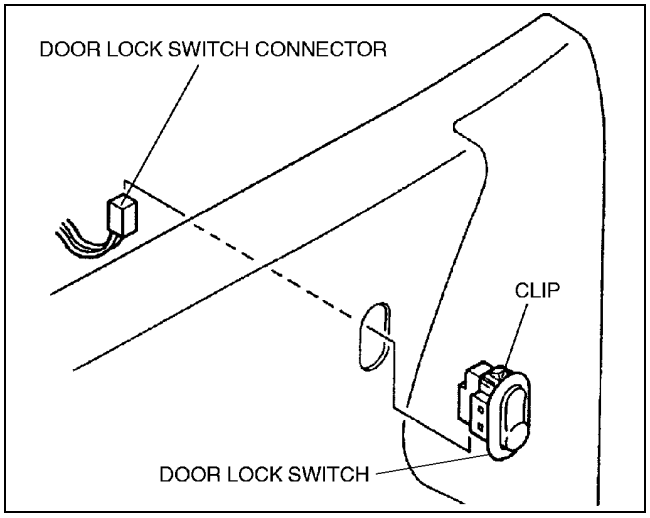


Y3U914WA3

DOOR LOCK SWITCH REMOVAL/INSTALLATION

A3U091466210W02

1. Disconnect the negative battery cable.
2. Insert a tape-wrapped flathead screwdriver between the front door trim and the door lock switch and push the clip to remove the door lock switch.
3. Disconnect the door lock switch connector.
4. Install in the reverse order of removal.



Z3U0914W005

DOOR LOCK STRIKER REMOVAL/INSTALLATION

A3U091458361W01

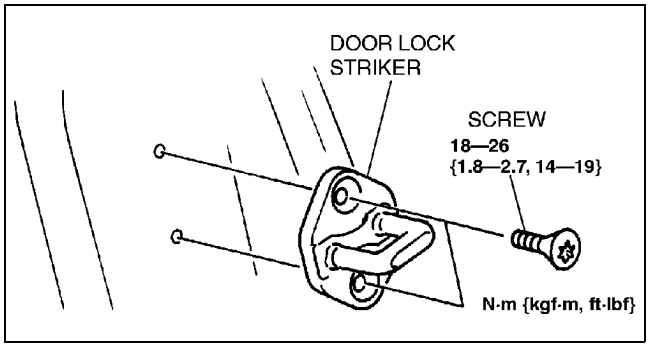
Warning

- **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 working around the B-pillar areas. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Note

- The side air bag sensor is located in the B-pillar.

1. Disconnect the negative battery cable.
2. Remove the screws.
3. Remove the door lock striker.
4. Install in the reverse order of removal.

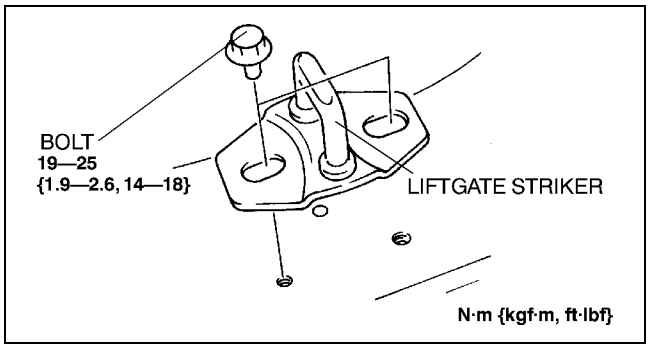


X3U914WA8

LIFTGATE LOCK STRIKER REMOVAL/INSTALLATION

A3U091462361W01

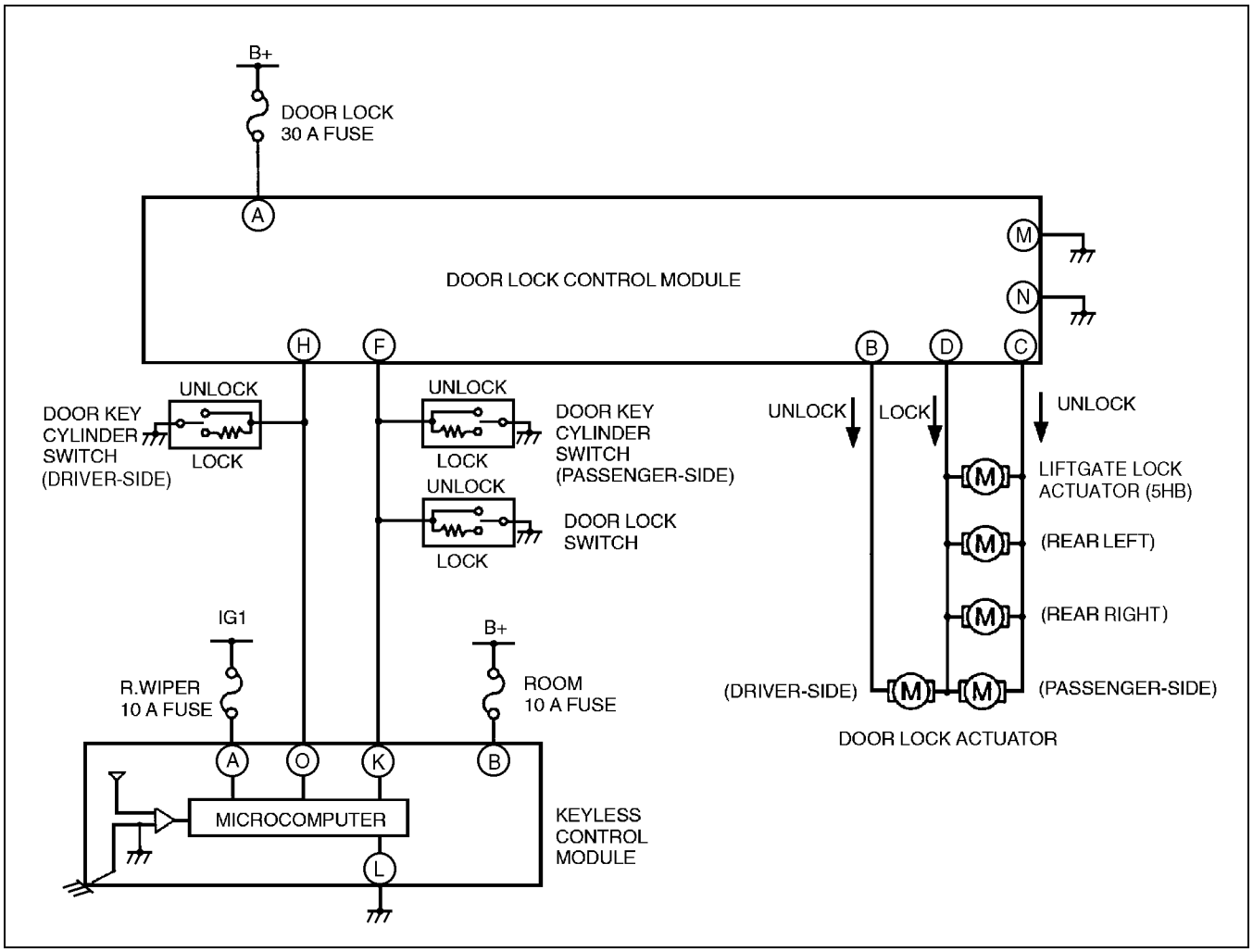
1. Remove the bolts.
2. Remove the liftgate striker.
3. Install in the reverse order of removal.



A3U0911W005

POWER DOOR LOCK SYSTEM WIRING DIAGRAM

A3U091466000W02



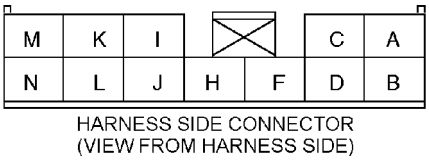
A3U0914W008

DOOR LOCK CONTROL MODULE INSPECTION

A3U091467830W01

1. Remove the lower panel.
2. Measure the voltage at the door lock control module terminals as indicated below.
3. Disconnect the door lock control module connector before inspecting for continuity at terminals F, H, M and N.
   - If not as specified, inspect the parts listed under “Action” 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.

Terminal Voltage List (Reference)



Y3U914WA5

Terminal	Signal	Connected to	Test condition	Voltage (V)/continuity	Action
A	Power supply	DOOR LOCK 30 A fuse	Under any condition	B+	• Inspect DOOR LOCK 30 A fuse • Inspect related harness

Terminal	Signal	Connected to	Test condition	Voltage (V)/continuity	Action
B	Unlock output	Driver-side door lock actuator	Driver-side door (door lock actuator) is unlocked	Below 1.0→B+→ Below 1.0	• Inspect driver-side door lock actuator • Inspect related harness
			Other	0	
C	Unlock output	Except driver-side door lock actuator	Except driver-side door (door lock actuator and liftgate lock actuator) is unlocked	Below 1.0→B+→Below 1.0	• Inspect except driver-side door lock actuator • Inspect related harness
			Other	Below 1.0	
D	Lock output	Door lock actuator	Door (door lock actuator) is locked	Below 1.0→B+→Below 1.0	• Inspect door lock actuator • Inspect related harness
			Other	Below 1.0	
F	Lock/ unlock input	Passenger-side door key cylinder switch, door lock switch, and *keyless control module	Passenger-side door is locked with key	B+→5→B+	• Inspect passenger-side door key cylinder switch (See 09–14–6 DOOR KEY CYLINDER SWITCH INSPECTION) • Inspect door lock switch (See 09–14–6 DOOR LOCK SWITCH INSPECTION) • Inspect *keyless control module (See 09–14–11 KEYLESS CONTROL MODULE INSPECTION) • Inspect related harness
				*5→2.5→5	
			Passenger-side door is unlocked with key	B+→Below 1.0→B+	
				*5→Below 1.0→5	
			Door lock switch is locked	B+→5→B+	
				*5→2.5→5	
			Door lock switch is unlocked	B+→Below 1.0→B+	
				*5→Below 1.0→5	
			*Transmitter UNLOCK button is pressed twice within 5 seconds	5→Below 1.0→5	
			Other	B+	
				*5	
H	Unlock input	Driver-side door key cylinder switch, and *keyless control module	Driver-side door is locked with key	B+→5→B+	• Inspect driver-side door key cylinder switch (See 09–14–6 DOOR KEY CYLINDER SWITCH INSPECTION) • Inspect *keyless control module (See 09–14–11 KEYLESS CONTROL MODULE INSPECTION) • Inspect related harness
				*5→2.5→5	
			Driver-side door is unlocked with key	B+→Below 1.0→B+	
				*5→Below 1.0→5	
			*Transmitter LOCK button is pressed	5→2.5→5	
			*Transmitter UNLOCK button is pressed once	5→Below 1.0→5	
			Other	B+	
				*5	
I	-	-	-	-	-
J	-	-	-	-	-
K	-	-	-	-	-
L	-	-	-	-	-
M	Signal ground	GND	Under any condition: inspect for continuity to ground	Yes	-
N	Power ground	GND	Under any condition: inspect for continuity to ground	Yes	-

* : Equipped with keyless entry system

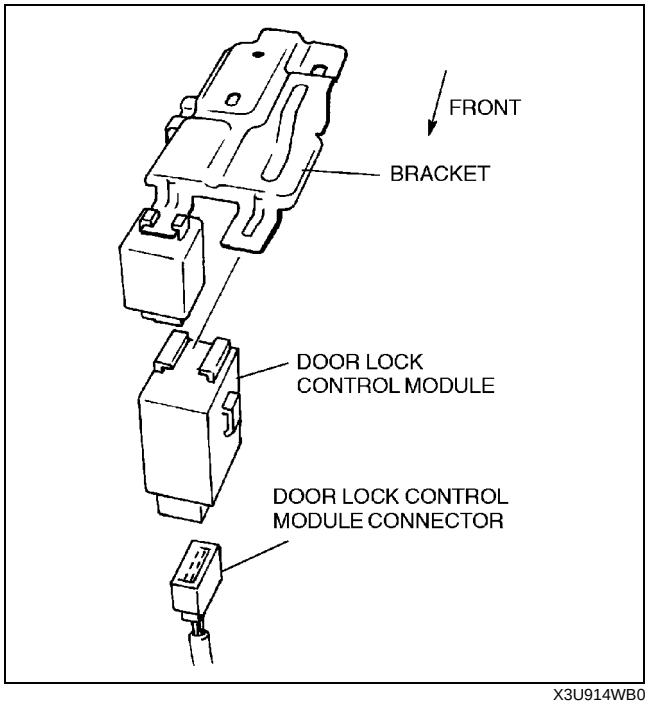
DOOR LOCK CONTROL MODULE REMOVAL/INSTALLATION

A3U091467830W02

Note

- Because the lock section of the module is damaged easily, do not remove the module from the bracket unless replacement is necessary. Always perform an inspection of the door lock control module before removal.

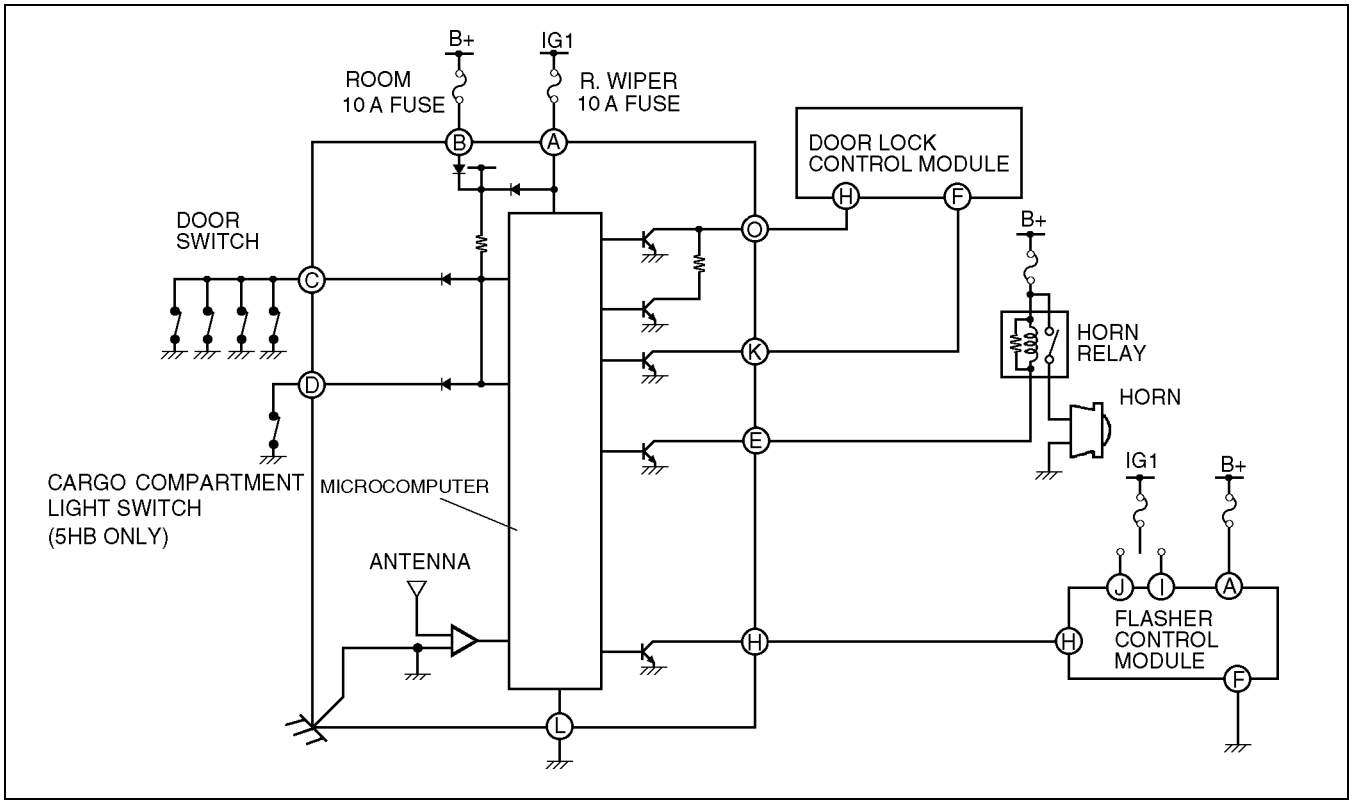
1. Disconnect the negative battery cable.
2. Remove the lower panel.
3. Remove the bracket.
4. Disconnect the door lock control module connector.
5. Remove the door lock control module by prying the lock section of the upper part with a flathead screwdriver.
6. Install in the reverse order of removal.



X3U914WB0

KEYLESS ENTRY SYSTEM WIRING DIAGRAM

A3U091469000W01



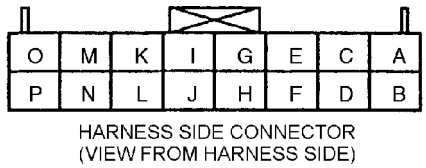
A3U0903W001

KEYLESS CONTROL MODULE INSPECTION

A3U091467540W01

1. Pull out the keyless control module with the connector connected.
2. Measure the voltage at the keyless control module terminals (other than terminal L) as indicated below.
   - If not as specified, inspect the parts listed under “Action.”
3. Disconnect the negative battery cable.
4. Disconnect the keyless control module connector and inspect for continuity between terminal L and bracket.
5. Inspect for continuity at terminal L as indicated below.
6. If the parts and wiring harnesses are okay but the system still does not work properly, perform the troubleshooting.

Terminal Voltage List (Reference)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y3U914WA6

Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
A	IG1	R. WIPE 10 A fuse	Ignition switch is at ON position	B+	• Inspect R. WIPE 10 A fuse • Inspect related harness
			Ignition switch is at LOCK or ACC position	Below 1.0	
B	Power supply	ROOM 10 A fuse	Under any condition	B+	• Inspect ROOM 10 A fuse • Inspect related harness
C	Door open/ closed	Door switch	Any door is open (any door switch is on)	Below 1.0	• Inspect door switches • Inspect related harness
			All door are closed (door switches are off)	B+	
D	Liftgate open/ closed	Cargo compartment light switch	Liftgate is open (cargo compartment light switch is on)	Below 1.0	• Inspect cargo compartment light switch • Inspect related harness
			Liftgate is closed (cargo compartment light switch is off)	B+	
E	Horn	Horn relay	Transmitter panic button is pressed	Alternates between B+ and Below 1.0	• Inspect transmitter • Inspect horn relay • Inspect related harness
			Transmitter panic button is not pressed	B+	
F	-	-	-	-	-
G	-	-	-	-	-
H	Hazard	Flasher control module	Transmitter panic button is pressed	Alternates between B+ and Below 1.0	• Inspect flasher control module • Inspect related harness
			Transmitter LOCK button is pressed	B+→Below 1.0→B+	
			Transmitter UNLOCK button is pressed once	B+→Below 1.0→B+→Below 1.0→B+	
			No transmitter buttons are pressed	B+	
I	-	-	-	-	-
J	-	-	-	-	-
K	Unlock output	Door lock control module	Transmitter UNLOCK button is pressed twice within 5 seconds. (second value)	5→Below 1.0→5	• Inspect door lock control module • Inspect related harness
			Other	5	

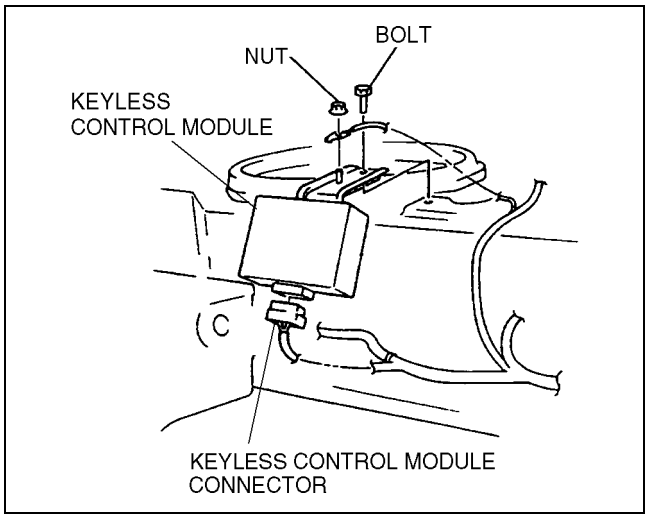
Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
L	Ground	GND	Under any condition: inspect for continuity to ground	Yes	-
M	-	-	-	-	-
N	-	-	-	-	-
O	Lock/unlock output	Door lock control module	Transmitter LOCK button is pressed	5→2.5→5	• Inspect door lock control module • Inspect related harness
			Transmitter UNLOCK button is pressed once	5→Below 1.0→5	
			No transmitter buttons are pressed	5	
P	-	-	-	-	-

KEYLESS CONTROL MODULE REMOVAL/INSTALLATION

A3U091467540W02

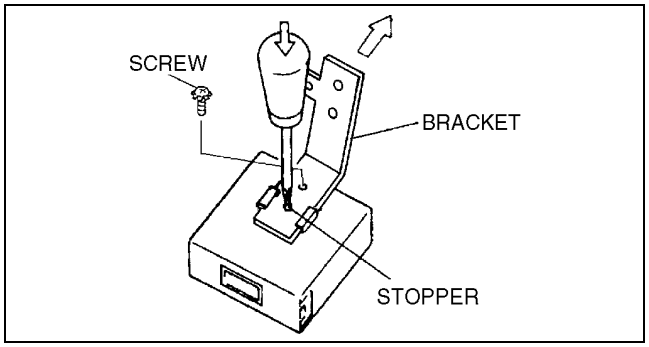
4SD

1. Disconnect the negative battery cable.
2. Remove the rear package trim.
3. Disconnect the keyless control module connector.
4. Remove the nut and bolt to remove the keyless control module and the bracket as a module.



Y3E7718W002

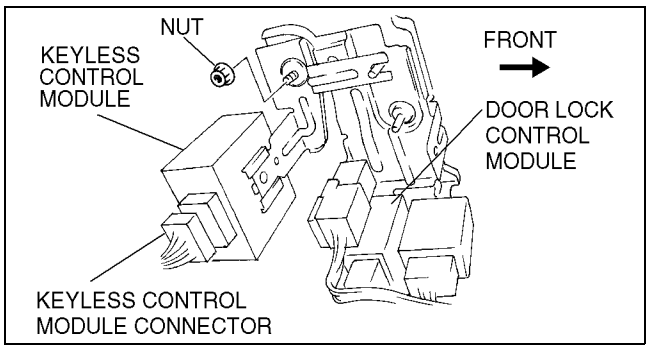
5. Remove the screw.
6. Push the stopper using a small driver, and remove the bracket.
7. Install in the reverse order of removal.



Y3E7718W003

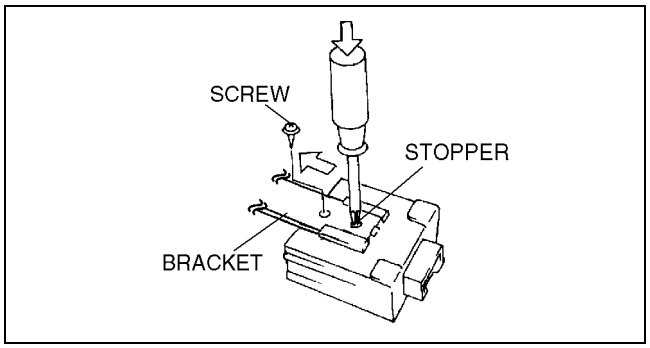
5HB

1. Disconnect the negative battery cable.
2. Disconnect the keyless control module connector. (under driver's side dash)
3. Remove the bolt to remove the keyless control module and the bracket as a module.



A3U0914W007

4. Remove the screw.
5. Push the stopper using a small driver, and remove the bracket.
6. Install in the reverse order of removal.

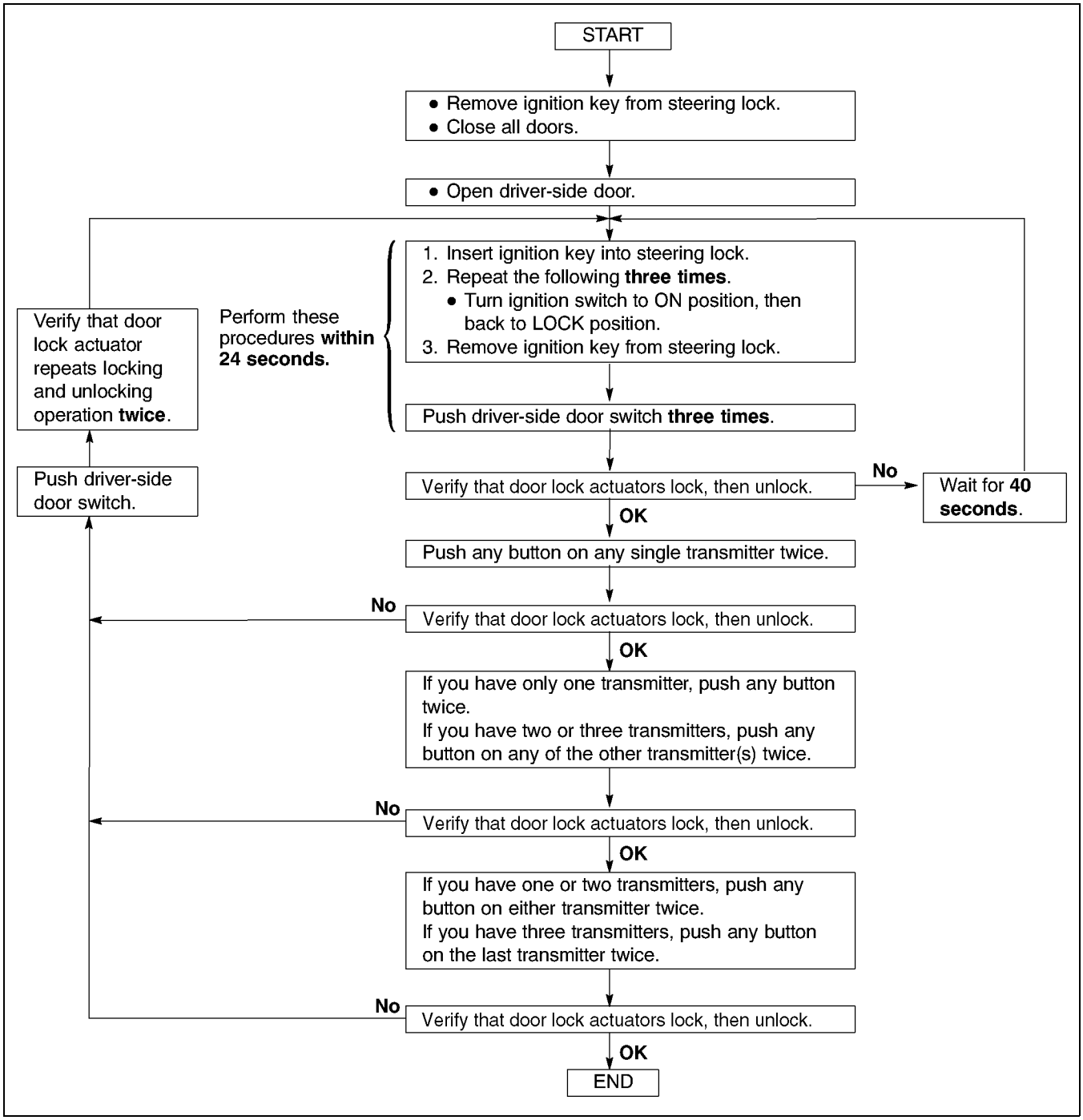


A3U0914W005

KEYLESS CONTROL MODULE ID CODE CHANGE

A3U091467540W03

- When programming the ID code into a transmitter, verify that other transmitters are not being operated in the vicinity.
- Program the ID code as indicated in the procedure below.



YLE7718W010

TRANSMITTER BATTERY INSPECTION

A3U091467543W01

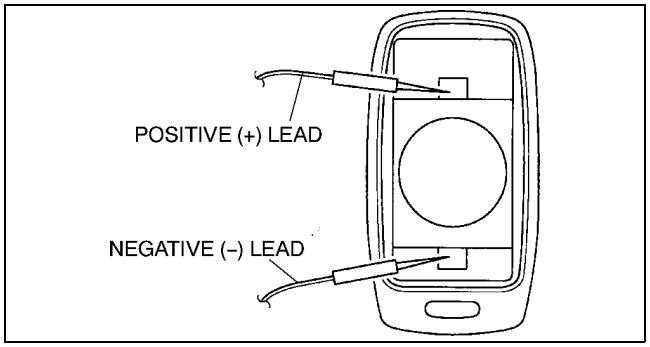
Caution

- **Since the battery voltage does not drop fully if the button is pushed for only 4 seconds or less, it cannot be properly examined to see whether it is good or bad. Always push the button for 5 seconds.**

Note

- Since a correct measurement cannot be obtained if the battery temperature is low, make sure the battery has been at **18 °C {64 °F} or more** for **at least 30 minutes** before reinspecting when a measurement value is under the standard voltage.

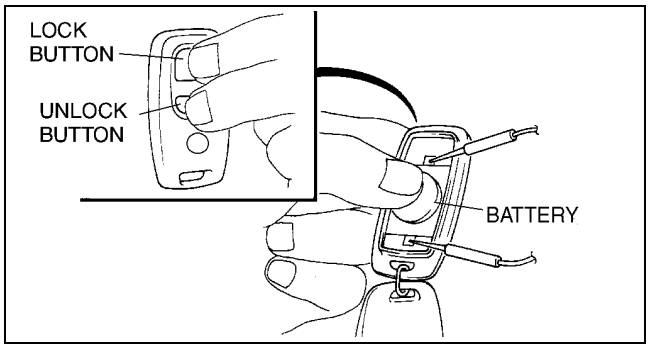
1. Remove the transmitter cover.
2. Apply the circuit tester leads to the positions as indicated in the figure.



YDE7718W003

3. While pressing the battery as shown in the figure, press the LOCK and UNLOCK buttons on the transmitter at the same time to start measurement of the voltage.
4. Release the buttons after **5 seconds**.
5. Verify that the minimum voltage is the standard voltage or more for **10 seconds** after starting measurement.
   - If the voltage is under the standard voltage, replace the battery.

Standard voltage
2.7 V

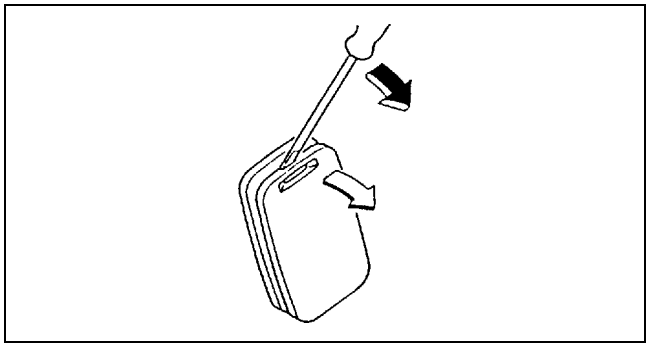


Z3U0914W006

TRANSMITTER BATTERY REPLACEMENT

A3U091467543W02

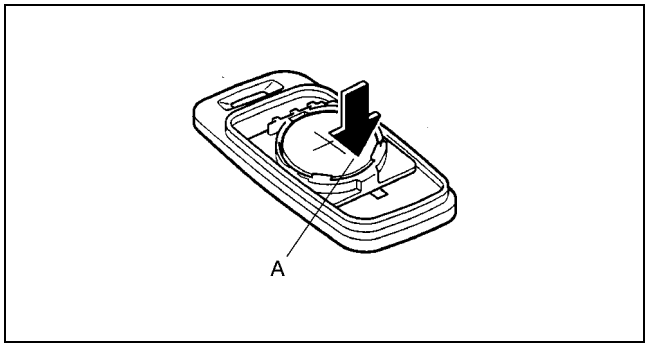
1. Insert a small flathead screwdriver into the slot and gently pry open the transmitter.



YMU914WAS

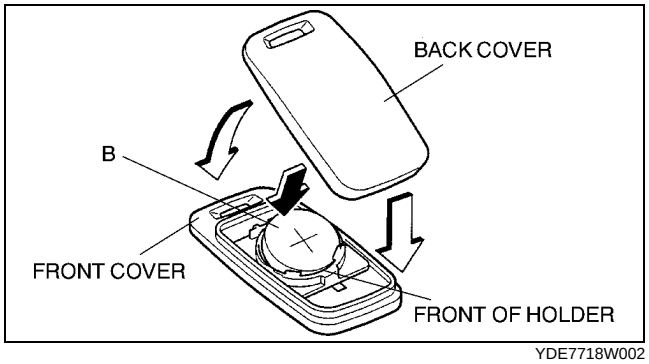
2. Press the portion of the battery indicated by A and remove the battery.
3. Install a new battery (CR2025 or the equivalent) into the front portion of the holder with the positive pole (+) facing up. Press on the B portion of the battery to set the battery.
4. Align the front and back covers and snap the transmitter shut.

Battery specification
Lithium CR2025 × 1



YDE7718W001

Note
- The batteries will last about **2 years** when used **10 times** a day.

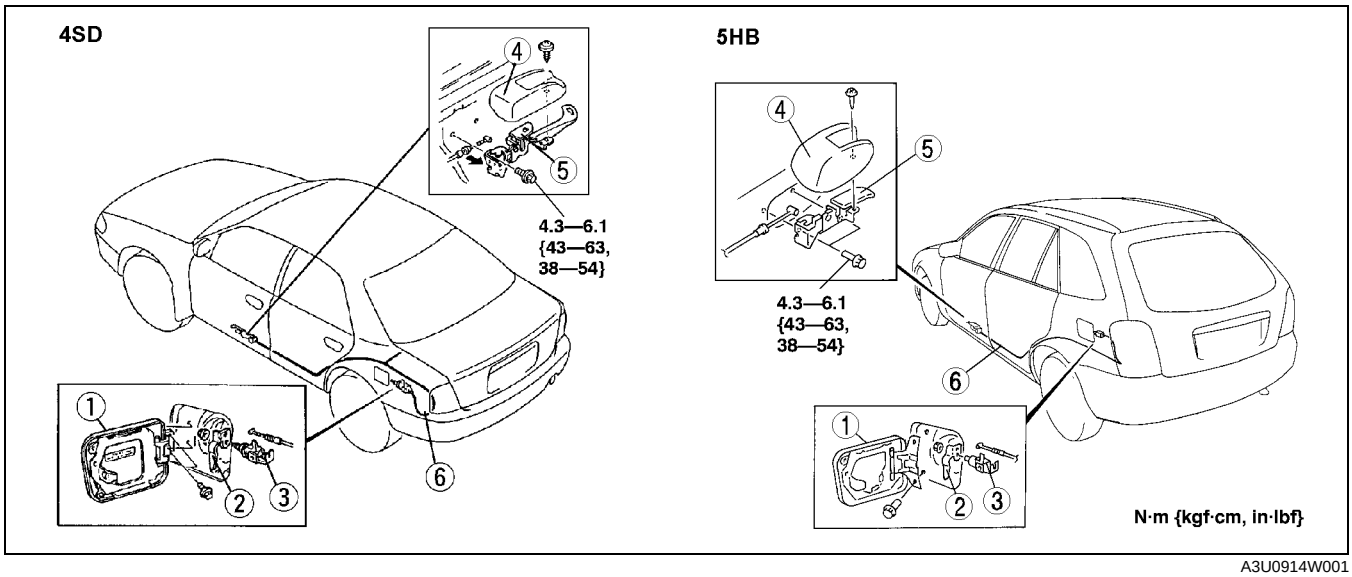


YDE7718W002

FUEL-FILLER LID AND OPENER REMOVAL/INSTALLATION

A3U091456890W01

1. To remove the fuel-filler lid opener, remove the left side trunk side trim.
2. To remove the fuel-filler lid opener cable, perform the following.
   (1) Remove the driver's seat. (See 09–13–1 FRONT SEAT REMOVAL/INSTALLATION.)
   (2) Remove the driver-side front and rear scuff plate.
   (3) Remove the driver-side B-pillar lower trim.
   (4) Remove the driver's seat belt lower anchor.
   (5) Remove the driver-side tire house trim.
   (6) Remove the driver-side trunk side trim.
   (7) Turn the floor covering over.
3. Install in the reverse order of removal.
4. Remove in the order indicated in the table.
5. Adjust the fuel-filler lid. (See 09–10–1 FUEL-FILLER LID ADJUSTMENT.)



A3U0914W001

1	Fuel-filler lid
2	Lift spring
3	Fuel-filler lid opener

4	Cover
5	Fuel-filler lid opener lever
6	Fuel-filler lid opener cable

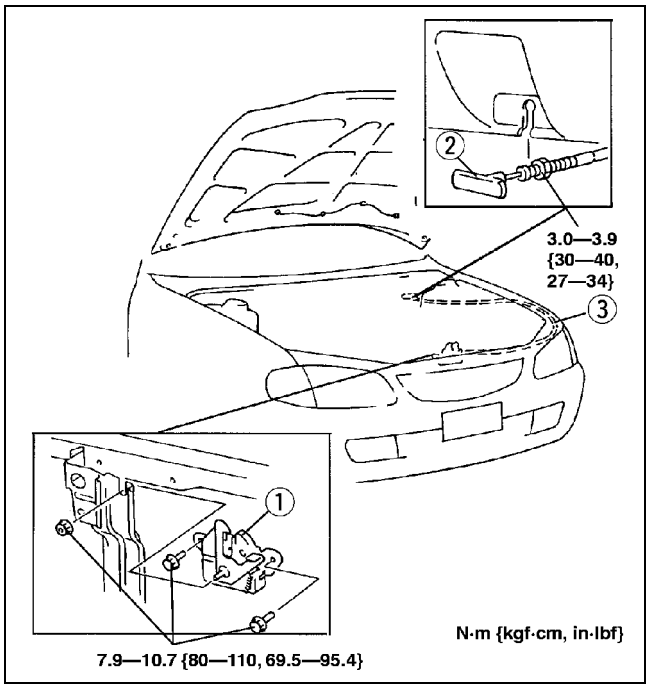
HOOD LOCK AND OPENER REMOVAL/INSTALLATION

A3U091456620W01

1. Remove in the order indicated in the table.

1	Hood lock
2	Hood release lever
3	Hood release cable

2. Install in the reverse order of removal.



X3U914WB2

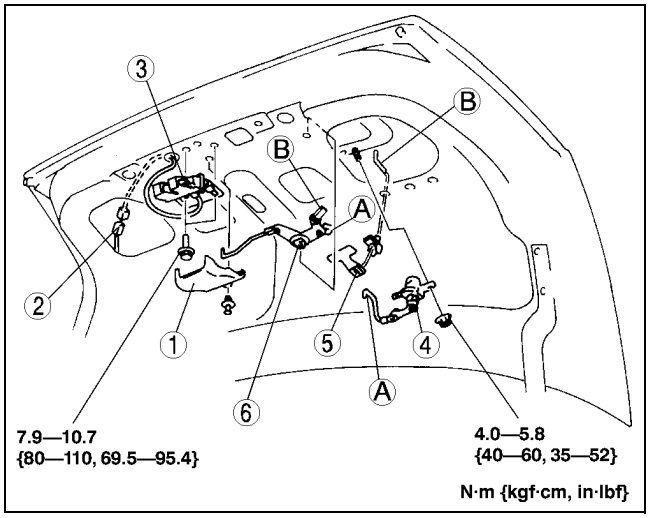
TRUNK LID LOCK REMOVAL/INSTALLATION

A3U091456820W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Cover
2	Connector
3	Trunk lid lock
4	Trunk lid lock cylinder
5	Internal trunk lid release handle (See 09–14–17 Internal Trunk Lid Release Handle Installation Note.)
6	Rod

3. Install in the reverse order of removal.



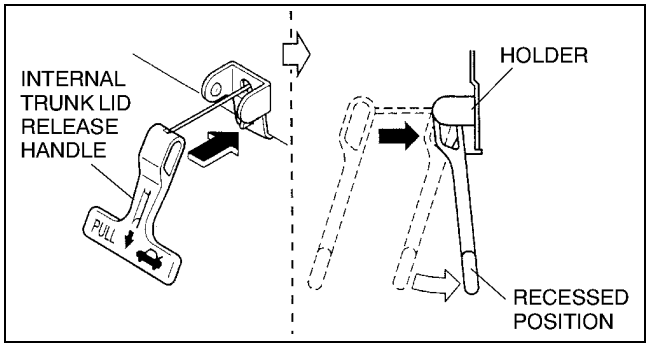
Z3U0914W008

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 and in the recessed position.



Z3U0914W009

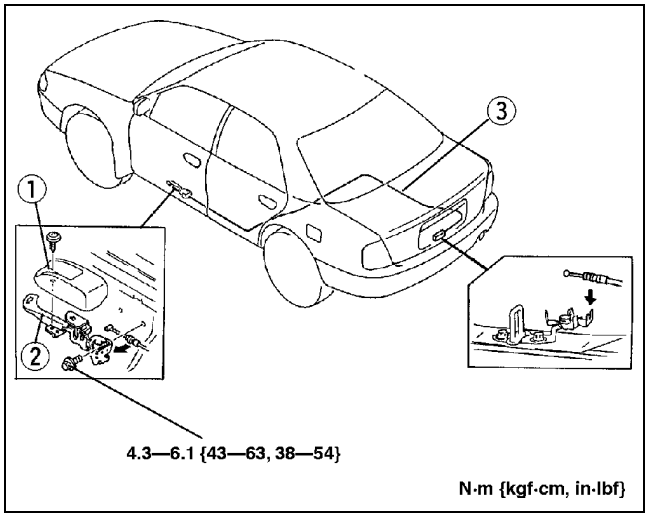
TRUNK LID OPENER REMOVAL/INSTALLATION

A3U091456822W01

1. To remove the trunk lid opener cable, perform the following.
   (1) Remove the driver's seat. (See 09–13–1 FRONT SEAT REMOVAL/INSTALLATION.)
   (2) Remove the driver-side front and rear scuff plate.
   (3) Remove the driver-side B-pillar lower trim. (See 09–17–10 B-PILLAR LOWER TRIM REMOVAL.) (See 09–17–11 B-PILLAR LOWER TRIM INSTALLATION.)
   (4) Remove the driver's seat belt lower anchor.
   (5) Remove the passenger's side tire house trim. (See 09–17–13 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (6) Remove the trunk end trim. (See 09–17–14 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (7) Turn the floor covering over.
2. Remove in the order indicated in the table.

1	Cover
2	Trunk lid opener lever
3	Trunk lid opener cable

3. Install in the reverse order of removal.
4. Adjust the trunk lid opener cable. (See 09–14–18 TRUNK LID OPENER CABLE ADJUSTMENT.)



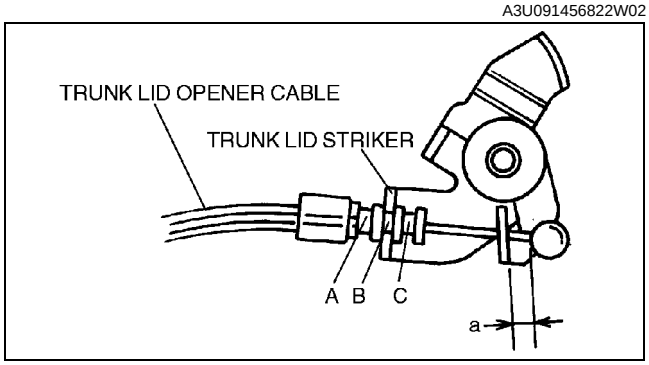
X3U914WC1

TRUNK LID OPENER CABLE ADJUSTMENT

A3U091456822W02

1. Install the trunk lid striker to one of the three places (A, B, and C) so that the play of the trunk lid opener cable is within the specified clearance.
   - If not as specified, move to the next location.

   Clearance
   a: 0.3—4.5 mm {0.02—0.17 in}

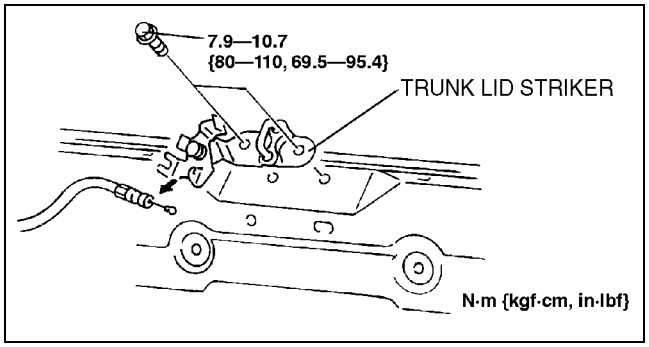


X3U914WC2

TRUNK LID STRIKER REMOVAL/INSTALLATION

A3U091456840W01

1. Remove the trunk end trim. (See 09–17–14 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the bolts, then remove the trunk lid striker.
3. Install in the reverse order of removal.
4. Adjust the trunk lid opener cable. (See 09–14–18 TRUNK LID OPENER CABLE ADJUSTMENT.)

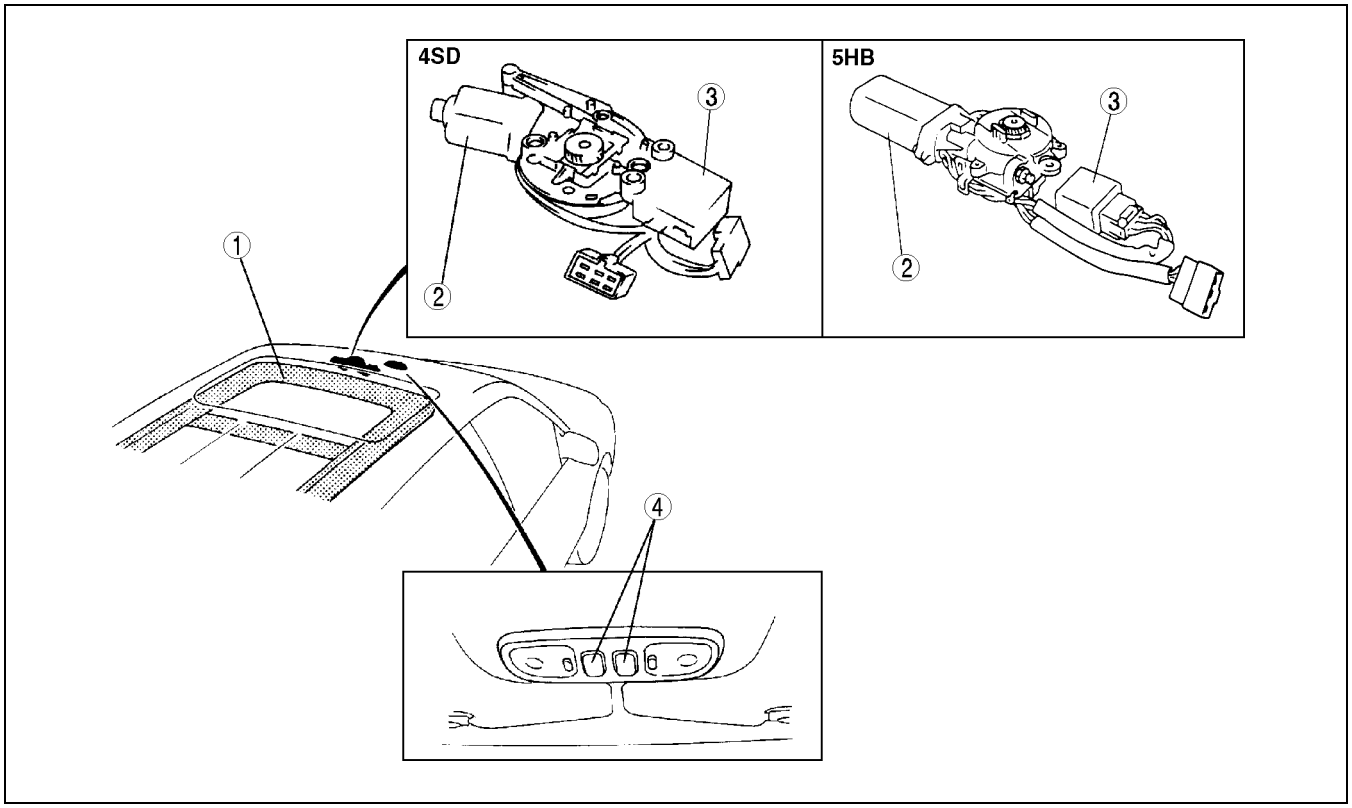


Z3U0914W004

09–15 SUNROOF

LOCATION INDEX

A3U091501049W01



A3U0915W024

1	Sunroof unit (See 09–15–5 SUNROOF UNIT REMOVAL/INSTALLATION) (See 09–15–8 SUNROOF UNIT ASSEMBLY) (See 09–15–5 SUNROOF UNIT DISASSEMBLY)
2	Sunroof motor (See 09–15–5 SUNROOF UNIT REMOVAL/INSTALLATION)

3	Sunroof relay (See 09–15–14 SUNROOF RELAY REMOVAL/INSTALLATION) (See 09–15–16 SUNROOF RELAY INSPECTION)
4	Sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) (See 09–15–18 SUNROOF SWITCH REMOVAL/INSTALLATION)

DEFLECTOR REMOVAL/INSTALLATION

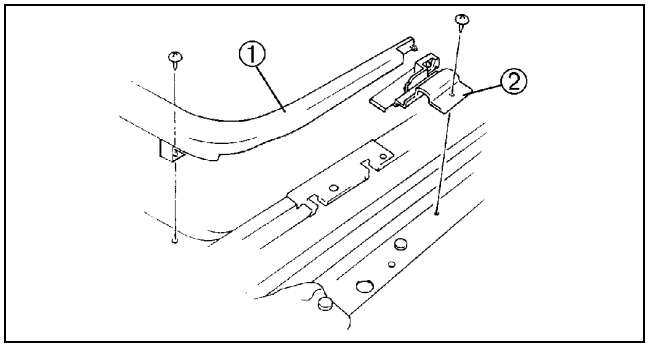
A3U091569880W01

4SD

1. Fully open the glass panel.
2. To remove the stopper, remove the sunroof unit. (See 09–15–5 SUNROOF UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Deflector (See 09–15–2 Deflector Removal Note)
2	Stopper

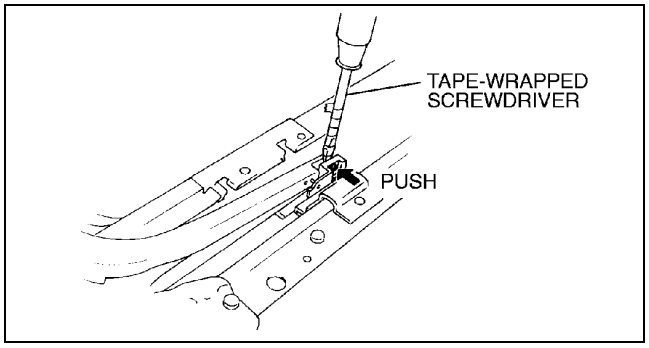
4. Install in the reverse order of removal.



X3U915WA2

Deflector Removal Note

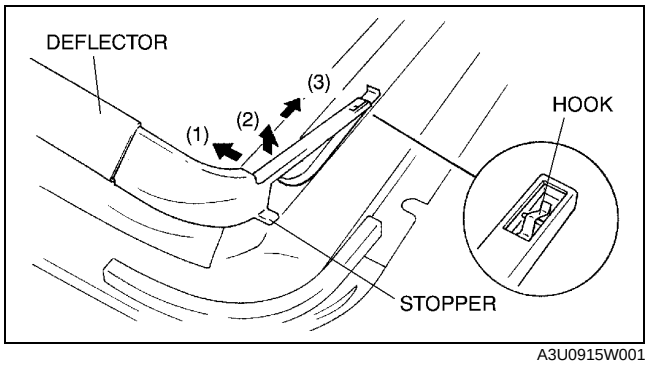
1. Remove the deflector using a tape-wrapped screwdriver.



X3U915WA3

5HB

1. Fully open the glass panel.
2. Push the deflector inside (1) and pull it up (2) to release the stopper.
3. Slide the deflector to disengage from the hook. (3)
4. Remove the deflector.
5. Install in the reverse order of removal.



A3U0915W001

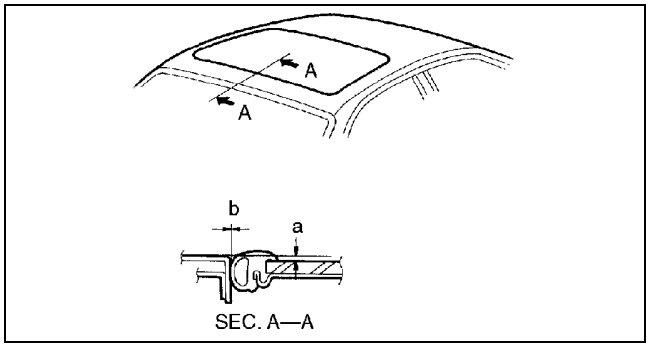
GLASS PANEL ADJUSTMENT

A3U091569810W01

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.

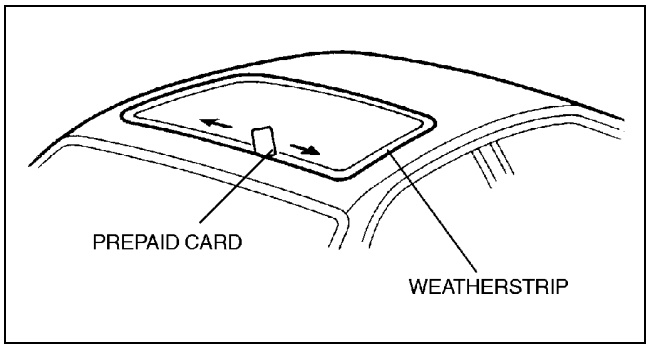
   Clearance
   a: 0.2—2.2 mm {0.008—0.086 in}
   b: 0 mm {0 in}

3. Tighten the installation screws.



X3U915WA6

4. Insert a prepaid card between the weatherstrip and the body of the vehicle. Verify that the sunroof is shut tightly (there is resistance when the prepaid card is moved).
   - If the sunroof is not shut tightly, readjust by performing Steps 3 and 4.

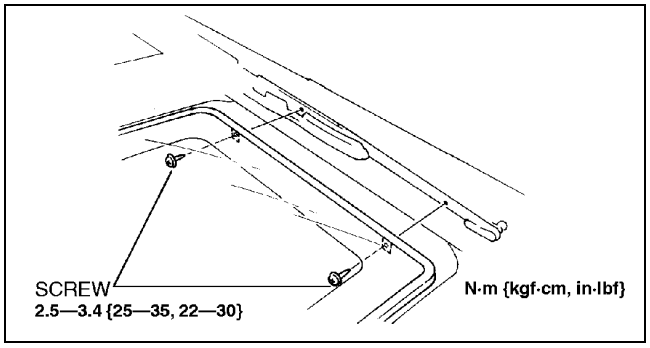


X3U915WA7

GLASS PANEL REMOVAL/INSTALLATION

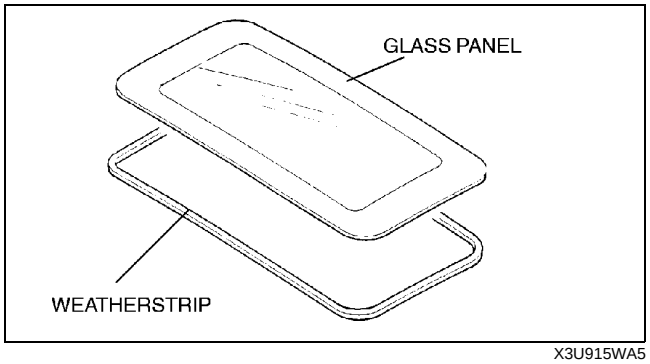
A3U091569810W02

1. Fully close the glass panel.
2. Fully open the sunshade.
3. Remove the screws, and then remove the glass panel.



X3U915WA4

4. Peel the weatherstrip off the glass panel.
5. Install in the reverse order of removal.
6. Adjust the glass panel. (See 09–15–3 GLASS PANEL ADJUSTMENT.)

