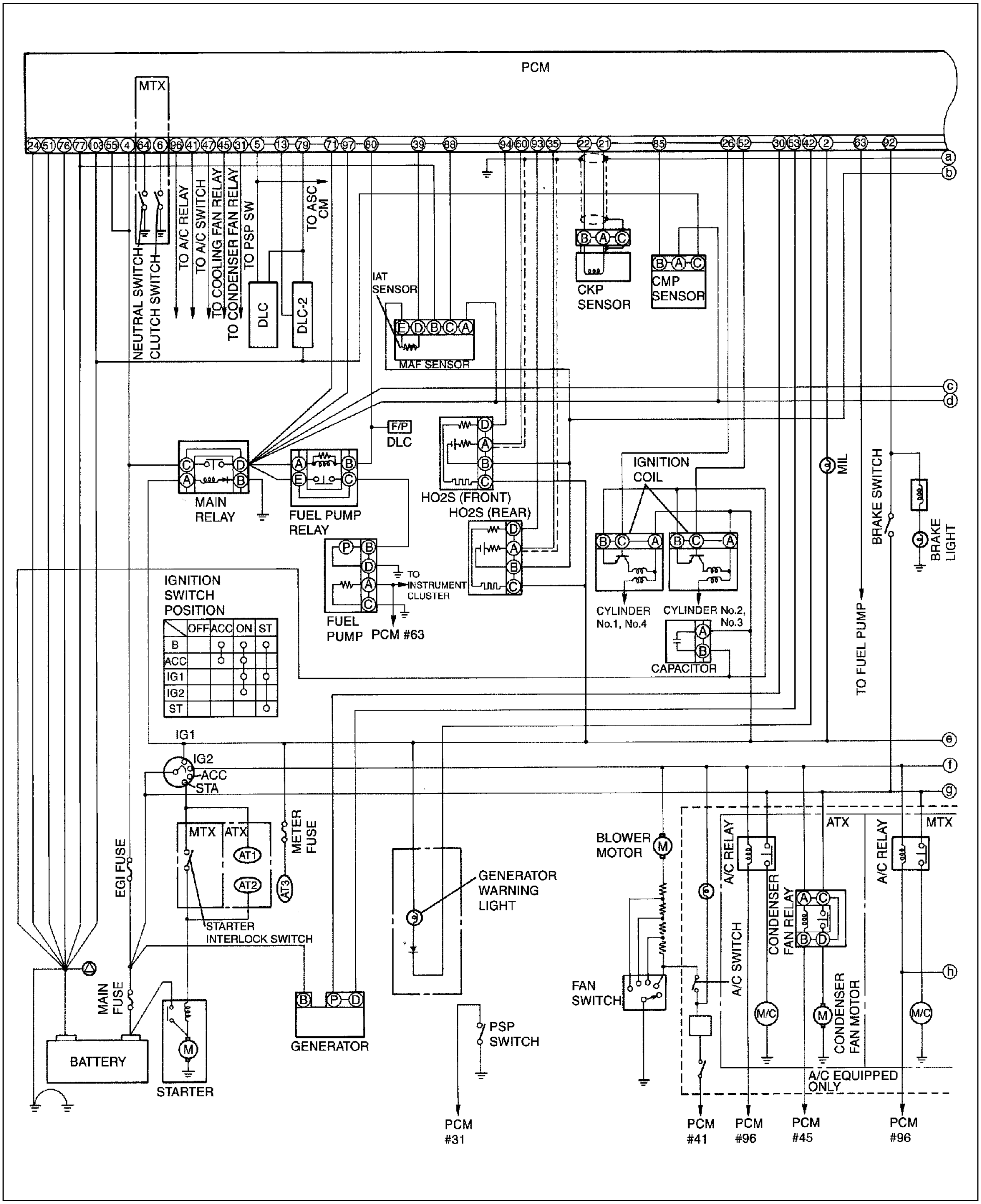
ENGINE

01 SECTION

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

CONTROL SYSTEM WIRING DIAGRAM [ZM]

A3U010218881W15



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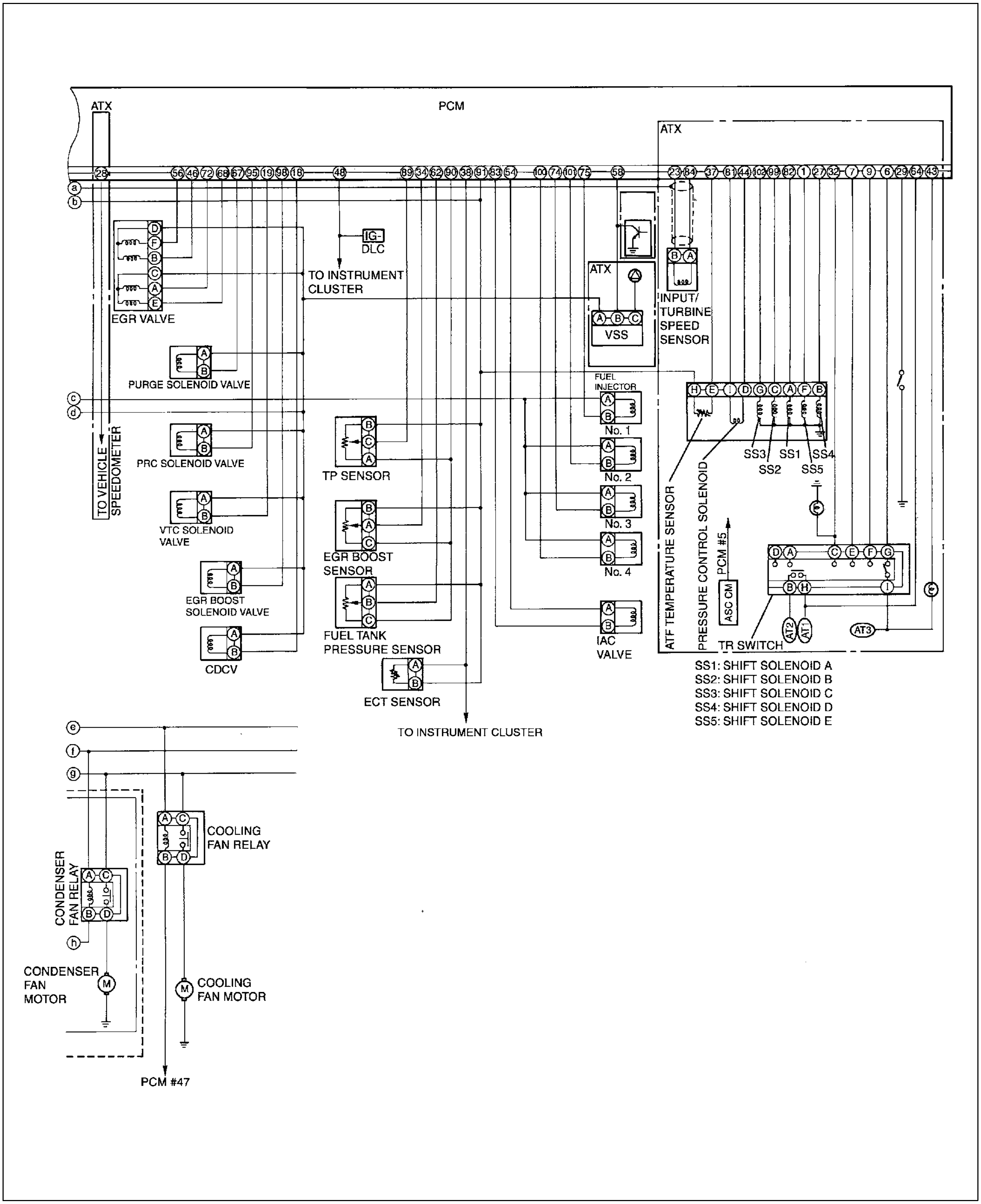


Z3U0140W005

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

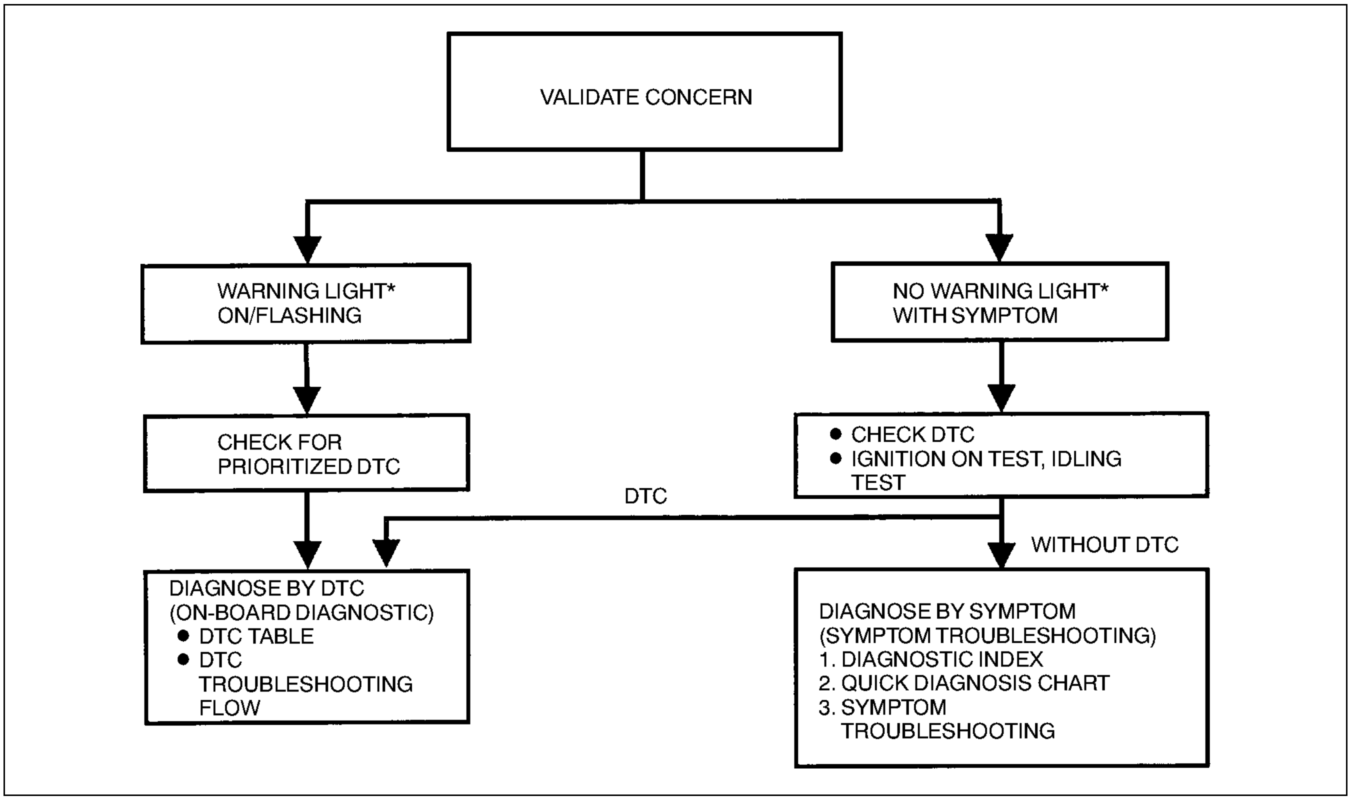
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier		×		×			×
PSP switch		×		×			×
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

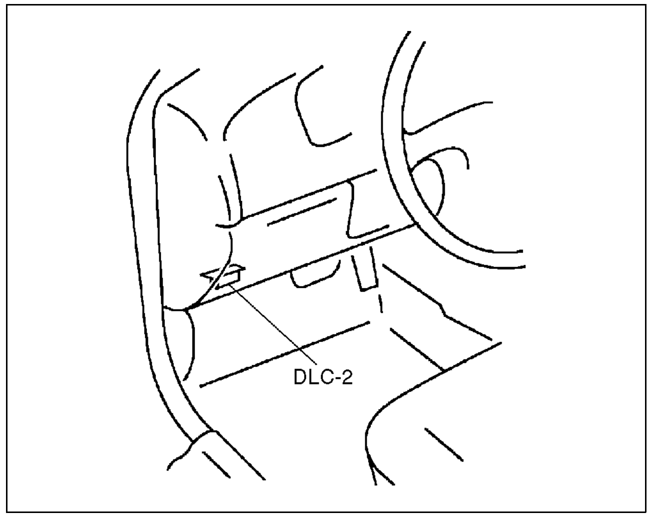
- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST [ZM]

A3U010218881W24

DTCs Retrieving Procedure

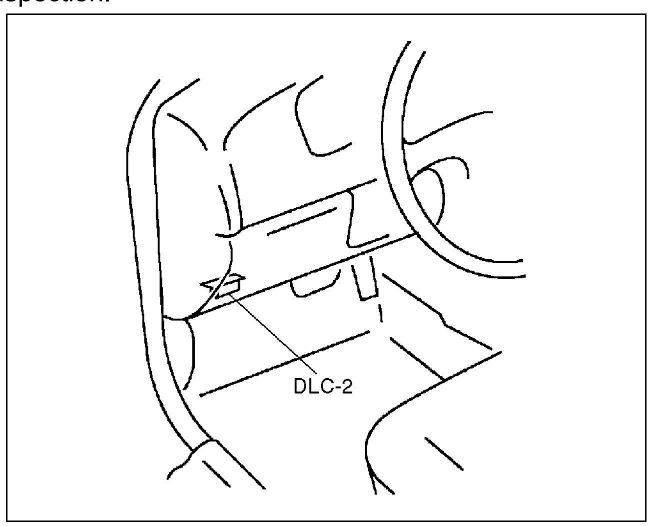
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve DTC using WDS or equivalent.



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.



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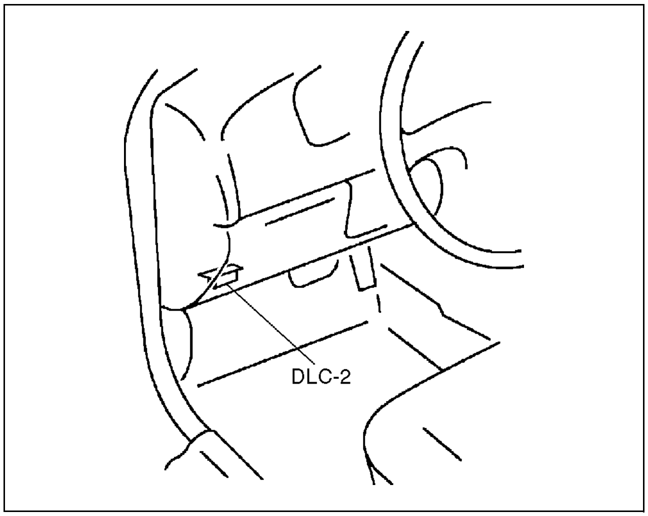
Freeze Frame PID Data Access Procedure

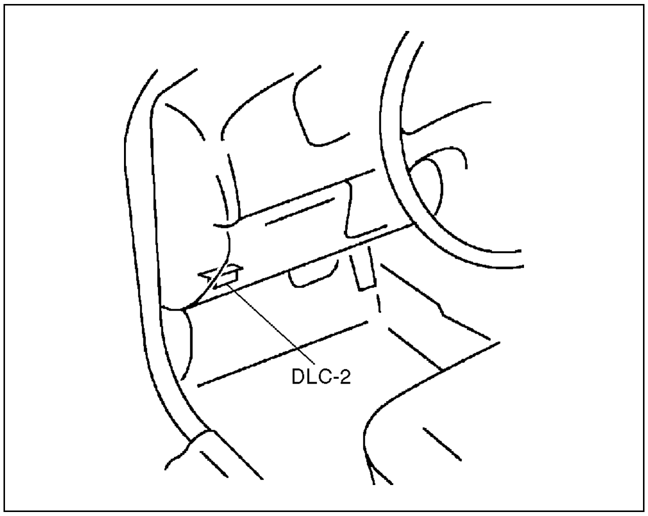
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve FREEZE FRAME PID DATA using WDS or equivalent.



Z3U0102W001

On-Board System Readiness Tests Access Procedure

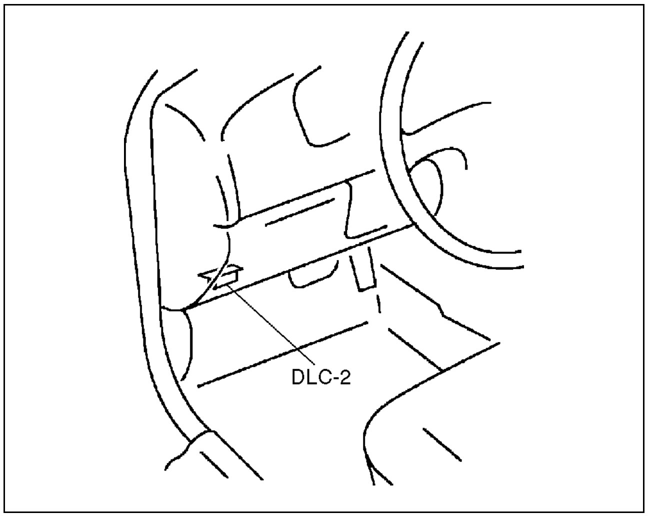
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Monitor the OBD-II system operating status using WDS or equivalent.



Z3U0102W001

PID/DATA Monitor and Record Procedure

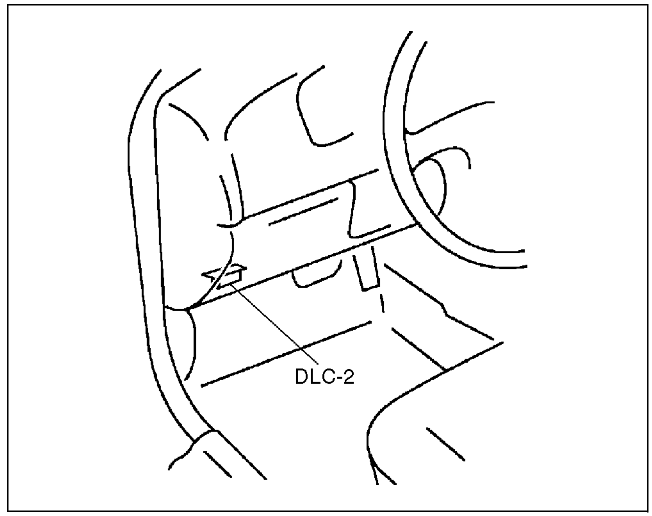
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access and monitor DTCs using WDS or equivalent.



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.

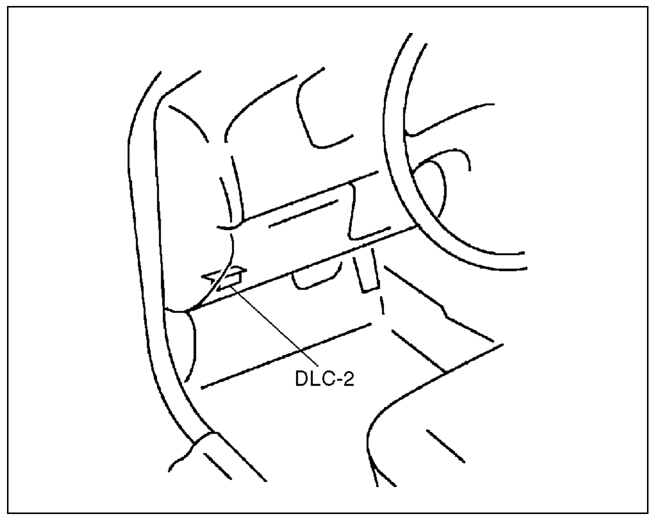


Z3U0102W001

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

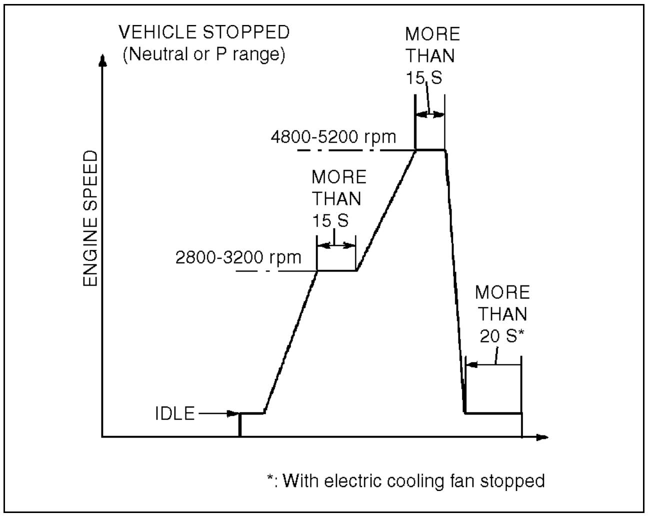
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the WDS or equivalent is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the WDS or equivalent using the PID/DATA MONITOR AND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

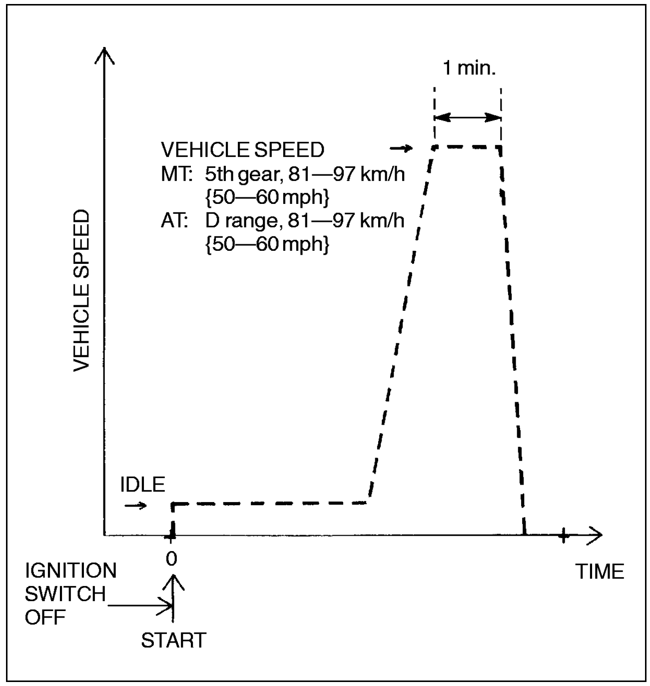
1. Start the engine and warm up completely.
2. Verify the following conditions and correct if necessary.
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
   - Initial ignition timing and idle speed are within specification.
   - TEN and GND of DLC are not connected.
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)

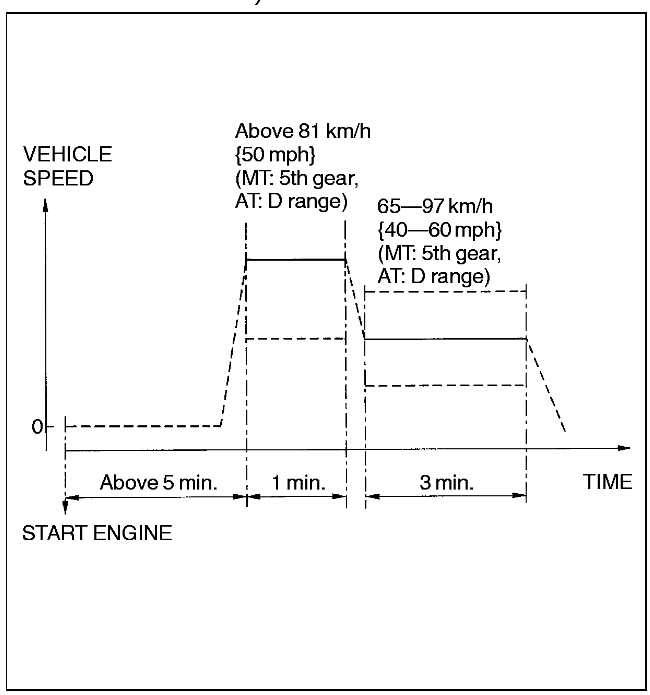
1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph.
4. Stop vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, 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.

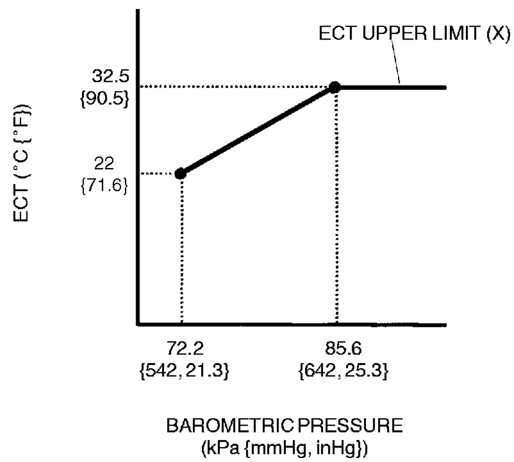


X3U101WBM

Mode 4 (EVAP system repair verification drive mode)

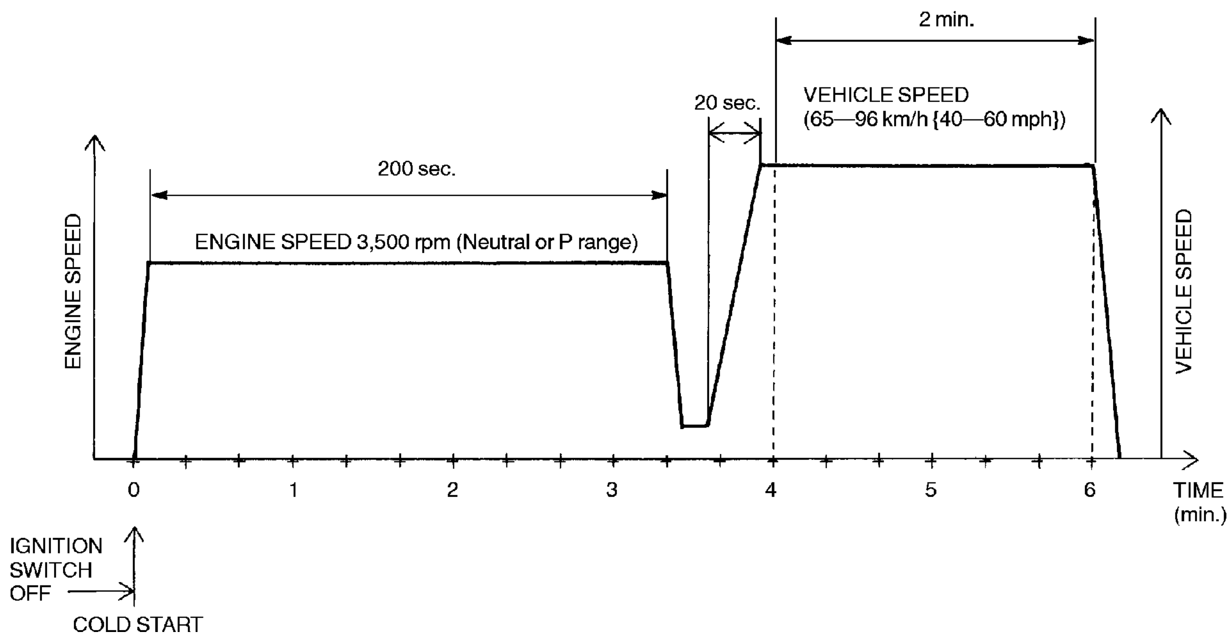
Note
- If Mode 4 can not be performed (you can not drive the vehicle under Mode 4 condition), perform evaporative system test procedure as an alternative. (See 01–03A–56 Evaporative System Leak Inspection Using Vacuum Pump.)
- Mode 4 can be performed regardless RFC FLAG condition.

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)					

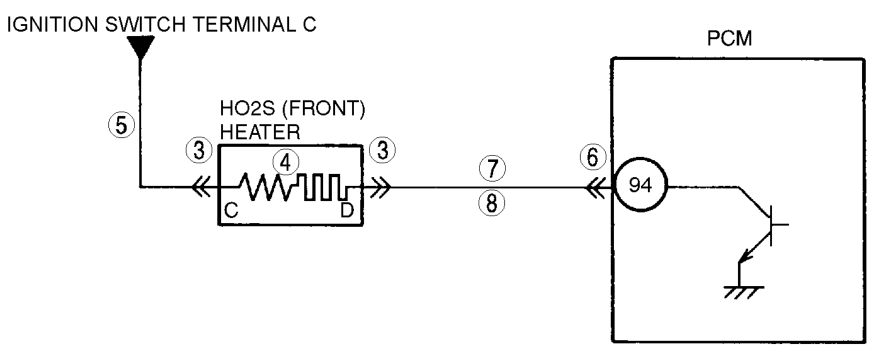
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0711	Transaxle temperature sensor circuit range/ performance (Stuck) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION)					
P0715	Input/turbine speed sensor circuit malfunction (ATX)	(See 05–02–6 AUTOMATIC 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)					

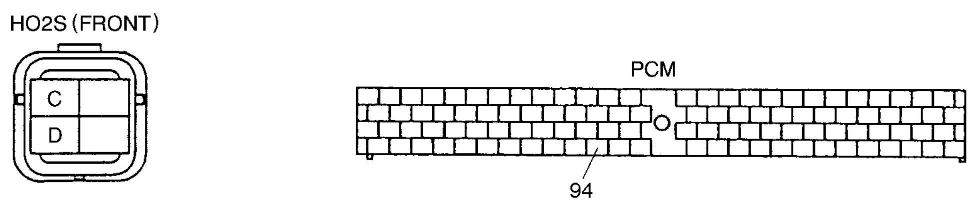
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P1102	MAF sensor inconsistent with TP sensor (Lower than expected)	ON	—	2	CCM	×	(See 01–02A–106 DTC P1102 [ZM])
P1103	Mass air flow inconsistent with engine speed (Greater than expected)	ON	—	2	CCM	×	(See 01–02A–107 DTC 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.

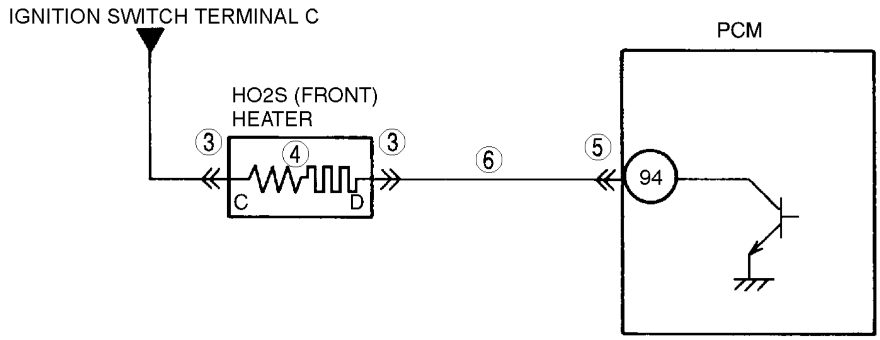
STEP	INSPECTION		ACTION
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 9.
5	**INSPECT POWER CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • 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.

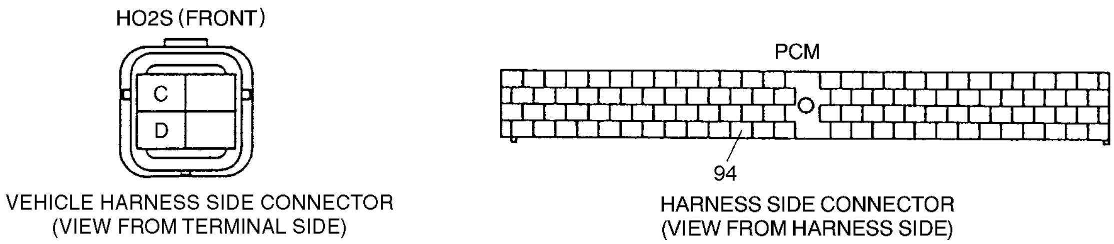
DTC P0032 [ZM]

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

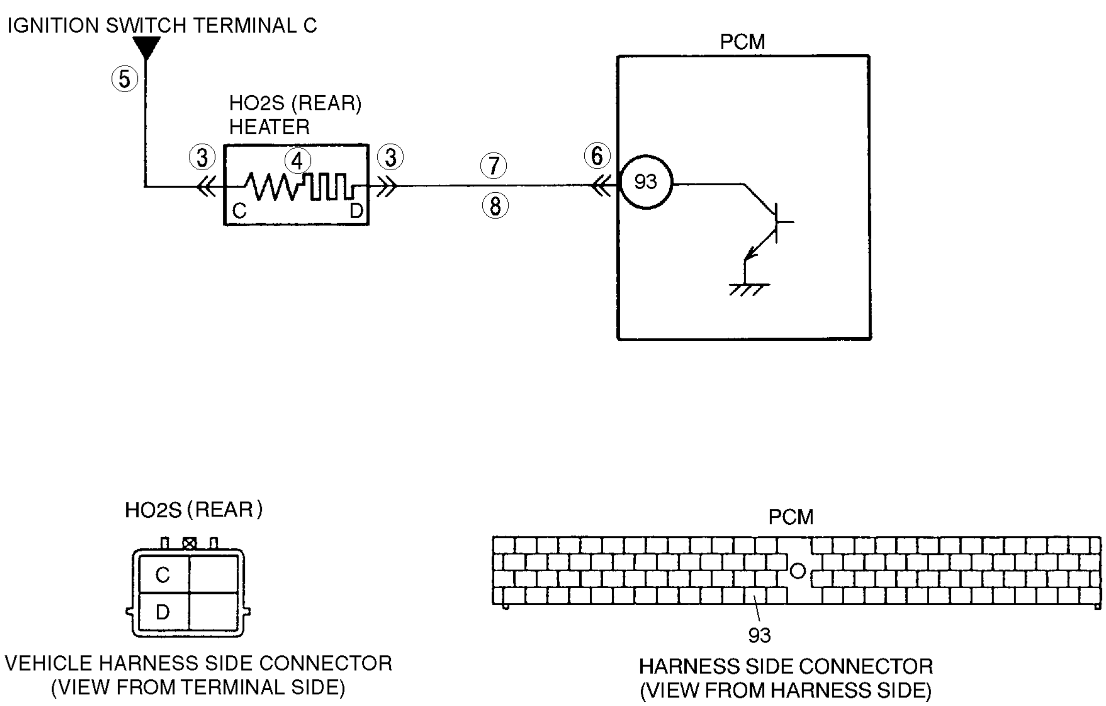
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

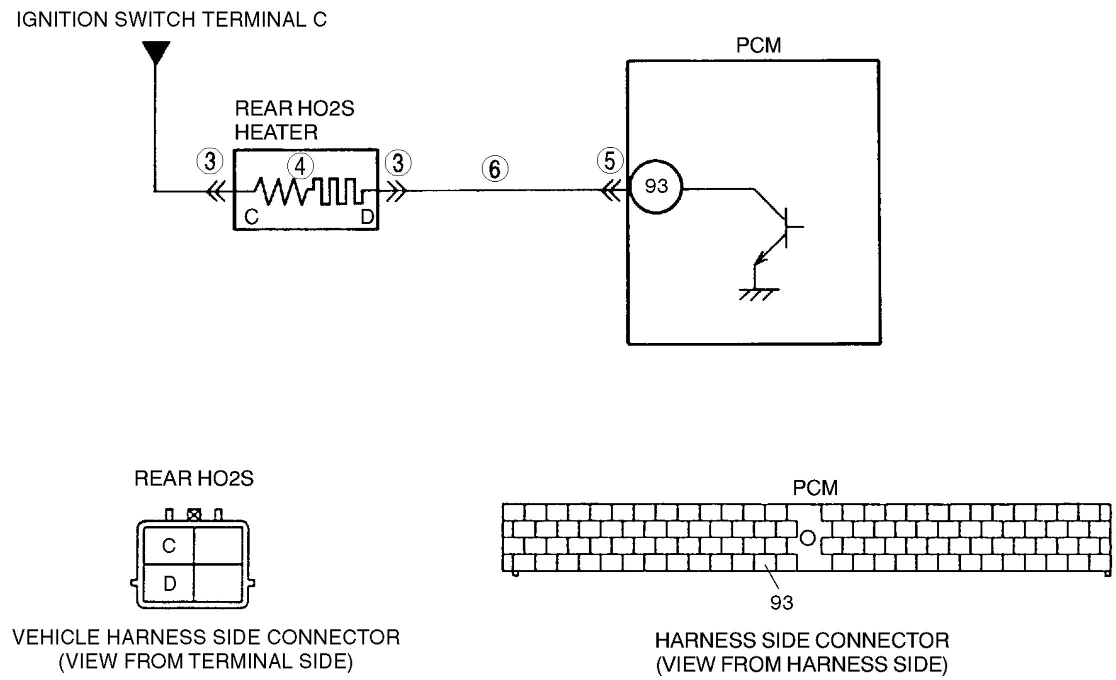
STEP	INSPECTION		ACTION
3	**INSPECT HO2S (REAR) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to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



Diagnostic procedure

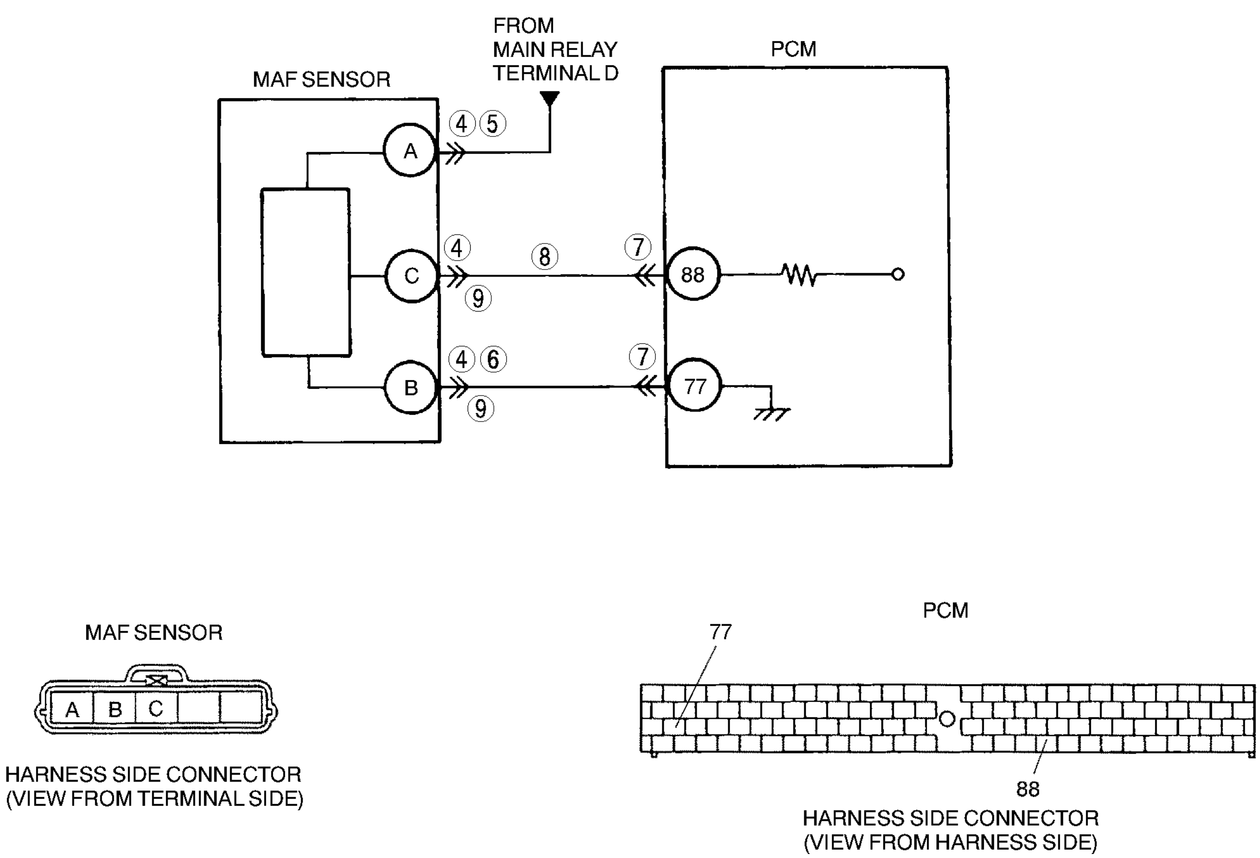
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



Diagnostic procedure

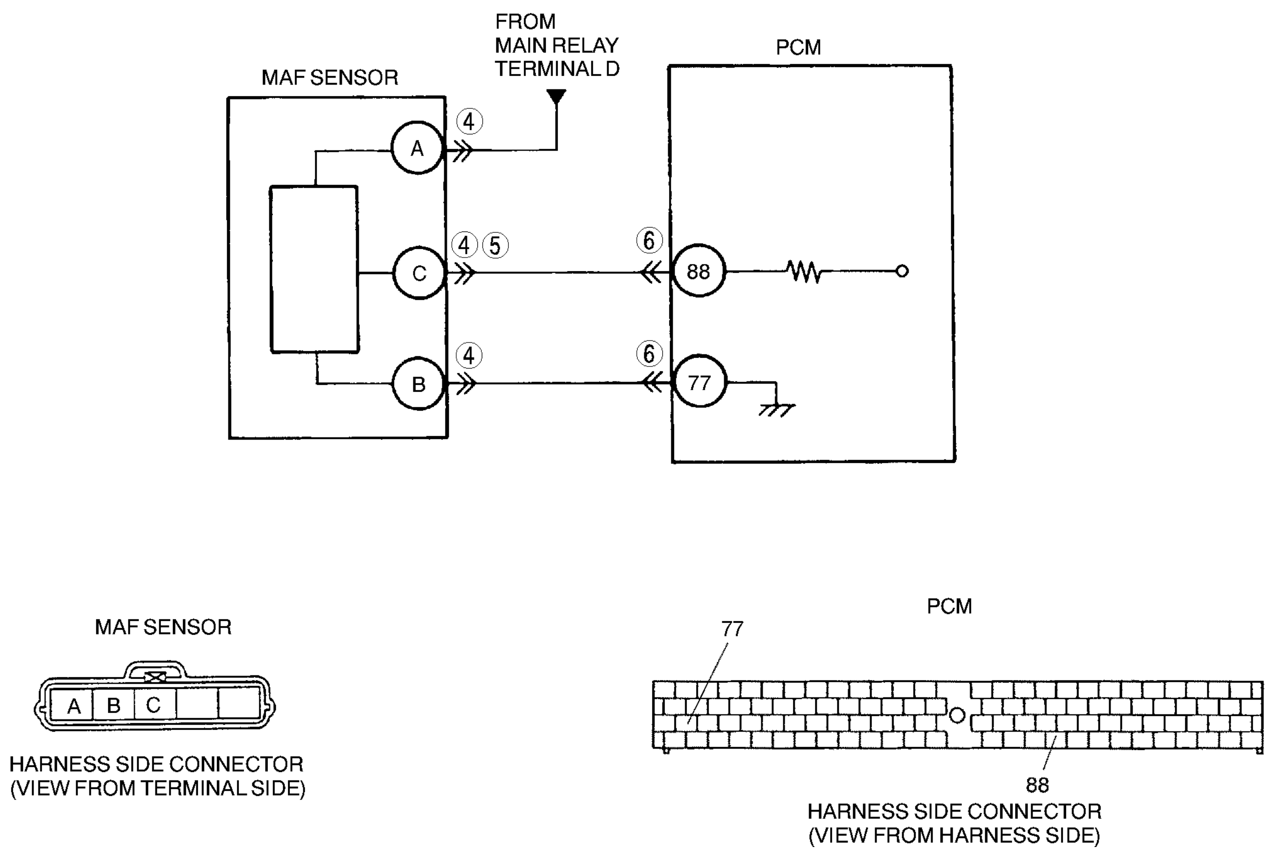
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

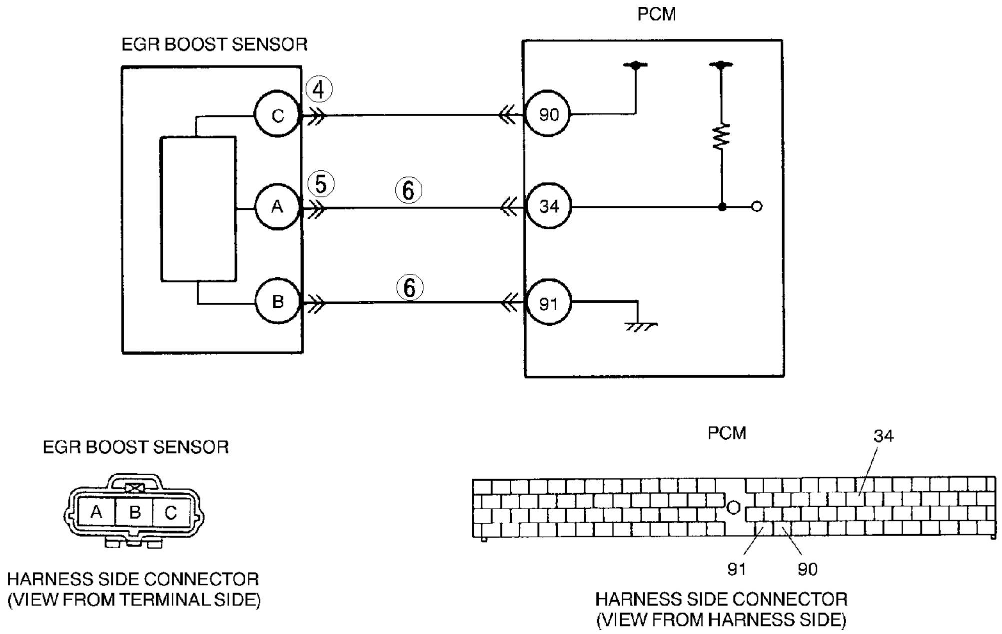
Diagnostic procedure

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.