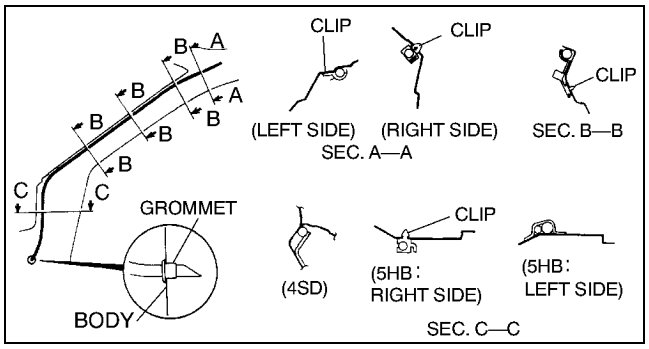


X3U915WA5

FRONT DRAIN HOSE REMOVAL

A3U091569920W01

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Disconnect the front drain hose from the sunroof frame.
3. Remove the front drain hose from the clips.
4. Pull the front drain hose into the room side.
5. Remove the front drain hose.



A3U0915W022

FRONT DRAIN HOSE INSTALLATION

A3U091569920W02

Caution

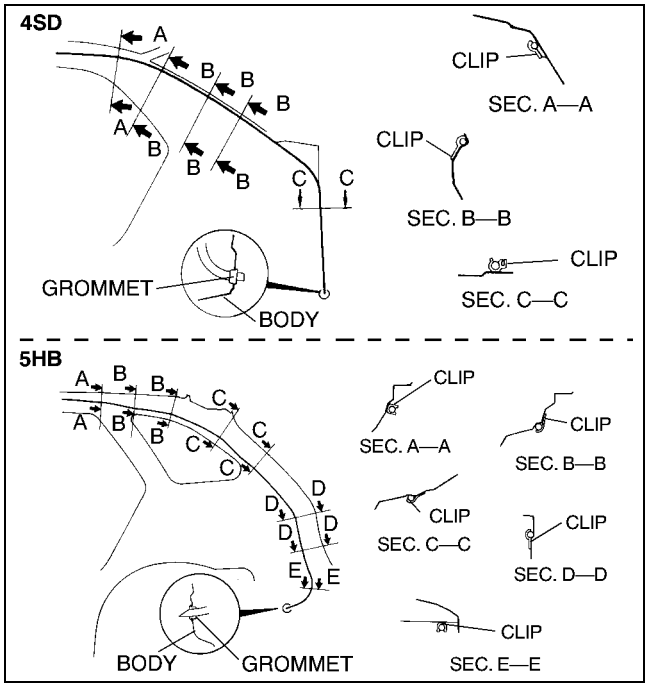
- **If the front drain hose is pinched or bent anywhere, the water in the hose may not discharge and enter the inside of the vehicle. During and after installation of the trims and the headliner, always make sure there is no interference with the front drain hose. Fix any problem if found.**

1. Apply soapy water to the front drain hose inserting area.
2. Insert one end of the front drain hose into the sunroof frame.
3. Install the front drain hose to the clips parallel to the pillar and free of slack.
4. Insert the front drain hose joint into the hinge pillar inner hole.
5. Install the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)

REAR DRAIN HOSE REMOVAL

A3U091569922W01

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. For 4SD, remove the trunk side trim.
3. Disconnect the rear drain hose from the sunroof frame.
4. Remove the rear drain hose from the clips.
5. Pull the rear drain hose into the room side.
6. Remove the rear drain hose.



A3U0915W002

REAR DRAIN HOSE INSTALLATION

A3U091569922W02

Caution

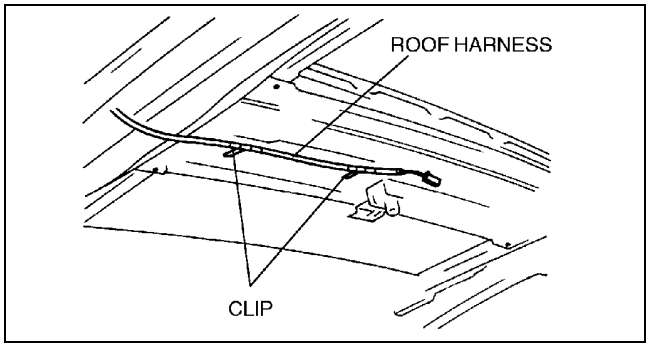
- **If the rear drain hose is pinched or bent anywhere, the water in the hose may not discharge and enter the inside of the vehicle. During and after installation of the trims and the headliner, always make sure there is no interference with the rear drain hose. Fix any problem if found.**

1. Apply soapy water to the rear drain hose inserting area.
2. Insert one end of the rear drain hose into the sunroof frame.
3. Install the rear drain hose to the clips parallel to the pillar and free of slack.
4. Insert the rear drain hose joint into the rear pillar inner hole.
5. Install the trunk side trim. (See 09–17–15 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
6. Install the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)

SUNROOF UNIT REMOVAL/INSTALLATION

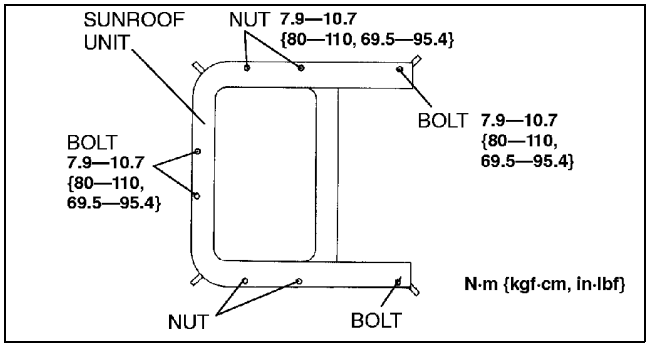
A3U091569850W01

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Remove the glass panel.
4. Disconnect the front and rear drain hoses from the sunroof frame.
5. Remove the roof harness from the sunroof frame.



X3U915WAA

6. Remove the bolts and nuts, and then remove the sunroof unit.
7. Install in the reverse order of removal.
8. Adjust the glass panel. (See 09–15–3 GLASS PANEL ADJUSTMENT.)



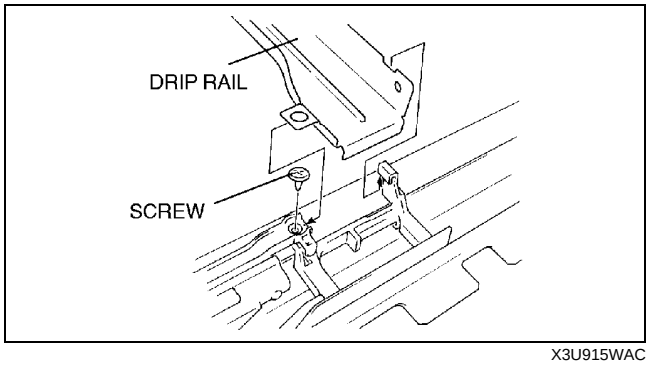
X3U915WAB

SUNROOF UNIT DISASSEMBLY

A3U091569850W02

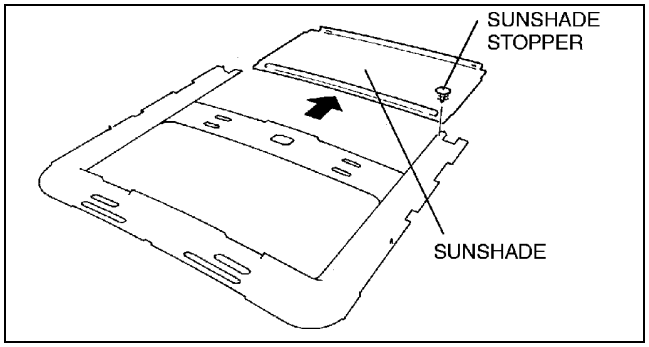
4SD

1. Remove the screws, and then remove the drip rail.



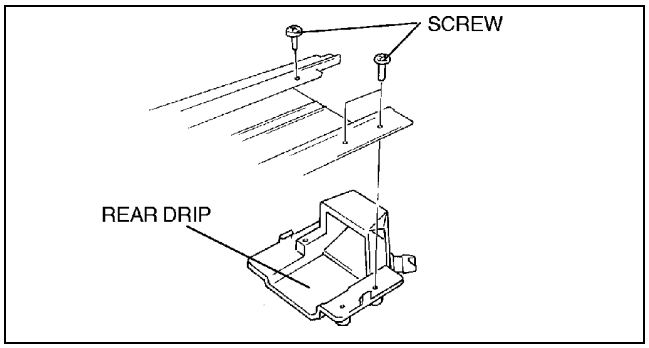
X3U915WAC

2. Remove the sunshade stopper.
3. Slide the sunshade backward, and remove it from the sunroof frame.



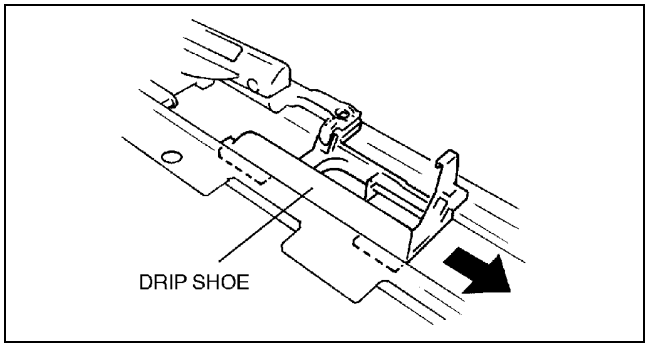
X3U915WAD

4. Remove the screws, and then remove the rear drip.



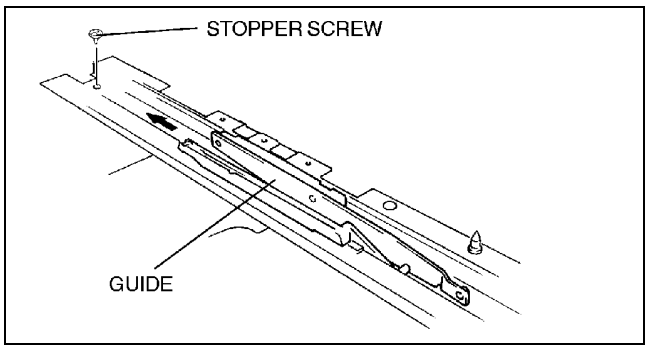
X3U915WAE

5. Slide the drip shoe backward, and remove it from the sunroof frame.
6. Remove the sunroof motor.



X3U915WAF

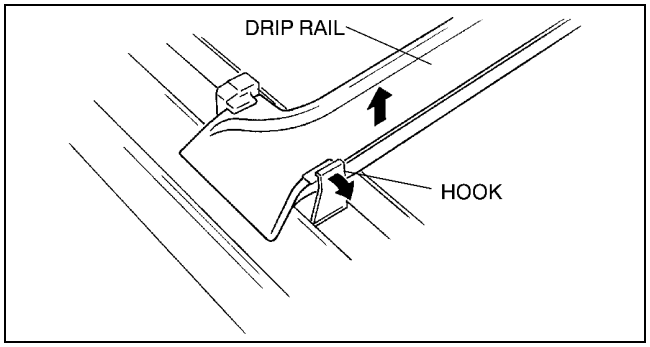
7. Remove the stopper screw.
8. Slide the guide backward, and remove it from the sunroof frame.
9. Remove the deflector.



X3U915WAG

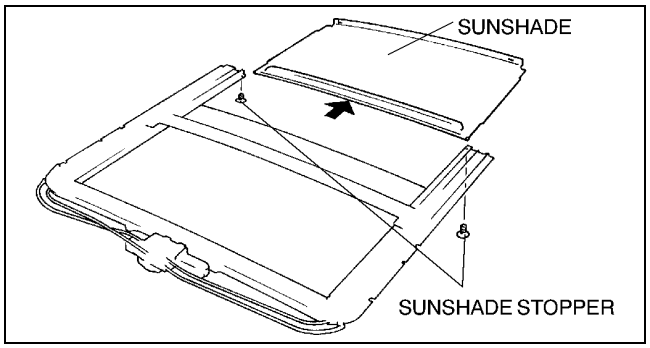
5HB

1. Bend the hook of the decoration link backward to remove the drip rail.



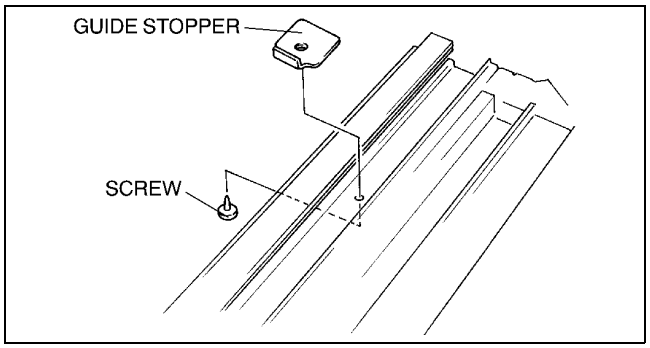
A3U0915W003

2. Remove the sunshade stopper.
3. Slide the sunshade backward, and remove it from the sunroof frame.



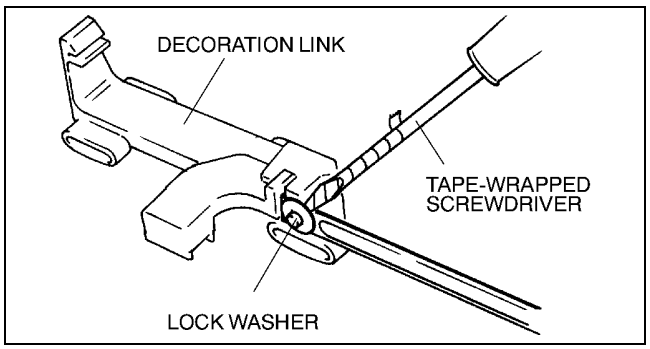
A3U0915W004

4. Remove the screw, and then remove the guide stopper.



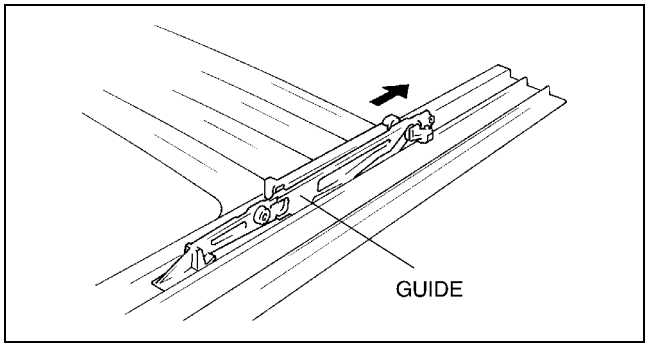
A3U0915W005

5. Remove the lock washer using a tape-wrapped screwdriver.
6. Slide the decoration link backward, and remove it from the sunroof frame.
7. Remove the sunroof motor.



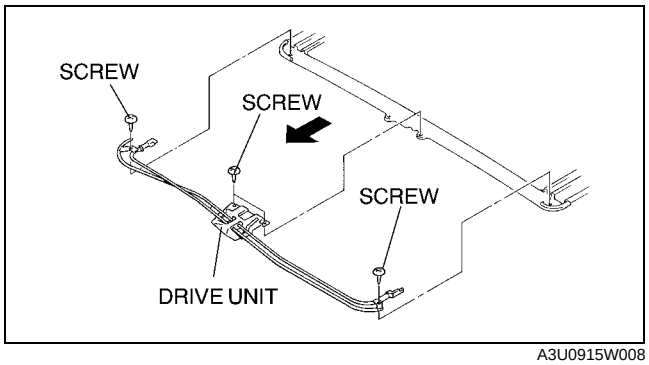
A3U0915W006

8. Slide the guide backward, and remove it from the sunroof frame.



A3U0915W007

9. Remove the screws.
10. Slide the drive unit forward, and remove it from the sunroof frame.
11. Remove the deflector.
12. Remove the sunroof relay.



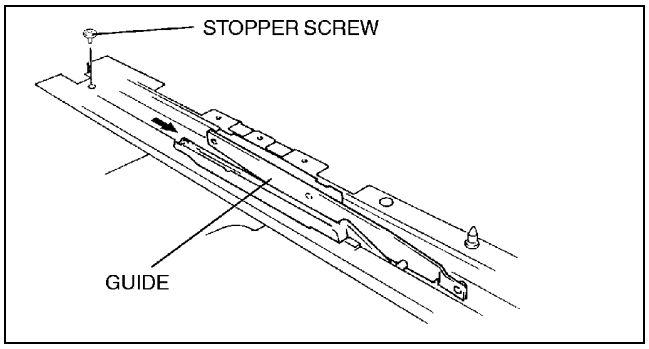
A3U0915W008

SUNROOF UNIT ASSEMBLY

A3U091569850W03

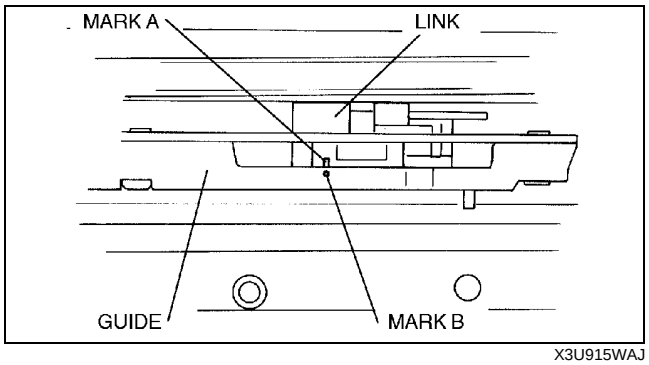
4SD

1. Install the deflector.
2. Slide the guide forward, and install it to the sunroof frame.
3. Install the stopper screw.
4. Move the guide by hand until it is tilted up position.



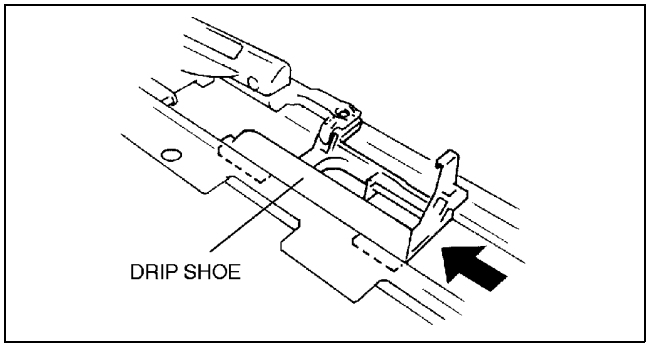
X3U915WAH

5. Move the link built into the guide by hand until it is aligned with mark A and mark B.
6. Install the sunroof motor.



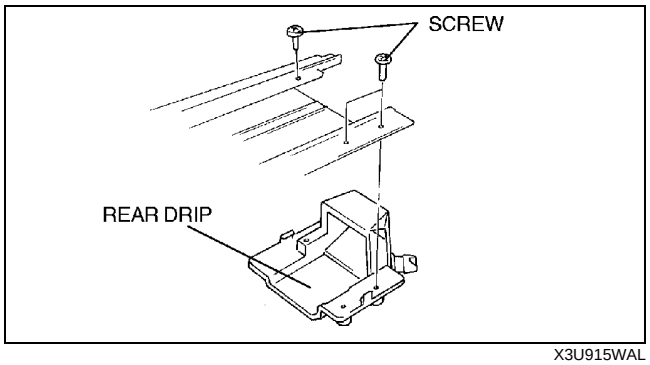
X3U915WAJ

7. Slide the drip shoe forward, and install it to the sunroof frame.
8. Use IPA (Isopropyl alcohol) to remove any excess repair sealant.



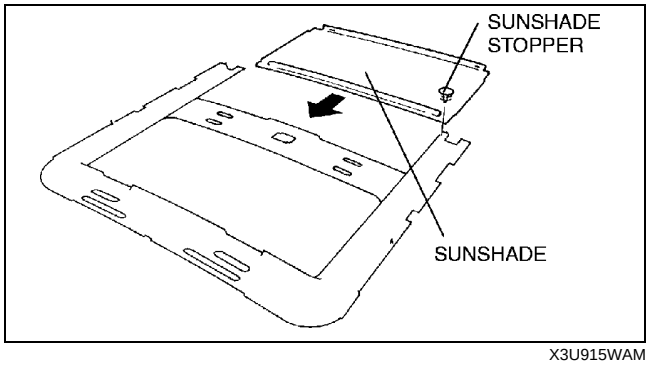
X3U915WAK

9. Install the screws, and then install the rear drip.



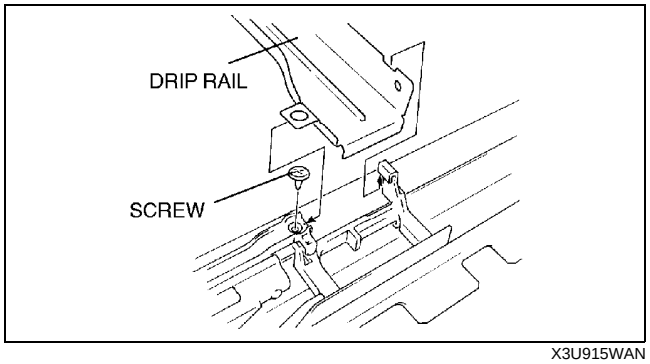
X3U915WAL

10. Slide the sunshade forward, and install it to the sunroof frame.
11. Install the sunshade stopper.



X3U915WAM

12. Install the screws, and then install the drip rail.

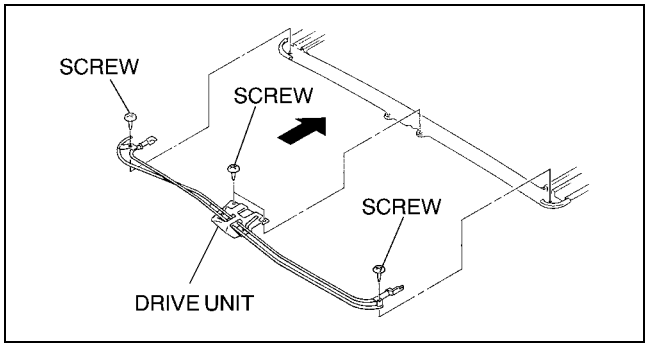


X3U915WAN

5HB

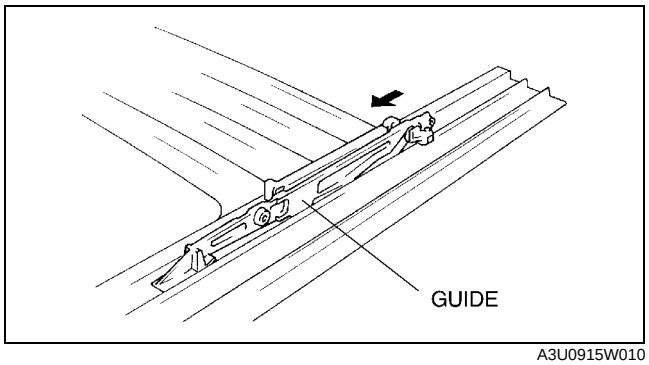
1. Install the sunroof relay.
2. Install the deflector.
3. Slide the drive unit backward, and install it to the sunroof frame.

4. Install the screws.



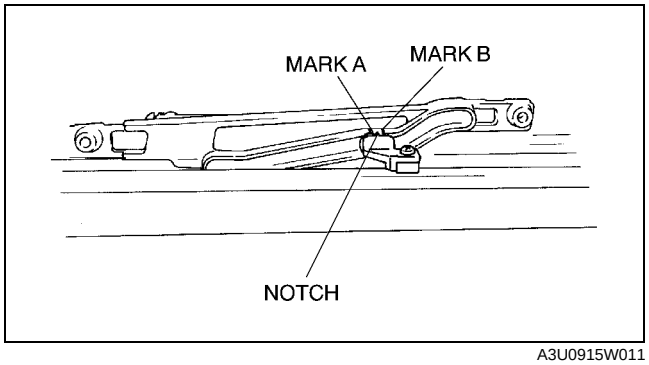
A3U0915W009

5. Slide the guide forward, and install it to the sunroof frame.
6. Move the guide by hand until it is in the tilted up position.



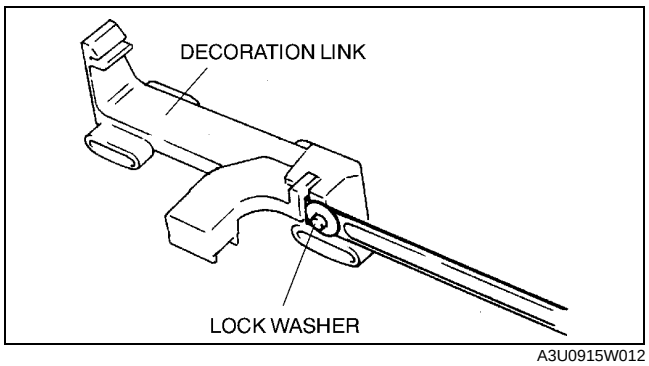
A3U0915W010

7. Move the guide by hand until notch comes between mark A and mark B.
8. Install the sunroof motor.
9. Slide the decoration link forward, and install it to the sunroof frame.



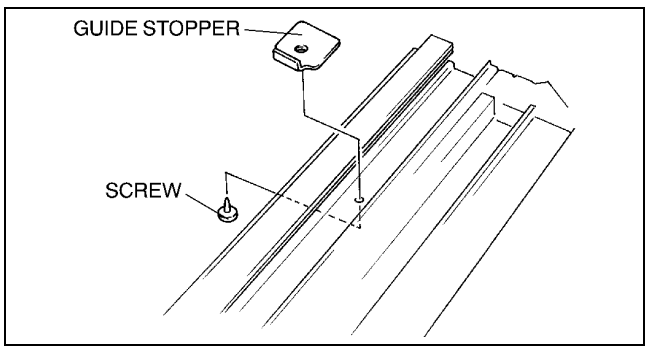
A3U0915W011

10. Install the lock washer.



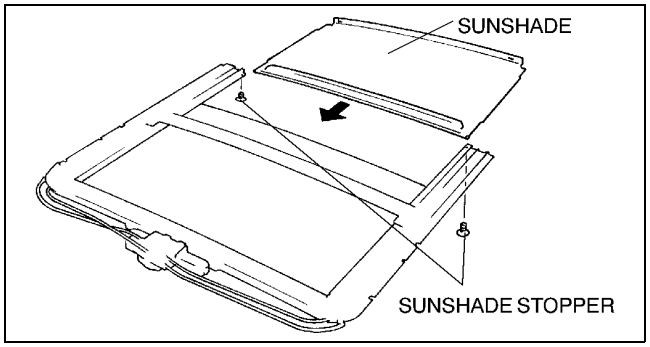
A3U0915W012

11. Install the screw, and then install the guide stopper.



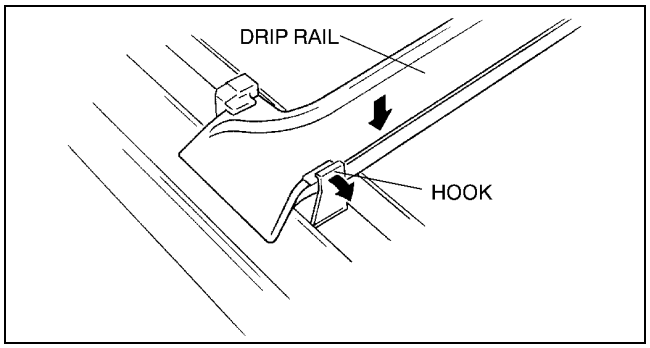
A3U0915W005

12. Slide the sunshade forward, and install it to the sunroof frame.
13. Install the sunshade stopper.



A3U0915W013

14. Bend the hook of the decoration link backward to install the drip rail.

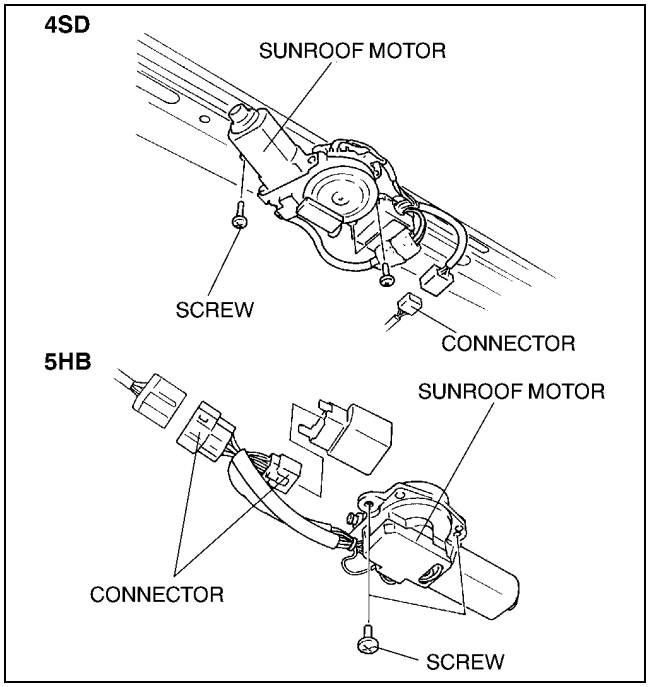


A3U0915W014

SUNROOF MOTOR REMOVAL

A3U091569870W01

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Disconnect the connector.
4. Remove the screws, and then remove the sunroof motor.



A3U0915W015

SUNROOF MOTOR INSTALLATION

A3U091569870W02

1. Connect the sunroof motor connector.
2. Connect the sunroof switch connector.
3. Connect the negative battery cable.
4. Turn the ignition switch to ON position.
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 then install the sunroof motor.
8. Install the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)

SUNROOF MOTOR INSPECTION

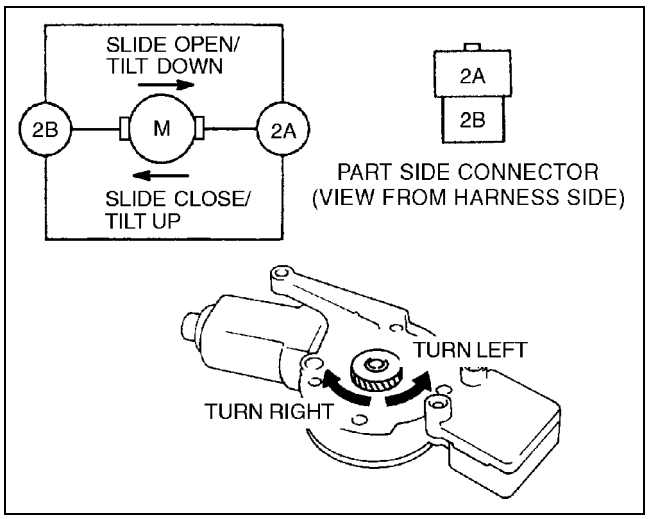
A3U091569870W03

4SD

Motor

1. Remove the sunroof motor.
2. Apply battery positive voltage to the sunroof motor terminals and inspect the operation of the sunroof motor.
   - If not as specified, replace the sunroof motor.

Connection		Motor operation
2A	2B	
B+	GND	Turn left (Slide close/Tilt up)
GND	B+	Turn right (Slide open/Tilt down)



A3U0915W025

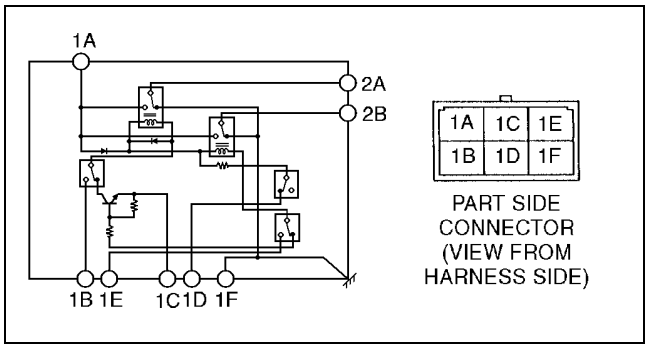
Limit Switch

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Verify the glass panel position.
3. Disconnect the connector.
4. Inspect for continuity between the sunroof motor terminals using an ohmmeter.
   - If not as specified, replace the sunroof motor.

○——○ : Continuity

Glass panel position	Terminal						
	1A	1B	1C	1D	1E	1F	GND
Fully open	○		○			○	○
Fully closed	○	○				○	○
	○			○			
Fully tilt up						○	○
	○			○			
	○				○		

X3U915WAR



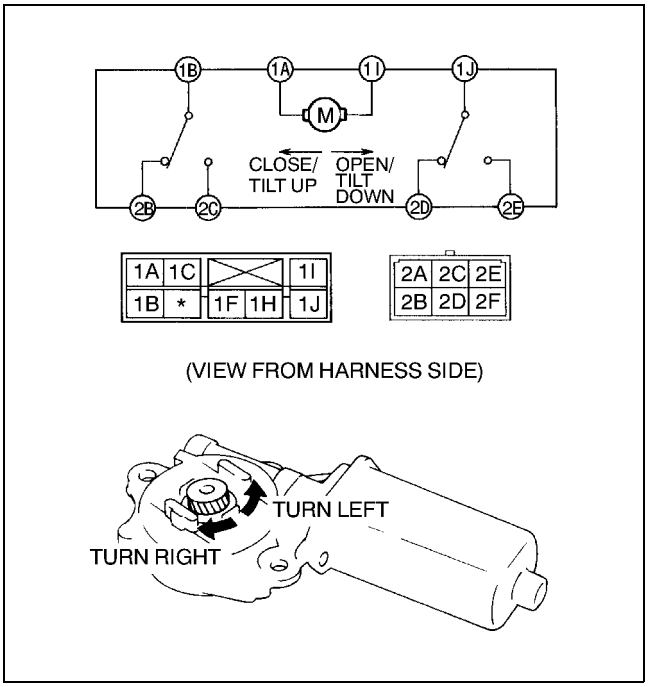
Y3U915WA1

5HB

Motor

1. Remove the sunroof motor.
2. Apply battery positive voltage to the sunroof motor terminals and inspect the operation of the sunroof motor.
   - If not as specified, replace the sunroof motor.

Connection		Motor operation
1A	1I	
B+	GND	Turn right (Slide open/Tilt down)
GND	B+	Turn left (Slide close/Tilt up)



A3U0915W017

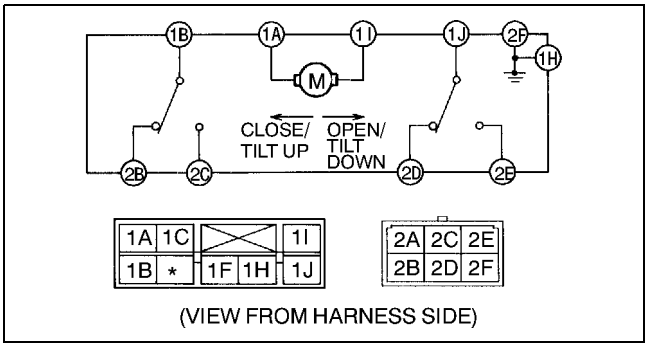
Limit Switch

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Verify the glass panel position.
3. Disconnect the connector.
4. Inspect for continuity between the sunroof motor terminals using an ohmmeter.
   - If not as specified, replace the sunroof motor.

○—○ : Continuity

Glass panel position	Terminal								
	2B	2C	2D	2E	1B	1J	2F	1H	Body GND
Fully open		○	○		○	○	○	○	○
Fully closed	○		○		○	○	○	○	○
Fully tilted up	○			○	○	○	○	○	○

A3U0915W018



A3U0915W019

SUNROOF RELAY REMOVAL/INSTALLATION

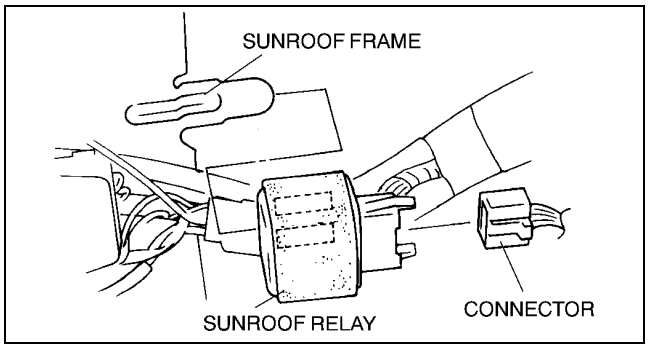
A3U091569873W01

4SD

Note
- Sunroof relay is built in the sunroof motor.

5HB

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Pull the sunroof relay from the sunroof frame.
4. Disconnect the connector, and remove the sunroof relay.
5. Install in the reverse order of removal.

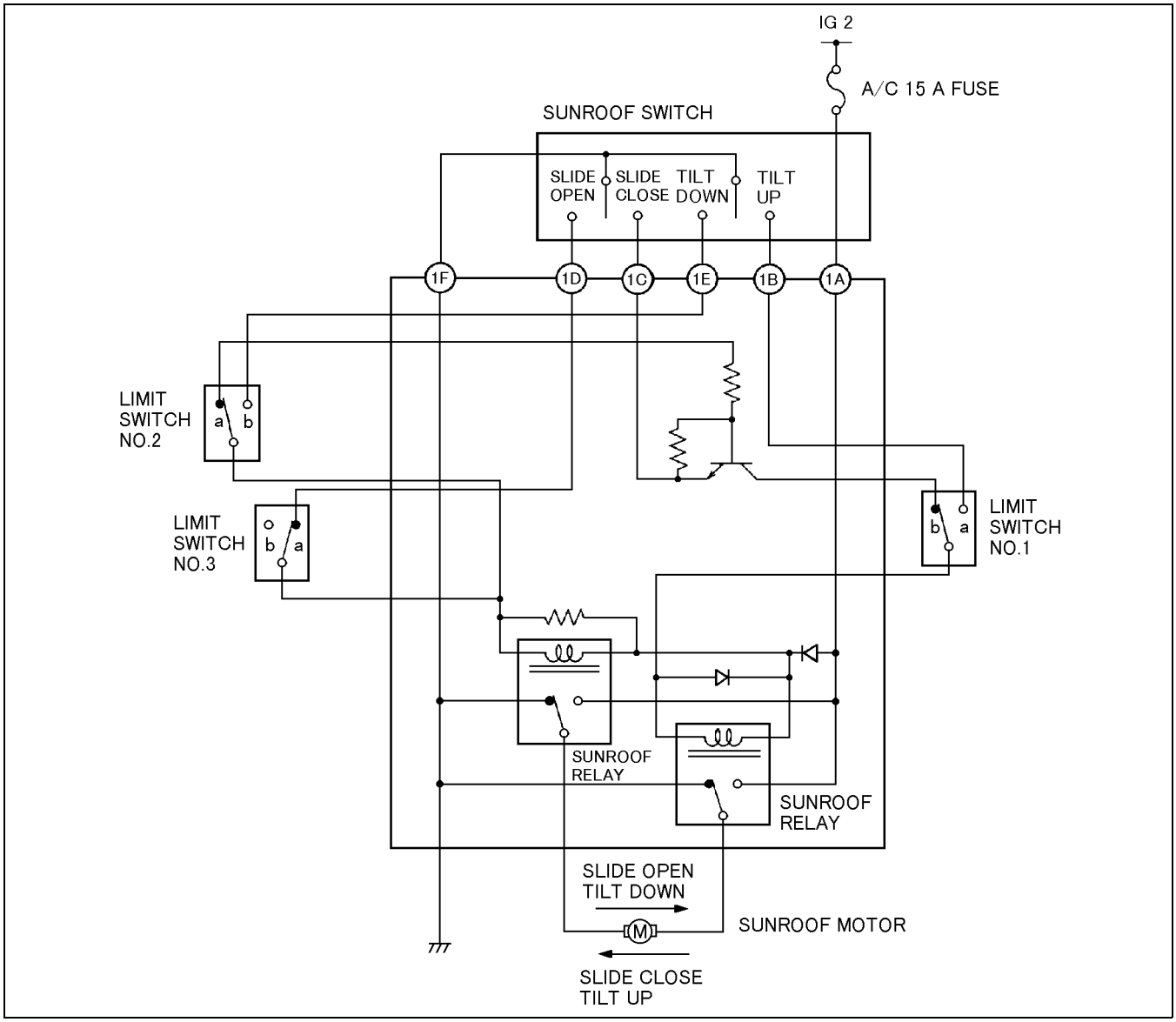


A3U0915W020

SLIDING SUNROOF SYSTEM WIRING DIAGRAM

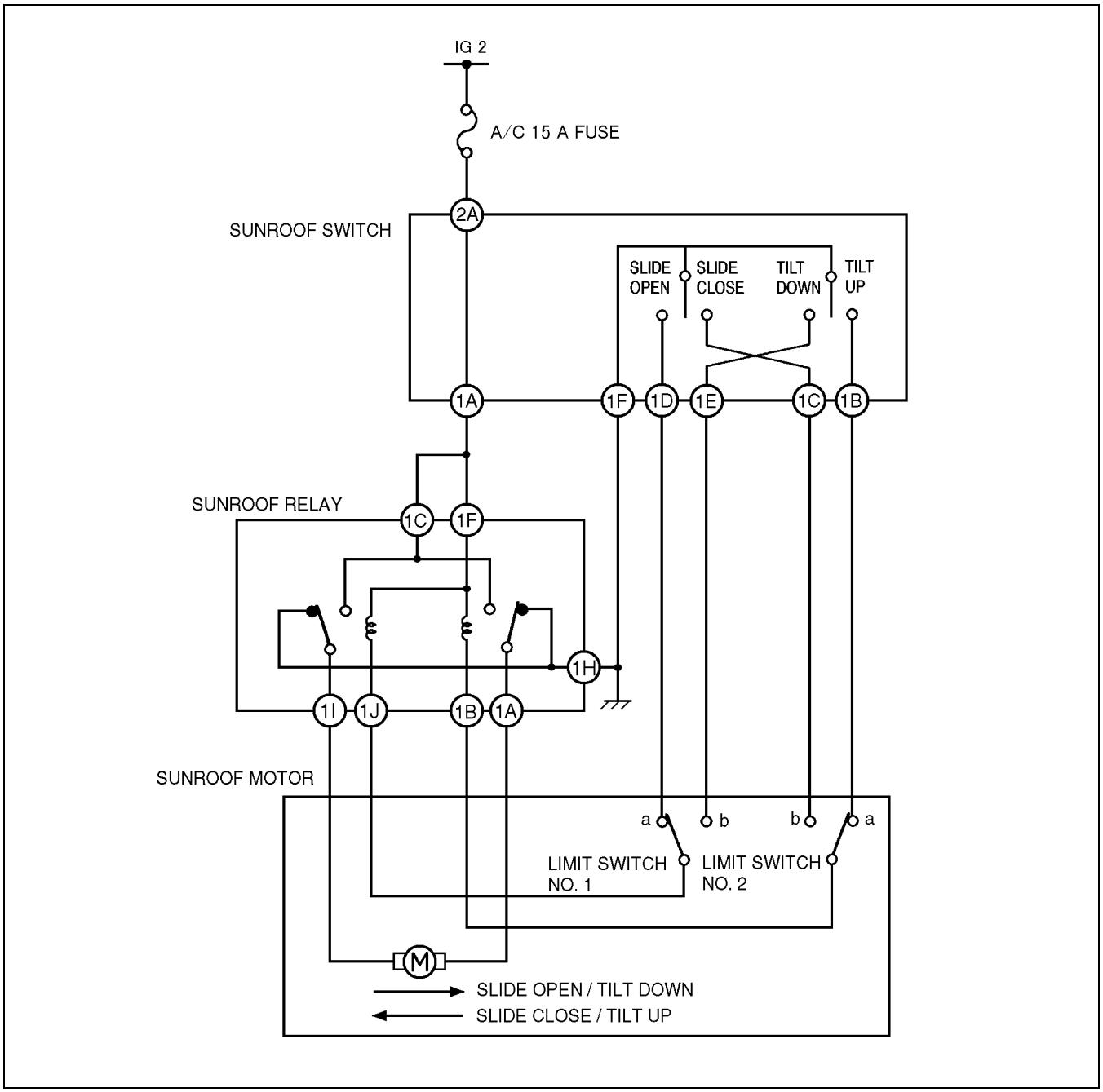
A3U091501049W02

4SD



A3U0915W027

5HB



A3U0915W026

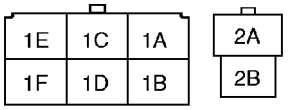
SUNROOF RELAY INSPECTION

A3U091569873W02

4SD

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Connect the sunroof switch connector.
3. Connect the negative battery cable.
4. Measure the voltage at the sunroof relay terminals as indicated below.
5. Disconnect the sunroof relay connector before inspecting for continuity at terminal 1F.
   - If not as specified, inspect the parts listed under “Action” and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the sunroof relay.

Terminal voltage list (Reference)



(VIEW FROM HARNESS SIDE)

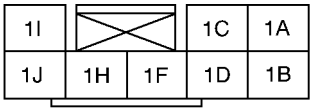
A3U0915W023

Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
1A	IG2	Sunroof motor	IG SW is at ON position.	B+	• Inspect A/C 15 A fuse • Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1B	Tilt up	Sunroof switch	Sunroof is tilting up. (Including position when fully closed)	B+	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1C	Slide close	Sunroof switch	Sunroof is closing. (Including position when fully closed and open)	B+	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1D	Slide open	Sunroof switch	Sunroof is fully opening.	0	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	B+	
1E	Tilt down	Sunroof switch	Sunroof is tilting down. (Not including position when fully closed)	B+	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1F	Sunroof relay ground	GND	Under any condition: inspect for continuity to ground.	Yes	• Inspect related harness
2A	Slide close/ tilt up	Sunroof motor	Sunroof is opening/tilting down.	0	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Sunroof is closing/tilting up.	B+	
			Other	0	
2B	Slide open/ tilt down	Sunroof motor	Sunroof is opening/tilting down.	B+	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Sunroof is closing/tilting up.	0	
			Other	0	

5HB

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Connect the sunroof switch connector.
3. Connect the negative battery cable.
4. Measure the voltage at the sunroof relay terminals as indicated below.
5. Disconnect the sunroof relay connector before inspecting for continuity at terminal H.
   - If not as specified, inspect the parts listed under “Action” and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the sunroof relay.

Terminal voltage list (Reference)



(VIEW FROM HARNESS SIDE)

A3U0915W021

Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
1A	Slide close/ tilt up	Sunroof motor	Sunroof is opening/tilting down.	0	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Sunroof is closing/tilting up.	B+	
			Other	0	
1B	Slide close/ tilt up	Sunroof motor (Limit switch)	Sunroof is closing/tilting up.	0	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (Limit switch) (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Other	B+	
1C	IG2	Sunroof switch	IG SW is at ON position.	B+	• Inspect A/C 15 A fuse • Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1D	-	Not used	-	-	-
1F	IG2	Sunroof switch	IG SW is at ON position.	B+	• Inspect A/C 15 A fuse • Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect related harness
			Other	0	
1H	Sunroof relay ground	GND	Under any condition: inspect for continuity to ground.	Yes	• Inspect related harness
1I	Slide open/ tilt down	Sunroof motor	Sunroof is opening/tilting down.	B+	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Sunroof is closing/tilting up.	0	
			Other	0	
1J	Slide open/ tilt down	Sunroof motor (Limit switch)	Sunroof is opening/tilting down.	0	• Inspect sunroof switch (See 09–15–18 SUNROOF SWITCH INSPECTION) • Inspect sunroof motor (Limit switch) (See 09–15–12 SUNROOF MOTOR INSPECTION) • Inspect related harness
			Other	B+	

SUNROOF SWITCH REMOVAL/INSTALLATION

A3U091566560W01

Note
- The sunroof switch is together with the spot light.

1. Disconnect the negative battery cable.
2. Remove the spot light from the headliner. (See 09–18–21 MAP LIGHT REMOVAL/INSTALLATION.)
3. Install in the reverse order of removal.

SUNROOF SWITCH INSPECTION

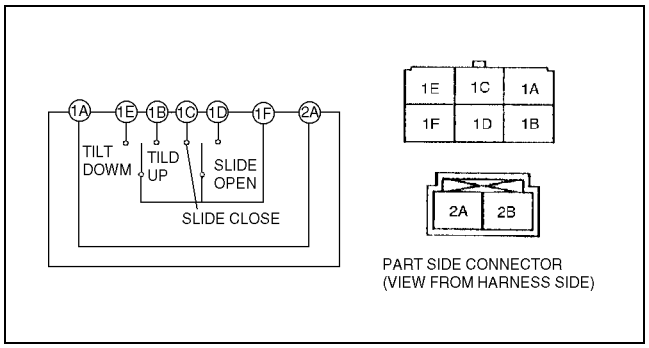
A3U091566560W02

1. Remove the sunroof switch. (See 09–18–21 MAP LIGHT REMOVAL/INSTALLATION.)
2. Inspect for continuity between the sunroof switch terminals using an ohmmeter.
   - If not as specified, replace the sunroof switch.

O—O : Continuity

Switch position	Terminal						
	1B	1C	1D	1E	1F	1A	2A
Slide open			O		O	O	O
Slide close		O			O	O	O
Tilt up	O				O	O	O
Tilt down				O	O	O	O
Off						O	O

X3U915WAU



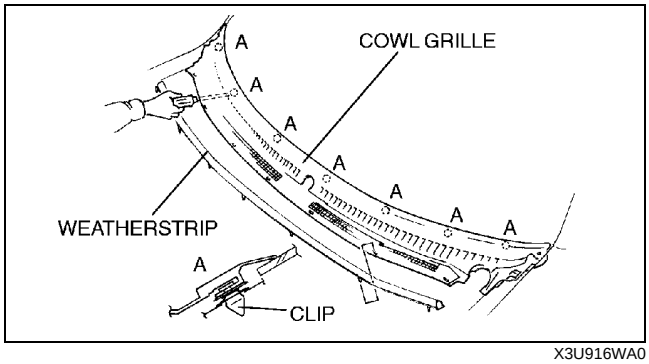
Z3U0915W001

09–16 EXTERIOR TRIM

COWL GRILLE REMOVAL/INSTALLATION

A3U091650790W01

1. Remove the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the weatherstrip.
3. Disengage the clips of the cowl grille using a fastener remover, then remove the cowl grille.
4. Install in the reverse order of removal.



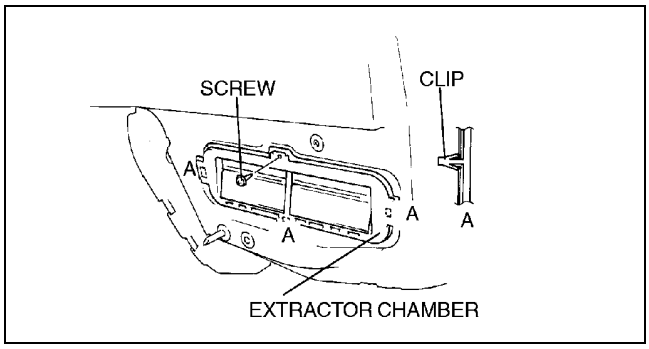
X3U916WA0

EXTRACTOR CHAMBER REMOVAL/INSTALLATION

A3U091651920W01

4SD

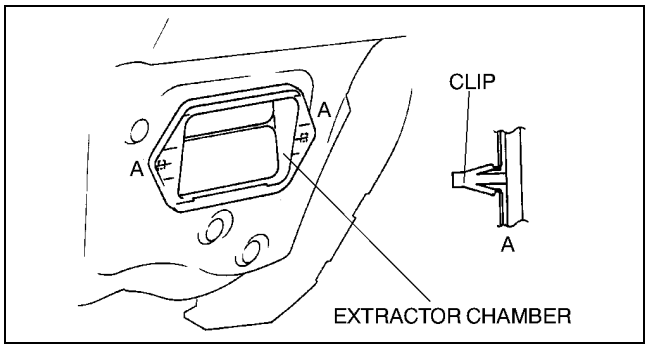
1. Remove the rear bumper.
2. Remove the passenger-side trunk side trim.
3. Remove the screw.
4. Squeeze the clips with your fingers and remove the extractor chamber from the vehicle side.
5. Install in the reverse order of removal.



X3U916WA1

5HB

1. Remove the rear bumper.
2. Squeeze the clips with your fingers and remove the extractor chamber from the vehicle side.
3. Install in the reverse order of removal.

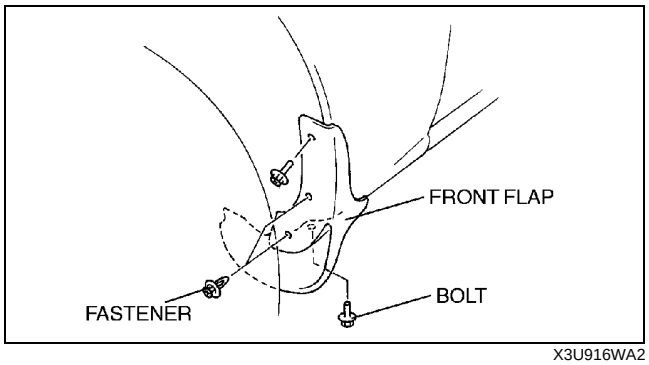


A3U0916W001

FRONT FLAP REMOVAL/INSTALLATION

A3U091651840W01

1. Remove the bolts and fasteners.
2. Remove the front flap.
3. Install in the reverse order of removal.

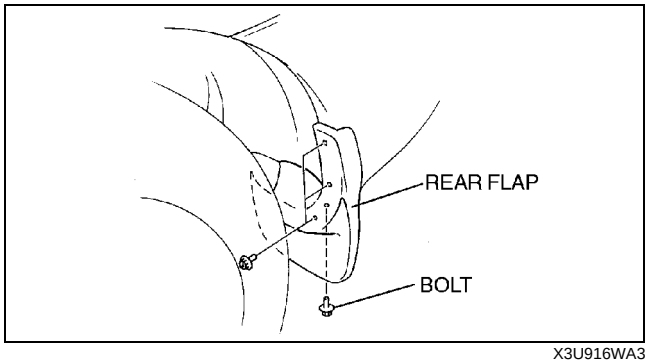


X3U916WA2

REAR FLAP REMOVAL/INSTALLATION

A3U091651940W01

1. Remove the bolts.
2. Remove the rear flap.
3. Install in the reverse order of removal.

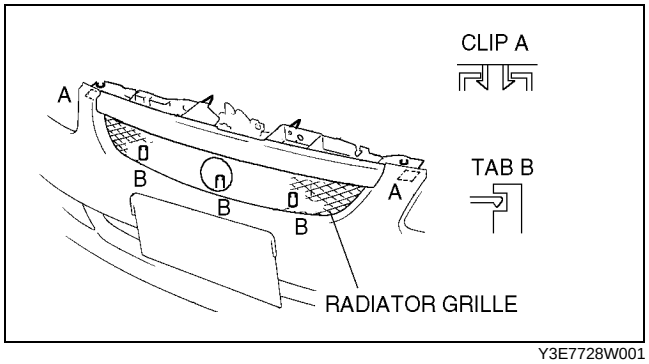


X3U916WA3

RADIATOR GRILLE REMOVAL/INSTALLATION

A3U091650710W01

1. Remove the front bumper. (See 09–10–5 FRONT BUMPER REMOVAL/INSTALLATION.)
2. Pull the radiator grille forward to disengage clips A and tabs B from the front bumper.
3. Install in the reverse order of removal.

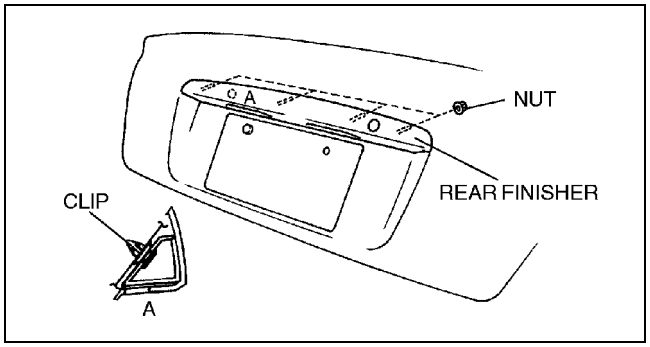


Y3E7728W001

REAR FINISHER REMOVAL/INSTALLATION

A3U091650810W01

1. Remove the nuts.
2. Pull the rear finisher toward you, then disengage clip A from the body.
3. Install in the reverse order of removal.