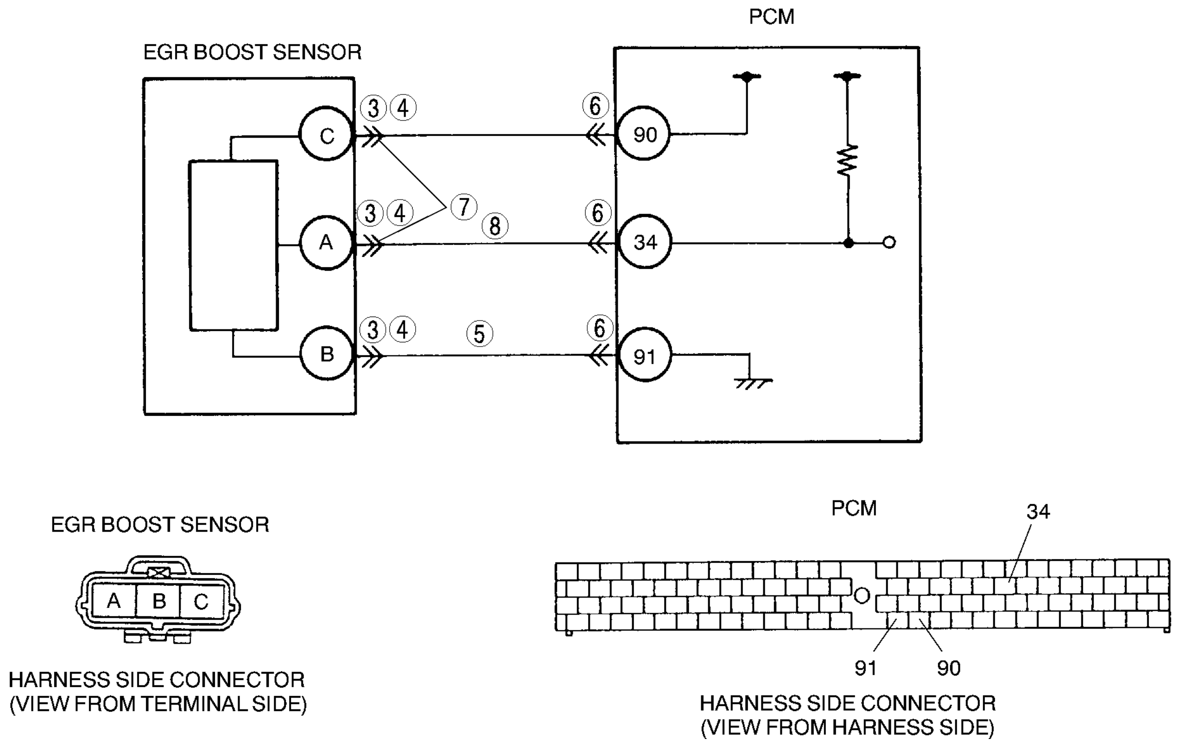
<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">CHECK POWER SUPPLY CIRCUIT VOLTAGE AT EGR BOOST SENSOR CONNECTOR
Note
• If DTCs P0122 and P0452 are also retrieved with P0107, go to REFERENCE VOLTAGE troubleshooting procedure.
• Measure voltage between EGR boost sensor terminal C (harness-side) and body ground.
• Is voltage within 4.5—5.5 V?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected harness, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected harness, then to go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>No concern is detected. Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

DTC P0108 [ZM]

A3U010201084W37

<table>
<tr><th>DTC P0108</th><th>BARO circuit high input</th></tr>
<tr><td>DETECTION CONDITION</td><td>• 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.</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>• 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</td></tr>
</table>

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

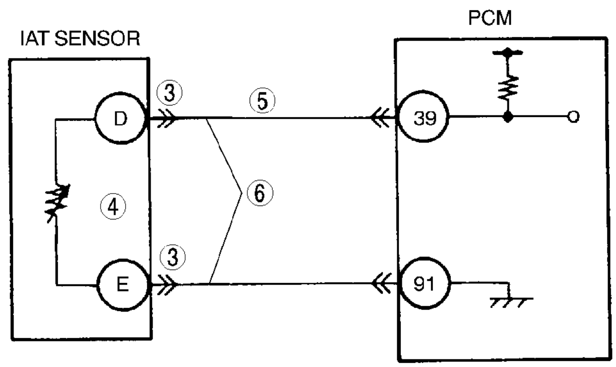
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

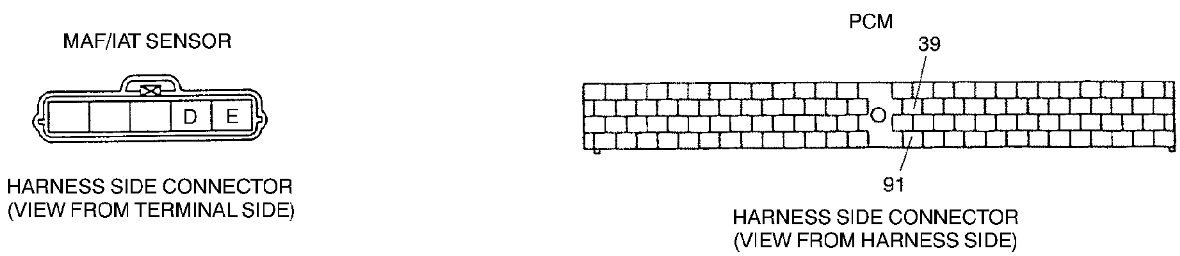
STEP	INSPECTION		ACTION
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check for poor connection at terminals 39 and 91 (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 6.
		No	Go to next step.
6	**VERIFY 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





Diagnostic procedure

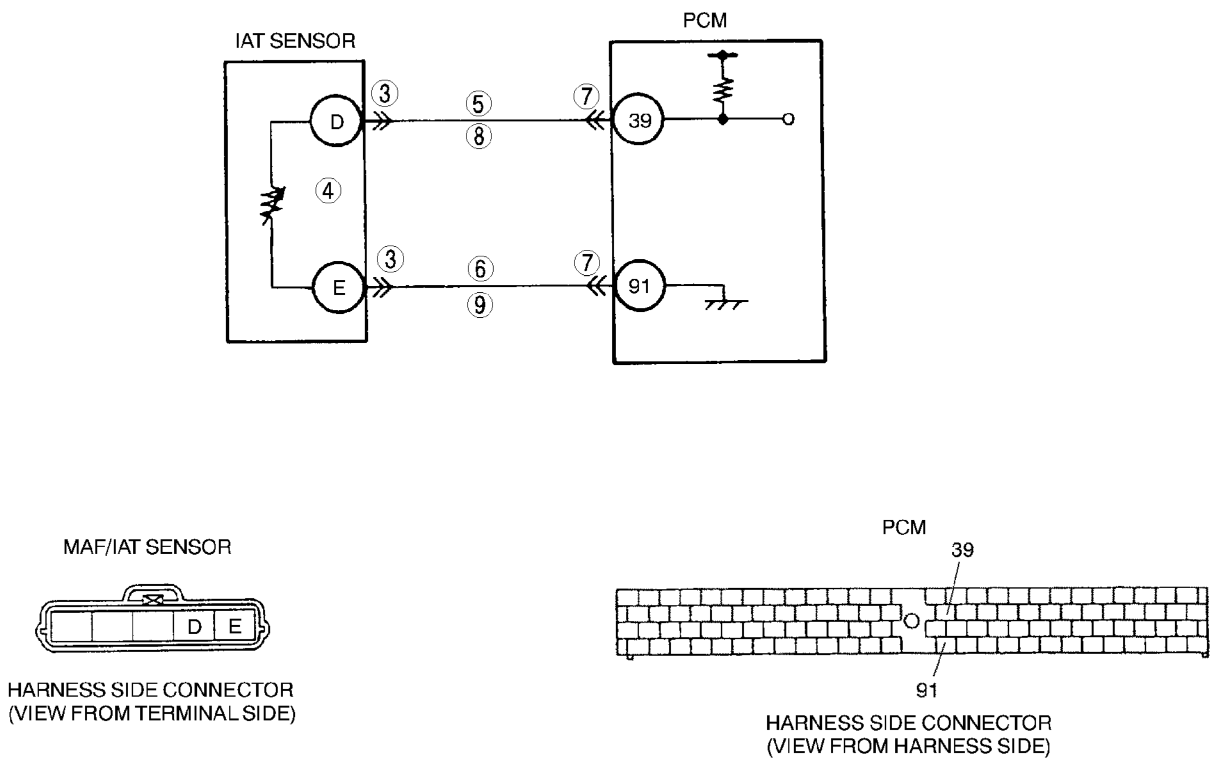
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



Diagnostic procedure

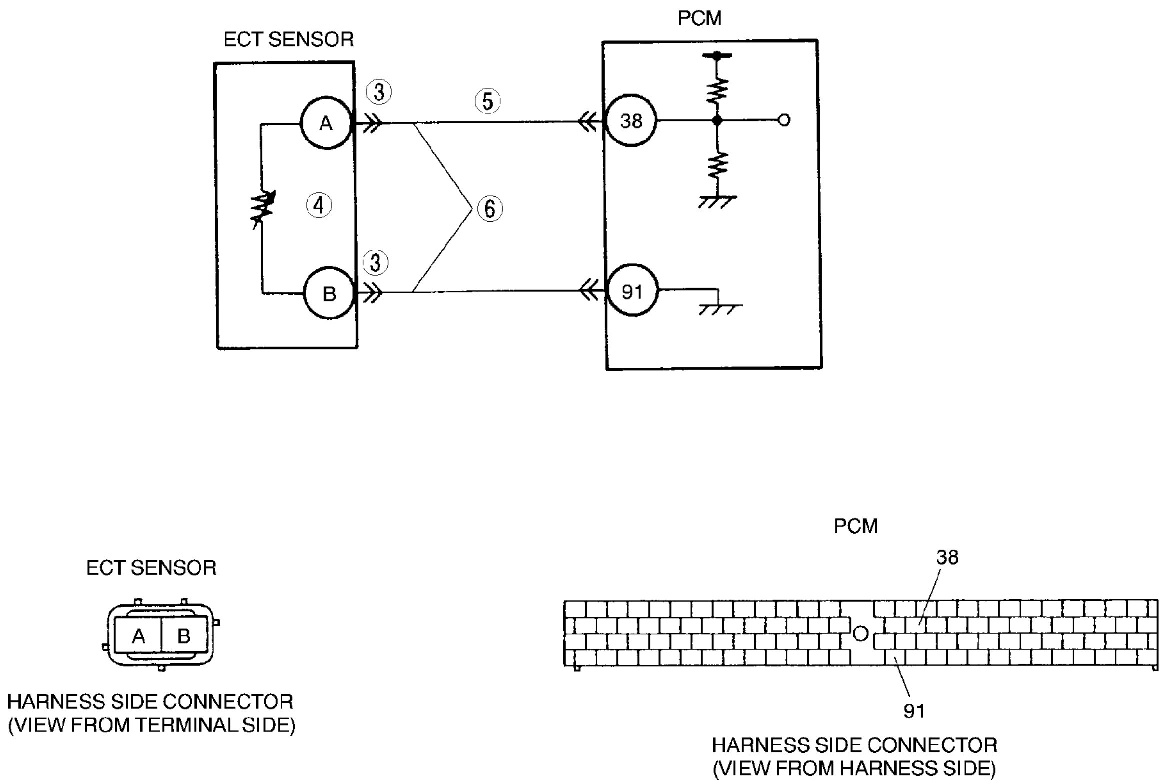
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminal, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, then go to Step 10.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, then go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>No concern is detected. Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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



Diagnostic procedure

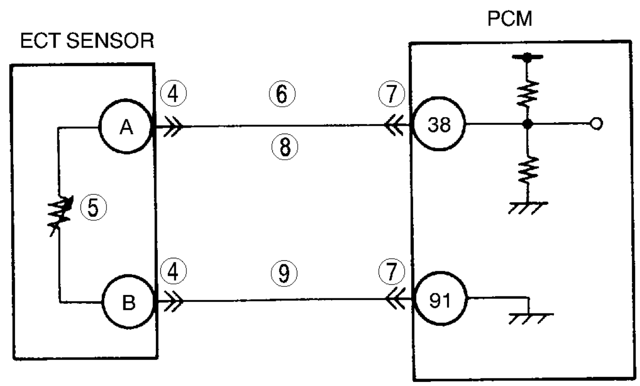
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

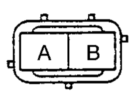
STEP	INSPECTION		ACTION
5	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to 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.

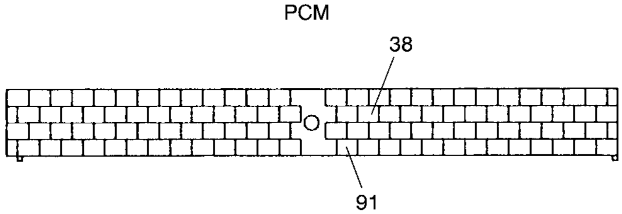
DTC P0118 [ZM]

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







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.

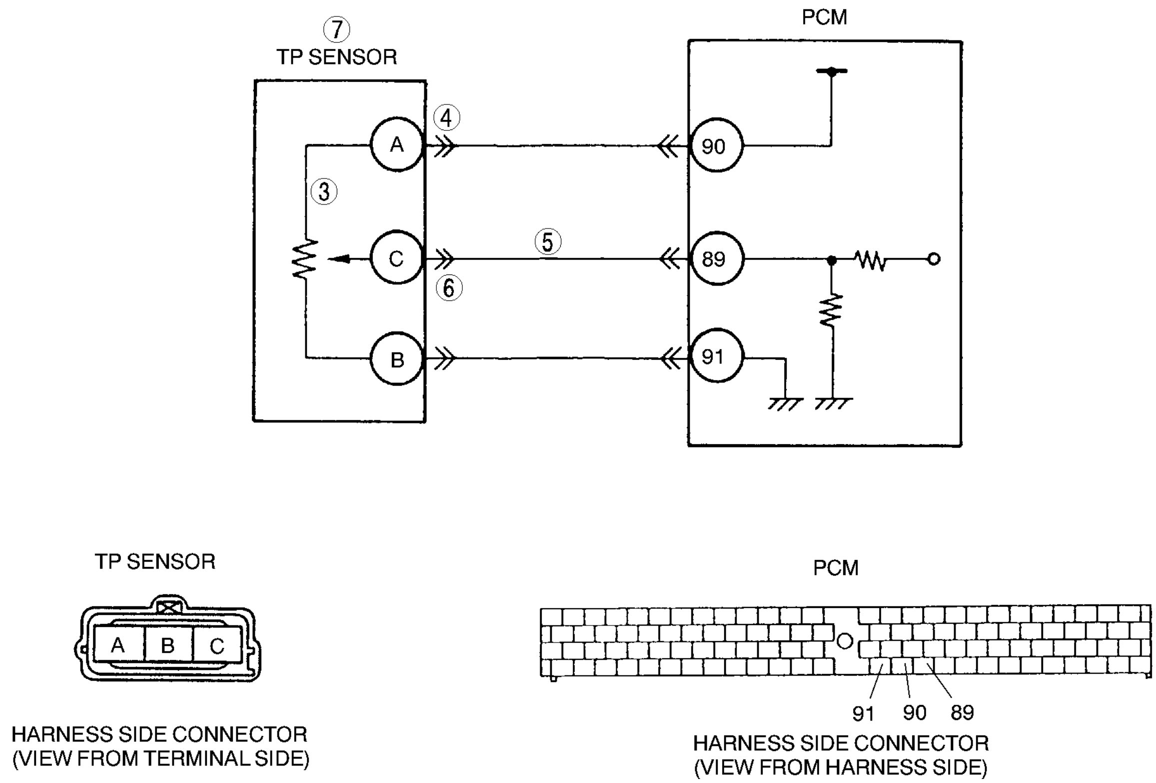
STEP	INSPECTION		ACTION
4	**CLASSIFY ECT SENSOR OR HARNESS MALFUNCTION** • Measure resistance between ECT sensor terminals A and B (part-side). • Is resistance **within 0.111—25.403 kilohms**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 10.
5	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR 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



Diagnostic procedure

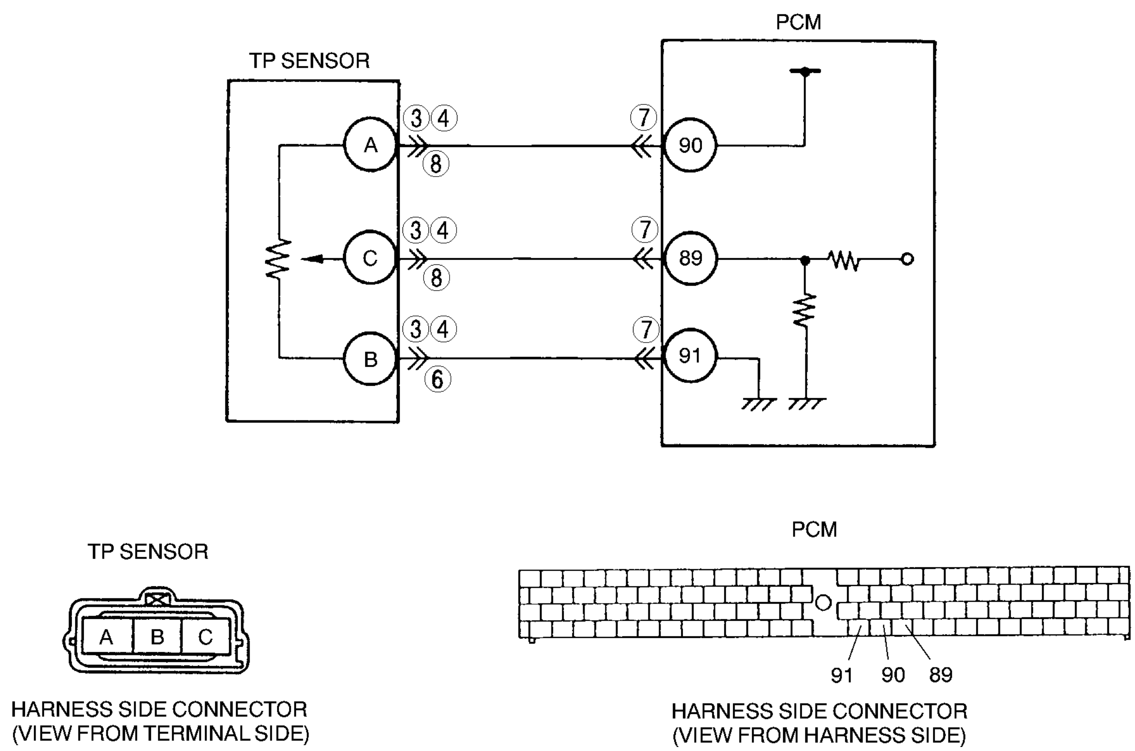
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT INSTALLATION OF FRONT HO2S
• Check if HO2S (front) is loosely installed.
• Is sensor installed securely?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Retighten sensor, then go to Step 15.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace any faulty exhaust parts, then go to Step 15.</td></tr>
<tr><td>No</td><td>Replace sensor, then go to Step 15.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">INSPECT LONG TERM FUEL TRIM
• Access LONGFT1 PIDs.
• Compare it with FREEZE FRAME DATA (FFD) recorded at Step 1.
• Is it below FFD value?</td><td>Yes</td><td>Engine is driven under rich condition. Go to next step.</td></tr>
<tr><td>No</td><td>Engine is driven under lean condition. Go to Step 11.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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}?</td><td>Yes</td><td>Go to Step 14.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">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}?</td><td>Yes</td><td>Go to Step 14.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">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}?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE
• Visually inspect fuel line for any leakage.
• Is any fuel leakage found?</td><td>Yes</td><td>Replace suspected fuel line, then go to Step 15.</td></tr>
<tr><td>No</td><td>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.</td></tr>
</table>

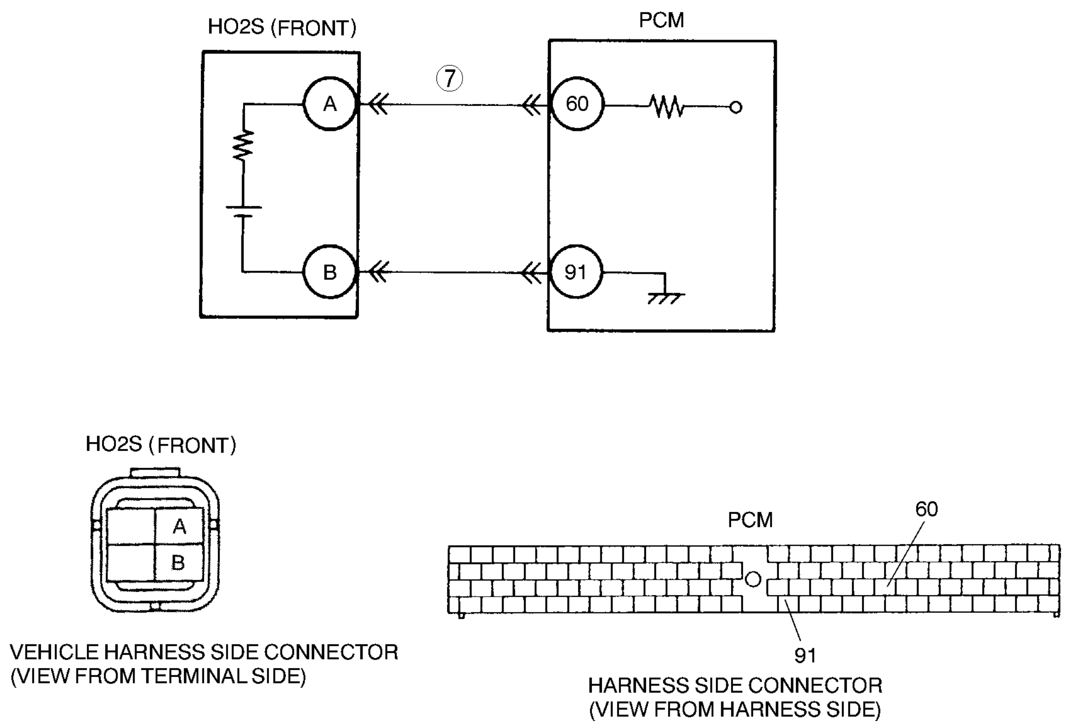
STEP	INSPECTION		ACTION
14	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove 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



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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT INSTALLATION OF HO2S
• Check if HO2S (front) is loosely installed.
• Is sensor installed securely?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Install sensor securely, then go to Step 10.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace any faulty exhaust parts, then go to Step 10.</td></tr>
<tr><td>No</td><td>• 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.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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.

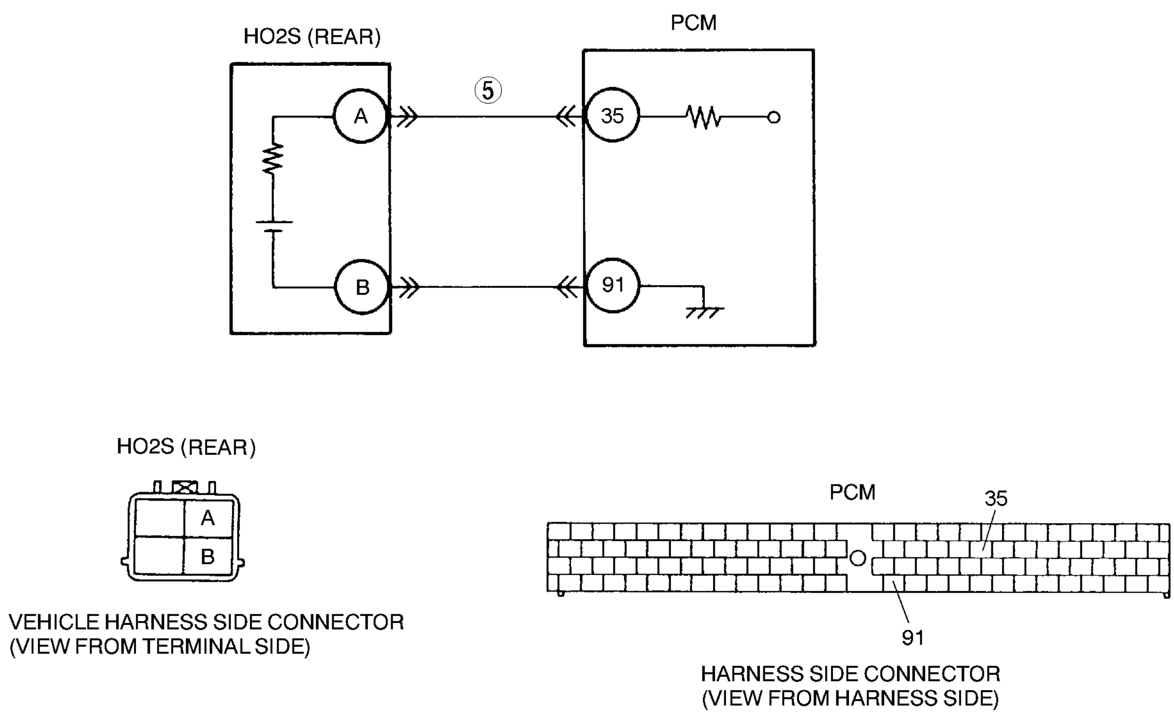
• Remove radiator cap.
• Implement procedure to bleed air from engine coolant, then run engine at idle.
• Is there any small bubble which makes engine coolant white at filling opening?

Note
• Large bubbles are normal since they are remaining air coming out from engine coolant passage.</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">INSPECT ENGINE COMPRESSION
• Inspect engine compression.
(See 01–10A–8 COMPRESSION INSPECTION [ZM].)
• Is it okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Implement engine overhaul for repairs, then go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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

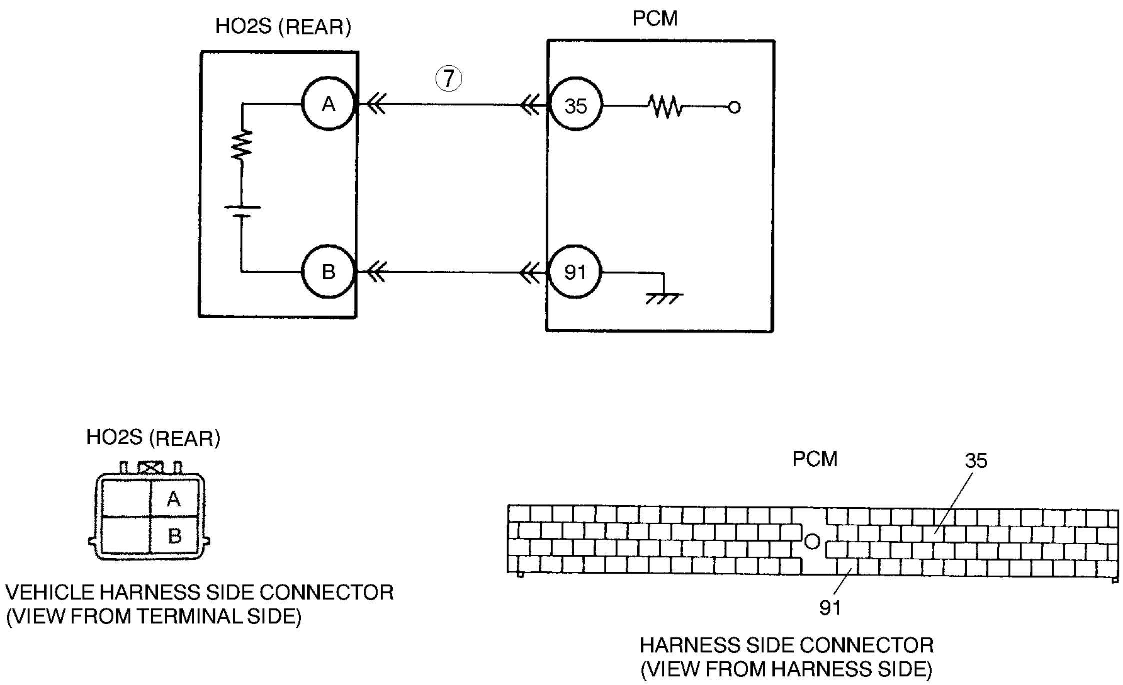
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">18</td><td rowspan="2">INSPECT ENGINE COMPRESSION
• Inspect engine compression.
(See 01–10A–8 COMPRESSION INSPECTION [ZM].)
• Is it okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Implement engine overhaul for repairs, then go to Step 23.</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace purge control solenoid valve, then go to Step 23.</td></tr>
<tr><td rowspan="2">20</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCV valve, then go to Step 23.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">21</td><td rowspan="2">INSPECT EGR VALVE FOR OPERATION
• Remove EGR valve.
• Visually check for stuck open condition.
• Is EGR valve stuck open?</td><td>Yes</td><td>Repair or replace EGR valve, then go to Step 23.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">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.</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">23</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">24</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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.

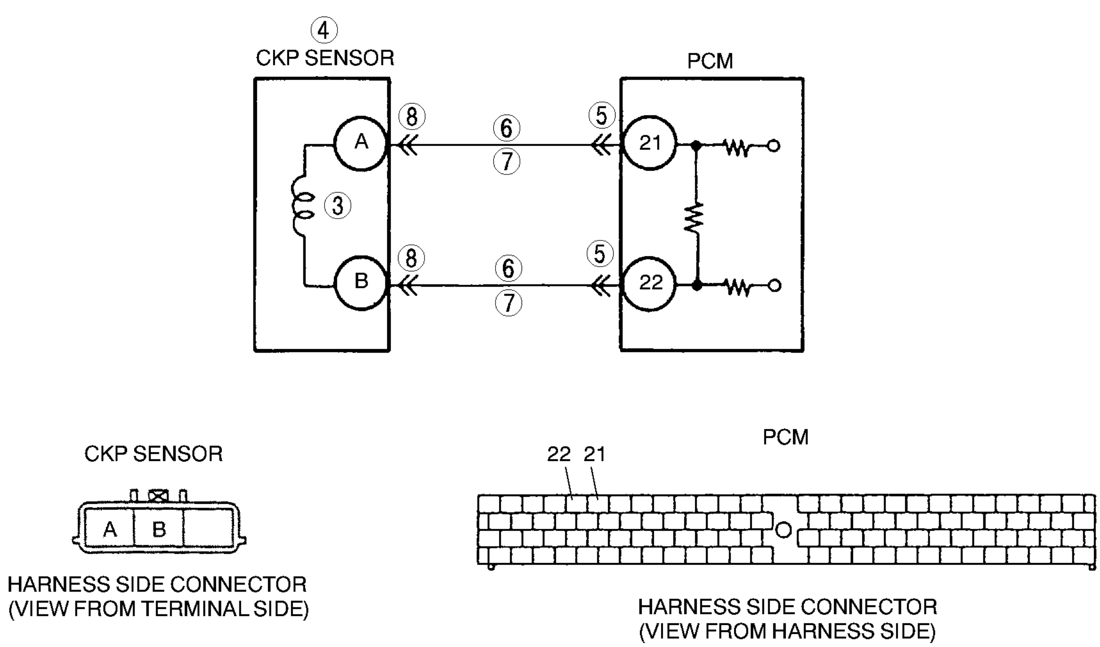
STEP	INSPECTION		ACTION
13	**VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Perform ODB-II DRIVE MODE 1. (See 01–02A–11 Mode 1 (PCM adaptive memory procedure drive mode).) • 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.

01–02A

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



Diagnostic procedure

<table>
<tr><th>STEP</th><th>INSPECTION</th><th colspan="2">ACTION</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VERIFY FREEZE FRAME DATA HAS BEEN RECORDED
• Has FREEZE FRAME DATA been recorded?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Record FREEZE FRAME DATA on repair order, then go to next step.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins availability.
• Is any related repair information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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?</td><td>Yes</td><td>Go to Step 5.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">INSPECT CKP SENSOR RESISTANCE
• Inspect CKP sensor.
(See 01–40A–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [ZM].)
• Is CKP sensor okay?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Replace CKP sensor, then go to Step 9.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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?</td><td>Yes</td><td>Repair terminal, then go to Step 9.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace suspected harness, then go to Step 9.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected harness, then go to Step 9.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">INSPECT CKP CIRCUITS FOR INTERMEDIATE SHORT
• Check for continuity between CKP sensor terminals A and B.
• Is there continuity?</td><td>Yes</td><td>Repair or replace suspected harness, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

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.

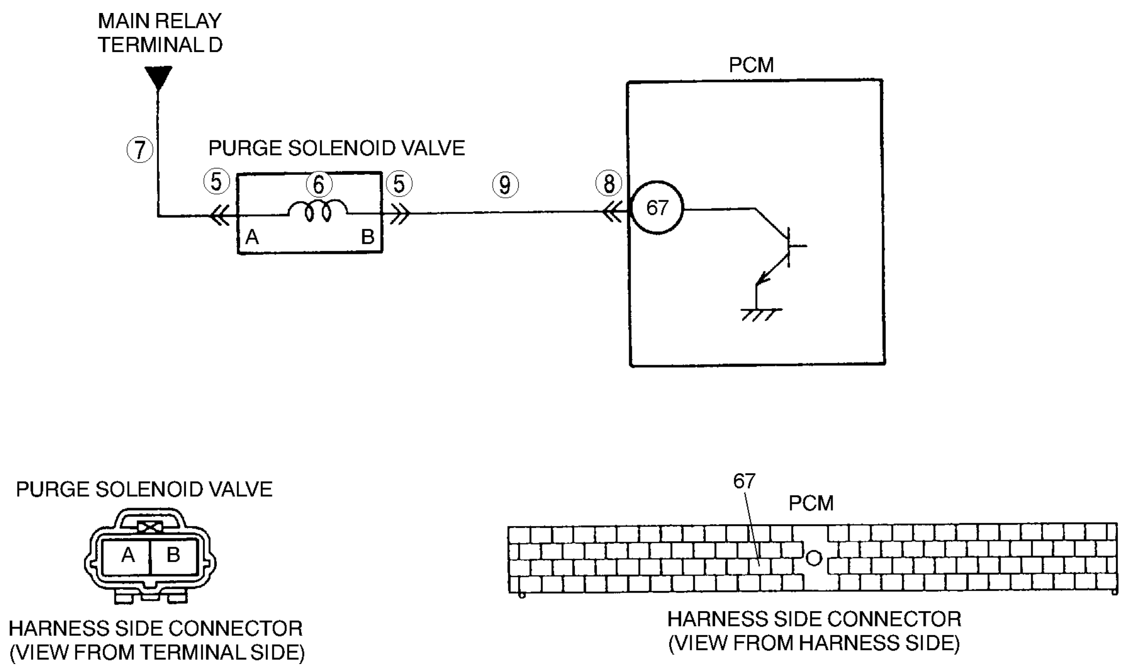
STEP	INSPECTION		ACTION
10	**INSPECT CATCH TANK** • Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. • Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to Step 15.
11	**INSPECT PURGE SOLENOID VALVE** • Remove purge solenoid valve and inspect for damage 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



Diagnostic procedure

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins availability.
• Is any related repair information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN
• Turn ignition key to OFF then start engine.
• Is same DTC present?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Refer to intermittent concern.
(See 01–03A–4 INTERMITTENT CONCERN TROUBLESHOOTING [ZM].)</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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?</td><td>Yes</td><td>Go to Step 5.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace harness for short to ground, then go to Step 10.</td></tr>
<tr><td>No</td><td>Replace purge solenoid valve, then go to Step 10.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminal, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT PURGE SOLENOID VALVE
• Measure resistance between purge solenoid valve terminals (part-side).
• Is resistance within 22—26 ohms?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace purge solenoid valve, then go to Step 10.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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+?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, then go to Step 10.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminal, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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+?</td><td>Yes</td><td>Repair or replace harness for short to power, then go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

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.

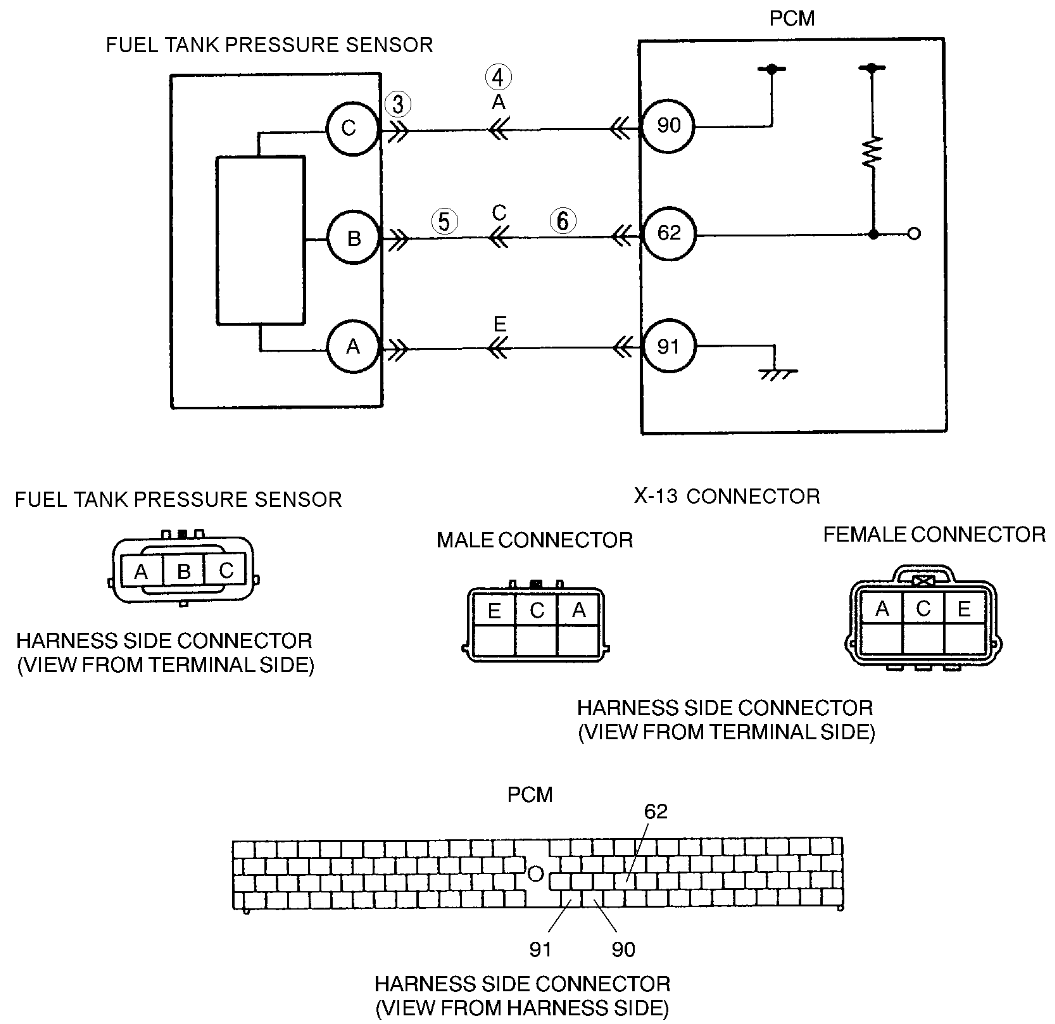
<table>
<tr><th>STEP</th><th>INSPECTION</th><th colspan="2">ACTION</th></tr>
<tr><td rowspan="2">8</td><td rowspan="2">VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST
• Turn ignition key to ON (Engine OFF).
• Verify that following conditions are met.
— Engine coolant temperature (at engine start): –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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Correct condition, then go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go back to Step 8.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">VERIFY TROUBLESHOOTING OF DTC P0451 COMPLETED
• Turn ignition key to ON (Engine OFF).
• Is pending code of same DTC present?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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.

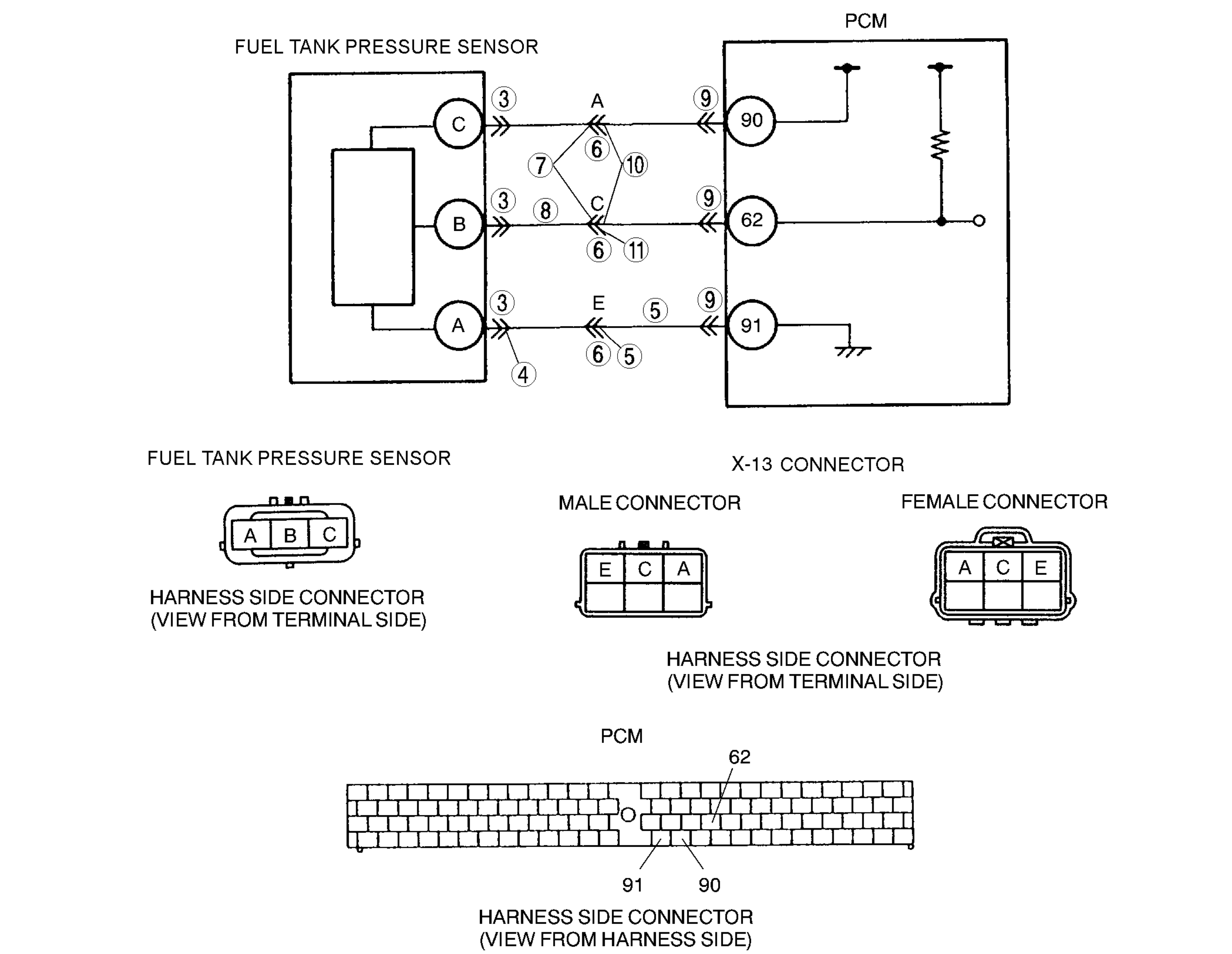
<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FUEL TANK PRESSURE SENSOR INTERMEDIATE CONNECTOR
• Disconnect X-13 connector.
• Measure voltage at X-13 male terminal A.
• Is voltage within 4.5—5.5 V?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected harness, then go to Step 7.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected harness, then go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02A–10 AFTER REPAIR PROCEDURE [ZM].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02A–15 DTC TABLE [ZM].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

DTC P0453 [ZM]

A3U010201086W23

<table>
<tr><th>DTC P0453</th><th>Fuel tank pressure sensor circuit high input</th></tr>
<tr><td>DETECTION CONDITION</td><td>• 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.</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>• 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.</td></tr>
</table>

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

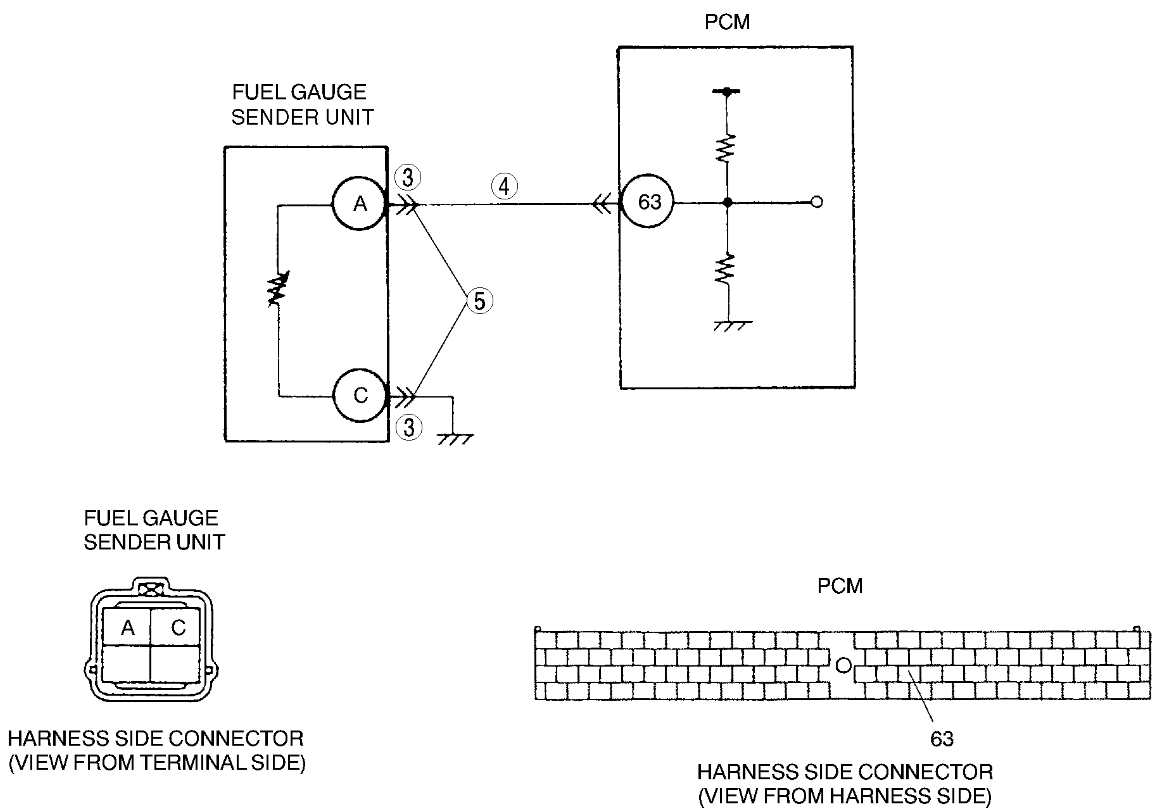
Diagnostic procedure

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



Diagnostic procedure

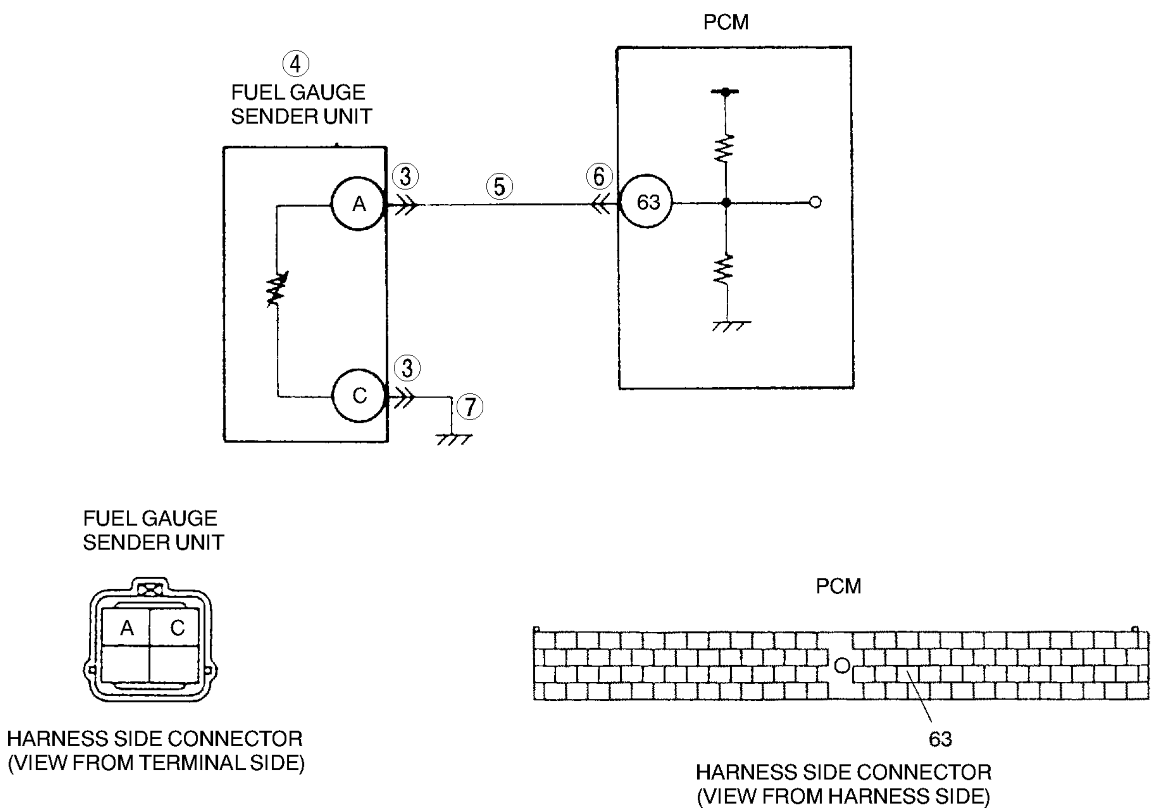
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

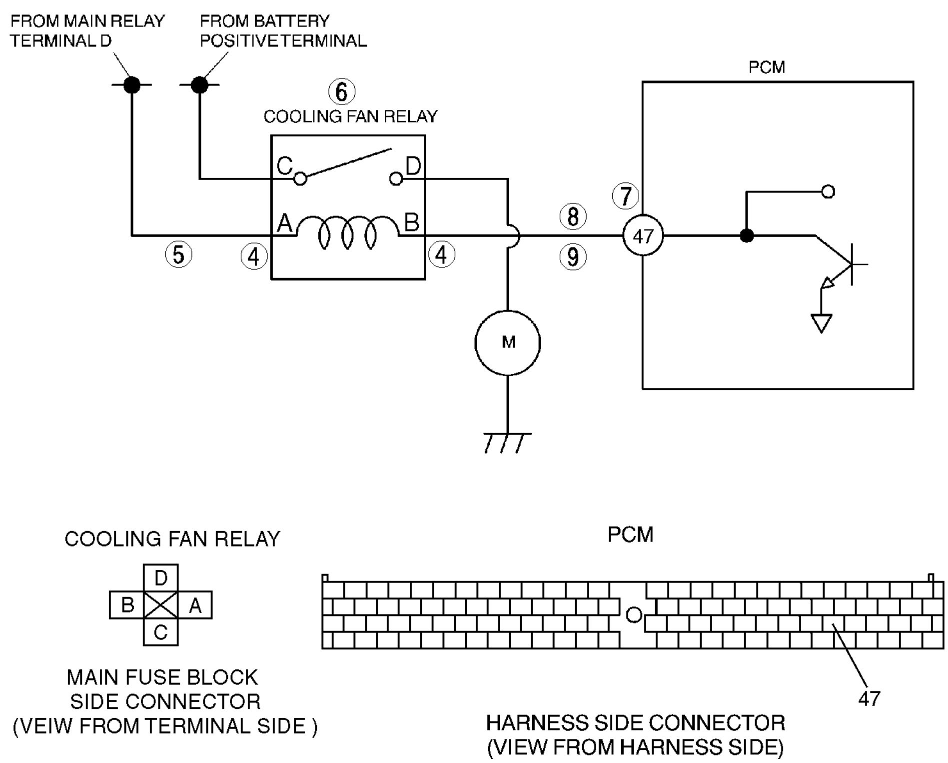
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