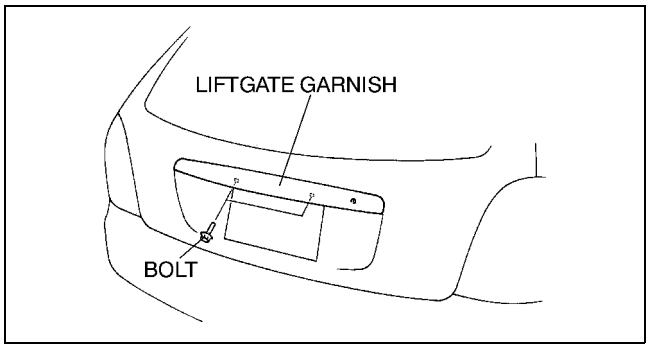


X3U916WA5

LIFTGATE GARNISH REMOVAL/INSTALLATION

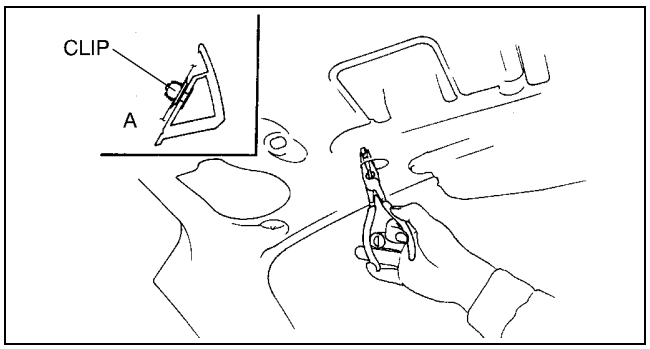
A3U091650810W02

1. Remove the liftgate key cylinder. (See 09–11–7 LIFTGATE REMOVAL/INSTALLATION.)
2. Remove the bolts.



A3U0916W004

3. Disengage clip A using pliers.
4. Pull the liftgate garnish downward, then remove it.
5. Install in the reverse order of removal.



A3U0916W005

SIDE PROTECTOR REMOVAL

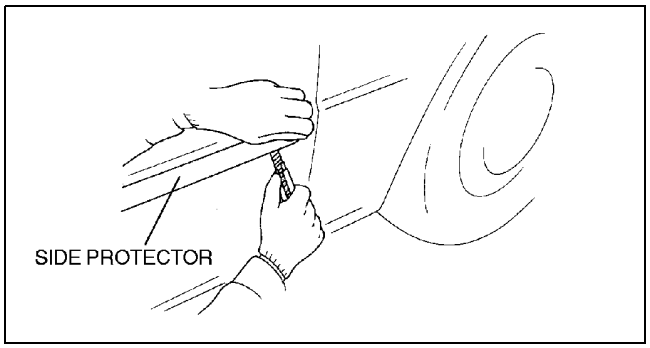
A3U091650680W01

1. Pry the side protector end **20—30 mm {0.8—1.1 in}** using a flathead screwdriver or a razor.

   Warning
   - **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Pull the side protector toward you, then 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 using a hot air blower.



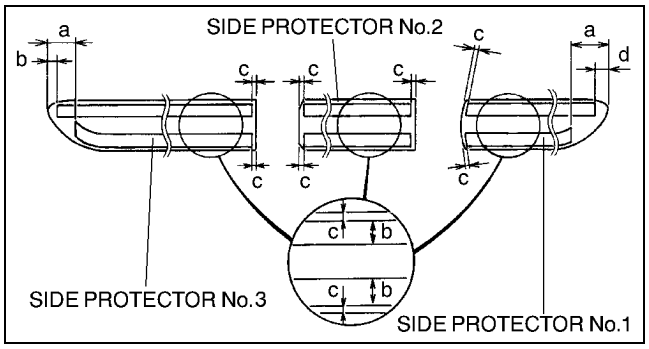
Y3U916WA1

SIDE PROTECTOR INSTALLATION

A3U091650680W02

1. Remove the adhesive remaining on the side protector (if it will be reused) and the body using a razor.
2. Remove any grease or dirt from the adhesion surface of the side protector (if it will be reused) and the body.
3. Attach double-sided adhesive tape to the side protector as shown (if it will be reused).

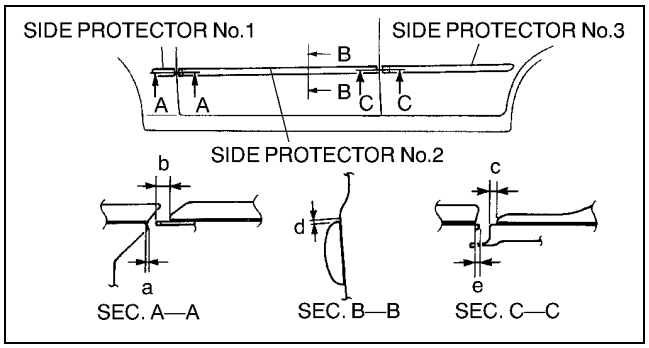
Clearance
a: 25.0 mm {0.98 in}
b: 7.0 mm {0.28 in}
c: 1.0—3.0 mm {0.04—0.11 in}
d: 9.0 mm {0.35 in}



A3U0916W002

4. Peel off the backing from the double-sided adhesive tape and attach the side protector onto the body as shown.

Clearance
a: 0.66—3.66 mm {0.03—0.14 in}
b: 7.74 mm {0.30 in}
c: 4.0—7.0 mm {0.16—0.27 in}
d: 0.5—3.5 mm {0.02—0.13 in}
e: 3.0—6.0 mm {0.12—0.23 in}

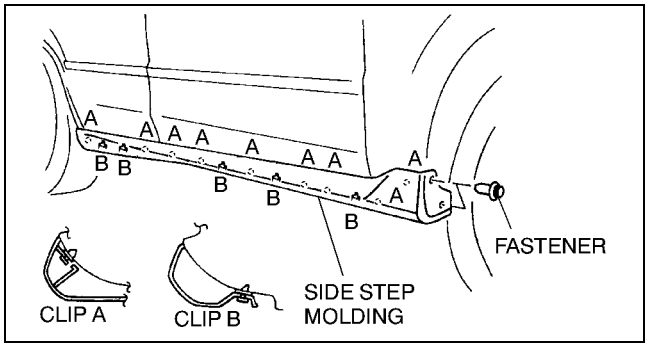


A3U0916W003

SIDE STEP MOLDING REMOVAL/INSTALLATION

A3U091651100W01

1. Remove the fasteners and clips B.
2. Disengage clips A from the vehicle front to remove the side step molding.
3. Install in the reverse order of removal.

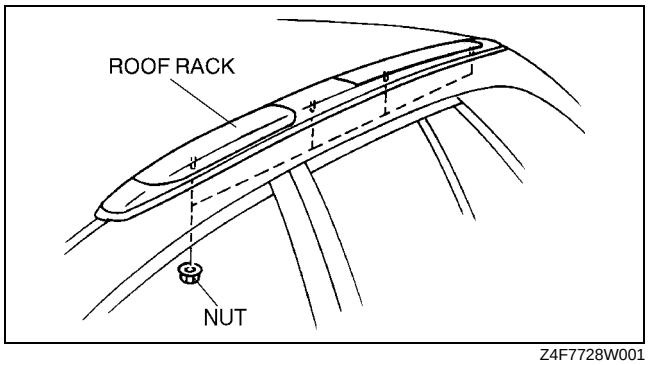


A3U0916W008

ROOF RACK REMOVAL/INSTALLATION

A3U091651720W01

1. Remove the headliner.
2. Remove the nuts.
3. Pull the roof rack upward, then remove the roof rack from the roof.
4. Install in the reverse order of removal.



Z4F7728W001

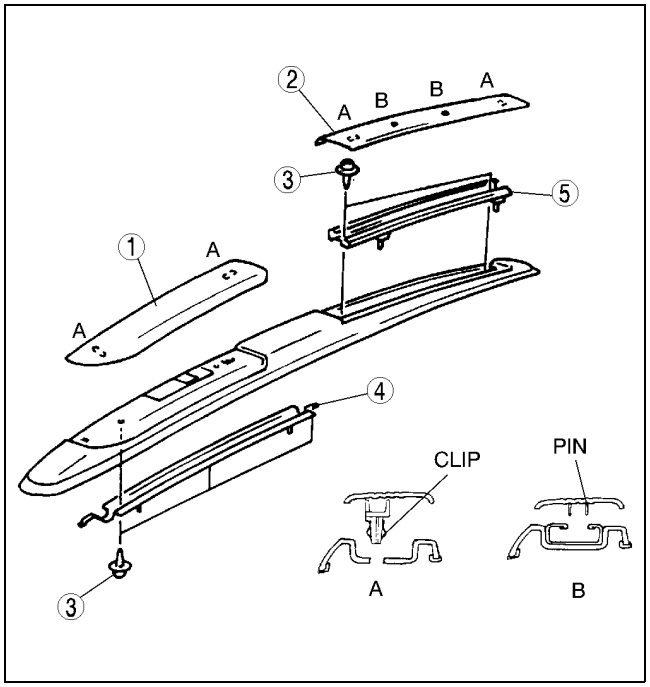
ROOF RACK DISASSEMBLY/ASSEMBLY

A3U091651720W02

1. Disassemble in the order indicated in the table.

1	Front cap
2	Rear cap
3	Screw
4	Front stay
5	Rear stay

2. Assemble in the reverse order of disassembly.



Z4F7728W002

ROOF CARRIER REMOVAL/INSTALLATION

A3U091651720W03

Caution

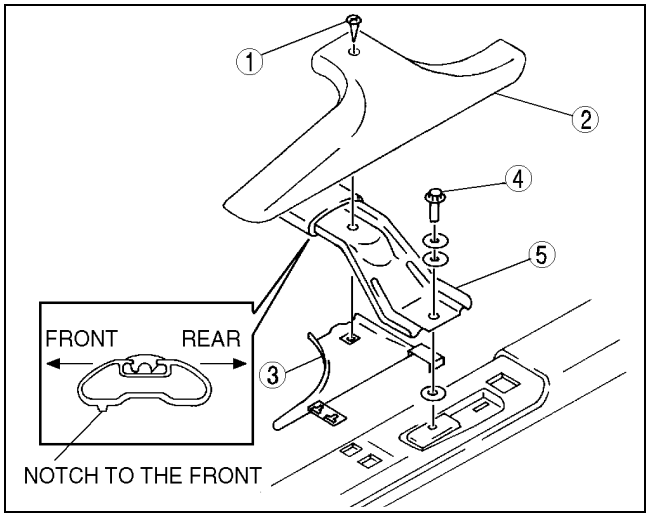
- **When installing the front carrier bar to the vehicle, use two or more people to do the work and do not scratch the vehicle body.**

Front

1. Remove in the order indicated in the table.

1	Screw
2	Cover A
3	Cover B
4	Bolt
5	Front carrier bar (See 09–16–6 Front Carrier Bar Installation Note.)

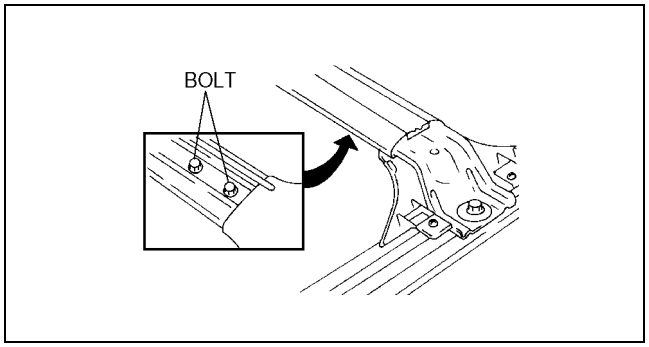
2. Install in the reverse order of removal.



A3U0916W011

Front Carrier Bar Installation Note

1. Loosen the bolt under the front carrier bar, and adjust the front carrier bar position.



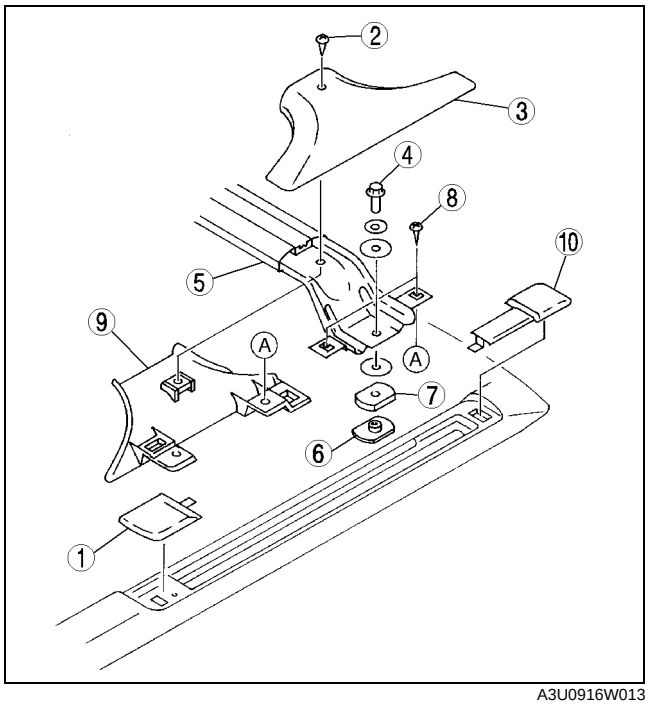
A3U0916W014

Rear

1. Remove in the order indicated in the table.

1	Front cover
2	Screw A
3	Cover A
4	Bolt
5	Rear carrier bar (See 09–16–6 Rear Carrier Bar Removal Note.) (See 09–16–7 Rear Carrier Bar Installation Note.)
6	Spacer
7	Stay
8	Screw B
9	Cover B
10	Rear cover

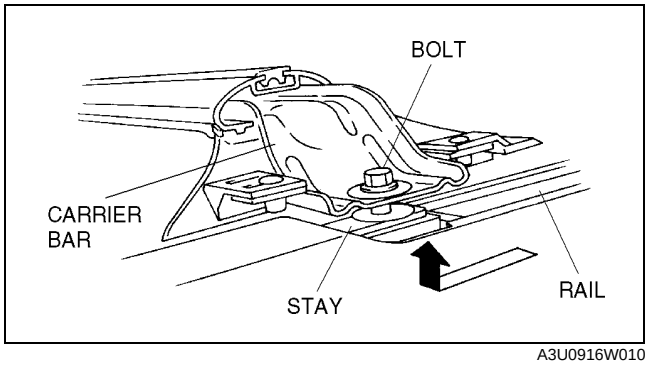
2. Install in the reverse order of removal.



A3U0916W013

Rear Carrier Bar Removal Note

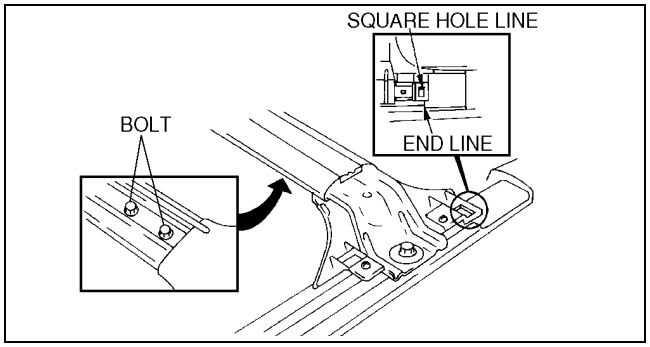
1. Loosen the bolt, slide the rear carrier bar and stay, and remove them from the rail.



A3U0916W010

Rear Carrier Bar Installation Note

1. Loosen the bolt under the rear carrier bar, and adjust the rear carrier bar position.
2. When the rear carrier bar is in the final position, align the square hole line for cover B with the rear cover line.

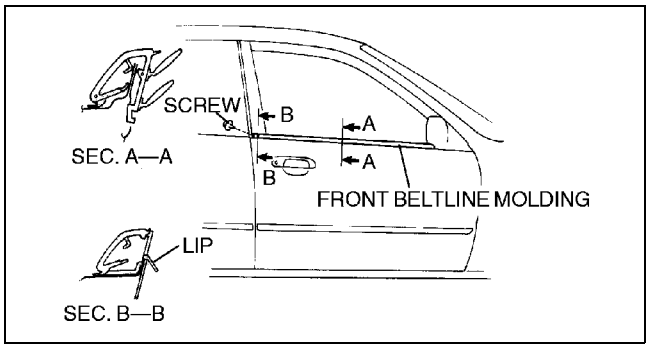


A3U0916W012

FRONT BELTLINE MOLDING REMOVAL/INSTALLATION

A3U091650640W01

1. Open the front door glass fully.
2. Remove the screw.
3. Pull the front beltline molding up, then remove it.
4. Install in the reverse order of removal.

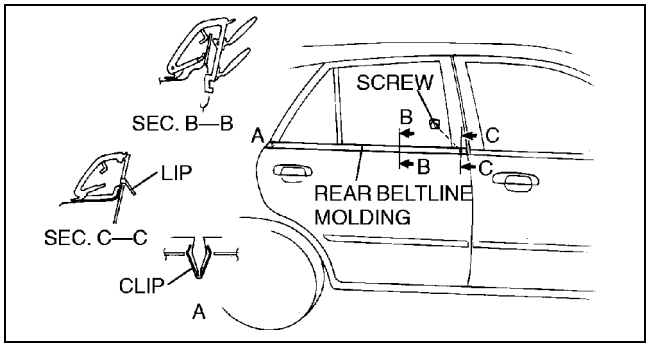


X3U916WA9

REAR BELTLINE MOLDING REMOVAL/INSTALLATION

A3U091650660W01

1. Remove the rear door glass. (See 09–11–5 REAR DOOR DISASSEMBLY/ASSEMBLY.)
2. Remove the screw.
3. Pull the rear beltline molding up, then disengage clip A.
4. Install in the reverse order of removal.



X3U916WAA

REAR WINDOW GLASS MOLDING REMOVAL

A3U091650690W01

Note

- Rear window glass molding is a replacement part.

1. Remove the rear window glass. (See 09–12–11 REAR WINDOW GLASS REMOVAL.)
2. Remove the rear window glass molding from the rear window glass.

REAR WINDOW GLASS MOLDING INSTALLATION

A3U091650690W02

Note

- Rear window glass molding is a replacement part.

1. Install the rear window glass molding to the rear window glass. (See 09–12–14 REAR WINDOW GLASS INSTALLATION.)

WINDSHIELD MOLDING REMOVAL

A3U091650600W01

Note
- Windshield molding is a replacement part.

1. Remove the windshield. (See 09–12–19 WINDSHIELD REMOVAL.)
2. Remove the windshield molding from the windshield.

WINDSHIELD MOLDING INSTALLATION

A3U091650600W02

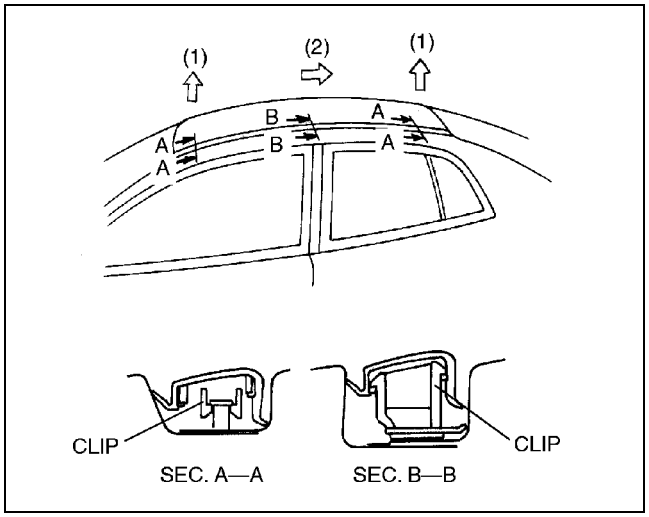
Note
- Windshield molding is a replacement part.

1. Install the windshield molding to the windshield. (See 09–12–21 WINDSHIELD INSTALLATION.)

ROOF MOLDING REMOVAL/INSTALLATION

A3U091650620W01

1. Pull the front edge and rear edge of the roof molding up (1).
2. Slide the roof molding rearward, then remove it (2).
3. Install in the reverse order of removal.



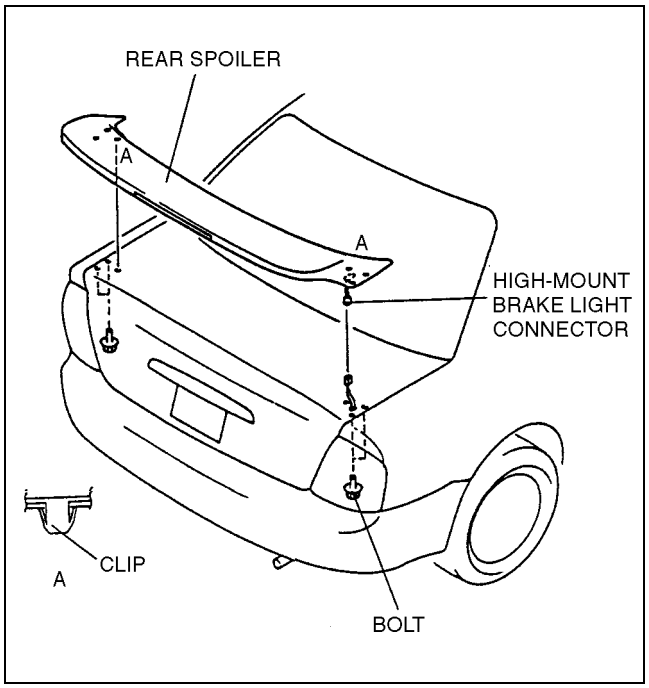
X3U916WAB

REAR SPOILER REMOVAL/INSTALLATION

A3U091651950W01

4SD

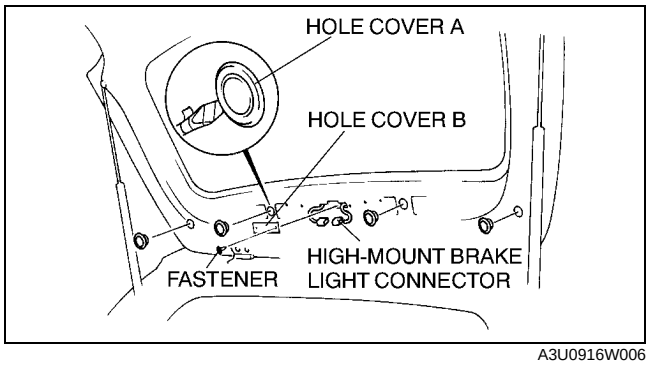
1. Disconnect the negative battery cable.
2. Disconnect the high-mount brake light connector.
3. Remove the bolts.
4. Pull the rear spoiler upward, then remove it.
5. Install in the reverse order of removal.



Y3U916WA0

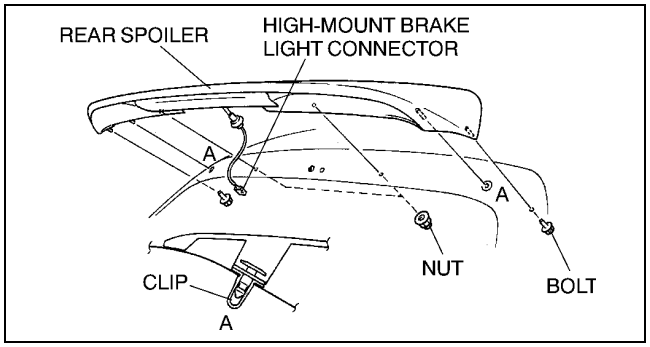
5HB

1. Disconnect the negative battery cable.
2. Remove the hole cover A using a tape-wrapped screwdriver.
3. Remove the fasteners, then remove hole cover B.
4. Pull out the high-mount brake light connector, then disconnect it.



A3U0916W006

5. Remove the bolts and nuts.
6. Pull the rear spoiler upward, then disengage clips A from the body.
7. Install in the reverse order of removal.



A3U0916W007

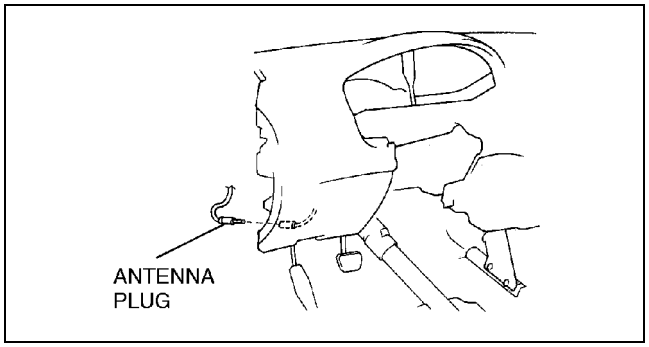
09–17 INTERIOR TRIM

DASHBOARD REMOVAL/INSTALLATION

A3U091755100W01

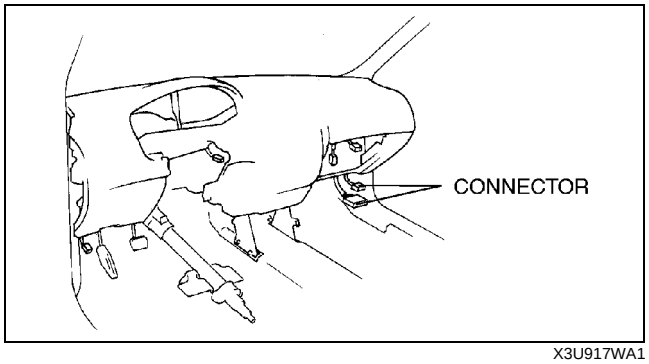
1. Remove the passenger-side air bag module if equipped. (See 08–10–6 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Remove the combination switch. (See 09–18–12 COMBINATION SWITCH REMOVAL/INSTALLATION.)
3. Remove the installation bolts then shift the assembled steering shaft in the dashboard. (See 06–12–6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
4. Remove the instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
5. Remove the console. (See 09–17–5 CONSOLE REMOVAL/INSTALLATION.)
6. Remove the glove compartment.
7. Remove the lower panel.
8. Remove the hood release cable installation nut.
9. Remove the side wall.
10. Remove the A-pillar trim. (See 09–17–10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
11. Remove the side panel.

12. Disconnect the antenna plug.
13. For vehicles equipped with the semi-logic type climate control unit, disconnect the wires for the heater unit. (See 07–40–9 CLIMATE CONTROL UNIT REMOVAL.) (See 07–40–10 CLIMATE CONTROL UNIT INSTALLATION.)



X3U917WA0

14. Disconnect the connectors.

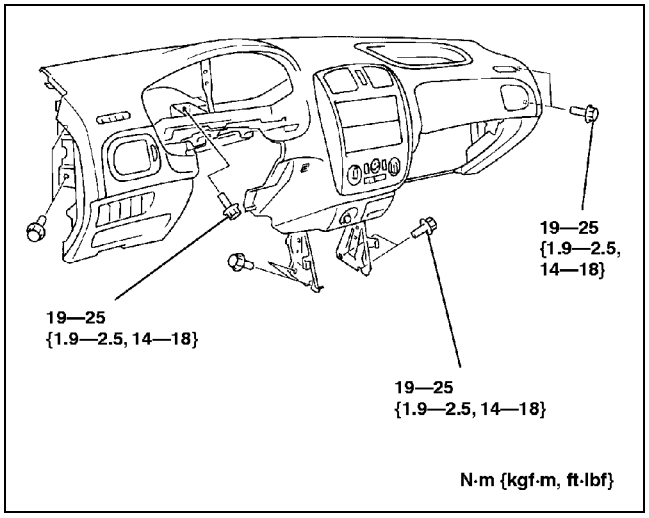


X3U917WA1

15. Remove the bolts.
16. Remove the dashboard from the vehicle.

Warning

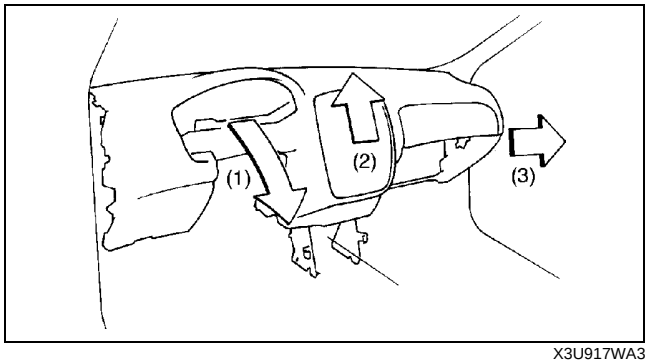
- **Removing the dashboard without supporting it can be dangerous. The dashboard may fall and injure you. Always perform these procedures together with at least another person.**



X3U917WA2

(1) Incline the dashboard slowly forward.
(2) Lift up the dashboard while it is inclined forward.
(3) Remove the dashboard from the vehicle through the passenger-side front door.

17. Install in the reverse order of removal.

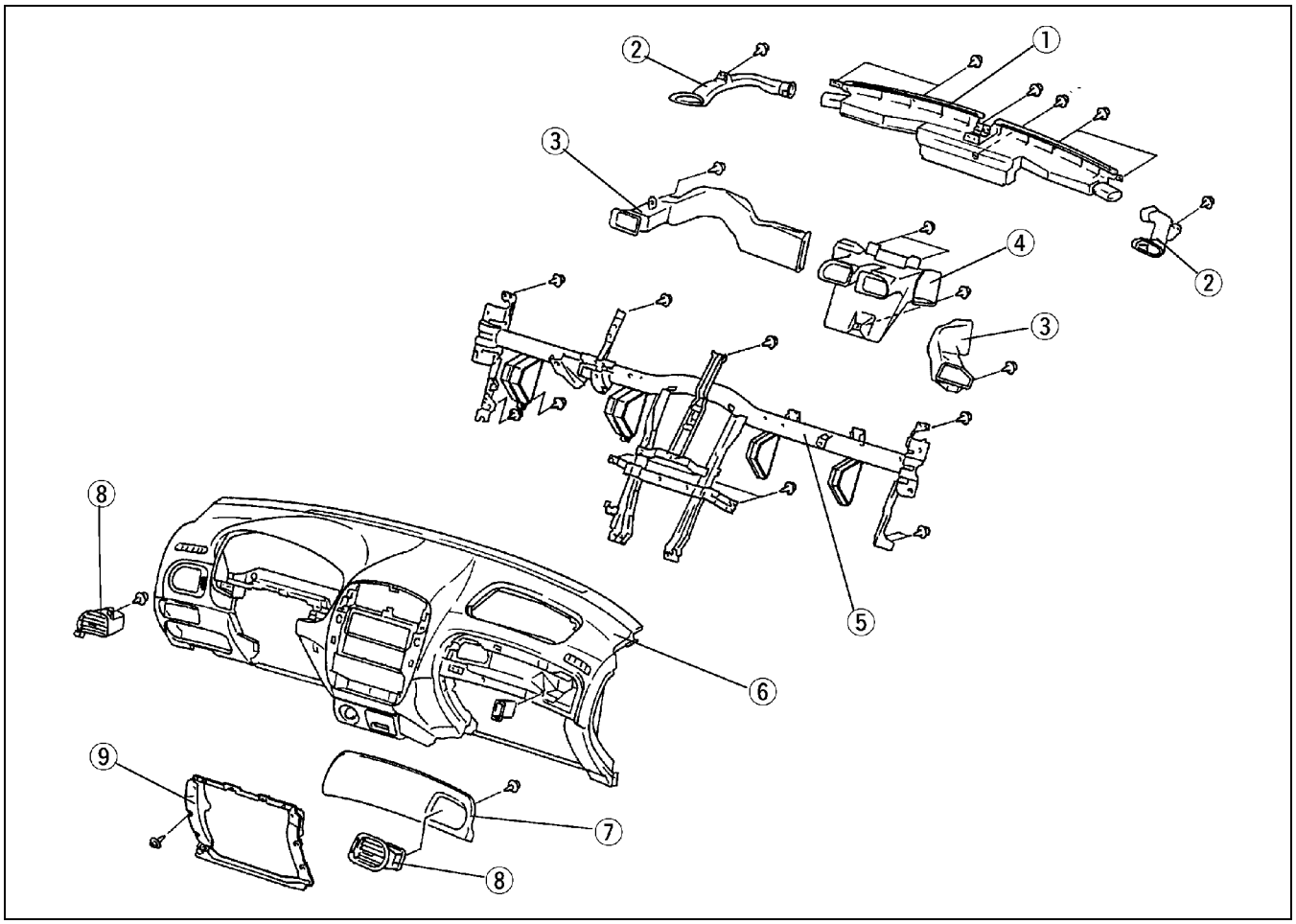


X3U917WA3

DASHBOARD DISASSEMBLY/ASSEMBLY

A3U091755100W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



X3U917WA4

1	Defroster nozzle
2	Side demister duct
3	Duct
4	Center duct
5	Dashboard member

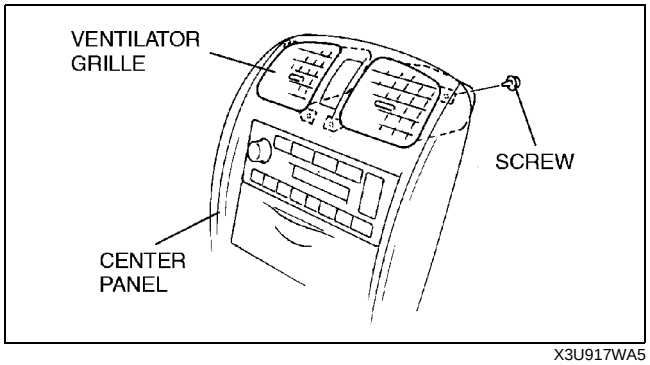
6	Crush pad
7	Pad
8	Ventilator grille
9	Passenger-side lower panel

VENTILATOR GRILLE REMOVAL/INSTALLATION

A3U091764730W01

Center Side

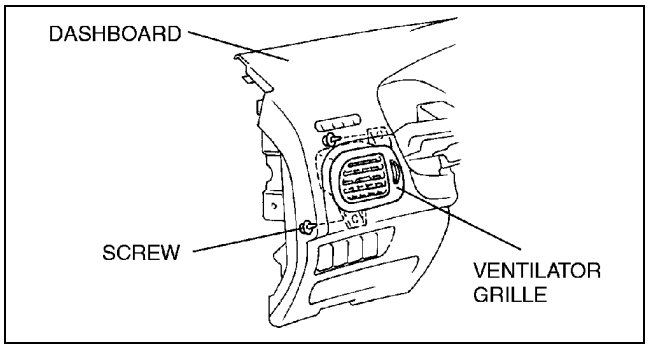
1. Remove the center panel. (See 09–17–4 CENTER PANEL REMOVAL/INSTALLATION.)
2. Remove the screws from behind the center panel.
3. Install in the reverse order of removal.



X3U917WA5

Driver's side

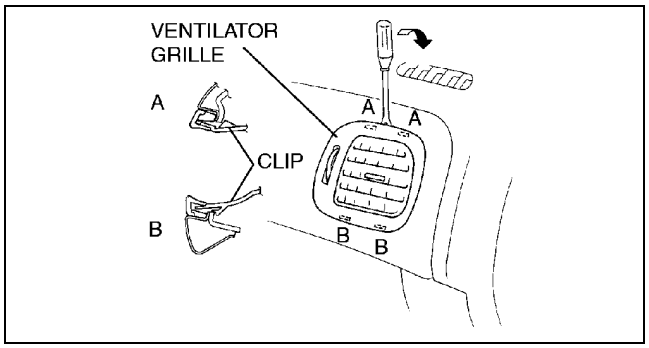
1. Remove the dashboard. (See 09–17–1 DASHBOARD REMOVAL/INSTALLATION.)
2. Remove the screws from behind the dashboard.
3. Install in the reverse order of removal.



X3U917WA6

Passenger's side

1. Disengage clips A and B using a fastener remover as shown in the figure.
2. Install in the reverse order of removal.

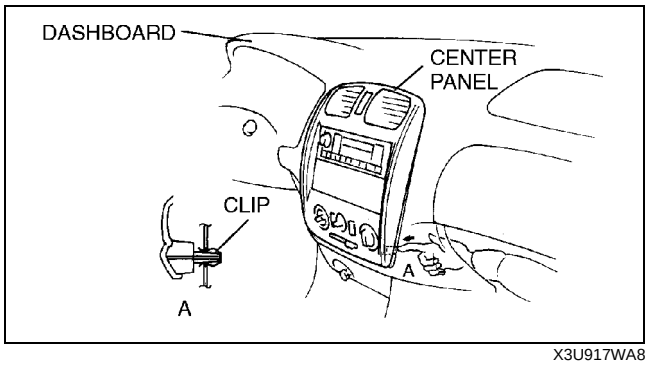


X3U917WA7

CENTER PANEL REMOVAL/INSTALLATION

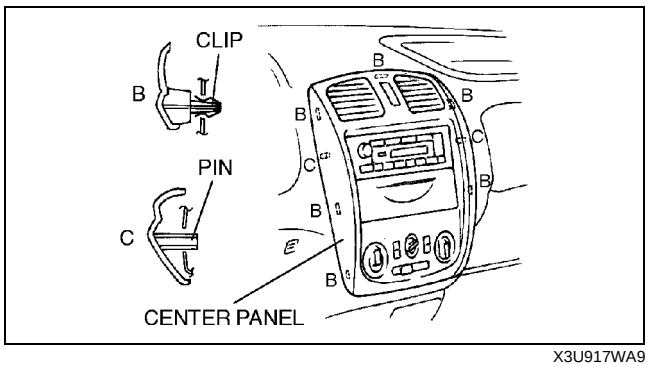
A3U091755210W01

1. Disconnect the negative battery cable.
2. Remove the glove compartment.
3. For vehicles equipped with the semi-logic type climate control unit, disconnect the wires for the heater unit. (See 07–40–9 CLIMATE CONTROL UNIT REMOVAL.) (See 07–40–10 CLIMATE CONTROL UNIT INSTALLATION.)
4. Push out clip A from behind the dashboard.



X3U917WA8

5. Pull the center panel, then remove clips B and pins C from the dashboard.
6. Disconnect the hazard warning switch connector and climate control unit connector.
7. Install in the reverse order of removal.

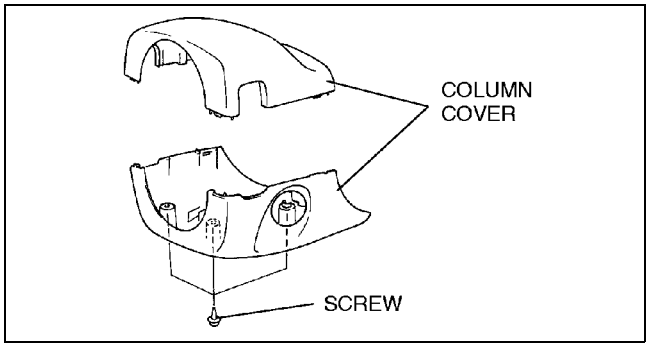


X3U917WA9

COLUMN COVER REMOVAL/INSTALLATION

A3U091760200W01

1. Remove the screws, then remove the column cover.
2. Install in the reverse order of removal.



X3U917WAA

CONSOLE ADJUSTMENT

A3U091764310W01

Caution

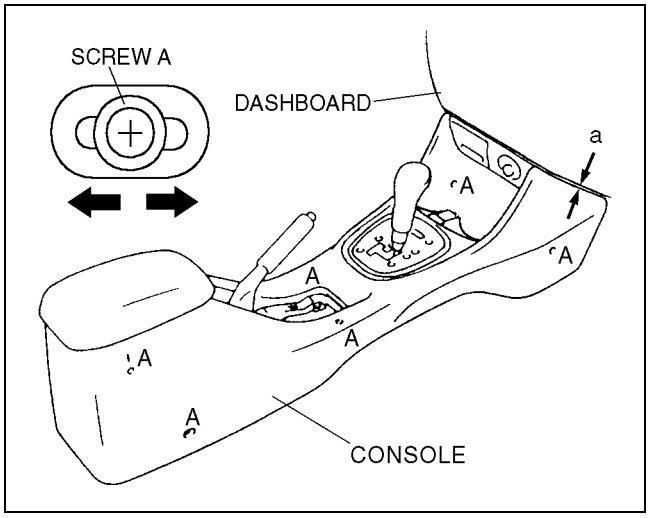
- **Take care to install the console and the center panel so that there is no interference which may cause noise.**

1. Loosen screws A.
2. Slide the console indicated by the arrow and measure the gap between the console and the dashboard.

Clearance

a: 0.2—1.8 mm {0.0008—0.07 in}

3. Tighten screws A.



Z3U0917W006

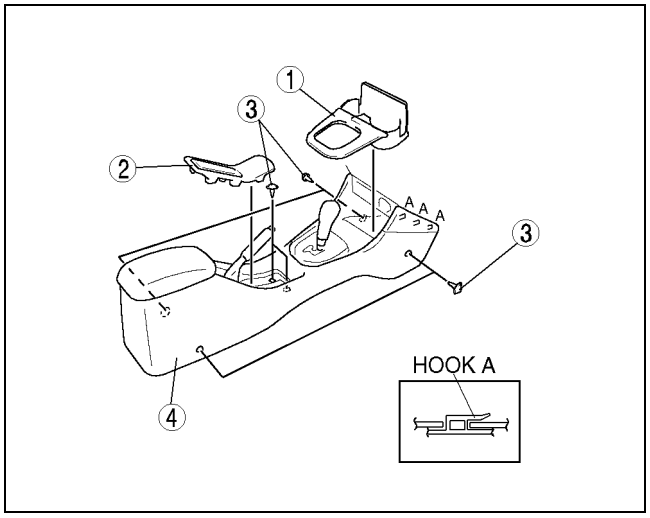
CONSOLE REMOVAL/INSTALLATION

A3U091764310W02

1. For MTX vehicle, remove the shift lever knob.
2. Remove in the order indicated in the table.

1	Boot panel (See 09–17–6 Boot Panel Removal Note.)
2	Console cover (See 09–17–6 Console Cover Removal Note.)
3	Screw
4	Console

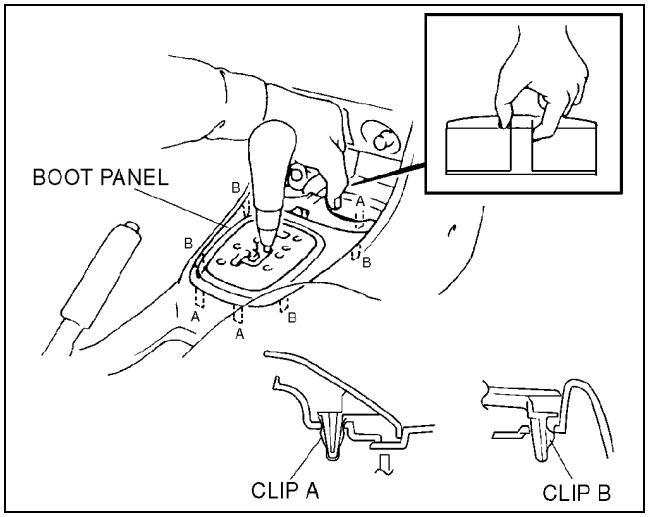
3. Install in the reverse order of removal.



Z3U0917W007

Boot Panel Removal Note

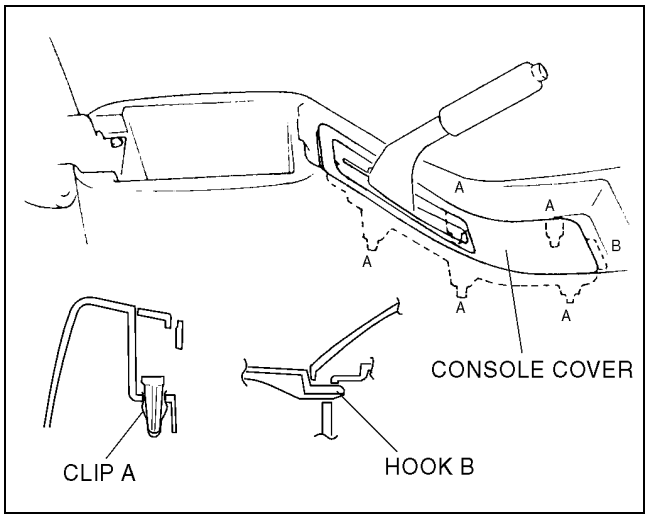
1. Pull the boot panel upward, then disengage clips A and B from the console.



Y3E7742W301

Console Cover Removal Note

1. Disengage clip A using a tape-wrapped flathead screwdriver.
2. Pull the console cover upward, then disengage hook B from the console.



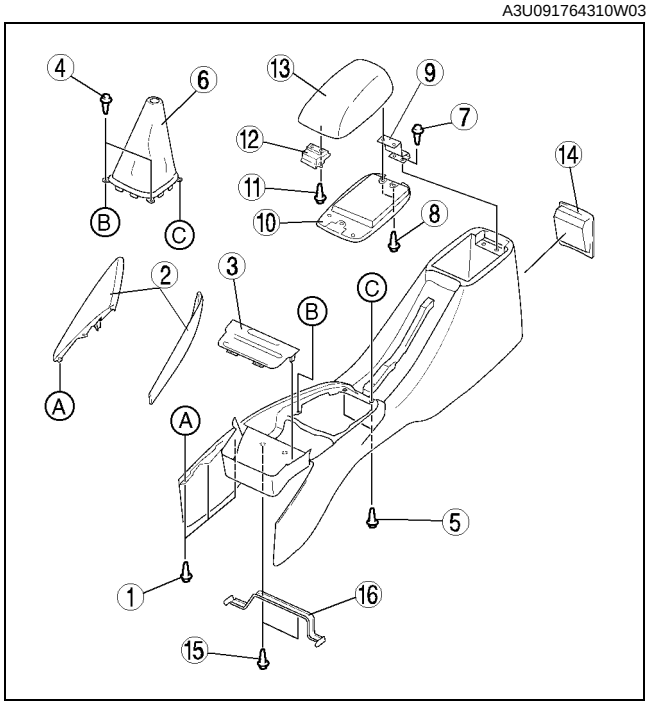
Y3E7742W302

CONSOLE DISASSEMBLY/ASSEMBLY

A3U091764310W03

1. Disassemble in the order indicated in the table.

1	Screw A
2	Side wall
3	Cover
4	Screw B (MTX)
5	Screw C (MTX)
6	Boot (MTX)
7	Screw D
8	Screw E
9	Console lid hinge
10	Console lid inner
11	Screw F
12	Console lid lock
13	Console lid outer
14	Ashtray
15	Screw G
16	Bracket



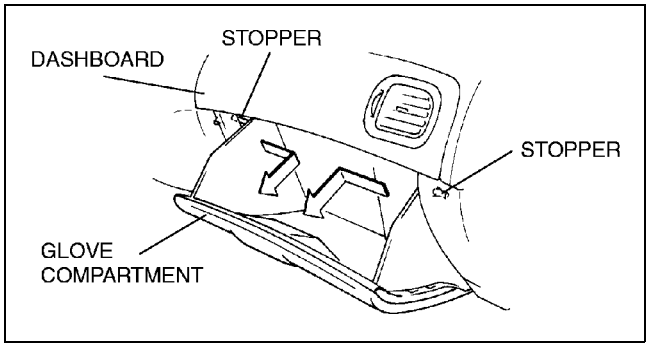
Y3E7742W305

2. Assemble in the reverse order of disassembly.

GLOVE COMPARTMENT REMOVAL/INSTALLATION

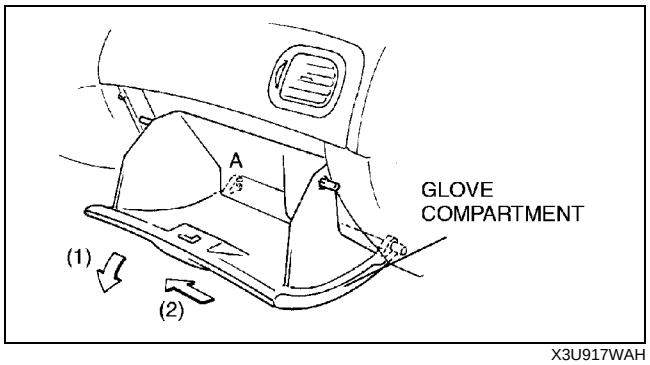
A3U091764030W01

1. Bend the stoppers inward, then remove them.



X3U917WAG

2. Pull the glove compartment toward you while pushing it downward (1), then remove clip A.
3. Slide the glove compartment toward driver's side door (2).
4. Install in the reverse order of removal.



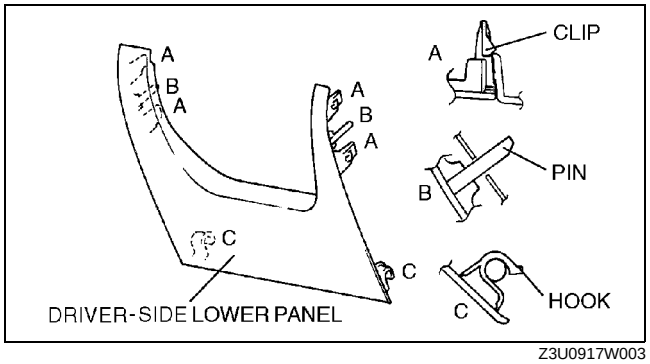
X3U917WAH

LOWER PANEL REMOVAL/INSTALLATION

A3U091764280W01

Driver's side

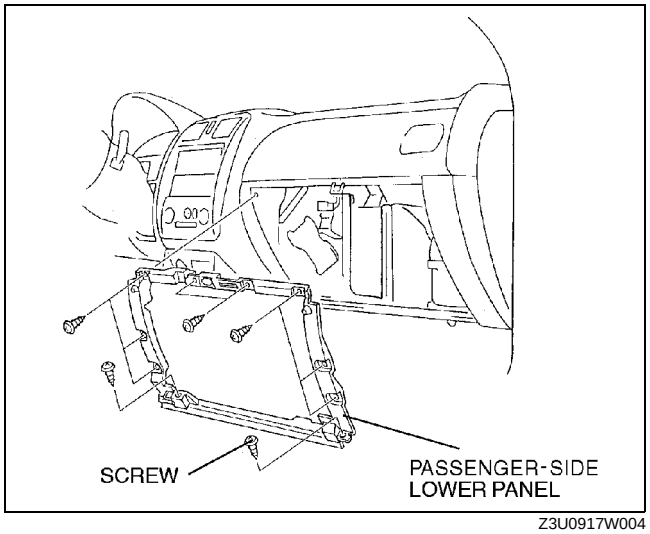
1. Pull the upper side of the lower panel downward, then disengage clips A and pins B from the dashboard.
2. Pull the lower panel toward you, then disengage hooks C from the dashboard.
3. Install in the reverse order of removal.



Z3U0917W003

Passenger's side

1. Remove the glove compartment.
2. Remove the screws.
3. Install in the reverse order of removal.

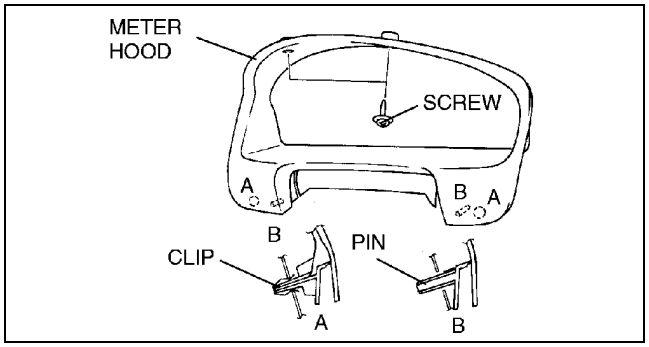


Z3U0917W004

METER HOOD REMOVAL/INSTALLATION

A3U091755420W01

1. Remove the screws.
2. Pull the meter hood toward you, then remove clips A and pins B from the dashboard.
3. Install in the reverse order of removal.

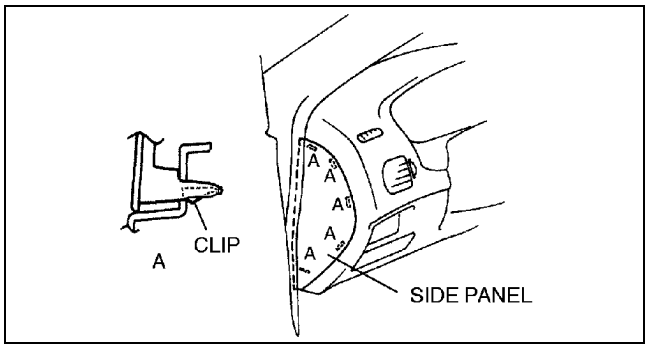


X3U917WAL

SIDE PANEL REMOVAL/INSTALLATION

A3U091764960W01

1. Remove clips A using a tape-wrapped flathead screwdriver.
2. Install in the reverse order of removal.

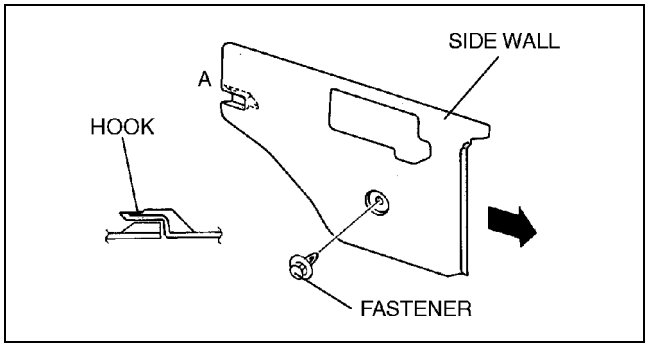


X3U917WAM

SIDE WALL REMOVAL/INSTALLATION

A3U091768371W01

1. Remove the fastener.
2. Pull the side wall indicated toward the arrow and disengage hook A from the body.
3. Install in the reverse order of removal.

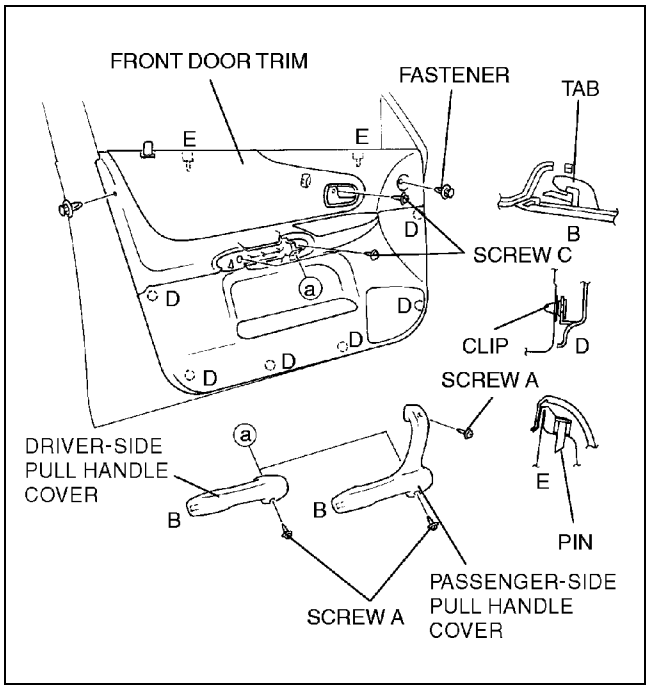


Y3U917WA3

FRONT DOOR TRIM REMOVAL/INSTALLATION

A3U091768420W01

1. Remove the inner garnish.
2. Remove the regulator handle if equipped.
3. Remove screws A and the fastener.
4. Slide the pull handle cover toward the front of the vehicle, then disengage tab B from the front door trim.
5. Remove the screws C.
6. Disengage clips D using a fastener remover from the body.
7. Pull the front door trim upward, then disengage pins E from the body.
8. Extract the inner handle from the front door trim.
9. Disconnect the power window main switch connector (driver's side).
10. Disconnect the power window sub switch connector (passenger's side).
11. Install in the reverse order of removal.

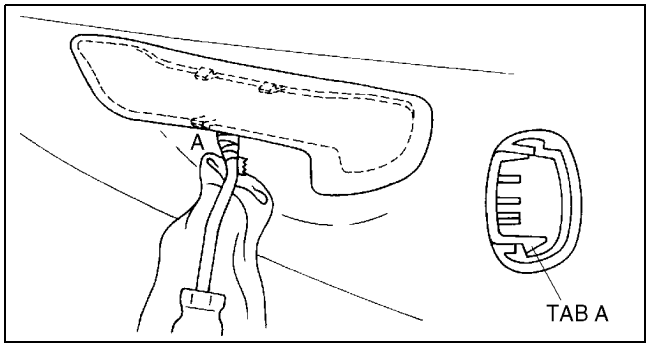


Z3U0917W005

REAR DOOR TRIM REMOVAL/INSTALLATION

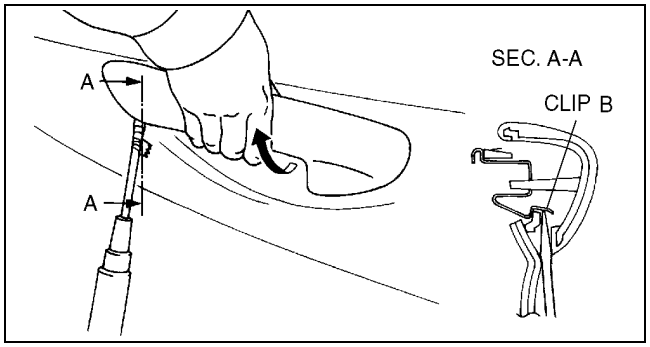
A3U091768520W01

1. Disconnect the negative battery cable if equipped with power window.
2. Remove the regulator handle if equipped.
3. Insert a tape-wrapped fastener remover under the pull-handle cover, and disengage tab A.



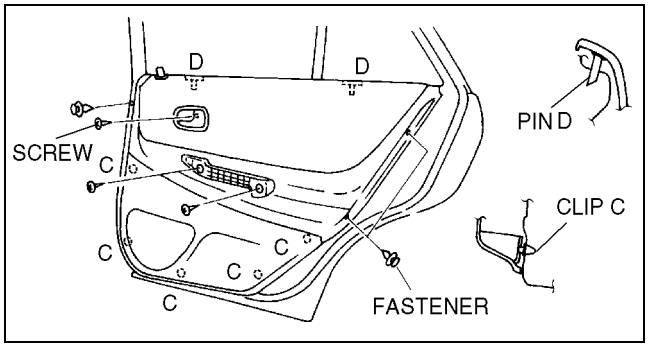
A3U0916W015

4. Insert a tape-wrapped flathead screwdriver into the access hole under the forward pull-handle cover, and remove the pull-handle cover by pulling it upward and diagonally while pushing clip B.



A3U0916W016

5. Remove the screws and fasteners.
6. Disengage clips C using a fastener remover.
7. Pull the rear door trim upward, then disengage pins D from the body.
8. Disconnect the power window sub switch connector if equipped.
9. Remove the inner handle from the rear door trim.
10. Install in the reverse order of removal.

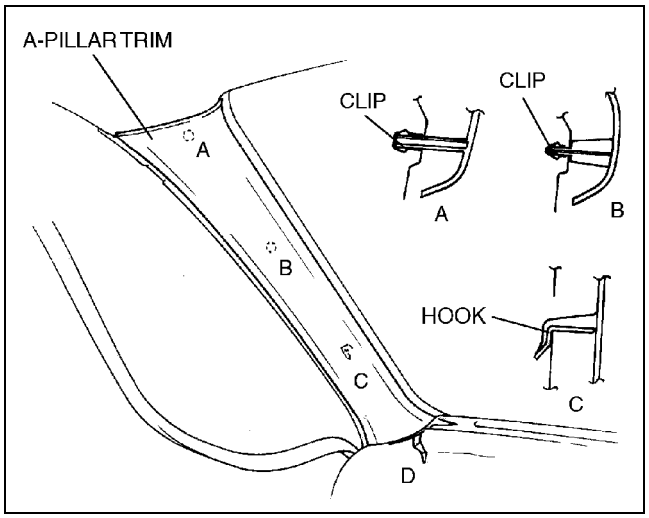


A3U0916W017

A-PILLAR TRIM REMOVAL/INSTALLATION

A3U091768160W01

1. Turn the seaming welt over.
2. Disengage clips A and B using a fastener remover.
3. Pull the A-pillar trim upward, then disengage hooks C and D.
4. Install in the reverse order of removal.



Y3U917WA5

B-PILLAR LOWER TRIM REMOVAL

A3U091768220W01

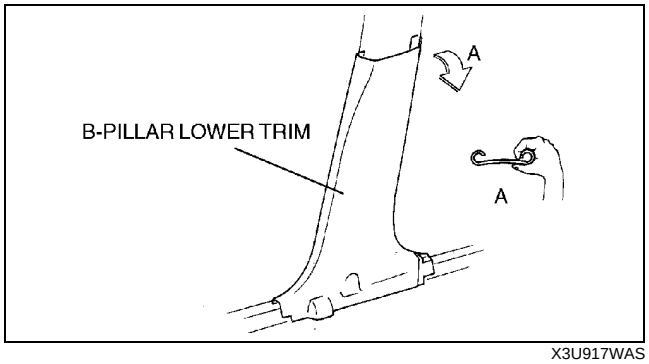
Warning

- **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 working around the B-pillar areas. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Note

- The side air bag sensor is located in the B-pillar.

1. Disconnect the negative battery cable.
2. Remove the front scuff plate.
3. Remove the rear scuff plate.
4. Pull the area marked A, then remove one side of the B-pillar lower trim.



X3U917WAS

B-PILLAR LOWER TRIM INSTALLATION

A3U091768220W02

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 working around the B-pillar areas. (See 08–10–3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Note

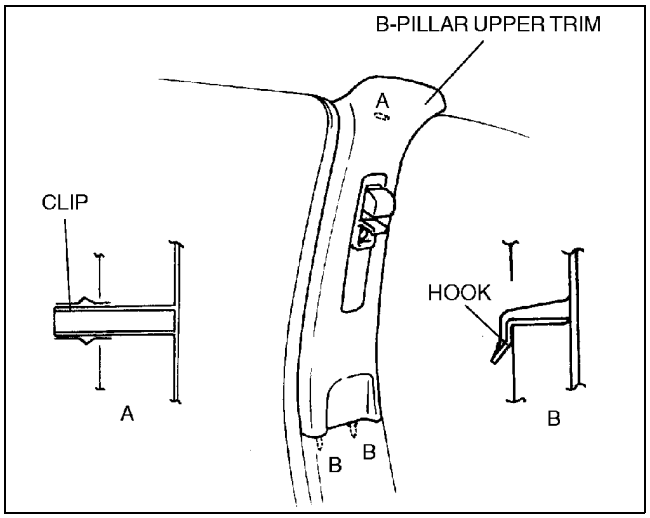
- The side air bag sensor is located in the B-pillar.

1. Disconnect the negative battery cable.
2. Install the B-pillar lower trim to the B-pillar with setting **5—10 mm {0.20—0.39 in}** upward from its original installation place.
3. Slide the B-pillar lower trim downward.
4. Install the rear scuff plate.
5. Install the front scuff plate.

B-PILLAR UPPER TRIM REMOVAL/INSTALLATION

A3U091768210W01

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 09–17–10 B-PILLAR LOWER TRIM REMOVAL.) (See 09–17–11 B-PILLAR LOWER TRIM INSTALLATION.)
3. Turn the seaming welt over.
4. Disengage clip A using a fastener remover.
5. Pull the B-pillar upper trim upward, then disengage hooks B from the body.
6. Install in the reverse order of removal.



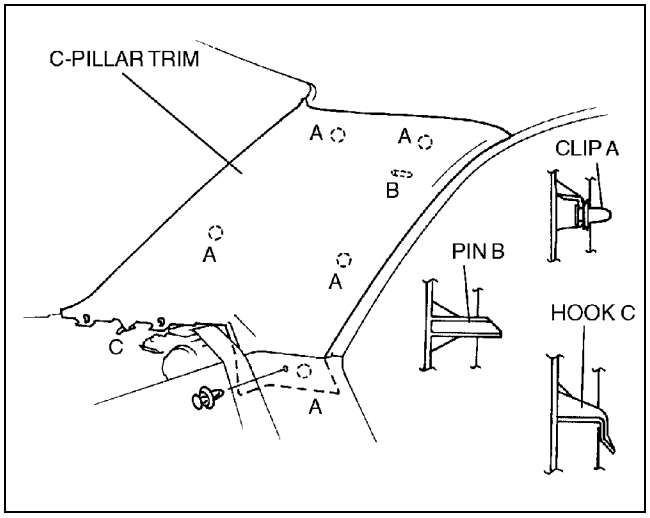
Y3U917WA6

C-PILLAR TRIM REMOVAL/INSTALLATION

A3U091768240W01

4SD

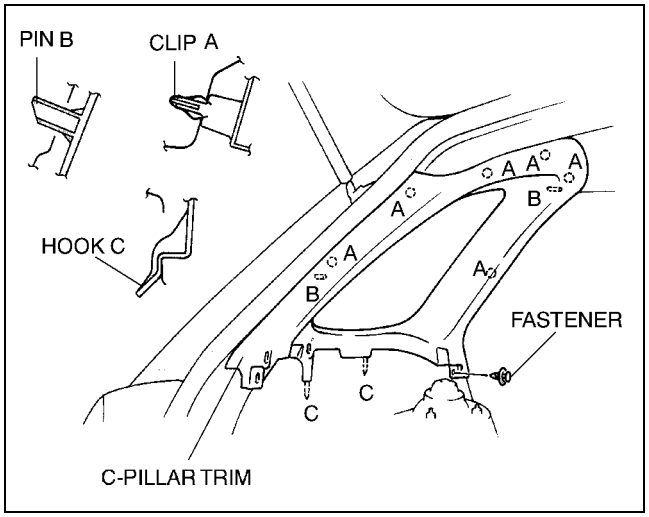
1. Remove the tire house trim.
2. Turn the seaming welt over.
3. Disengage clips A and pin B using a fastener remover.
4. Pull the C-pillar trim upward, then disengage hook C from the body.
5. Install in the reverse order of removal.



Y3U917WA7

5HB

1. Remove the trunk side trim.
2. Remove the rear center seat belt upper anchor installation bolt. (LH only)
3. Remove the fastener.
4. Disengage clips A and pins B using a fastener remover.
5. Pull the C-pillar trim upward, then disengage hooks C from the body.
6. Install in the reverse order of removal.



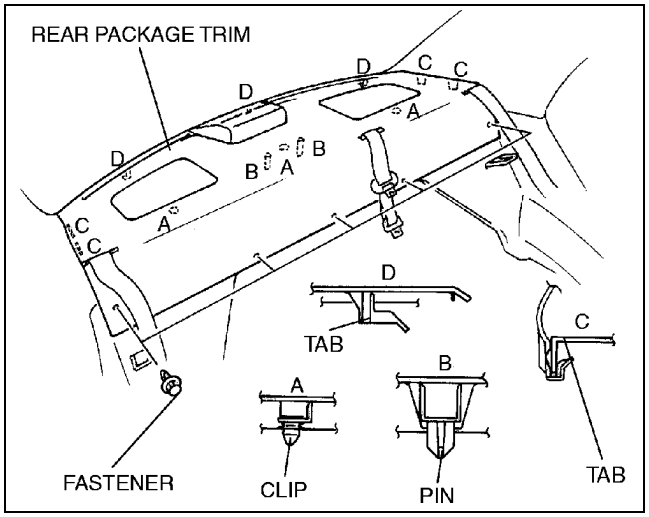
A3U0917W001

REAR PACKAGE TRIM REMOVAL/INSTALLATION

A3U091768320W01

4SD

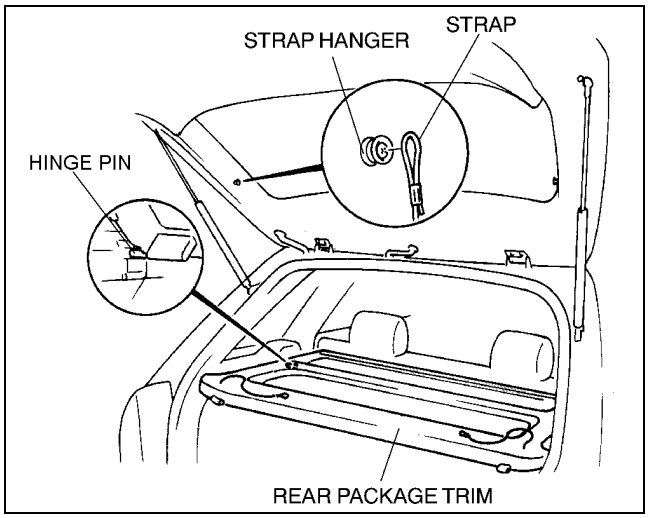
1. Remove the rear seat back.
2. Pull the rear package trim upward, then disengage clips A, pins B and tabs C from the body.
3. Pull the rear package trim toward you, then disengage tabs D from the body.
4. Install in the reverse order of removal.



Z3U0917W001

5HB

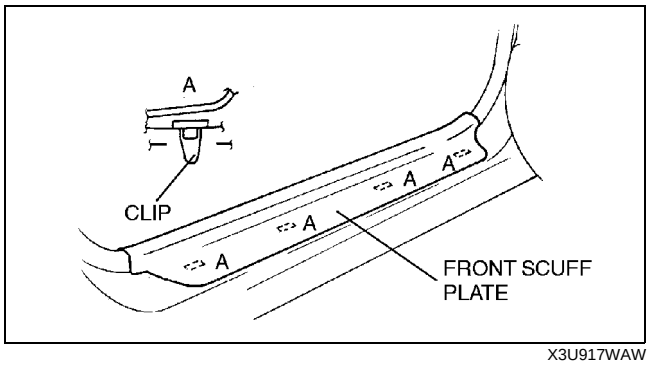
1. Remove the straps from the strap hangers.
2. Pull the rear package trim, then remove the hinge pin from the trunk side trim.
3. Install in the reverse order of removal.



A3U0917W003

FRONT SCUFF PLATE REMOVAL/INSTALLATION

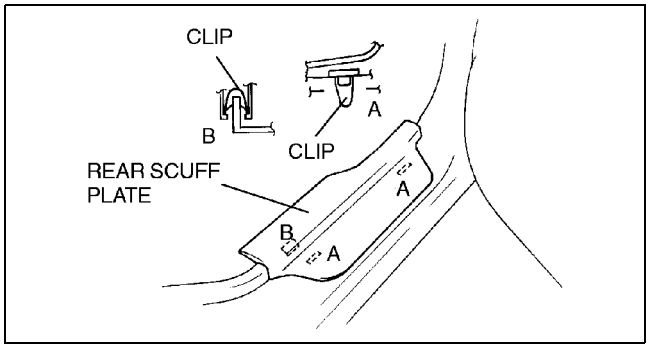
1. Pull the front scuff plate upward, then disengage clips A from the body.
2. Install in the reverse order of removal.



X3U917WAW

REAR SCUFF PLATE REMOVAL/INSTALLATION

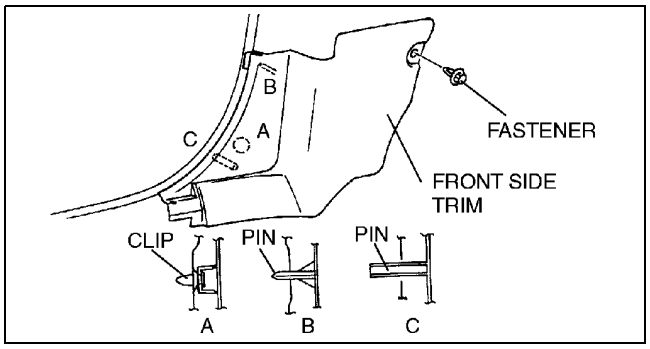
1. Pull the rear scuff plate upward, then disengage clips A and B from the body.
2. Install in the reverse order of removal.



X3U917WAX

FRONT SIDE TRIM REMOVAL/INSTALLATION

1. Remove the front scuff plate.
2. Turn the seaming welt over.
3. Remove the fasteners.
4. Pull the front side trim toward you, then disengage clip A, pins B and C from the body.
5. Install in the reverse order of removal.

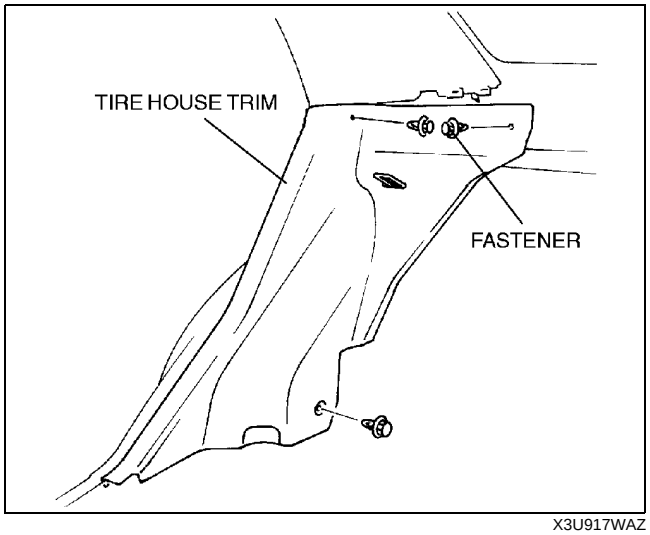


X3U917WAY

A3U091768760W01

TIRE HOUSE TRIM REMOVAL/INSTALLATION 4SD

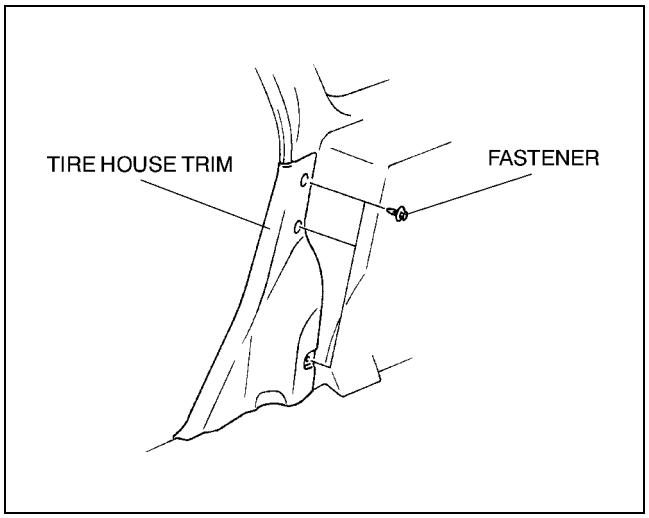
1. Remove the rear seat back.
2. Remove the rear scuff plate.
3. Remove the rear package trim.
4. Remove the lower anchor installation bolt from the rear seat belt.
5. Remove the fasteners.
6. Pull the tire house trim forward, then remove the tire house trim.
7. Install in the reverse order of removal.



X3U917WAZ

5HB

1. Lift up the rear seat cushion.
2. Remove the rear seat back.
3. Remove the rear scuff plate.
4. Remove the fasteners.
5. Pull the tire house trim forward, then remove the tire house trim.
6. Install in the reverse order of removal.

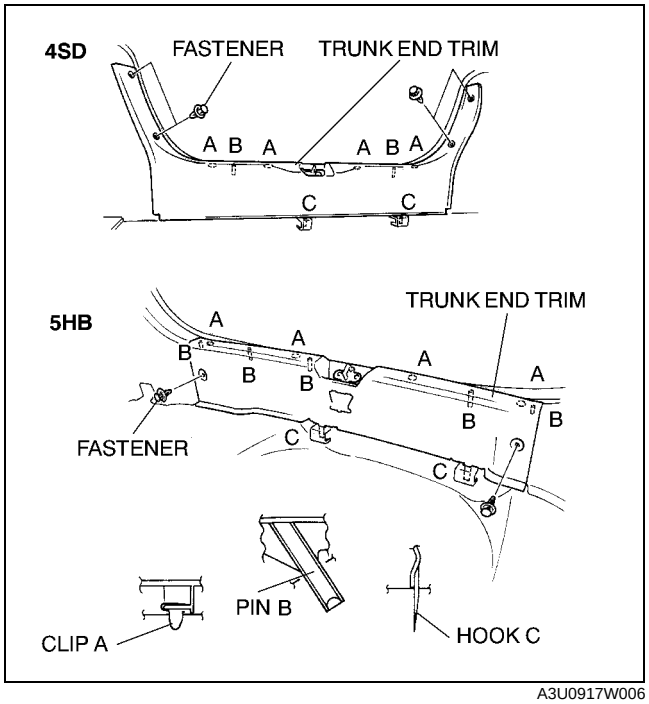


A3U0917W002

TRUNK END TRIM REMOVAL/INSTALLATION

A3U091768890W01

1. Turn the weatherstrip over.
2. Remove the fasteners.
3. Disengage clips A using a fastener remover from the body.
4. Pull the trunk end trim upward, then disengage pins B and C from the body.
5. Install in the reverse order of removal.



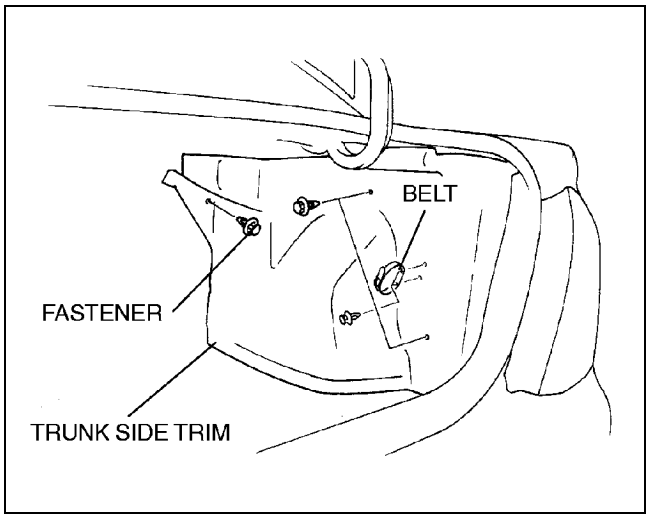
A3U0917W006

TRUNK SIDE TRIM REMOVAL/INSTALLATION

A3U091768860W01

4SD

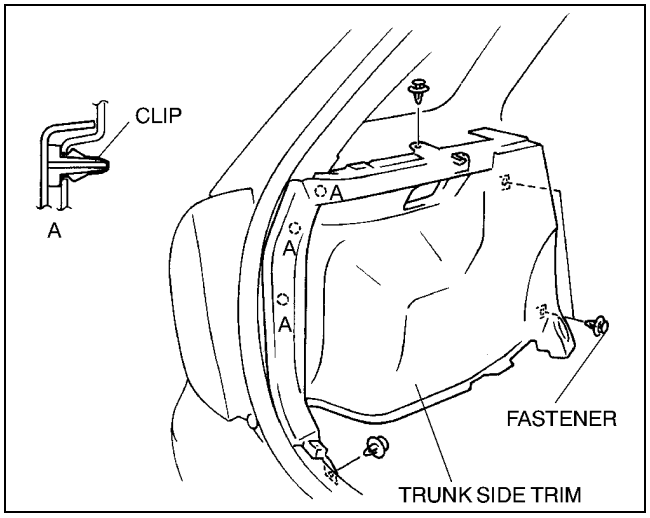
1. Remove the trunk mat.
2. Remove the trunk end trim.
3. Remove the tire house trim.
4. Remove the fasteners, then remove the belt.
5. Pull the trunk side trim outward, then remove it.
6. Install in the reverse order of removal.



X3U917WB1

5HB

1. Remove the trunk end trim.
2. Turn over the weatherstrip.
3. Remove the trunk side upper trim.
4. Remove the tire house trim.
5. Remove the fasteners.
6. Remove the trunk side trim, then disengage clips A.
7. Disconnect the cargo compartment light connector. (LH only)
8. Install in the reverse order of removal.

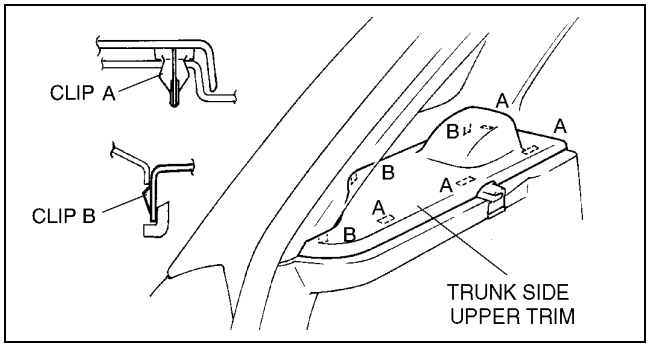


A3U0917W005

TRUNK SIDE UPPER TRIM REMOVAL/INSTALLATION

A3U091768860W02

1. Remove the rear package trim.
2. Pull the trunk side upper trim upward, then disengage clips A and B from the body.
3. Lift up the rear seat cushion.
4. Remove the rear seat belt lower anchor installation bolts.
5. Install in the reverse order of removal.

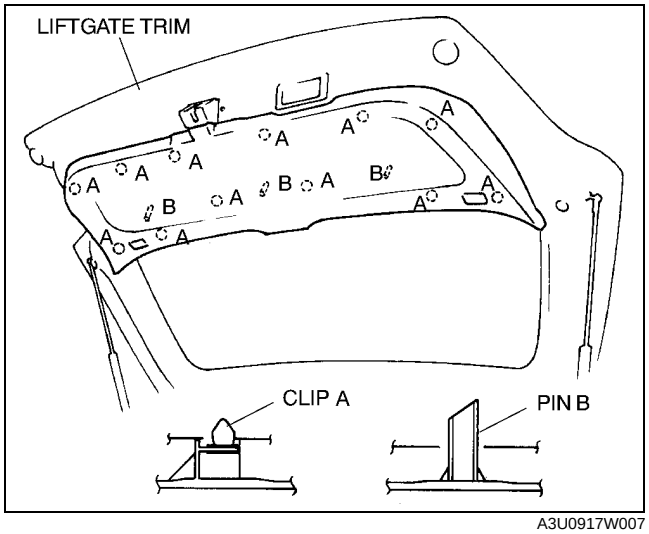


A3U0917W004

LIFTGATE TRIM REMOVAL/INSTALLATION

A3U091768961W01

1. Disengage clips A and pins B using a fastener remover, then remove the liftgate trim.
2. Install in the reverse order of removal.

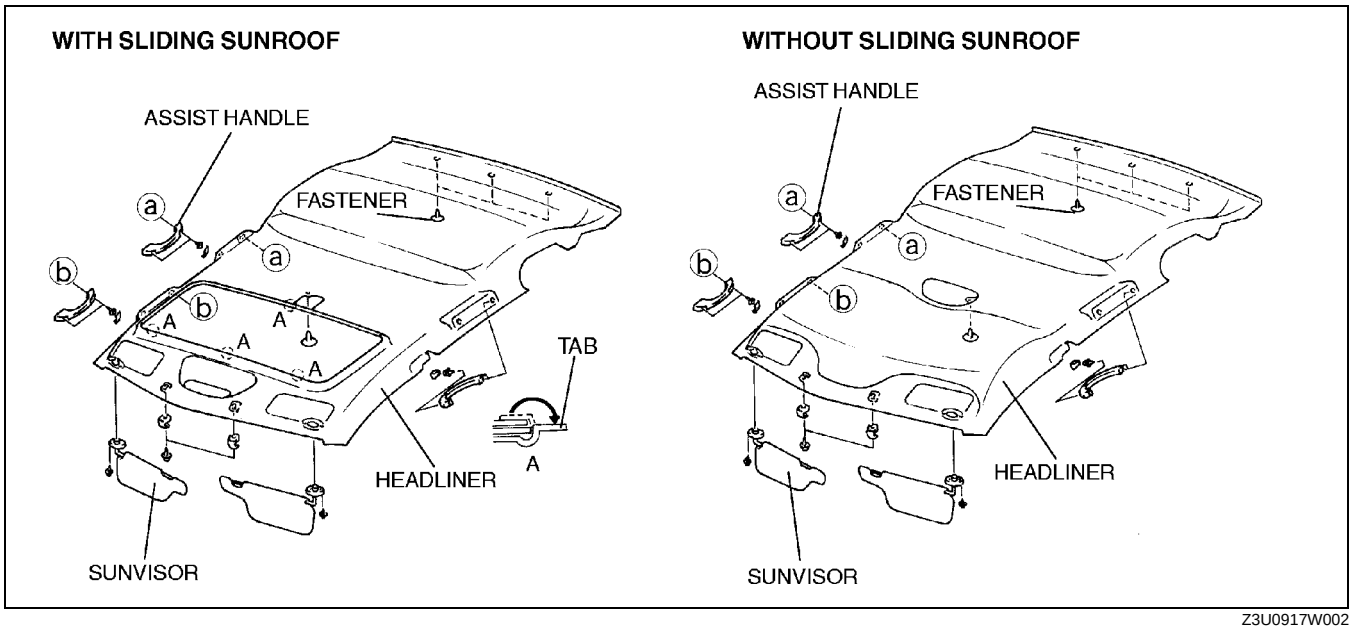


A3U0917W007

HEADLINER REMOVAL/INSTALLATION

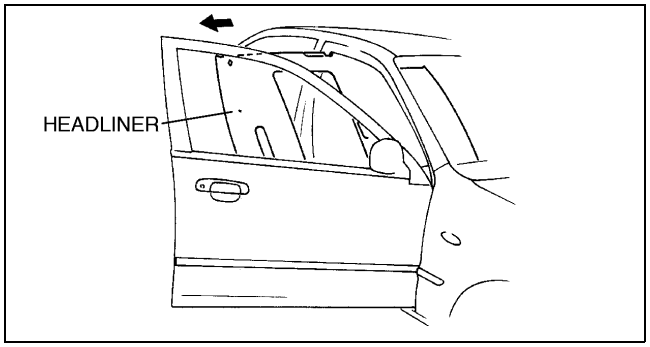
A3U091768030W01

1. Disconnect the negative battery cable.
2. Turn the seaming welt and weatherstrip over.
3. Remove the A-pillar trims. (See 09–17–10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
4. Remove the B-pillar upper trims. (See 09–17–11 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
5. Remove the C-pillar trims. (See 09–17–11 C-PILLAR TRIM REMOVAL/INSTALLATION.)
6. Remove the interior and map light if not equipped with a sliding sunroof. (See 09–18–20 INTERIOR AND MAP LIGHT REMOVAL/INSTALLATION.)
7. Remove the map light and interior light if equipped with a sliding sunroof. (See 09–18–22 INTERIOR LIGHT REMOVAL/INSTALLATION.) (See 09–18–21 MAP LIGHT REMOVAL/INSTALLATION.)
8. Remove the screws then remove the sunvisor and assist handle.
9. Fold tabs A up if equipped with a sliding sunroof.
10. Remove the fasteners.



Z3U0917W002

11. Remove the headliner diagonally from the passenger-side front door frame.

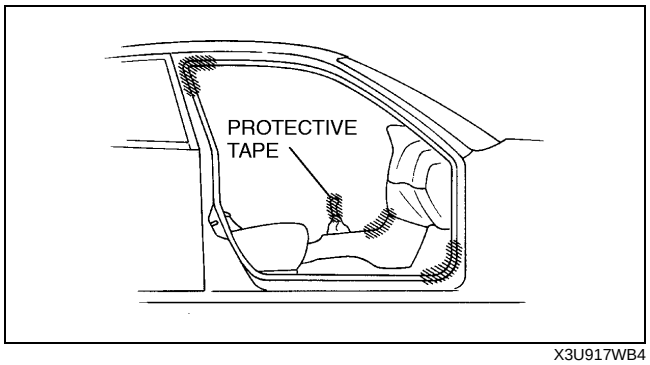


X3U917WB5

Caution

- **To protect the trim, seaming welt, etc. from scratches when removing the headliner from the vehicle, affix protective tape to the console, shift lever knob and door frame.**

12. Install in the reverse order of removal.

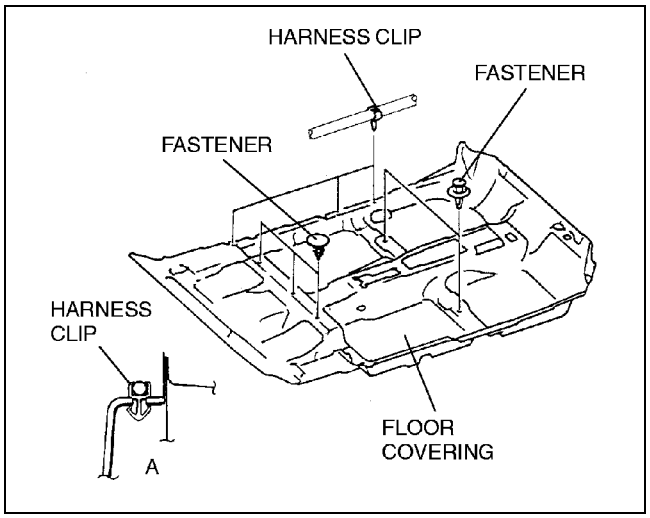


X3U917WB4

FLOOR COVERING REMOVAL/INSTALLATION

A3U091768670W01

1. Disconnect the negative battery cable.
2. Remove the front seats. (See 09–13–1 FRONT SEAT REMOVAL/INSTALLATION.)
3. Remove the rear seat cushion. (See 09–13–5 REAR SEAT REMOVAL/INSTALLATION.)
4. Remove the tire house trim. (See 09–17–13 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
5. Remove the dashboard. (See 09–17–1 DASHBOARD REMOVAL/INSTALLATION.)
6. Remove the front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
7. Remove the B-pillar lower trim. (See 09–17–10 B-PILLAR LOWER TRIM REMOVAL.) (See 09–17–11 B-PILLAR LOWER TRIM INSTALLATION.)
8. Remove the lower anchor of the front seat belt installation bolts.
9. Remove the selector cable if equipped with ATX. (See 05–18–3 SELECTOR LEVER REMOVAL/INSTALLATION.)
10. Remove the interlock cable if equipped with ATX. (See 05–18–3 SELECTOR LEVER REMOVAL/INSTALLATION.)
11. Remove the rear heat duct.
12. Remove the fasteners and clips A, then remove the floor covering.
13. Remove the floor covering from the vehicle through the passenger-side front door.
14. Install in the reverse order of removal.

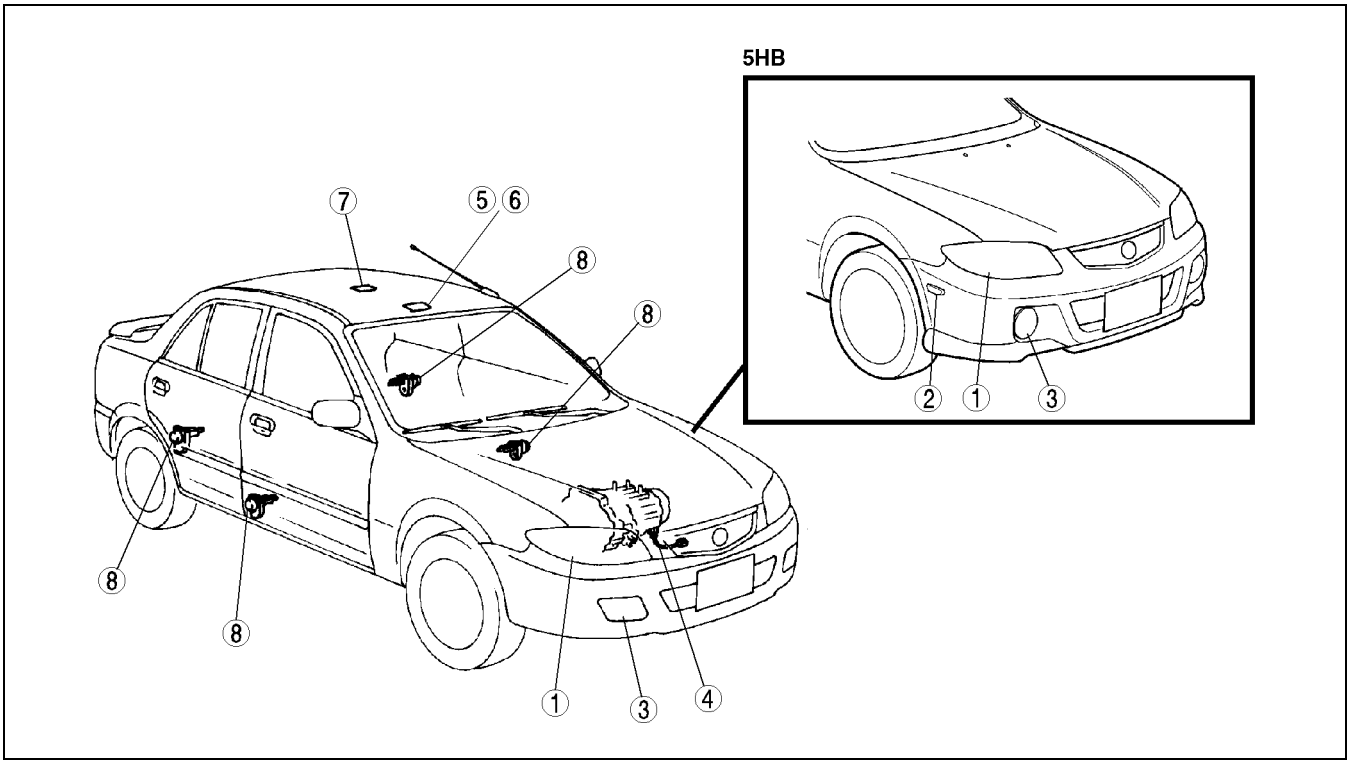


X3U917WB6

09–18 LIGHTING SYSTEMS

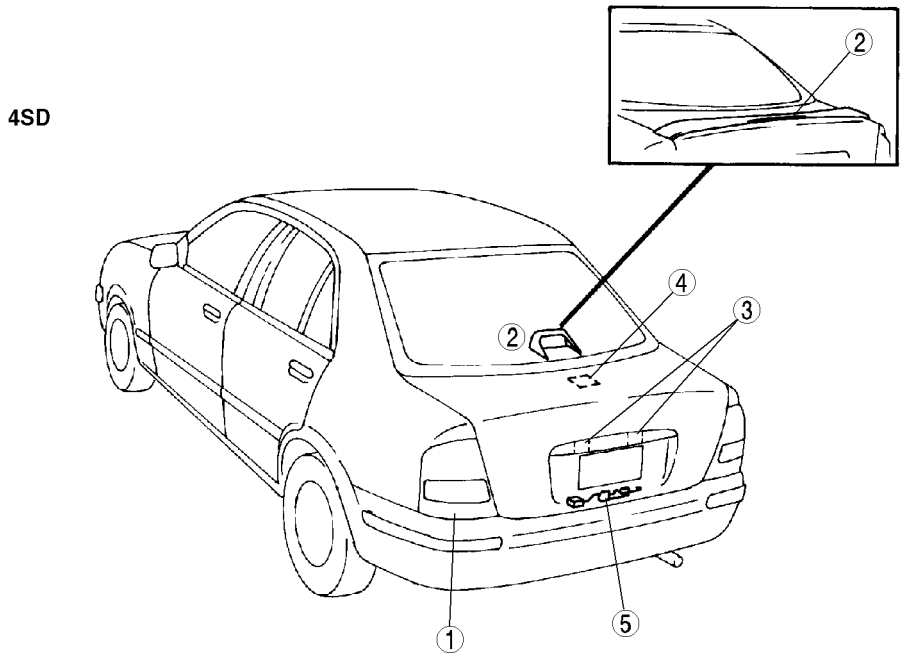
LOCATION INDEX

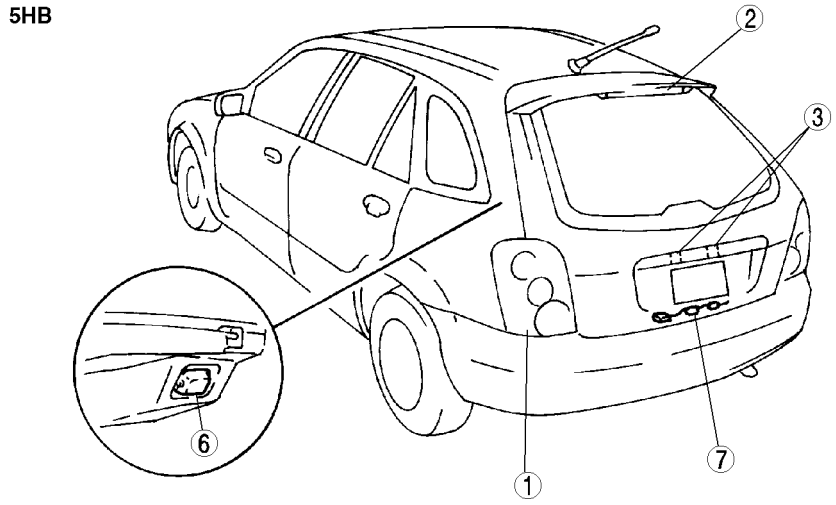
A3U091801051W01



A3U0918W108

1	Front combination light (See 09–18–5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION) (See 09–18–5 HEADLIGHT ADJUSTMENT) (See 09–18–6 HEADLIGHT BULB REMOVAL/INSTALLATION) (See 09–18–7 FRONT TURN LIGHT/PARKING LIGHT BULB REMOVAL/INSTALLATION) (See 09–18–7 4SD)
2	Front side marker light (5HB) (See 09–18–7 5HB)
3	Front fog light (See 09–18–9 FRONT FOG LIGHT ADJUSTMENT) (See 09–18–8 FRONT FOG LIGHT REMOVAL/INSTALLATION)
4	Back-up light switch (See 09–18–15 BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION) (See 09–18–15 BACK-UP LIGHT SWITCH INSPECTION)
5	Interior and map light (See 09–18–20 INTERIOR AND MAP LIGHT REMOVAL/INSTALLATION) (See 09–18–20 INTERIOR AND MAP LIGHT INSPECTION)
6	Map light (See 09–18–21 MAP LIGHT REMOVAL/INSTALLATION) (See 09–18–21 MAP LIGHT INSPECTION)
7	Interior light (See 09–18–22 INTERIOR LIGHT REMOVAL/INSTALLATION) (See 09–18–22 INTERIOR LIGHT INSPECTION)
8	Door switch (See 09–18–24 DOOR SWITCH REMOVAL/INSTALLATION) (See 09–18–25 DOOR SWITCH INSPECTION)

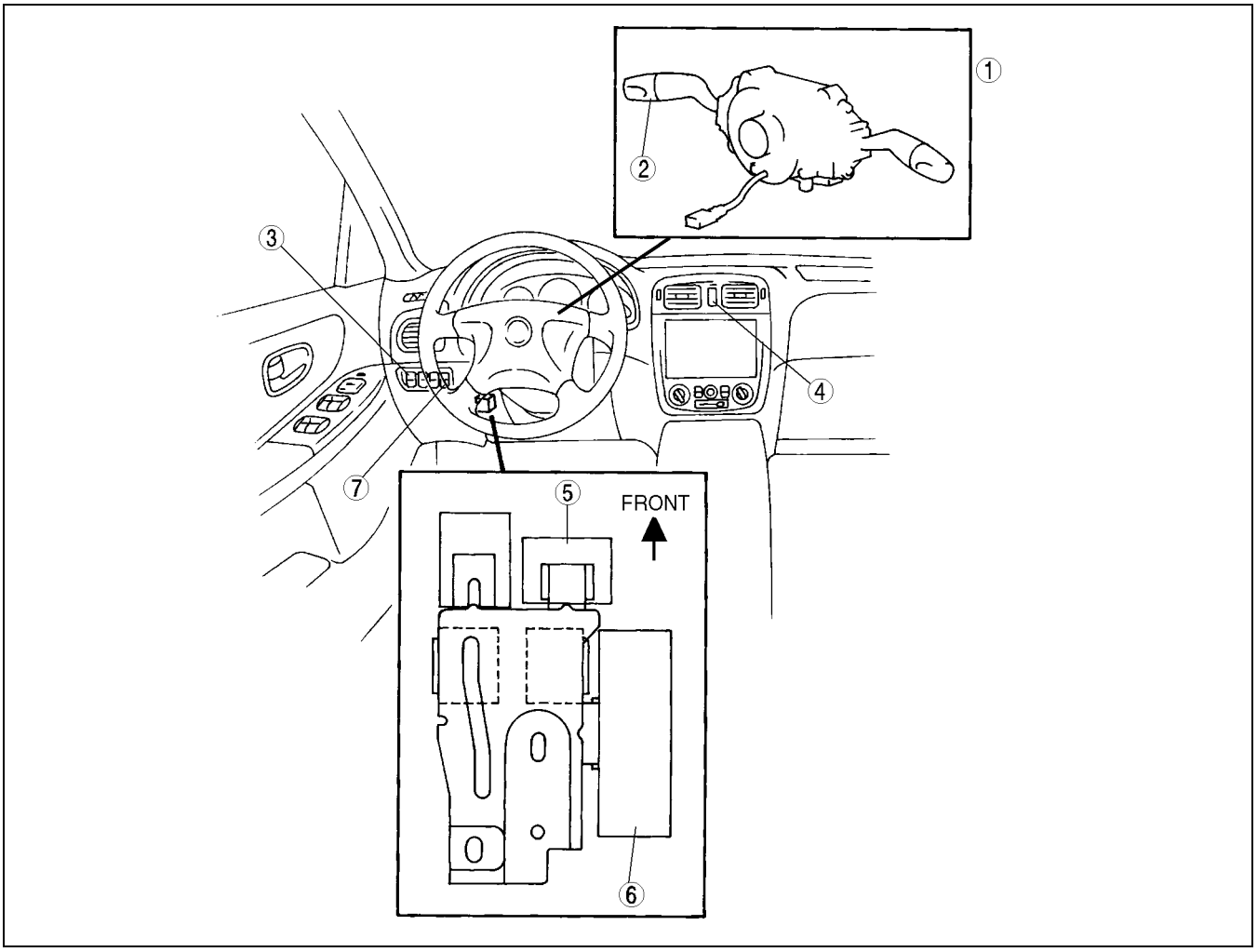




A3U0918W104

1	Rear combination light (See 09–18–10 REAR COMBINATION LIGHT REMOVAL/INSTALLATION)
2	High-mount brake light (See 09–18–11 HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION)
3	License plate light (See 09–18–12 LICENSE PLATE LIGHT REMOVAL/INSTALLATION)
4	Trunk compartment light bulb (See 09–18–23 TRUNK COMPARTMENT LIGHT BULB REMOVAL/INSTALLATION)

5	Trunk compartment light switch (See 09–18–23 TRUNK COMPARTMENT LIGHT SWITCH INSPECTION)
6	Cargo compartment light (See 09–18–23 CARGO COMPARTMENT LIGHT REMOVAL/INSTALLATION) (See 09–18–24 CARGO COMPARTMENT LIGHT INSPECTION)
7	Cargo compartment light switch (See 09–18–24 CARGO COMPARTMENT LIGHT SWITCH INSPECTION)



Z3U0918W013

1	Combination switch (See 09–18–12 COMBINATION SWITCH REMOVAL/INSTALLATION) (See 09–18–13 COMBINATION SWITCH DISASSEMBLY/ASSEMBLY)
2	Light switch (See 09–18–13 LIGHT SWITCH REMOVAL/INSTALLATION) (See 09–18–13 LIGHT SWITCH INSPECTION)
3	Front fog light switch (See 09–18–14 FRONT FOG LIGHT SWITCH REMOVAL/INSTALLATION) (See 09–18–14 FRONT FOG LIGHT SWITCH INSPECTION)
4	Hazard warning switch (See 09–18–14 HAZARD WARNING SWITCH REMOVAL/INSTALLATION) (See 09–18–15 HAZARD WARNING SWITCH INSPECTION)

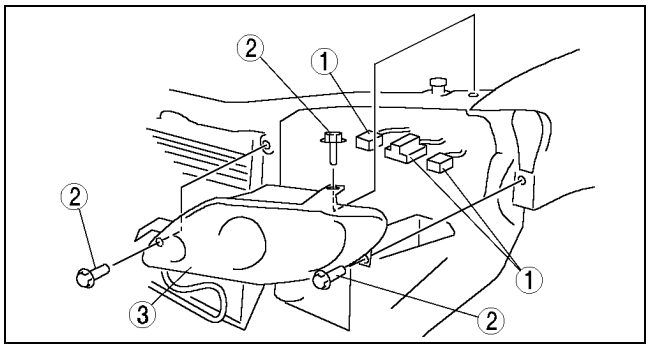
5	Flasher control module (See 09–18–16 FLASHER CONTROL MODULE REMOVAL/INSTALLATION) (See 09–18–16 FLASHER CONTROL MODULE INSPECTION)
6	DRL control module (See 09–18–18 DRL CONTROL MODULE REMOVAL/INSTALLATION (CANADA)) (See 09–18–18 DRL CONTROL MODULE INSPECTION (CANADA))
7	Panel light control switch (See 09–18–25 PANEL LIGHT CONTROL SWITCH REMOVAL/INSTALLATION) (See 09–18–26 PANEL LIGHT CONTROL SWITCH INSPECTION)

FRONT COMBINATION LIGHT REMOVAL/INSTALLATION

A3U091851060W01

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09–10–5 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	Front combination light



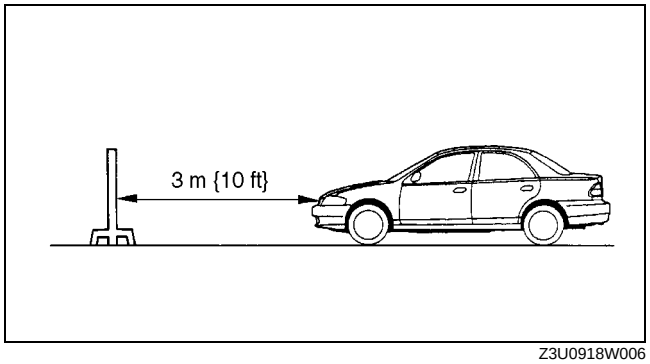
Y3J8112W111

4. Install in the reverse order of removal.
5. Adjust the headlight aiming. (See 09–18–5 HEADLIGHT ADJUSTMENT.)

HEADLIGHT ADJUSTMENT

A3U091851030W01

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 and perpendicular to a wall.
5. Set the headlights **3 m {10 ft}** from the wall.
6. While adjusting one headlight, disconnect the connector of the other.
7. Start the engine to charge the battery.
8. Turn on the low-beam headlight.

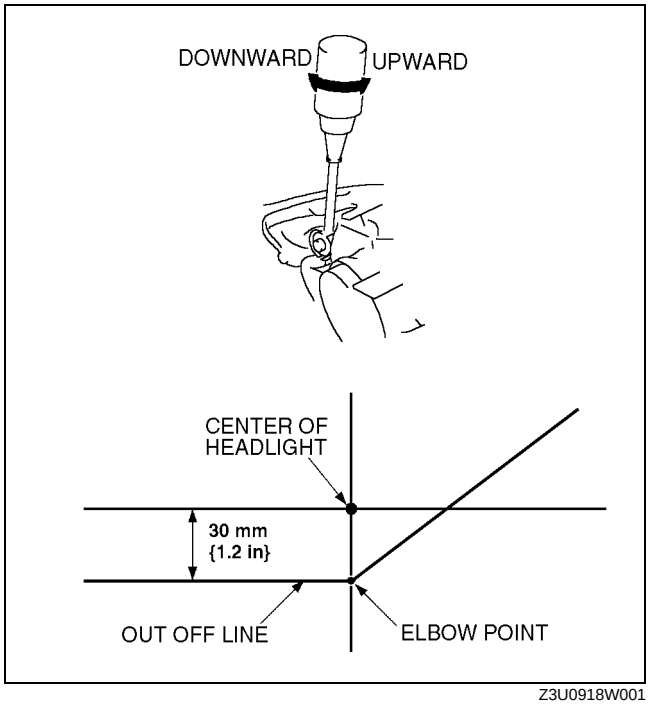


Z3U0918W006

9. 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.



Z3U0918W001

HEADLIGHT BULB REMOVAL/INSTALLATION

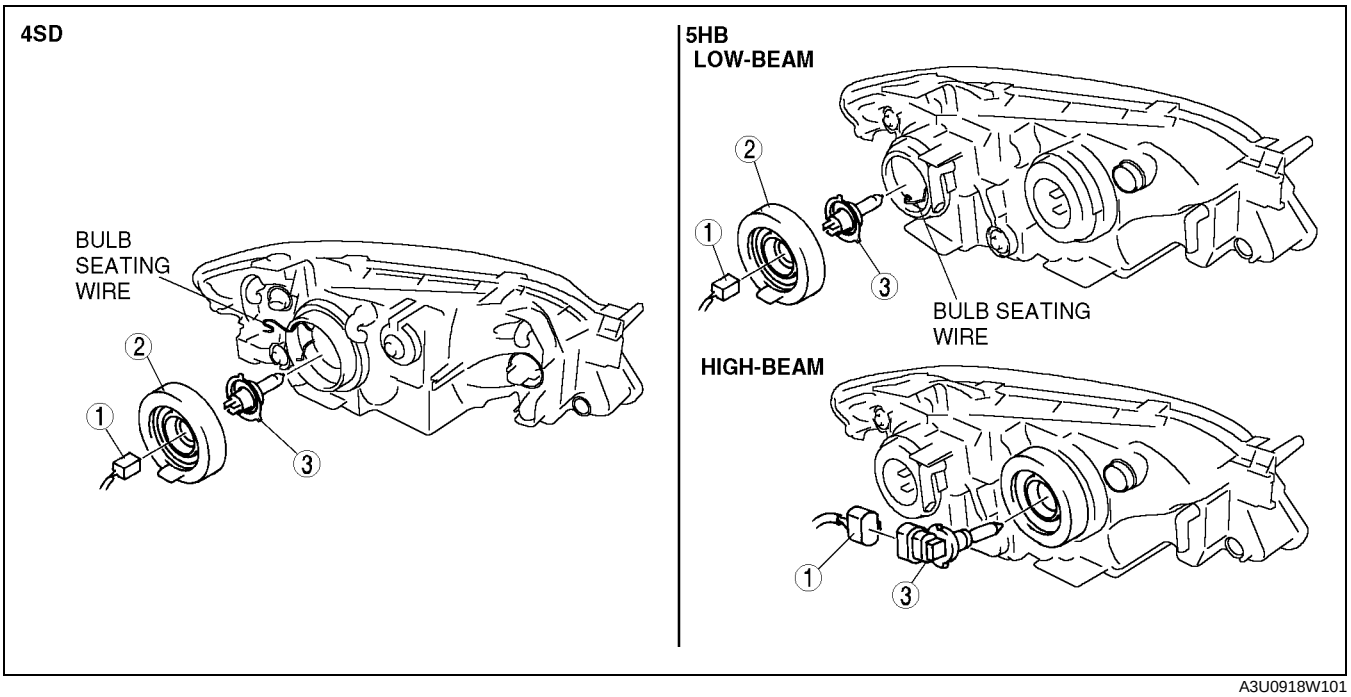
A3U091851030W02

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

Caution

- **A halogen bulb generates extremely high heat when it is used. If the surface of the bulb is dirty, excessive heat will build up and the light's life will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

3. Install in the reverse order of removal.



A3U0918W101

1	Connector
2	Cover (See 09–18–6 Cover Installation Note)

3	Headlight bulb (See 09–18–6 Headlight Bulb Removal Note (4SD and 5HB Low-beam)) (See 09–18–6 Headlight Bulb Removal Note (5HB High-beam))

Headlight Bulb Removal Note (4SD and 5HB Low-beam)

1. Release the bulb seating wire to remove the headlight bulb.

Headlight Bulb Removal Note (5HB High-beam)

1. Turn the bulb to remove the headlight bulb.

Cover Installation Note

1. Make sure the cover is seated properly to prevent the moisture from getting into the headlight housing.

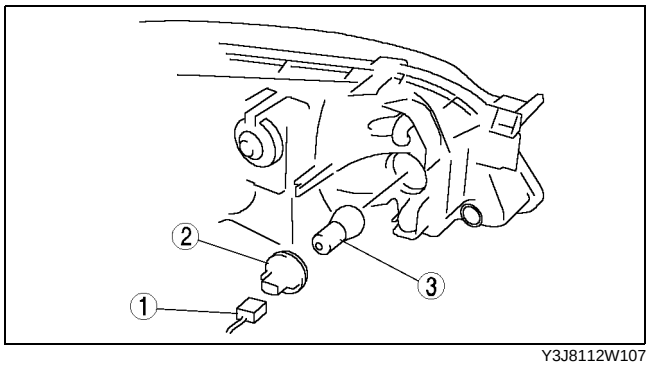
FRONT TURN LIGHT/PARKING LIGHT BULB REMOVAL/INSTALLATION

A3U091851050W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Connector
2	Socket
3	Front turn light/parking light bulb

3. Install in the reverse order of removal.



Y3J8112W107

FRONT SIDE MARKER LIGHT REMOVAL/INSTALLATION

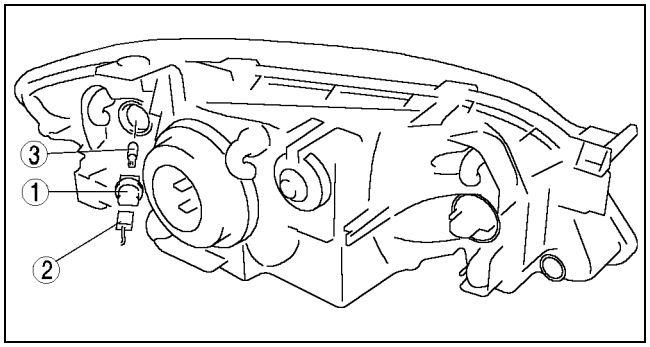
A3U091851120W01

4SD

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Socket
2	Connector
3	Front side marker light bulb

3. Install in the reverse order of removal.



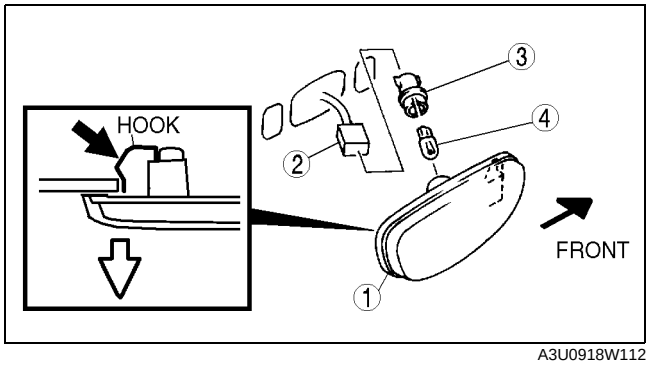
Z3U0918W002

5HB

1. Disconnect the negative battery cable.
2. Remove the bolts and fasteners, and bend the splash shield down.
3. Remove in the order indicated in the table.