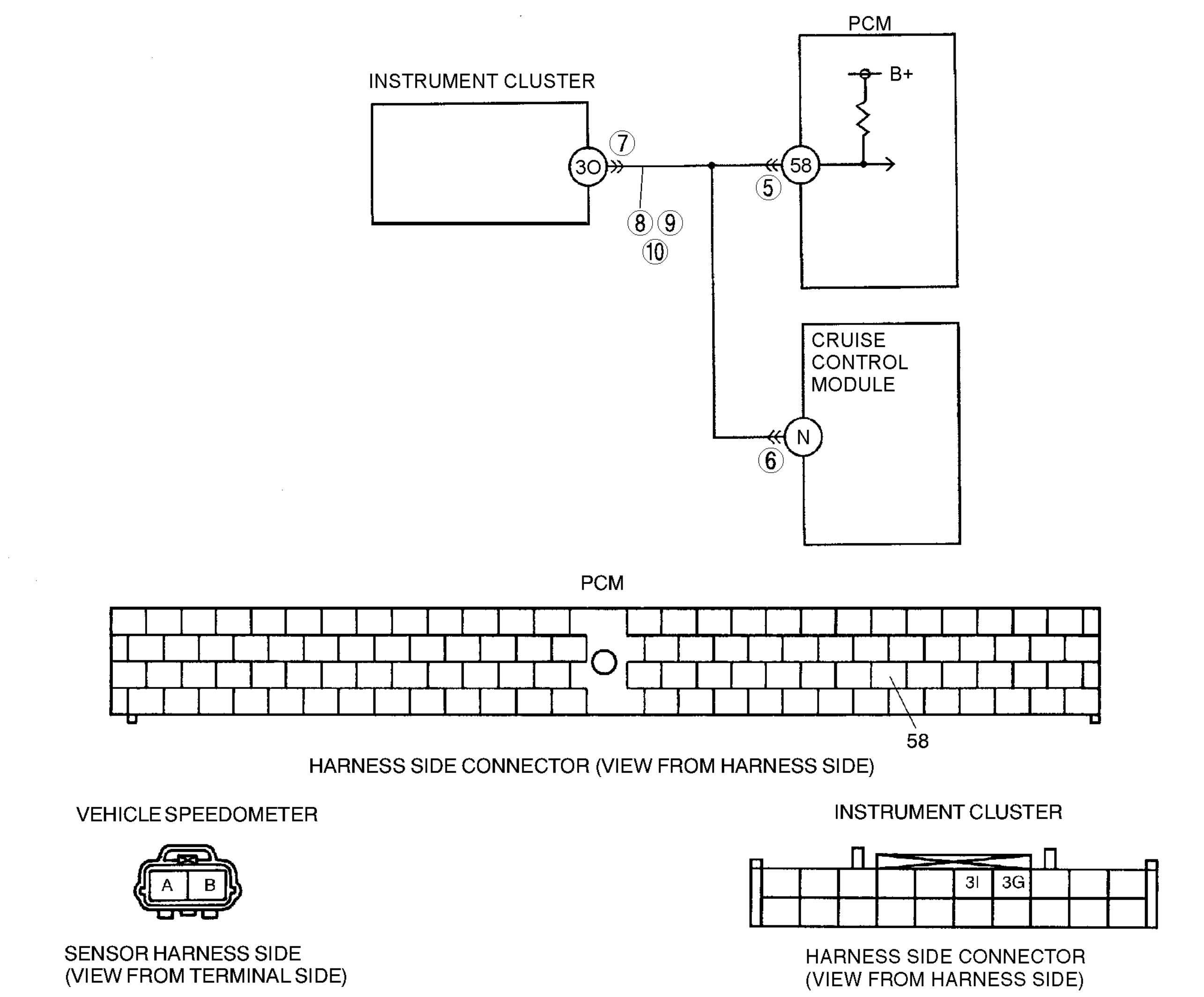
Diagnostic procedure

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



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

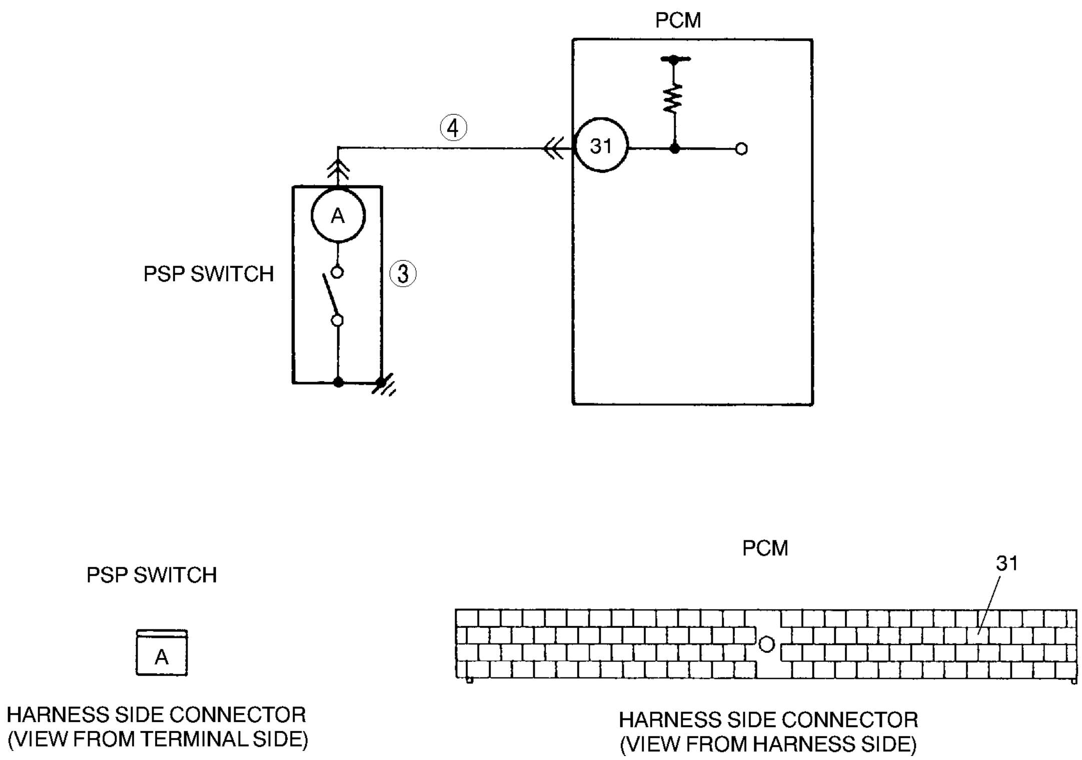
Diagnostic procedure

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

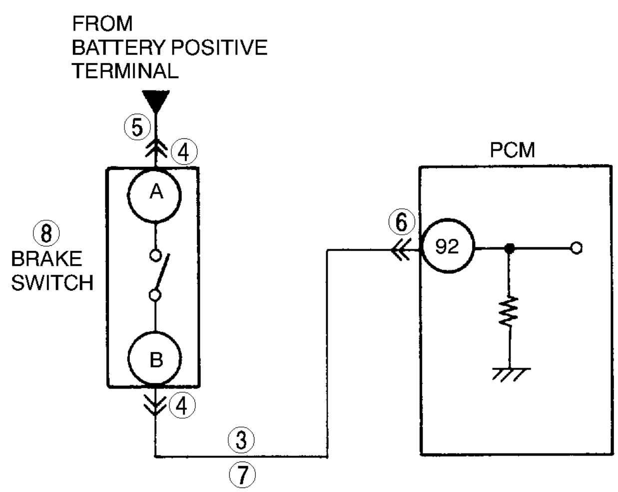
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

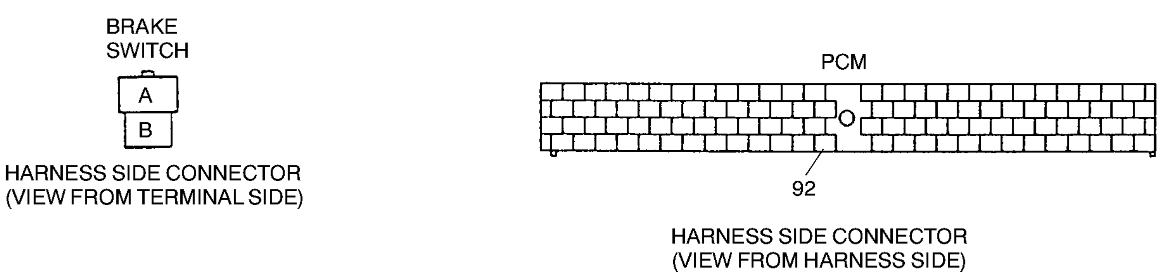
STEP	INSPECTION		ACTION
5	**VERIFY TROUBLESHOOTING OF DTC P0550 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using WDS or equivalent. • Drive vehicle **above 60.1 km/h {37.3 mph}** for **1 minute**. • Verify that ECT PID is **above 60°C {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





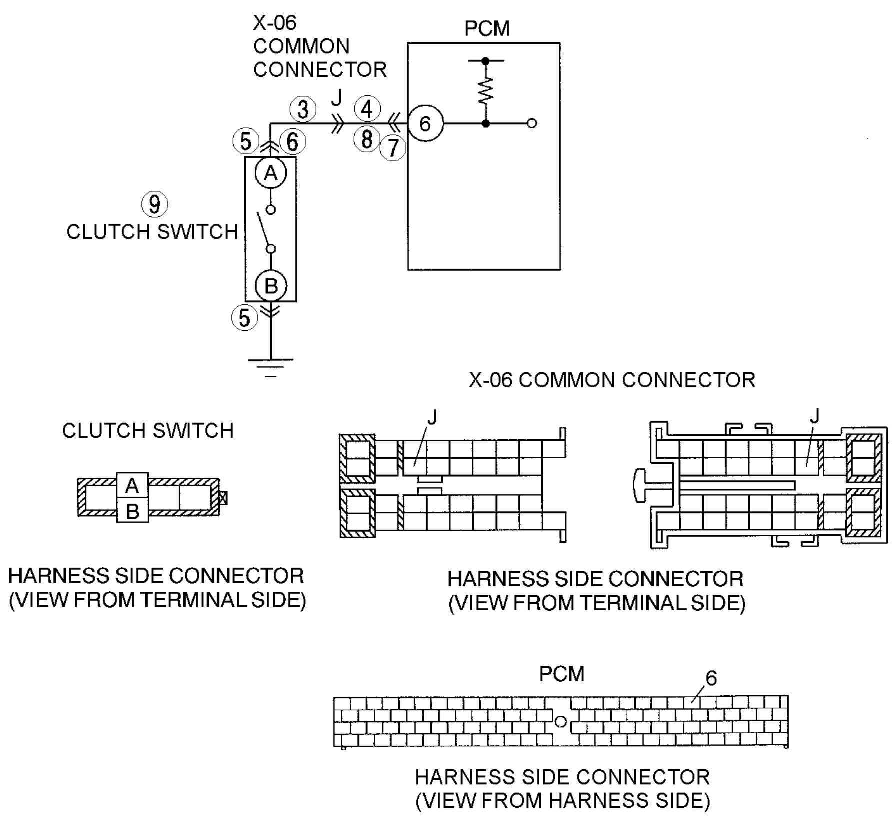
Diagnostic procedure

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

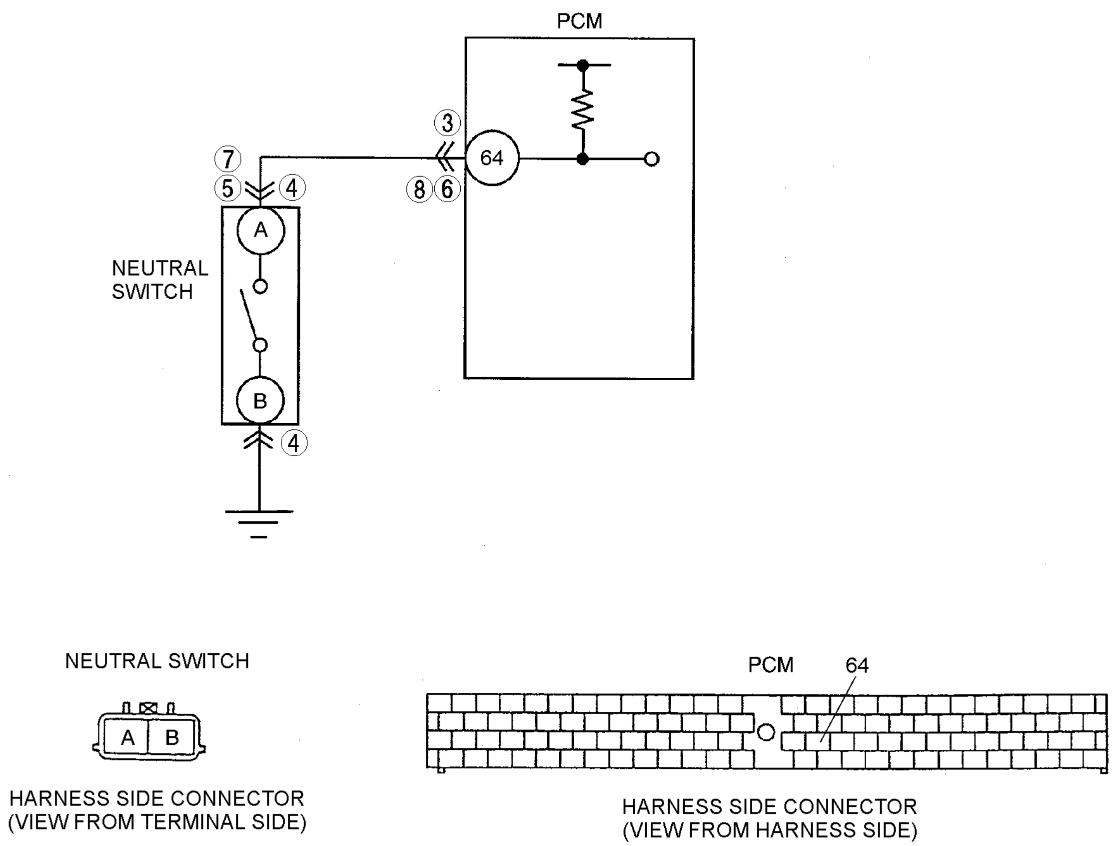
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">11</td><td rowspan="2">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/cm², 22 psi}?</td><td>Yes</td><td>Go to Step 14.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">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/cm², 64—92 psi}?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PUMP
• Visually inspect fuel line for any leakage.
• Is any fuel leakage found?</td><td>Yes</td><td>Replace suspected fuel line, then go to Step 21.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">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?</td><td>Yes</td><td>Go to Step 18.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace faulty high-tension lead, then go to Step 21.</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">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+?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Check for open circuit between ignition coil connector and ignition switch.
Repair or replace wiring harness, then go to Step 21.</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">INSPECT IGNITION COIL RESISTANCE
• Check ignition coil resistance.
(See 01–18–2 IGNITION COIL INSPECTION.)
• Is coil resistance okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace ignition coil, then go to Step 21.</td></tr>
<tr><td rowspan="2">18</td><td rowspan="2">INSPECT ENGINE COMPRESSION
• Inspect engine compression.
(See 01–10A–8 COMPRESSION INSPECTION [ZM].)
• Is it okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Implement engine overhaul for repairs, then go to next step.</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">INSPECT FUEL INJECTOR OPERATION
• Turn ignition key to OFF.
• Inspect injector.
(See 01–14–24 FUEL INJECTOR INSPECTION.)
• Is injector okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace injector, then go to Step 21.</td></tr>
</table>

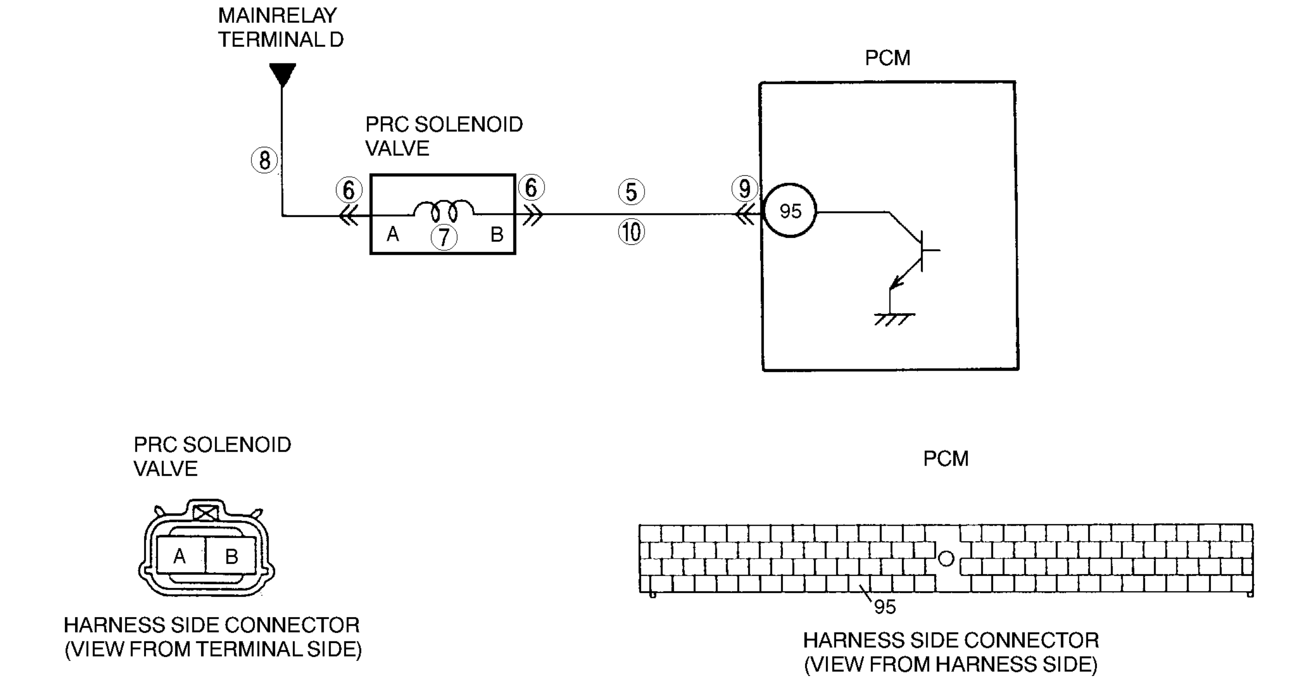
STEP	INSPECTION		ACTION
20	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** **Warning** • **Removing radiator cap when radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing radiator cap, wrap a thick cloth around and turn it slowly.** • Remove 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.

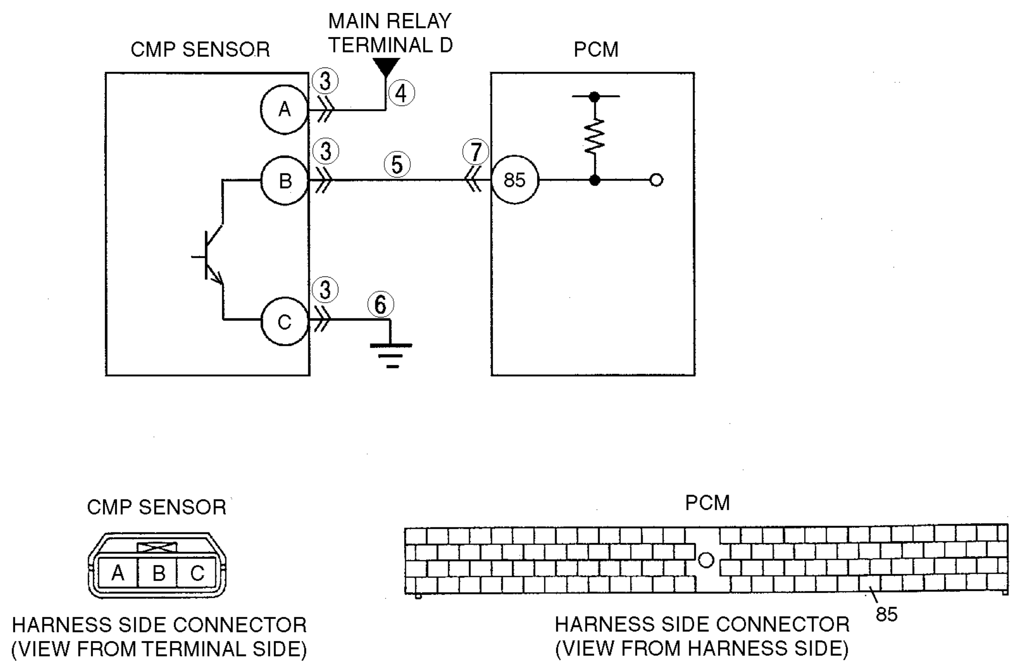
STEP	INSPECTION		ACTION
8	**INSPECT PRC SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, 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

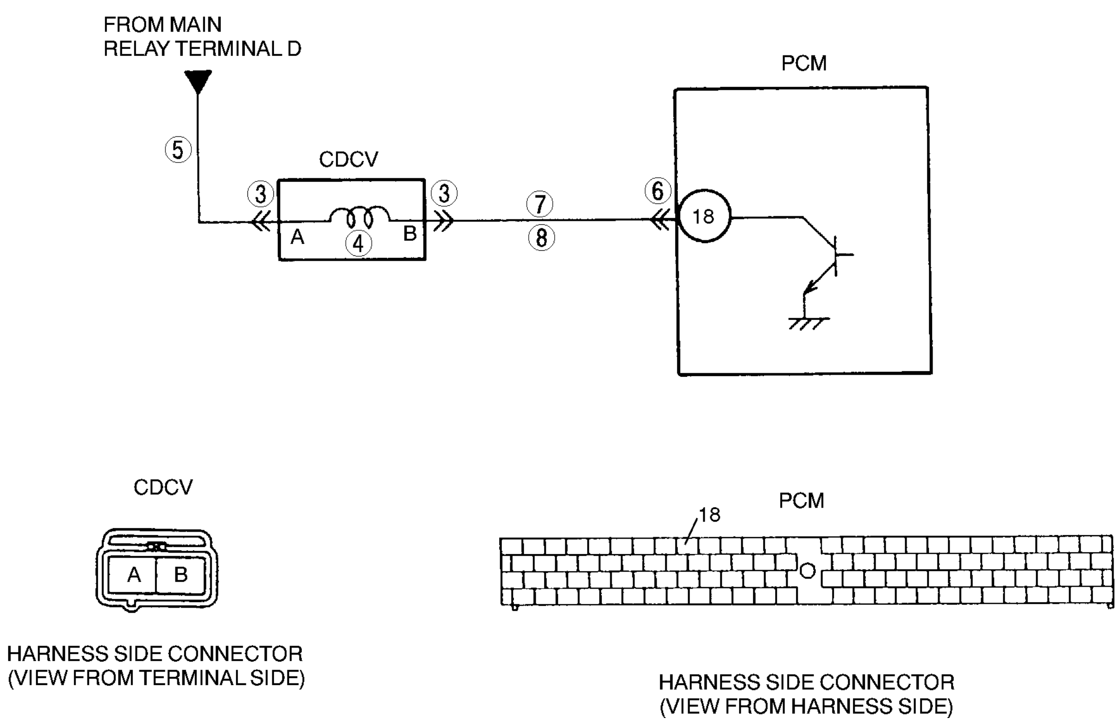
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to available Service Information • If vehicle is not repaired, go to next step.
		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



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.

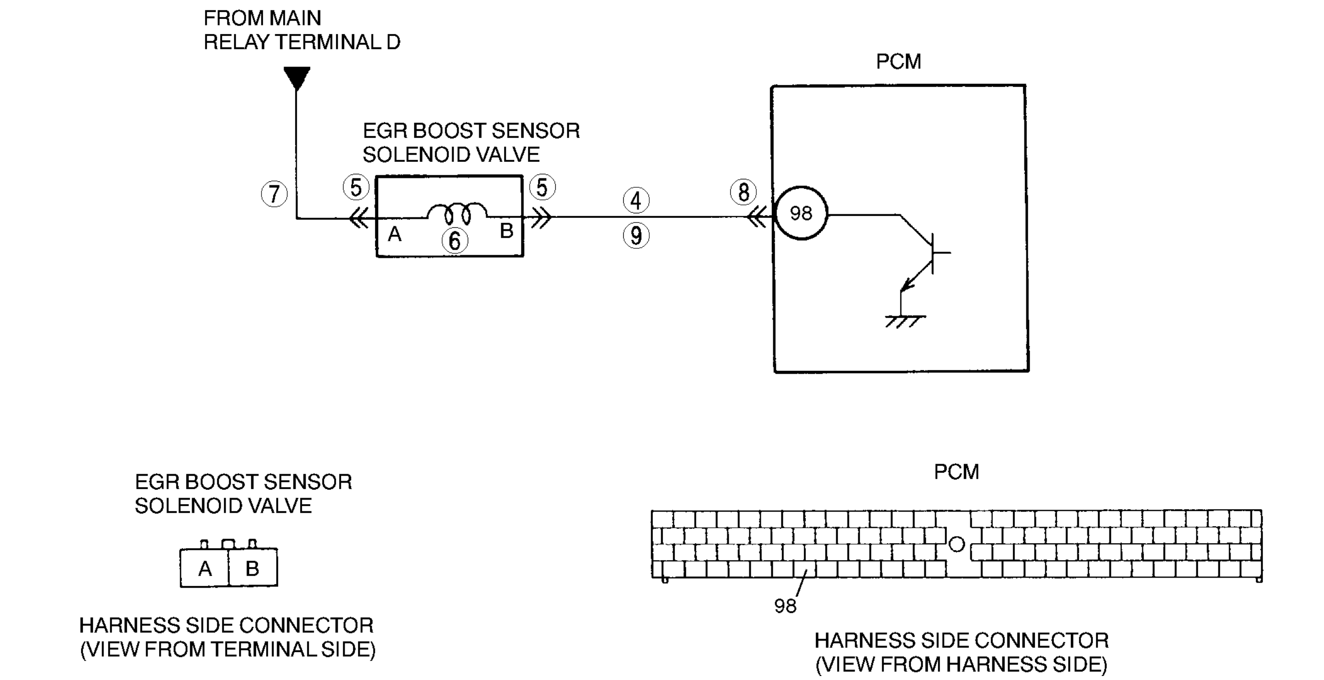
STEP	INSPECTION		ACTION
9	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Verify that following conditions are met. — BARO: **72.2 kPa {542 mmHg, 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.

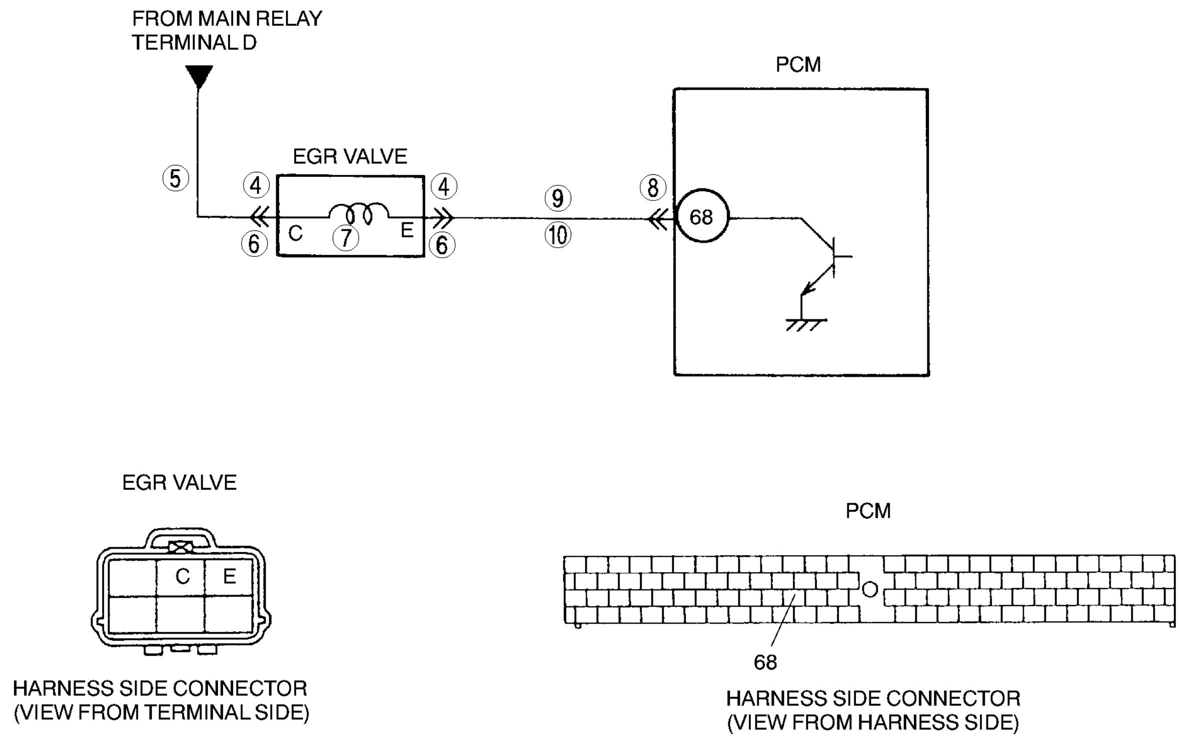
STEP	INSPECTION		ACTION
6	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Measure resistance between EGR boost sensor solenoid valve terminals (part-side). • Is resistance **within 22—26 ohms**?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 10.
7	**INSPECT EGR BOOST 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.

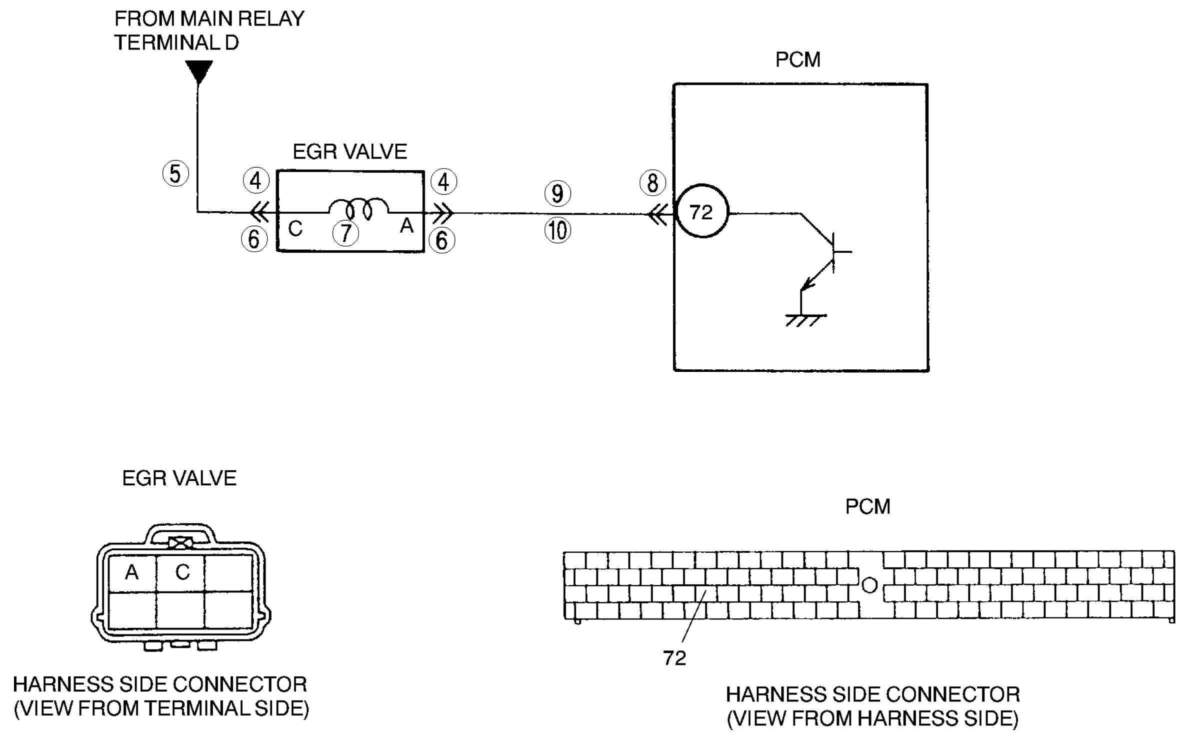
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and E (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check 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.

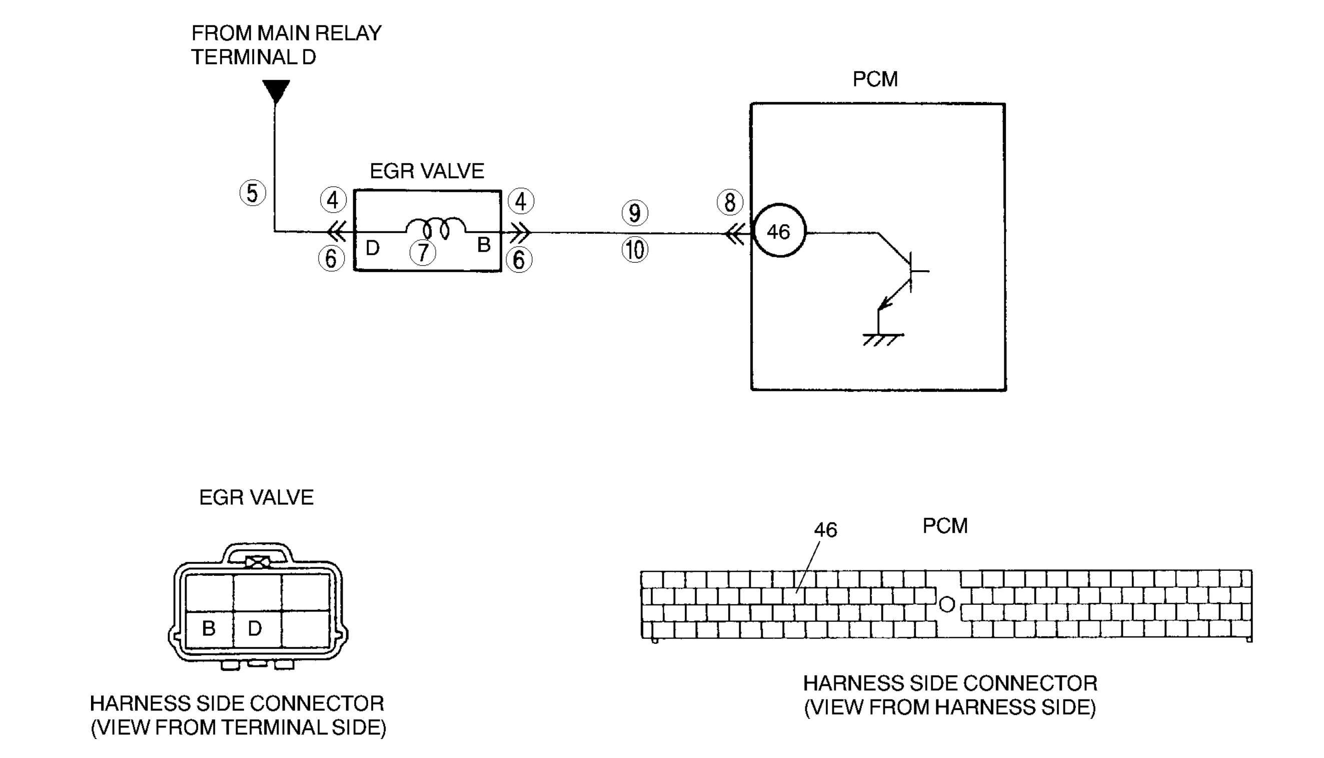
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals C and A (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check 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.

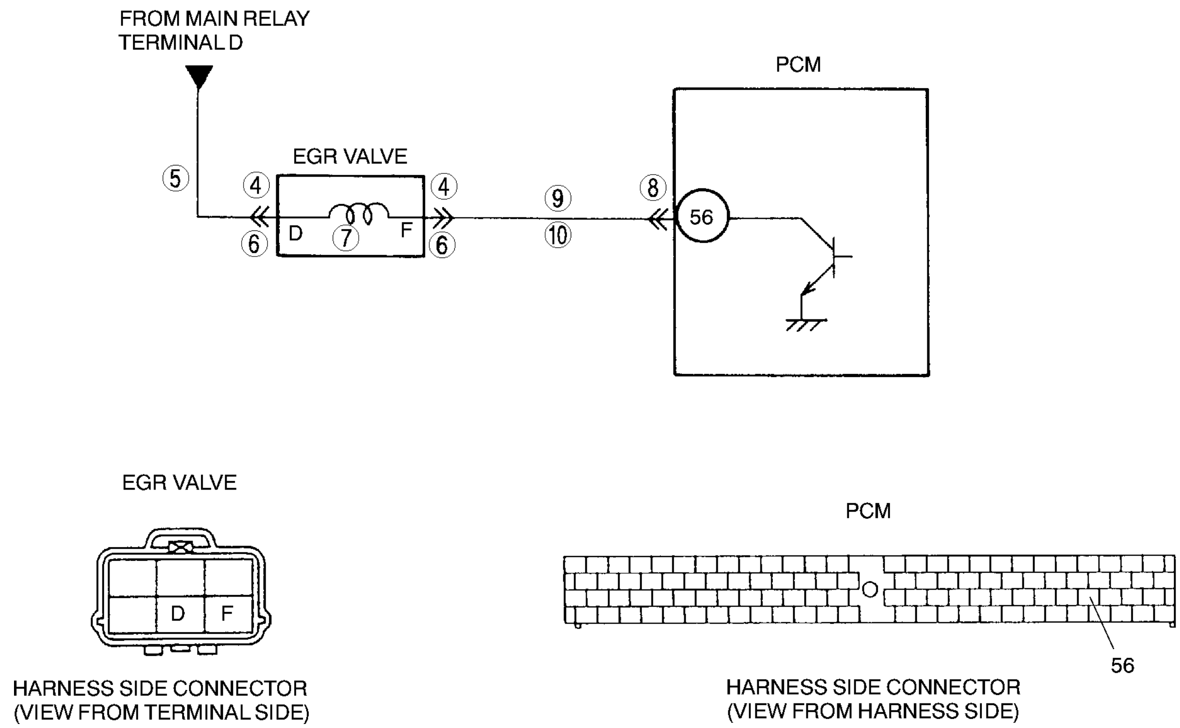
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminals D and B (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check 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



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.

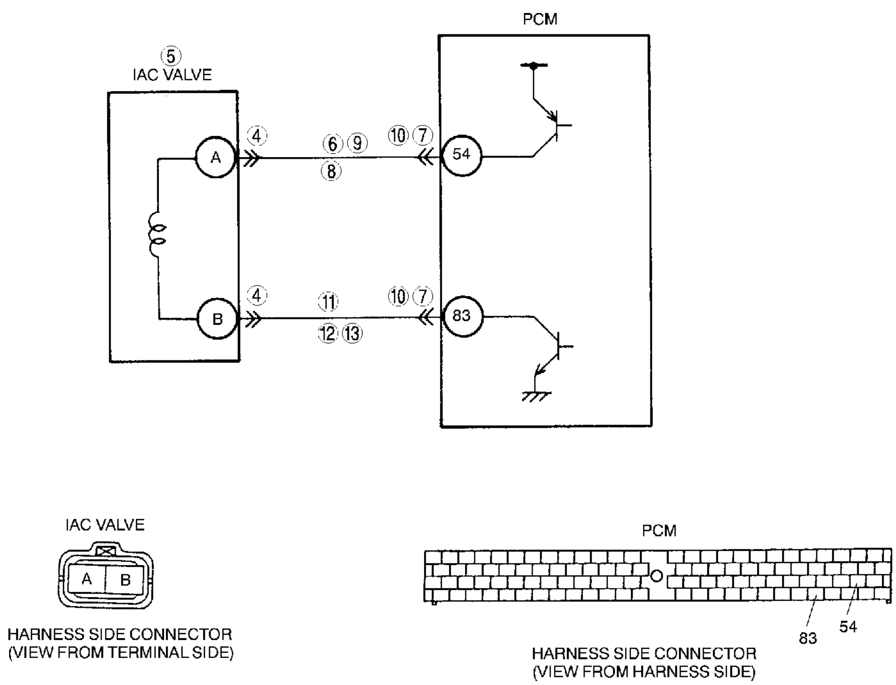
STEP	INSPECTION		ACTION
7	**INSPECT EGR VALVE** • Measure resistance between EGR valve terminal D and F (part-side). • Is resistance **within 20—24 ohms**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 11.
8	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Disconnect PCM connector. • Check 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

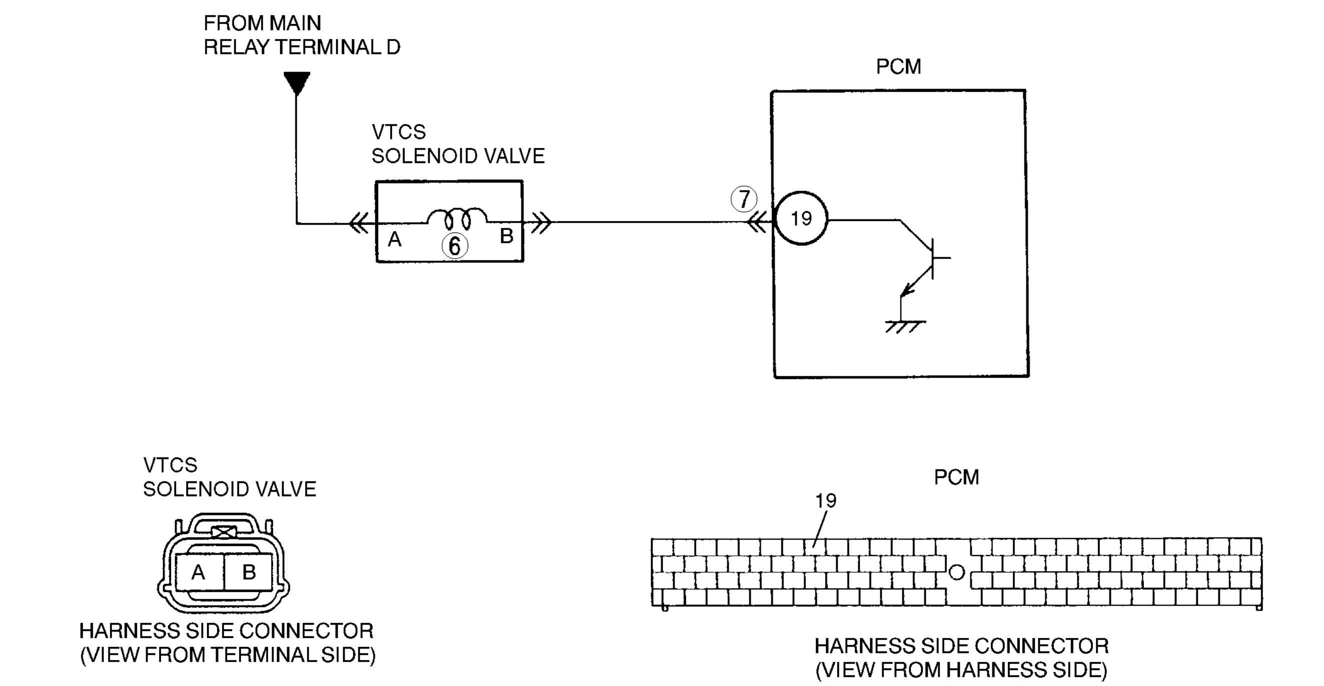
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

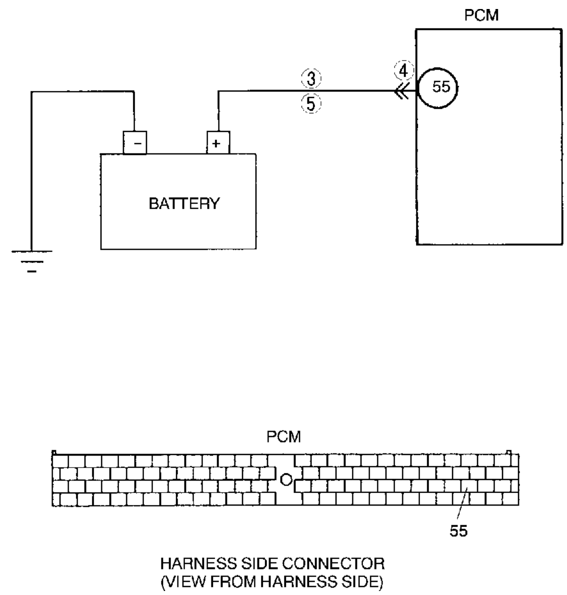
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 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



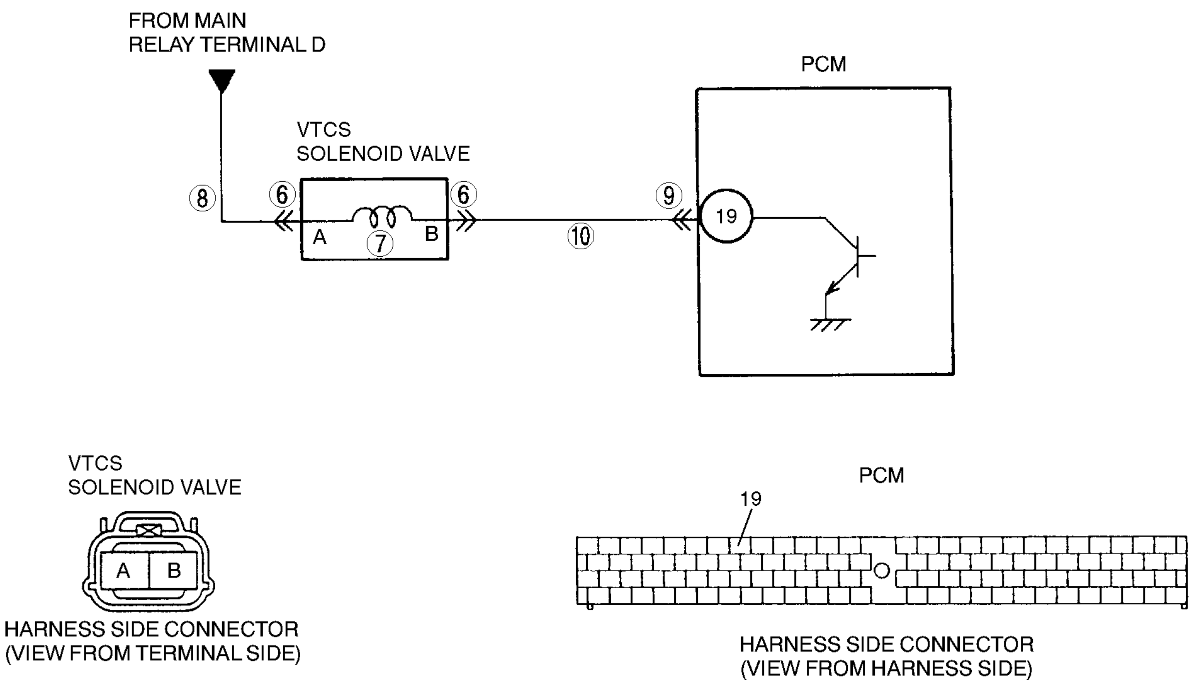
Diagnostic procedure

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

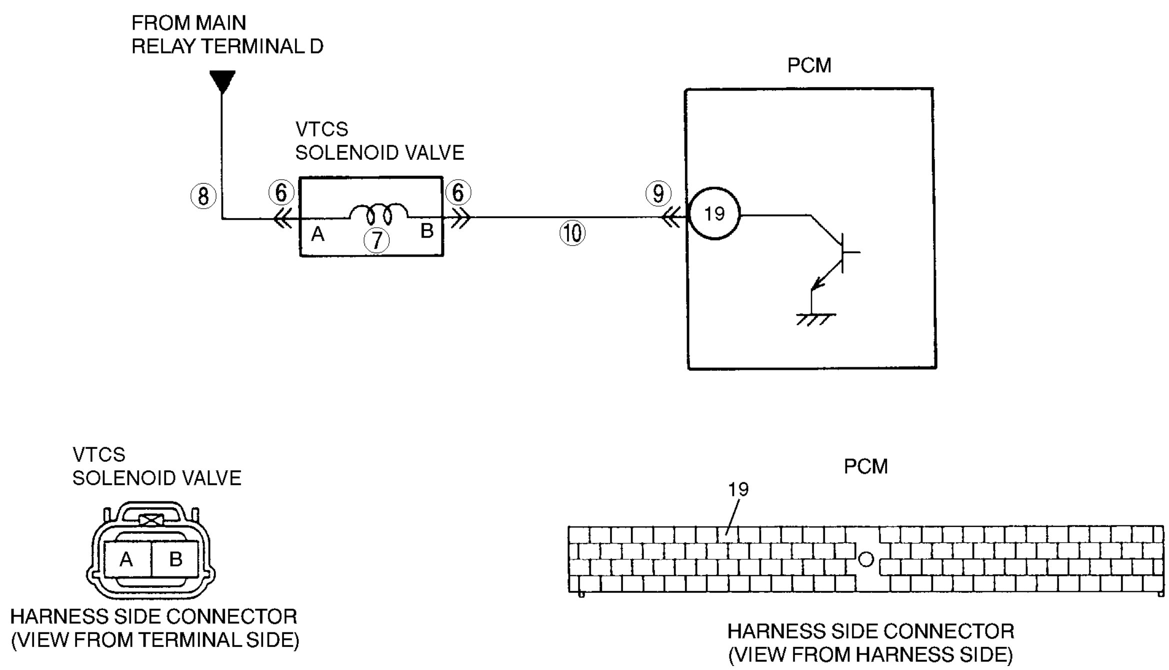
STEP	INSPECTION		ACTION
1	**CHECK FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

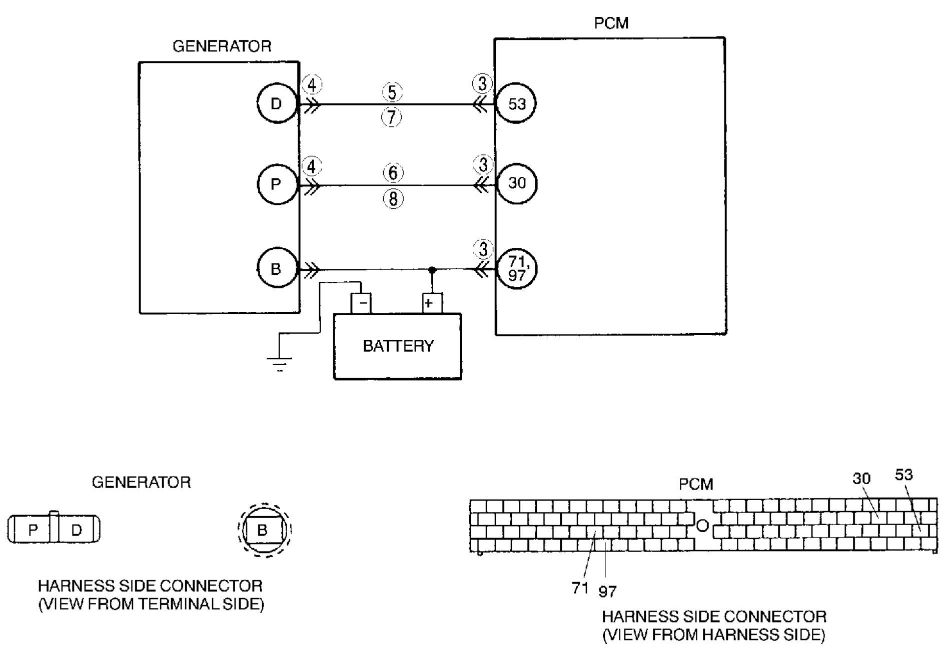
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle 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



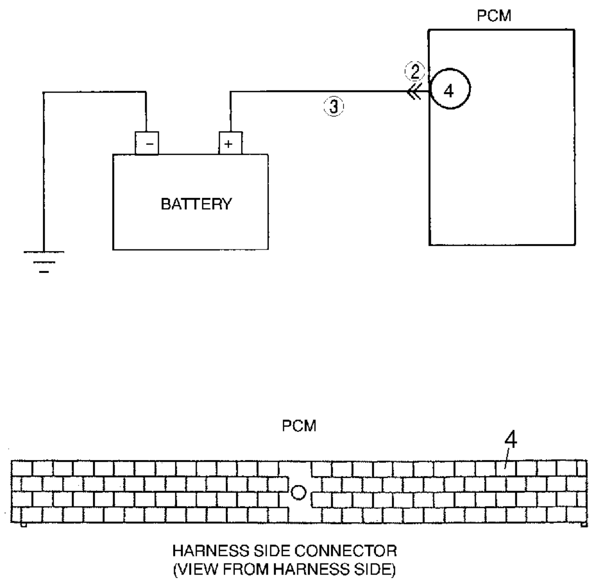
Diagnostic procedure

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



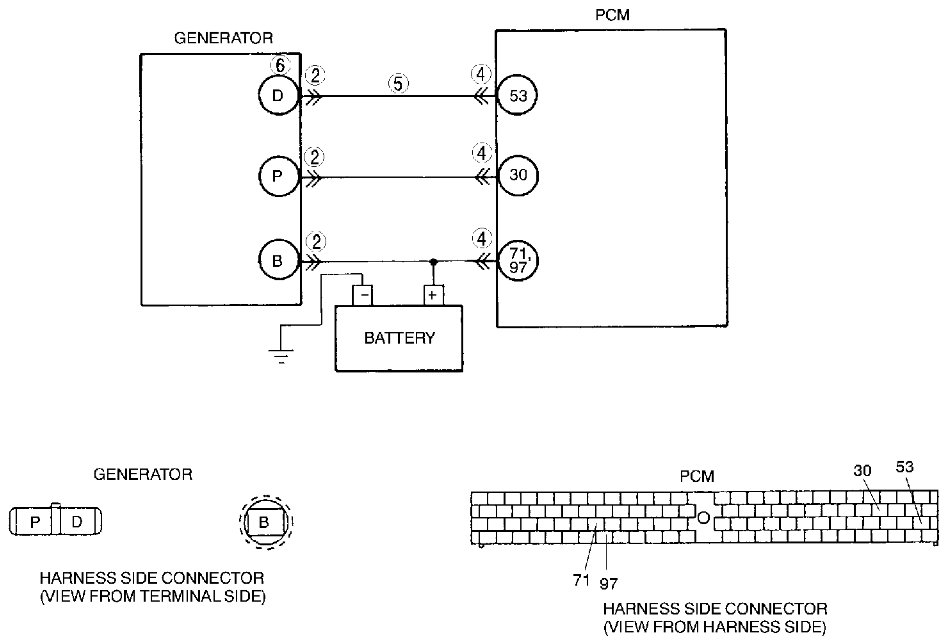
Diagnostic procedure

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

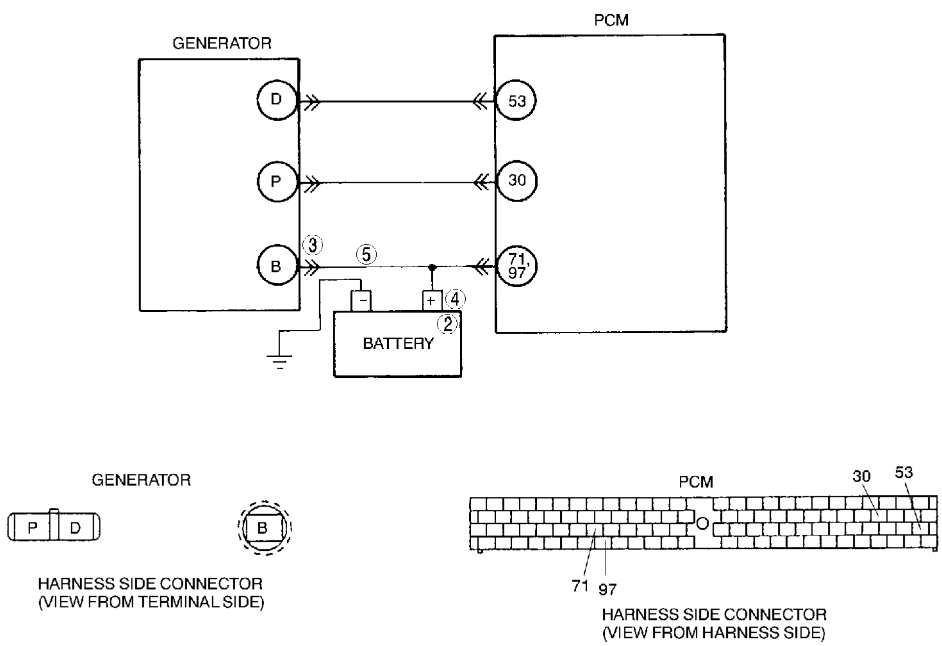
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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

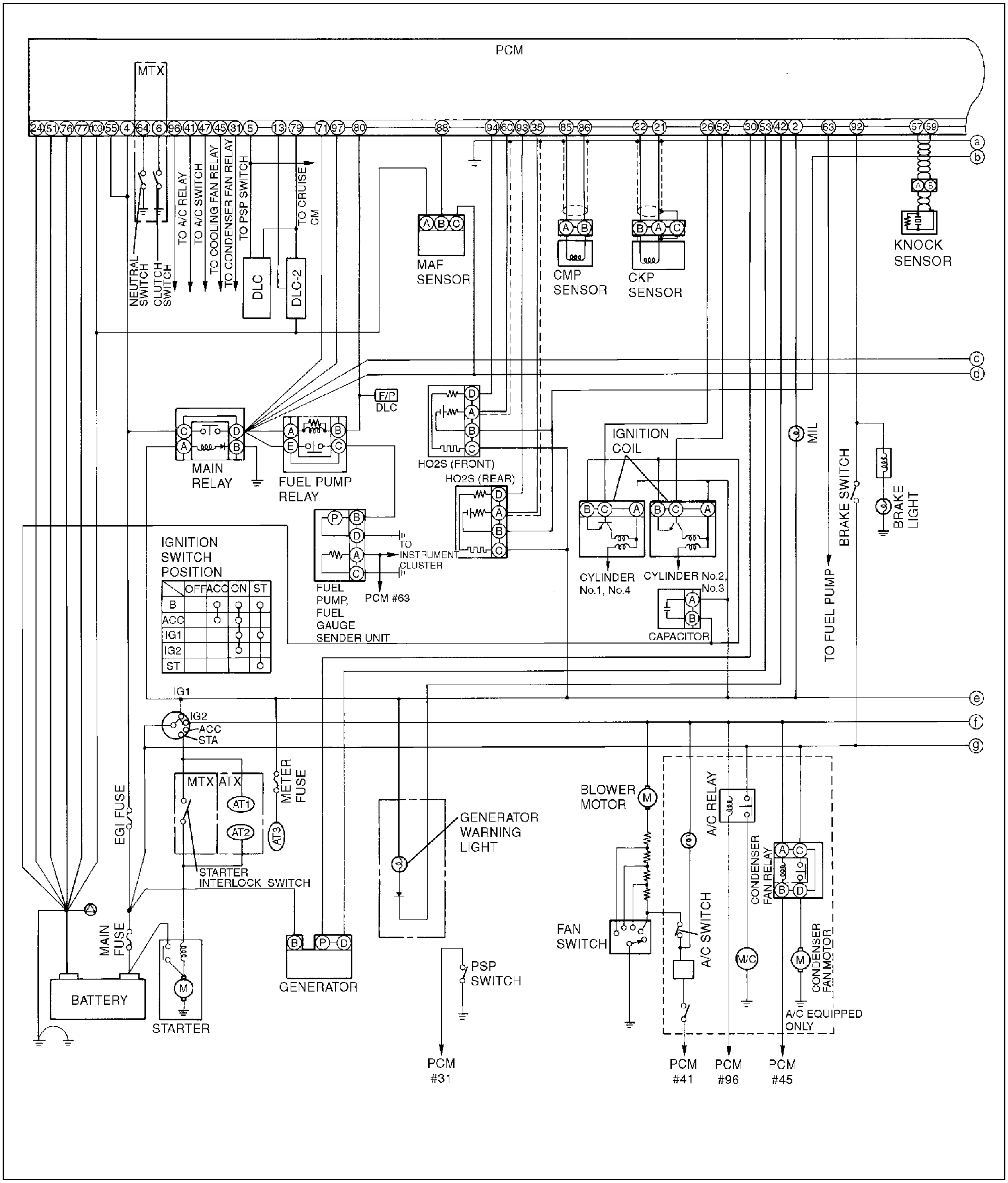
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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.

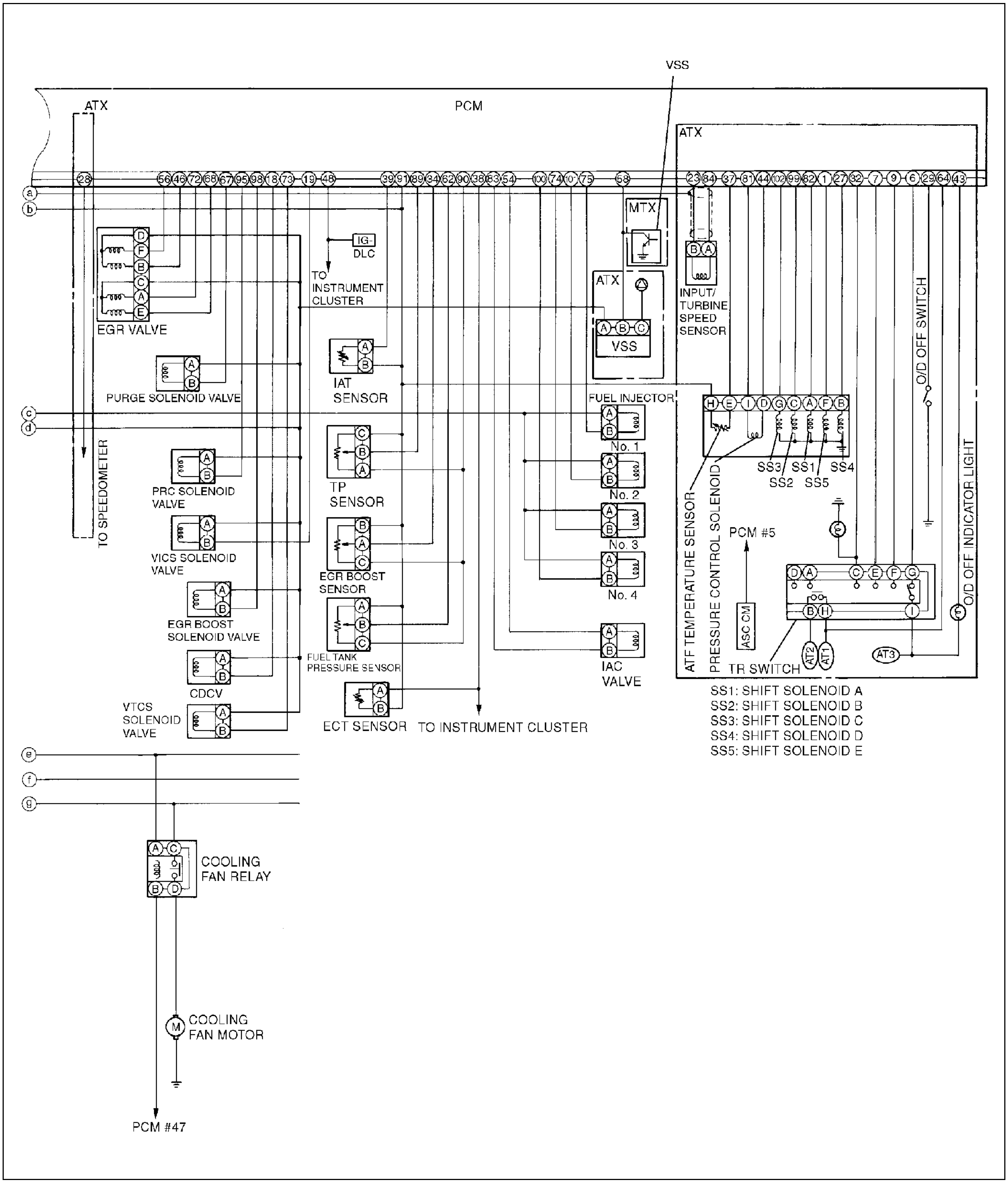
01–02B ON-BOARD DIAGNOSTIC [ENGINE CONTROL SYSTEM (FS)]

CONTROL SYSTEM WIRING DIAGRAM [FS]

A3U010218881W01



A3U0140W001



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

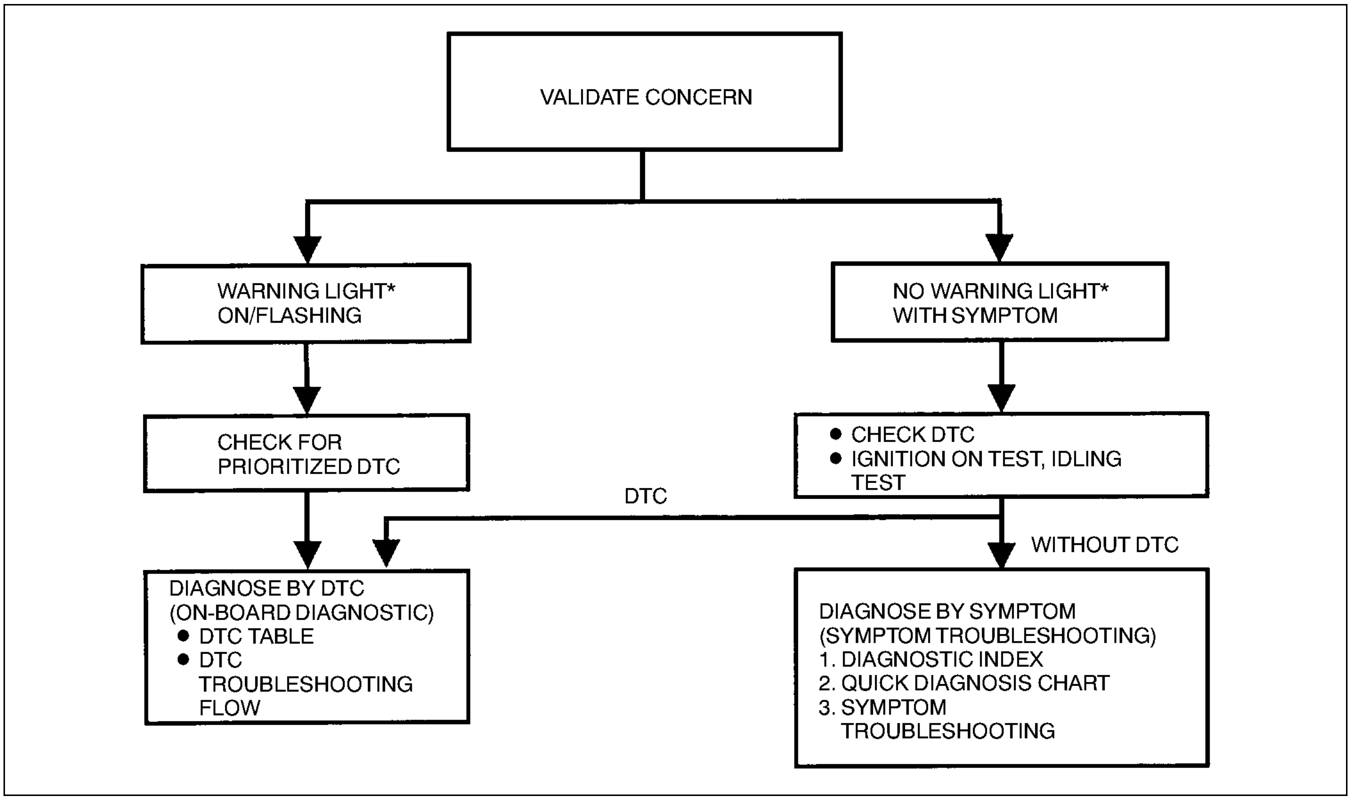
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier		×		×			×
PSP switch		×		×			×
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

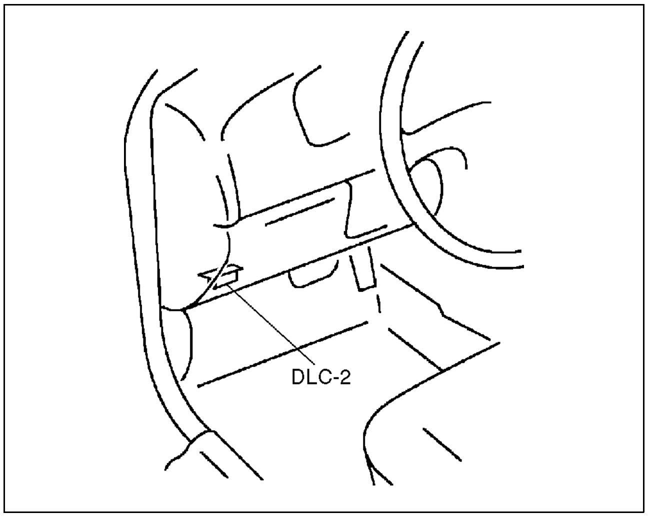
- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST [FS]

A3U010218881W10

DTCs Retrieving Procedure

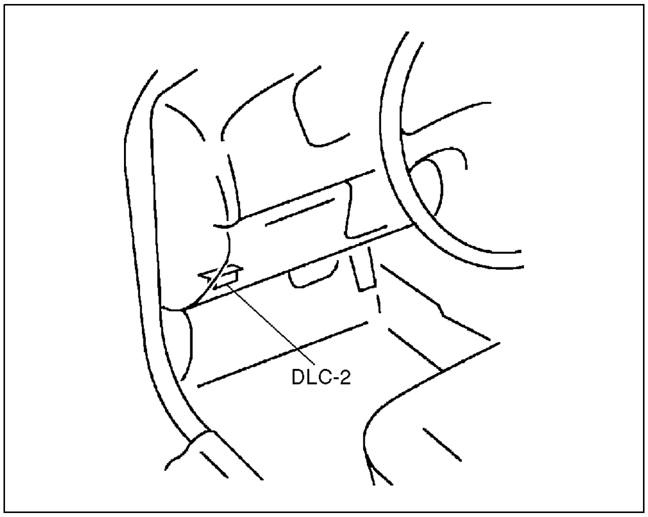
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve DTC using WDS or equivalent.



Z3U0102W001

Pending Trouble Code Access Procedure

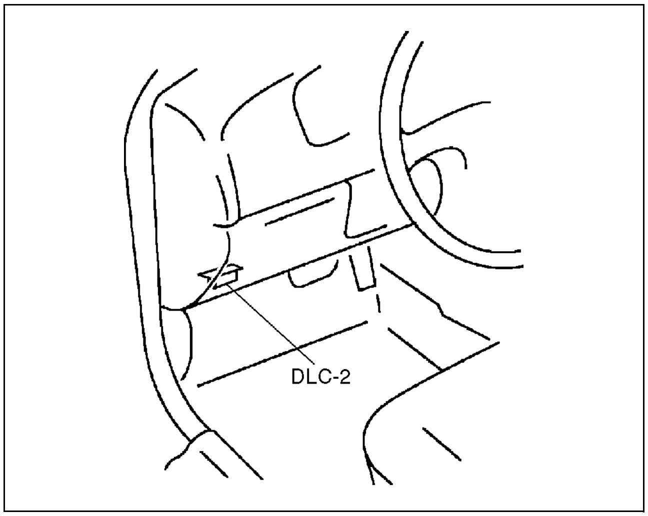
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve pending trouble code using WDS or equivalent.



Z3U0102W001

Freeze Frame PID Data Access Procedure

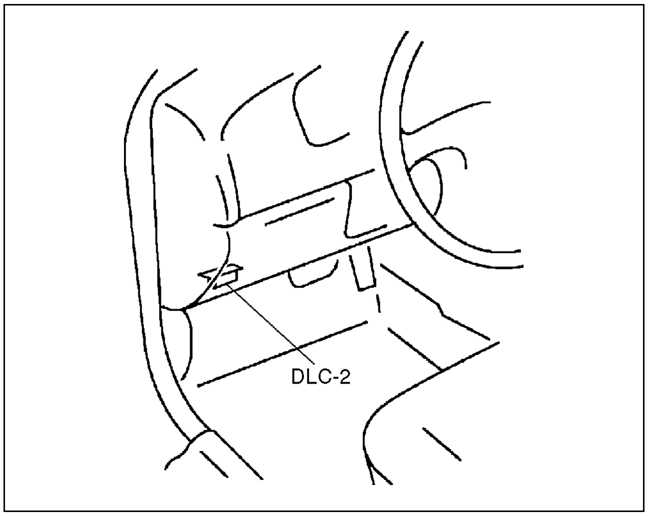
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve FREEZE FRAME PID DATA using WDS or equivalent.



Z3U0102W001

On-Board System Readiness Tests Access Procedure

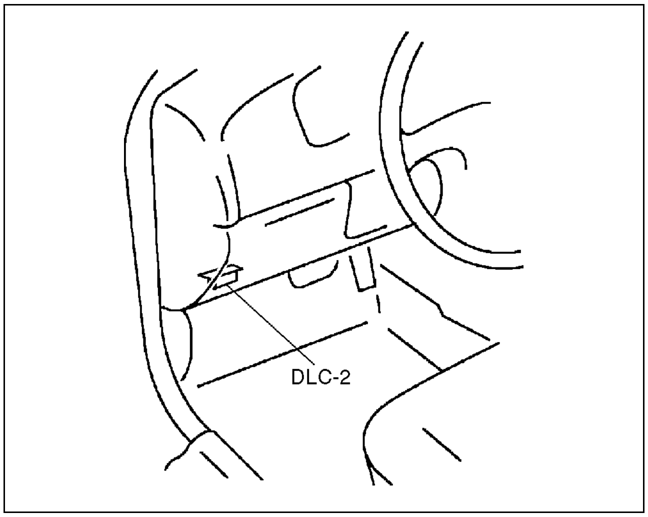
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Monitor the OBD-II system operating status using WDS or equivalent.



Z3U0102W001

PID/DATA Monitor and Record Procedure

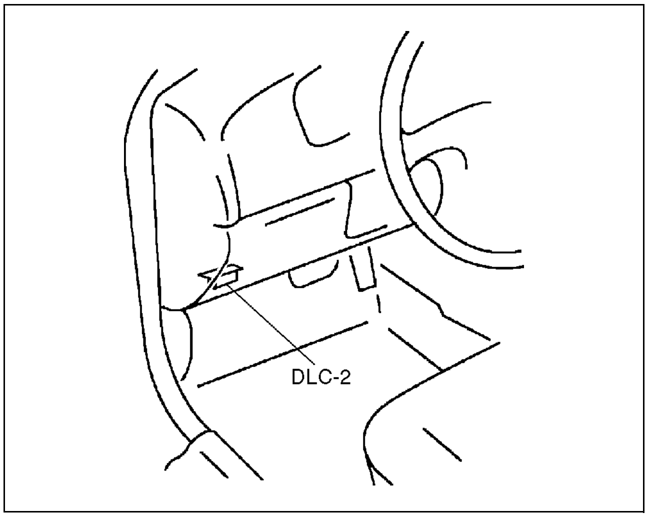
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access and monitor PIDs using WDS or equivalent.



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.

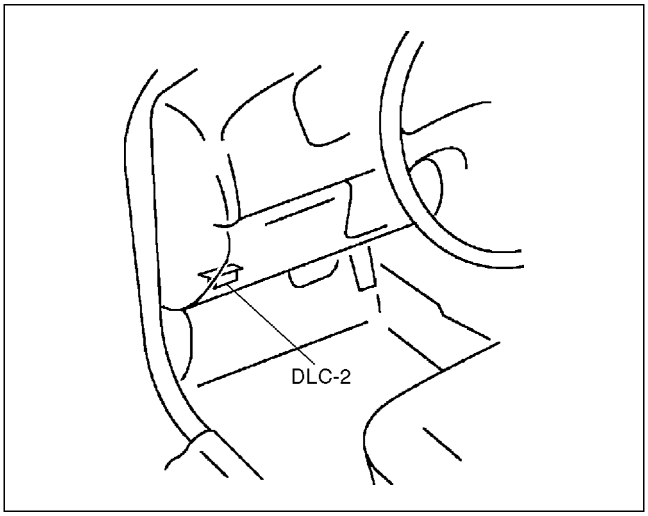


Z3U0102W001

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

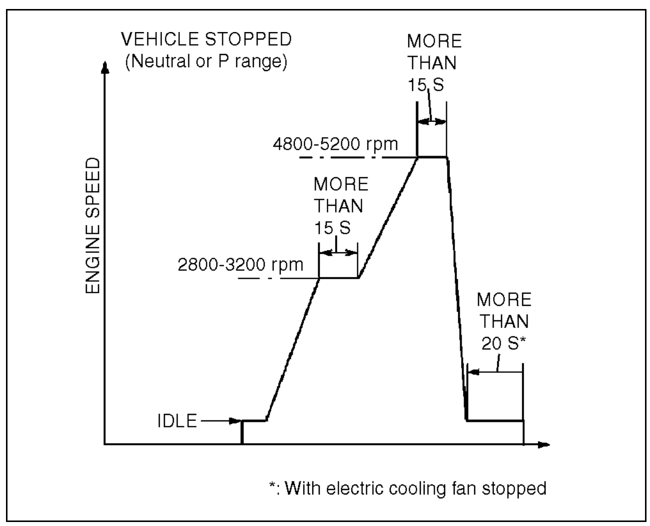
- Performing the Drive Mode inspects the OBD-II system for proper operation and must be performed to ensure that no additional DTCs are present.
- During Drive Mode, the following systems are inspected:
  — EGR system
  — Oxygen sensor (HO2S)
  — Oxygen sensor heater
  — Catalytic converter (TWC)
  — 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)

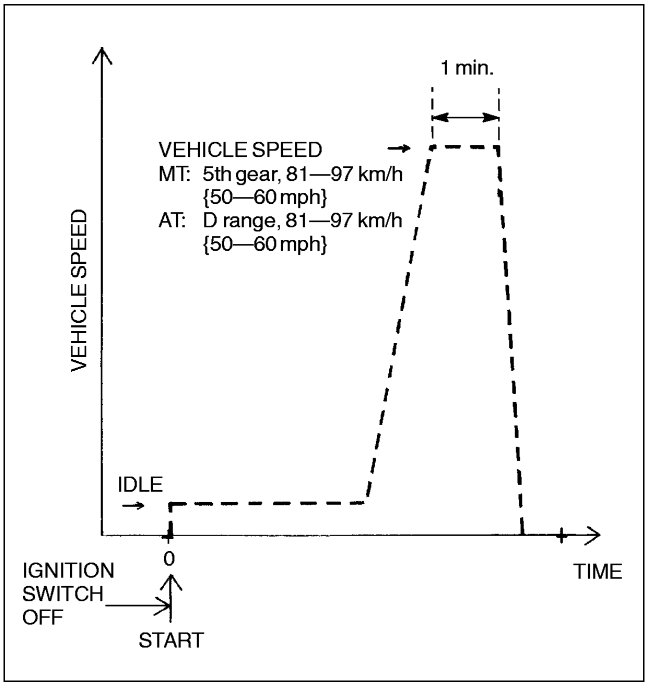
1. Start the engine and warm up completely.
2. Verify the following conditions and correct if necessary.
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
   - Initial ignition timing and idle speed are within specification.
   - TEN and GND of DLC are not connected.
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)

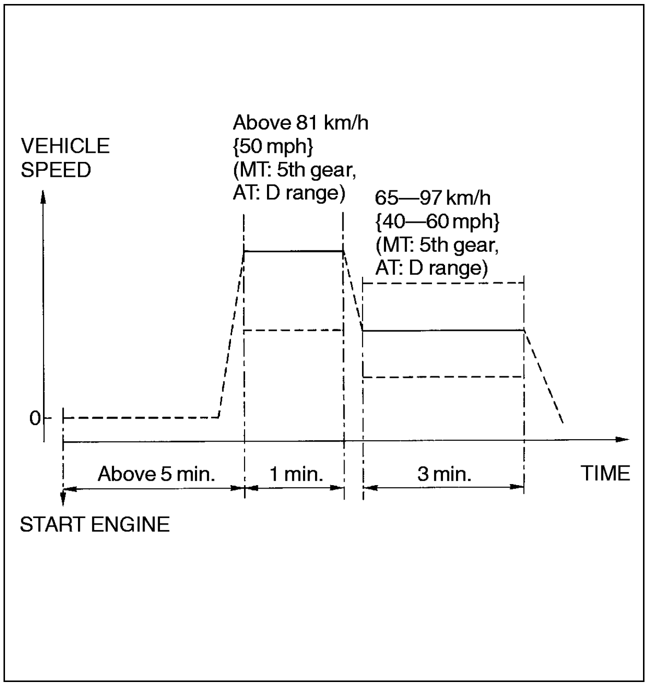
1. Perform Mode 1 first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph.
4. Stop vehicle and access to ON BOARD SYSTEM READINESS menu of GENERIC OBD II FUNCTION to inspect the Drive Mode completion status. If completed, 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.

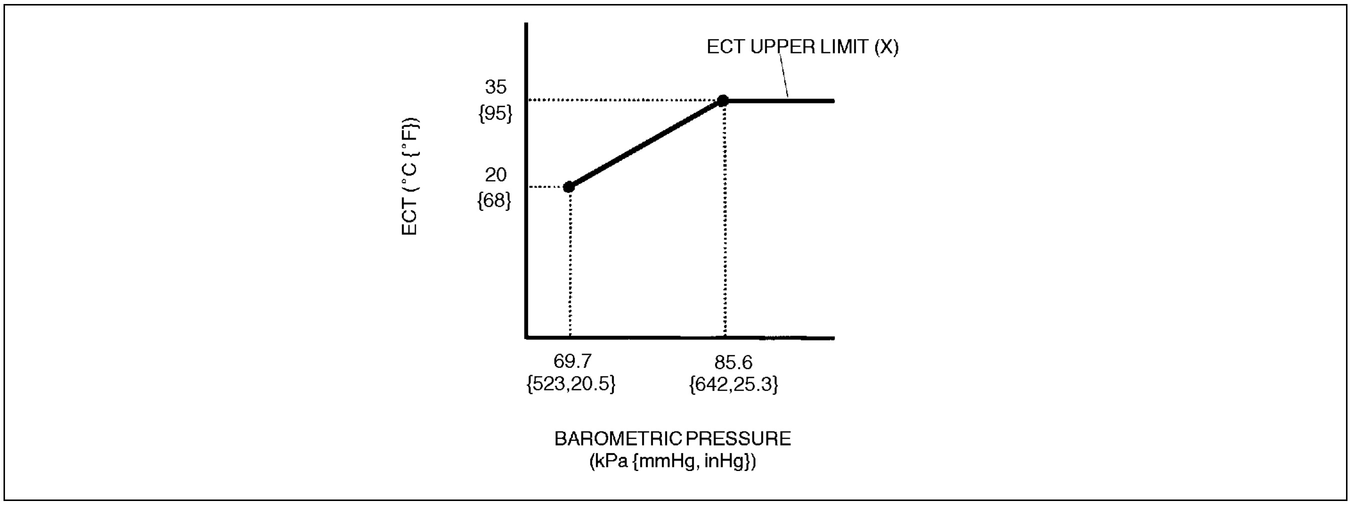


X3U101WBM

Mode 4 (EVAP system repair verification drive mode)

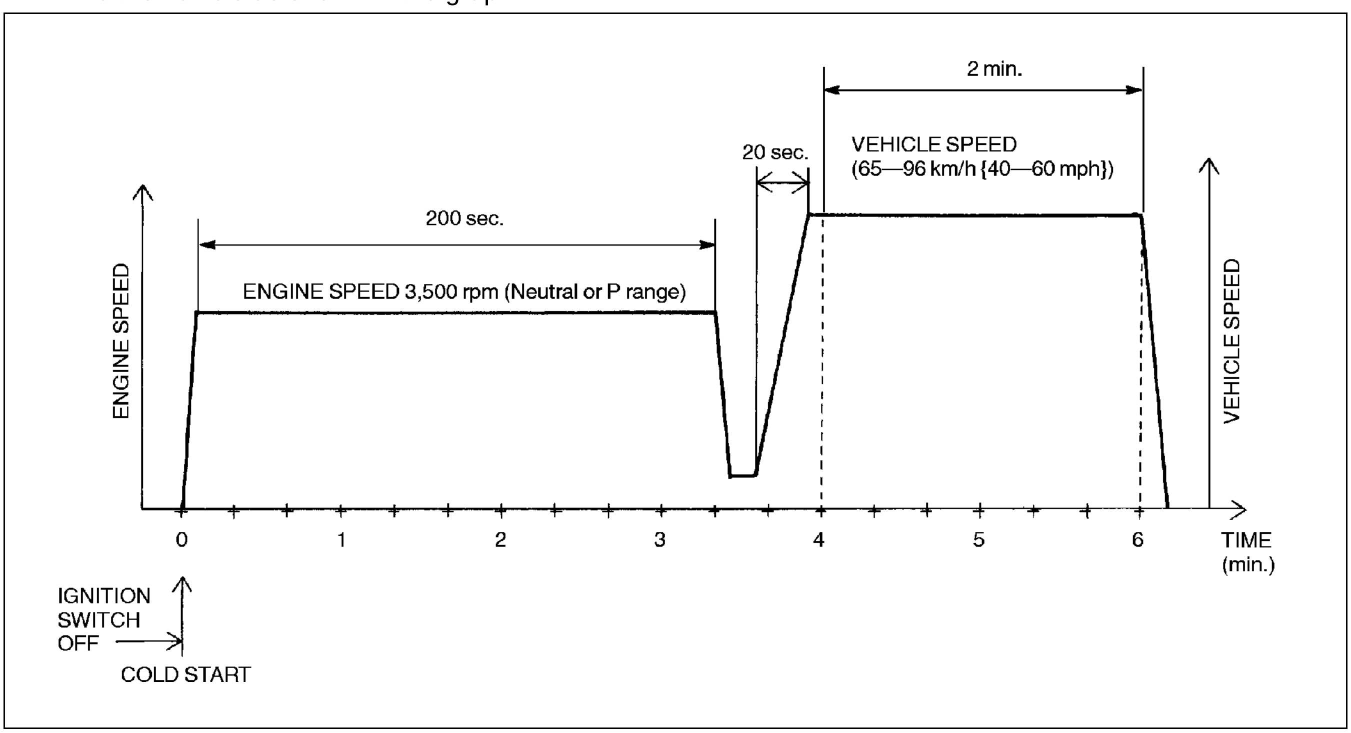
Note
- If Mode 4 can not be performed (you can not drive the vehicle under Mode 4 condition), perform evaporative system test procedure as an alternative. (See 01–03B–54 ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS].)
- Mode 4 can be performed regardless of RFC FLAG condition.

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.

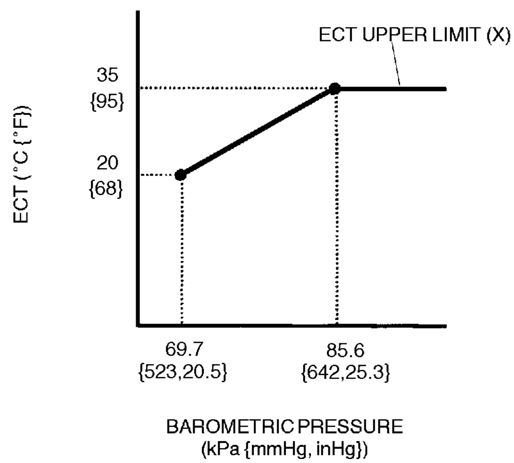
7. Access to DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD II FUNCTION to inspect the monitor results. If MEAS are not within specification, repair has not completed.
8. Verify no DTCs are available.

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.

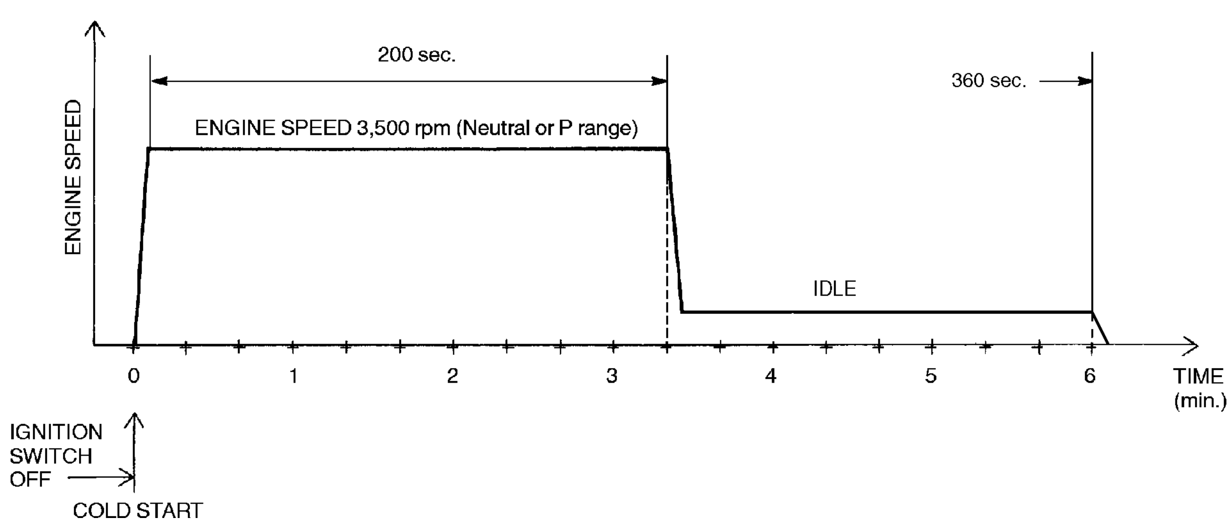
01–02B

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])

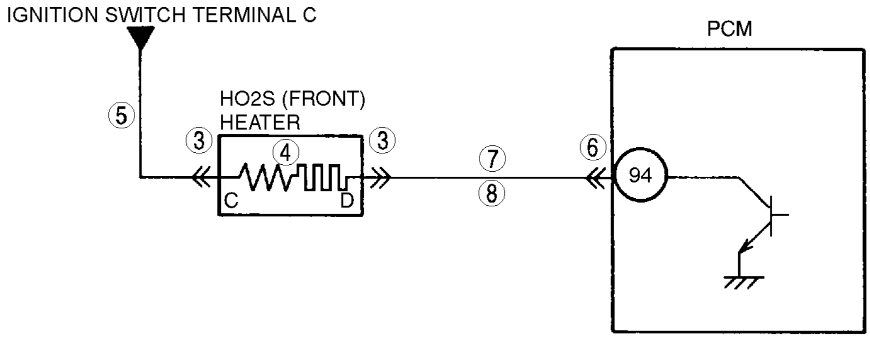
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0507	Idle control system RPM higher than expected	ON	—	2	CCM	×	(See 01–02B–117 DTC P0507 [FS])
P0550	PSP switch circuit malfunction	ON	—	2	CCM	×	(See 01–02B–118 DTC P0550 [FS])
P0660	VICS solenoid valve circuit malfunction	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.)					

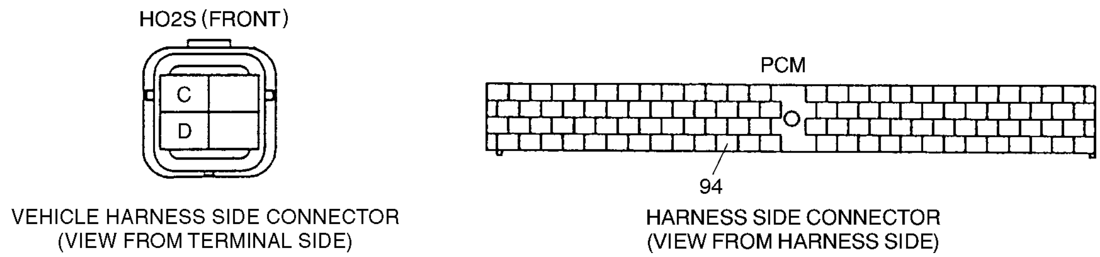
DTC No.	Condition	MIL	O/D off indicator light	DC	Monitor item	Memory function	Page
P0763	Shift solenoid C malfunction (electrical) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION.)					
P0766	Shift solenoid D malfunction (stuck off) (ATX)	(See 05–02–6 AUTOMATIC TRANSAXLE ON-BOARD 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





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.

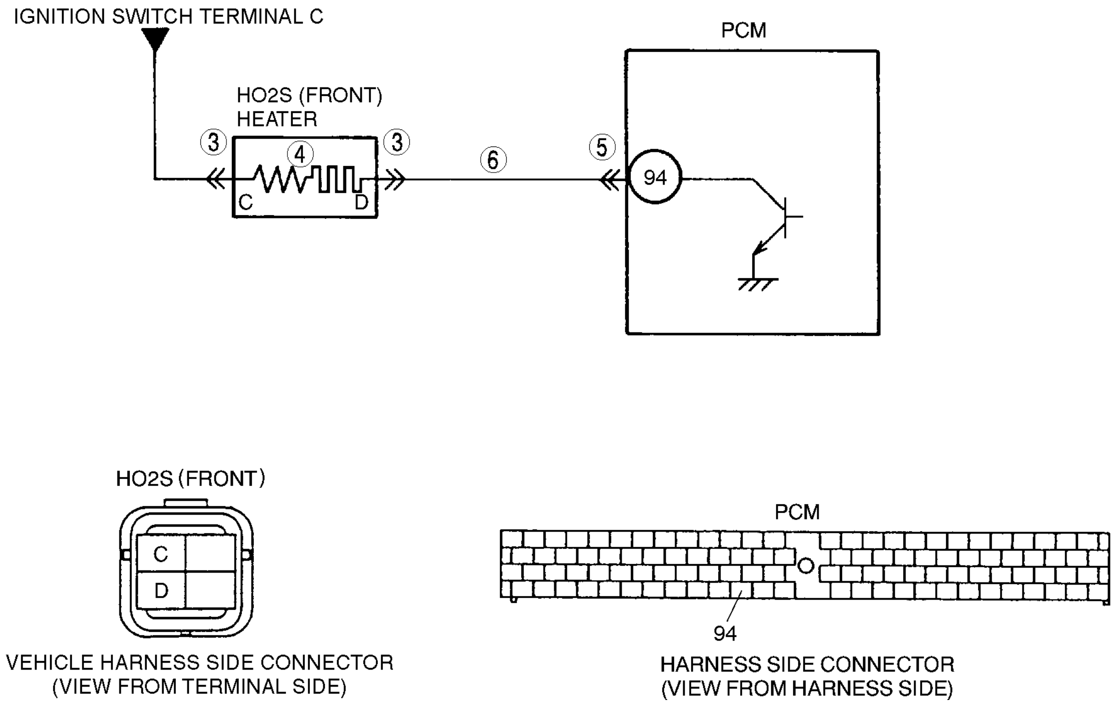
STEP	INSPECTION		ACTION
4	**INSPECT HO2S HEATER (FRONT)** • Measure resistance between HO2S (front) terminals C and D (part-side). • Is resistance **approx. 5.6 ohms**?	Yes	Go to next step.
		No	Replace the HO2S (front), then go to Step 9.
5	**INSPECT POWER CIRCUIT OF HO2S HEATER (FRONT) FOR OPEN CIRCUIT** • 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

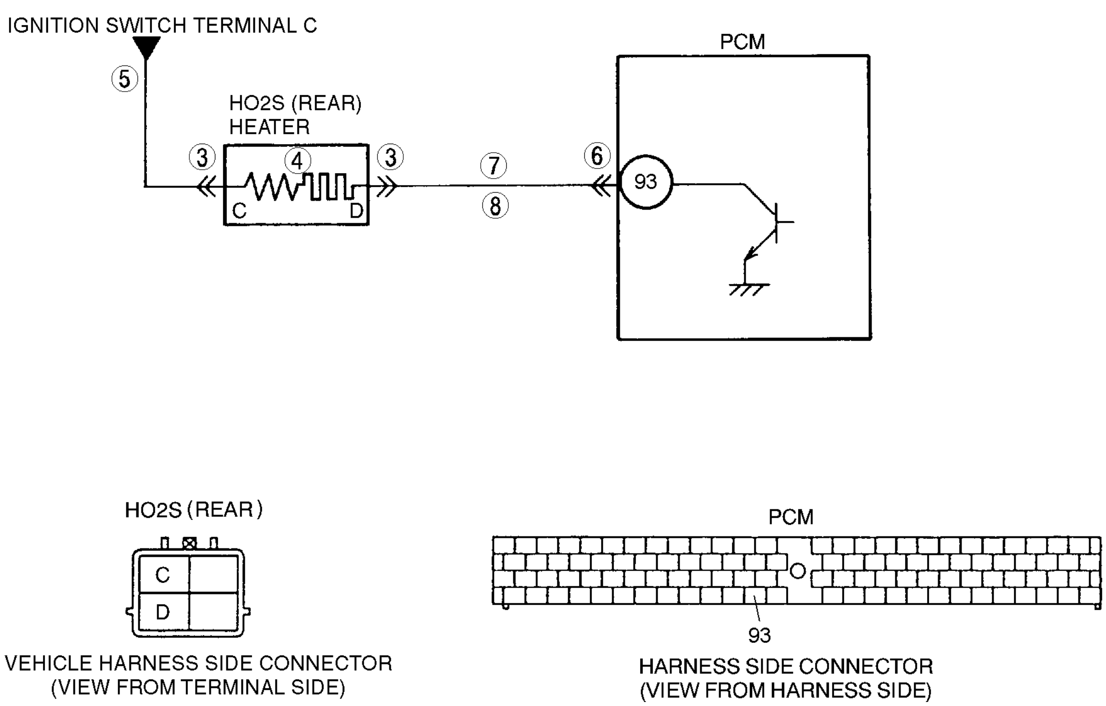
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

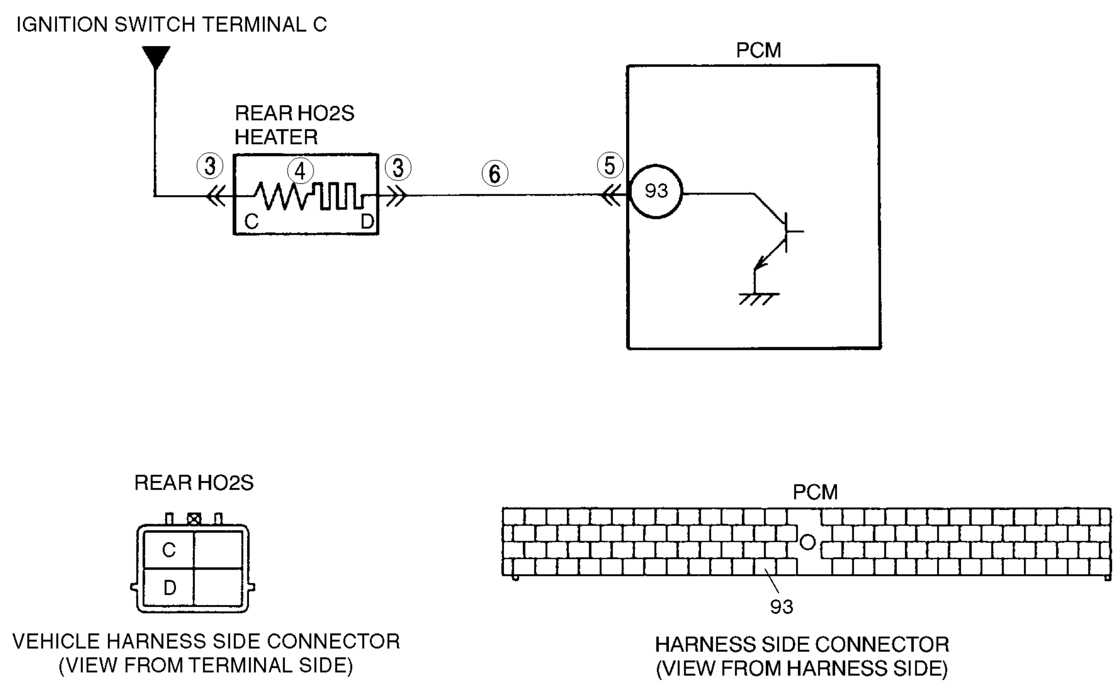
STEP	INSPECTION		ACTION
3	**INSPECT HO2S (REAR) CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect HO2S (rear) connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		No	Go to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



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

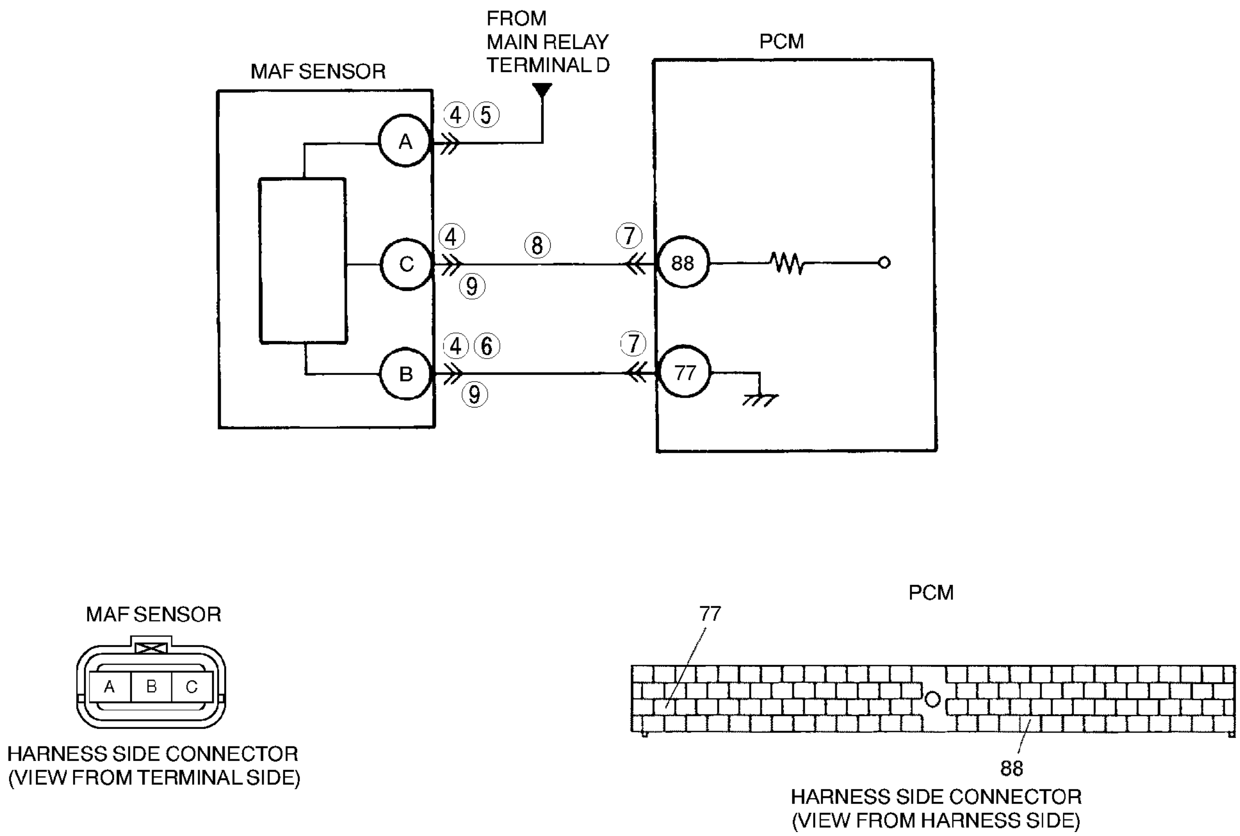
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

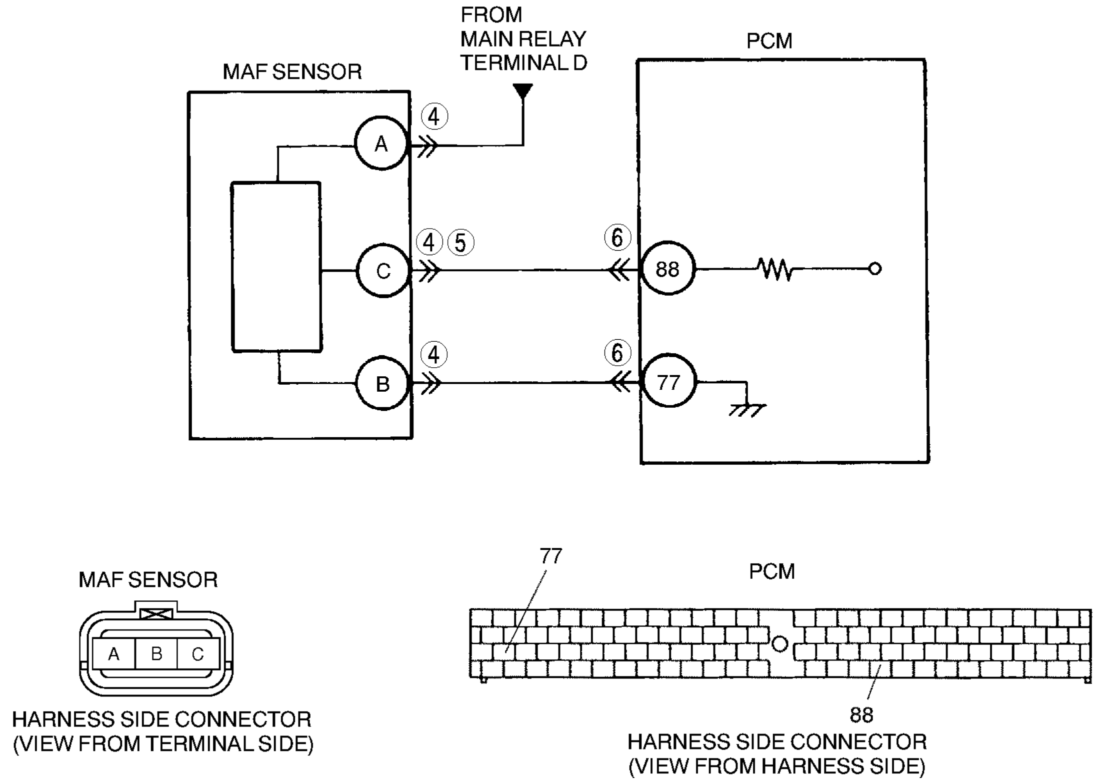
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

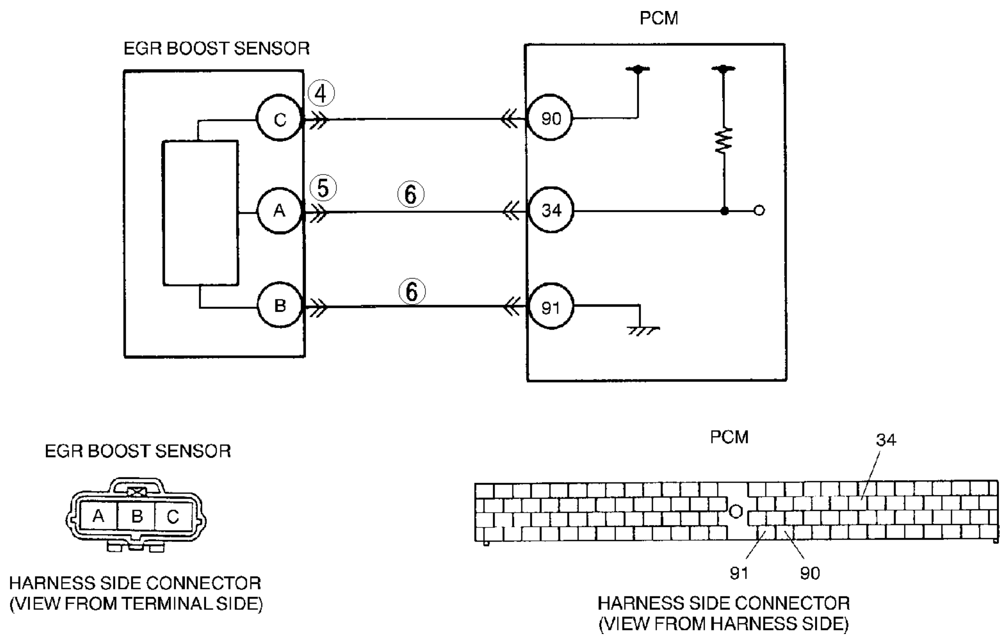
STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0106 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.
5	**INSPECT CONNECTION OF EGR BOOST SENSING RELATED VACUUM HOSES** • Inspect the following vacuum hoses 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 °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.