1	Front side marker light (See 09–18–7 Front side marker light removal note)
2	Connector
3	Socket
4	Front side marker light bulb

4. Install in the reverse order of removal.



A3U0918W112

Front side marker light removal note

1. Pull out the rear end of the front side marker light while pressing the hook.

FRONT FOG LIGHT REMOVAL/INSTALLATION

A3U091851680W01

4SD

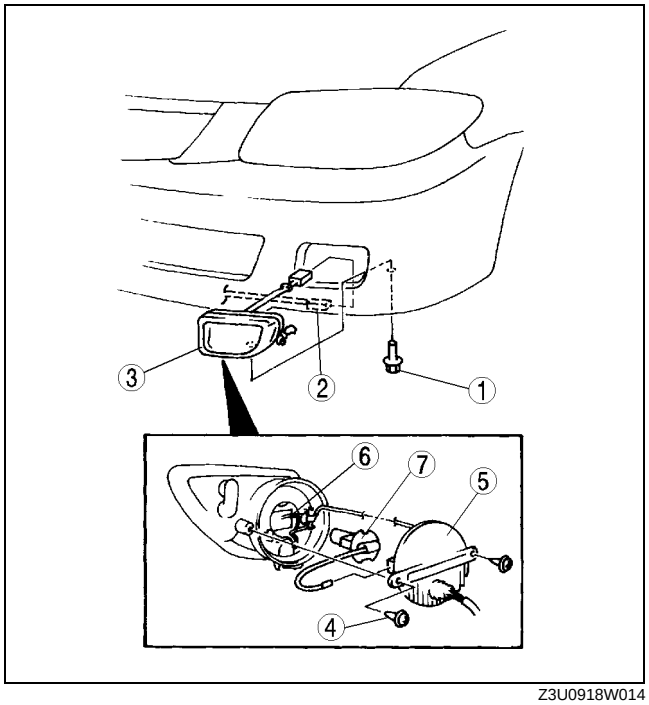
Caution

- **A halogen bulb generates extremely high heat when it is used. If the surface of the bulb is dirty, excessive heat will build up and the bulb's life will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

1. Disconnect the negative battery cable.
2. Turn over the mud guard.
3. Remove in the order indicated in the table.

1	Bolt
2	Connector
3	Front fog light
4	Screw
5	Cover
6	Bulb pressing wire
7	Front fog light bulb

4. Install in the reverse order of removal.
5. Adjust the front fog light aiming. (See 09–18–9 FRONT FOG LIGHT ADJUSTMENT.)



Z3U0918W014

5HB

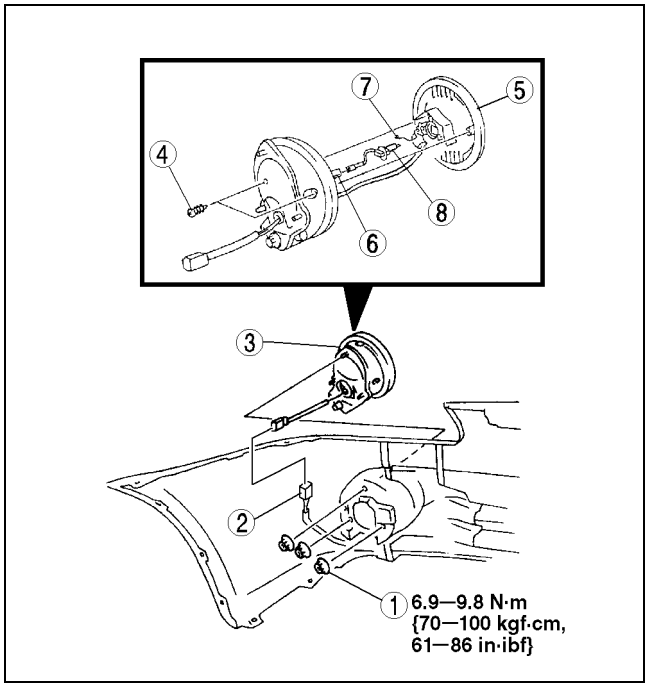
Caution

- **A halogen bulb generates extremely high heat when it is used. If the surface of the bulb is dirty, excessive heat will build up and the bulb's life will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09–10–5 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Nut
2	Connector
3	Front fog light
4	Screw
5	Front fog light unit
6	Connector
7	Bulb pressing wire
8	Front fog light bulb

4. Install in the reverse order of removal.
5. Adjust the front fog light aiming. (See 09–18–9 FRONT FOG LIGHT ADJUSTMENT.)

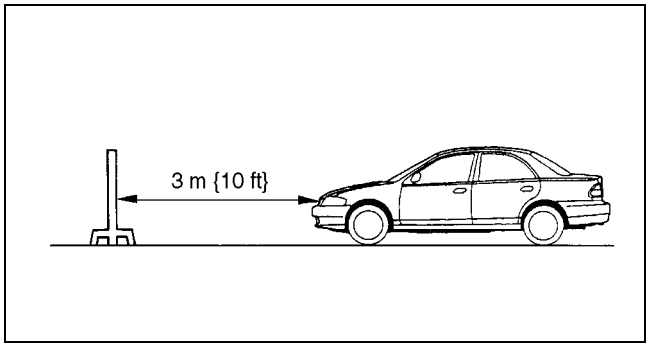


A3U0918W110

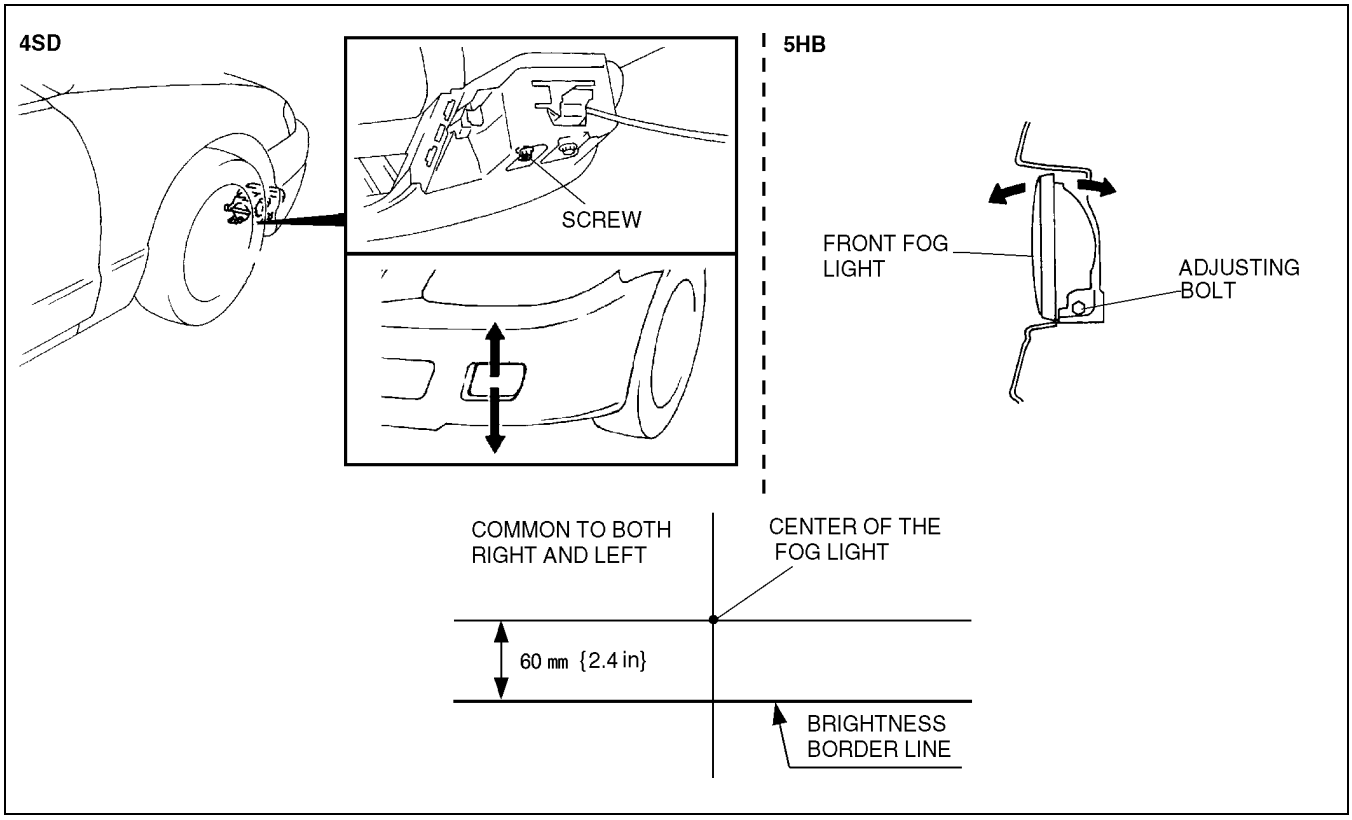
FRONT FOG LIGHT ADJUSTMENT

A3U091851680W02

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 **3 m {10 ft}** in front of a white screen.
5. While adjusting one fog light, mask the other.
6. Start the engine to charge the battery.
7. Turn the front fog light on.
8. Peel off the mud guard.
9. Loosen the screw or bolts for the aim adjustment.
10. Move the front fog light in the direction of the arrows indicated in the figure and adjust the center of the front fog light to the position.



Z3U0918W006



A3U0918W111

11. Tighten the front fog light adjusting screw or bolts.

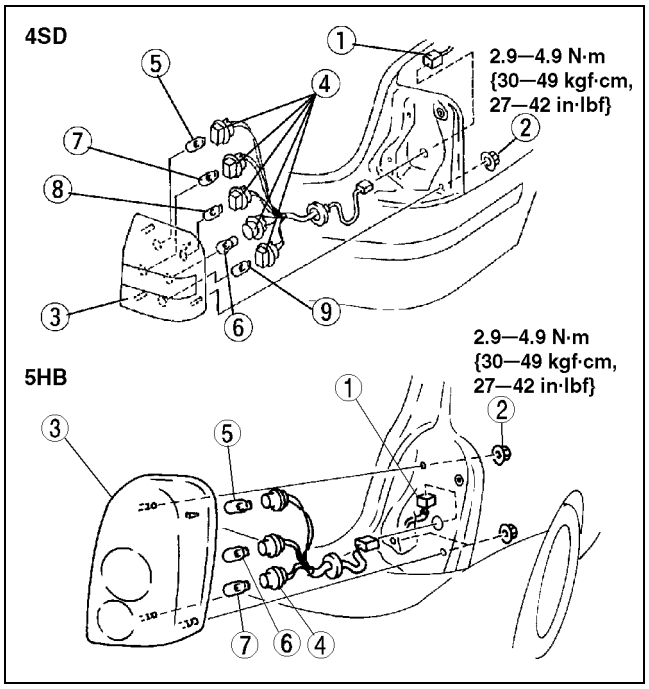
REAR COMBINATION LIGHT REMOVAL/INSTALLATION

A3U091851150W01

1. Disconnect the negative battery cable.
2. Remove the trunk side trim. (See 09–17–15 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Nut
3	Rear combination light
4	Socket (See 09–18–10 Socket Installation Note)
5	Brake light/taillight bulb
6	Rear turn light bulb
7	Back-up light bulb
8	Rear side marker light bulb (4SD)
9	Taillight bulb (4SD)

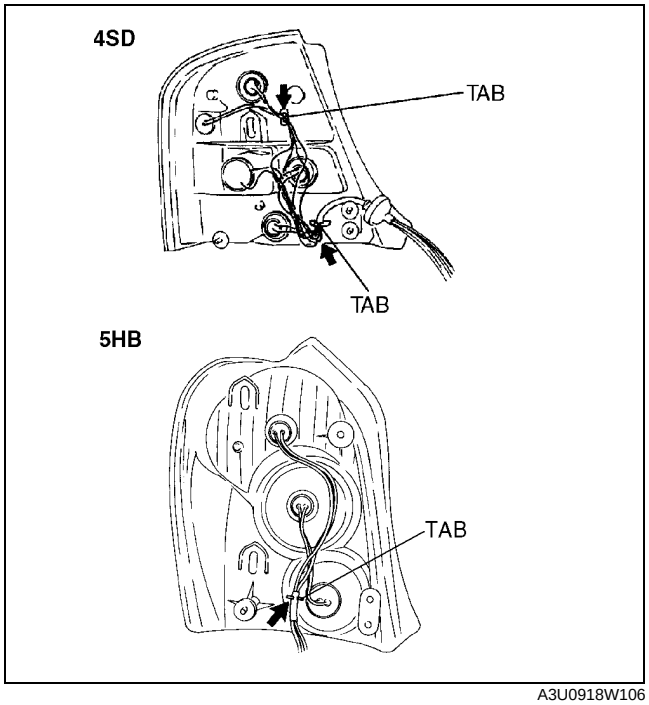
4. Install in the reverse order of removal.



A3U0918W107

Socket Installation Note

1. Hook the harness as shown in the figure.



A3U0918W106

HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION

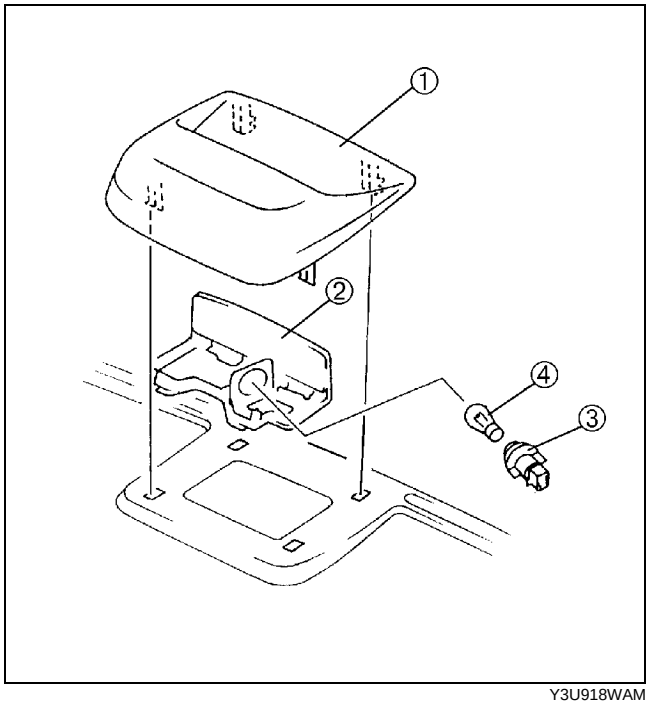
A3U091851580W01

In-Vehicle Type

1. Disconnect the negative battery cable.
2. Remove the rear package trim. (See 09–17–12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	High-mount brake light
2	Lens
3	Socket
4	High-mount brake light bulb

4. Install in the reverse order of removal.



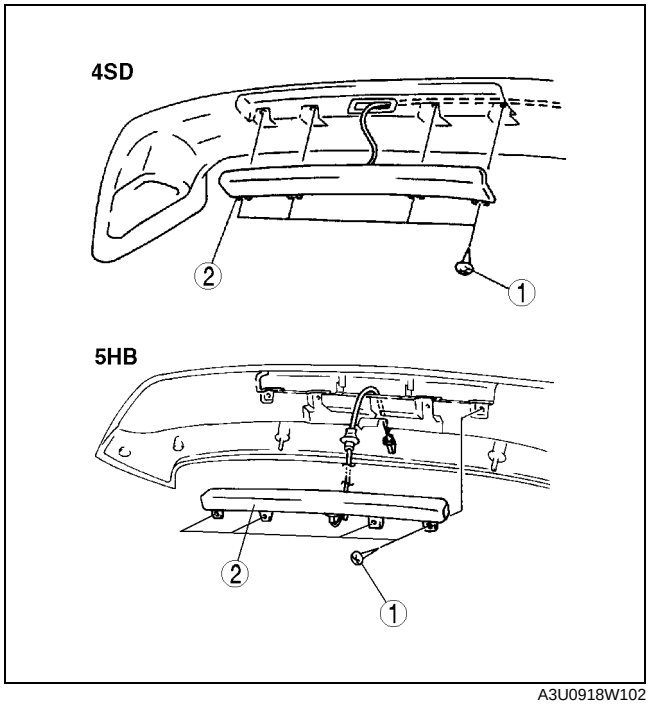
Y3U918WAM

Rear Spoiler Type

1. Disconnect the negative battery cable.
2. Remove the rear spoiler. (See 09–16–8 REAR SPOILER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Screw
2	High-mount brake light (See 09–18–12 High-mount brake light removal note (4SD))

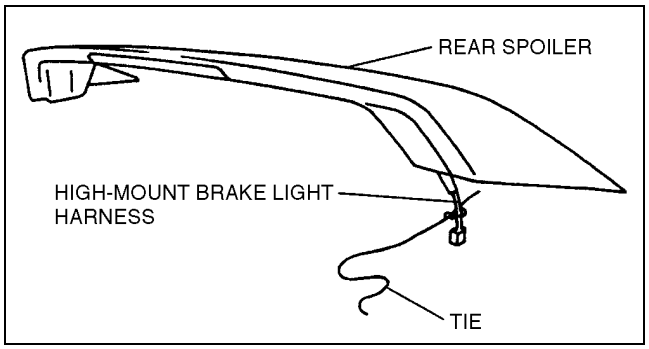
4. Install in the reverse order of removal.



A3U0918W102

High-mount brake light removal note (4SD)

1. Tie a string to the end of the connector of the high-mount brake light beforehand so that the connector can be passed easily through the rear spoiler during installation.



Y3U918WAJ

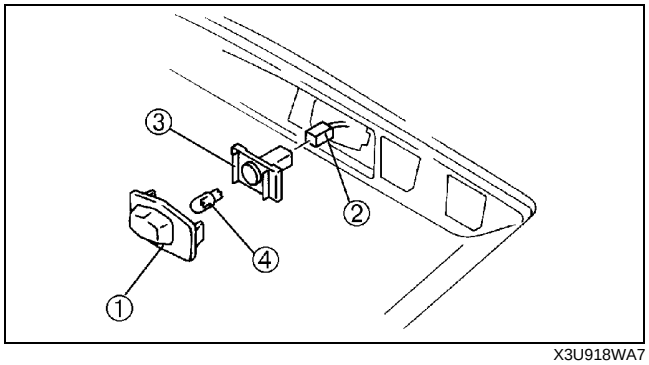
LICENSE PLATE LIGHT REMOVAL/INSTALLATION

A3U091851270W01

1. Disconnect the negative battery cable.
2. Remove the rear finisher. (See 09–16–3 REAR FINISHER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	License plate light (See 09–18–12 License Plate Light Removal Note)
2	Connector
3	Socket
4	License plate light bulb

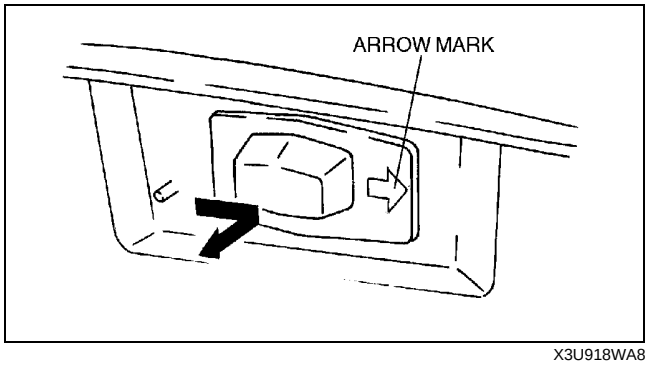
4. Install in the reverse order of removal.



X3U918WA7

License Plate Light Removal Note

1. Slide the license plate light to the arrow mark and remove it.



X3U918WA8

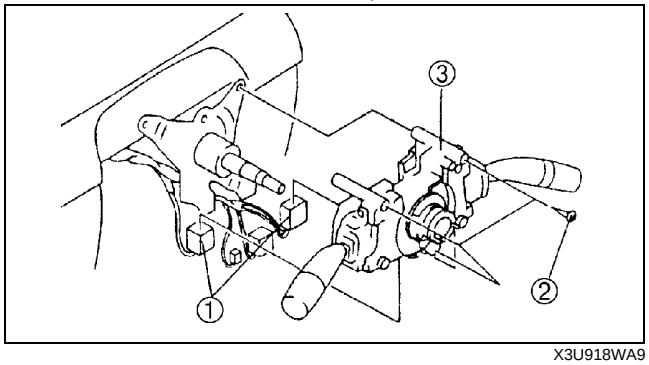
COMBINATION SWITCH REMOVAL/INSTALLATION

A3U091866120W01

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08–10–5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the steering wheel. (See 06–12–6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
4. Remove the column cover. (See 09–17–5 COLUMN COVER REMOVAL/INSTALLATION.)
5. Remove the clock spring. (See 08–10–9 CLOCK SPRING REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Combination switch

7. Install in the reverse order of removal.



X3U918WA9

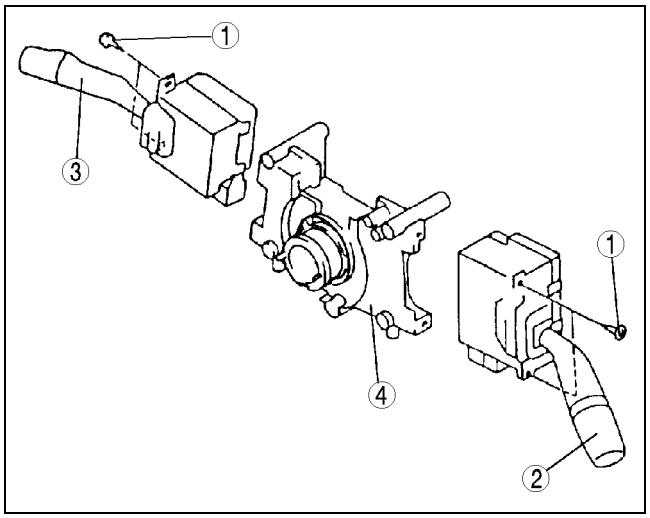
COMBINATION SWITCH DISASSEMBLY/ASSEMBLY

A3U091866120W02

1. Disassemble in the order indicated in the table.

1	Screw
2	Wiper lever
3	Light lever
4	Body

2. Assemble in the reverse order of disassembly.



Z3U0918W003

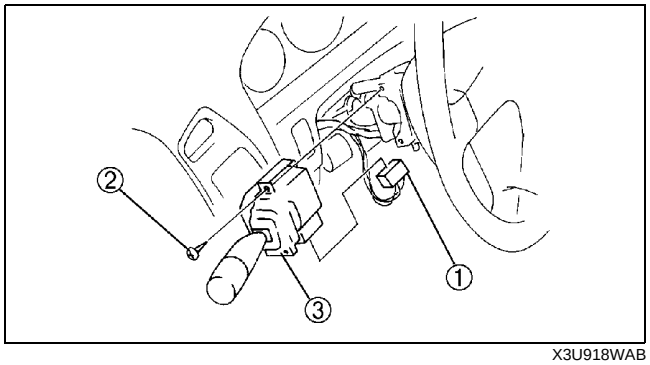
LIGHT SWITCH REMOVAL/INSTALLATION

A3U091866121W01

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09–17–5 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Light lever

4. Install in the reverse order of removal.



X3U918WAB

LIGHT SWITCH INSPECTION

A3U091866121W02

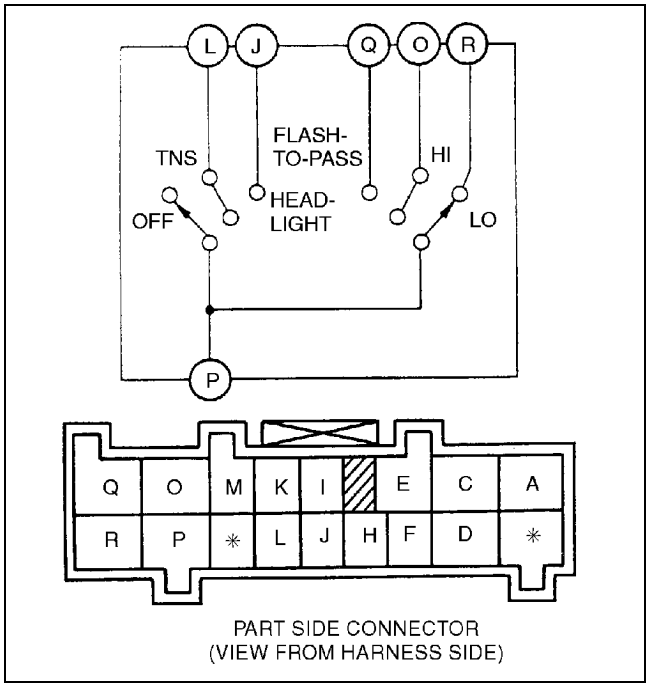
Headlight switch

1. Remove the light switch. (See 09–18–13 LIGHT SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the light switch terminals using an ohmmeter.
   - If not as specified, replace the light switch.

O—O : Continuity

Switch position			Terminal					
Light	Dimmer	Flash-to-pass	J	L	P	O	Q	R
OFF	–	Off						
		On			O	O	O	
TNS	–	Off		O	O			
		On		O	O	O	O	
Head-light	LO	Off	O	O	O			O
		On	O	O	O	O	O	
	HI	–	O	O	O	O		

Y3U918WAN



Y3U918WA0

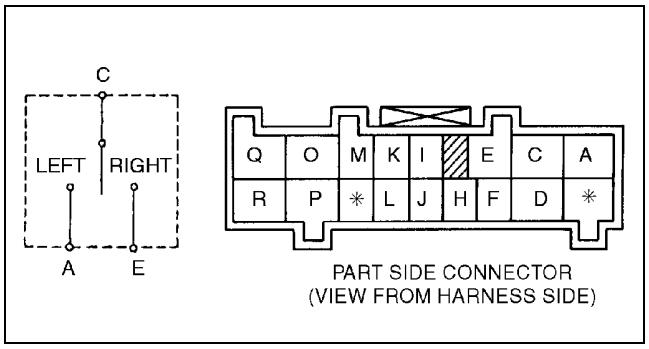
Turn switch

1. Remove the light switch. (See 09–18–13 LIGHT SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the light switch terminals using an ohmmeter.
   - If not as specified, replace the light switch.

○—○ : Continuity

Switch position	Terminal		
	C	A	E
Left	○	○	
Off			
Right	○		○

X3U918WBG

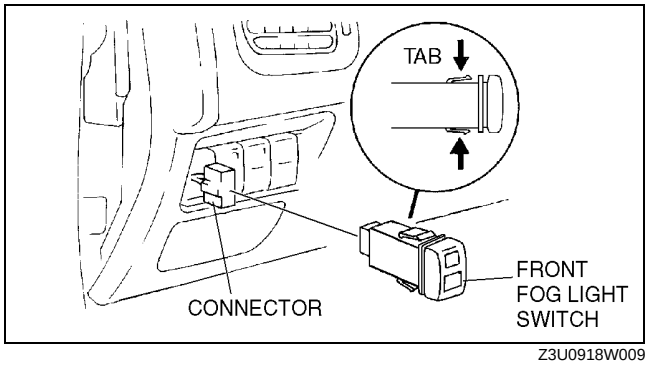


Y3U918WA1

FRONT FOG LIGHT SWITCH REMOVAL/INSTALLATION

A3U091866402W01

1. Disconnect the negative battery cable.
2. Remove the left side side panel from the dashboard.
3. Compress the tabs of the front fog light switch and pull the switch out of the dashboard.
4. Disconnect the connector to remove the front fog light switch.
5. Install in the reverse order of removal.



Z3U0918W009

FRONT FOG LIGHT SWITCH INSPECTION

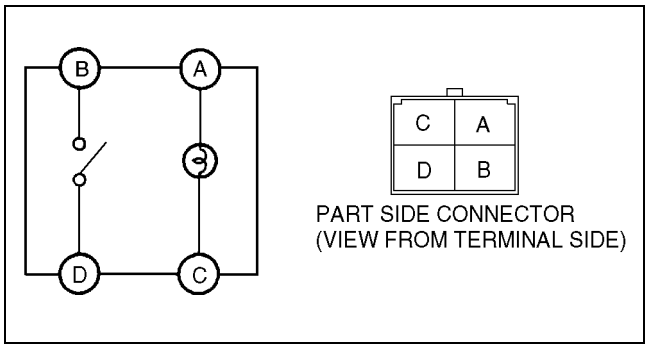
A3U091866402W02

1. Remove the front fog light switch. (See 09–18–14 FRONT FOG LIGHT SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the front fog light switch terminals using an ohmmeter.
   - If not as specified, replace the front fog light switch.

○—○ : Continuity ○—⓪—○ : Bulb

Switch position	Terminal			
	A	C	B	D
Off	○	⓪ ○		
On	○	⓪ ○	○	○

Z3U0918W008

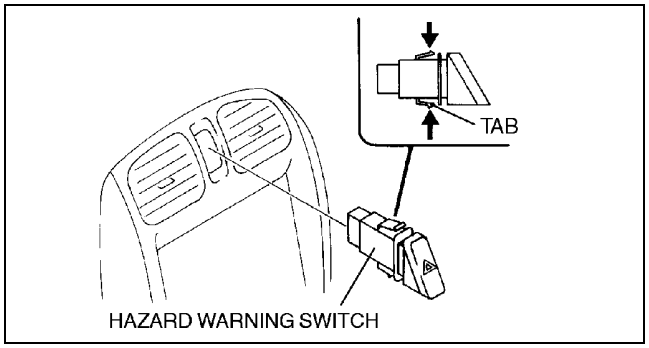


Z3U0918W007

HAZARD WARNING SWITCH REMOVAL/INSTALLATION

A3U091866401W01

1. Disconnect the negative battery cable.
2. Remove the center panel. (See 09–17–4 CENTER PANEL REMOVAL/INSTALLATION.)
3. Grasp the tabs of the hazard warning switch and pull it forward to remove it.
4. Install in the reverse order of removal.



Y3U918WAP

HAZARD WARNING SWITCH INSPECTION

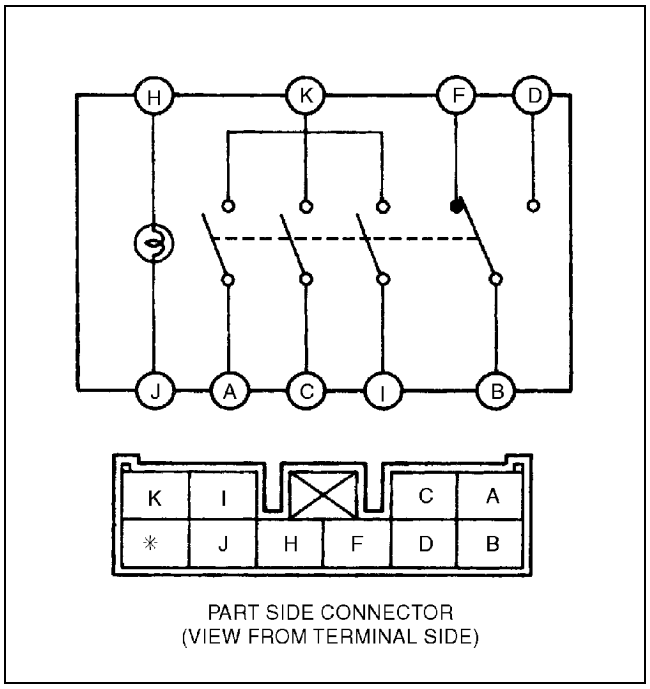
A3U091866401W02

1. Remove the hazard warning switch. (See 09–18–14 HAZARD WARNING SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the hazard warning switch terminals using an ohmmeter.
   - If not as specified, replace the hazard warning switch.

○—○ : Continuity ○—⓪—○ : Bulb

Switch position	Terminal								
	F	D	B	A	C	I	K	H	J
OFF	○		○					○—⓪—○	
ON		○	○	○	○	○	○	○—⓪—○	

X3U918WBH



Y3U918WA2

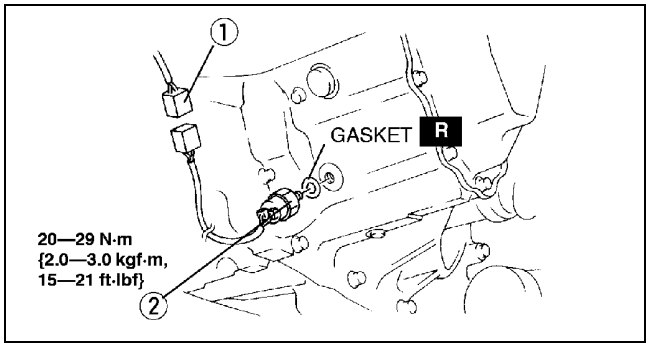
BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION

A3U091817640W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Connector
2	Back-up light switch

3. Install in the reverse order of removal.



X3U918WAG

BACK-UP LIGHT SWITCH INSPECTION

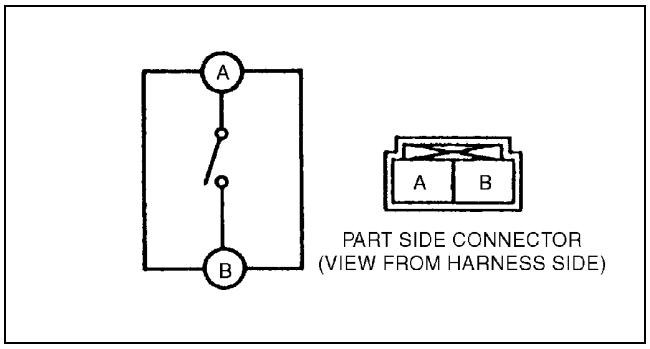
A3U091817640W02

1. Disconnect the back-up light switch connector.
2. Inspect for continuity between the back-up light switch terminals using an ohmmeter.
   - If not as specified, replace the back-up light switch.

○—○ : Continuity

Shift lever position	Terminal	
	A	B
Reverse	○	○
Other		

X3U918WBJ



Y3U918WA3

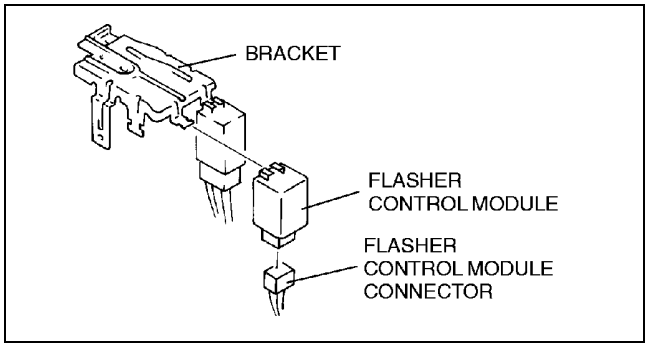
FLASHER CONTROL MODULE REMOVAL/INSTALLATION

A3U091866830W01

Note

- Because the lock section of the control module is damaged easily, do not remove the control module from the bracket unless replacement is necessary. Always perform an inspection of the flasher control module before removal.

1. Disconnect the negative battery cable.
2. Remove the bracket.
3. Disconnect the flasher control module connector.
4. Remove the flasher control module by prying the lock section of the upper part with a flathead screwdriver.
5. Install in the reverse order of removal.



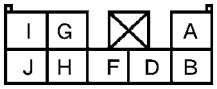
X3U918WAJ

FLASHER CONTROL MODULE INSPECTION

A3U091866830W02

1. Remove the bracket and pull it toward you.
2. Measure the voltage at the flasher control module terminals as indicated below.
3. Disconnect the flasher control module connector before inspecting for continuity at terminal F.
   - If not as specified, inspect the parts listed under “Action."
   - 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)



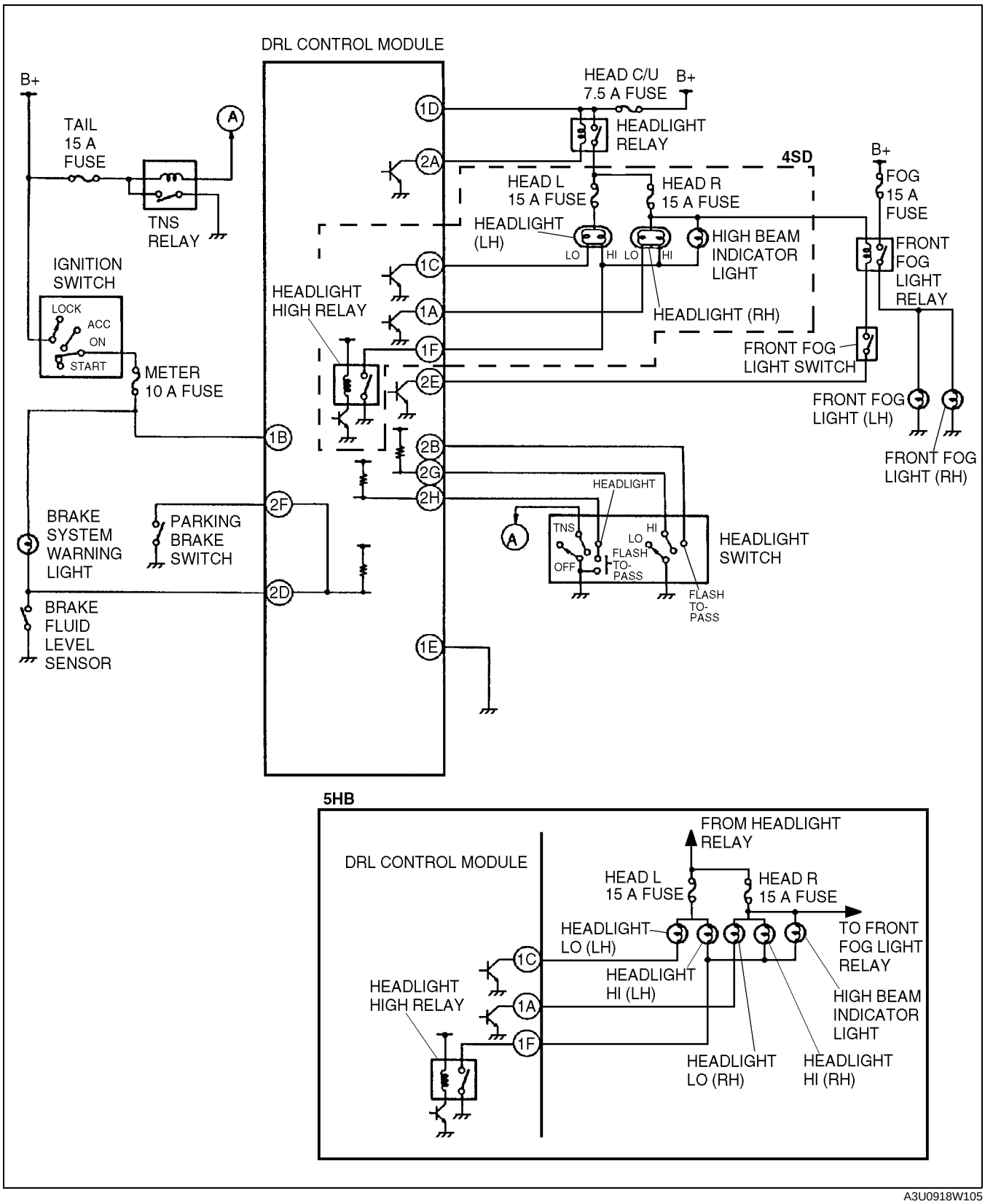
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

ZLU918WA6

Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
A	Power supply	HAZARD 15 A fuse	Under any condition	B+	• Inspect HAZARD 15 A fuse • Inspect related harness
B	—	—	—	—	—
D	Turn signal flasher (LH)	Turn signal light (LH)	Turn signal light (LH) flashes.	Alternates below 1.0 and B+	• Inspect turn signal light (LH) • Inspect related harness
			Hazard warning switch at on position.		
			Other	Below 1.0	
F	Flasher control module ground	GND	Constant: inspect for continuity to ground.	Yes	• Inspect GND
G	Turn signal flasher (RH)	Turn signal light (RH)	Turn signal light (RH) flashes.	Alternates below 1.0 and B+	• Inspect turn signal light (RH) • Inspect related harness
			Hazard warning switch at on position.		
			Other	Below 1.0	
H	Hazard warning on	Hazard warning switch	Hazard warning switch at on position.	Below 1.0	• Inspect hazard warning switch (See 09–18–15 HAZARD WARNING SWITCH INSPECTION) • Inspect related harness
			Hazard warning switch at off position.	B+	
I	Turn switch on/ off (RH)	Combination switch (light switch)	Ignition switch is at ON and turn switch (RH) on.	B+	• Inspect light switch (See 09–18–13 LIGHT SWITCH INSPECTION) • Inspect TURN 10 A fuse • Inspect related harness
			Other	Below 1.0	
J	Turn switch on/ off (LH)	Combination switch (light switch)	Ignition switch is at ON and turn switch (LH) on.	B+	• Inspect light switch (See 09–18–13 LIGHT SWITCH INSPECTION) • Inspect TURN 10 A fuse • Inspect related harness
			Other	Below 1.0	

DAYTIME RUNNING LIGHT (DRL) SYSTEM WIRING DIAGRAM

A3U091867750W01



A3U0918W105

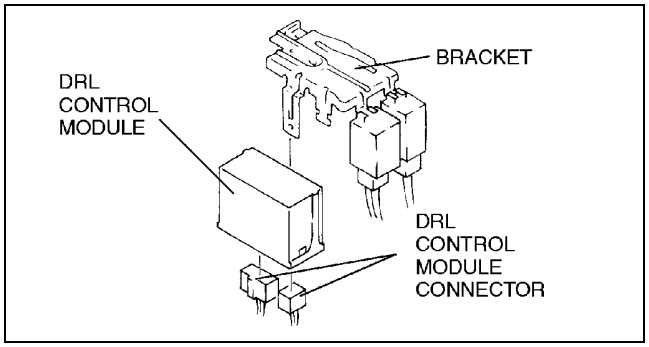
09–18

DRL CONTROL MODULE REMOVAL/INSTALLATION (CANADA)

A3U091867750W02

Note
- Because the lock section of the control module is damaged easily, do not remove the control module from the bracket unless replacement is necessary. Always perform an inspection of the DRL control module before removal.

1. Remove the negative battery cable.
2. Remove the bracket.
3. Disconnect the DRL control module connector.
4. Remove the DRL control module by prying the lock section of the side part with a flathead screwdriver.
5. Install in the reverse order of removal.



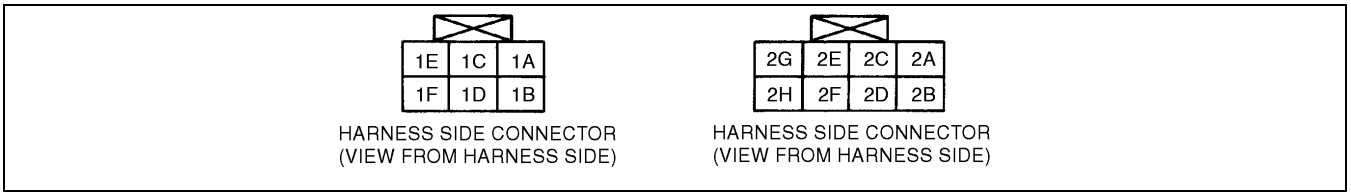
X3U918WAL

DRL CONTROL MODULE INSPECTION (CANADA)

A3U091867750W03

1. Remove the bracket and pull it toward you.
2. Measure the voltage at the DRL control module terminals as indicated below.
3. Disconnect the DRL control module connector before inspecting for continuity at terminal 1E.
   - If not as specified, inspect the parts listed under “Action.”
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the DRL control module.

Terminal Voltage List (Reference)



Y3U918WA7

Terminal	Signal	Connected to	Test condition			Voltage (V)/ Continuity	Action
1A	RH headlight operation (low beam)	RH headlight (low beam)	Headlight switch at headlight position	Dimmer switch at high beam position	4SD	B+	• Inspect HEAD R 15 A fuse • Inspect RH headlight • Inspect related harness
					5HB	Below 1.5	
				Dimmer switch at low beam position		Below 1.5	
			Headlight switch at OFF or TNS position			Below 1.5	
1B	IG1	METER 10 A fuse	Ignition switch at ON position			B+	• Inspect METER 10 A fuse • Inspect related harness
			Ignition switch at LOCK or ACC position			Below 1.0	
1C	LH headlight operation (low beam)	LH headlight (low beam)	Headlight switch at headlight position	Dimmer switch at high beam position	4SD	B+	• Inspect HEAD L 15 A fuse • Inspect LH headlight • Inspect related harness
					5HB	Below 1.5	
				Dimmer switch at low beam position		Below 1.5	
			Headlight switch at OFF or TNS position			Below 1.5	
1D	Power supply	HEAD C/U 7.5 A fuse	Under any condition			B+	• Inspect HEAD C/U 7.5 A fuse • Inspect related harness
1E	DRL control module ground	GND	Constant: inspect for continuity to ground			Yes	• Inspect related harness

Terminal	Signal	Connected to	Test condition		Voltage (V)/ Continuity	Action
1F	Headlight operation (high beam)	Headlight (high beam)	Headlight switch at headlight position	Dimmer switch at high beam position	Below 1.0	• Inspect headlight • Inspect HEAD R 15 A fuse • Inspect HEAD L 15 A fuse • Inspect related harness
				Dimmer switch at low beam position	B+	
			Headlight switch at OFF or TNS position		Below 1.0	
2A	Headlight relay operation	Headlight relay	Headlight switch at headlight position		Below 1.0	• Inspect headlight relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
			Headlight switch at OFF or TNS position		B+	
2B	Flash-to-pass on/off	Headlight switch	Flash-to-pass activated		Below 1.0	• Inspect combination switch • Inspect related harness
			Flash-to-pass not activated		B+	
2C	—	—	—		—	—
2D	Brake system warning light operation	• Brake system warning light • Brake fluid level sensor	Ignition switch at ON position	Brake fluid level is below MIN.	Below 1.0	• Inspect METER 10 A fuse • Inspect instrument cluster (See 09–22–4 INSTRUMENT CLUSTER INSPECTION) • Inspect brake fluid level sensor (See 04–11–9 FLUID LEVEL SENSOR INSPECTION) • Inspect related harness
				Brake fluid level is above MIN.	B+	
			Ignition switch at LOCK or ACC position		Below 1.0	
2E	Front fog light relay operation	Front fog light switch	• Headlight switch at headlight position • Front fog light switch on	Dimmer switch at high beam position	B+	• Inspect front fog light relay (See 09–21–5 RELAY INSPECTION) • Inspect related harness
				Dimmer switch at low beam position	Below 1.5	
2F	Parking brake lever pulled/ released	Parking brake switch	Parking brake lever pulled		Below 1.0	• Inspect parking brake switch • Inspect related harness
			Parking brake lever released		B+	
2G	High beam on/off	Headlight switch	Dimmer switch at high beam position		Below 1.0	• Inspect combination switch • Inspect related harness
			Dimmer switch at low beam position		B+	
2H	Headlight switch on/off	Headlight switch	Headlight switch at headlight position		Below 1.0	• Inspect combination switch • Inspect related harness
			Headlight switch at OFF or TNS position		B+	

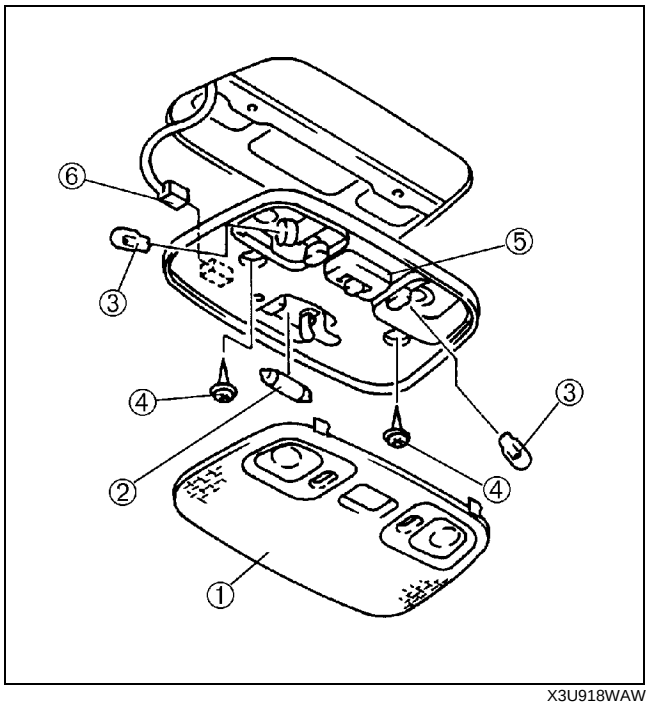
INTERIOR AND MAP LIGHT REMOVAL/INSTALLATION

A3U091851310W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Lens (See 09–18–20 Lens Removal Note)
2	Interior light bulb
3	Map light bulb
4	Screw
5	Interior and map light
6	Connector

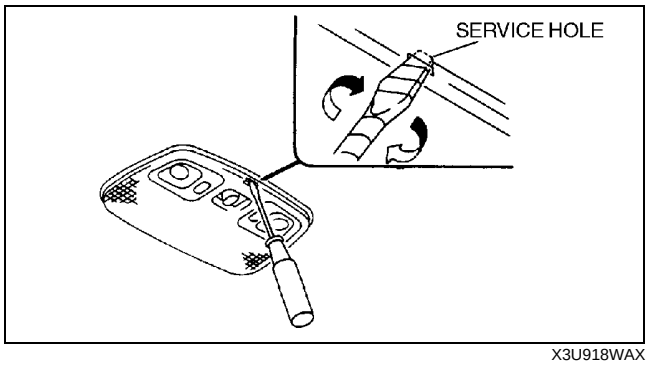
3. Install in the reverse order of removal.



X3U918WAW

Lens Removal Note

1. Insert a tape-wrapped, flathead screwdriver into the service hole.
2. Twist the flathead screwdriver in the direction indicated by the arrow to remove the lens.



X3U918WAX

INTERIOR AND MAP LIGHT INSPECTION

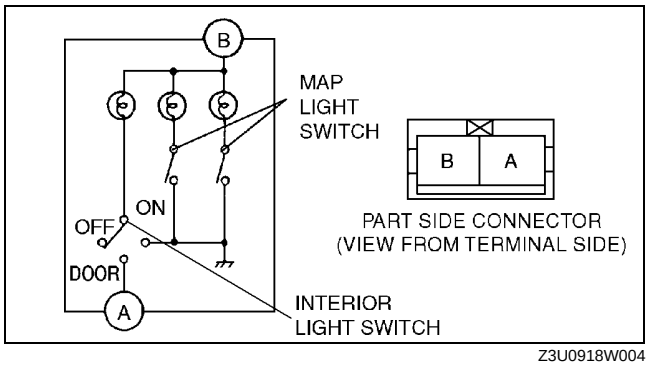
A3U091851310W02

1. Remove the interior and map light. (See 09–18–20 INTERIOR AND MAP LIGHT REMOVAL/INSTALLATION.)
2. Inspect for continuity between the interior and map light terminals using an ohmmeter.
   - If not as specified, replace the interior and map light.

○—◎—○ : Bulb

Switch position		Terminal		
		A	B	Body GND
Map light switch	ON		○—◎—○	
	OFF			
Interior light switch	ON		○—◎—○	
	DOOR	○—◎—○		
	OFF			

Y3U918WAK



Z3U0918W004

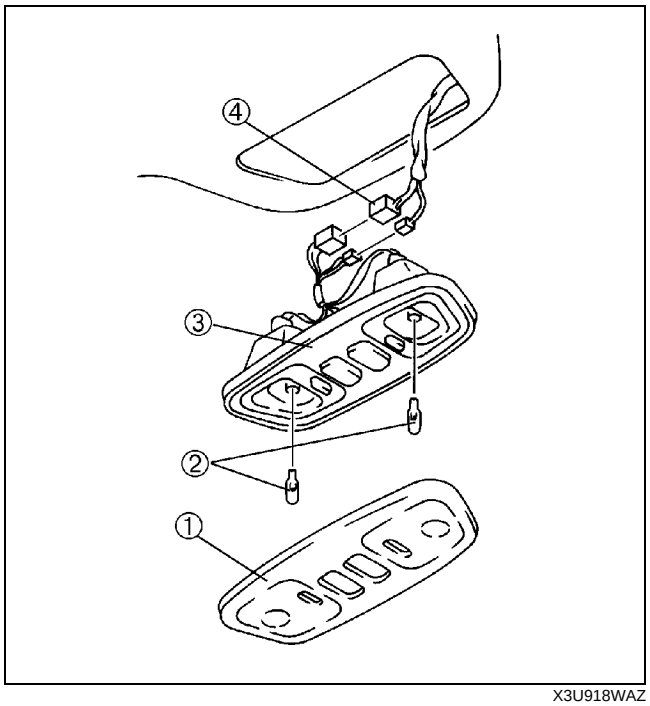
MAP LIGHT REMOVAL/INSTALLATION

A3U091851310W03

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Lens (See 09–18–21 Lens Removal Note)
2	Map light bulb
3	Map light
4	Connector

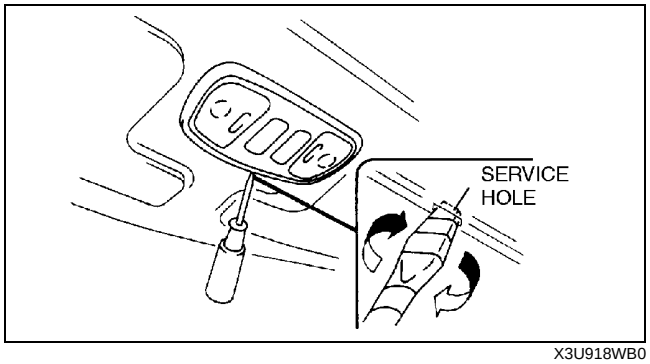
3. Install in the reverse order of removal.



X3U918WAZ

Lens Removal Note

1. Insert a tape-wrapped, flathead screwdriver into the service hole.
2. Twist the flathead screwdriver in the direction indicated by the arrow to remove the lens.



X3U918WB0

MAP LIGHT INSPECTION

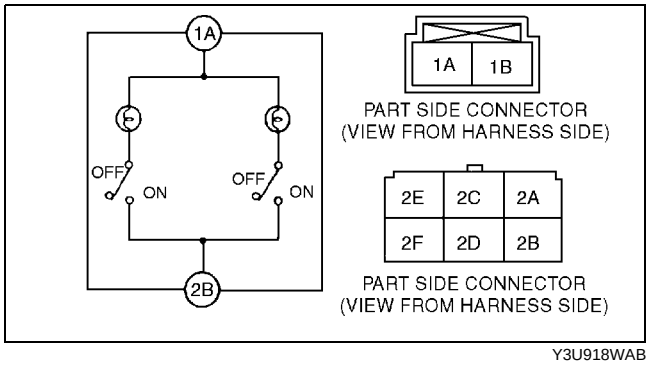
A3U091851310W04

1. Remove the map light. (See 09–18–21 MAP LIGHT REMOVAL/INSTALLATION.)
2. Inspect for continuity between the map light terminals using an ohmmeter.
   - If not as specified, replace the map light.