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

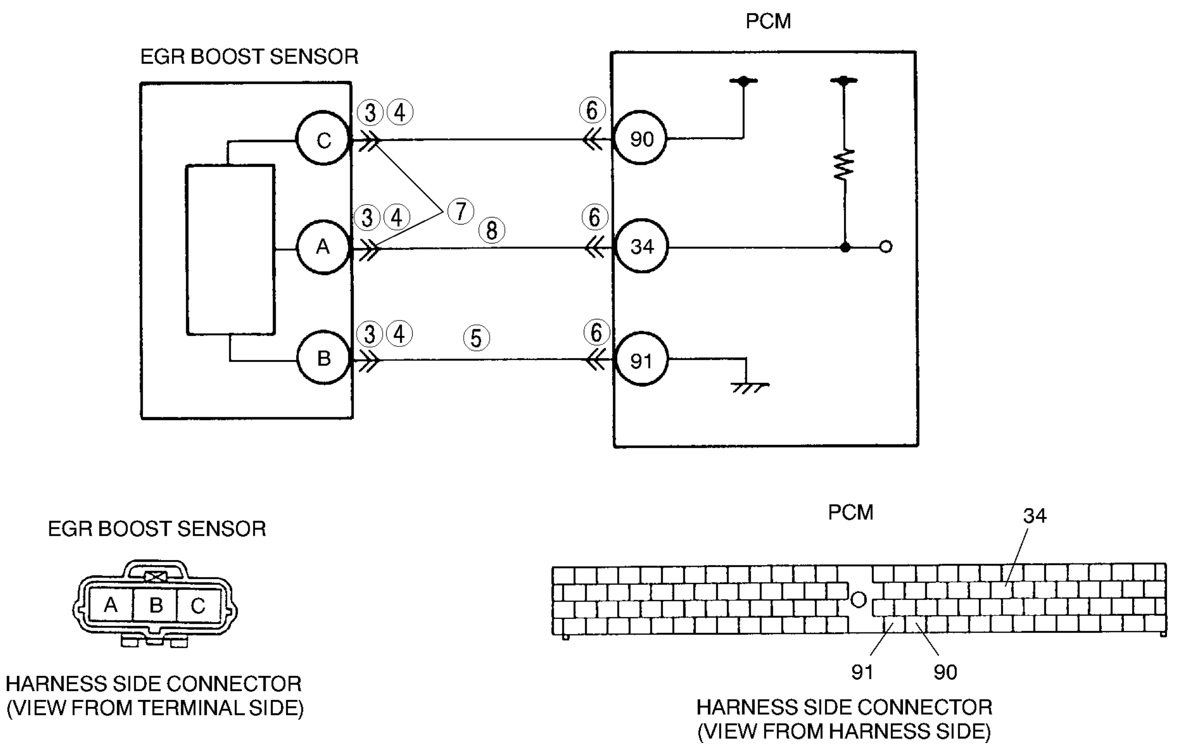
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



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

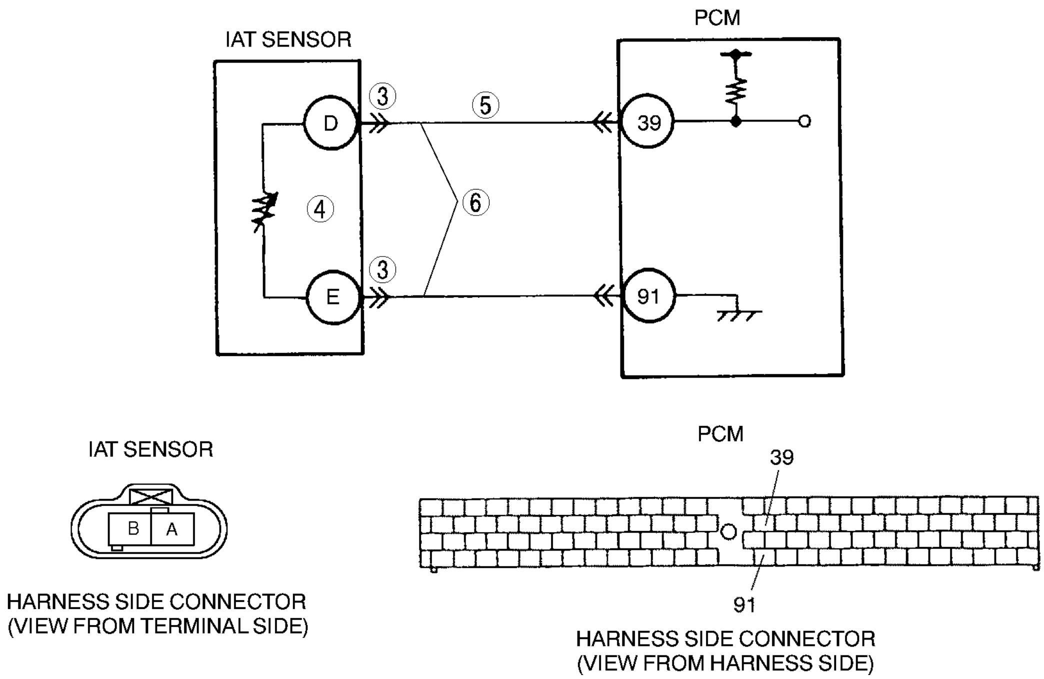
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

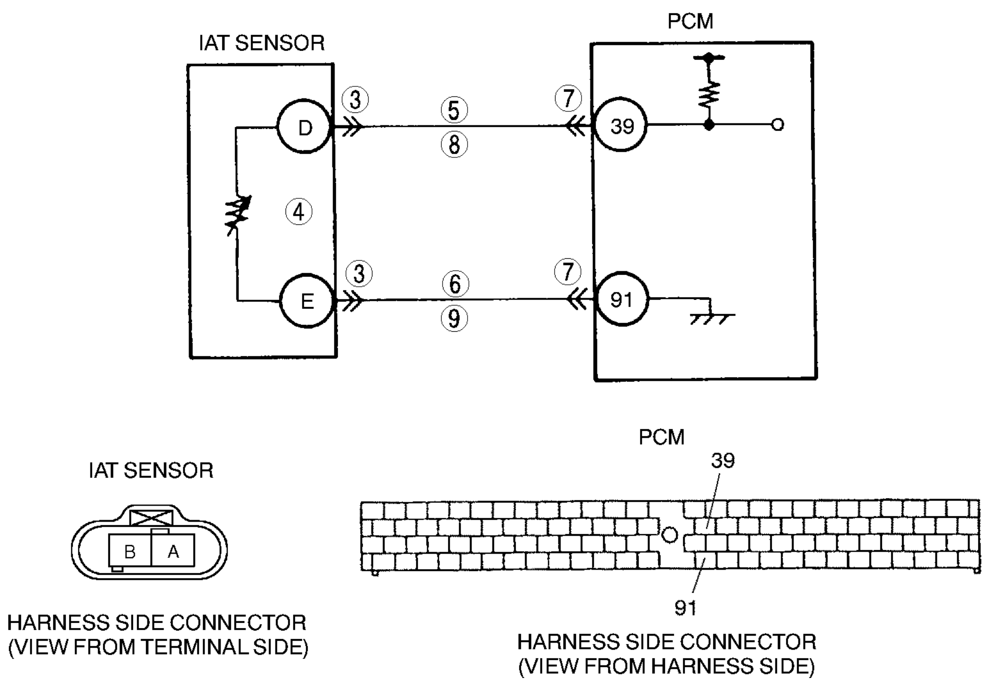
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



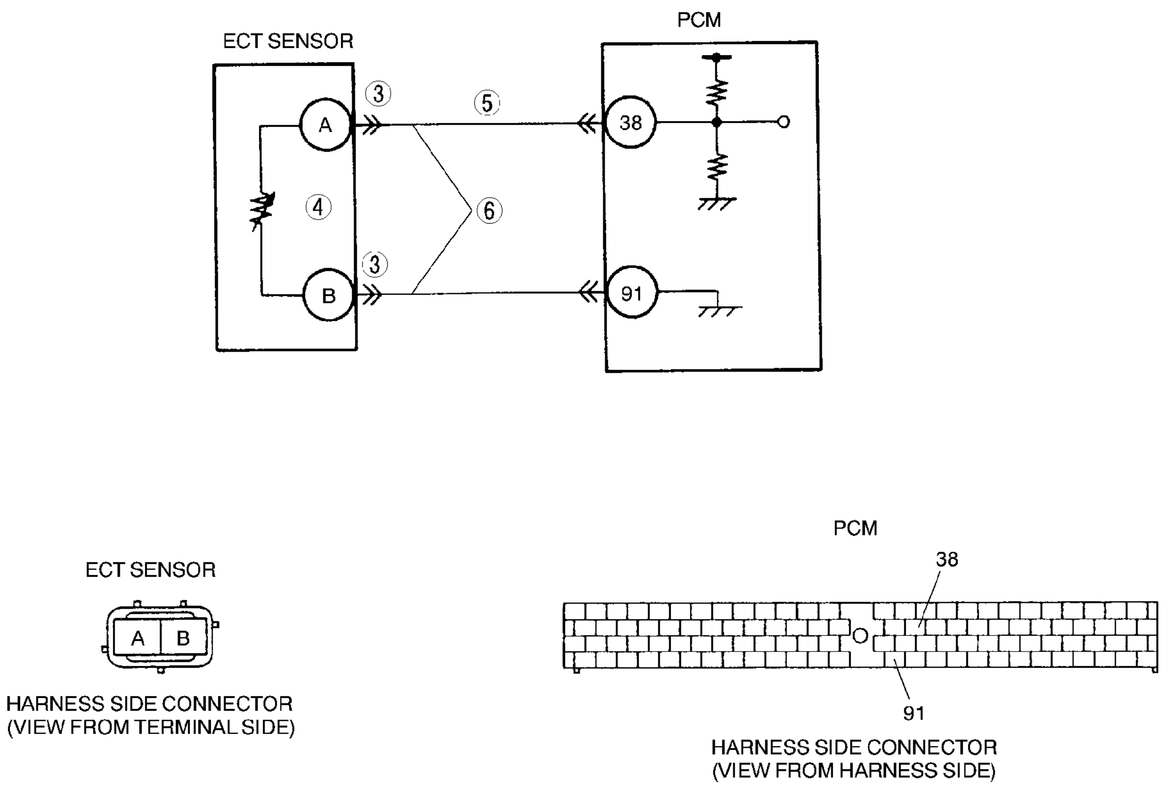
Diagnostic procedure

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VERIFY FREEZE FRAME DATA HAS BEEN RECORDED
• Has FREEZE FRAME DATA been recorded?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Record FREEZE FRAME DATA on repair order, then go to next step.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins availability.
• Is any related repair information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminal, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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?</td><td>Yes</td><td>Replace IAT sensor, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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+?</td><td>Yes</td><td>Repair or replace harness for short to power, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT IAT SENSOR GROUND CIRCUIT FOR SHORT TO POWER
• Measure voltage between IAT sensor terminal A (harness-side) and body ground.
• Is voltage B+?</td><td>Yes</td><td>Repair or replace harness for short to power, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminal, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, then go to Step 10.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, then go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, then go to next step.</td></tr>
<tr><td>No</td><td>No concern is detected. Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02B–9 AFTER REPAIR PROCEDURE [FS].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02B–15 DTC TABLE [FS].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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



Diagnostic procedure

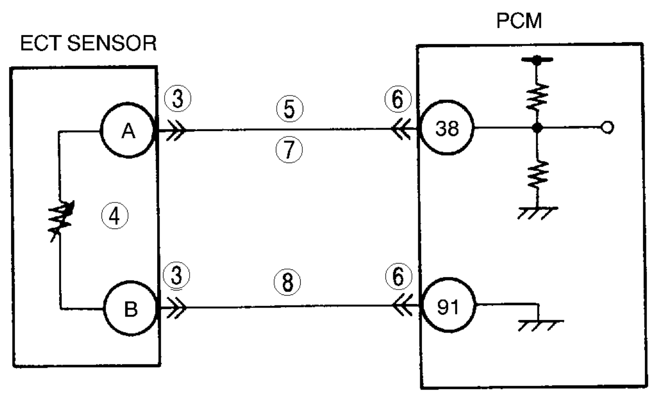
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

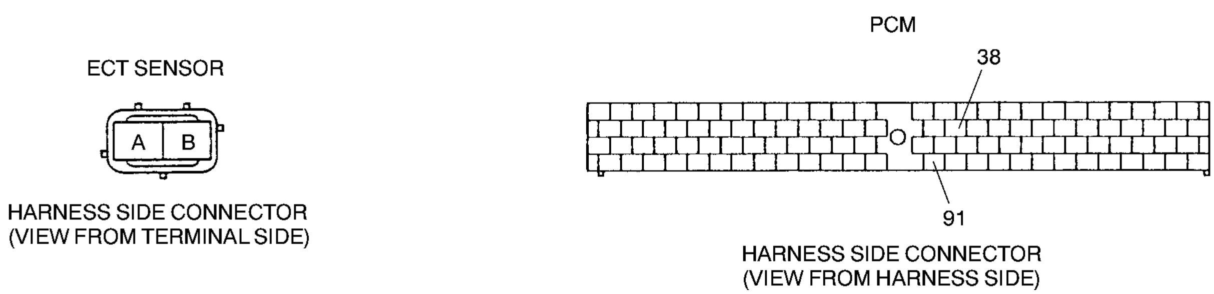
STEP	INSPECTION		ACTION
5	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to 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





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

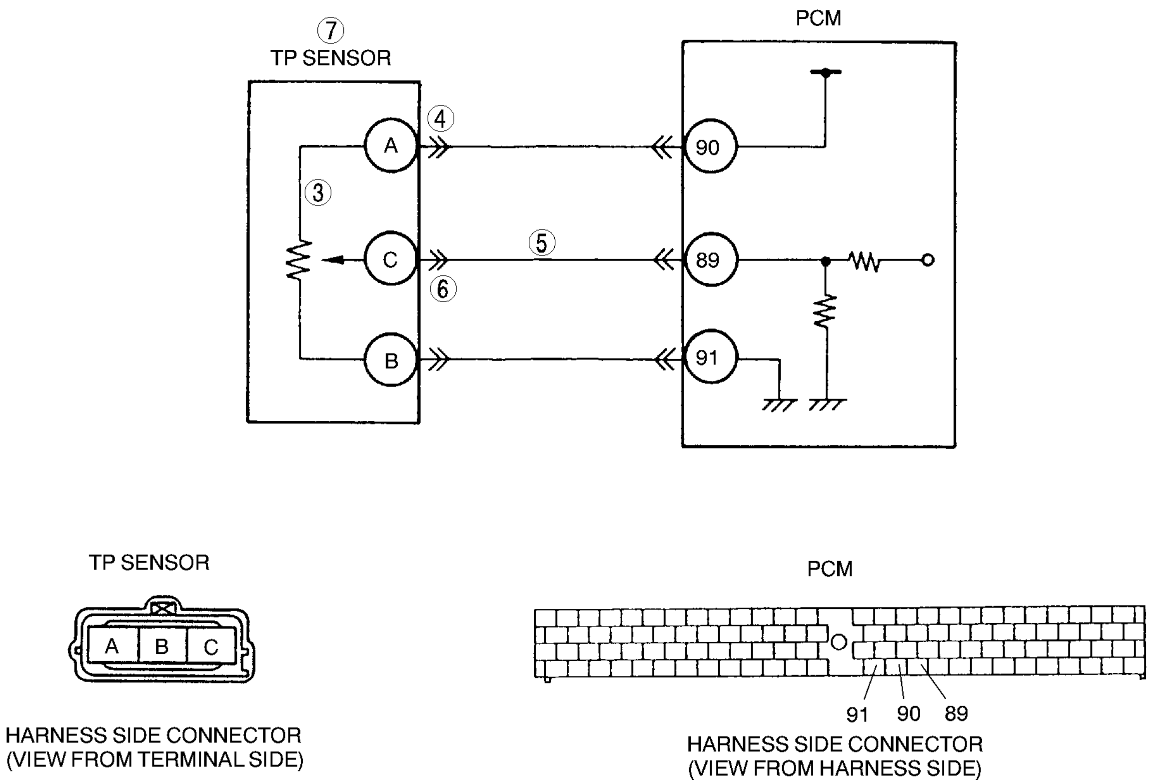
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED PENDING CODE OR STORED DTC** • Turn ignition key to ON (Engine OFF). • Retrieve 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.

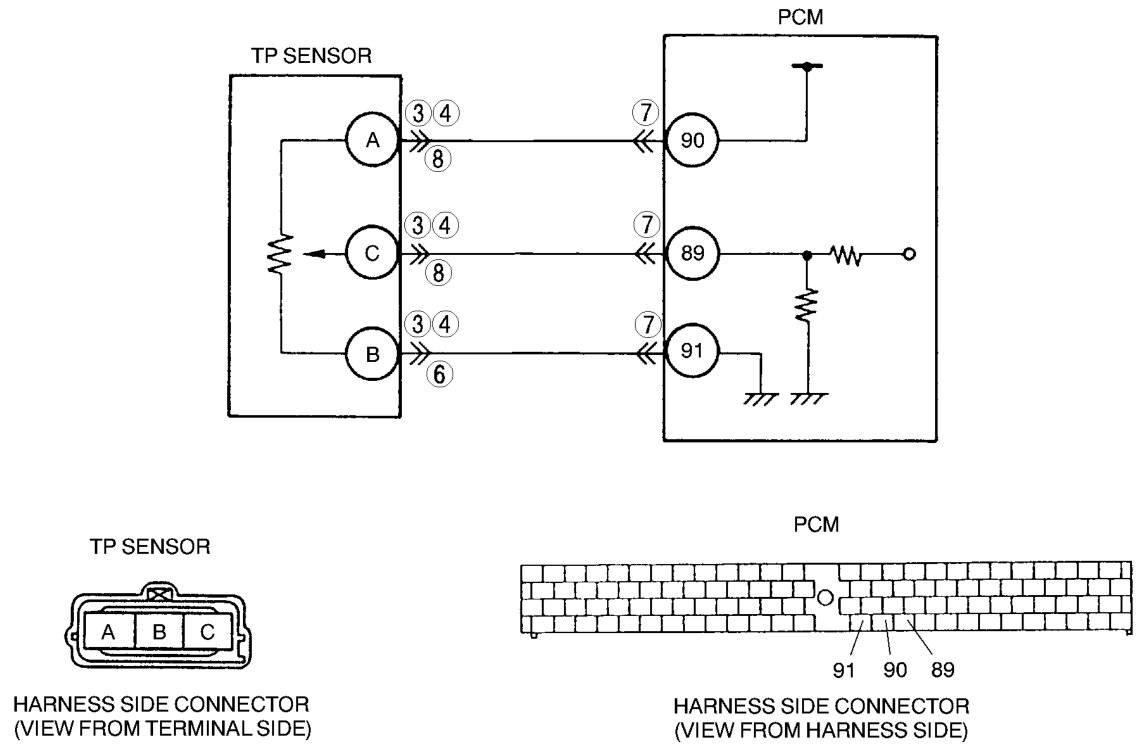
STEP	INSPECTION		ACTION
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT TP SENSOR CONNECTOR** **Note** • If DTC P0107 and P0452 are also retrieved with P0122, go to REFERENCE VOLTAGE troubleshooting procedure. (See 01–03B–49 NO.30 REFERENCE VOLTAGE [FS].) • Turn ignition key to ON (Engine OFF). • Check voltage 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.

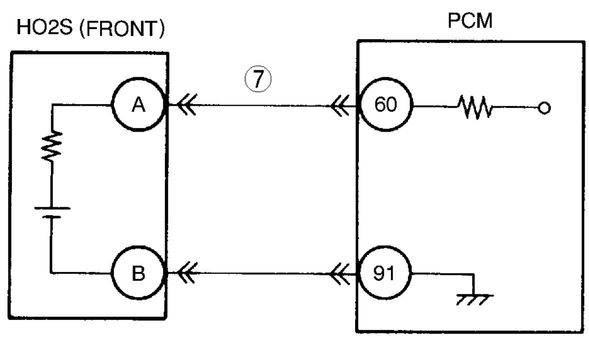
STEP	INSPECTION		ACTION
9	**INSPECT FUEL LINE PRESSURE (Excessive fuel line pressure)** • Start engine. • Inspect fuel line pressure while engine running. (See 01–14–6 FUEL PRESSURE INSPECTION.) • Is fuel line pressure **within 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}**?	Yes	Go to Step 14.
		No	Go to 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.

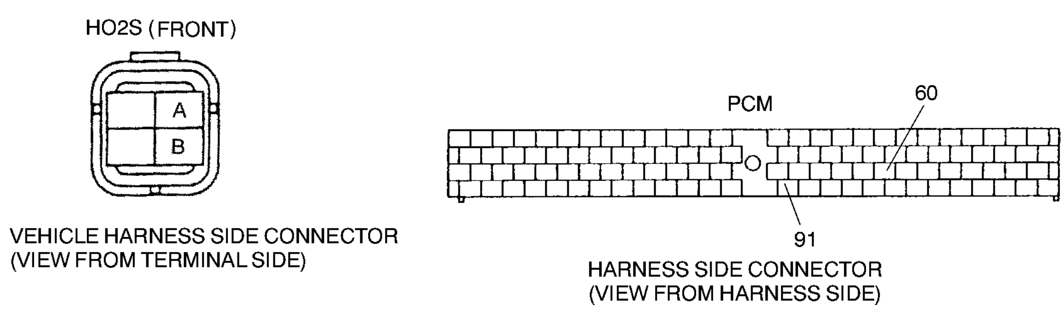
STEP	INSPECTION		ACTION
15	**VERIFY TROUBLESHOOTING OF DTC P0133 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using WDS or equivalent. • Start engine. • Run OBD-ll DRIVE MODE 1 and 3. (See 01–02B–10 OBD-II DRIVE MODE [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





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.

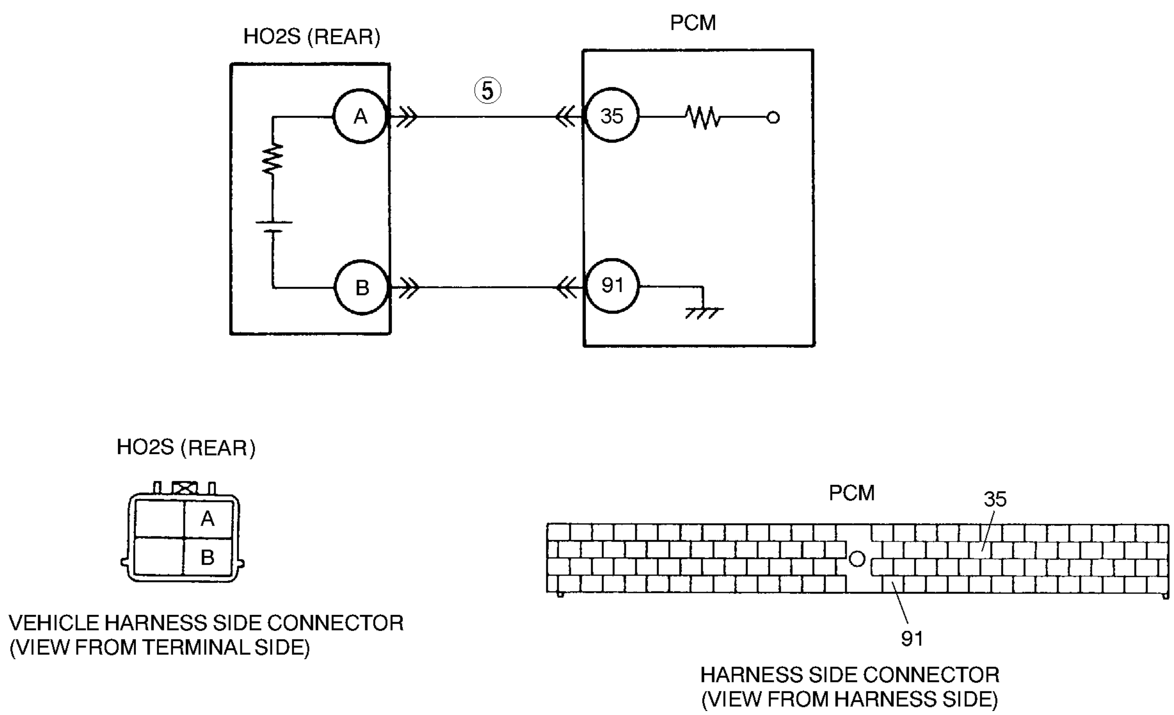
STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is DTC P0134 on FREEZE FRAME DATA?	Yes	Go to next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. (See 01–02B–15 DTC TABLE [FS].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Warm up engine. • Access O2S11 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



Diagnostic procedure

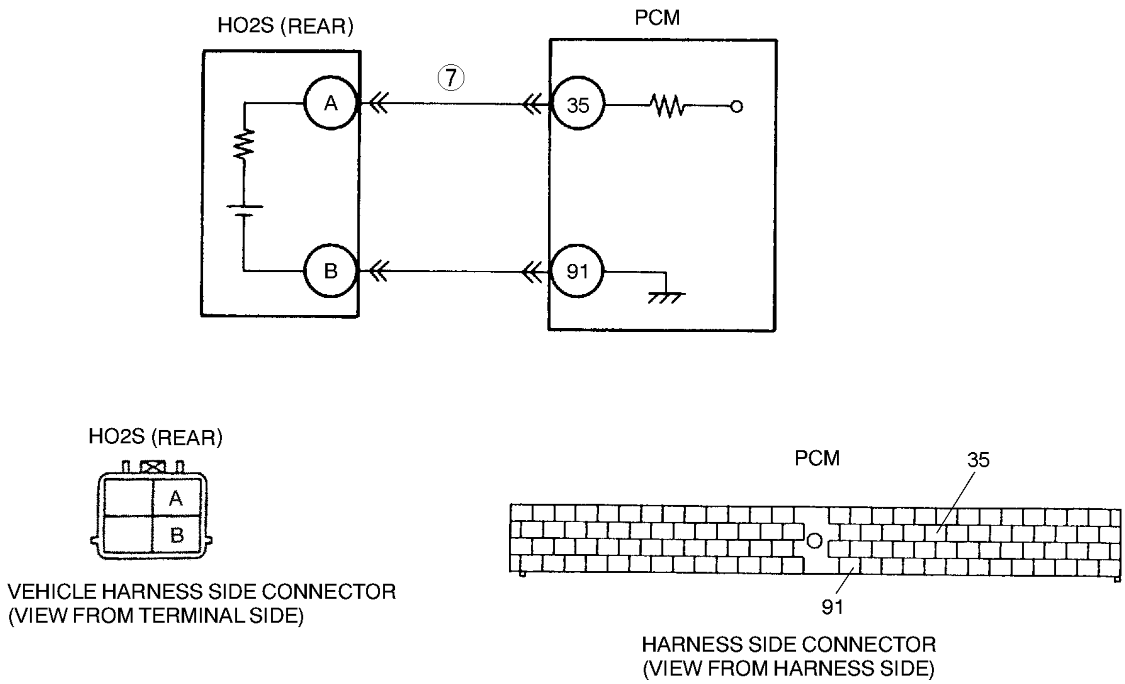
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th colspan="2">ACTION</th></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace high-tension lead, then go to Step 13.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace suspected part, then go to Step 13.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Check for fuel injector harnesses.
Repair or replace if necessary, then go to Step 13.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?

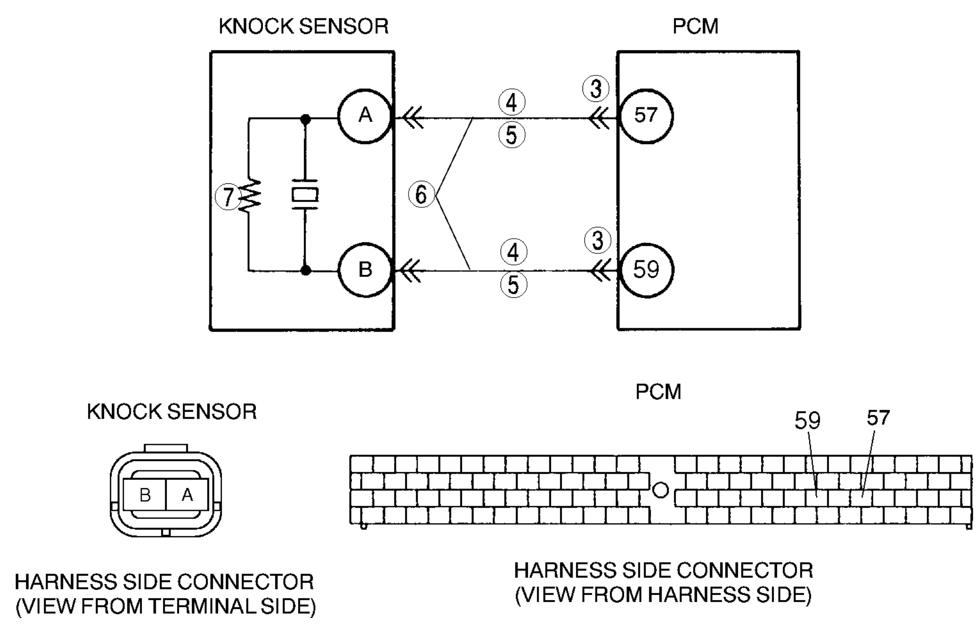
Note
• Large bubbles are normal since they are remaining air coming out from engine coolant passage.</td><td>Yes</td><td>Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace faulty parts, then go to Step 13.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">INSPECT ENGINE COMPRESSION
• Inspect engine compression.
(See 01–10B–8 COMPRESSION INSPECTION [FS].)
• Is engine compression okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Overhaul the engine, then go to next step.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">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?</td><td>Yes</td><td>Replace injector, then go to Step 13.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

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



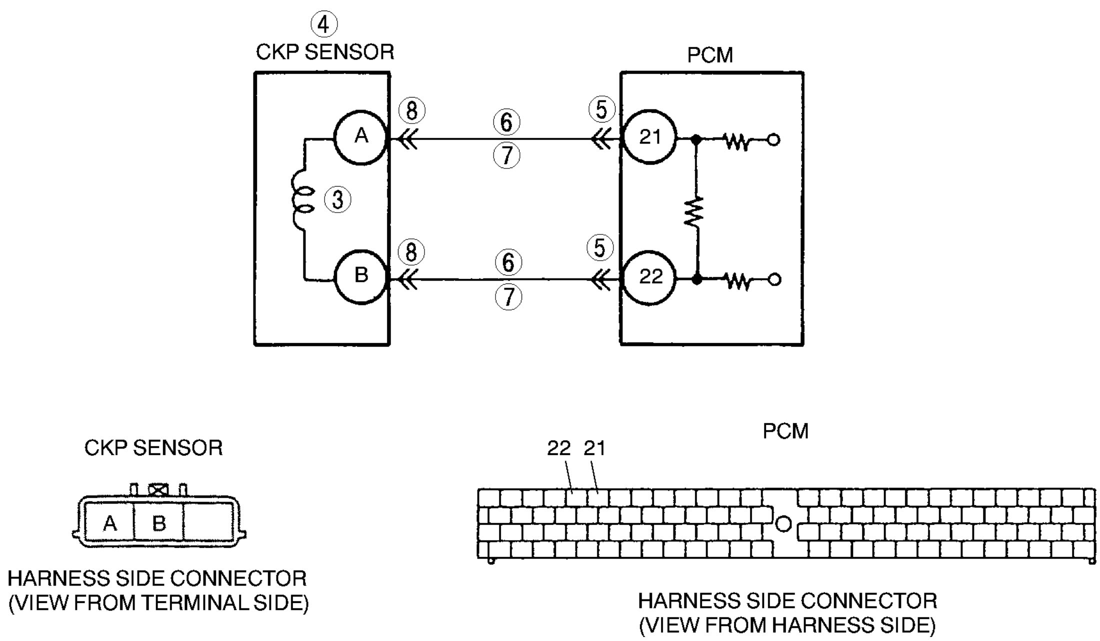
Diagnostic procedure

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.

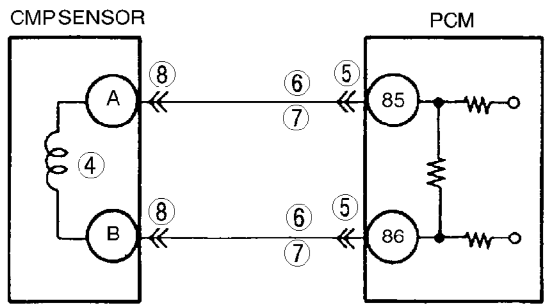
STEP	INSPECTION		ACTION
5	**INSPECT PCM CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminals 21 and 22 (damaged,/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go 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.

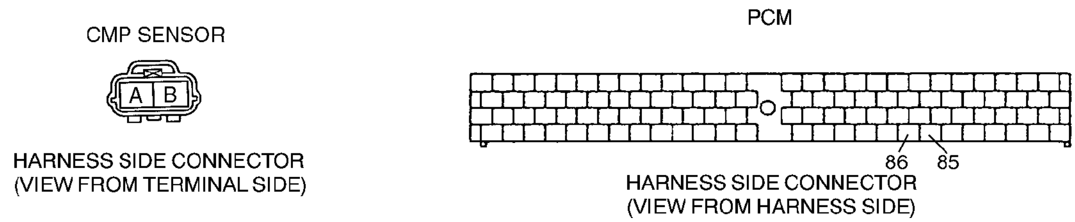
DTC P0340 [FS]

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

<table>
<tr><th>DTC P0442</th><th>Evaporative emission control system leak detected (small leak)</th></tr>
<tr><td>DETECTION CONDITION</td><td>• 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.</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>• 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</td></tr>
</table>

Diagnostic procedure

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VERIFY FREEZE FRAME DATA HAS BEEN RECORDED
• Has FREEZE FRAME DATA been recorded?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Record FREEZE FRAME DATA on repair order, then go to next step.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins availability.
• Is any related repair information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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?</td><td>Yes</td><td>Go to appropriate DTC inspection.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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.</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Retighten fuel-filler cap or replace it if it is damaged.
Then go to Step 15.</td></tr>
</table>

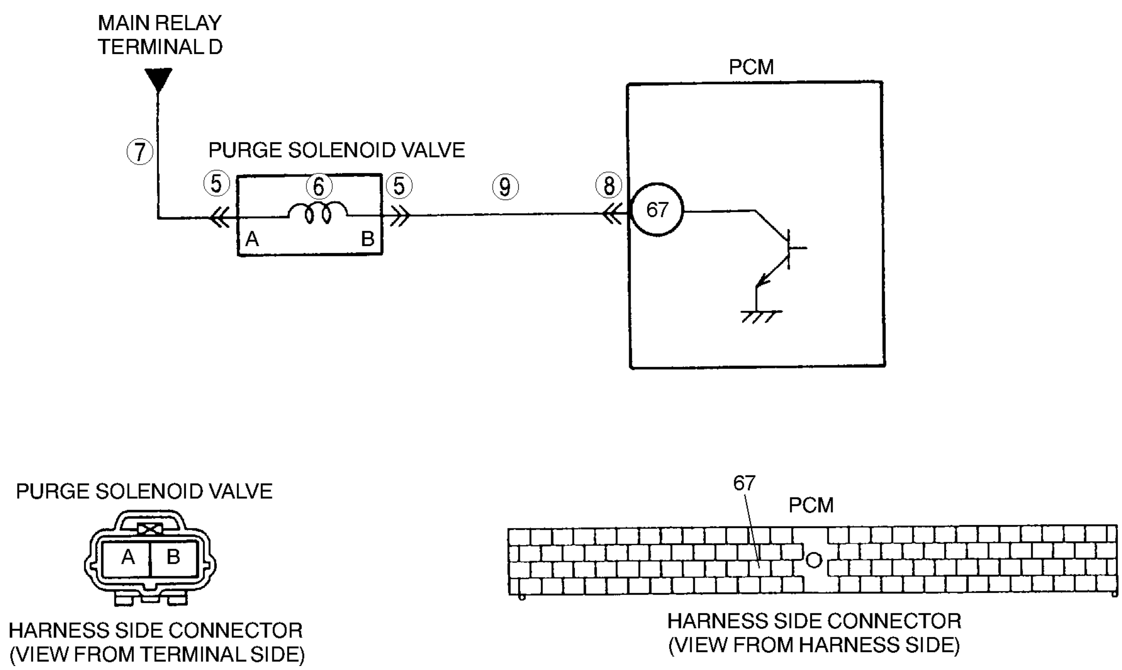
STEP	INSPECTION		ACTION
5	**INSPECT WHOLE EVAP CONTROL SYSTEM** • Implement “01-03B ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS], Evaporative System Leak Inspection Using Vacuum Pump, Whole system inspection”. (See 01–03B–55 Whole system inspection.) • Does voltage change under to specified readings 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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">15</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go to Step 18.</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">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?</td><td>Yes</td><td>EVAP system repaired.
Go to Step 22.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Then go to next step.</td></tr>
<tr><td rowspan="2">18</td><td rowspan="2">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?</td><td>Yes</td><td>Go to Step 20.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">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?</td><td>Yes</td><td>EVAP system repaired.
Go to Step 22.</td></tr>
<tr><td>No</td><td>Replace PCM, then go to Step 22.</td></tr>
<tr><td rowspan="2">20</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go back to Step 17.</td></tr>
<tr><td rowspan="2">21</td><td rowspan="2">VERIFY EVAP SYSTEM REPAIRED
• Access DIAGNOSTIC MONITORING TEST RESULTS.
• Is it below MAX value?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace PCM, then go next step.</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02B–9 AFTER REPAIR PROCEDURE [FS].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02B–15 DTC TABLE [FS].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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

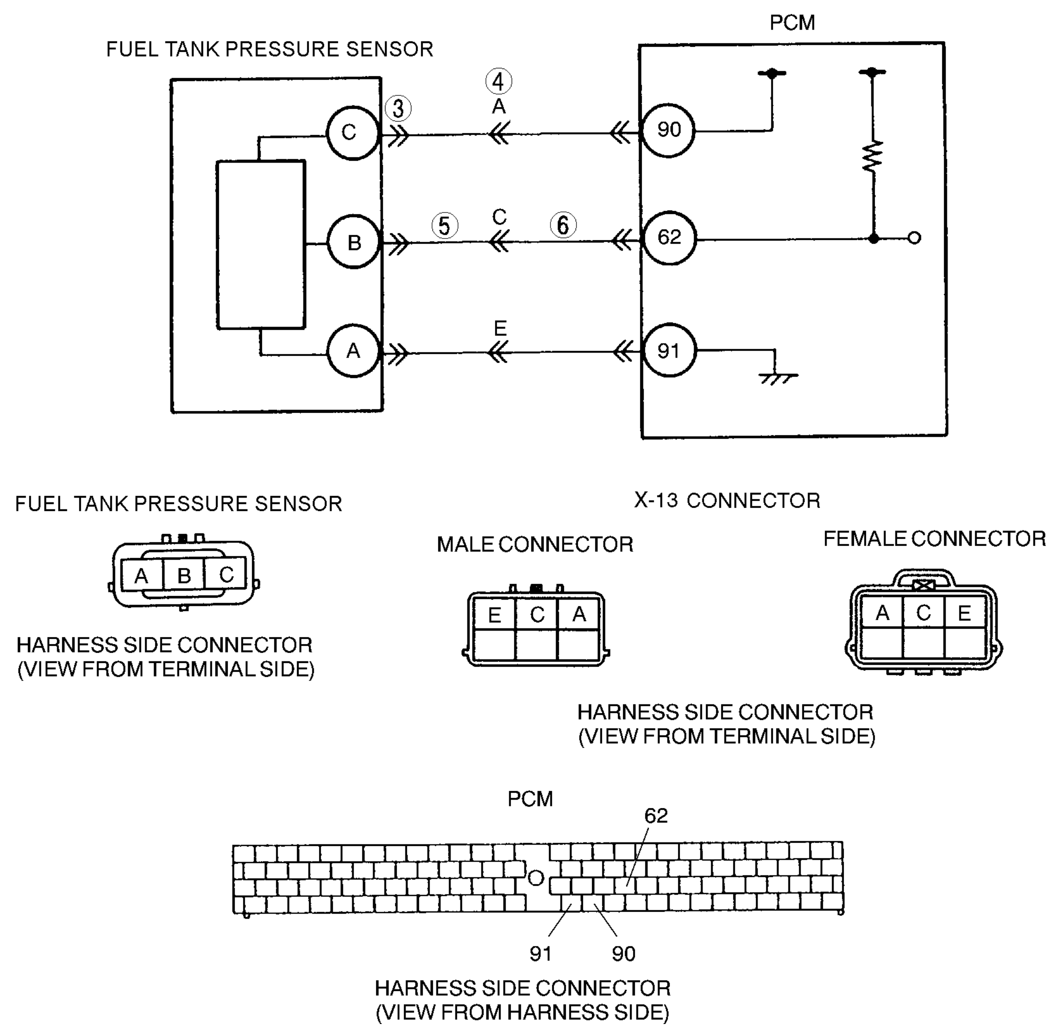
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

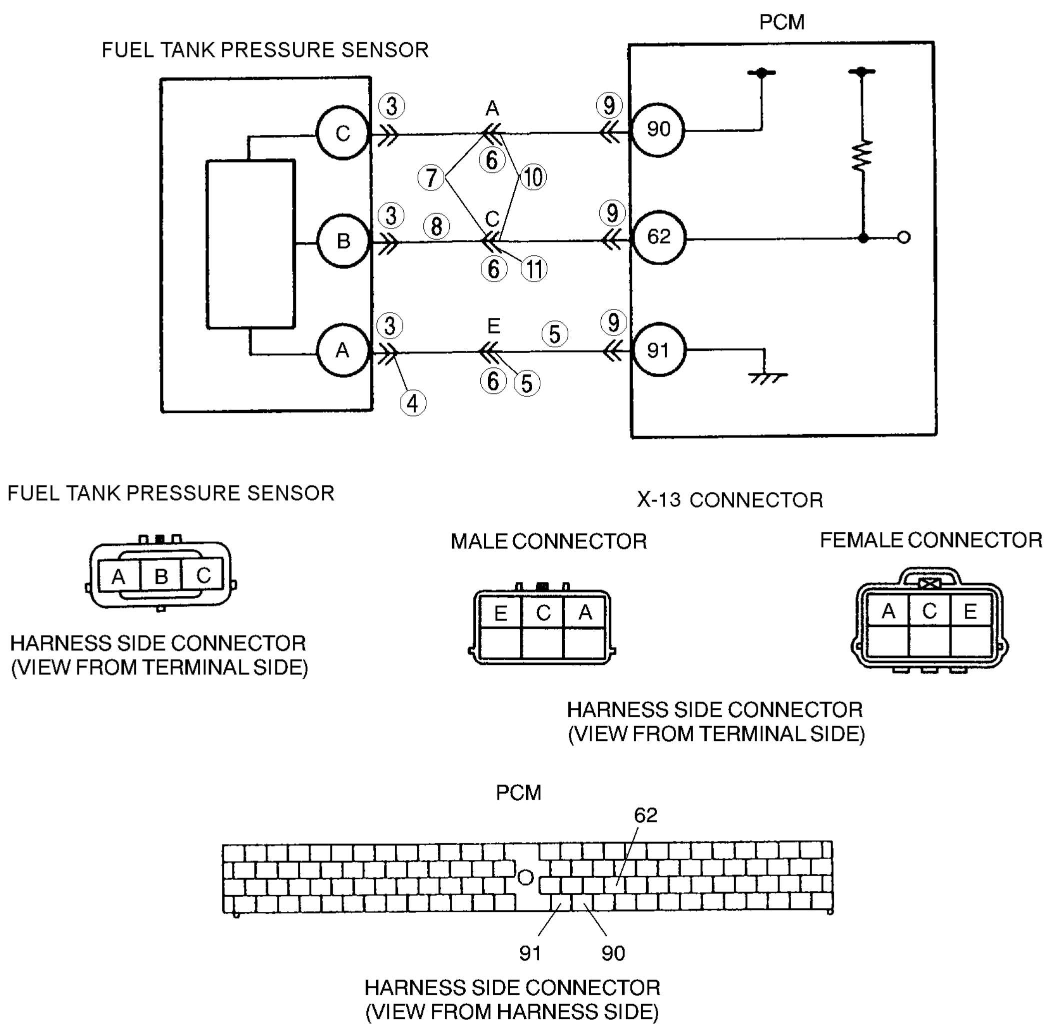
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VERIFY FREEZE FRAME DATA HAS BEEN RECORDED
• Has FREEZE FRAME DATA been recorded?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Record FREEZE FRAME DATA on repair order, then go to next step.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins availability.
• Is any related repair information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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?</td><td>Yes</td><td>Go to appropriate DTC inspection.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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.</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Retighten fuel-filler cap or replace it if it is damaged.
Then go to Step 27.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">INSPECT PURGE SOLENOID VALVE STUCK
• Inspect purge solenoid valve
(See 01–16–12 PURGE SOLENOID VALVE INSPECTION.)
• Is purge solenoid valve okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace purge solenoid valve, then go to Step 27.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT CDCV STUCK
• Inspect CDCV.
(See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.)
• Is CDCV okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace CDCV, then go to Step 27.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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)?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">VERIFY REPAIR SHOP CONDITION
• Is repair shop possible to perform Drive Mode 4?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go to Step 16.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

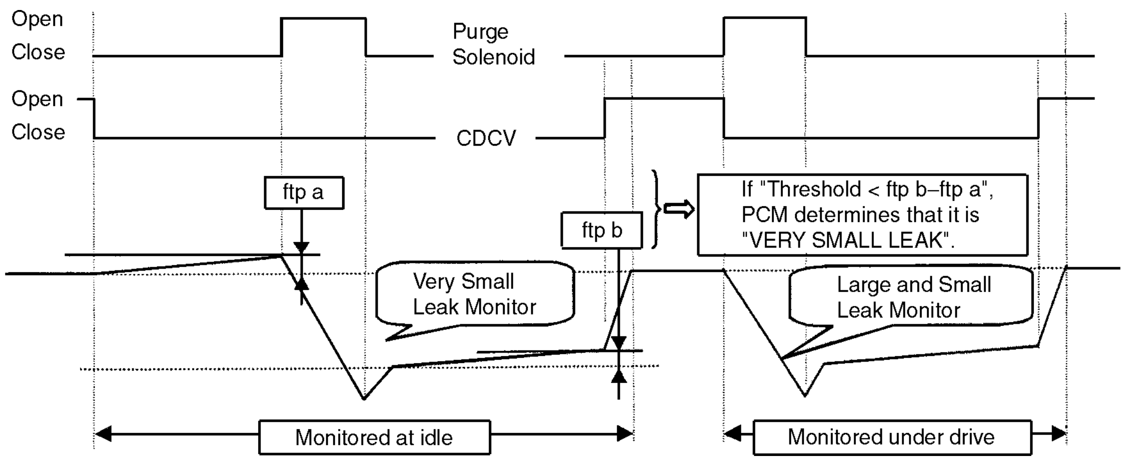
STEP	INSPECTION		ACTION
10	**MONITOR EVAP SYSTEM BY DRIVE MODE 4** • Clear DTC from memory using WDS or equivalent. • Run OBD-II Drive Mode 4 and verify that CDCV and FTP graphs. (See 01–02B–12 Mode 4 (EVAP system repair verification drive mode).) • Is there any problem detected?	Yes	FTP does not change: • 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

<table>
<tr><th>DTC P0456</th><th>Evaporative emission control system leak detected (very small leak)</th></tr>
<tr><td>DETECTION CONDITION</td><td>
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.
</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>

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
</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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)?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Intermittent concern existing. Inspect purge solenoid valve and CDCV circuit for intermittent concern.
(See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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?</td><td>Yes</td><td>Repair leakage or replace part, then go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace purge solenoid valve, then go to Step 10.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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)?</td><td>Yes</td><td>Go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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)?</td><td>Yes</td><td>Replace CDCV, then go to Step 11.</td></tr>
<tr><td>No</td><td>Go to Step 11.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">INSPECT FUEL PUMP UNIT INSTALLATION
• Remove fuel tank.
• Visually inspect for damage, insufficient sealing or poorly installed fuel pump unit.
• Is it okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace fuel tank or sealing, then go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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)?</td><td>Yes</td><td>Leakage still exists. Locate leak point and repair.
Then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">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?</td><td>Yes</td><td>Cool down engine with fan or adjust fuel level, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

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

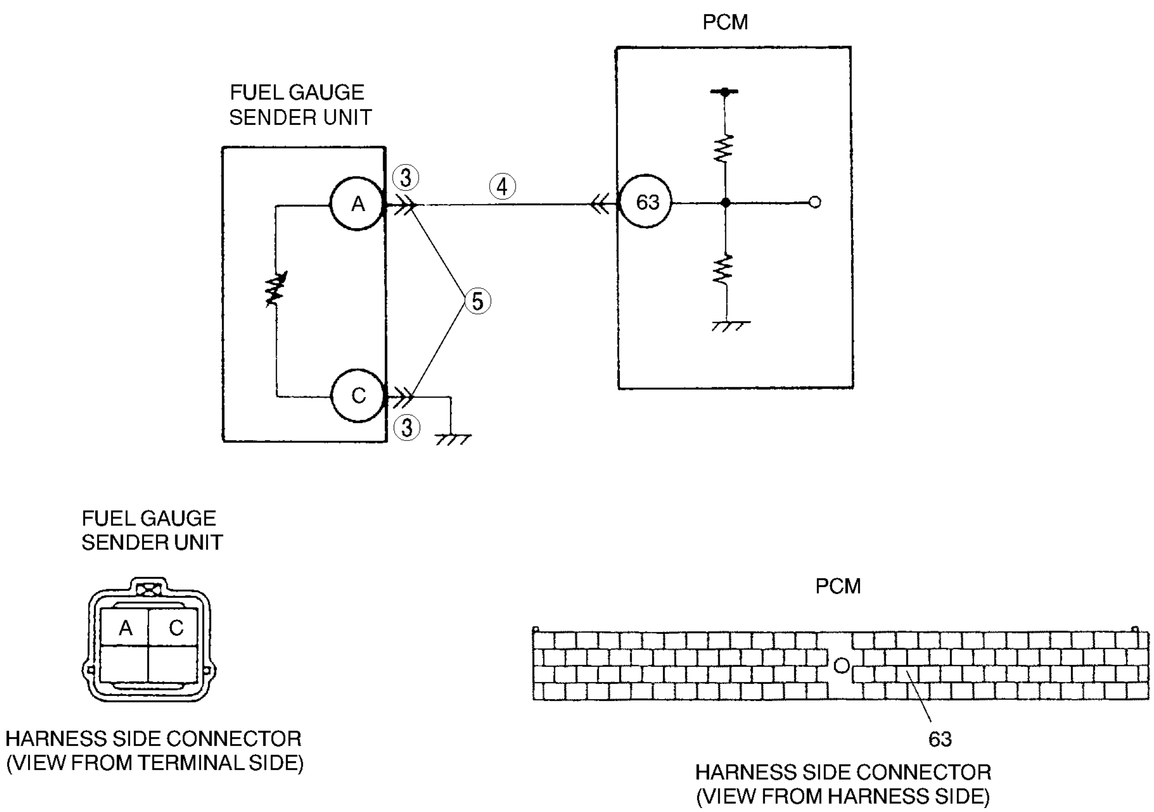
Diagnostic procedure

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



Diagnostic procedure

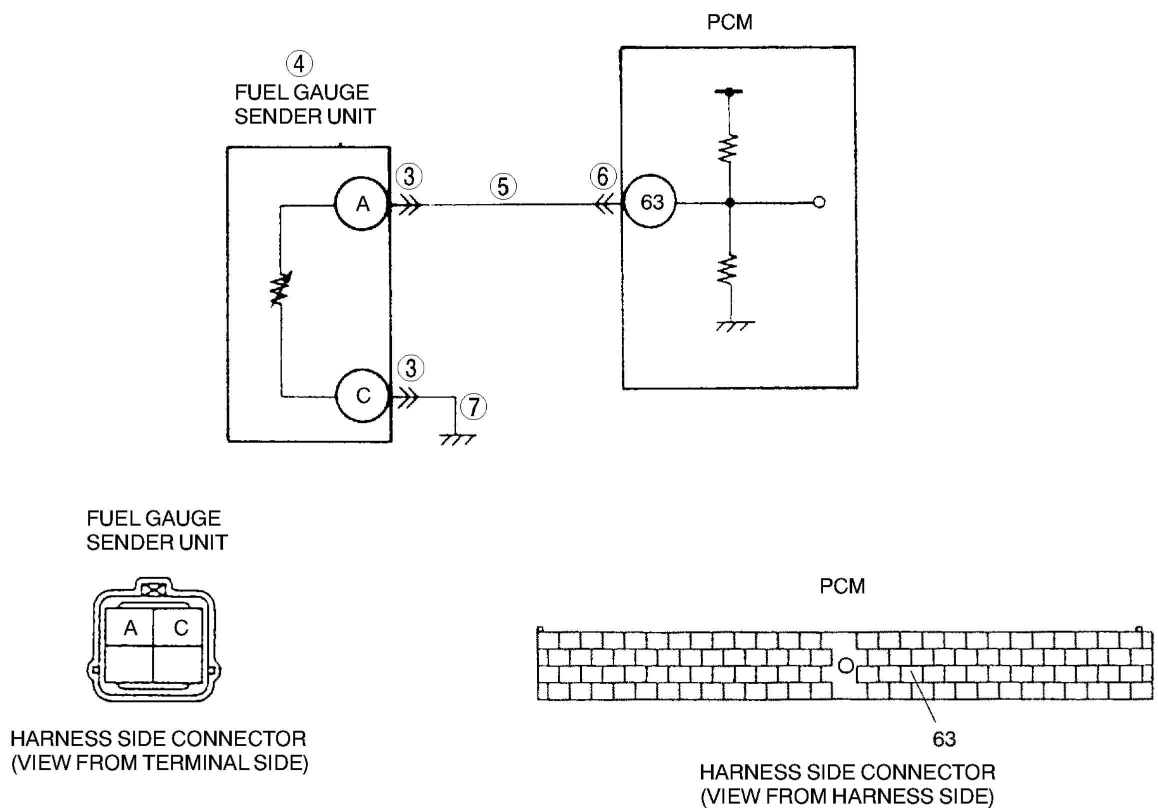
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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



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

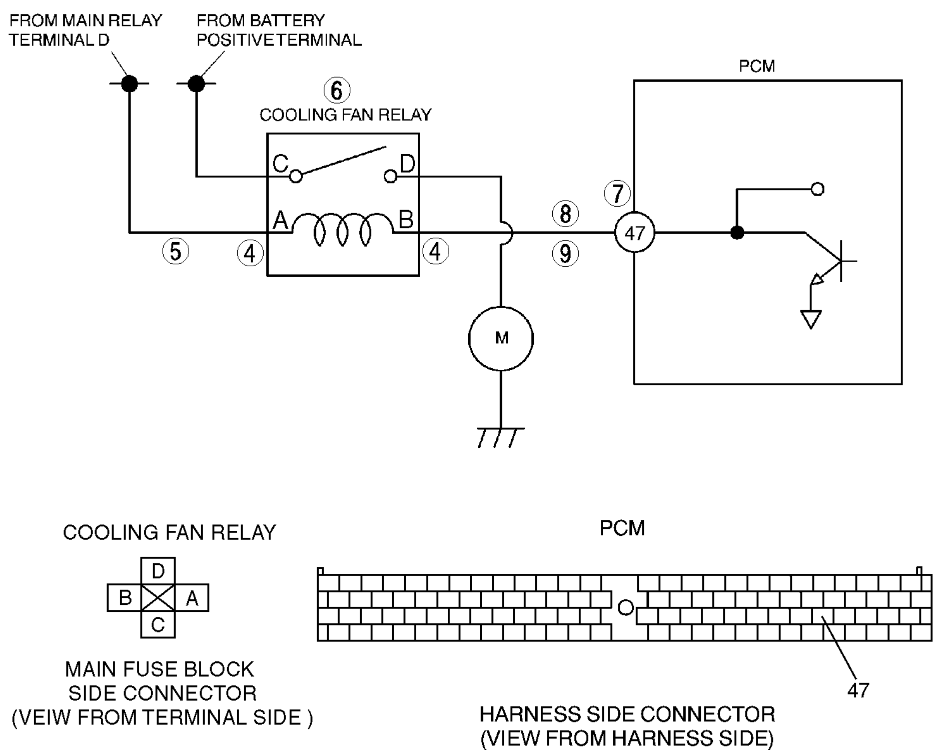
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

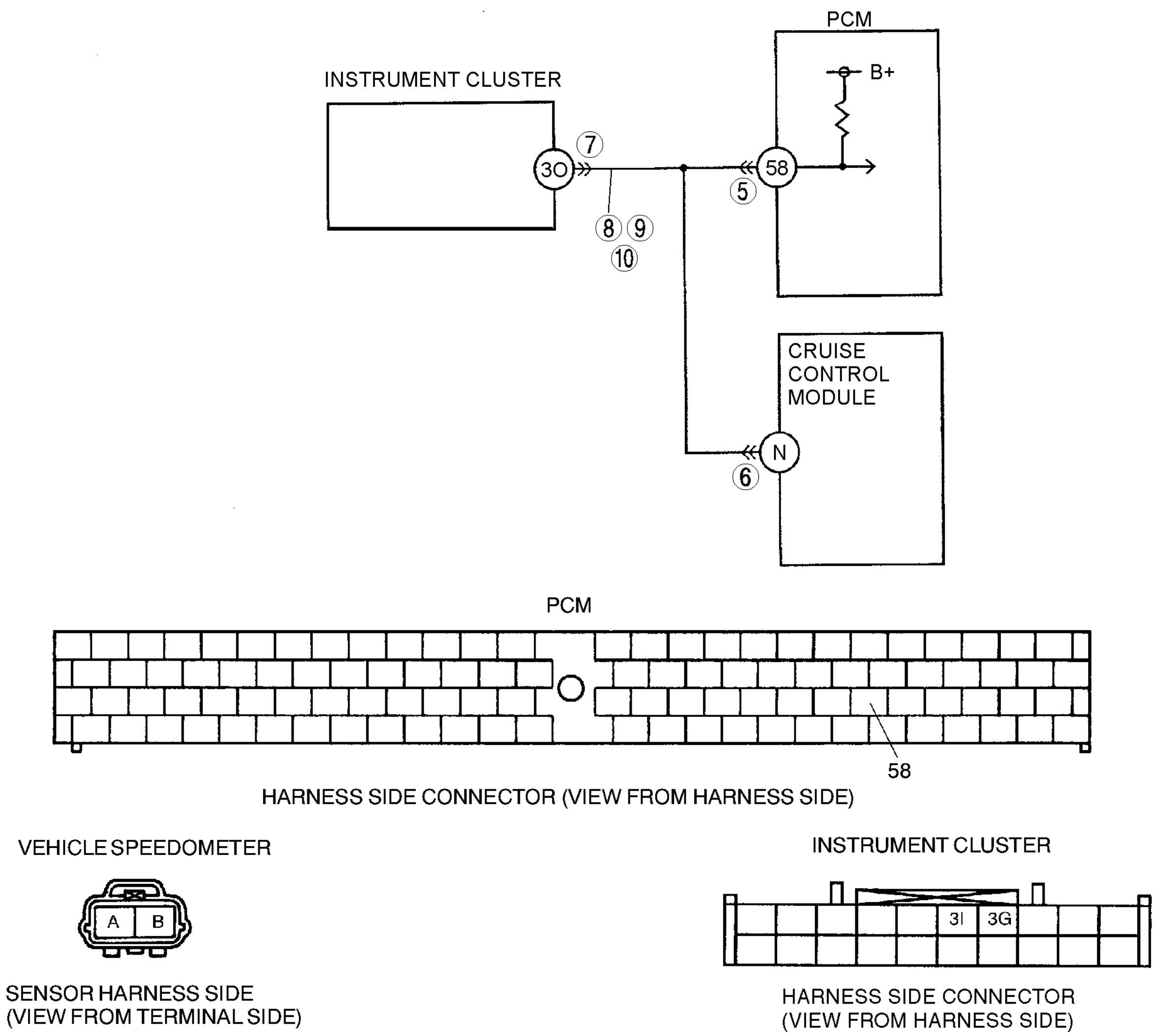
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th colspan="2">ACTION</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">VERIFY RELATED REPAIR INFORMATION AVAILABILITY
• Check for related Service Bulletins and/or on - line repair information availability.
• Is any Service Information available?</td><td>Yes</td><td>Perform repair or diagnosis according to available repair Information.
• If vehicle is not repaired, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN
• Start engine.
• Operate A/C to operate cooling fan relay.
• Is same of DTC present?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Refer to intermittent concern.
(See 01–03B–4 INTERMITTENT CONCERN TROUBLESHOOTING [FS].)</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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?</td><td>Yes</td><td>Repair or replace terminals, go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">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+?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness, go to Step 10.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">INSPECT COOLING FAN RELAY
• Inspect cooling fan relay.
• Is cooling fan relay okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace cooling fan relay, go to Step 10.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">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?</td><td>Yes</td><td>Repair terminal, go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">INSPECT CONTROL CIRCUIT FOR SHORT
• Check for continuity between cooling fan relay terminal B (harness-side) and body GND.
• Is there continuity?</td><td>Yes</td><td>Repair or replace harness for short to GND, go to Step 10.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace harness for open, go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">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?</td><td>Yes</td><td>Replace PCM, go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">VERIFY AFTER REPAIR PROCEDURE
• Perform “After Repair Procedure”.
(See 01–02B–9 AFTER REPAIR PROCEDURE [FS].)
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.
(See 01–02B–15 DTC TABLE [FS].)</td></tr>
<tr><td>No</td><td>Troubleshooting completed.</td></tr>
</table>

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



Diagnostic procedure

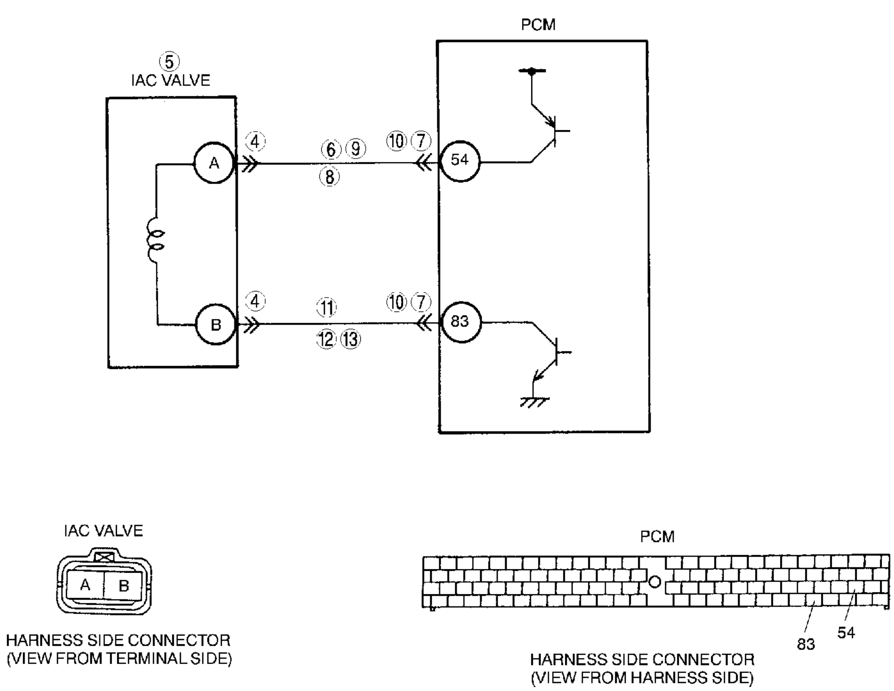
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins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

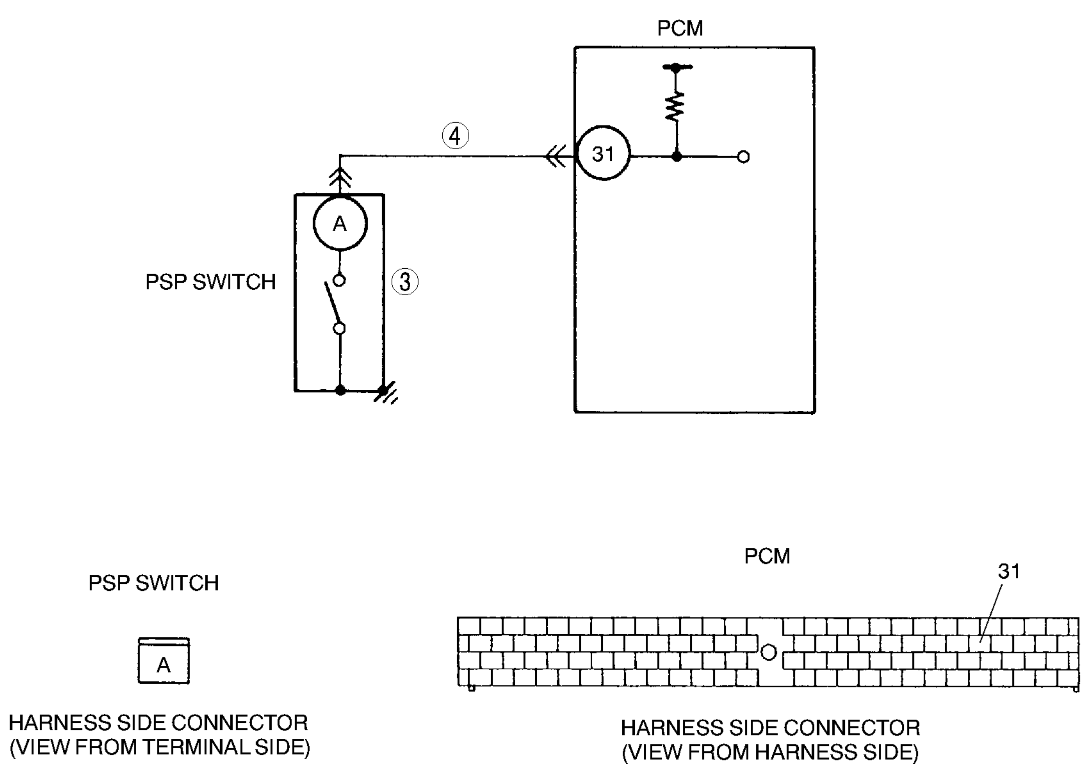
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

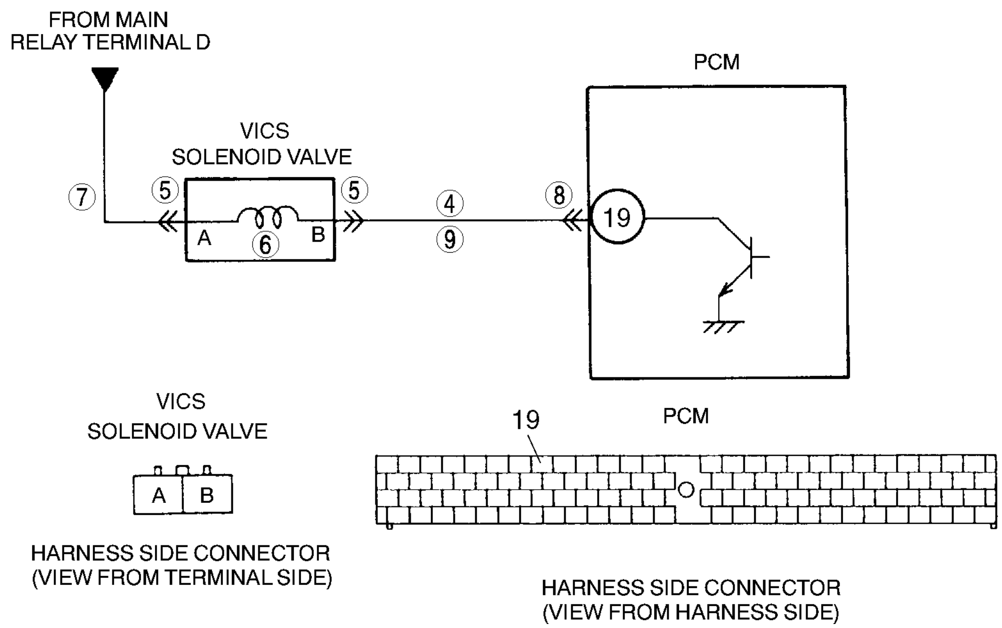
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

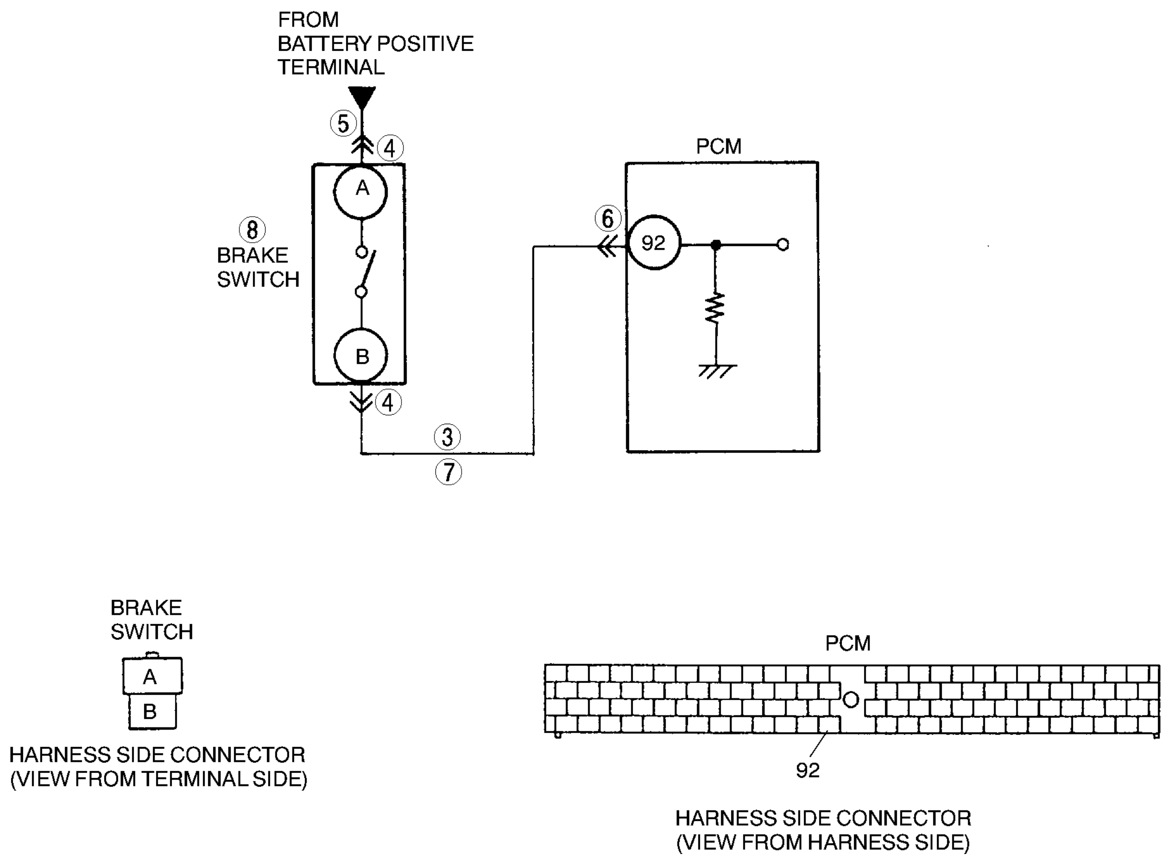
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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.

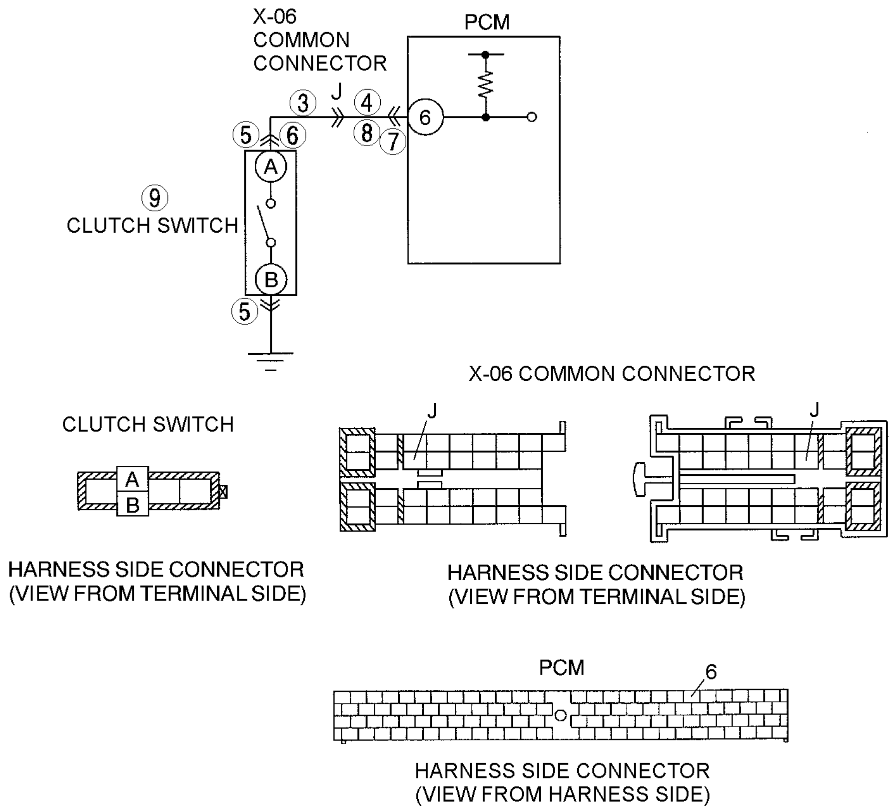
STEP	INSPECTION		ACTION
4	**INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION** • Turn ignition switch to OFF. • Disconnect brake switch connector. • Check for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 9.
		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.

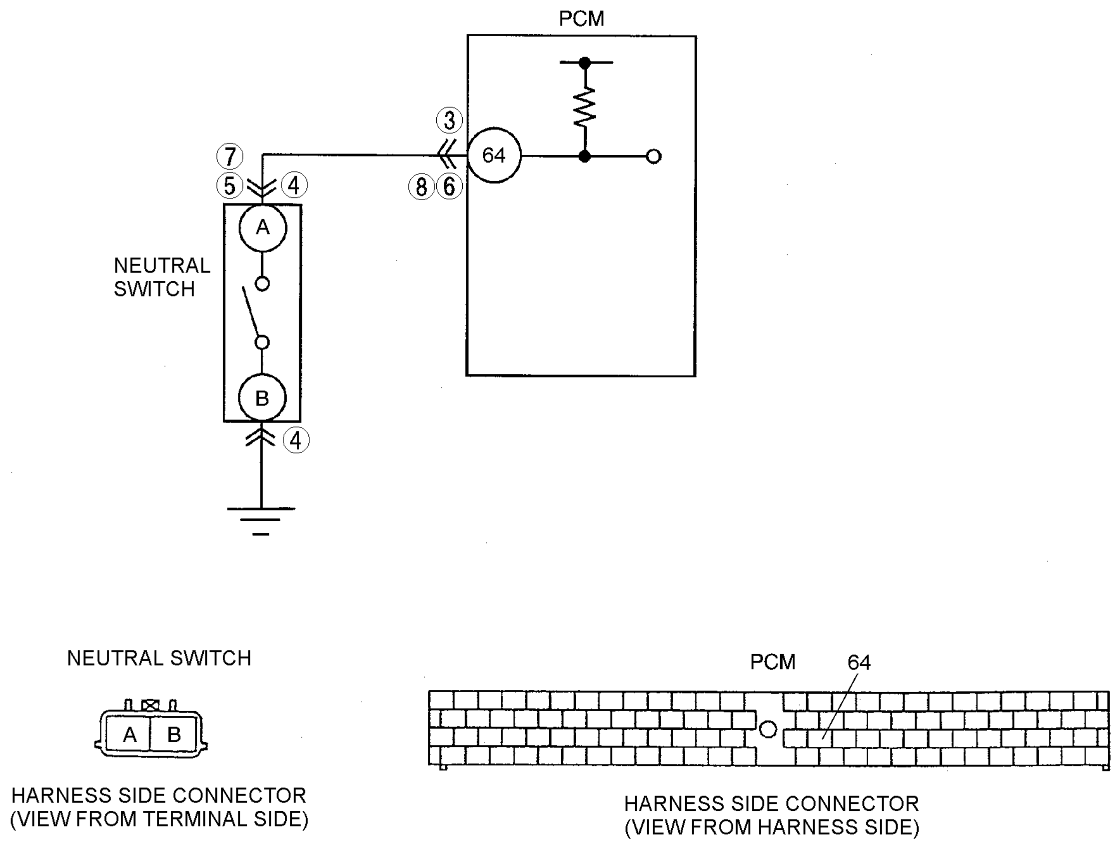
STEP	INSPECTION		ACTION
6	**INSPECT CLUTCH SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Measure voltage between clutch switch terminal A and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or 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.

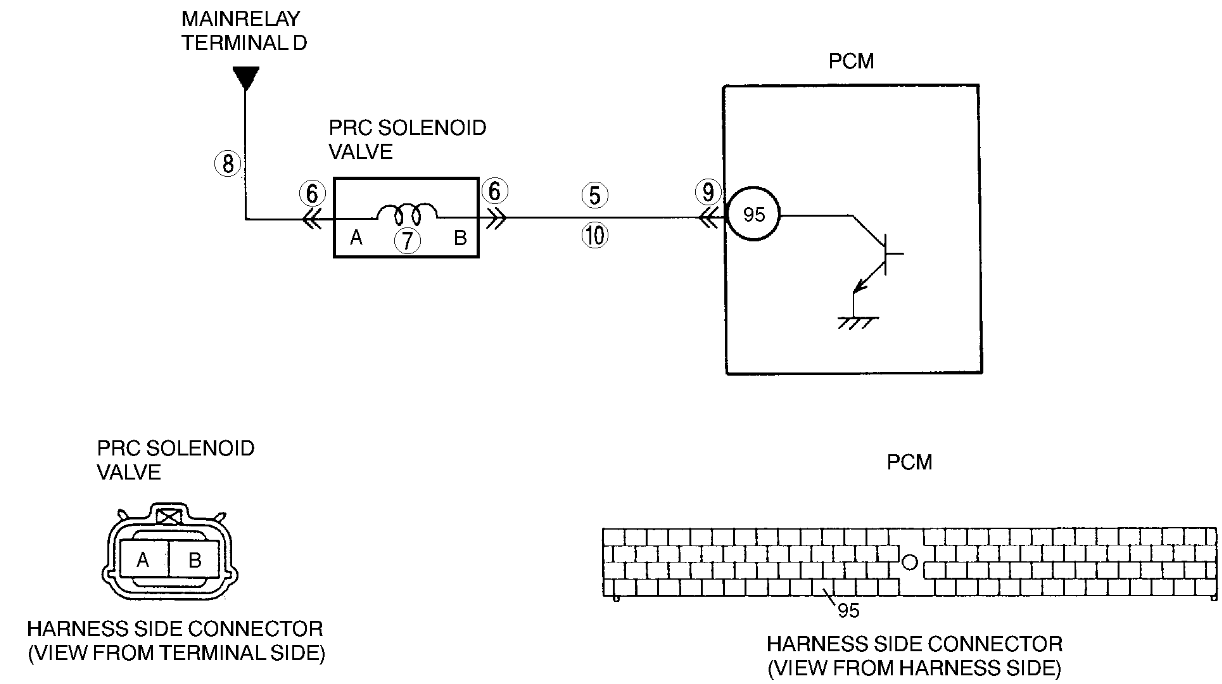
STEP	INSPECTION		ACTION
5	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (engine OFF). • Measure voltage between neutral switch terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		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.

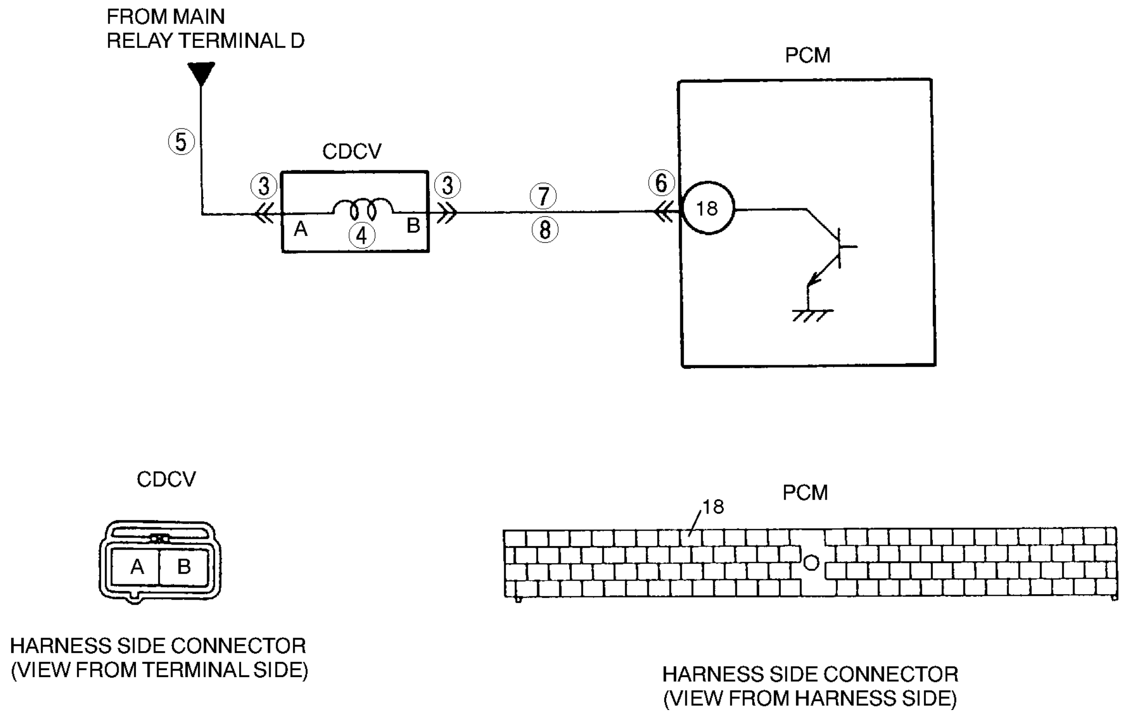
STEP	INSPECTION		ACTION
6	**INSPECT PRC SOLENOID VALVE CONNECTOR FOR POOR CONNECTION** • Turn ignition key to OFF. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace terminal, then go to Step 11.
		No	Go to next step.
7	**INSPECT PRC 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

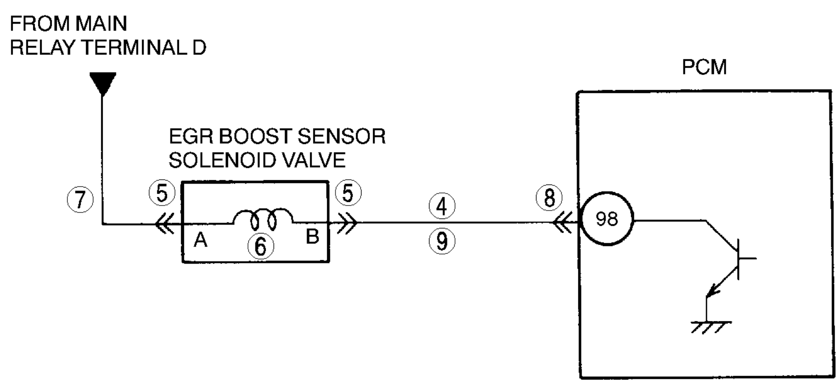
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

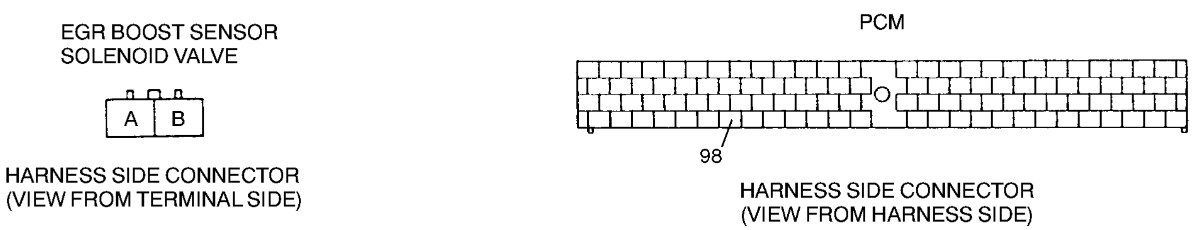
STEP	INSPECTION		ACTION
4	**INSPECT FOR OPERATION SOUND OF CDCV** • Perform CDCV inspection. (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.) • Is CDCV okay?	Yes	Go to next step.
		No	Replace it if necessary, then go to Step 9.
5	**INSPECT PURGE SOLENOID VALVE** • Disconnect vacuum hose that 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

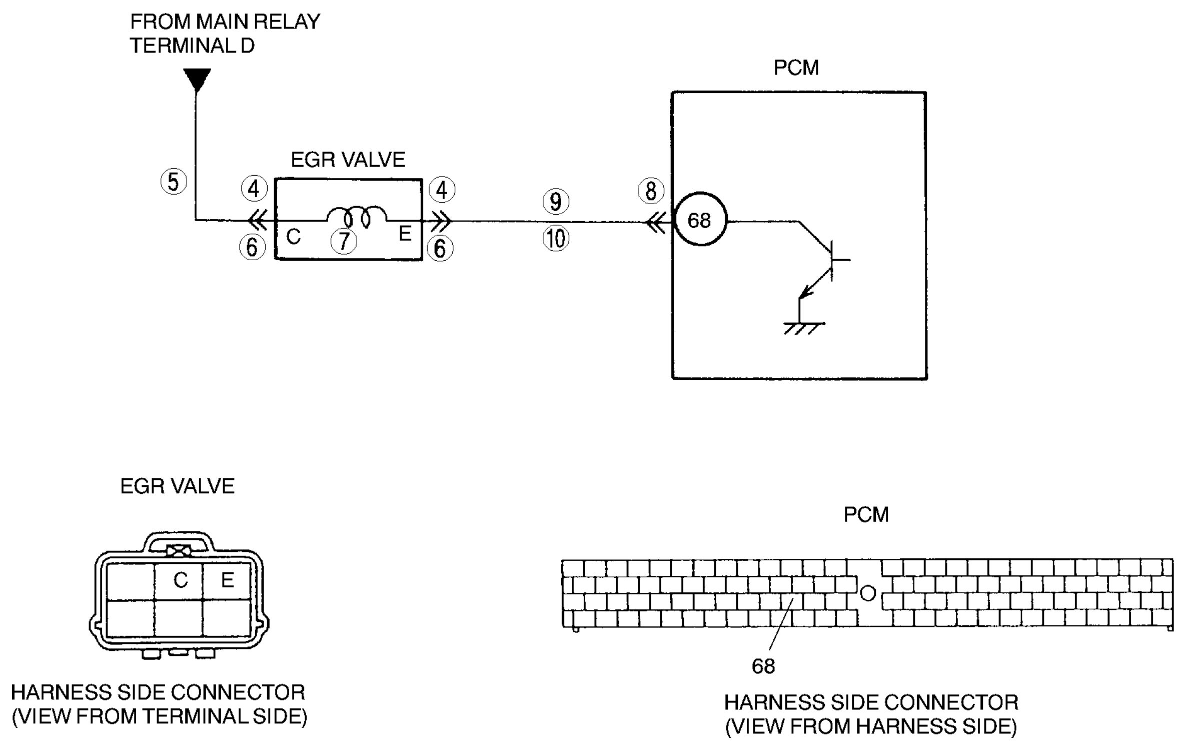
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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

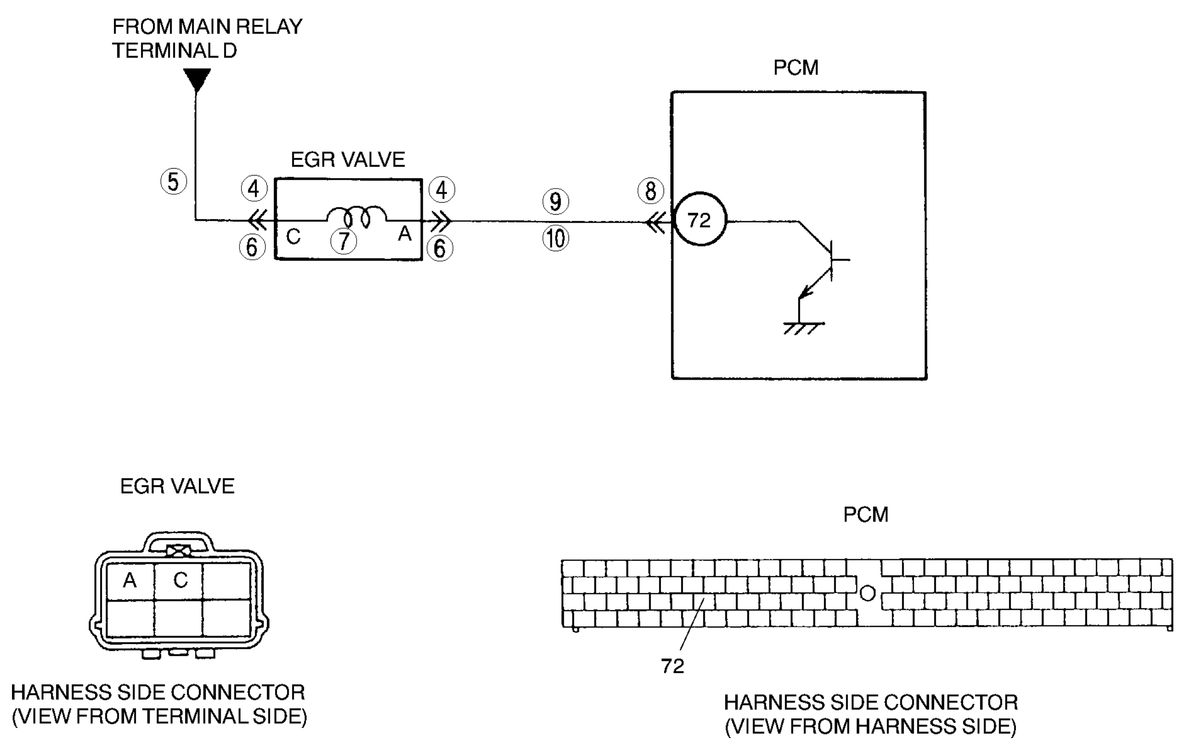
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to 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



Diagnostic procedure

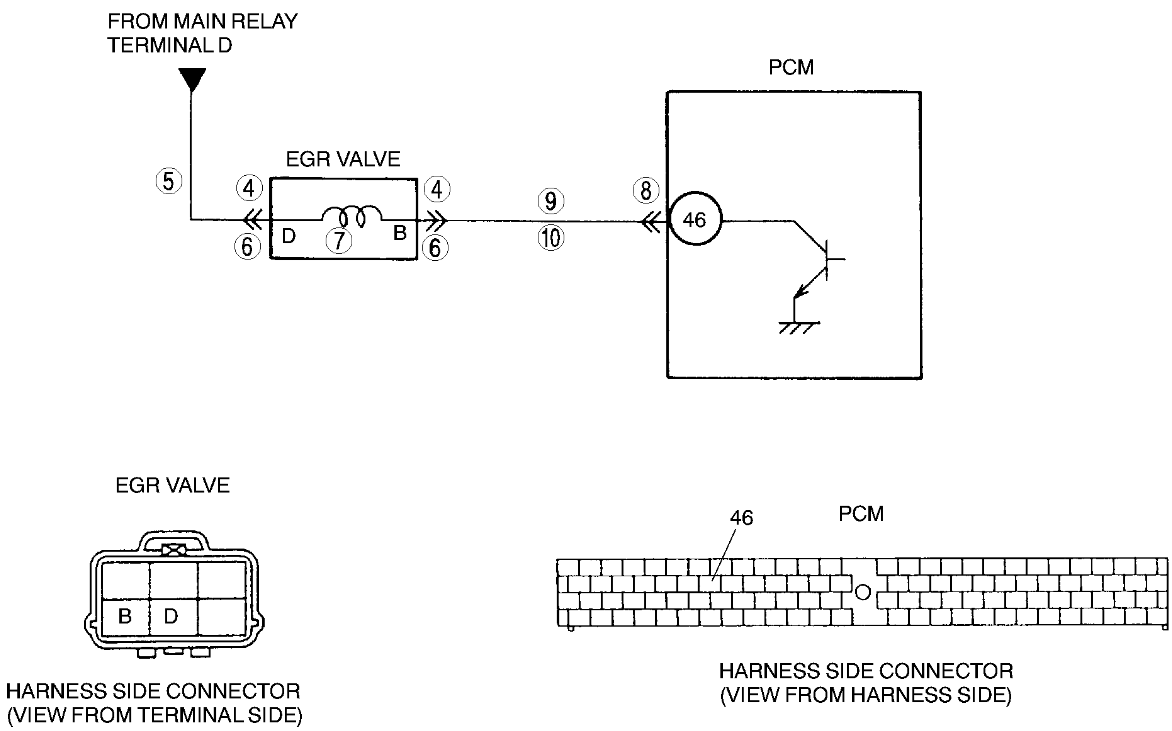
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to 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.