○-⓪-○ : Bulb

Switch position	Terminal	
	1A	2B
ON	○	○
OFF		

X3U918WBN



Y3U918WAB

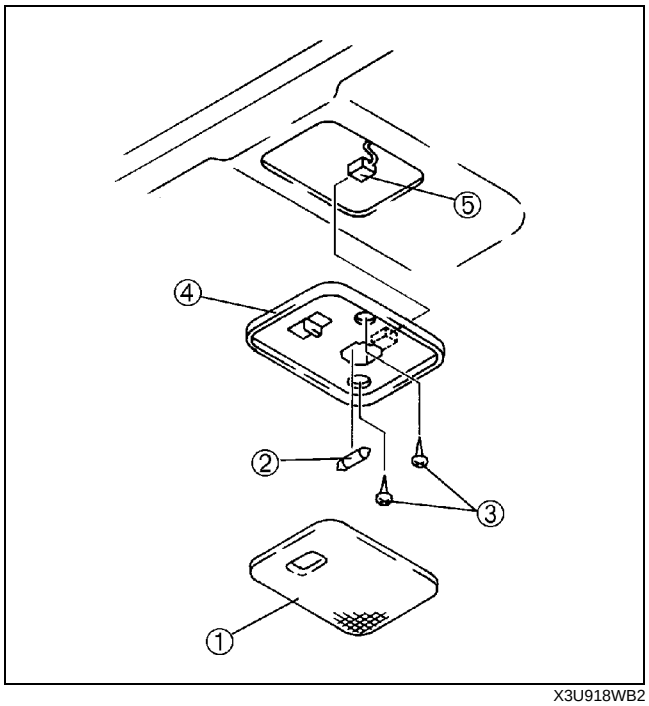
INTERIOR LIGHT REMOVAL/INSTALLATION

A3U091869970W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Lens (See 09–18–22 Lens Removal Note)
2	Interior light bulb
3	Screw
4	Interior light
5	Connector

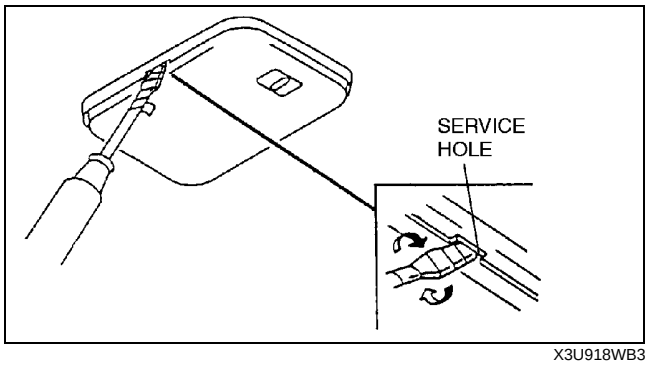
3. Install in the reverse order of removal.



X3U918WB2

Lens Removal Note

1. Insert a tape-wrapped, flathead screwdriver into the service hole.
2. Twist the flathead screwdriver in the direction indicated by the arrow to remove the lens.



X3U918WB3

INTERIOR LIGHT INSPECTION

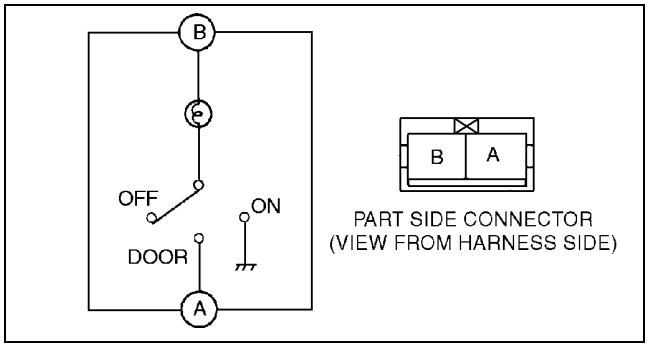
A3U091869970W02

1. Remove the interior light. (See 09–18–22 INTERIOR LIGHT REMOVAL/INSTALLATION.)
2. Inspect for continuity between the interior light terminals using an ohmmeter.
   - If not as specified, replace the interior light.

: Bulb

Switch position	Terminal		
	A	B	Body GND
ON		○	○ ○
DOOR	○	○	
OFF			

X3U918WBP

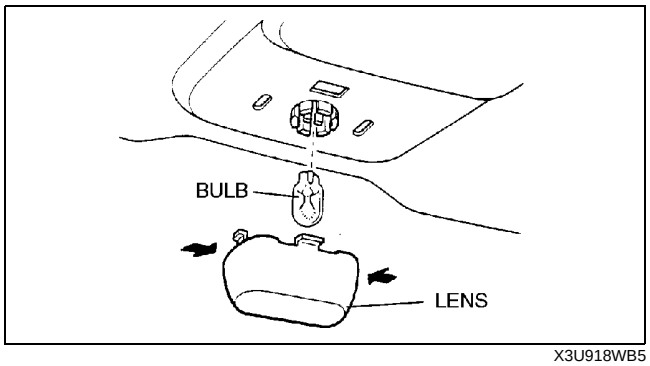


Z3U0918W005

TRUNK COMPARTMENT LIGHT BULB REMOVAL/INSTALLATION

A3U091851440W01

1. Disconnect the negative battery cable.
2. Pinch the sides of the lens and pull down to remove.
3. Remove the bulb.
4. Install in the reverse order of removal.



X3U918WB5

TRUNK COMPARTMENT LIGHT SWITCH INSPECTION

A3U091851440W02

Note

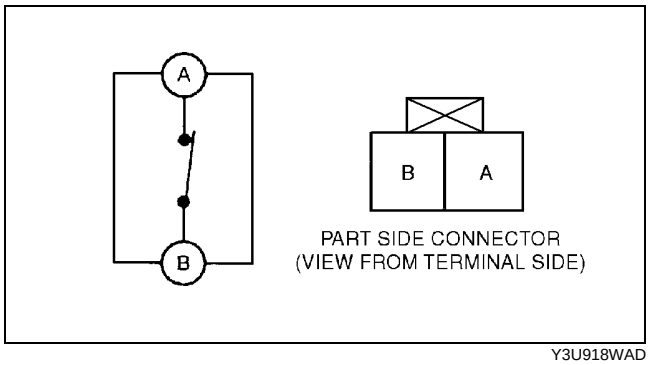
- Trunk compartment light switch has a built-in trunk lid lock.

1. Disconnect the trunk compartment light switch connector.
2. Inspect for continuity between the trunk compartment light switch terminal and a body ground using an ohmmeter.
   - If not as specified, replace the trunk lid lock.

○—○ : Continuity

Switch position	Terminal	
	A	B
Locked (trunk lid closed)		
Unlocked (trunk lid opened)	○	○

X3U918WBQ

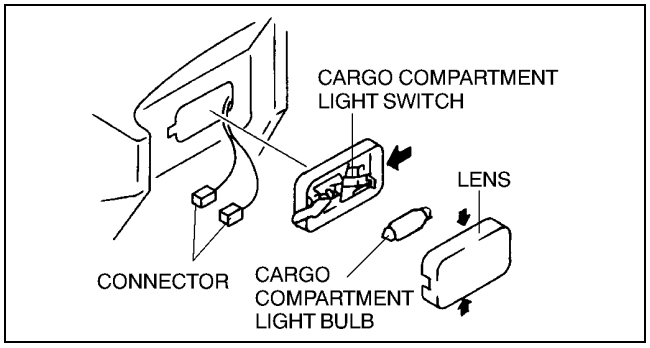


Y3U918WAD

CARGO COMPARTMENT LIGHT REMOVAL/INSTALLATION

A3U091851441W01

1. Disconnect the negative battery cable.
2. Pinch the sides of the lens and pull to remove.
3. Remove the cargo compartment light bulb.
4. Push the area indicated by the arrow and pull to remove the cargo compartment light.
5. Disconnect the connectors.
6. Install in the reverse order of removal.



A3U0918W005

CARGO COMPARTMENT LIGHT INSPECTION

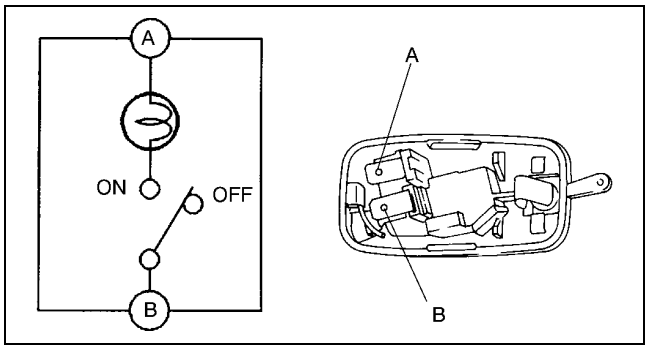
A3U091851441W02

1. Remove the cargo compartment light. (See 09–18–23 CARGO COMPARTMENT LIGHT REMOVAL/INSTALLATION.)
2. Inspect for continuity between the cargo compartment light terminals using an ohmmeter.
   - If not as specified, replace the cargo compartment light.

○—⊙—○ : Bulb

Switch position	Terminal	
	A	B
ON	○	○
OFF		

YMU918WB7



A3U0918W007

CARGO COMPARTMENT LIGHT SWITCH INSPECTION

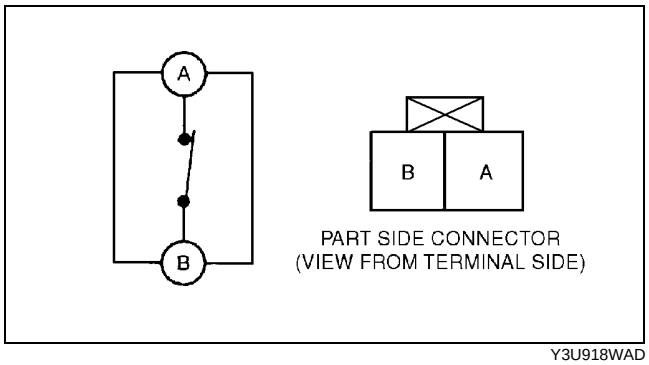
A3U091851442W01

1. Remove the liftgate trim. (See 09–17–16 LIFTGATE TRIM REMOVAL/INSTALLATION.)
2. Disconnect the cargo compartment light switch connector.
3. Inspect for continuity between the cargo compartment light switch terminals using an ohmmeter.
   - If not as specified, replace the liftgate lock.

○—○ : Continuity

Switch position	Terminal	
	A	B
On (liftgate open)	○	○
Off (liftgate closed)		

YMU918WB9

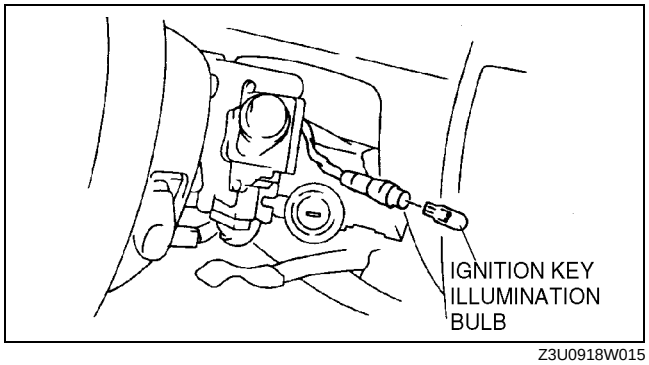


Y3U918WAD

IGNITION KEY ILLUMINATION BULB REMOVAL/INSTALLATION

A3U091860231W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Remove the ignition key illumination bulb.
4. Install in the reverse order of removal.



Z3U0918W015

DOOR SWITCH REMOVAL/INSTALLATION

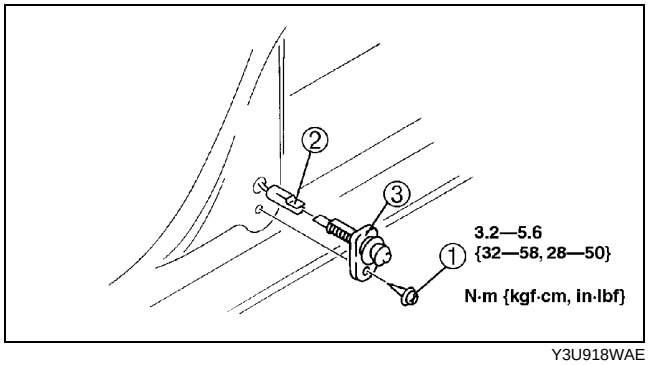
A3U091866540W01

Front

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Screw
2	Connector
3	Door switch

3. Install in the reverse order of removal.



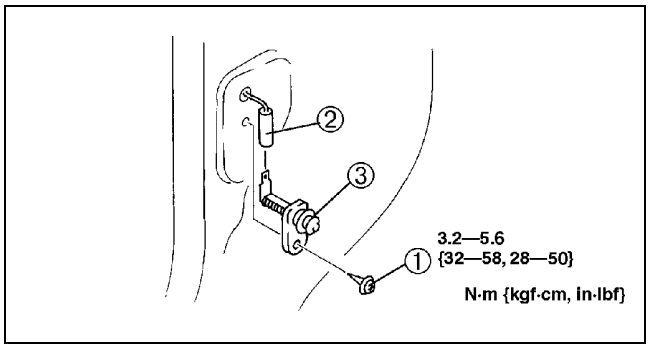
Y3U918WAE

Rear

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Screw
2	Connector
3	Door switch

3. Install in the reverse order of removal.



Y3U918WAF

DOOR SWITCH INSPECTION

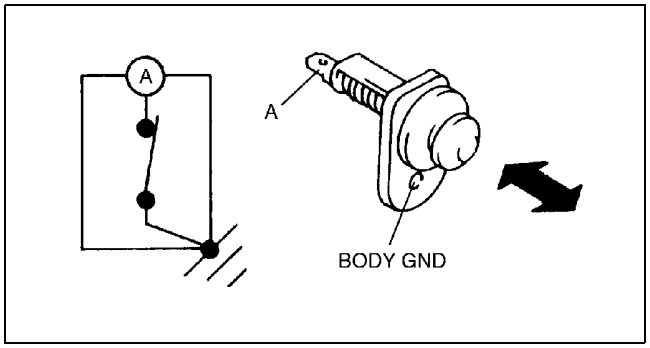
A3U091866540W02

1. Remove the door switch. (See 09–18–24 DOOR SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the door switch terminal and a body ground using an ohmmeter.
   - If not as specified, replace the door switch.

○—○ : Continuity

Switch position	Terminal	
	A	Body GND
Pressed		
Released	○	○

X3U918WBR



X3U918WB9

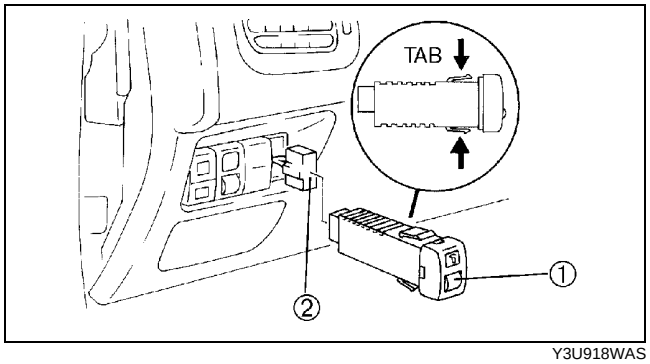
PANEL LIGHT CONTROL SWITCH REMOVAL/INSTALLATION

A3U091866600W01

1. Disconnect the negative battery cable.
2. Remove the driver-side side panel.
3. Remove in the order indicated in the table.

1	Panel light control switch (See 09–18–25 Panel Light Control Switch Removal Note)
2	Connector

4. Install in the reverse order of removal.



Y3U918WAS

Panel Light Control Switch Removal Note

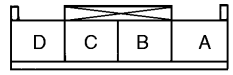
1. Insert your hand into the hole in the driver-side side panel, grasp the tabs of the panel light control switch and pull it forward to remove.

PANEL LIGHT CONTROL SWITCH INSPECTION

A3U091866600W02

1. Remove the panel light control switch. (See 09–18–25 PANEL LIGHT CONTROL SWITCH REMOVAL/INSTALLATION.)
2. Connect the negative battery cable.
3. Connect the connector to the panel light control switch.
4. Measure the voltage at the panel light control switch as indicated below.
5. Disconnect the panel light control switch connector before inspecting for continuity at terminal D.
   - If not as specified, inspect the parts listed under “Action.”
   - 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)



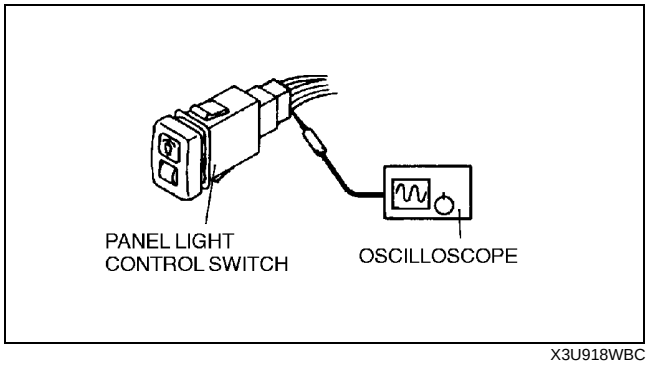
PART SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Y3U918WAG

Terminal	Signal	Connected to	Test condition	Voltage (V)/ Continuity	Action
A	—	—	—	—	—
B	TNS	TNS relay	Headlight switch at TNS or headlight position	B+	• Inspect TNS relay • Inspect combination switch • Inspect TAIL 15 A fuse • Inspect related harness
			Other	Below 1.0	
C	Illumination	Each illumination	Inspect using an oscilloscope (See 09–18–26 Terminal C inspection)	—	• Inspect each illumination • Inspect related harness
D	Ground	GND	Constant: inspect for continuity to ground	Yes	• Inspect GND

Terminal C inspection

1. Measure the wave pattern of the C terminal on the panel light control switch using an oscilloscope.
2. Set the headlight switch to either the TNS or headlight position.
3. Set the panel light control switch to the brightest position.

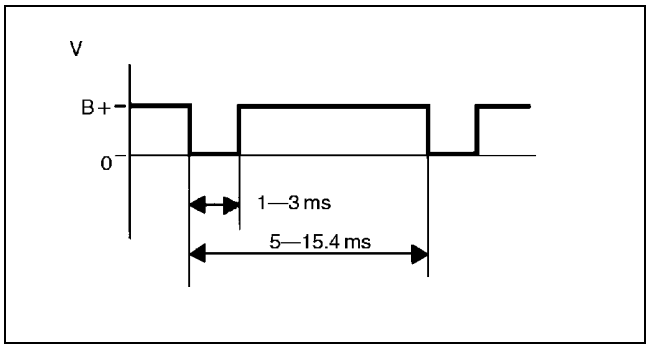


X3U918WBC

4. Verify that the pattern on the screen is as shown in the figure.

X3U918WBD

5. 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.



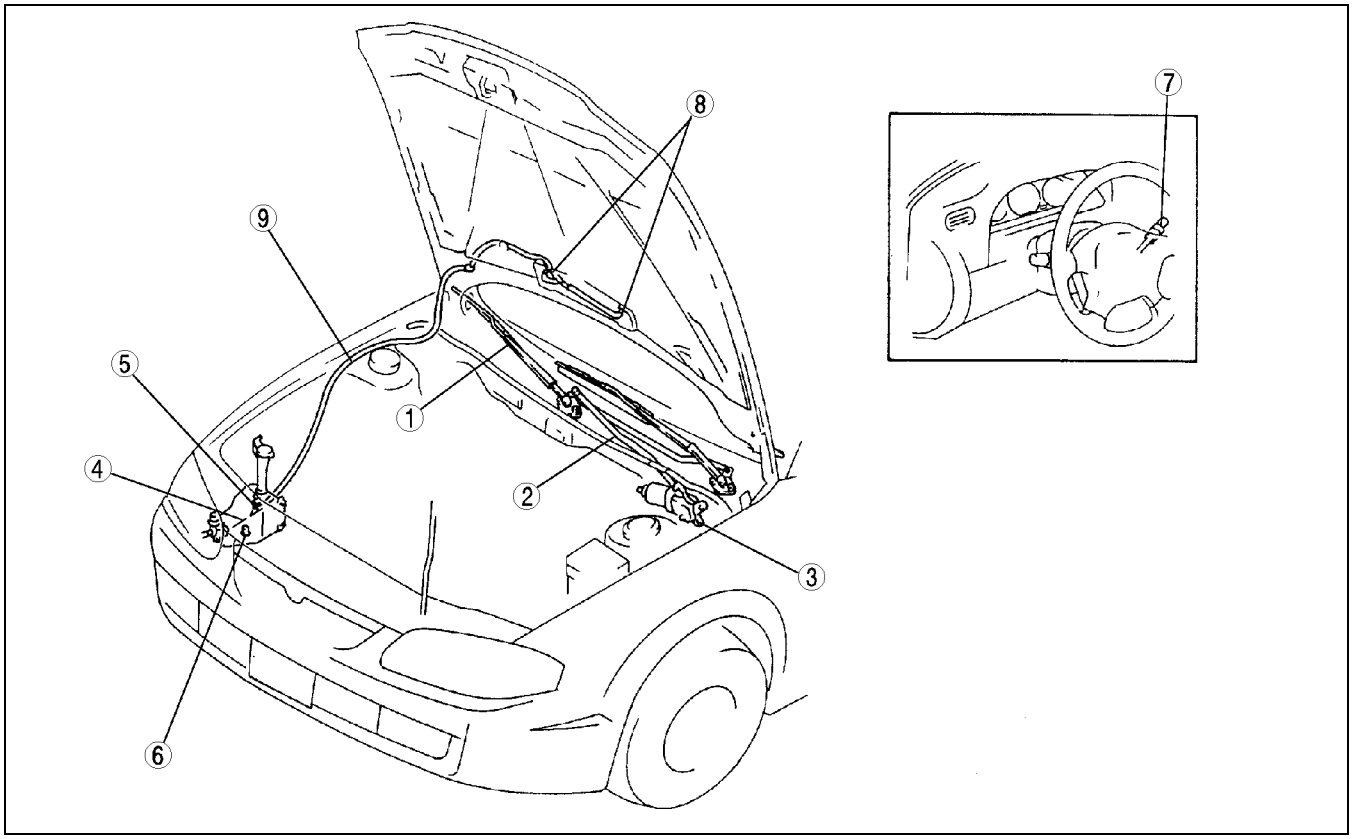
X3U918WBE

09–19 WIPER/WASHER SYSTEM

LOCATION INDEX

A3U091901063W01

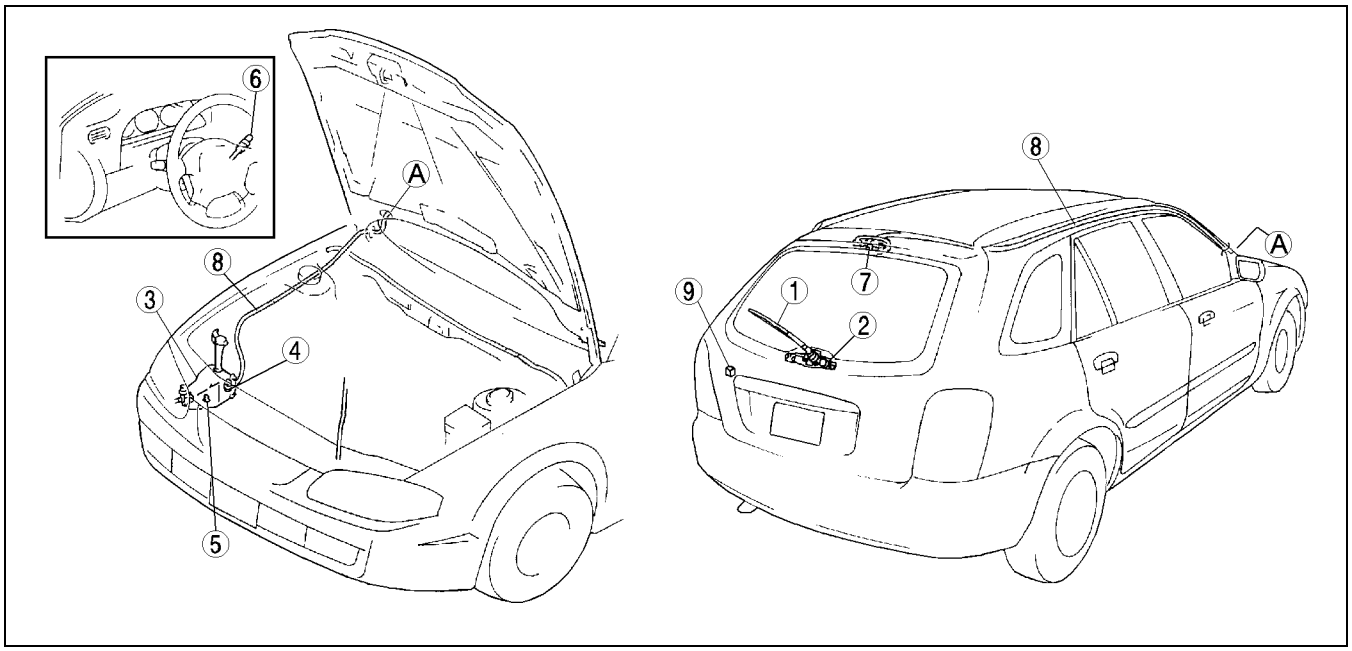
Windshield Wiper and Washer System



Z3U0919W003

1	Windshield wiper arm and blade (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT) (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION)
2	Windshield wiper link (See 09–19–5 WINDSHIELD WIPER LINK REMOVAL/INSTALLATION)
3	Windshield wiper motor (See 09–19–6 WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION) (See 09–19–6 WINDSHIELD WIPER MOTOR INSPECTION)
4	Washer tank (See 09–19–7 WASHER TANK REMOVAL/ INSTALLATION)
5	Windshield washer motor (See 09–19–7 WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION) (See 09–19–8 WINDSHIELD WASHER MOTOR INSPECTION)
6	Washer fluid-level sensor (See 09–19–8 WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION) (See 09–19–8 WASHER FLUID-LEVEL SENSOR INSPECTION)
7	Wiper and washer switch (See 09–19–9 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION) (See 09–19–9 WIPER AND WASHER SWITCH INSPECTION)
8	Windshield washer nozzle (See 09–19–10 WINDSHIELD WASHER NOZZLE ADJUSTMENT) (See 09–19–11 WINDSHIELD WASHER NOZZLE CLEANING) (See 09–19–11 WINDSHIELD WASHER NOZZLE REMOVAL) (See 09–19–11 WINDSHIELD WASHER NOZZLE INSTALLATION)
9	Windshield washer hose (See 09–19–11 WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION)

Rear Wiper and Washer System



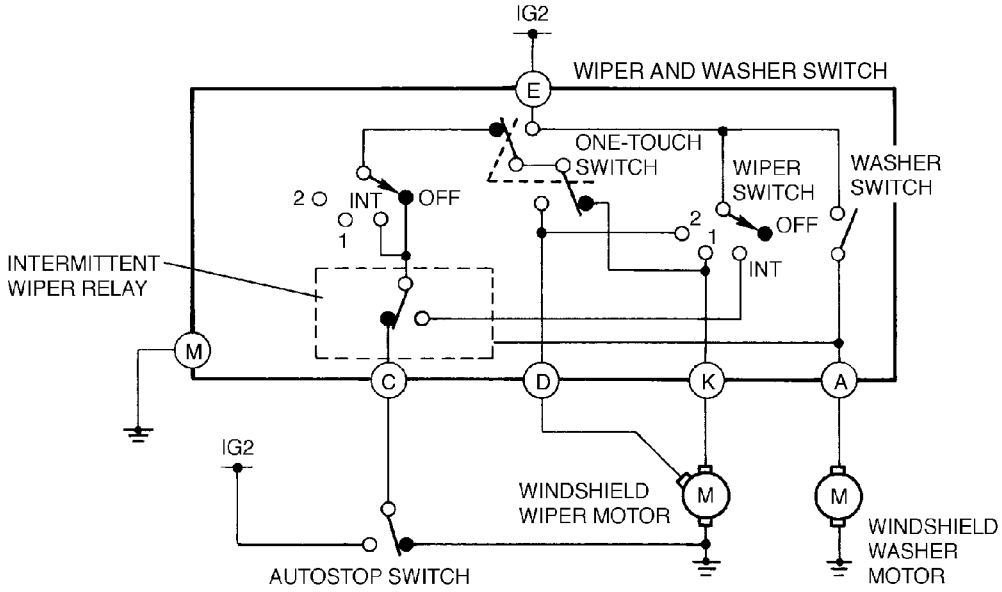
A3U0919W109

1	Rear wiper arm and blade (See 09–19–12 REAR WIPER ARM AND BLADE ADJUSTMENT) (See 09–19–12 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION)
2	Rear wiper motor (See 09–19–12 REAR WIPER MOTOR REMOVAL/INSTALLATION) (See 09–19–13 REAR WIPER MOTOR INSPECTION)
3	Windshield washer tank (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION)
4	Rear washer motor (See 09–19–14 REAR WASHER MOTOR REMOVAL/INSTALLATION) (See 09–19–14 REAR WASHER MOTOR INSPECTION)
5	Washer fluid-level sensor (See 09–19–8 WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION) (See 09–19–8 WASHER FLUID-LEVEL SENSOR INSPECTION)
6	Wiper and washer switch (See 09–19–9 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION) (See 09–19–9 WIPER AND WASHER SWITCH INSPECTION)
7	Rear washer nozzle (See 09–19–15 REAR WASHER NOZZLE ADJUSTMENT) (See 09–19–15 REAR WASHER NOZZLE CLEANING) (See 09–19–14 REAR WASHER NOZZLE REMOVAL/INSTALLATION)
8	Rear washer hose (See 09–19–15 REAR WASHER HOSE REMOVAL/INSTALLATION)
9	Intermittent rear wiper relay (See 09–19–16 INTERMITTENT REAR WIPER RELAY REMOVAL/INSTALLATION) (See 09–19–16 INTERMITTENT REAR WIPER RELAY INSPECTION)

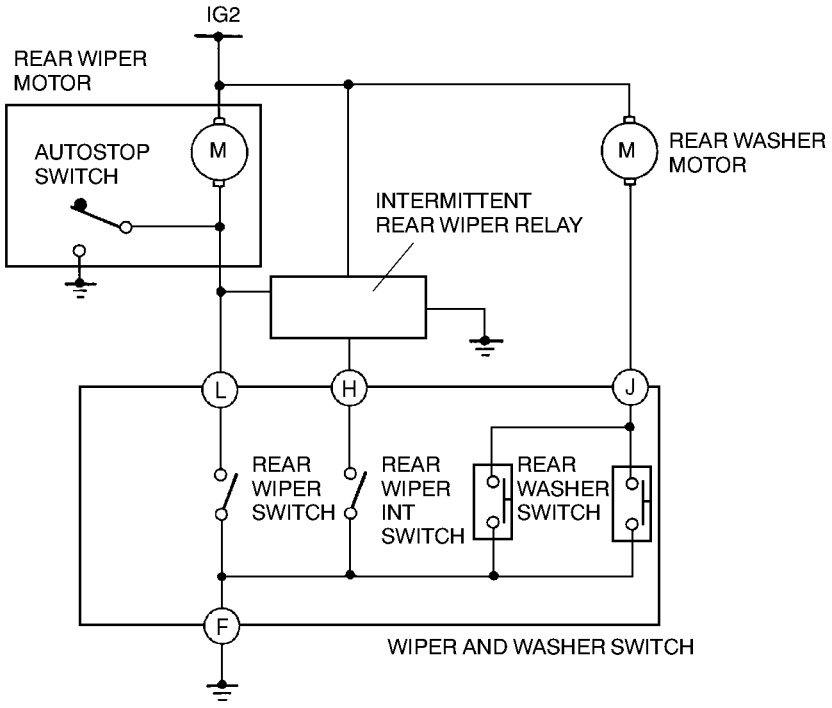
WIPER/WASHER SYSTEMS WIRING DIAGRAM

A3U091901063W02

WINDSHIELD WIPER AND WASHER SYSTEM



REAR WIPER AND WASHER SYSTEM

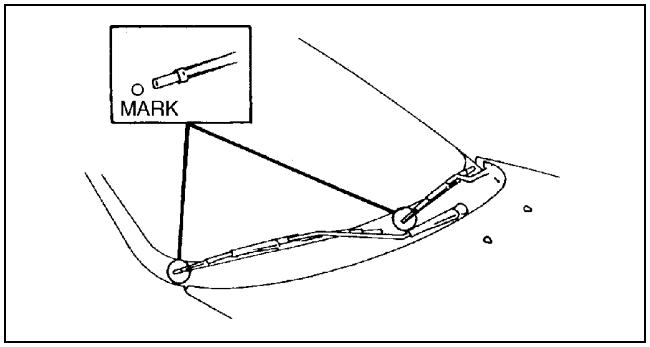


A3U0919W108

WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT

A3U091967320W01

1. Operate the windshield wiper motor to set the wipers in the park position.
2. Align the windshield wiper blades to the marks.



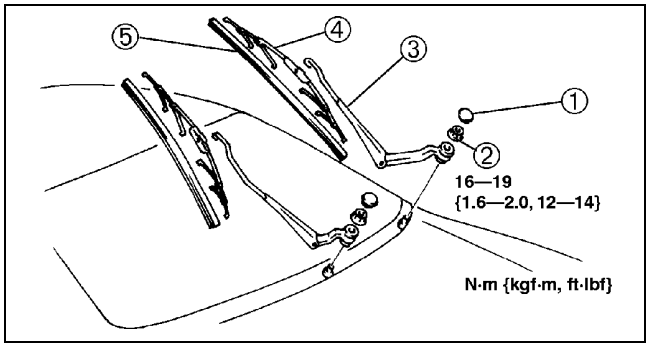
X3U919WA4

WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION

A3U091967320W02

1. Remove in the order indicated in the table.

1	Cap
2	Nut
3	Windshield wiper arm (See 09–19–5 Windshield Wiper Arm Installation Note)
4	Windshield wiper blade
5	Rubber brush

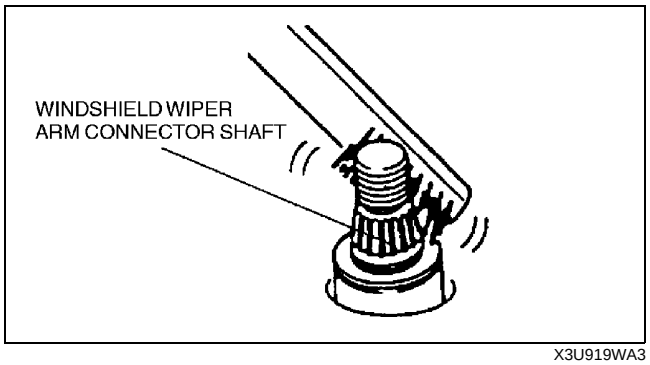


X3U919WA2

2. Install in the reverse order of removal.
3. Adjust the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)

Windshield Wiper Arm Installation Note

1. Clean the windshield wiper arm connector shafts using a wire brush before installing the windshield wiper arms.



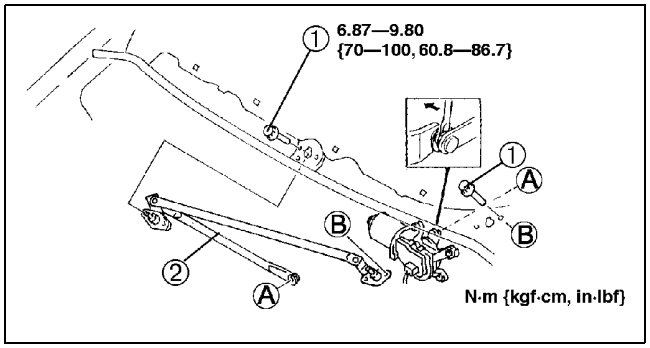
X3U919WA3

WINDSHIELD WIPER LINK REMOVAL/INSTALLATION

A3U091967360W01

1. Remove the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09–16–1 COWL GRILLE REMOVAL/INSTALLATION.)
3. Pry off the connection between the windshield wiper motor and windshield wiper link.
4. Remove in the order indicated in the table.

1	Bolt
2	Windshield wiper link



X3U919WA5

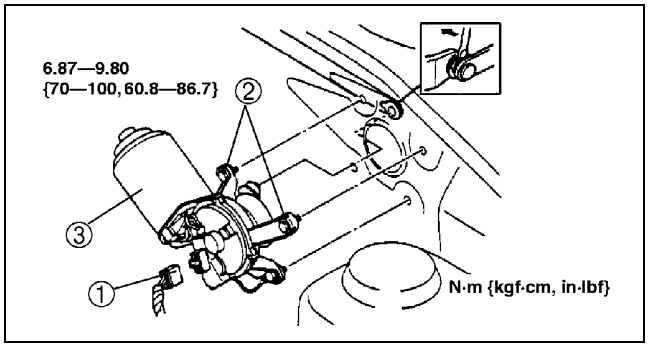
5. Install in the reverse order of removal.
6. Adjust the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)

WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION

A3U091967340W01

1. Disconnect the negative battery cable.
2. Remove the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
3. Remove the cowl grille. (See 09–16–1 COWL GRILLE REMOVAL/INSTALLATION.)
4. Pry off the connection between the windshield wiper motor and windshield wiper link.
5. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	Windshield wiper motor



X3U919WA0

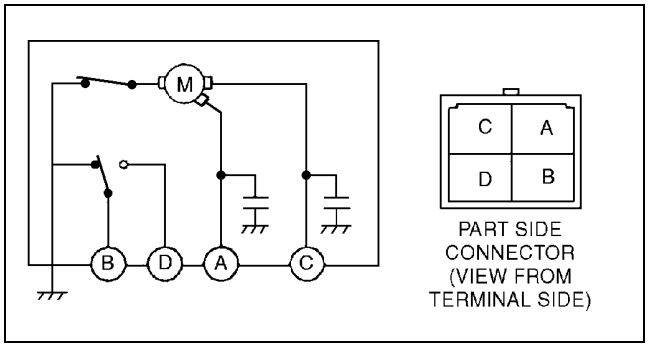
6. Install in the reverse order of removal.
7. Adjust the windshield wiper arm and blade. (See 09–19–5 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)

WINDSHIELD WIPER MOTOR INSPECTION

A3U091967340W02

1. Disconnect the windshield wiper motor connector.
2. Connect battery positive voltage and inspect the operation of the windshield wiper motor as indicated below.

Terminal	Operation
A	High
C	Low



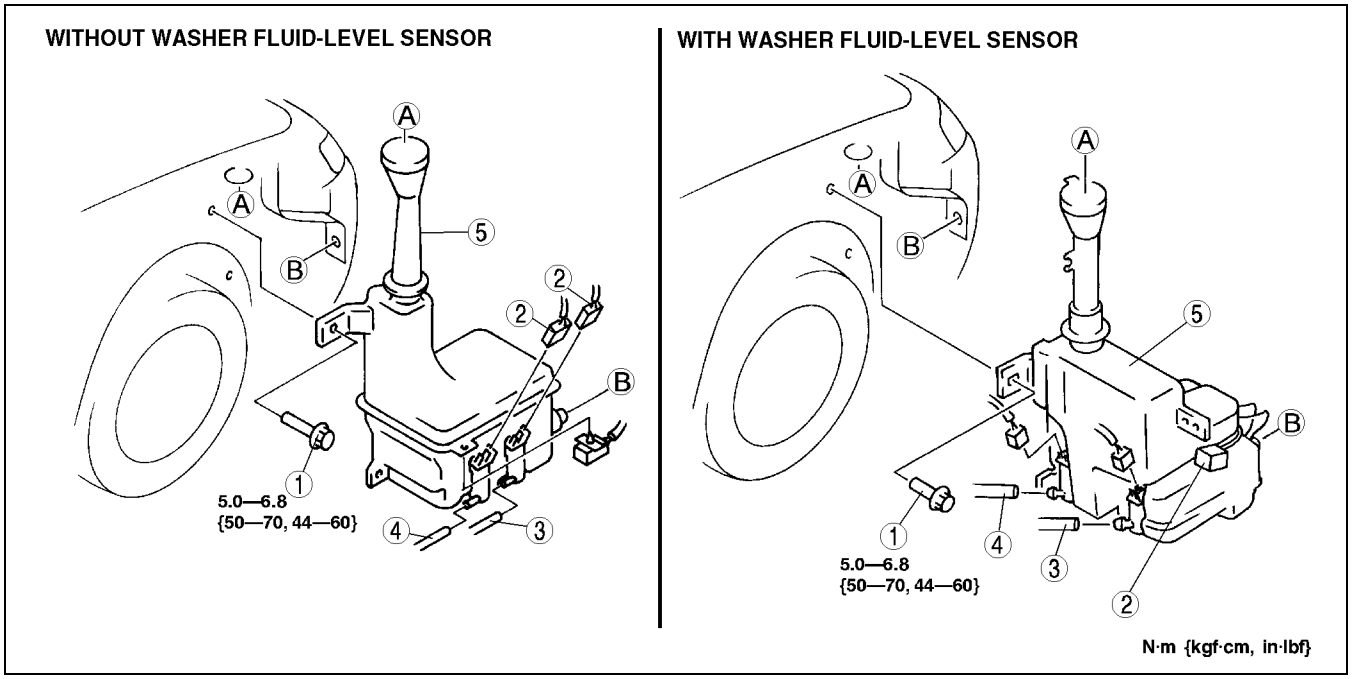
Z3U0919W001

3. Disconnect battery positive voltage from terminal C of the motor while the wipers are operating.
4. Verify that the wipers do not stop in the park position.
5. Short between terminal B and C of the motor and connect battery positive voltage to terminal D of the motor.
6. Verify that the wipers operate at low speed again, then stop in the park position.
   - If not as specified, replace the windshield wiper motor.

WASHER TANK REMOVAL/INSTALLATION

A3U091967480W01

1. Disconnect the negative battery cable.
2. Partially peel off the right side mud guard.
3. Partially remove the right side front bumper (if equipped with washer fluid-level sensor). (See 09–10–5 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



A3U0919W112

1	Bolt
2	Connector
3	Windshield washer hose
4	Rear washer hose
5	Washer tank

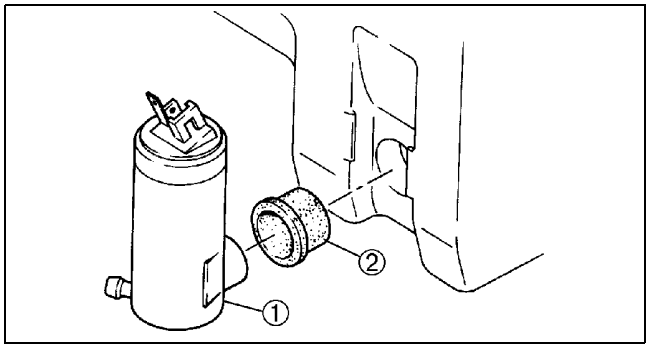
WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION

A3U091976670W01

1. Disconnect the negative battery cable.
2. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Windshield washer motor
2	Grommet

4. Install in the reverse order of removal.

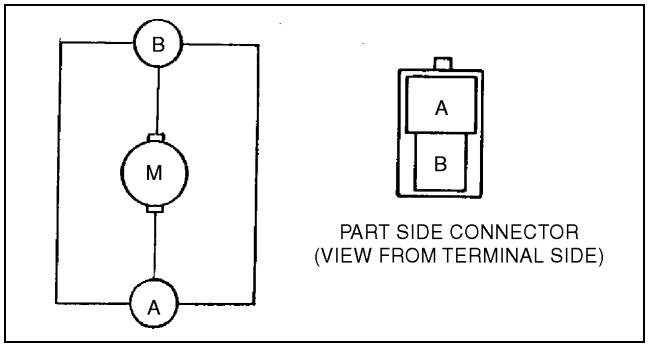


X3U919WA8

WINDSHIELD WASHER MOTOR INSPECTION

A3U091976670W02

1. Disconnect the negative battery cable.
2. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
3. Connect battery positive voltage to the terminal B and ground to the terminal A of the motor.
4. Verify that the windshield washer motor operates.
   - If the motor does not operate, replace the windshield washer motor.



Y3U919WA3

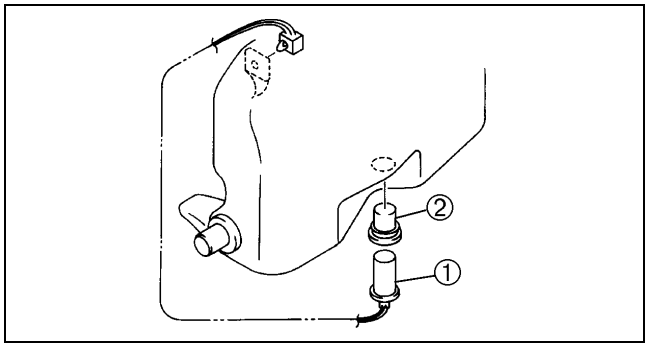
WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION

A3U091967488W01

1. Disconnect the negative battery cable.
2. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Washer fluid-level sensor
2	Grommet

4. Install in the reverse order of removal.



X3U919WB0

WASHER FLUID-LEVEL SENSOR INSPECTION

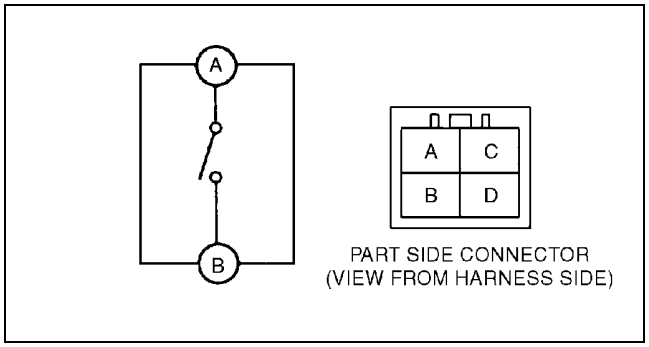
A3U091967488W02

1. Disconnect the negative battery cable.
2. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
3. Inspect for continuity between the washer fluid-level sensor terminals using an ohmmeter.
   - If not as specified, replace the washer fluid-level sensor.

○—○ : Continuity

Fluid level	Terminal	
	A	B
Above Low		
Below Low	○	○

X3U919WB1



Y3U919WA4

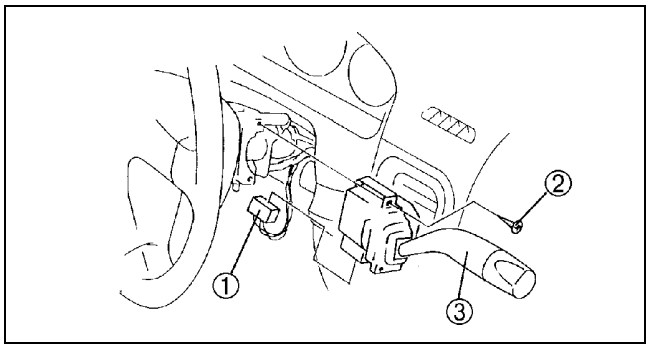
WIPER AND WASHER SWITCH REMOVAL/INSTALLATION

A3U091966122W01

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09–17–5 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Wiper and washer switch

4. Install in the reverse order of removal.



X3U919WB7

WIPER AND WASHER SWITCH INSPECTION

A3U091966122W02

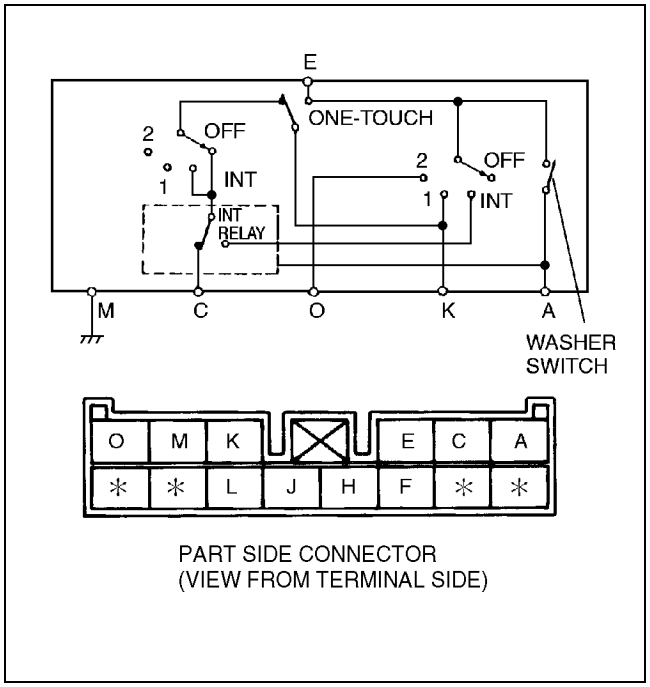
Windshield Wiper and Washer

1. Disconnect the negative battery cable.
2. Remove the wiper and washer switch. (See 09–19–9 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION.)
3. Inspect for continuity between the wiper and washer switch terminals using an ohmmeter.
   - If not as specified, replace the wiper and washer switch.

○—○ : Continuity

Switch position		One-touch	Terminal				
			A	C	E	K	O
Wiper switch	OFF	OFF		○		○	
		ON			○	○	
	INT			○		○	
	1				○	○	
	2				○		○
Washer switch	ON		○		○		

X3U919WB8



Y3U919WA5

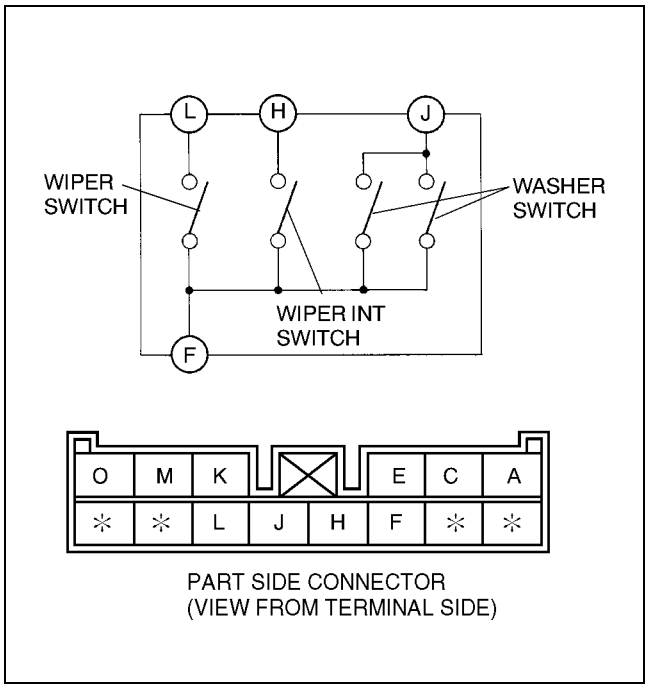
Rear Wiper and Washer

1. Disconnect the negative battery cable.
2. Remove the wiper and washer switch. (See 09–19–9 WIPER AND WASHER SWITCH REMOVAL/ INSTALLATION.)
3. Inspect for continuity between the wiper and washer switch terminals using an ohmmeter.
   - If not as specified, replace the wiper and washer switch.

○—○ : Continuity

Switch position	Terminal			
	F	J	H	L
OFF				
Wiper	○			○
Washer	○	○		
Wiper and washer	○	○		○
Wiper INT	○		○	

A3U0919W017

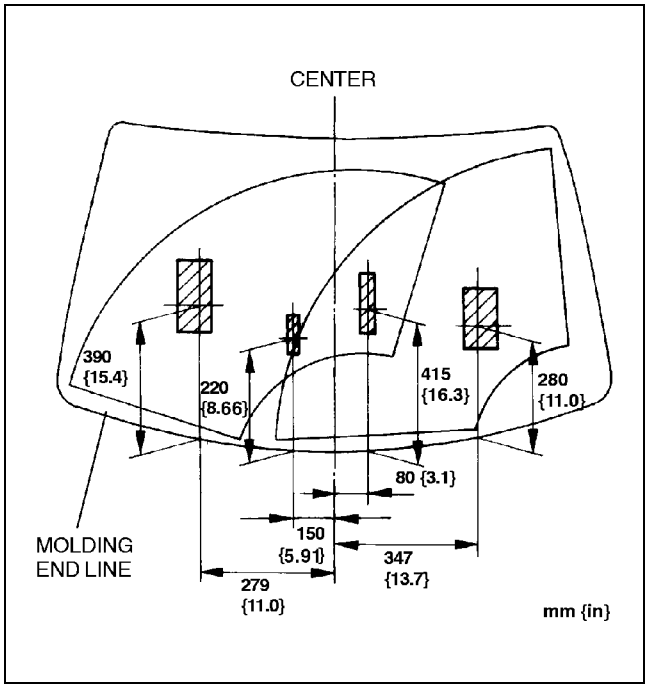


A3U0919W107

WINDSHIELD WASHER NOZZLE ADJUSTMENT

1. Insert a needle or equivalent tool into the spray hole of the windshield washer nozzle and adjust the nozzle direction as shown.

A3U091967510W01

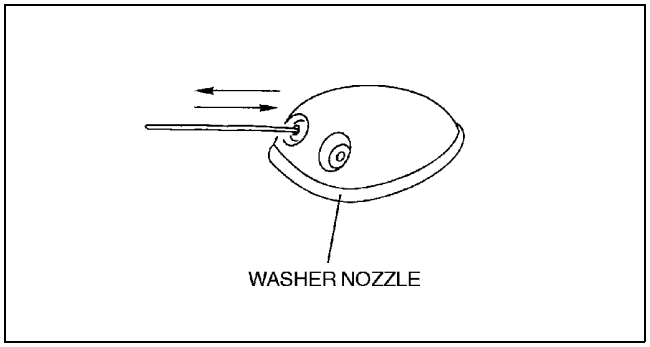


Y3U919WA6

WINDSHIELD WASHER NOZZLE CLEANING

A3U091967510W02

1. Clean the washer nozzle by inserting and moving a needle or similar tool back and forth.
   - If the nozzle becomes clogged again after cleaning, remove the hose from washer nozzle. Make sure there is enough washer fluid. Then turn the washer switch on and flush the inside of the hose.

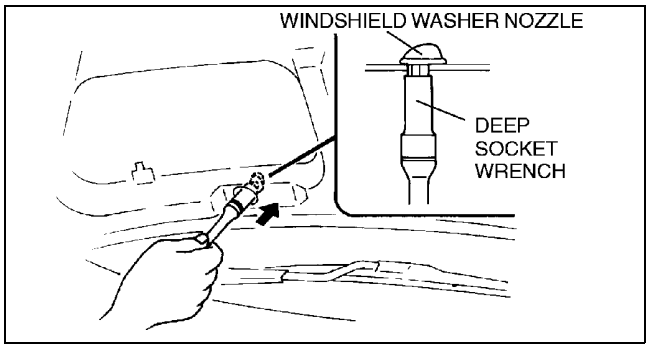


Y3U919WA7

WINDSHIELD WASHER NOZZLE REMOVAL

A3U091967510W03

1. Remove the bonnet insulator.
2. Disconnect the windshield washer hose to windshield washer nozzle.
3. Remove the windshield washer nozzle using a **10 mm {0.4 in}** deep socket wrench from underneath the bonnet.



X3U919WB3

WINDSHIELD WASHER NOZZLE INSTALLATION

A3U091967510W04

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 09–19–10 WINDSHIELD WASHER NOZZLE ADJUSTMENT.)
4. Install the bonnet insulator.