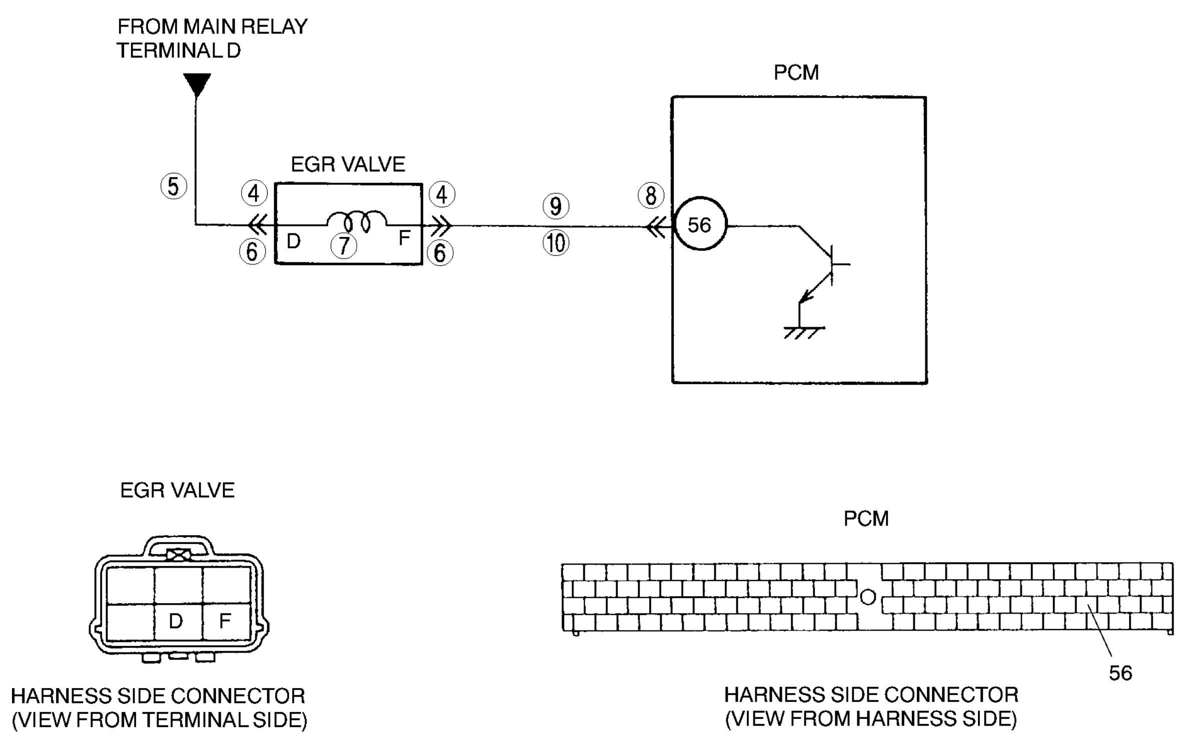
01–02B

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

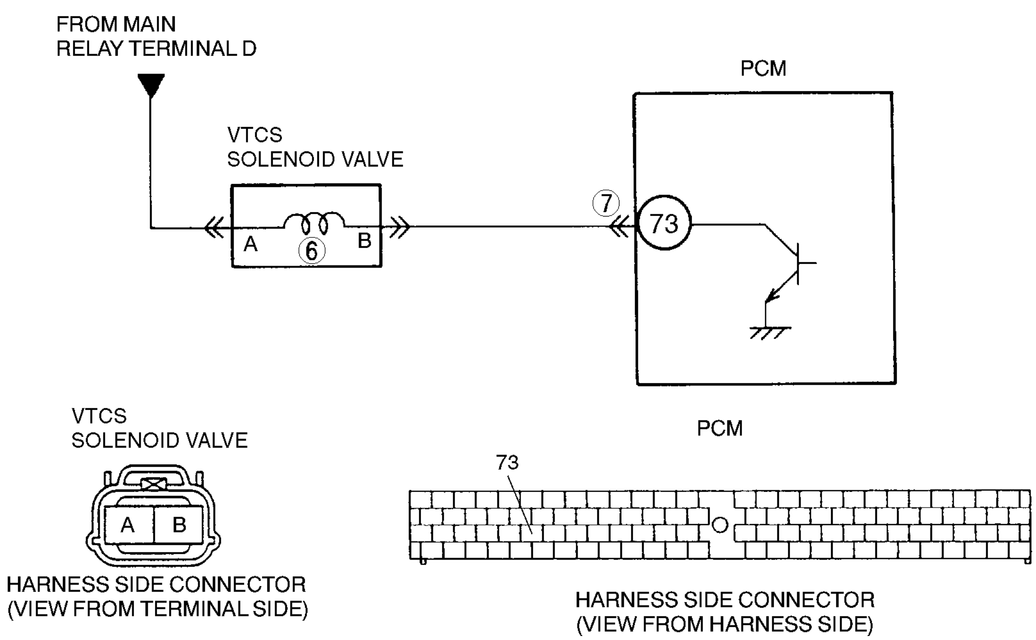
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to 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.

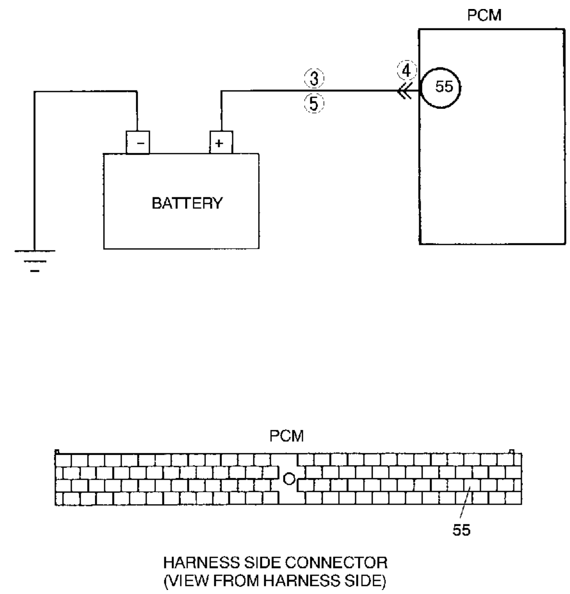
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Verify that following conditions are met. — ECT: **at 20 °C {68 °F}** • Drive vehicle under following conditions: — Engine speed: **above 3,000 rpm** — MAF: **below 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



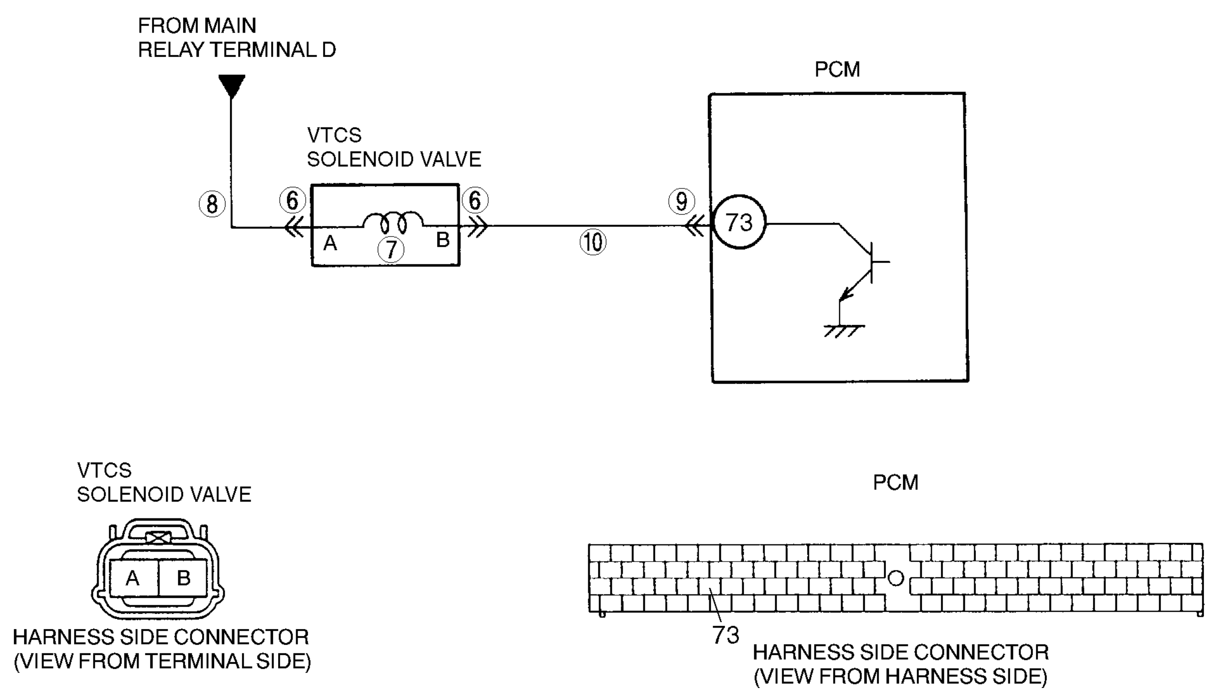
Diagnostic procedure

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

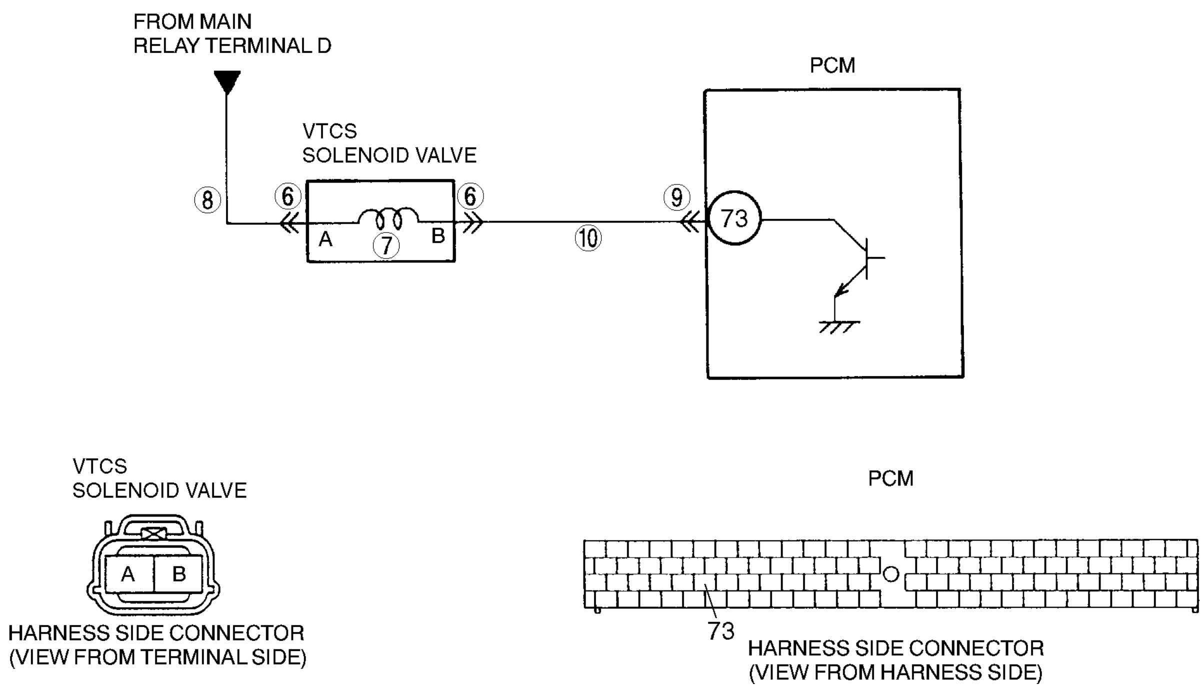
STEP	INSPECTION		ACTION
1	**CHECK FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability.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

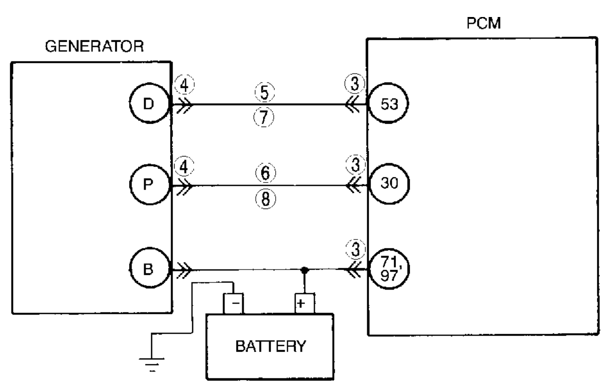
STEP	INSPECTION		ACTION
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **below 3,250 rpm**. — Engine coolant temperature is **below 65°C {149 °F}**. — Throttle 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.

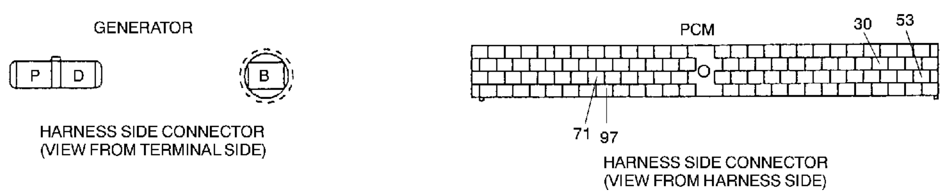
STEP	INSPECTION		ACTION
11	**VERIFY TROUBLESHOOTING OF DTC P1570 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using WDS or equipment. • Start engine. • Drive vehicle under following conditions: — Engine speed is **above 3,250 rpm**. — Engine coolant temperature 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





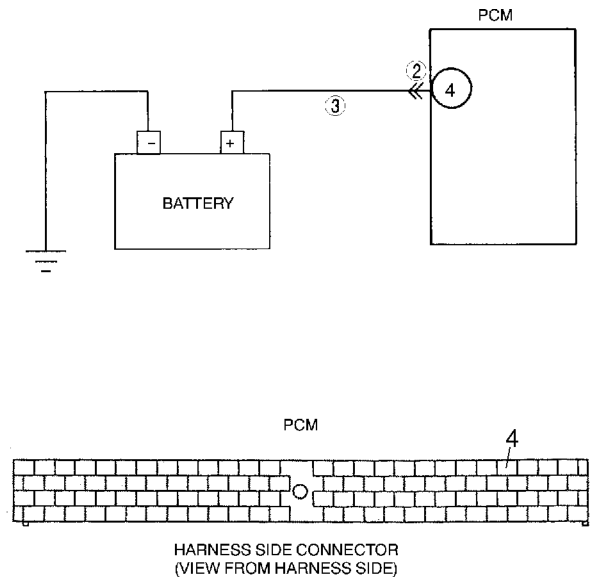
Diagnostic procedure

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



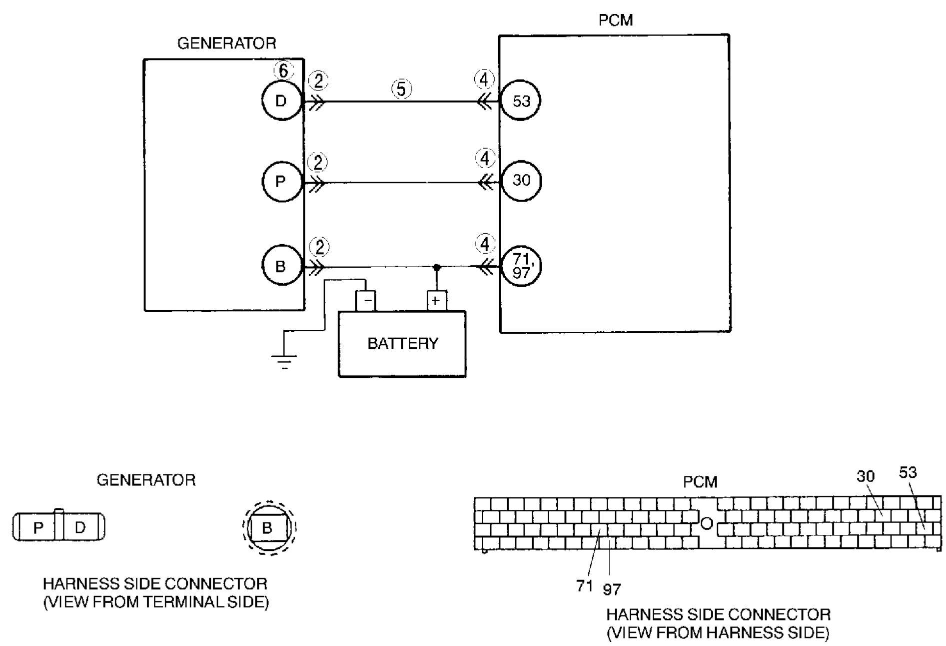
Diagnostic procedure

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

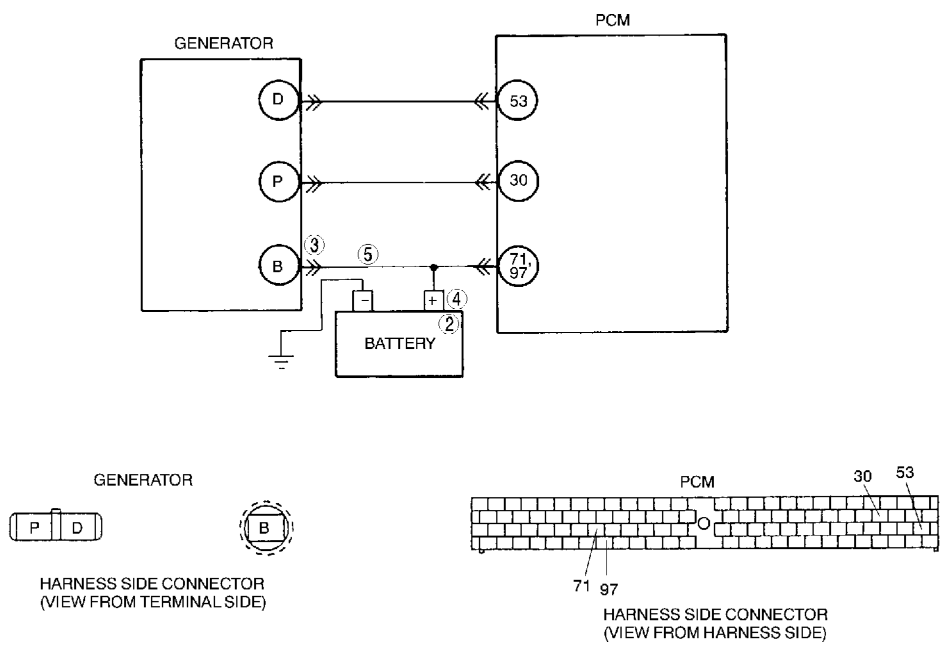
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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

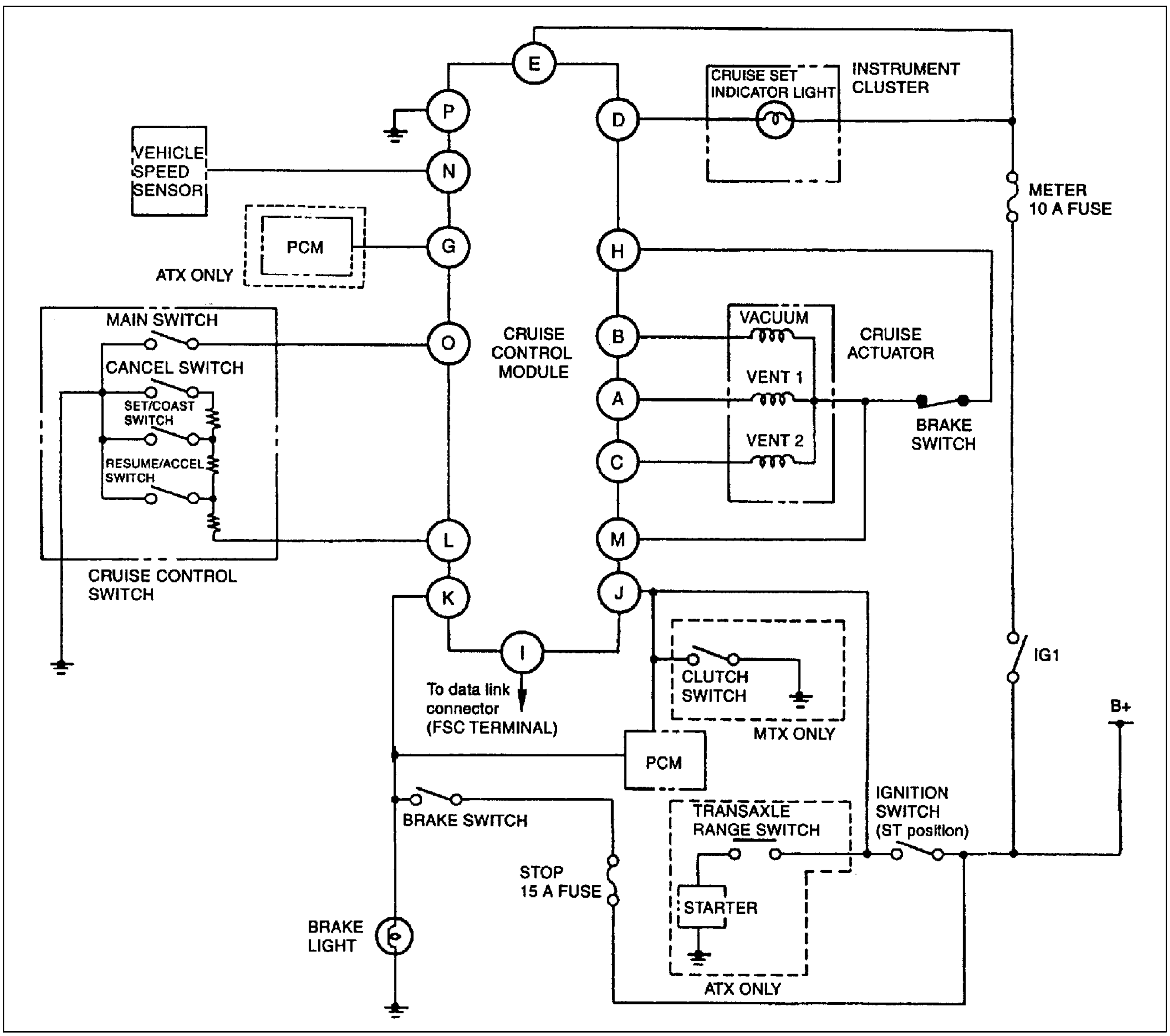
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	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]

01–02C

CRUISE CONTROL SYSTEM WIRING DIAGRAM

A3U010266350W01



A3U102WY01

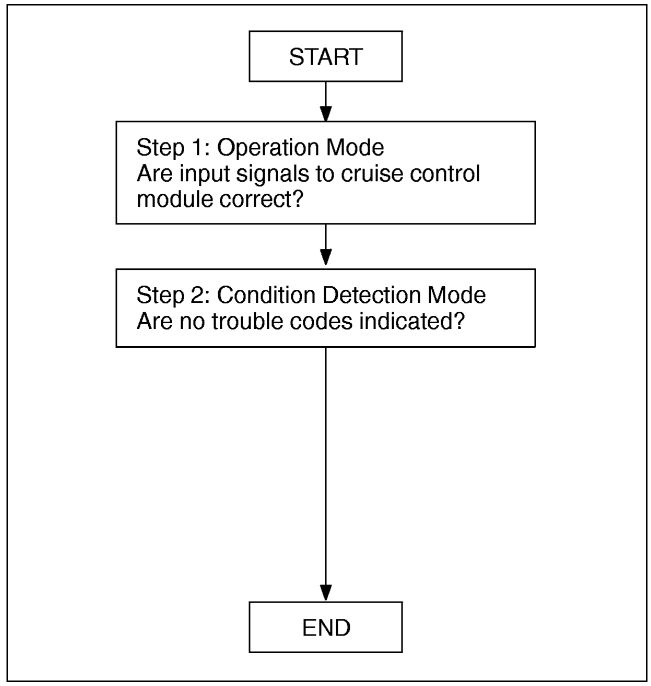
FOREWORD

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

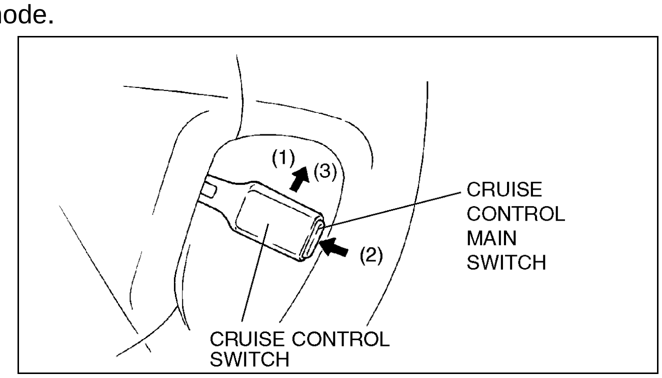
A3U010266350W03

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.

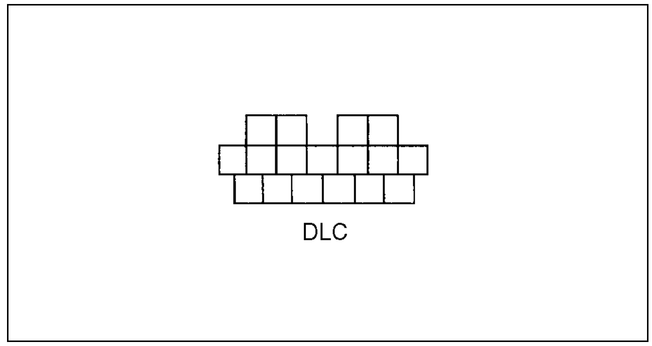


Y3U102WYA

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

01–02C

Operation Code List

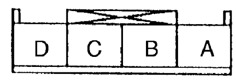
<table>
<tr><th colspan="2">Operation</th><th>DTC</th><th>Output pattern</th><th colspan="2">Diagnosed circuit</th></tr>
<tr><td colspan="2">Turn SET/COAST switch on</td><td>21</td><td></td><td colspan="2">Cruise control switch (SET/COAST switch)</td></tr>
<tr><td colspan="2">Turn RESUME/ACCEL switch on</td><td>22</td><td></td><td colspan="2">Cruise control switch (RESUME/ACCEL switch)</td></tr>
<tr><td colspan="2">Depress brake pedal</td><td>31</td><td></td><td colspan="2">Brake switch</td></tr>
<tr><td>ATX</td><td>Shift selector lever to P or N range</td><td rowspan="2">35</td><td rowspan="2"></td><td>ATX</td><td>Transaxle range switch</td></tr>
<tr><td>MTX</td><td>Depress clutch pedal</td><td>MTX</td><td>Clutch switch</td></tr>
<tr><td colspan="2">Drive vehicle above 40 km/h {25 mph}</td><td>37</td><td></td><td colspan="2">Vehicle speed sensor</td></tr>
</table>

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

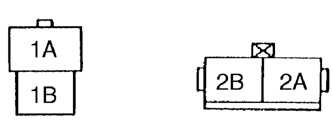
ACTION
Replace cruise control module. (See 01–20–2 CRUISE CONTROL MODULE REMOVAL/INSTALLATION)

DTC 31

A3U010266350W06

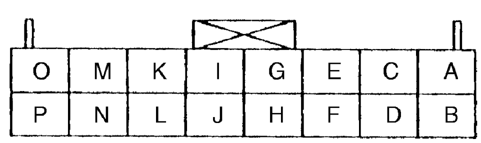
DTC 31	Brake switch
DETECTION CONDITION	• Voltage detected at terminal K is not **approximately 12 V** or voltage detected at terminal M is not **approximately 0 V**.
POSSIBLE CAUSE	• Burnt STOP 15 A fuse • Cruise control module malfunction • Brake switch malfunction • Open circuit in wiring harness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

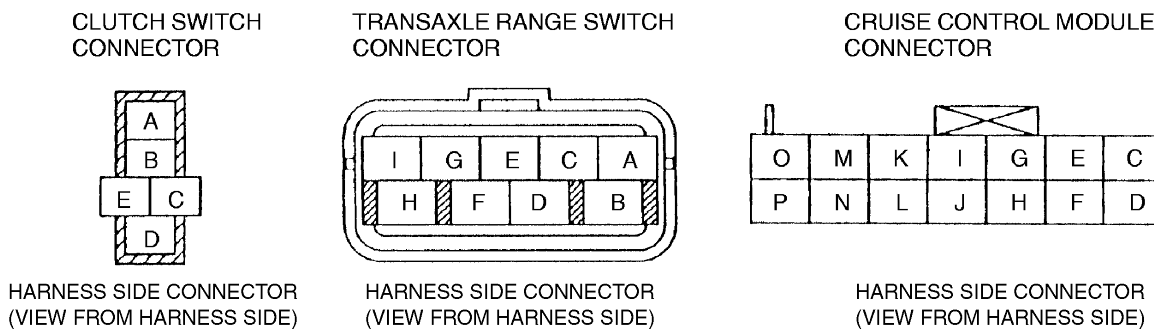
Diagnostic procedure

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



Diagnostic procedure

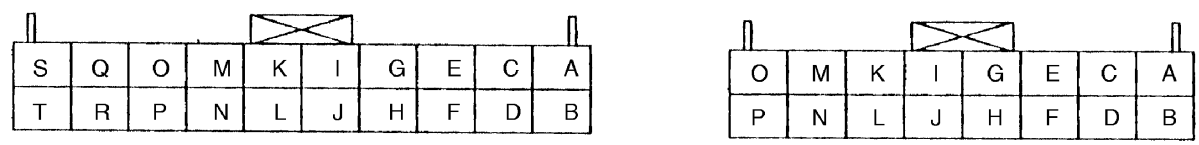
STEP	INSPECTION		ACTION
1	• Does vehicle has MTX?	Yes	Go to next step.
		No	Go to Step 6.
2	• Inspect clutch switch. (See 01–40A–41 CLUTCH SWITCH INSPECTION [ZM]) (See 01–40B–42 CLUTCH SWITCH INSPECTION [FS]) • Is clutch switch okay?	Yes	Go to next step.
		No	Replace clutch switch. (See 05–10–5 CLUTCH 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



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

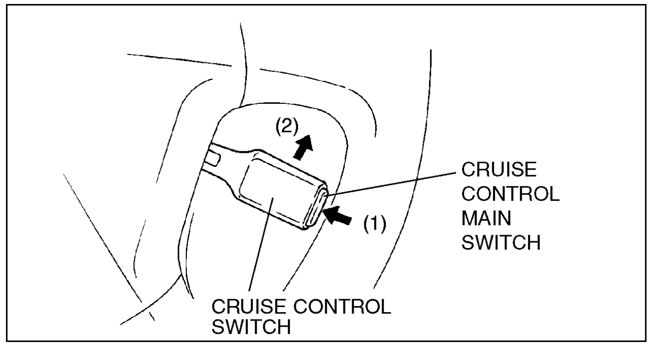
A3U010266350W09

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.

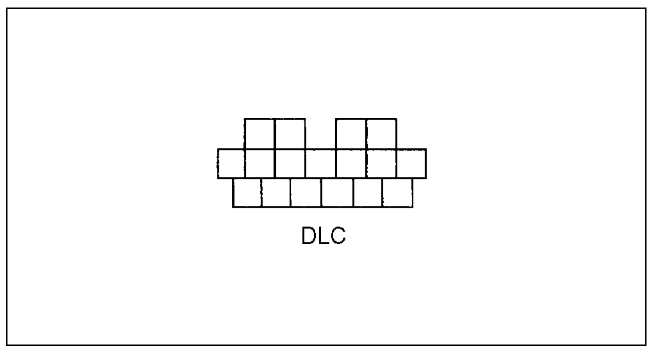


Y3U102WYB

Using The SST (WDS or equivalent)

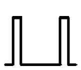
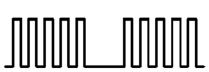
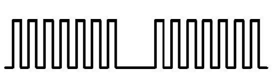
DTCs retrieving procedure

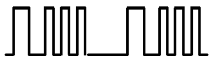
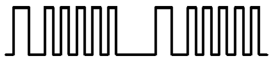
1. Hook-up the **SST** to the vehicle. Make sure that ignition key is at LOCK and all accessories are OFF.
2. Turn the ignition key to ON (engine OFF).
3. Retrieve any DTCs by WDS or equivalent.



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

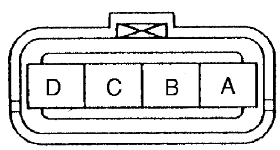
Note
- When two or more DTCs are indicated, inspect the malfunction with the smallest number first.

DTC 01

A3U010266350W10

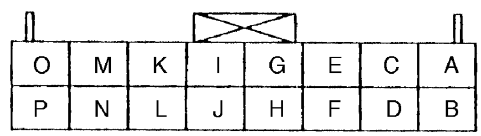
DTC 01	Cruise actuator
DETECTION CONDITION	• Voltages detected at terminal A, B or C are not **approximately 12 V**.
POSSIBLE CAUSE	• Cruise control module malfunction • Cruise actuator malfunction • Open circuit in wiring harness between cruise control module and cruise actuator • Open circuit in wiring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

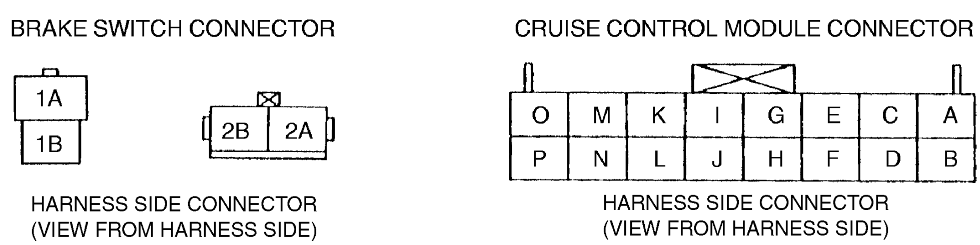
Diagnostic procedure

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



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				×			

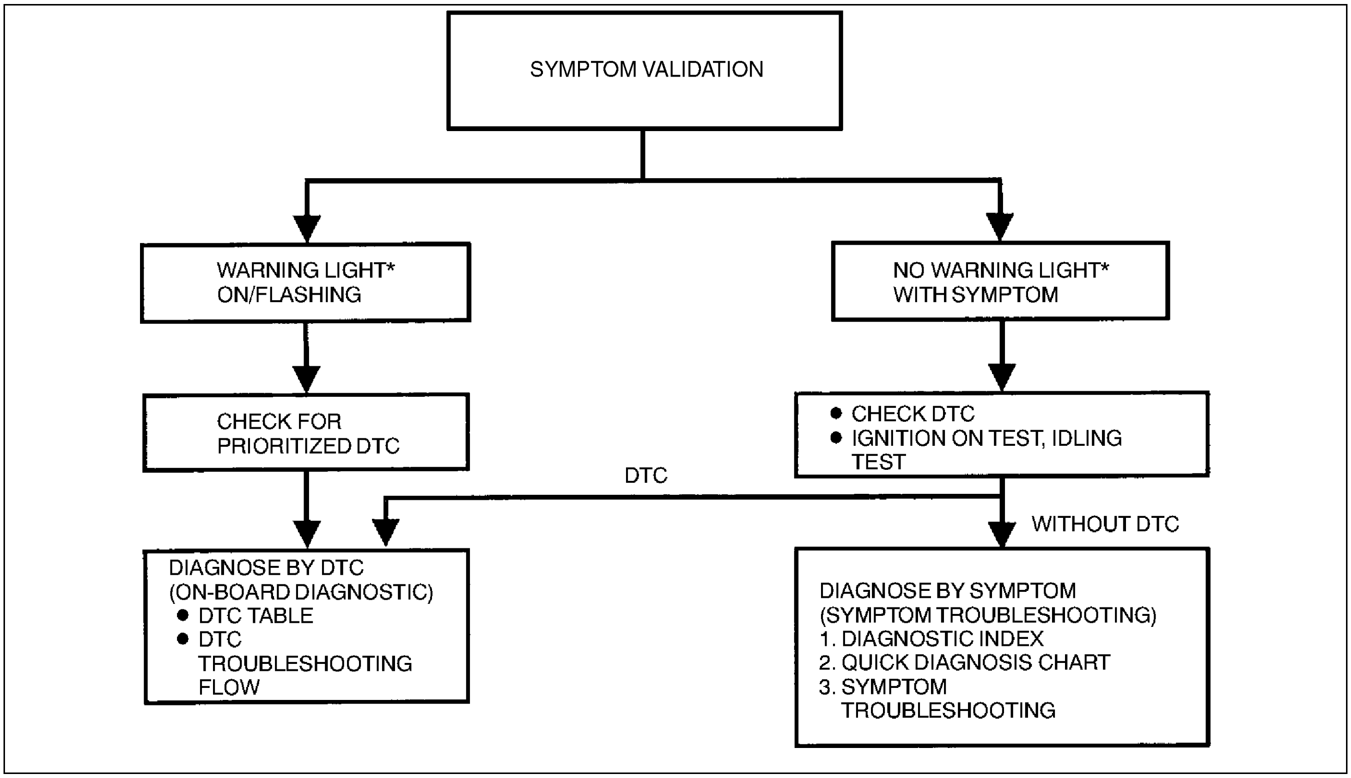
Y3U103WA6

01–03A

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

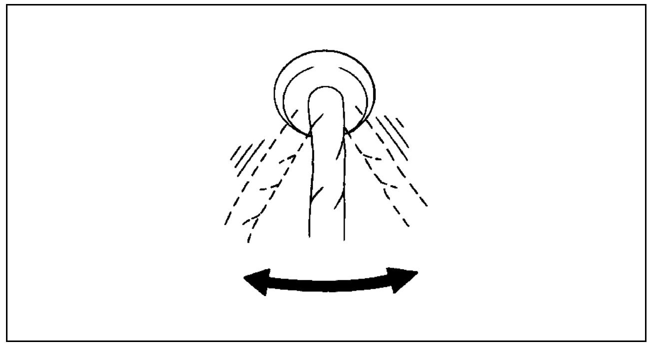
- There are several reasons vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
  — Connectors not fully seated.
  — Wire harnesses not having full play.
  — Wires laying across brackets or moving parts.
  — Wires routed too close to hot parts.
- An 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.



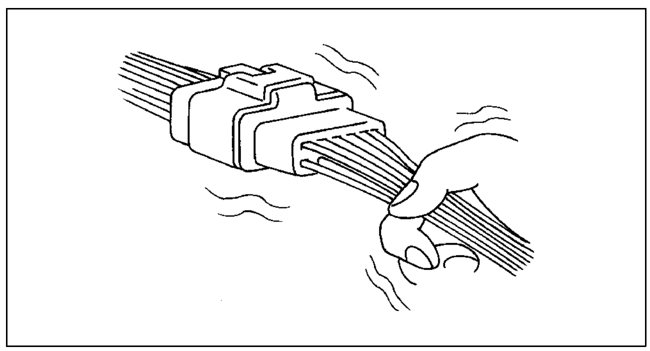
YMU103WC0

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.

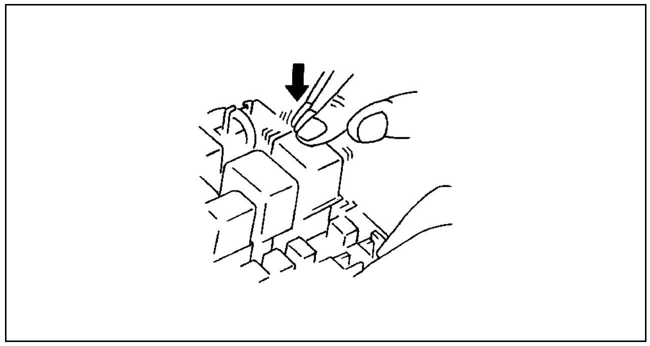
Inspection Method for Actuators or Relays

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

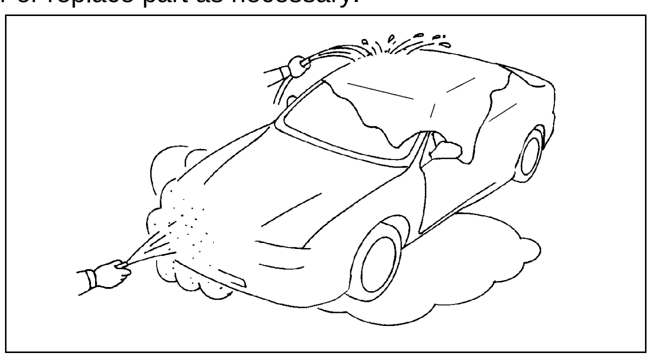
If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

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No.	Troubleshooting item		Starter motor malfunction(Mechanical or electrical)	Starter circuit including ignition switch open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Drive plate or flywheel 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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No.	Troubleshooting item		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																

Y3U103WA1

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No.	Troubleshooting item		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

No.	Troubleshooting item		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																	

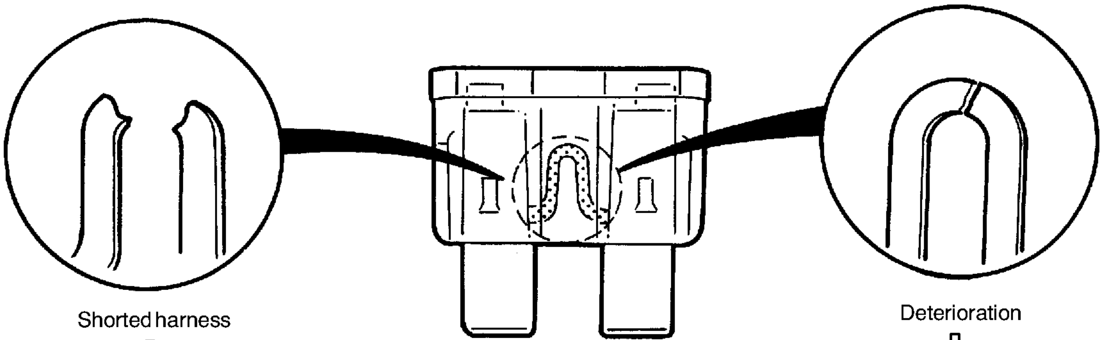
Y3U103WA3

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Connect WDS or equivalent to DLC-2.
• Turn ignition switch on.
• Retrieve any DTC.
• Is “DTC” displayed?</td><td>Yes</td><td>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</td></tr>
<tr><td>No</td><td>No DTC is displayed:
• Inspect following:
— START circuit in ignition switch
— Open circuit between ignition switch and starter
— Starter interlock switch (MTX)</td></tr>
<tr><td>7</td><td colspan="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.</td></tr>
</table>

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

A3U010318881W46

<table>
<tr><th>4</th><th>Hard to start/long crank/erratic start/erratic crank</th></tr>
<tr><td>DESCRIPTION</td><td>• Starter cranks engine at normal speed but engine requires excessive cranking time before start.
• Battery is in normal condition.</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>• 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)</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">• 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.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect pressure regulator diaphragm condition.
• If condition is okay, inspect fuel injector.
• If condition is not okay, replace pressure regulator.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">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.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>• 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</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">• 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?</td><td>Yes</td><td>Inspect if purge solenoid valve sticks open.
Inspect evaporative emission control system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">• Is air leakage felt or heard at intake-air system components while racing engine to higher speed?</td><td>Yes</td><td>Repair or replace.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">18</td><td rowspan="2">• Inspect engine condition while tapping EGR valve housing.
• Does engine condition improve?</td><td>Yes</td><td>Replace EGR valve.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">• Is engine compression correct?</td><td>Yes</td><td>Inspect valve timing.</td></tr>
<tr><td>No</td><td>Inspect for cause.</td></tr>
<tr><td>20</td><td colspan="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.</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">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.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• 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?</td><td>Yes</td><td>Inspect power steering pressure switch operation and wiring harness between power steering pressure switch connector and PCM connector terminal 31.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Visually inspect CKP sensor and teeth of crankshaft pulley.
• Are CKP sensor and teeth of crankshaft pulley okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Adjust CKP sensor.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• Inspect for cracks on high-tension leads.
• Are there any cracks on high-tension leads?</td><td>Yes</td><td>Repair suspected high-tension leads.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• Inspect spark plug conditions.
• Is spark plug wet, covered with carbon or grayish white?</td><td>Yes</td><td>Spark plug is wet or covered with carbon:
• Inspect for fuel leakage from injector.

Spark plug is grayish white:
• Inspect for clogged fuel injector.</td></tr>
<tr><td>No</td><td>Install spark plugs on original cylinders.
Go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• Start engine and disconnect IAC valve connector.
• Does rpm drop or engine stall?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect IAC valve and wiring harness.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">• 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.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect pressure regulator diaphragm condition.
• If condition is okay, inspect fuel injector.
• If condition is not okay, replace pressure regulator.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• 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%?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Inspect following:
• High-tension leads
• Ignition coil and connector</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Inspect tumble swirl control system operation.
(See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.)
• Does tumble swirl control system work properly?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• Remove and shake PCV valve.
• Does PCV valve rattle?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace PCV valve.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• Is there any restriction in exhaust system?</td><td>Yes</td><td>Inspect exhaust system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• Is brake system functioning properly?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect for cause.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• Inspect for contaminated MAF sensor.
• Is there any contamination?</td><td>Yes</td><td>Replace MAF sensor.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• Is engine compression correct?</td><td>Yes</td><td>Inspect valve timing.</td></tr>
<tr><td>No</td><td>Inspect for cause.</td></tr>
<tr><td>12</td><td colspan="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.</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">• Remove thermostat and inspect operation.
(See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION.)
(See 01–12–7 THERMOSTAT INSPECTION.)
• Is thermostat okay?</td><td>Yes</td><td>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</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td>4</td><td colspan="3">• 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.</td></tr>
</table>

NO.19 EXHAUST SMOKE [ZM]

A3U010318881W61

<table>
<tr><th>19</th><th>Exhaust smoke</th></tr>
<tr><td>DESCRIPTION</td><td>• Blue, black, or white smoke from exhaust system</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>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.)</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair open circuit between PCM terminal 71/97 and main relay.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• 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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Repair constant voltage circuit short to GND.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• 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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Repair open constant voltage circuit.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go to Step 11.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• 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)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair open GND circuit to sensor where constant voltage circuit inspection failed.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• 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?</td><td>Yes</td><td>Reconnect sensor connector.
Go to appropriate DTC test.</td></tr>
<tr><td>No</td><td>Repair open GND circuit.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair open GND circuit.</td></tr>
</table>

<table>
<tr><th>STEP</th><th colspan="2">INSPECTION</th><th>ACTION</th></tr>
<tr><td rowspan="2">12</td><td rowspan="2">• 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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Inspect for open GND circuit.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• 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?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Repair constant voltage circuit short to power in harness.</td></tr>
</table>

NO.31 SPARK PLUG CONDITION [ZM]

A3U010318881W73

<table>
<tr><th>31</th><th>Spark plug condition</th></tr>
<tr><td>DETECTION CONDITION</td><td>• Incorrect spark plug condition</td></tr>
<tr><td>POSSIBLE CAUSE</td><td>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.)</td></tr>
</table>

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

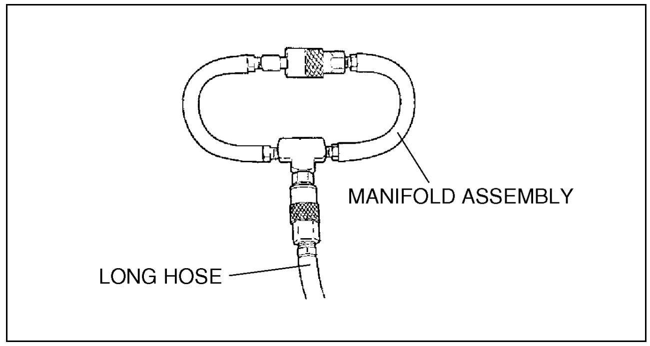
1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test:

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.



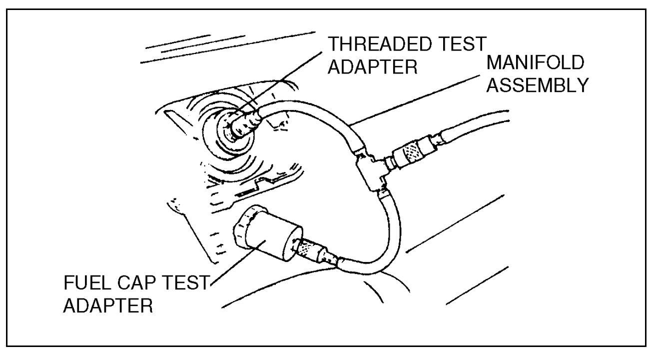
YMU103WZ2

(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}**.



YMU103WZ3

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

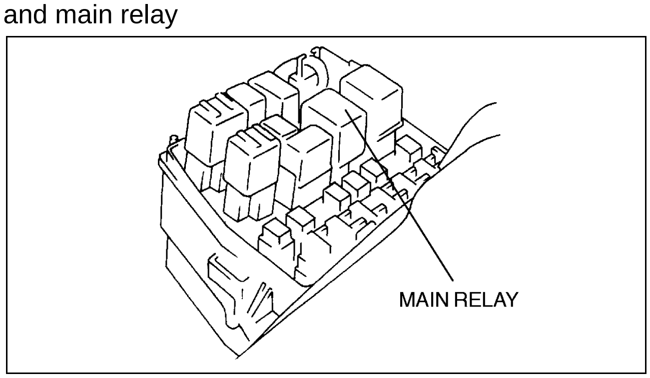
1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply 1.7 kPa 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



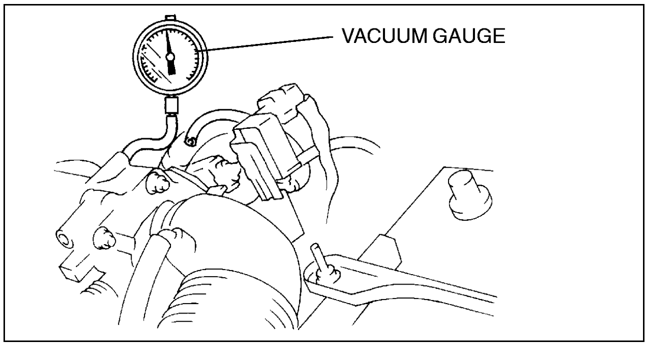
X3U101WCV

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)

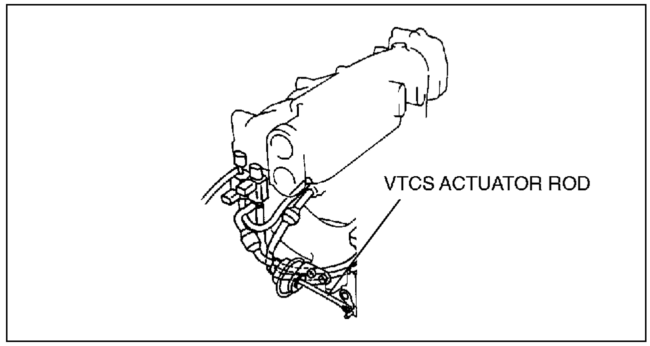
Load condition	Idle-up speed (rpm)*
No load	650—750 (700±50)
Headlight switch is on.	
P/S on	700—800 (750±50)
A/C on	

* : 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

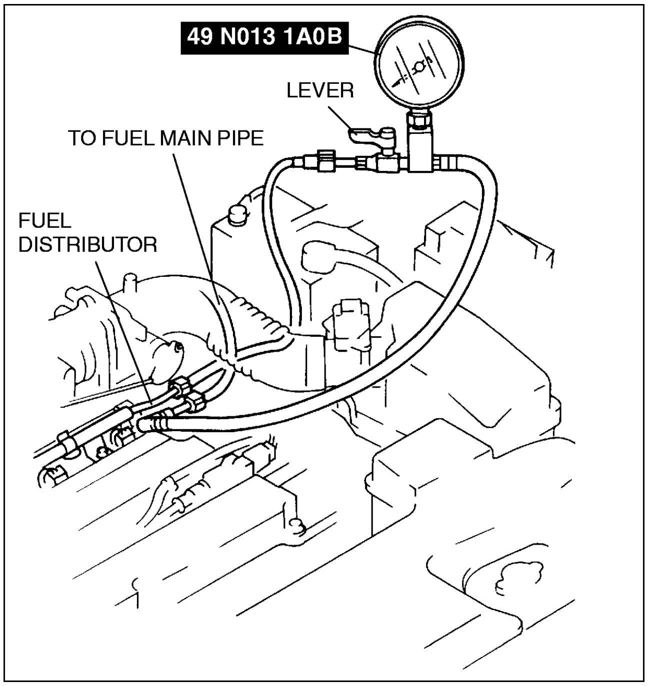
Pressure Regulator Control Inspection

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.