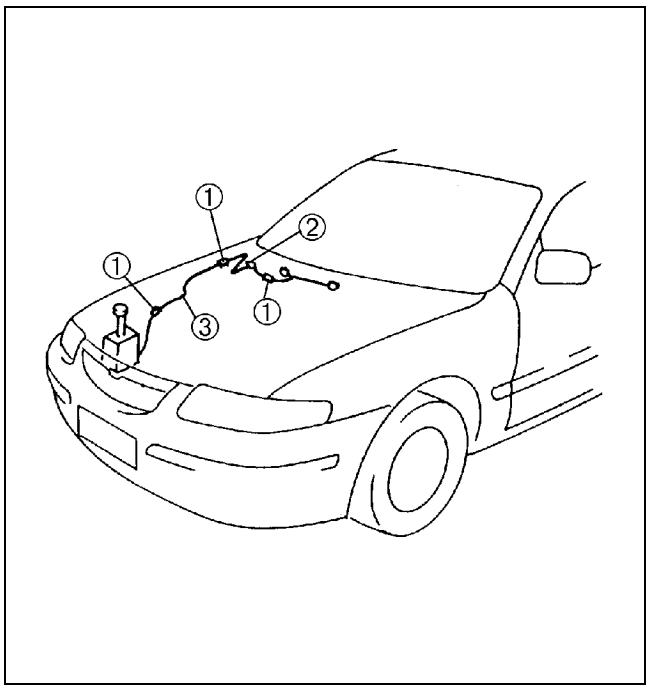
WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION

A3U091967500W01

1. Remove the bonnet insulator.
2. Partially peel off the right side mud guard.
3. Remove in the order indicated in the table.

1	Clip
2	Joint pipe
3	Windshield washer hose

4. Install in the reverse order of removal.

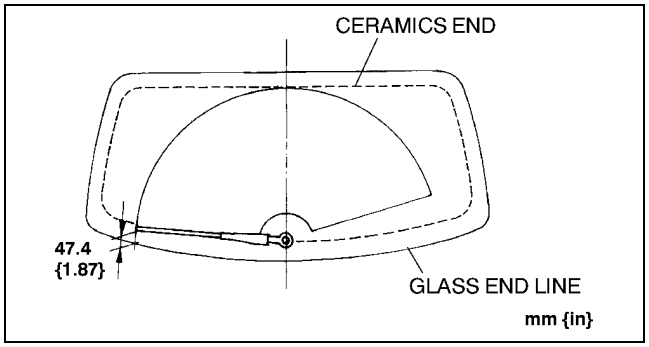


X3U919WB6

REAR WIPER ARM AND BLADE ADJUSTMENT

A3U091967420W01

1. Operate the rear wiper motor to set the wiper in the park position.
2. Set the rear wiper arm height as shown.



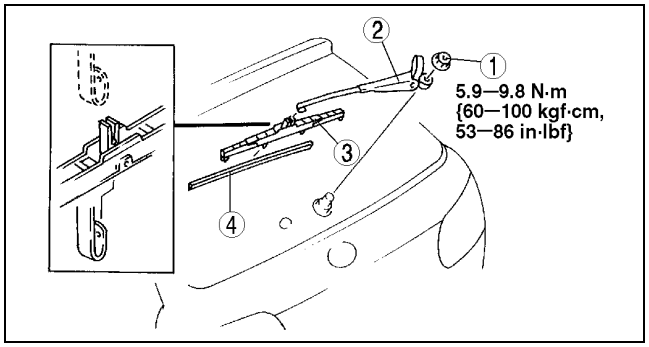
A3U0919W008

REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION

A3U091967420W02

1. Remove in the order indicated in the table.

1	Nut
2	Rear wiper arm (See 09–19–12 Rear Wiper Arm Installation Note)
3	Rear wiper blade
4	Rubber brush

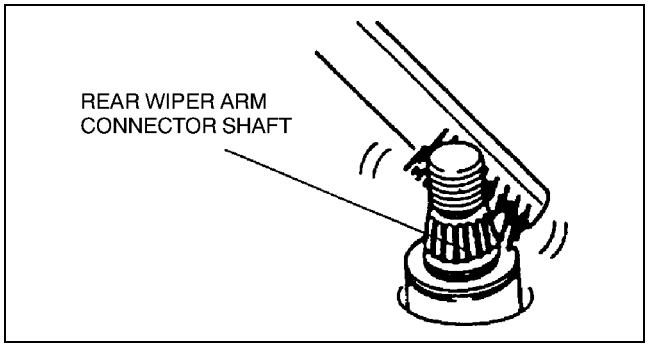


A3U0919W006

2. Install in the reverse order of removal.
3. Adjust the rear wiper arm and blade. (See 09–19–12 REAR WIPER ARM AND BLADE ADJUSTMENT.)

Rear Wiper Arm Installation Note

1. Clean the rear wiper arm connector shaft using a wire brush before installing the rear wiper arm.



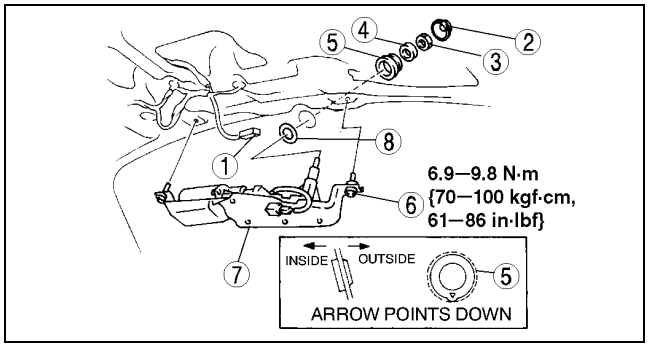
YMU919WAR

REAR WIPER MOTOR REMOVAL/INSTALLATION

A3U091967450W01

1. Disconnect the negative battery cable.
2. Remove the rear wiper arm and blade. (See 09–19–12 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
3. Remove the liftgate trim. (See 09–17–16 LIFTGATE TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Connector
2	Seal cap
3	Nut
4	Washer
5	Outer bushing
6	Bolt
7	Rear wiper motor
8	Washer



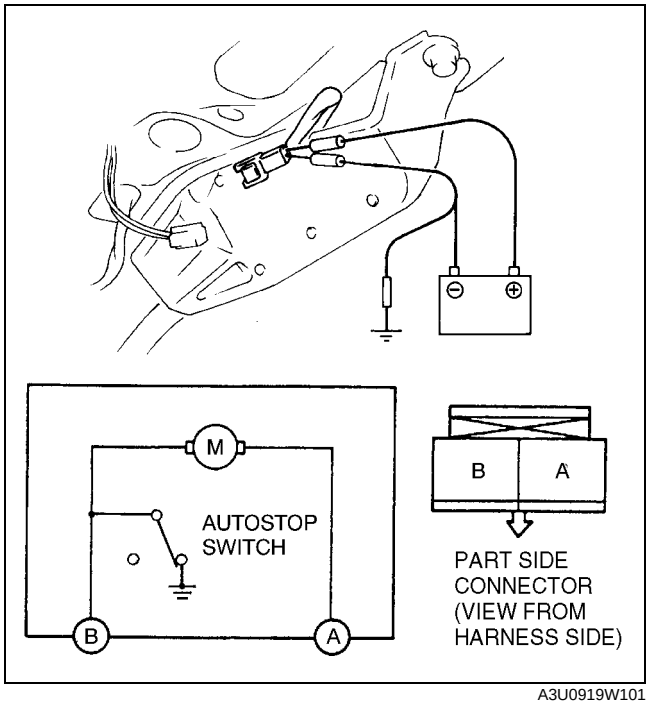
A3U0919W001

5. Install in the reverse order of removal.
6. Adjust the rear wiper arm and blade. (See 09–19–12 REAR WIPER ARM AND BLADE ADJUSTMENT.)

REAR WIPER MOTOR INSPECTION

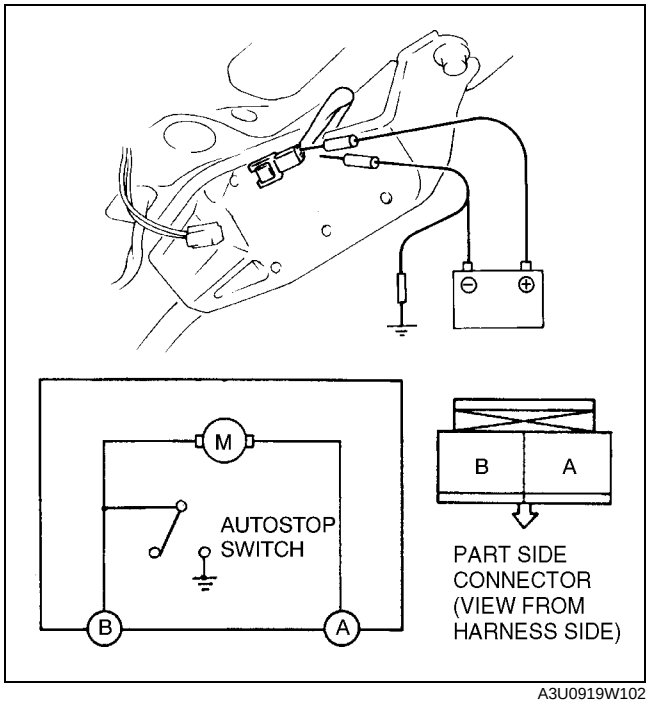
A3U091967450W02

1. Disconnect the negative battery cable.
2. Remove the liftgate trim. (Refer to 09–17–16 LIFTGATE TRIM REMOVAL/INSTALLATION.)
3. Disconnect the rear wiper motor connector.
4. Connect battery positive voltage to the rear wiper motor terminal A and the ground to a bare metal part of the vehicle and the rear wiper motor terminal B.
5. Verify that the rear wiper motor operates.



A3U0919W101

6. Disconnect the ground to the terminal B while the rear wiper is operating.
7. Verify that the rear wiper stops in the park position.
   - If not as specified, replace the rear wiper motor.



A3U0919W102

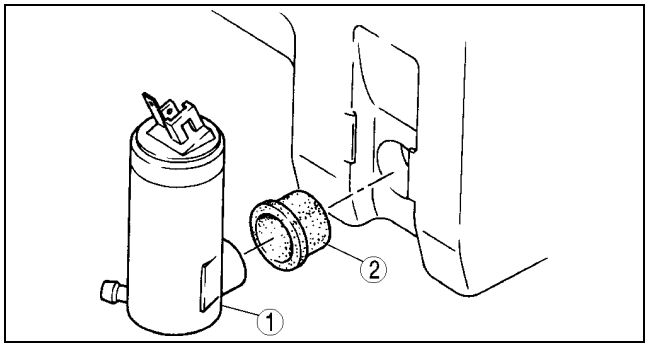
REAR WASHER MOTOR REMOVAL/INSTALLATION

A3U091976672W01

1. Disconnect the negative battery cable.
2. Partially peel off the right side mud guard.
3. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Rear washer motor
2	Grommet

5. Install in the reverse order of removal.

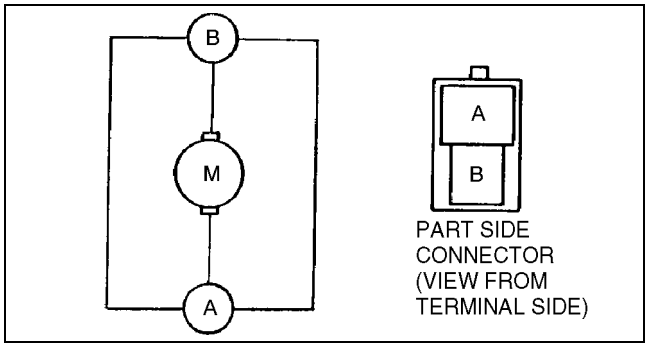


YMU919WAT

REAR WASHER MOTOR INSPECTION

A3U091976672W02

1. Remove the washer tank. (See 09–19–7 WASHER TANK REMOVAL/INSTALLATION.)
2. Connect battery positive voltage to the terminal B and ground to the terminal A of the motor.
3. Verify that the rear washer motor operates.
   - If the motor does not operate, replace the rear washer motor.

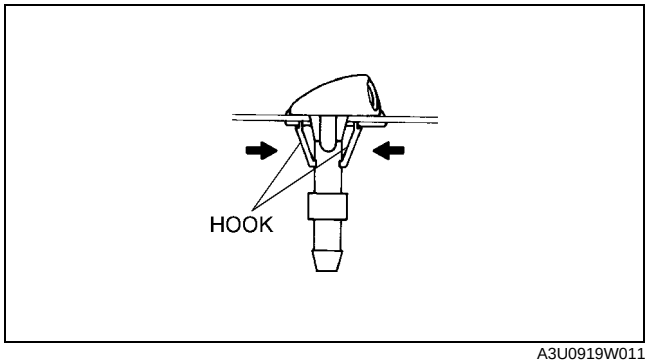


A3U0919W103

REAR WASHER NOZZLE REMOVAL/INSTALLATION

A3U091967511W01

1. Disconnect the negative battery cable.
2. Remove the rear spoiler. (See 09–16–8 REAR SPOILER REMOVAL/INSTALLATION.)
3. Remove the rear washer hose from the rear washer nozzle.
4. Compress the hooks of the rear washer nozzle.
5. Pull the rear washer nozzle out to remove it.
6. Install in the reverse order of removal.
7. Adjust the rear washer nozzle. (See 09–19–15 REAR WASHER NOZZLE ADJUSTMENT.)

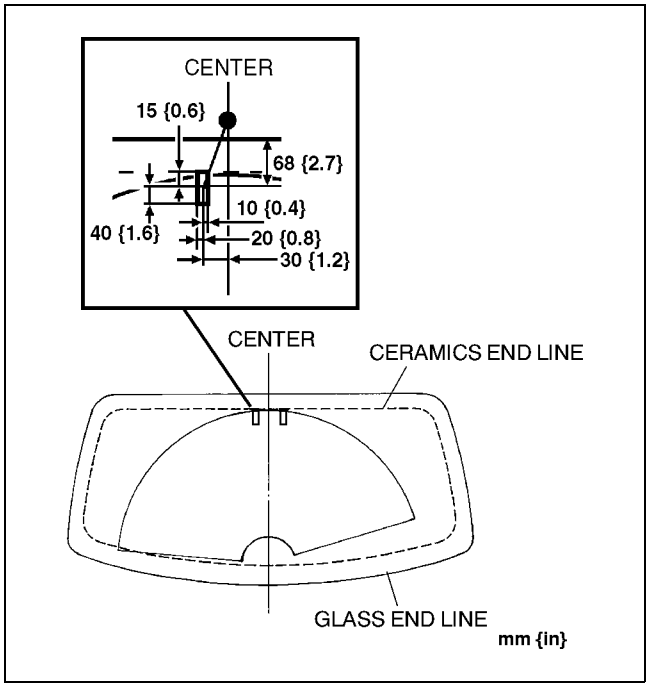


A3U0919W011

REAR WASHER NOZZLE ADJUSTMENT

A3U091967511W02

1. Insert a needle or equivalent tool into the spray hole of the rear washer nozzle and adjust the nozzle direction as shown.



A3U0919W110

REAR WASHER NOZZLE CLEANING

A3U091967511W03

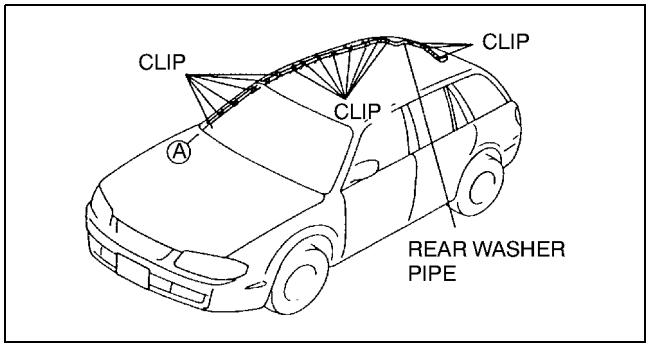
1. Clean the rear washer nozzle. (See 09–19–11 WINDSHIELD WASHER NOZZLE CLEANING.)

09–19

REAR WASHER HOSE REMOVAL/INSTALLATION

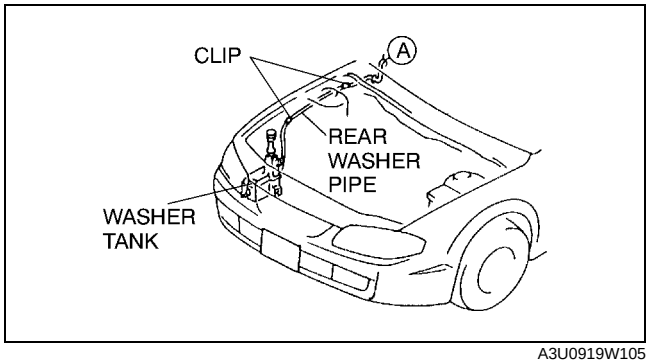
A3U091967470W01

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Remove the rear washer hose from the clips.
4. Partially peel off the right side mud guard and remove the rear washer hose from the clip.



A3U0919W104

5. Remove the rear washer hose from the washer tank.
6. Install in the reverse order of removal.



A3U0919W105

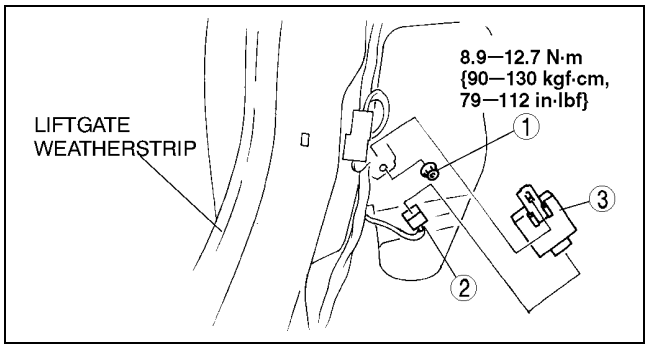
INTERMITTENT REAR WIPER RELAY REMOVAL/INSTALLATION

A3U091966810W01

1. Disconnect the negative battery cable.
2. Remove the left side trunk side trim. (See 09–17–15 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Nut
2	Connector
3	Intermittent rear wiper relay

4. Install in the reverse order of removal.



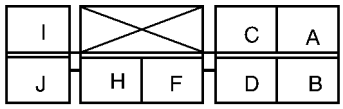
A3U0919W111

INTERMITTENT REAR WIPER RELAY INSPECTION

A3U091966810W02

1. Measure the voltage at the intermittent rear wiper relay terminals as indicated below.
2. Disconnect the intermittent rear wiper relay connector before inspecting for continuity at the terminal H.
   - If not as specified, inspect the parts listed under “Action”.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the intermittent rear wiper relay.

Terminal Voltage Table (Reference)



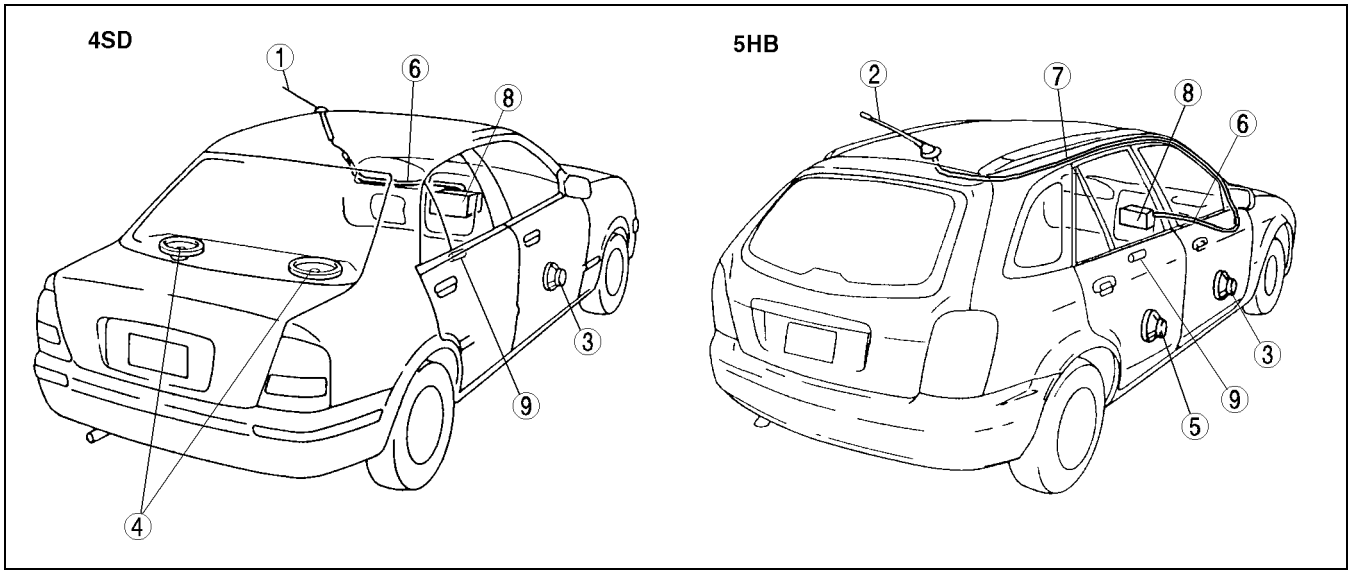
HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

A3U0919W106

Terminal	Signal	Connected to	Test condition		Voltage (V)/ Continuity	Action
A	—	—	—		—	—
B	IG2	R. WIP 10 A fuse	Ignition switch at ON position		B+	• Inspect R. WIP 10 A fuse • Inspect related harness
			Other		Below 1.0	
C	—	—	—		—	—
D	—	—	—		—	—
F	Rear wiper switch INT	Rear wiper switch	Ignition switch at ON position	Rear wiper switch at INT position	Below 1.0	• Inspect R. WIP 10 A fuse • Inspect wiper and washer switch (See 09–19–9 WIPER AND WASHER SWITCH INSPECTION) • Inspect related harness
				Rear wiper switch at OFF position	B+	
H	GND	GND	Under any condition: inspect for continuity to ground		Yes	• Inspect GND
I	—	—	—		—	—
J	Autostop	Rear wiper motor	Ignition switch at ON position	Rear wiper is operating (INT position)	Alternates below 1.0 and B+	• Inspect R. WIP 10 A fuse • Inspect wiper and washer switch (See 09–19–9 WIPER AND WASHER SWITCH INSPECTION) • Inspect rear wiper motor (See 09–19–13 REAR WIPER MOTOR INSPECTION) • Inspect related harness
				Other	B+	

09–20 ENTERTAINMENT

LOCATION INDEX



A3U0920W102

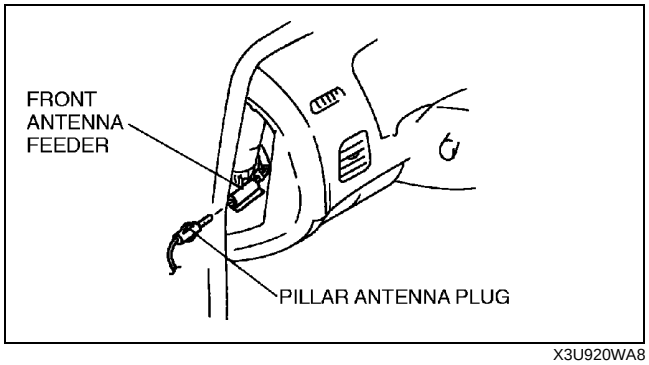
1	Pillar antenna (See 09–20–2 PILLAR ANTENNA REMOVAL) (See 09–20–2 PILLAR ANTENNA INSTALLATION) (See 09–20–2 PILLAR ANTENNA INSPECTION)
2	Rear center roof antenna (See 09–20–3 REAR CENTER ROOF ANTENNA REMOVAL/INSTALLATION) (See 09–20–3 REAR CENTER ROOF ANTENNA INSPECTION)
3	Front door speaker (See 09–20–3 FRONT DOOR SPEAKER REMOVAL/INSTALLATION) (See 09–20–4 DOOR SPEAKER INSPECTION)
4	Rear package speaker (See 09–20–4 REAR PACKAGE SPEAKER REMOVAL/INSTALLATION) (See 09–20–4 REAR PACKAGE SPEAKER INSPECTION)

5	Rear door speaker (See 09–20–3 REAR DOOR SPEAKER REMOVAL/INSTALLATION) (See 09–20–4 DOOR SPEAKER INSPECTION)
6	Front antenna feeder (See 09–20–5 FRONT ANTENNA FEEDER REMOVAL/INSTALLATION) (See 09–20–5 FRONT ANTENNA FEEDER INSPECTION)
7	Rear antenna feeder (See 09–20–5 REAR ANTENNA FEEDER REMOVAL/INSTALLATION) (See 09–20–6 REAR ANTENNA FEEDER INSPECTION)
8	Audio unit (See 09–20–6 AUDIO UNIT REMOVAL) (See 09–20–6 AUDIO UNIT INSTALLATION)

9	Cigarette lighter (See 09–20–8 CIGARETTE LIGHTER REMOVAL/ INSTALLATION) (See 09–20–9 CIGARETTE LIGHTER INSPECTION)

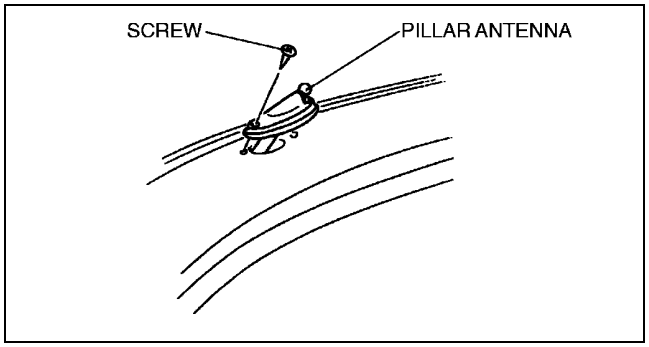
PILLAR ANTENNA REMOVAL

1. Disconnect the negative battery cable.
2. Remove the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Disconnect the pillar antenna plug.



X3U920WA8

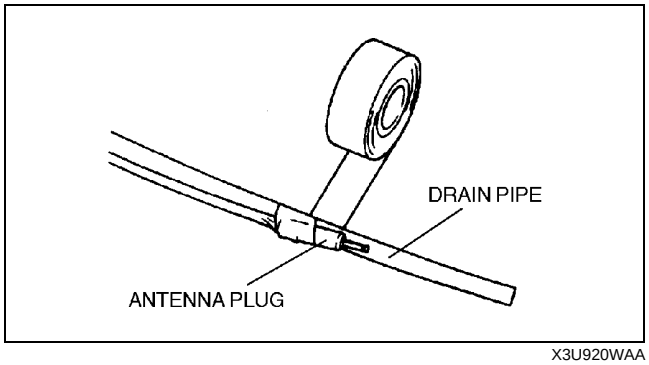
4. Remove the screw and pull out the pillar antenna.



X3U920WA9

PILLAR ANTENNA INSTALLATION

1. Tape the antenna plug to the antenna drain pipe.
2. Pass the pillar antenna and antenna drain pipe through the A-pillar from the hole in the roof.
3. Install the screws and install the roof antenna.
4. Connect the antenna plug.
5. Install the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/ INSTALLATION.)
6. Connect the negative battery cable.



X3U920WAA

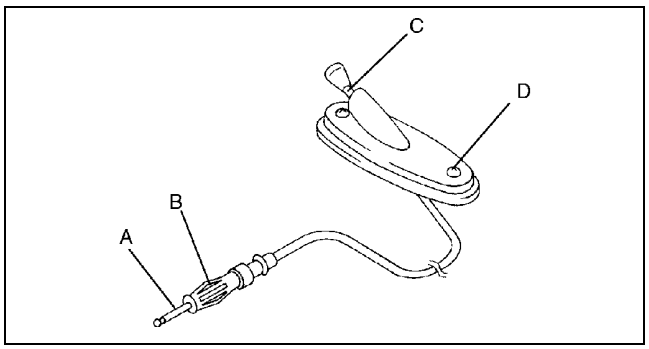
PILLAR ANTENNA INSPECTION

1. Remove the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
2. Disconnect the pillar antenna plug.
3. Verify that there is no continuity between pillar antenna terminal A and B using an ohmmeter.
   - If not as specified, replace the pillar antenna.
4. Inspect for continuity between the pillar antenna terminals using an ohmmeter.
   - If not as specified, replace the pillar antenna.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

X3U920WAB



X3U920WAC

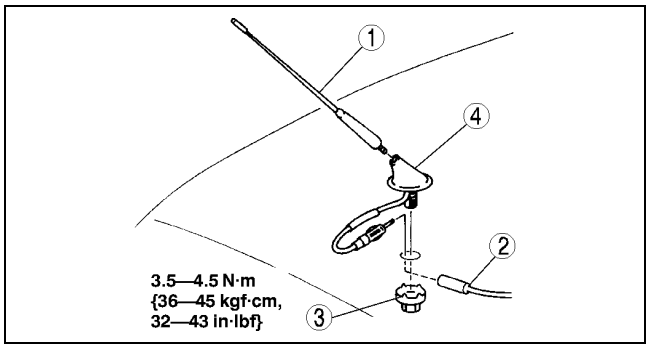
REAR CENTER ROOF ANTENNA REMOVAL/INSTALLATION

A3U092066939W01

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Antenna rod
2	Rear center roof antenna feeder
3	Nut
4	Rear center roof antenna

4. Install in the reverse order of removal.
5. After installation, verify that the rubber of the rear center roof antenna is installed to the roof panel with no space between them.



Y3A8124W001

REAR CENTER ROOF ANTENNA INSPECTION

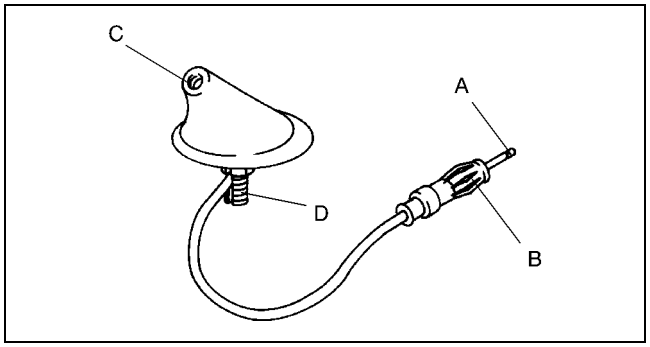
A3U092066939W02

1. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
2. Disconnect the rear center roof antenna jack.
3. Remove the antenna rod.
4. Verify that there is no continuity between roof antenna terminals A and B using an ohmmeter.
5. Inspect for continuity between the rear center roof antenna terminals using an ohmmeter.
   - If not as specified, replace the rear center roof antenna.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

Y3A8124W002

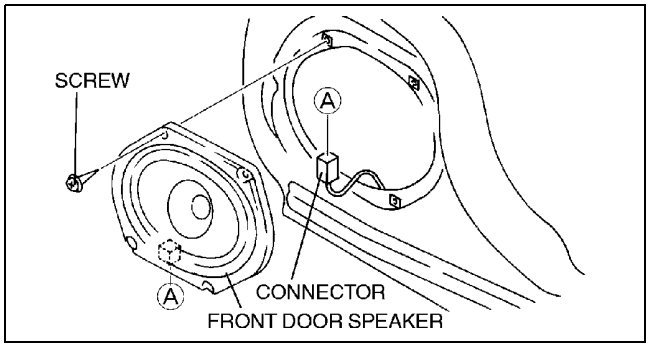


Y3A8124W003

FRONT DOOR SPEAKER REMOVAL/INSTALLATION

A3U092066961W01

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 front door speaker.
5. Install in the reverse order of removal.

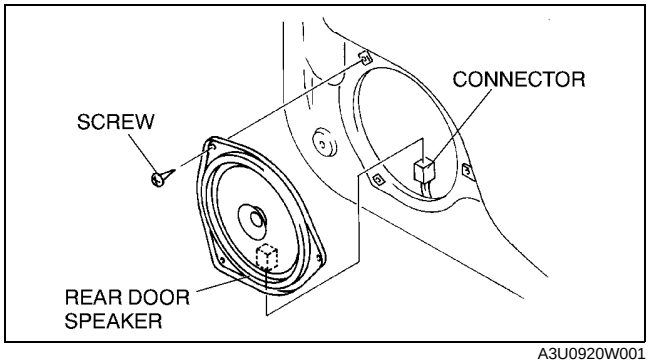


X3U920WA2

REAR DOOR SPEAKER REMOVAL/INSTALLATION

A3U092066961W02

1. Disconnect the negative battery cable.
2. Remove the rear door trim. (See 09–17–9 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Disconnect the connector and remove the rear door speaker.
5. Install in the reverse order of removal.

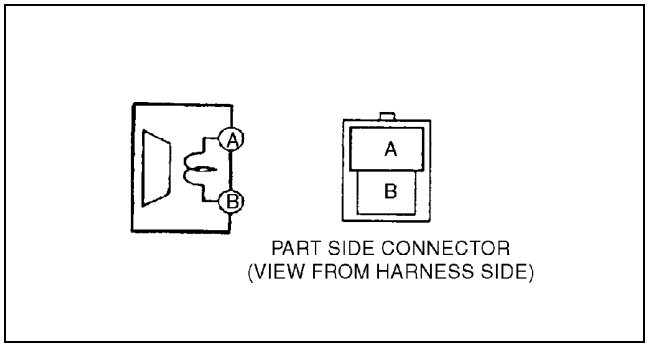


A3U0920W001

DOOR SPEAKER INSPECTION

A3U092066961W03

1. Remove the door speaker.
2. Inspect for resistance between the door speaker terminals using an ohmmeter.



Y3U920WA0

: Resistance

Test condition	Terminal	
	A	B
Constant		R

R: 4 ohms

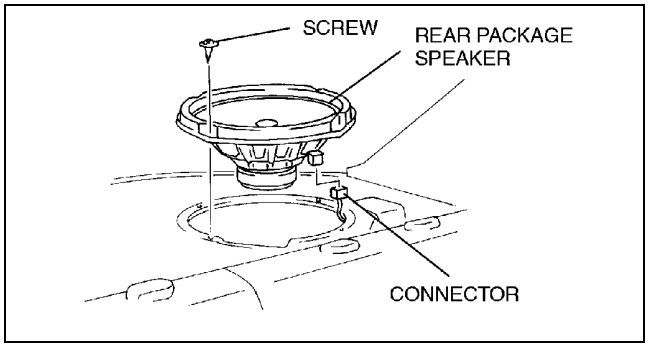
Z3U0920W002

3. To verify that the speakers output sound, apply voltage to each speaker and release using a 1.5-V battery.
   - If not as specified, replace the door speaker.

REAR PACKAGE SPEAKER REMOVAL/INSTALLATION

A3U092066964W01

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 package speaker.
5. Install in the reverse order of removal.

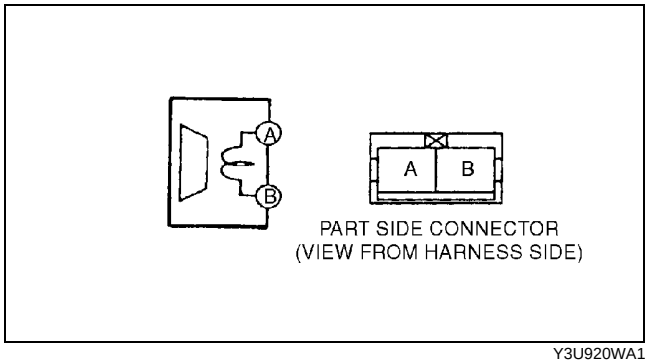


X3U920WA5

REAR PACKAGE SPEAKER INSPECTION

A3U092066964W02

1. Remove the rear package speaker.
2. Inspect for resistance between the rear package speaker terminals using an ohmmeter.



Y3U920WA1

: Resistance

Test condition	Terminal	
	A	B
Constant		R

R: 4 ohms

Z3U0920W002

3. To verify that the speakers output sound, apply voltage to each speaker and release using a 1.5-V battery.
   - If not as specified, replace the rear package speaker.

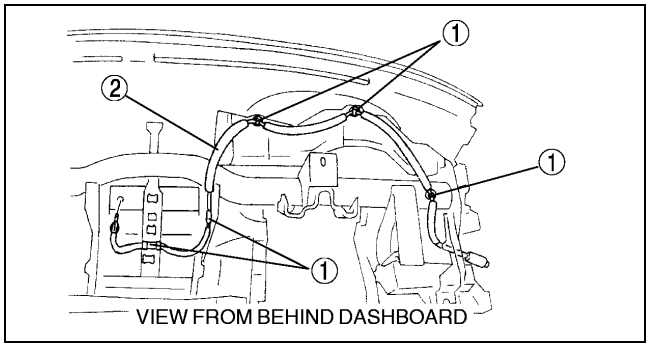
FRONT ANTENNA FEEDER REMOVAL/INSTALLATION

A3U092066941W01

1. Disconnect the negative battery cable.
2. Remove the audio unit. (See 09–20–6 AUDIO UNIT REMOVAL.) (See 09–20–6 AUDIO UNIT INSTALLATION.)
3. Remove the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
4. Disconnect the connection between the pillar antenna and the front antenna feeder.
5. Remove in the order indicated in the table.

1	Clip
2	Front antenna feeder

6. Install in the reverse order of removal.



X3U920WAD

FRONT ANTENNA FEEDER INSPECTION

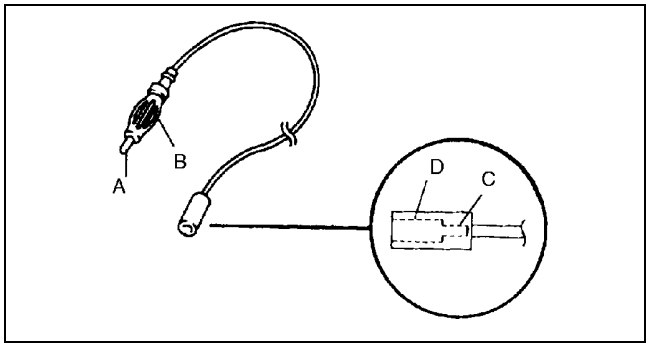
A3U092066941W02

1. Disconnect the negative battery cable.
2. Remove the audio unit. (See 09–20–6 AUDIO UNIT REMOVAL.) (See 09–20–6 AUDIO UNIT INSTALLATION.)
3. Remove the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
4. Disconnect the connection between the pillar antenna and the front antenna feeder.
5. Verify that there is no continuity between the front antenna feeder terminals A and B using an ohmmeter.
   - If not as specified, replace the front antenna feeder.
6. Inspect for continuity between the front antenna feeder terminals using an ohmmeter.
   - If not as specified, replace the front antenna feeder.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

X3U920WAE



X3U920WAF

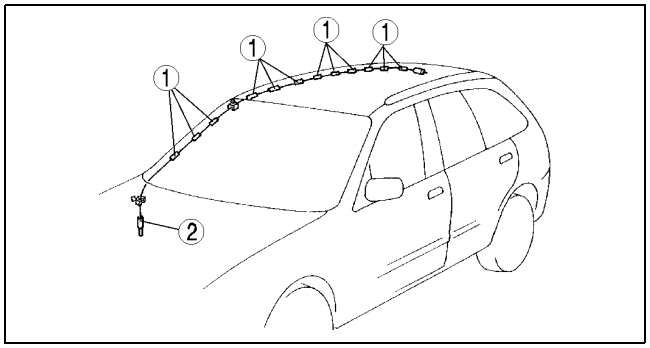
REAR ANTENNA FEEDER REMOVAL/INSTALLATION

A3U092066942W01

1. Disconnect the negative battery cable.
2. Remove the right-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove the right-side A-pillar trim. (See 09–17–10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
4. Remove the headliner. (See 09–17–16 HEADLINER REMOVAL/INSTALLATION.)
5. Disconnect the connector between the rear center roof antenna and rear antenna feeder.
6. Disconnect the connector between the front antenna feeder and rear antenna feeder.
7. Remove in the order indicated in the table.

1	Clip
2	Rear antenna feeder

8. Install in the reverse order of removal.

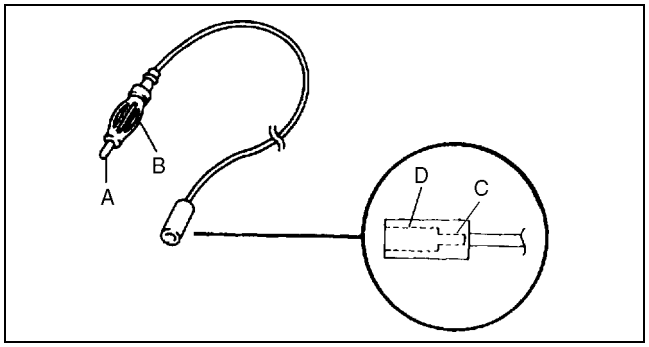


Y3A8124W004

REAR ANTENNA FEEDER INSPECTION

A3U092066942W02

1. Remove the rear antenna feeder.
2. Verify that there is no continuity between rear antenna feeder terminals A and B using an ohmmeter.
3. Inspect for continuity between the rear antenna feeder terminals using an ohmmeter.
   - If not as specified, replace the rear antenna feeder.



A3U0920W101

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

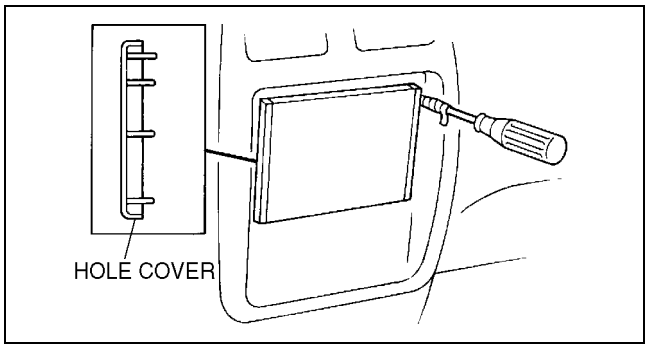
Y3A8124W002

AUDIO UNIT REMOVAL

A3U092066900W01

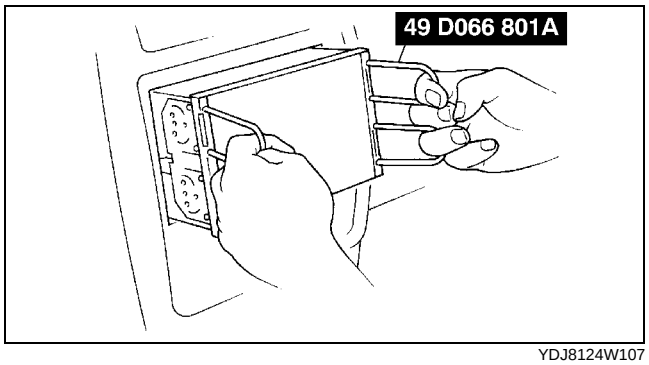
1. Disconnect the negative battery cable.
2. Remove the hole covers by inserting a small tape-wrapped screwdriver into the slot and carefully pry them off without scratching the center panel. Pry up and pull off the hole covers carefully to prevent the posts from breaking off.
3. With the beveled parts of the **SST** facing inward, insert them into the unit.

Note
- Two sets of the **SSTs** are necessary to remove the audio unit.



YDE81241201

4. Pull the **SST** outward and forward to slide out the unit.
5. Disconnect the connectors and antenna jack.



YDJ8124W107

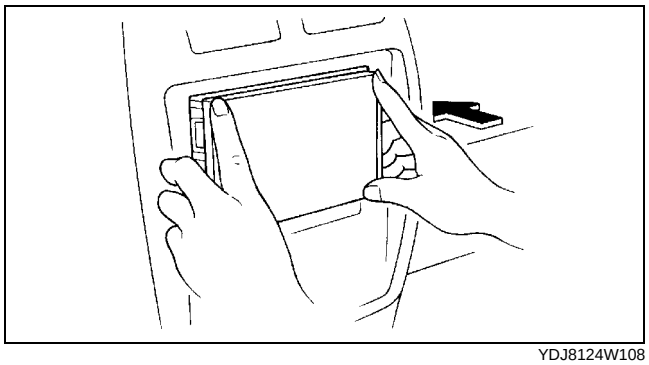
AUDIO UNIT INSTALLATION

A3U092066900W02

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 clicks into place.

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.**



YDJ8124W108

3. Install the service hole covers.
4. Connect the negative battery cable.

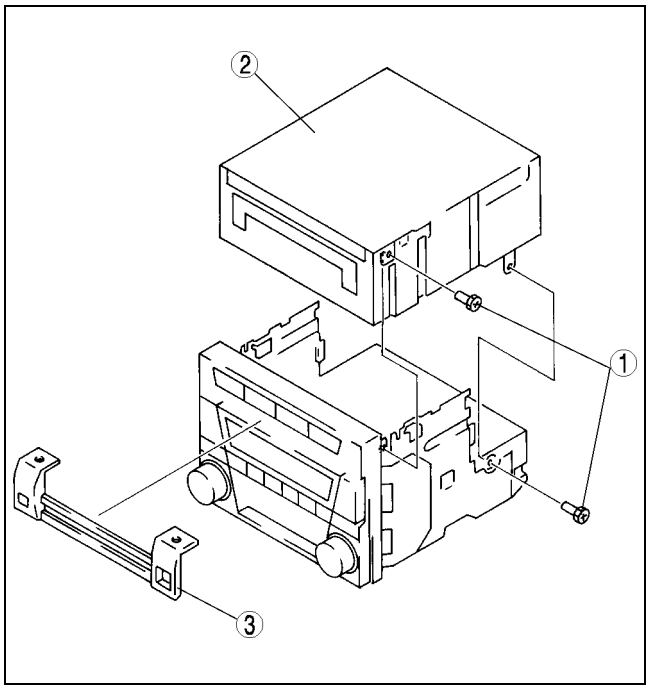
UPPER MODULE REMOVAL/INSTALLATION

A3U092066900W03

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.

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)

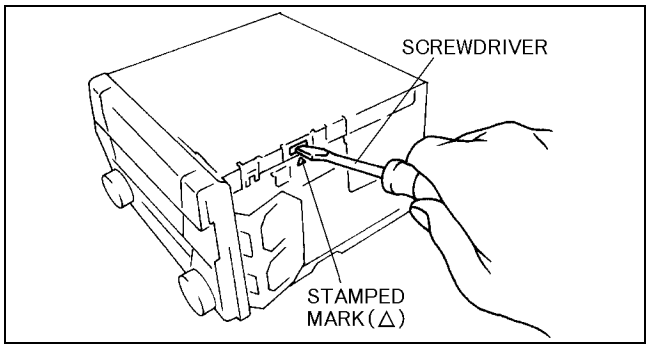
4. Install in the reverse order of removal.



Y5J8124W004

Upper Module Removal Note

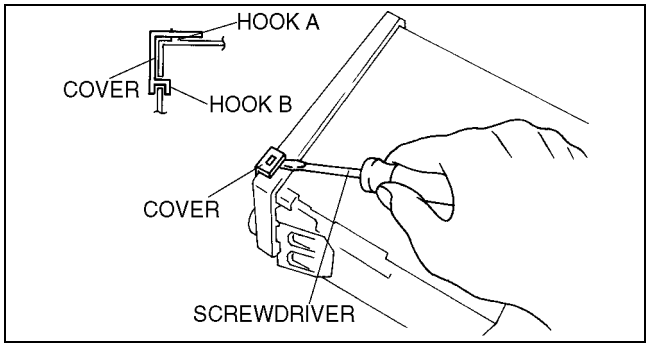
1. Insert a screwdriver into the hole stamped mark.
2. To remove upper module, lift it by pushing down the screwdriver's handle.



YLE8124W005

Cover Removal Note

1. Insert a tape-wrapped screwdriver between the cover and the base unit, then unlatch hook A.
2. To unlatch hook B, pull the cover upward.



YLE8124W006

Screw Installation Note

Caution

- **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).**

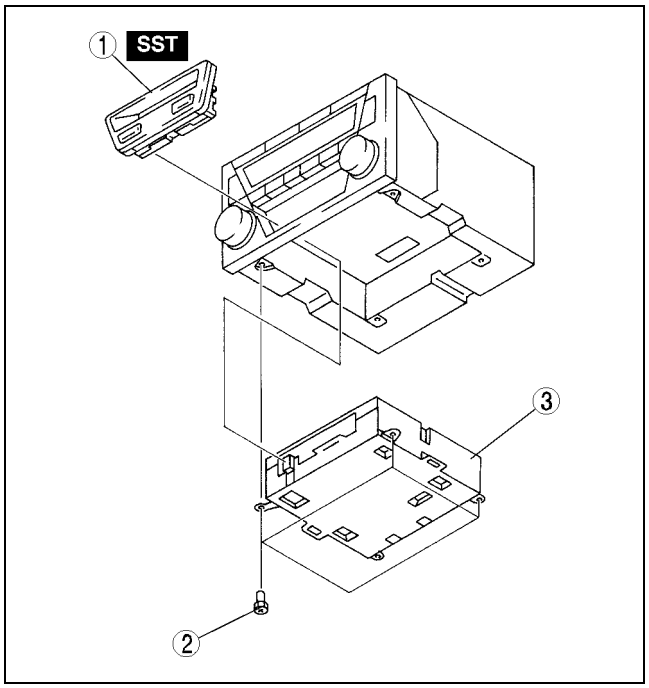
LOWER MODULE REMOVAL/INSTALLATION

A3U092066900W04

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.

1	Cover (See 09–20–8 Cover Removal Note)
2	Screw (See 09–20–8 Screw Installation Note)
3	Lower module

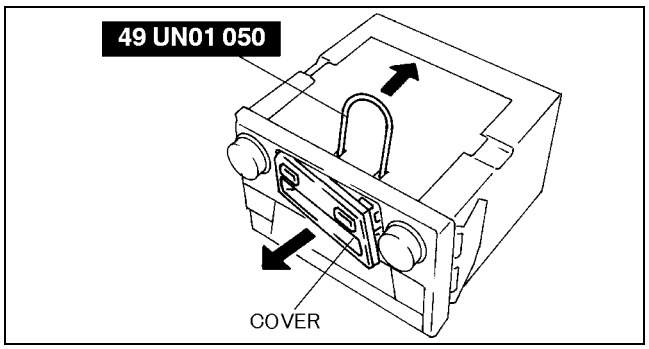
4. Install in the reverse order of removal.



YLE8124W007

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

Caution

- **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).**

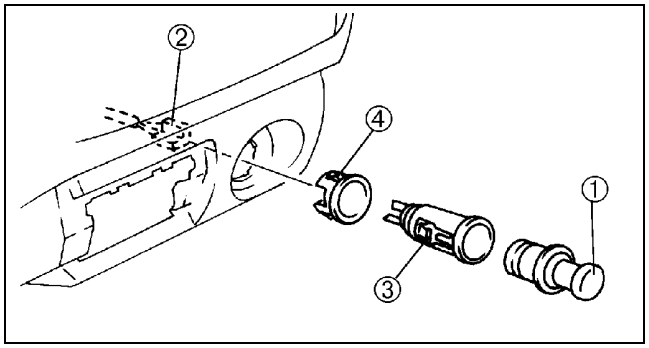
CIGARETTE LIGHTER REMOVAL/INSTALLATION

A3U092067000W01

1. Disconnect the negative battery cable.
2. Remove the console. (See 09–17–5 CONSOLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Cigarette lighter plug
2	Connector
3	Socket (See 09–20–9 Socket Removal Note)
4	Ring (See 09–20–9 Ring Removal Note)

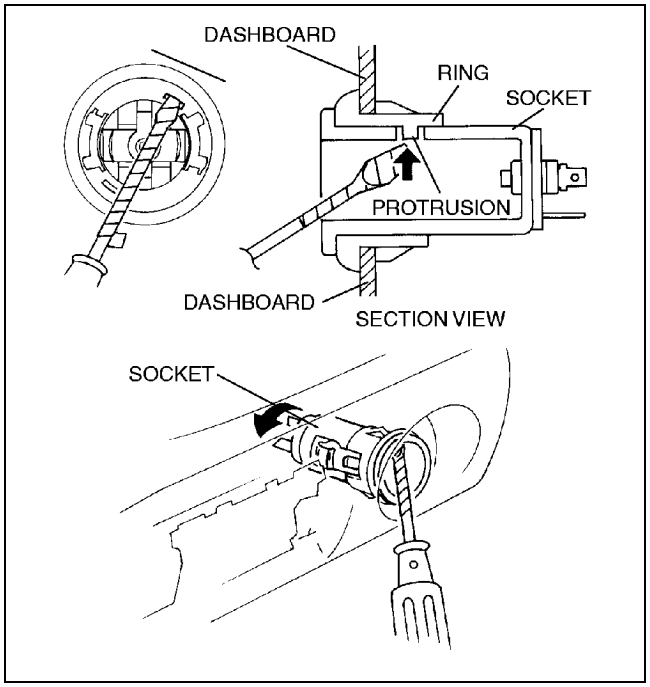
4. Install in the reverse order of removal.



X3U920WAG

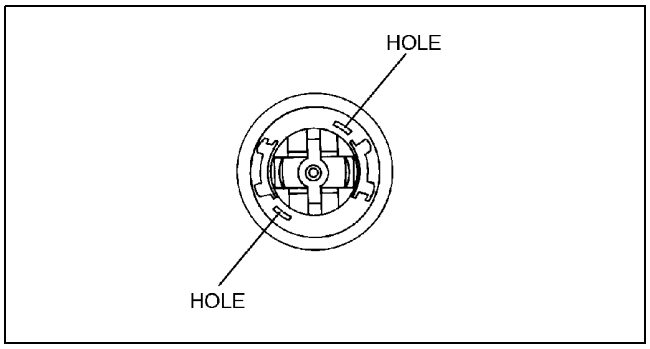
Socket Removal Note

1. Turn the socket while pushing the protrusion of the ring through the hole of the socket with a tape-wrapped screwdriver.
2. Push the socket forward.



X3U920WAH

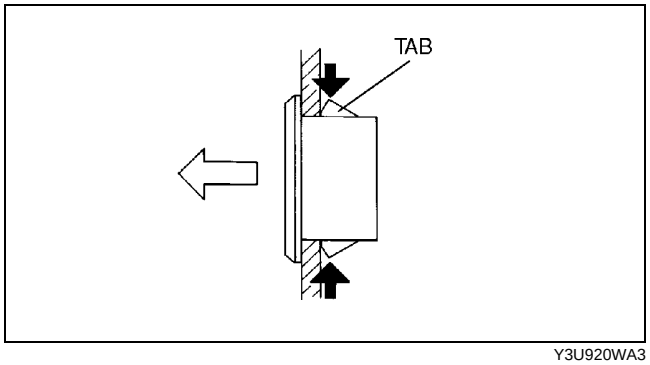
3. Return the socket clockwise to original angle position as shown to pull it out forward.



X3U920WAJ

Ring Removal Note

1. Pull the ring forward while pushing the tabs.



Y3U920WA3

CIGARETTE LIGHTER INSPECTION

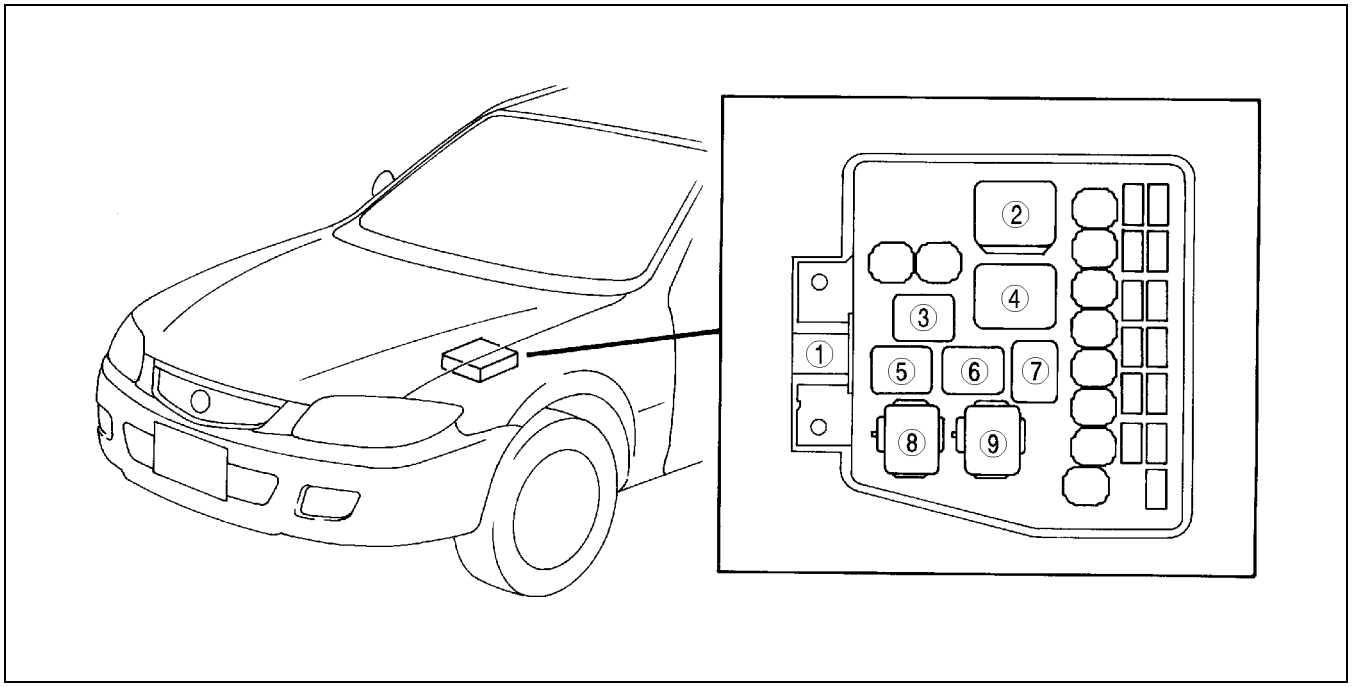
A3U092067000W02

1. Turn the ignition switch to ACC position.
2. Verify that the cigarette lighter plug will move normally within **10—20 seconds**, after pressing the plug into the socket.
   - If the cigarette lighter does not operate normally, replace the cigarette lighter and socket. (See 09–20–8 CIGARETTE LIGHTER REMOVAL/INSTALLATION.)

09–21 POWER SYSTEMS

LOCATION INDEX

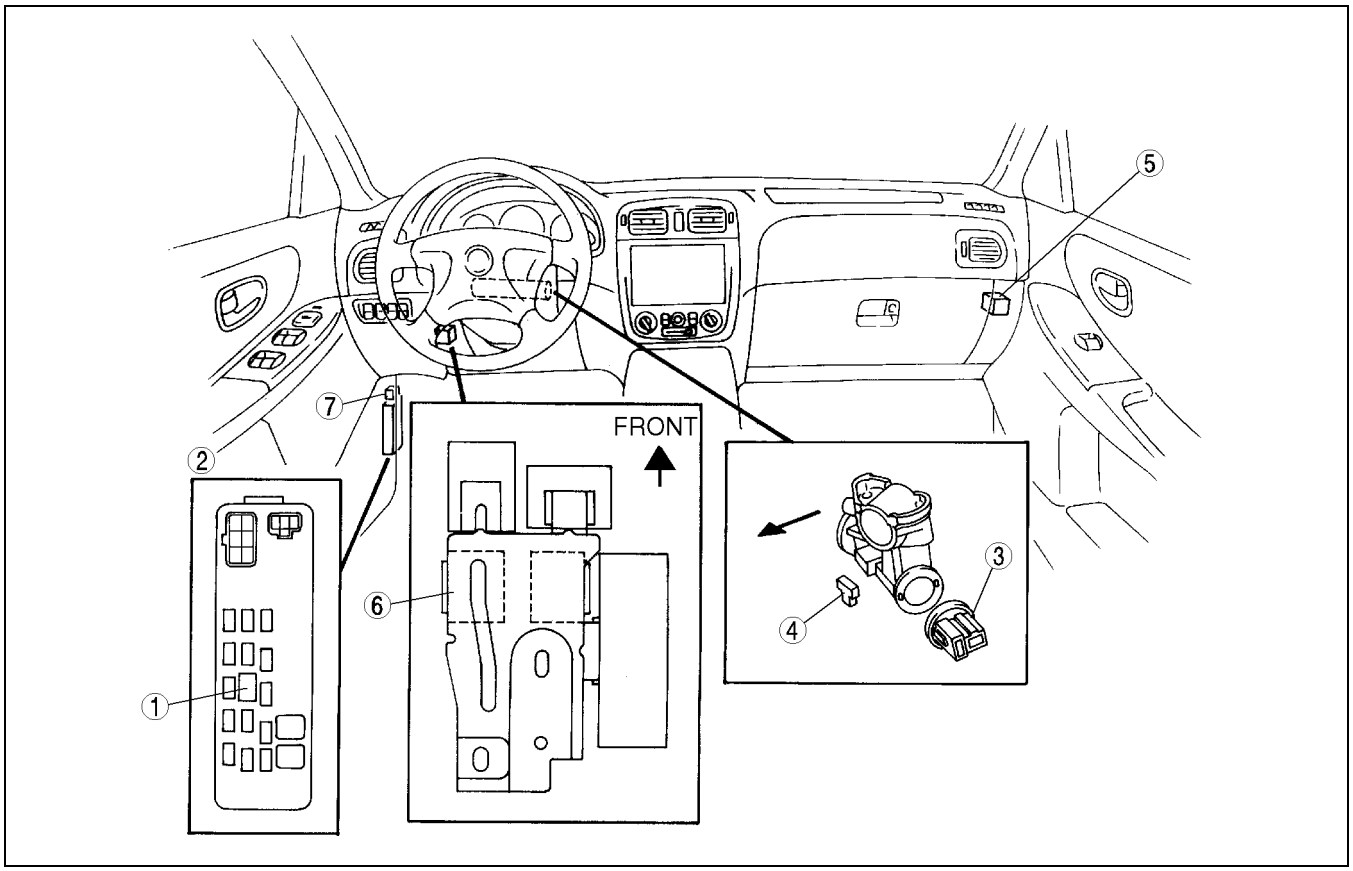
A3U092101072W01



Z3U0921W007

1	Main fuse (See 09–21–2 MAIN FUSE REMOVAL/ INSTALLATION)
2	Fuel pump relay (See 09–21–5 RELAY INSPECTION)
3	A/C relay (See 09–21–5 RELAY INSPECTION)
4	Main relay (See 09–21–5 RELAY INSPECTION)

5	TNS relay (See 09–21–5 RELAY INSPECTION)
6	Horn relay (See 09–21–5 RELAY INSPECTION)
7	Headlight relay (See 09–21–5 RELAY INSPECTION)
8	Cooling fan relay (See 09–21–5 RELAY INSPECTION)
9	Condenser fan relay (See 09–21–5 RELAY INSPECTION)



Z3U0921W008

1	Room fuse (See 09–21–3 ROOM FUSE INSTALLATION)
2	Fuse block (See 09–21–3 FUSE BLOCK REMOVAL/ INSTALLATION)
3	Ignition switch (See 09–21–3 IGNITION SWITCH REMOVAL/ INSTALLATION) (See 09–21–4 IGNITION SWITCH INSPECTION)

4	Key reminder switch (See 09–21–4 KEY REMINDER SWITCH REMOVAL/INSTALLATION) (See 09–21–4 KEY REMINDER SWITCH INSPECTION)
5	Blower relay (See 09–21–5 RELAY INSPECTION)
6	Front fog light relay (See 09–21–5 RELAY INSPECTION)
7	Rear window defroster relay (See 09–21–5 RELAY INSPECTION)

FUSE SERVICE CAUTION

A3U092166000W01

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.**

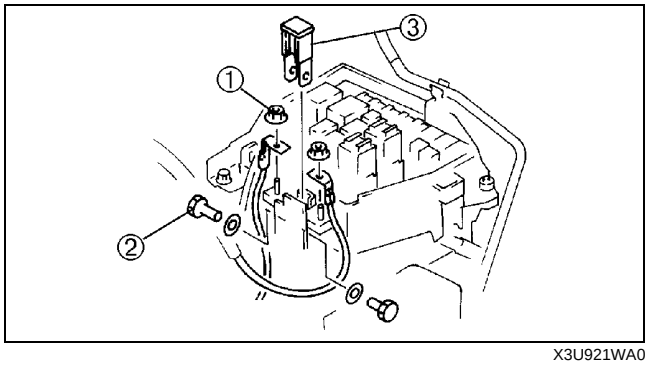
MAIN FUSE REMOVAL/INSTALLATION

A3U092166761W01

1. Disconnect the negative battery cable.
2. Remove the main fuse block cover.
3. Remove in the order indicated in the table.

1	Nut
2	Bolt
3	Main fuse

4. Install in the reverse order of removal.



X3U921WA0

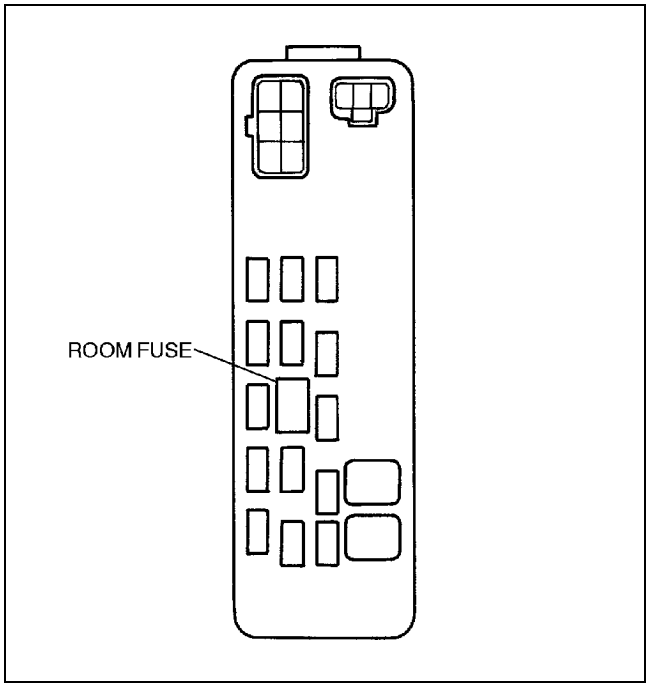
ROOM FUSE INSTALLATION

A3U092166731W01

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 position, the malfunction indicator lamp will continue to illuminate.

1. Turn the ignition switch to LOCK position.
2. Install the ROOM 10 A fuse.



X3U921WA1

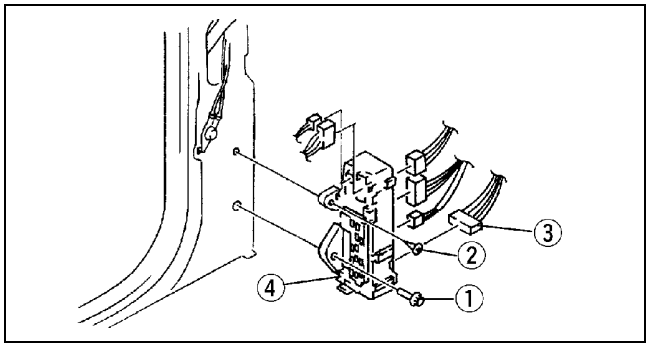
FUSE BLOCK REMOVAL/INSTALLATION

A3U092166730W01

1. Disconnect the negative battery cable.
2. Remove the driver-side front side trim. (See 09–17–13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Bolt
2	Screw
3	Connector
4	Fuse block

4. Install in the reverse order of removal.



X3U921WA8

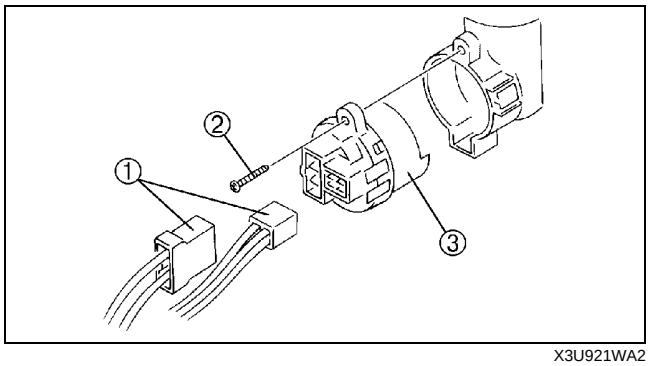
IGNITION SWITCH REMOVAL/INSTALLATION

A3U092166151W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Ignition switch

4. Install in the reverse order of removal.



X3U921WA2

IGNITION SWITCH INSPECTION

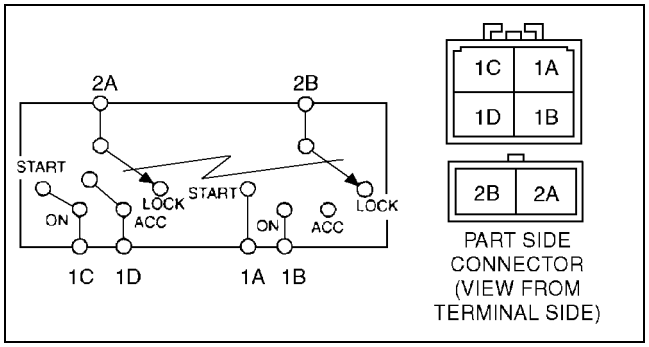
A3U092166151W02

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the ignition switch connectors.
4. Inspect for continuity between the ignition switch terminals using an ohmmeter.
   - If not as specified, replace the ignition switch.

○—○ : Continuity

Ignition key position	Terminal					
	2A	2B	1D	1C	1B	1A
LOCK						
ACC	○		○			
ON	○		○	○		
		○			○	
START	○			○		
		○				○

X3U921WA3

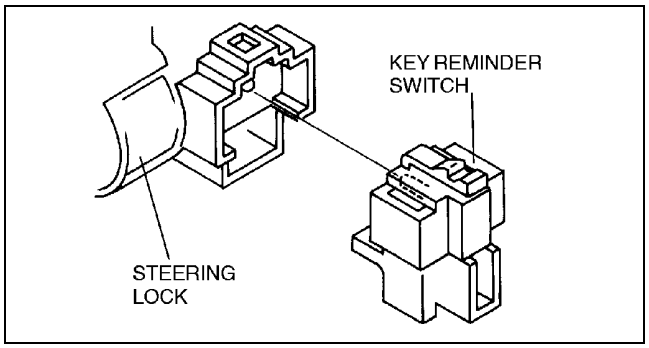


Z3U0921W001

KEY REMINDER SWITCH REMOVAL/INSTALLATION

A3U092166152W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the key reminder switch connector.
4. Remove the key reminder switch.
5. Install in the reverse order of removal.



X3U921WA5

KEY REMINDER SWITCH INSPECTION

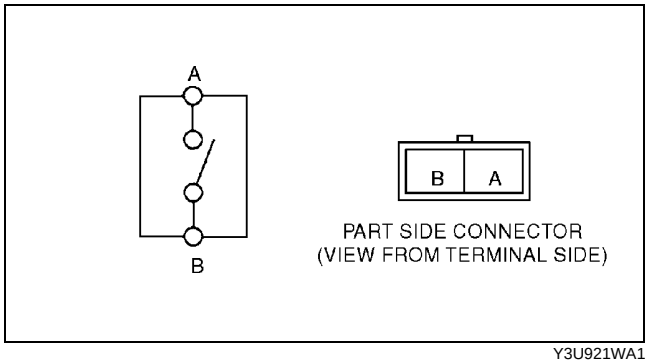
A3U092166152W02

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the key reminder switch connector.
4. Inspect for continuity between the key reminder switch terminals using an ohmmeter.
   - If not as specified, replace the key reminder switch.

○—○ : Continuity

Key position	Terminal	
	A	B
key inserted	○	○
key removed		

X3U921WA6



Y3U921WA1

RELAY INSPECTION

A3U092167742W01

Relay type

Terminal type		Parts name
Four-terminal	Type A	• Front fog light relay • A/C relay • Condenser fan relay No.1 • Condenser fan relay No.2 • Cooling fan relay No.2 (KJ) • Cooling fan relay No.3 (KJ) • Rear window defroster relay • TNS relay • Woofer relay • Trunk lid opener relay • Seat warmer relay • Power window relay • Main relay
	Type B	• Horn relay
	Type C	• Starter cut relay
	Type D	• Fuel pump relay
Five-terminal	Type A	• DRL relay • Cooling fan relay (KL) • Cooling fan relay No.1 (KJ)
	Type B	• Headlight relay • Blower relay
Eight-terminal		• Sunroof relay

Four-terminal

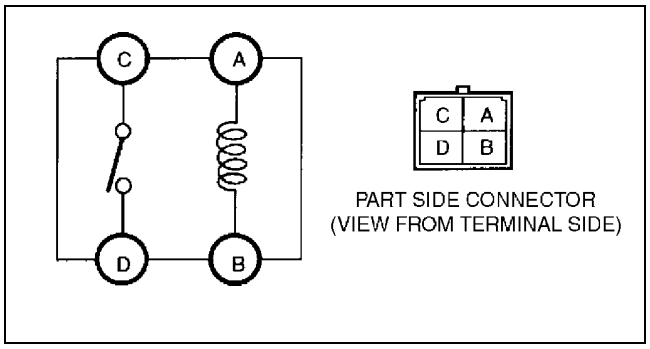
Type A

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○	○		
2	B+	GND	○	○

ZLU0921W004



ZLU0921W003

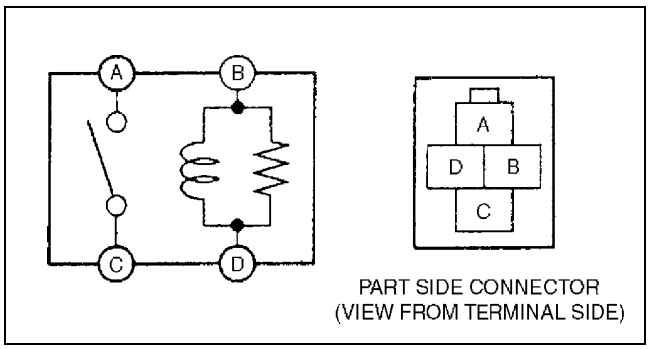
Type B

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○ : Continuity

Step	Terminal			
	D	B	A	C
1	○	○		
2	GND	B+	○	○

ZLU0921W002



ZLU0921W001

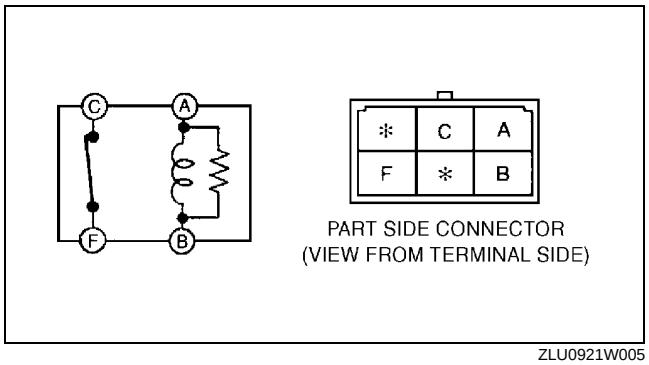
Type C

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○: Continuity

Step	Terminal			
	A	B	C	F
1	○	○	○	○
2	B+	GND		

ZLU0921W006



ZLU0921W005

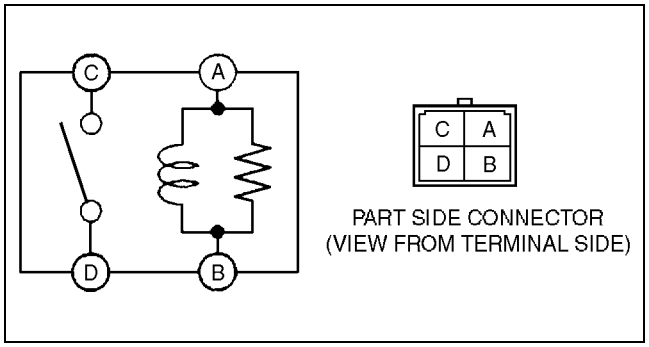
Type D

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○: Continuity

Step	Terminal			
	A	B	C	D
1	○	○		
2	B+	GND	○	○

ZLU0921W007



ZLU921WA0

Five-terminal

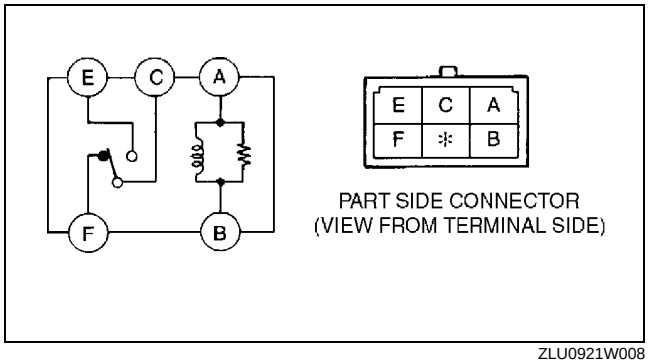
Type A

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○: Continuity

Step	Terminal				
	A	B	E	C	F
1	○	○		○	○
2	GND	B+	○	○	

ZLU0921W009



ZLU0921W008

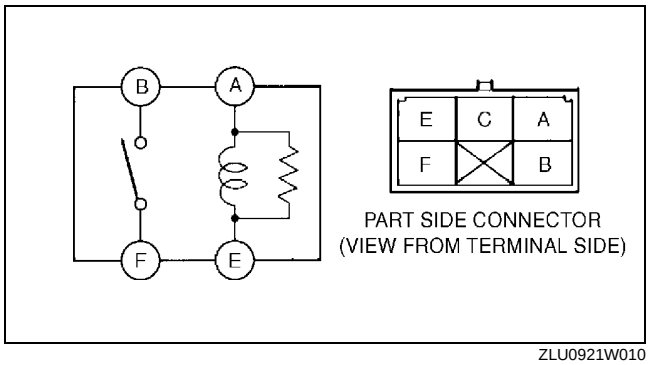
Type B

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○: Continuity

Step	Terminal			
	A	E	B	F
1	○	○		
2	GND	B+	○	○

ZLU0921W011



ZLU0921W010

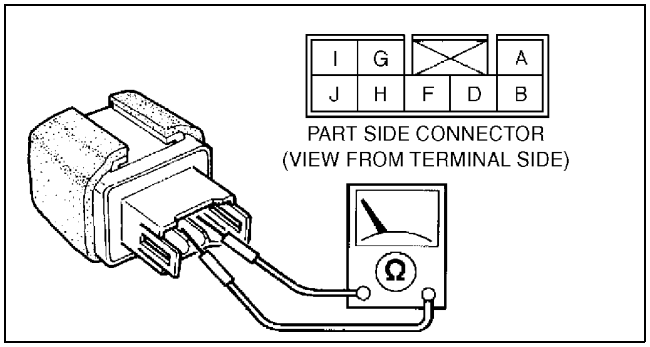
Eight-terminal

1. Remove the relay.
2. Inspect for continuity between the relay terminals using an ohmmeter.
   - If not as specified, replace the relay.

○—○: Continuity

Connection		Terminal			
B+	GND	A	D	G	I
—	—	○	○		○
H	J	○	○	○	○
F	B	○	○	○	○

ZLU0921W013



ZLU0921W012

09–22 INSTRUMENTATION/DRIVER INFO.

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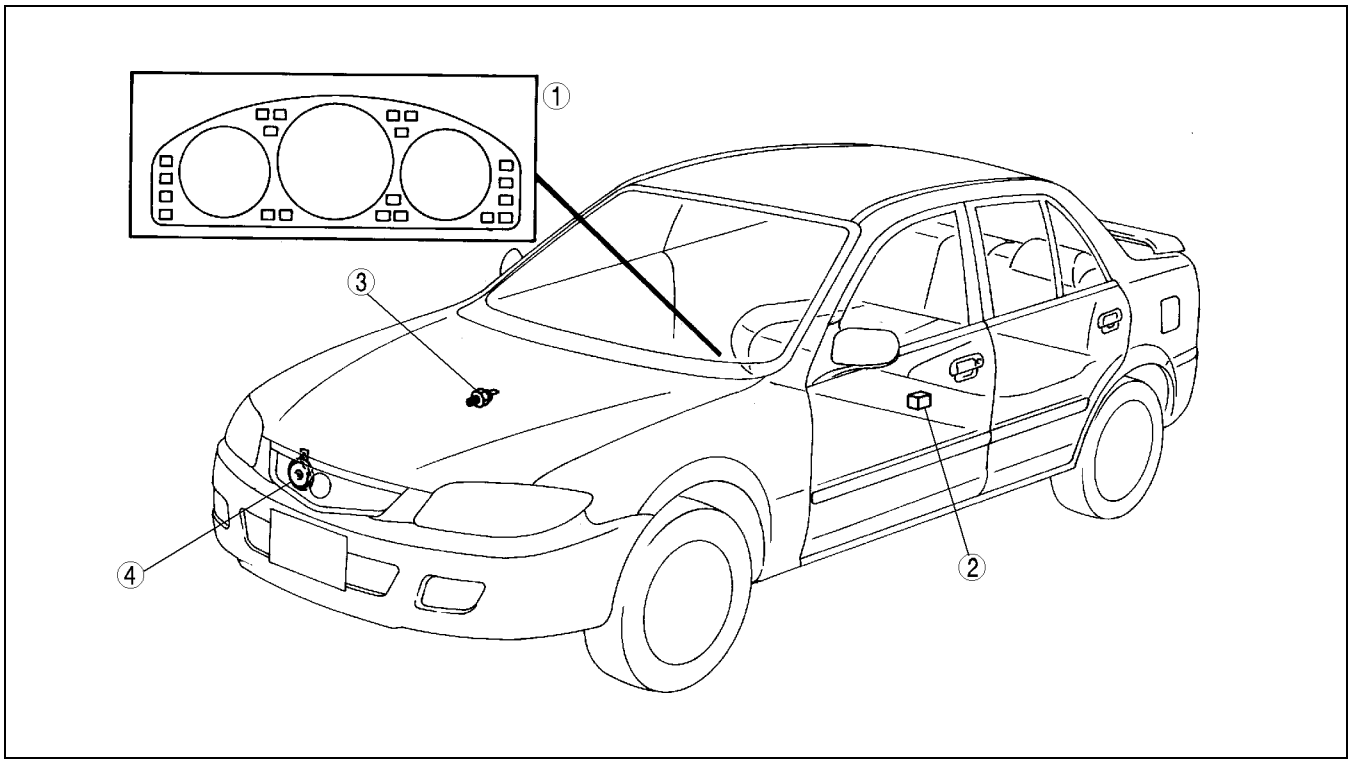
A3U092201067W01



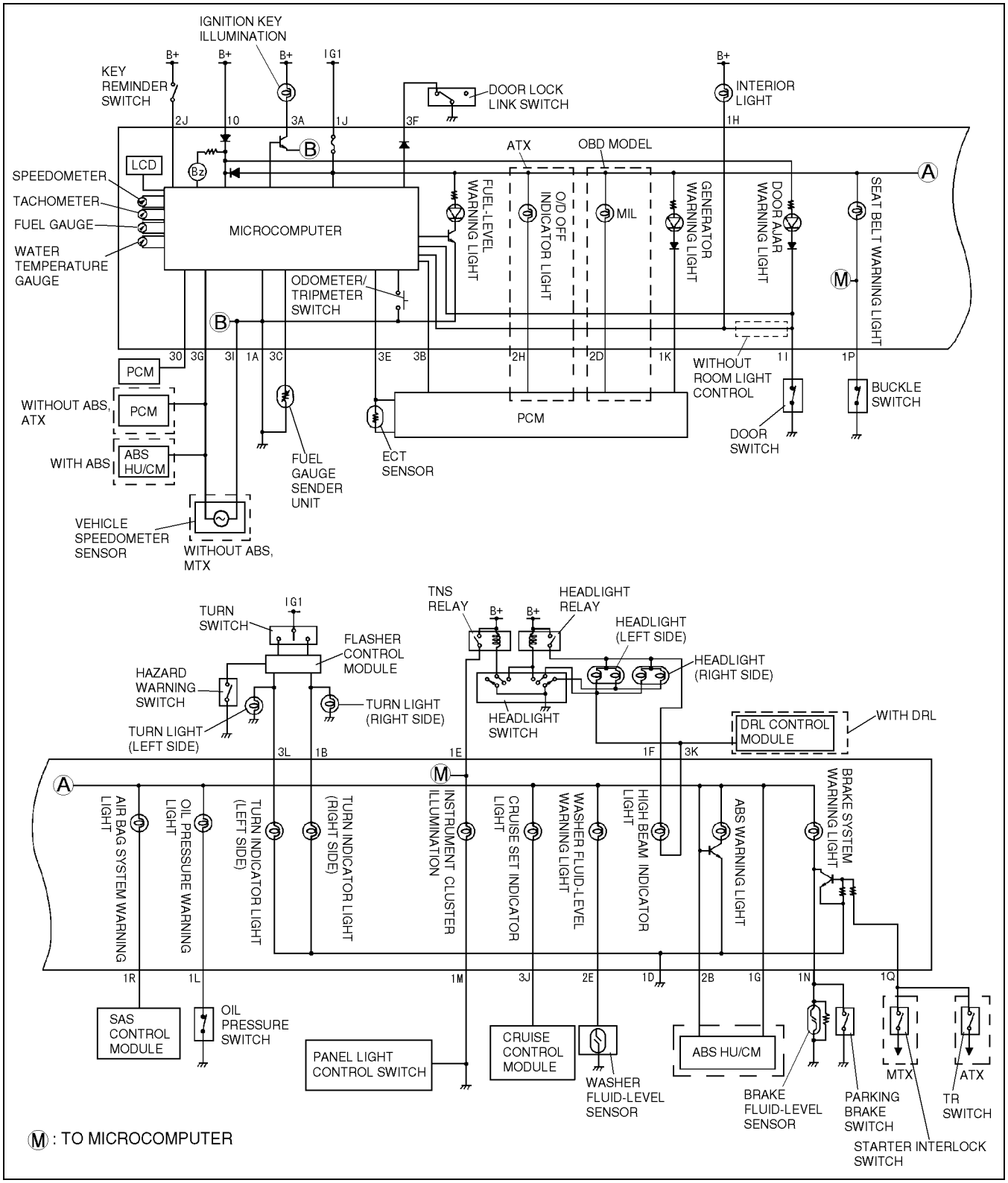
Z3U0922W003

1	Instrument cluster (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) (See 09–22–3 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY) (See 09–22–4 INSTRUMENT CLUSTER INSPECTION) (See 09–22–4 INSTRUMENT CLUSTER REPAIR) (See 09–22–5 INSTRUMENT CLUSTER INPUT/ OUTPUT CHECK MODE) (See 09–22–13 WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION)

2	Fuel gauge sender unit (See 09–22–13 FUEL GAUGE SENDER UNIT INSPECTION)
3	Oil pressure switch (See 09–22–13 OIL PRESSURE SWITCH INSPECTION)
4	Horn (See 09–22–13 HORN REMOVAL/INSTALLATION)

INSTRUMENT CLUSTER SYSTEM WIRING DIAGRAM

A3U092255430W01



Z3U0922W005

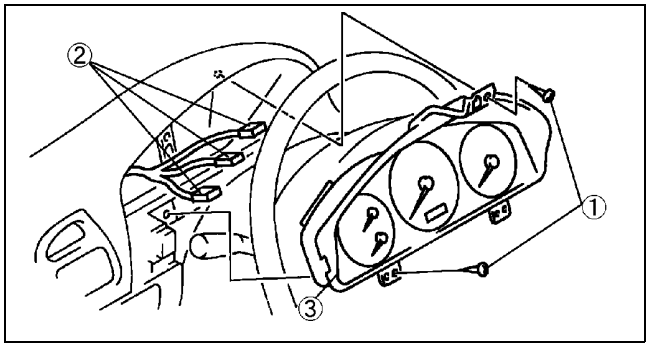
INSTRUMENT CLUSTER REMOVAL/INSTALLATION

A3U092255430W02

1. Disconnect the negative battery cable.
2. Pull down the adjusting lever of the tilt steering wheel and push the steering wheel down.
3. Remove the meter hood.
4. Remove in the order indicated in the table.

1	Screw
2	Connector
3	Instrument cluster (See 09–22–3 Instrument Cluster Removal Note)

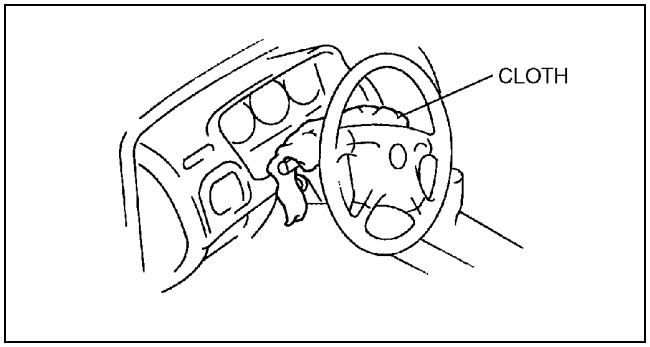
5. Install in the reverse order of removal.



X3U922WA0

Instrument Cluster Removal Note

1. When removing the instrument cluster, in order to prevent damage to the lens, cover the steering shaft with a cloth.



X3U922WA1

INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY

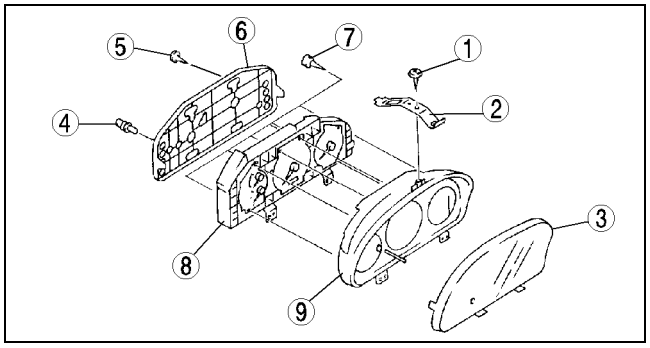
A3U092255430W03

Caution

- **If the instrument cluster is dropped or the print plate is damaged, the system will not operate properly and it may become the cause of trouble or malfunctions.**

1. Disassemble in the order indicated in the table.

1	Screw
2	Bracket
3	Lens
4	Bulb
5	Screw
6	Cover
7	Screw
8	Instrument cluster
9	Case



Z3U0922W001

2. Assemble in the reverse order of disassembly.

INSTRUMENT CLUSTER INSPECTION

A3U092255430W04

Speedometer

1. Inspect the speedometer by setting it in the input/output check mode DTC 12. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Tachometer

1. Inspect the tachometer by setting it in the input/output check mode DTC 13. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Fuel Gauge

1. Inspect the fuel gauge by setting it in the input/output check mode DTC 23. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Water Temperature Gauge

1. Inspect the water temperature gauge by setting it in the input/output check mode DTC 25. (See 09–22–5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

INSTRUMENT CLUSTER REPAIR

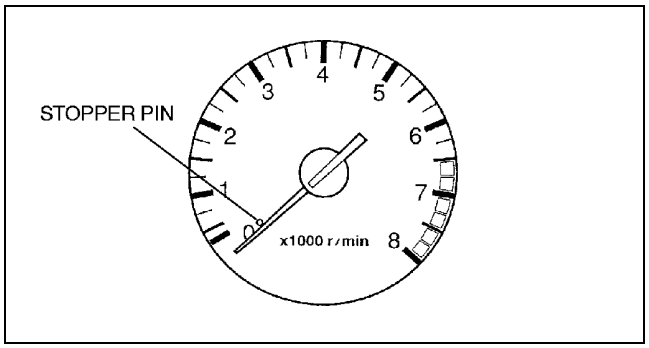
A3U092255430W05

Tachometer

Note

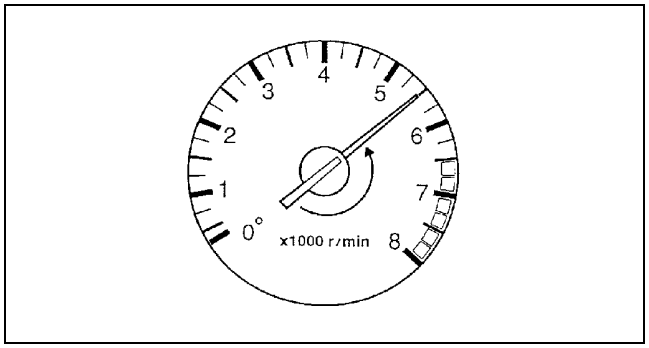
- The tach needle will not return to zero if the engine is turned off while the engine speed is **4,000 rpm** or higher when the ROOM fuse is not installed. The tach needle will continue to rotate clockwise until it rests on the wrong side of the stopper pin. If a customer complains of this concern, inspect the ROOM fuse and if necessary, repair according to the following steps.

1. Verify the concern.
2. Verify that the ROOM fuse is installed.

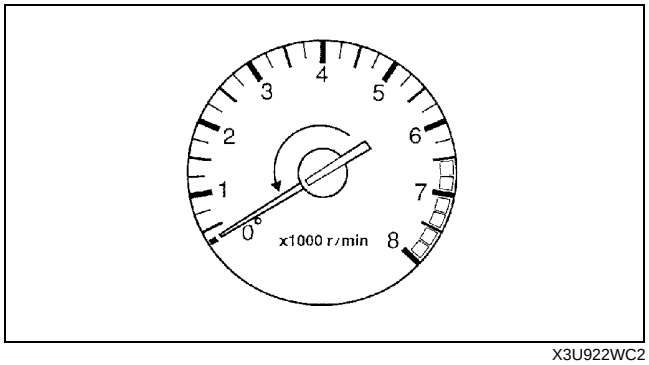


X3U922WC0

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 (counterclockwise).
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 needle does not return to zero, remove the lens and carefully move the needle by hand.



X3U922WC1



X3U922WC2

INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE

A3U092255430W06

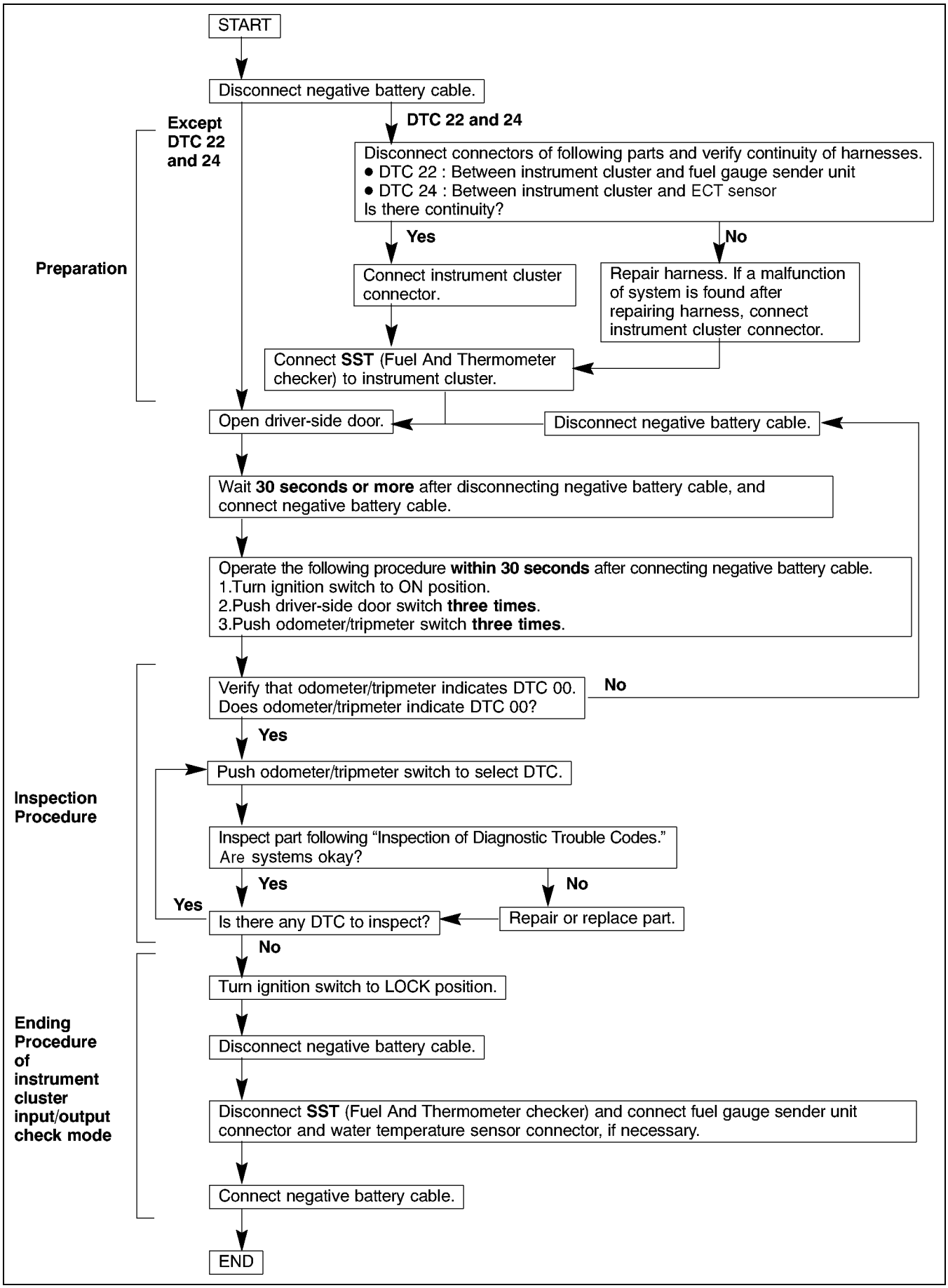
Note
- In this mode, it is possible to check the items in the following chart.

DTC Chart

DTC	Checking item	Related item
01	Buckle switch	Buckle switch
04	Door switch	• Ignition key illumination • Room light control • Power door lock system • Lights-on reminder warning buzzer
05	Door lock-link switch	Room light control
08	TNS relay	• Lights-on reminder warning buzzer • Each illumination
10	**With ABS** • ABS HU/CM (vehicle speed signal) **Without ABS, MTX** • Vehicle speedometer sensor (vehicle speed signal) **Without ABS, ATX** • PCM (vehicle speed signal)	Speedometer
11	PCM (engine speed signal)	Tachometer
12	Speedometer	Speedometer
13	Tachometer	Tachometer
14	Buzzer	• Lights-on reminder warning buzzer • Key reminder warning buzzer
16	Fuel-level warning light	Fuel-level warning light
22	Fuel gauge sender unit	Fuel gauge
23	Fuel gauge	Fuel gauge
24	ECT sensor	Water temperature gauge
25	Water temperature gauge	Water temperature gauge
26	LCD	LCD
27	Interior light	Room light control
31	Key reminder switch	• Room light control • Keyless entry system

Note
- The diagnostic trouble codes are displayed in numerical order. (While performing the inspection, if you want to inspect a diagnostic trouble code number which 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**.

Operating Order



Z3U0922W002

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		01, 04, 05, 08, 10, 11, 12, 13, 14, 16, 23, 25, 26, 27
3	LOCK	31

Inspection of DTCs

DTC 01	Buckle switch on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
1	Unfasten driver-side seat belt. (Buckle switch on.)		Go to next step.
			• Inspect buckle switch. (See 08–11–5 BUCKLE SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — buckle switch)
2	Fasten driver-side seat belt. (Buckle switch off.)		• Inspect buckle switch. (See 08–11–5 BUCKLE SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — buckle switch)
			Input signal to instrument cluster is okay.

DTC 04	Door switch on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
1	Open driver-side door. (Door switch on.)		Close driver-side door, then go to next step.
			• Inspect door switch. (See 09–18–25 DOOR SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door switch)
2	Open passenger-side door. (Door switch on.)		Close passenger-side door, then go to next step.
			• Inspect door switch. (See 09–18–25 DOOR SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door switch)
3	Open rear door on driver-side. (Door switch on.)		Close rear door on driver-side, then go to next step.
			• Inspect door switch. (See 09–18–25 DOOR SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door switch)

DTC 04	Door switch on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
4	Open rear door on passenger-side. (Door switch on.)		Close rear door on passenger-side, then go to next step.
			• Inspect door switch. (See 09–18–25 DOOR SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door switch)
5	Close all doors. (Door switch off.)		• Inspect door switch. (See 09–18–25 DOOR SWITCH INSPECTION) • Inspect wiring harness.(Instrument cluster — door switch)
			Input signals to instrument cluster are okay.

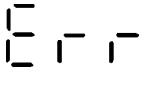
DTC 05	Door lock-link switch on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
1	Turn driver-side door lock knob to lock position. (Door lock-link switch to lock position.)		Go to next step.
			• Inspect door lock-link switch. (See 09–14–4 DOOR LOCK-LINK SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door lock-link switch — GND)
2	Turn driver-side door lock knob to unlock position. (Door lock-link switch to unlock position.)		• Inspect door lock-link switch. (See 09–14–4 DOOR LOCK-LINK SWITCH INSPECTION) • Inspect wiring harness. (Instrument cluster — door lock-link switch — GND)
			Input signal to instrument cluster is okay.

DTC 08	TNS relay on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
1	Turn headlight switch to TNS position. (TNS relay on.)		Go to next step.
			• Inspect TNS relay. (See 09–21–5 RELAY INSPECTION) • Inspect wiring harness. (Battery — TNS relay — instrument cluster)
2	Turn headlight switch off. (TNS relay off.)		• Inspect TNS relay. (See 09–21–5 RELAY INSPECTION) • Inspect wiring harness. (TNS relay — instrument cluster)
			Input signal to instrument cluster is okay.

DTC 10	Vehicle speed input signal		
INSPECTION		**INDICATION**	**ACTION**
Rotate drive wheels using chassis roller.			Input signal to instrument cluster is okay.
			Inspect following parts **With ABS** • ABS HU/CM • Wiring harness (Instrument cluster—ABS HU/CM) **Without ABS, ATX** • PCM • Wiring harness (Instrument cluster—PCM) **Without ABS, MTX** • Vehicle speedometer sensor • Wiring harness (Instrument cluster—vehicle speedometer sensor)

DTC 11	Engine speed input signal		
INSPECTION		**INDICATION**	**ACTION**
Start engine.			Input signal to instrument cluster is okay.
			• Inspect PCM. (See 01–40A–7 PCM INSPECTION [ZM]) (See 01–40B–7 PCM INSPECTION [FS]) • Inspect wiring harness. (instrument cluster — PCM)

DTC 12	Operation signal to speedometer			
INSPECTION		**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 12.			Speedometer needle moves full scale then returns to **60 km/h {37 MPH}**.	Speedometer is okay.
			Other than stated above.	Replace instrument cluster.
			—	

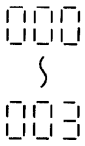
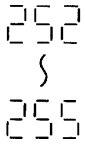
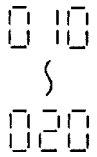
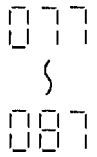
DTC 13	Operation signal to tachometer			
INSPECTION		**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 13.			Tachometer needle moves full scale then returns to **3000 rpm**.	Tachometer is okay.
			Other than stated above.	Replace instrument cluster.
			—	

DTC 14	Operation signal to buzzer			
INSPECTION		**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 14.		 (Fixed)	Buzzer continuously sounds.	Buzzer is okay.
			Buzzer does not continuously sound.	Replace instrument cluster.

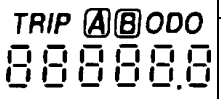
DTC 16	Operation signal to fuel-level warning light		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 16.	07 (Turns on and off)	Fuel-level warning light turns on and off **3 times**.	Fuel-level warning light is okay.
		Other than stated above.	Inspect fuel-level warning light. (See 09–22–13 WARNING AND INDICATOR LIGHT BULB REMOVAL/ INSTALLATION)

DTC 22	Fuel level signal			
STEP	**INSPECTION**	**INDICATION**	**SITUATION**	**ACTION**
1	Select DTC 22.	000 ↕ 003	Short to GND.	• Inspect fuel gauge sender unit. (See 09–22–13 FUEL GAUGE SENDER UNIT INSPECTION) • Inspect wiring harness. (Instrument cluster — fuel gauge sender unit.)
		125 ↕ 127	Open circuit.	
		Other than stated above.	Go to next step.	
2	Using **SST** (Fuel And Thermometer checker), input **20 ohms** to terminal 3C of instrument cluster.	017 ↕ 023	—	Go to next step.
		Other than stated above.	—	Replace instrument cluster.
3	Using **SST** (Fuel And Thermometer checker), input **60 ohms** to terminal 3C of instrument cluster.	057 ↕ 063	—	Go to next step.
		Other than stated above.	—	Replace instrument cluster.
4	Using **SST** (Fuel And Thermometer checker), input **100 ohms** to terminal 3C of instrument cluster.	097 ↕ 103	—	Input signal to instrument cluster is okay.
		Other than stated above.	—	Replace instrument cluster.

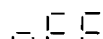
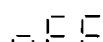
DTC 23	Operation signal to fuel gauge		
INSPECTION	INDICATION	SITUATION	ACTION
Wait for **2 seconds** after selecting DTC 23.		Fuel gauge indicates in following order for every **2 seconds**. • F→1/2→E→F (fixed)	Fuel gauge is okay.
		Other than stated above.	Replace instrument cluster.
		Replace instrument cluster.	

DTC 24	Water temperature signal				
STEP	INSPECTION		INDICATION	SITUATION	ACTION
1	Inspect PCM and ETC sensor. Are any DTCs of PCM displayed?	Yes	—	—	Go to applicable DTC inspection.
		No	—	—	Go to next step.
2	Select DTC 24. **Caution** • **If ignition switch is turned to ON position with ECT sensor connector disconnected, DTC (P0117, P0118) of on-board diagnostic system will be recorded in PCM. After inspecting DTC 24, always delete DTC of PCM.**			Short to GND.	Inspect wiring harness. (Instrument cluster — ECT sensor)
				Open circuit.	
			Other than stated above.	—	Go to next step.
3	Use the **SST** (Fuel and thermometer checker) to adjust the resistance so that the voltage of the instrument cluster terminal 3E is **approximately 0.29 V**.			—	Go to next step.
			Other than stated above.	—	Replace instrument cluster.
4	Use the **SST** (Fuel and thermometer checker) to adjust the resistance so that the voltage of the instrument cluster terminal 3E is **approximately 1.61V**.			—	Input signal to instrument cluster is okay.
			Other than stated above.	—	Replace instrument cluster.

DTC 25	Operation signal to water temperature gauge		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 25.		Water temperature gauge indicates in following order for every **2 seconds**. • H→Center→C→H (fixed)	Water temperature gauge is okay.
		Other than stated above.	Replace instrument cluster.
		Replace instrument cluster.	

DTC 26	LCD indication		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 26.		Indication is normal.	LCD is okay.
		Other than stated above.	Replace instrument cluster.

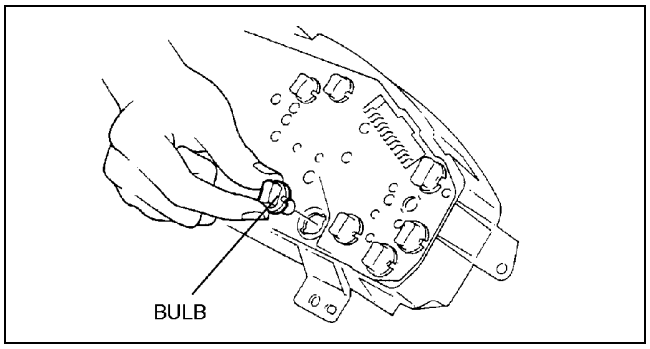
DTC 27	Operation signal to interior light		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
a. Turn interior light switch to DOOR position. b. Wait for **2 seconds** after selecting DTC 27.	 (Turns on and off)	Interior light turns on and off **3 times**.	Interior light is okay.
		Other than stated above.	• Inspect interior light. • Inspect wiring harness. (Battery — interior light — instrument cluster)

DTC 31	TNS relay on/off signal		
STEP	**INSPECTION**	**INDICATION**	**ACTION**
1	Remove key from steering lock and then insert key into steering lock after selecting DTC 31 (key reminder switch on).		Go to next step.
			• Inspect key reminder switch. (See 09–21–4 KEY REMINDER SWITCH INSPECTION) • Inspect wiring harness. (Battery — key reminder switch — instrument cluster)
2	Remove key from steering lock (key reminder switch off).		• Inspect key reminder switch. (See 09–21–4 KEY REMINDER SWITCH INSPECTION) • Inspect wiring harness. (Battery — key reminder switch — instrument cluster)
			Input signal to instrument cluster is okay.

WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION

A3U092255431W01

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
3. Turn the socket counterclockwise to remove the bulb as shown in the figure.
4. Install in the reverse order of removal.

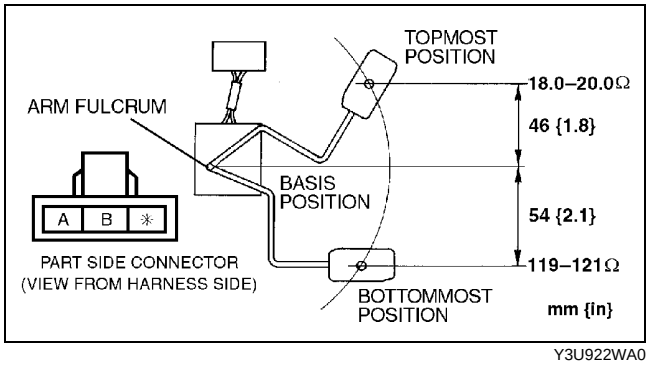


X3U922WBK

FUEL GAUGE SENDER UNIT INSPECTION

A3U092260960W01

1. Remove the fuel gauge sender unit. (See 01–14–15 FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY.)
2. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and B 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.



Y3U922WA0

OIL PRESSURE SWITCH INSPECTION

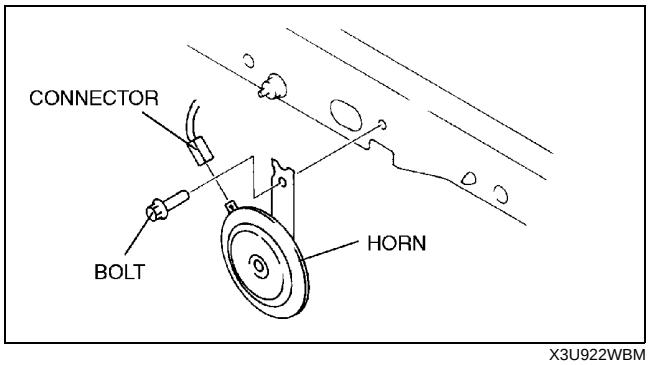
A3U092218500W01

1. Verify that the oil pressure warning light illuminates when the ignition switch is turned to ON position.
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.
   - 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.

HORN REMOVAL/INSTALLATION

A3U092266790W01

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09–10–5 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Disconnect the horn connector.
4. Remove the bolt.
5. Remove the horn.
6. Install in the reverse order of removal.



X3U922WBM

09–50 TECHNICAL DATA

BODY & ACCESSORIES TECHNICAL DATA

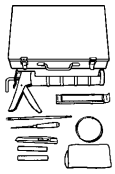
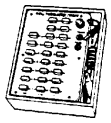
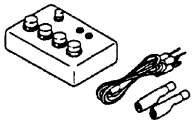
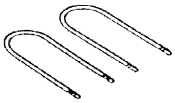
A3U095001047W01

Item				Specifications (W) × number
LIGHTING SYSTEMS				
Exterior lights	Headlight	4SD		60/55 × 2
		5HB	High-beam	60 × 2
			Low-beam	55 × 2
	Front turn light/parking light			27/8 × 2
	Front side marker light			5 × 2
	Front fog light			55 × 2
	Brake light/taillight			21/5 × 2
	Rear turn light			21 × 2
	Taillight (4SD)			3.8 × 2
	Back-up light			21 × 2
	Rear side marker light (4SD)			3.8 × 2
	License plate light			5 × 2
	High-mount brake light	In-vehicle type		21 × 1
		Rear spoiler type		5.8 × 1
Interior lights	Interior light	Front		8 × 1
		Rear		10 × 1
	Map light			5 × 2
	Interior and map light			Interior 8 × 1, Map 5 × 2
	Trunk compartment light (4SD)			5 × 1
	Cargo compartment light (5HB)			5 × 1
	Instrument cluster illumination			3.4 × 2, 1.4 × 2
INSTRUMENTATION/DRIVER INFO.				
Warning and indicator lights	MIL			1.4 × 1
	Air bag system warning light			1.4 × 1
	Seat belt warning light			1.4 × 1
	Oil pressure warning light			1.4 × 1
	Brake system warning light			1.4 × 1
	ABS warning light			1.4 × 1
	High beam indicator light			1.4 × 1
	Turn indicator light			1.4 × 2
	O/D OFF indicator light			1.4 × 1
	Cruise set indicator light			1.4 × 1
	Washer fluid-level warning light			1.4 × 1

09–60 SERVICE TOOLS

BODY & ACCESSORIES SST

A3U096001047W01

49 0305 870A Window tool set 	49 0839 285 Fuel and thermometer checker (OLD) 	49 N088 0A0 Fuel and thermometer checker (NEW) 
49 UN01 050 Removing tool 	—	—

ALPHABETICAL INDEX

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