Specification

<table>
<tr><th>Condition</th><th colspan="3">Fuel pressure (kPa {kgf/cm², psi})</th></tr>
<tr><td>Idling</td><td>210—250 {2.1—2.6, 30—36}</td><td rowspan="3">210—250 {2.1—2.6, 30—36}</td><td rowspan="3">270—310 {2.7—3.2, 39—45}</td></tr>
<tr><td>During 100 sec. of hot start</td><td>270—310 {2.7—3.2, 39—45}</td></tr>
<tr><td>After 100 sec. of hot start</td><td>210—250 {2.1—2.6, 30—36}</td></tr>
<tr><td>Judgment</td><td>Normal</td><td>Not Normal (Perform Inspection 1)</td><td>Not Normal (Perform Inspection 2)</td></tr>
</table>



X3U101WD7

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

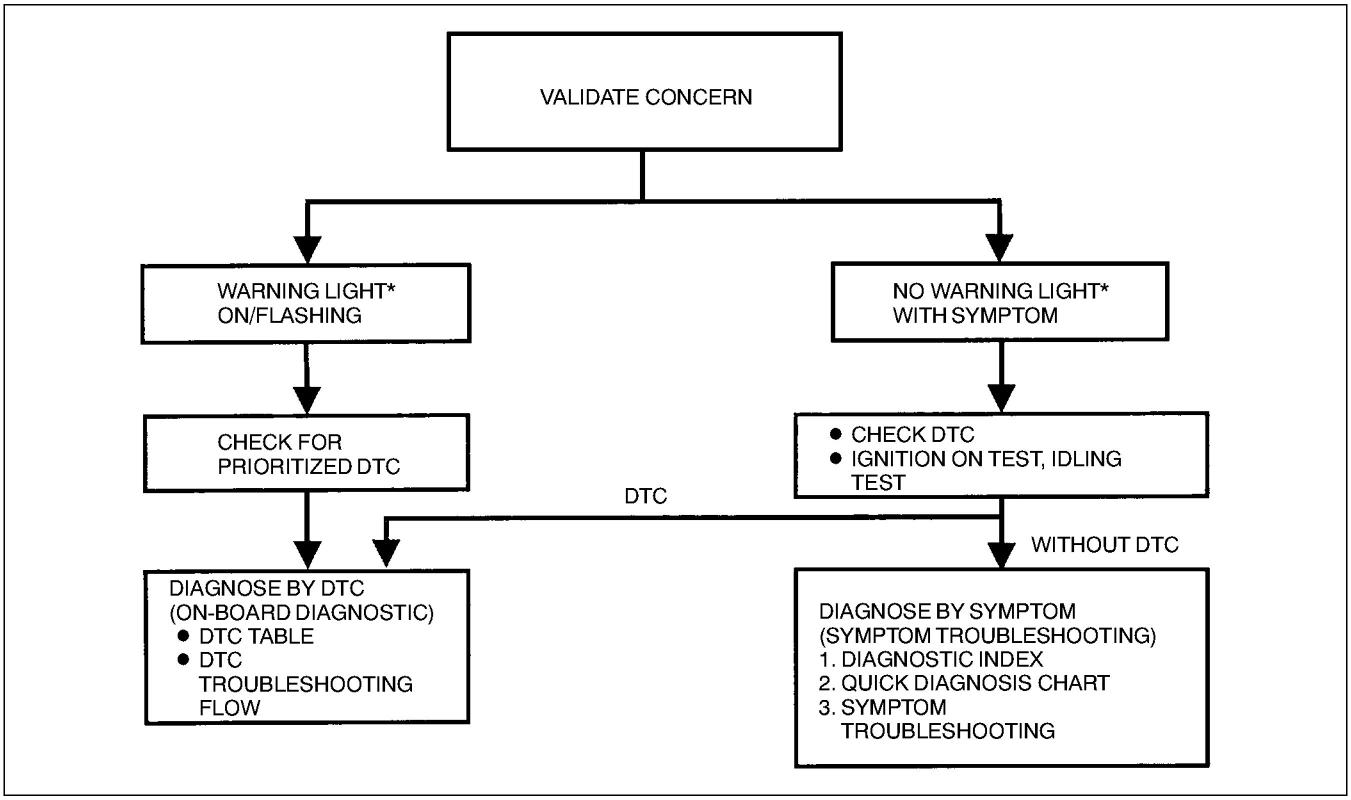
Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan and A/C amplifier		×		×			×
PSP switch		×		×			×
CKP sensor	×	×	×	×	×	×	×
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

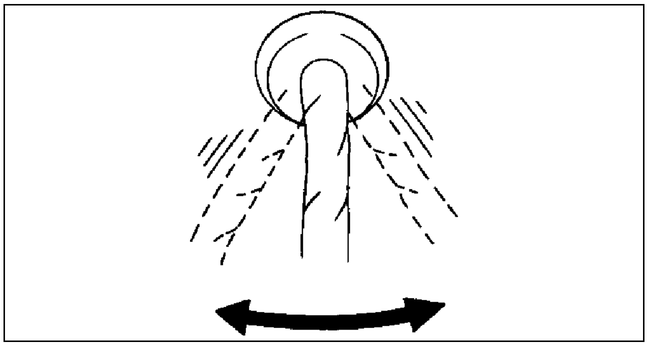
- There are several reasons vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
  — Connectors not fully seated.
  — Wire harnesses not having full play.
  — Wires laying across brackets or moving parts.
  — Wires routed too close to hot parts.
- An 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.



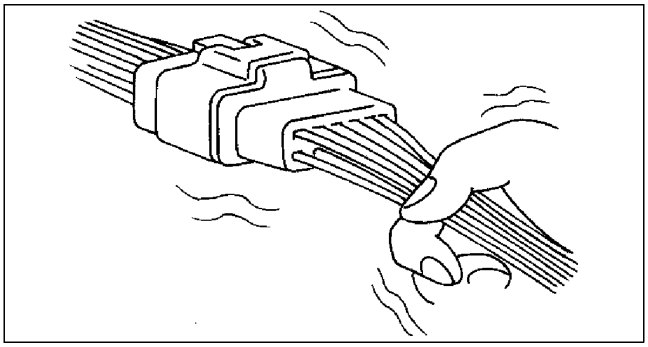
Y3U103WN3

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.

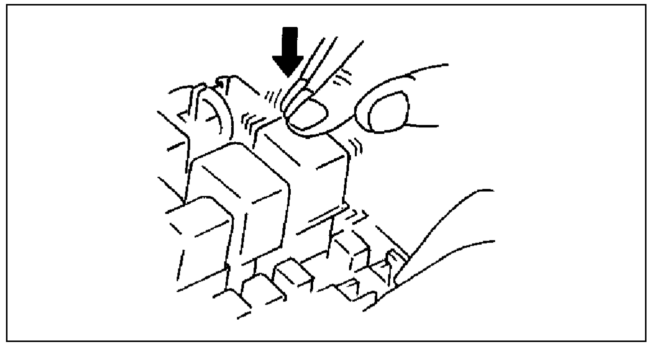
Inspection Method for Actuators or Relays

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

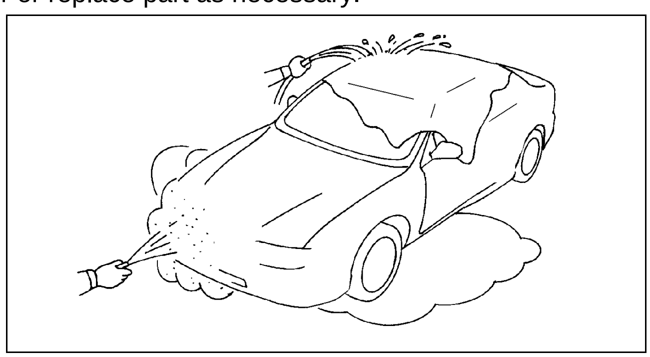
If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

<table>
<tr><th>No.</th><th colspan="2">TROUBLESHOOTING ITEM</th><th>DESCRIPTION</th><th>PAGE</th></tr>
<tr><td>1</td><td colspan="2">Melting of main or other fuses</td><td>—</td><td>(See 01–03B–13 NO.1 MELTING OF MAIN OR OTHER FUSES [FS])</td></tr>
<tr><td>2</td><td colspan="2">MIL illuminates</td><td>MIL is illuminated incorrectly.</td><td>(See 01–03B–14 NO.2 MIL ILLUMINATES [FS])</td></tr>
<tr><td>3</td><td colspan="2">Will not crank</td><td>Starter does not work.</td><td>(See 01–03B–14 NO.3 WILL NOT CRANK [FS])</td></tr>
<tr><td>4</td><td colspan="2">Hard start/long crank/erratic start/ erratic crank</td><td>Starter cranks engine at normal speed but engine requires excessive cranking time before starting.
Battery is in normal condition.</td><td>(See 01–03B–15 NO.4 HARD START/LONG CRANK/ ERRATIC START/ERRATIC CRANK [FS])</td></tr>
<tr><td>5</td><td>Engine stalls</td><td>After start/at idle</td><td>Engine stops unexpectedly at idle and/or after start.</td><td>(See 01–03B–17 NO.5 ENGINE STALLS-AFTER START/AT IDLE [FS])</td></tr>
<tr><td>6</td><td colspan="2">Cranks normally but will not start</td><td>Starter cranks engine at normal speed but engine will not run.</td><td>(See 01–03B–20 NO.6 CRANKS NORMALLY BUT WILL NOT START [FS])</td></tr>
<tr><td>7</td><td colspan="2">Slow return to idle</td><td>Engine takes more time than normal to return to idle speed.</td><td>(See 01–03B–22 NO.7 SLOW RETURN TO IDLE [FS])</td></tr>
<tr><td>8</td><td colspan="2">Engine runs rough/rolling idle</td><td>Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.</td><td>(See 01–03B–23 NO.8 ENGINE RUNS ROUGH/ ROLLING IDLE [FS])</td></tr>
<tr><td>9</td><td colspan="2">Fast idle/runs on</td><td>Engine speed continues at fast idle after warm-up.
Engine runs after ignition key is turned to OFF.</td><td>(See 01–03B–26 NO.9 FAST IDLE/RUNS ON [FS])</td></tr>
<tr><td>10</td><td colspan="2">Low idle/stalls during deceleration</td><td>Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.</td><td>(See 01–03B–26 NO.10 LOW IDLE/STALLS DURING DECELERATION [FS])</td></tr>
<tr><td rowspan="6">11</td><td>Engine stalls/quits</td><td>Acceleration/ cruise</td><td>Engine stops unexpectedly at beginning of acceleration or during acceleration.
Engine stops unexpectedly while cruising.</td><td rowspan="6">(See 01–03B–28 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [FS])</td></tr>
<tr><td>Engine runs rough</td><td>Acceleration/ cruise</td><td>Engine speed fluctuates during acceleration or cruising.</td></tr>
<tr><td>Misses</td><td>Acceleration/ cruise</td><td>Engine misses during acceleration or cruising.</td></tr>
<tr><td>Buck/jerk</td><td>Acceleration/ cruise/ deceleration</td><td>Vehicle bucks/jerks during acceleration, cruising, or deceleration.</td></tr>
<tr><td>Hesitation/ stumble</td><td>Acceleration</td><td>Momentary pause at beginning of acceleration, or during acceleration</td></tr>
<tr><td>Surges</td><td>Acceleration/ cruise</td><td>Momentary minor irregularity in engine output</td></tr>
<tr><td>12</td><td>Lack/loss of power</td><td>Acceleration/ cruise</td><td>Performance is poor under load (e.g. power down when climbing hills).</td><td>(See 01–03B–31 NO.12 LACK/ LOSS OF POWER-ACCELERATION/ CRUISE [FS])</td></tr>
<tr><td>13</td><td>Knocking/pinging</td><td>Acceleration/ cruise</td><td>Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).</td><td>(See 01–03B–33 NO.13 KNOCKING/ PINGING-ACCELERATION/ CRUISE [FS])</td></tr>
<tr><td>14</td><td colspan="2">Poor fuel economy</td><td>Fuel economy is unsatisfactory.</td><td>(See 01–03B–34 NO.14 POOR FUEL ECONOMY [FS])</td></tr>
<tr><td>15</td><td colspan="2">Emission compliance</td><td>Fails emissions test</td><td>(See 01–03B–36 NO.15 EMISSION COMPLIANCE [FS])</td></tr>
<tr><td>16</td><td colspan="2">High oil consumption/leakage</td><td>Oil consumption is excessive.</td><td>(See 01–03B–37 NO.16 HIGH OIL CONSUMPTION/ LEAKAGE [FS])</td></tr>
</table>

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]

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No.	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						×	×														×
11	Engine runs rough.	Acceleration/cruise						×	×														×
11	Misses	Acceleration/cruise						×	×														×
11	Buck/jerk	Acceleration/cruise/deceleration						×	×														×
11	Hesitation/stumble	Acceleration						×	×														×
11	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*																				

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No.	Troubleshooting item		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*																	

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No.	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	×		×		×	×	×	×		×	×	×	×	×				
11	Engine runs rough.	Acceleration/cruise	×		×		×	×	×	×		×	×	×	×	×				
11	Misses	Acceleration/cruise	×		×		×	×	×	×		×	×	×	×	×				
11	Buck/jerk	Acceleration/cruise/deceleration	×		×		×	×	×	×		×	×	×	×	×				
11	Hesitation/stumble	Acceleration	×		×		×	×	×	×		×	×	×	×	×				
11	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*																	

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No.	Troubleshooting item		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

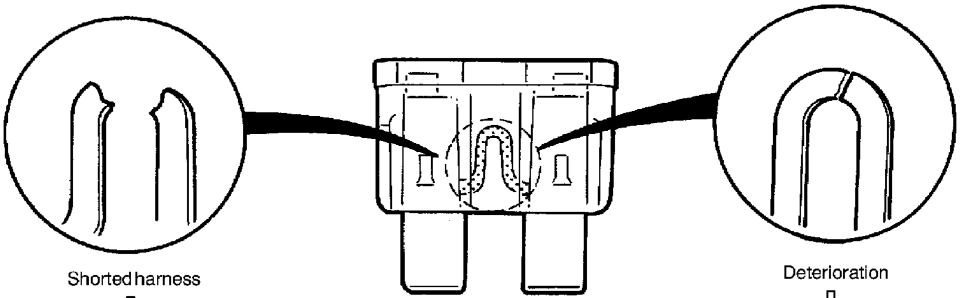
NO.1 MELTING OF MAIN OR OTHER FUSES [FS]

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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">• Connect WDS or equivalent to DLC-2.
• Turn ignition key to ON.
• Retrieve any DTC.
• Is “DTC” displayed?</td><td>Yes</td><td>DTC displayed:
• Go to appropriate DTC test.</td></tr>
<tr><td>No</td><td>No DTC displayed:
• Go to next step.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">• Is engine overheating?</td><td>Yes</td><td>Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS].”</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">• Inspect for cracks on high-tension leads.
• Are there any cracks on high-tension leads?</td><td>Yes</td><td>Repair suspected high-tension leads.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• Inspect condition of spark plugs.
• Is spark plug wet, covered with carbon or grayish white?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Install spark plugs on original cylinders.
Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Visually inspect CKP sensor and teeth of crankshaft pulley.
• Are CKP sensor and teeth of crankshaft pulley okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Adjust CKP sensor.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• Remove and inspect PCV valve.
• Does PCV valve rattle?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace PCV valve.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• Is fuel line pressure held after ignition key is turned to LOCK?
(See 01–14–28 Operation Inspection.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect pressure regulator diaphragm condition.
If condition is okay, inspect fuel injector.
If condition is not okay, replace pressure regulator.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect for clogged fuel filter.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">• 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?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• Disconnect vacuum hose from purge solenoid valve and plug opening end of vacuum hose.
• Attempt to start engine.
• Is starting condition improved?</td><td>Yes</td><td>Inspect if purge solenoid valve is stuck open.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">• Inspect MAF sensor for contamination.
• Is there any contamination?</td><td>Yes</td><td>Replace MAF sensor.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">• Is there a restriction in exhaust system?</td><td>Yes</td><td>Inspect exhaust system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• 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%?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">• 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?</td><td>Yes</td><td>Inspect if purge solenoid valve is stuck open mechanically.
Inspect evaporative emission control system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">• Remove and shake PCV valve.
• Does PCV valve rattle?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace PCV valve.</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">• Is there any restriction in exhaust system?</td><td>Yes</td><td>Inspect exhaust system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">• Visually inspect CMP sensor and projections of camshaft pulley.
• Are CMP sensor and projections of camshaft pulley okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">18</td><td rowspan="2">• Inspect engine condition while tapping EGR valve housing.
• Does engine condition improve?</td><td>Yes</td><td>Replace EGR valve.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">• Is engine compression correct?</td><td>Yes</td><td>Inspect valve timing.</td></tr>
<tr><td>No</td><td>Inspect for causes.</td></tr>
<tr><td>20</td><td colspan="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.</td></tr>
</table>

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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?</td><td>Yes</td><td>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.</td></tr>
<tr><td>No</td><td>Inspect following:
• High-tension leads
• Ignition coil and connector</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Inspect VICS operation. (See 01–03B–57 VICS Operation Inspection.)
• Does VICS work properly?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• Inspect tumble swirl control system operation. (See 01–03B–57 Variable Tumble Control System (VTCS) Inspection.)
• Does tumble swirl control system work properly?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning parts.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• Remove and shake PCV valve.
• Does PCV valve rattle?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace PCV valve.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• Is there any restriction in exhaust system?</td><td>Yes</td><td>Inspect exhaust system.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• Is brake system functioning properly?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Inspect for cause.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• Inspect MAF sensor for contamination.
• Is there any contamination?</td><td>Yes</td><td>Replace MAF sensor.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">• Is engine compression correct?</td><td>Yes</td><td>Inspect valve timing.</td></tr>
<tr><td>No</td><td>Inspect for cause.</td></tr>
<tr><td>13</td><td colspan="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.</td></tr>
</table>

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)

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">• Start engine and run it at idle speed.
• Turn A/C switch on.
• Do cooling fan and condenser fan operate?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• Is drive belt okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace drive belt.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Is there any leakage around heater unit in passenger compartment?</td><td>Yes</td><td>Inspect and service heater for leakage.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• Is there any leakage at coolant hoses and/or radiator?</td><td>Yes</td><td>Replace malfunctioning part.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• 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?</td><td>Yes</td><td>Engine coolant temperature and thermostat are okay.
Inspect engine block for leakage or blockage.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td>9</td><td colspan="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.</td></tr>
</table>

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.

01–03B

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.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">• Inspect spark plug for following.
— Cracked insulator
— Heating value
— Air gap
— Worn electrode
• Are spark plugs okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace spark plug.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">• Inspect compression pressure at suspected faulty cylinder.
• Is compression pressure correct?
(See 01–10B–8 COMPRESSION INSPECTION [FS].)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">• Install all spark plugs.
• Carry out spark test at suspected faulty cylinder.
• Is strong blue spark visible? (Compare with normal cylinder.)</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">• Perform fuel line pressure inspection.
(See 01–14–28 PRESSURE REGULATOR INSPECTION.)
• Is fuel line pressure okay?</td><td>Yes</td><td>Inspect fuel injector for following:
• Open or short in injector
• Leakage
• Injection volume</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">• Inspect spark plugs for following.
— Heating value
— Air gap
• Are they okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace spark plug.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">• 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?</td><td>Yes</td><td>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</td></tr>
<tr><td>No</td><td>Replace fuel injector.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">• Is air cleaner element free of restrictions?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace air cleaner element.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">• Carry out spark test.
• Is strong blue spark visible at each cylinder?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">• 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}</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">• Inspect following PIDs.
— ECT
— O2S11
— O2S12
— MAF
• Are PIDs okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">• Inspect purge solenoid valve. (When the engine can be started)
• Is purge solenoid valve okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
</table>

<table>
<tr><th>STEP</th><th>INSPECTION</th><th>RESULTS</th><th>ACTION</th></tr>
<tr><td rowspan="2">14</td><td rowspan="2">• Carry out compression inspection.
• Is compression correct?</td><td>Yes</td><td>Inspect for clogging in exhaust system.</td></tr>
<tr><td>No</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">• 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?</td><td>Yes</td><td>Repair or replace malfunctioning part.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">• 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}</td><td>Yes</td><td>Inspect following PIDs.
• ECT
• O2S11
• O2S12
• MAF
Inspect PCM GND condition.</td></tr>
<tr><td>No</td><td>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.</td></tr>
<tr><td>17</td><td colspan="3">• 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.</td></tr>
</table>

ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS]

A3U010318881W37

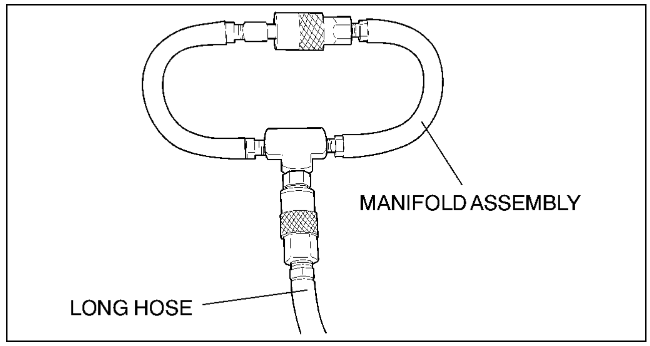
Evaporative System Leak Inspection Using Leak Tester

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.

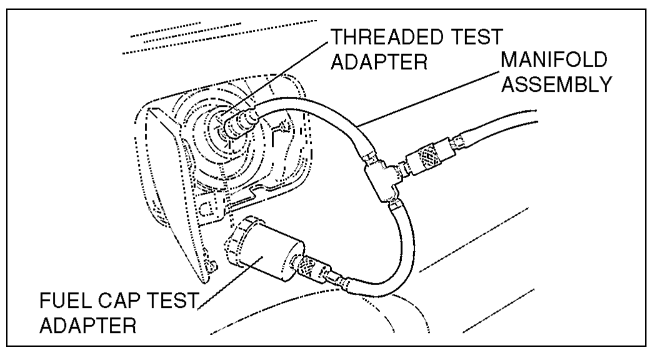


Y3U103WT0

   (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}**.



Y3U103WT1

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

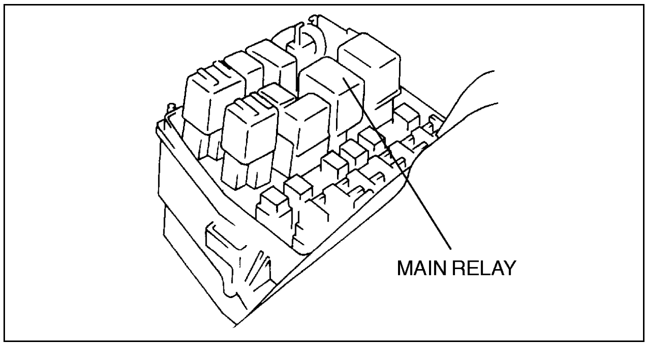
1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01–16–2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply 1.7 kPa 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



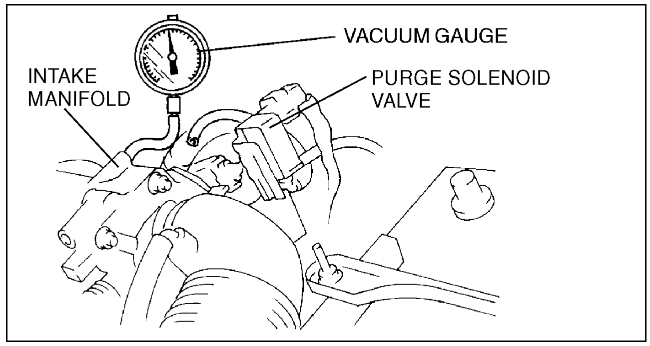
Y3U103WP6

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)

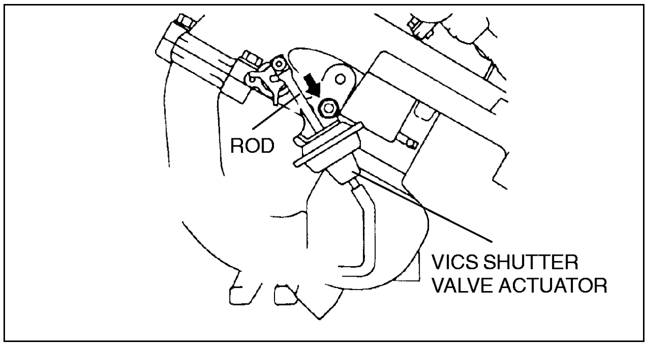
Load condition	Idle-up speed (rpm)*
No load	650—750 (700±50)
Headlight switch is on.	
P/S on	700—800 (750±50)
A/C on	

* : 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

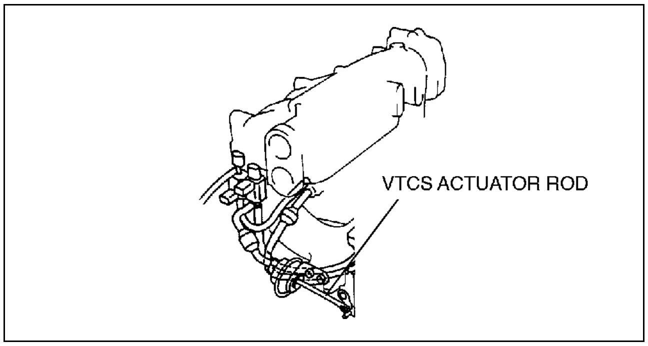
- The shutter valve actuator rod extends for five seconds after the engine is started.

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)



X3U101WEB

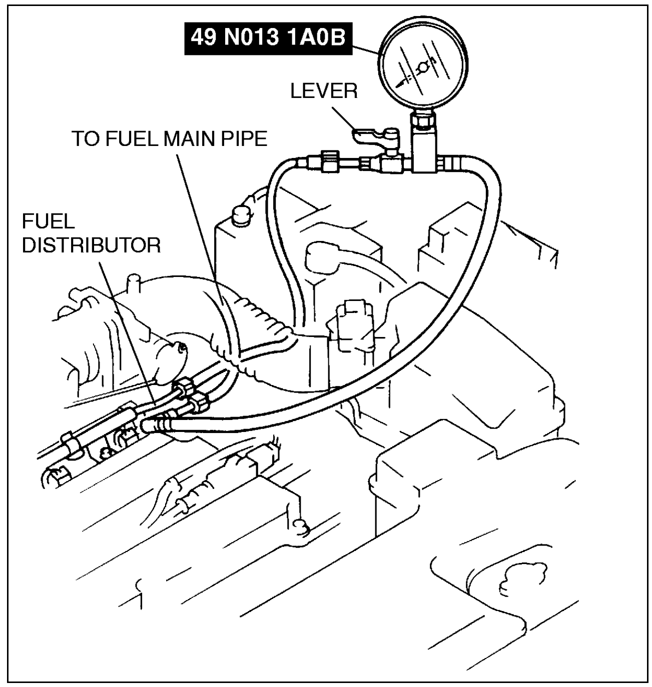
Rod operation

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 **SST** between the fuel filter and fuel distributor.
3. Connect the negative battery cable.
4. Measure the fuel line pressure under the following conditions.



Y3U103WQ2

Specification

<table>
<tr><th>Condition</th><th colspan="3">Fuel pressure (kPa {kgf/cm^2, psi})</th></tr>
<tr><td>Idling</td><td>210—250 {2.1—2.6, 30—36}</td><td rowspan="3">210—250 {2.1—2.6, 30—36}</td><td rowspan="3">270—310 {2.7—3.2, 39—45}</td></tr>
<tr><td>During 100 sec. of hot start</td><td>270—310 {2.7—3.2, 39—45}</td></tr>
<tr><td>After 100 sec. of hot start</td><td>210—250 {2.1—2.6, 30—36}</td></tr>
<tr><td>Judgment</td><td>Normal</td><td>Not Normal (Perform Inspection 1)</td><td>Not Normal (Perform Inspection 2)</td></tr>
</table>

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

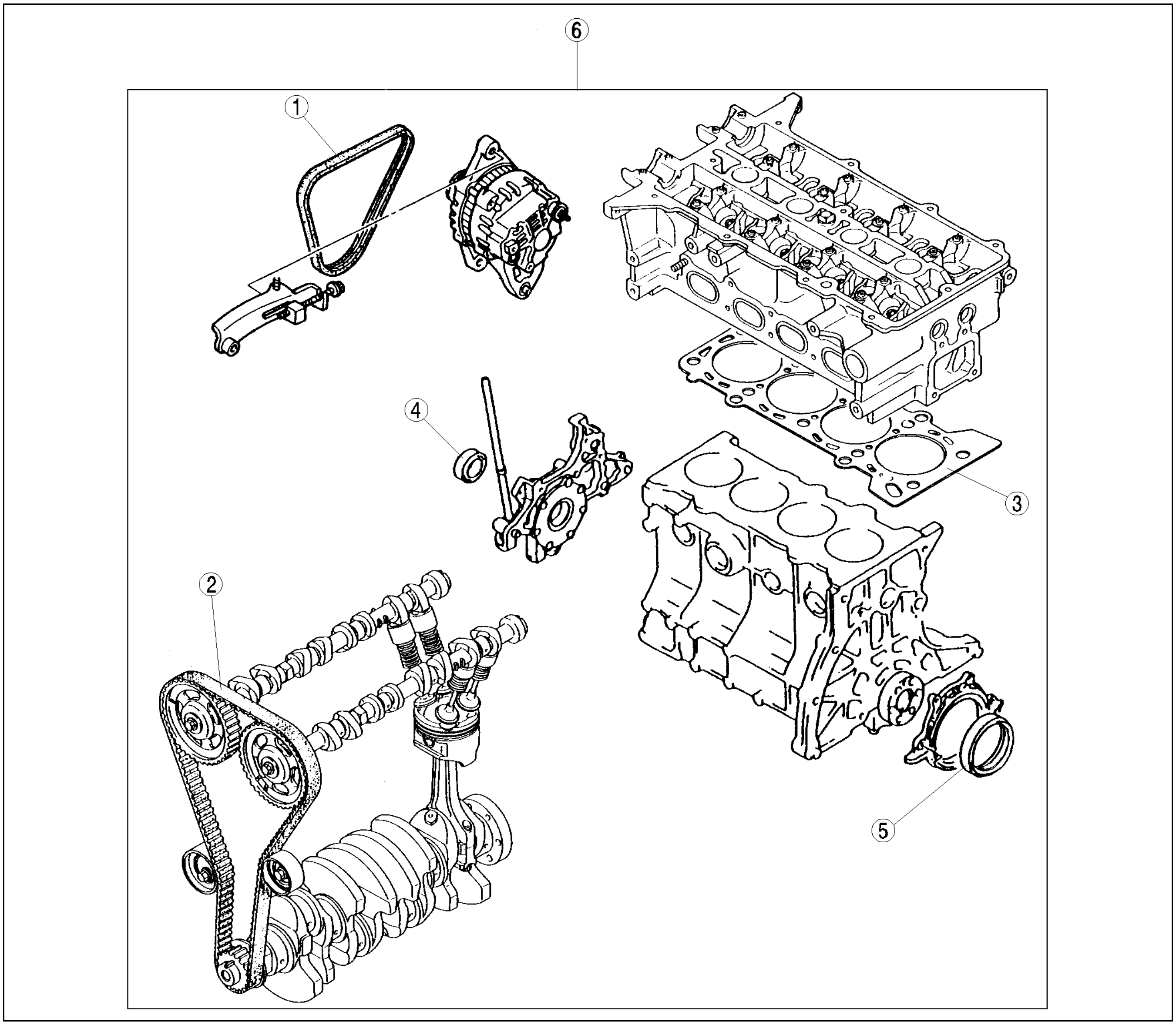
- **High voltage in the ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the following spark test.**

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

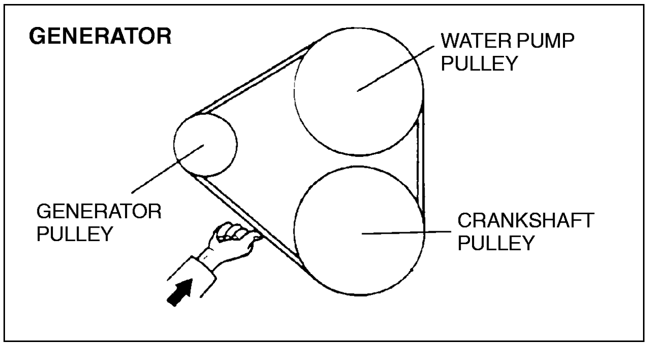
Note
- Inspect the drive belt deflection when the engine is cold, or **at least 30 min** after the engine has been stopped.

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].)

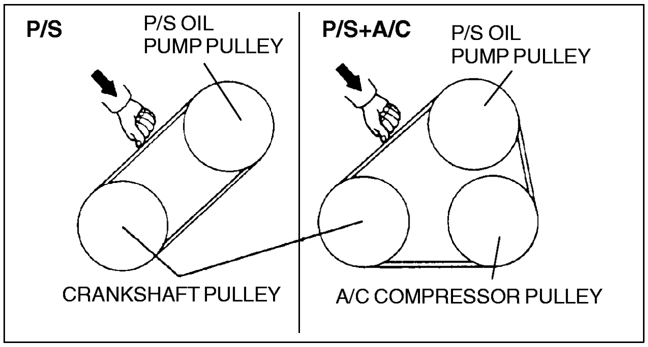
Deflection

mm {in}

Drive belt	Limit
Generator	8.0 {0.31}
P/S, P/S+A/C	11.5 {0.45}



X3U110WA0



X3U110WA1

Drive Belt Tension Inspection

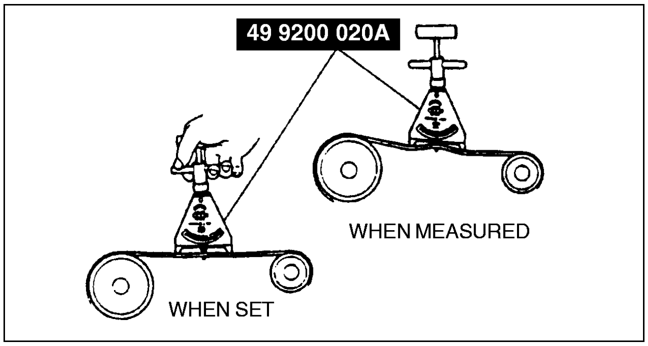
Note
- Belt tension can be inspected in place of belt deflection. Inspect the drive belt tension when the engine is cold, or **at least 30 min** after the engine has been stopped.

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}

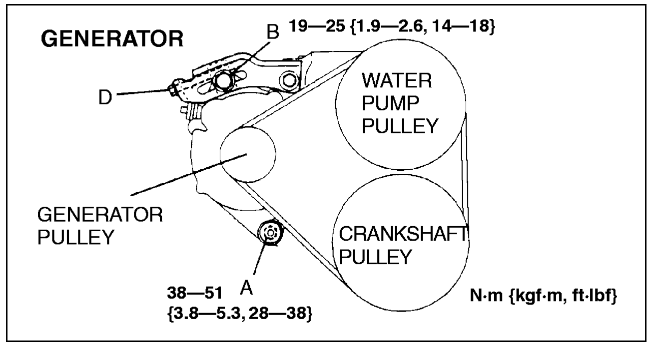


X3U110WA2

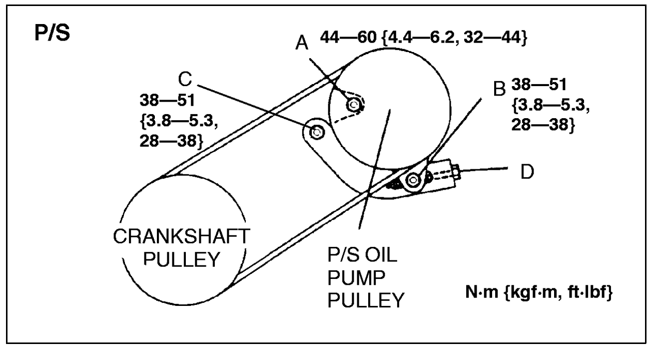
DRIVE BELT ADJUSTMENT [ZM]

A3U011015800W04

1. Loosen mounting bolt A, B, and C.

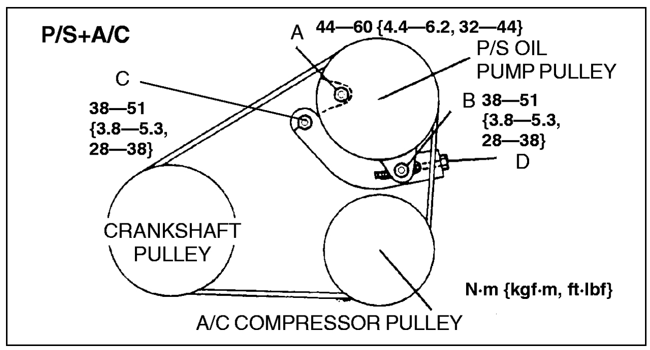


X3U110WA3



X3U110WA4

2. Adjust the belt deflection or tension by turning the adjusting bolt D.



X3U110WA5

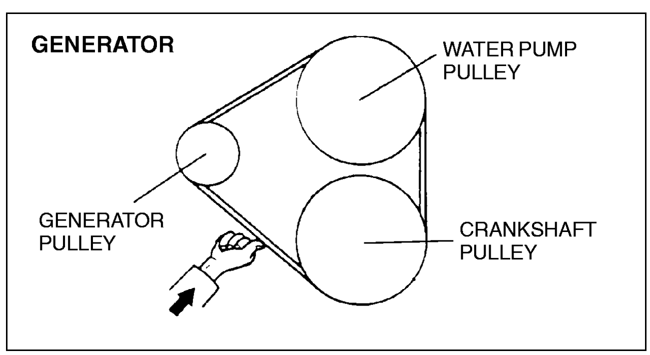
Caution

- **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.**

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}

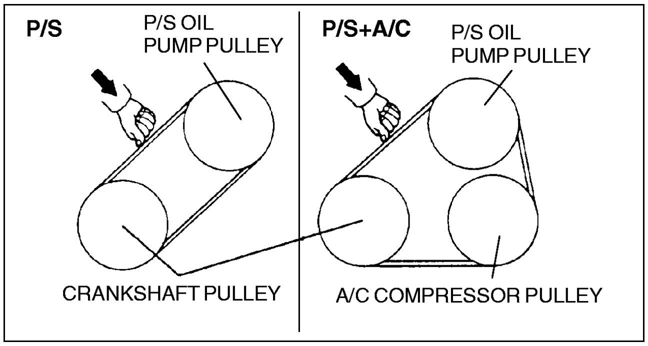


X3U110WA0

Tension

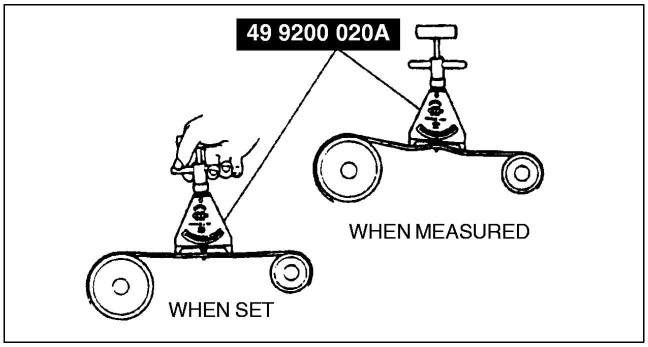
N {kgf, lbf}

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}



X3U110WA1

3. Tighten mounting bolt A, B, and C.
4. Inspect the belt deflection or tension.
   - If not within “Used” specification, repeat from Step 1.

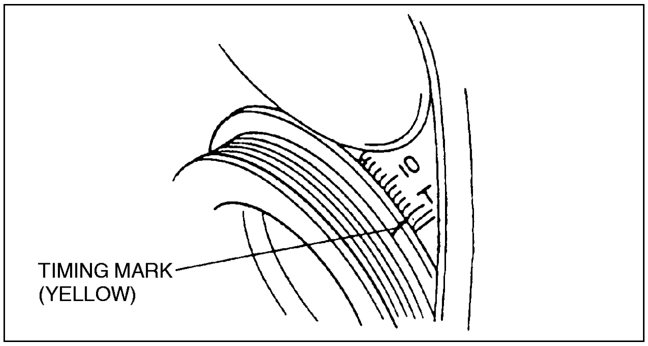


X3U110WA2

VALVE CLEARANCE INSPECTION [ZM]

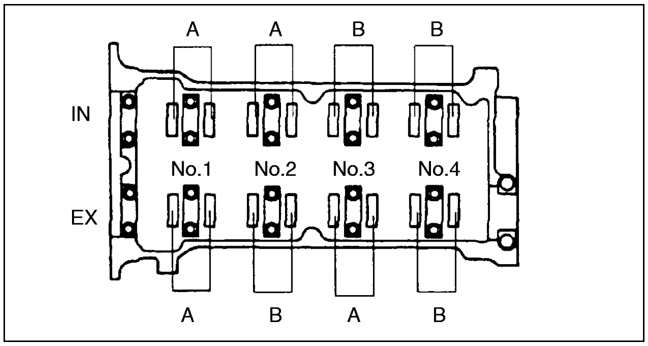
A3U011012010W03

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.



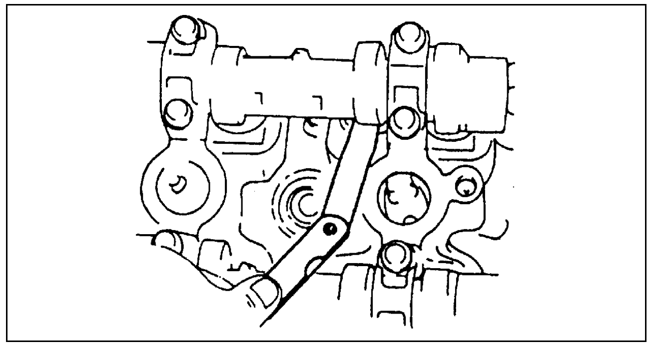
X3U110WA6

   (2) Measure the valve clearance at A in the figure.



X3U110WA7

- 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].)

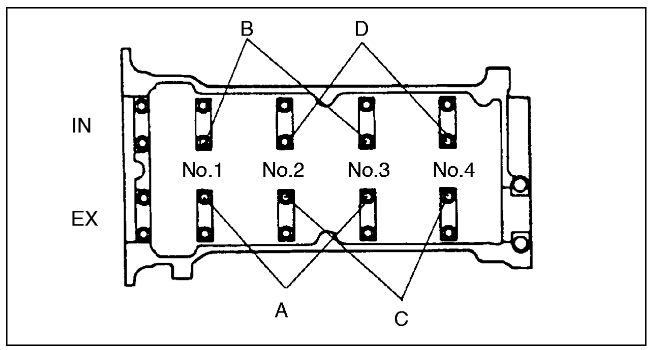
VALVE CLEARANCE ADJUSTMENT [ZM]

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.

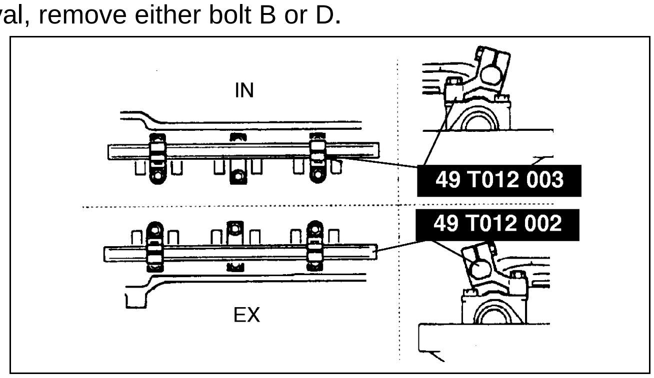
Note
- Remove only one pair of cap bolts at a time.
- Reinstall the cap bolts before removing the next pair.
  — A: For EX side No.1, 2, 3 cylinder adjustment shim removal.
  — B: For IN side No.1, 2, 3 cylinder adjustment shim removal.
  — C: For EX side No.2, 3, 4 cylinder adjustment shim removal.
  — D: For IN side No.2, 3, 4 cylinder adjustment shim removal.



X3U110WA9

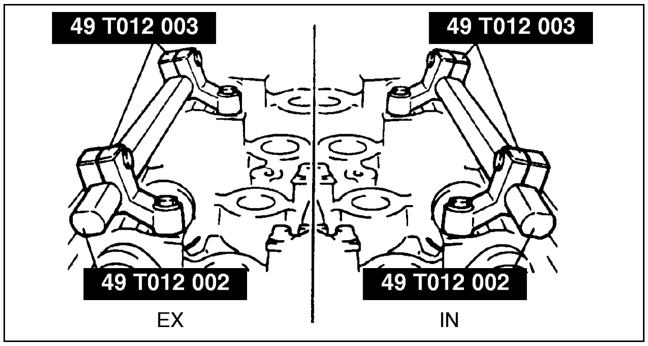
- For EX side No.2, 3 cylinder adjustment shim removal, remove either bolt A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove either bolt B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.



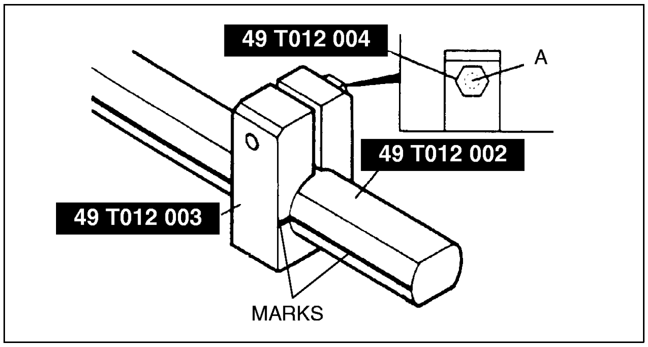
X3U110WAA

Tightening torque
11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}



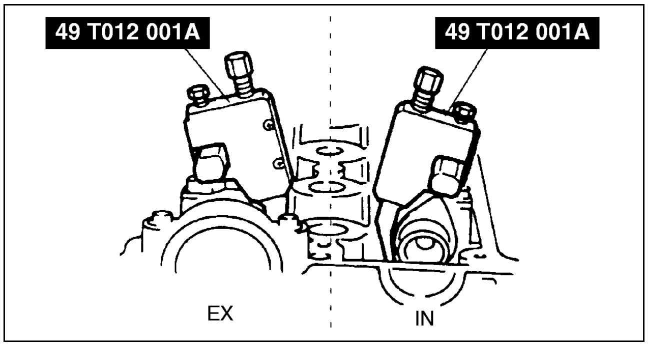
X3U110WAB

4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts A to secure the **SST** (shaft).



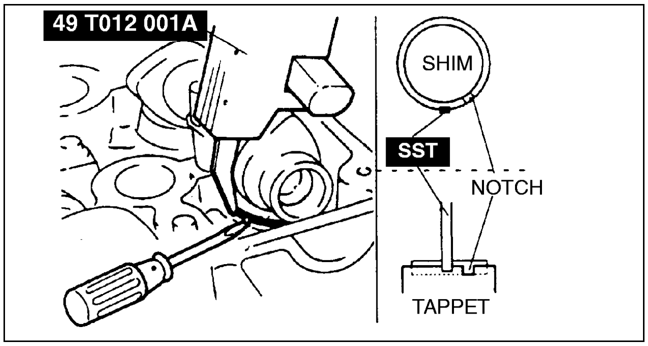
X3U110WAC

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.

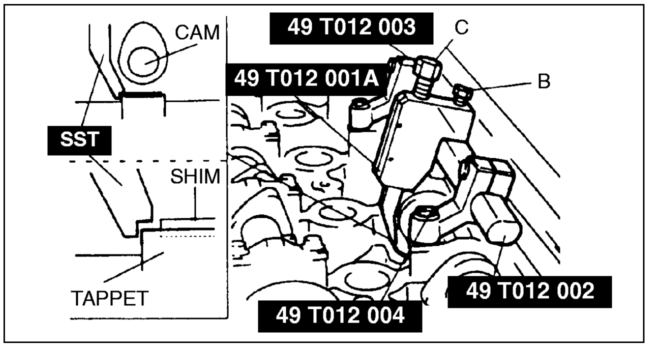


X3U110WAE

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.



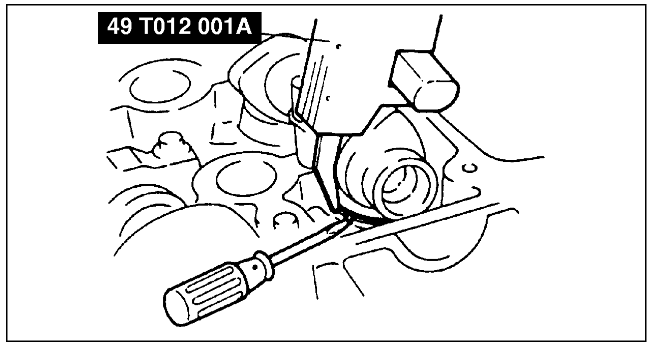
X3U110WAF

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.

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}



X3U110WAG

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.

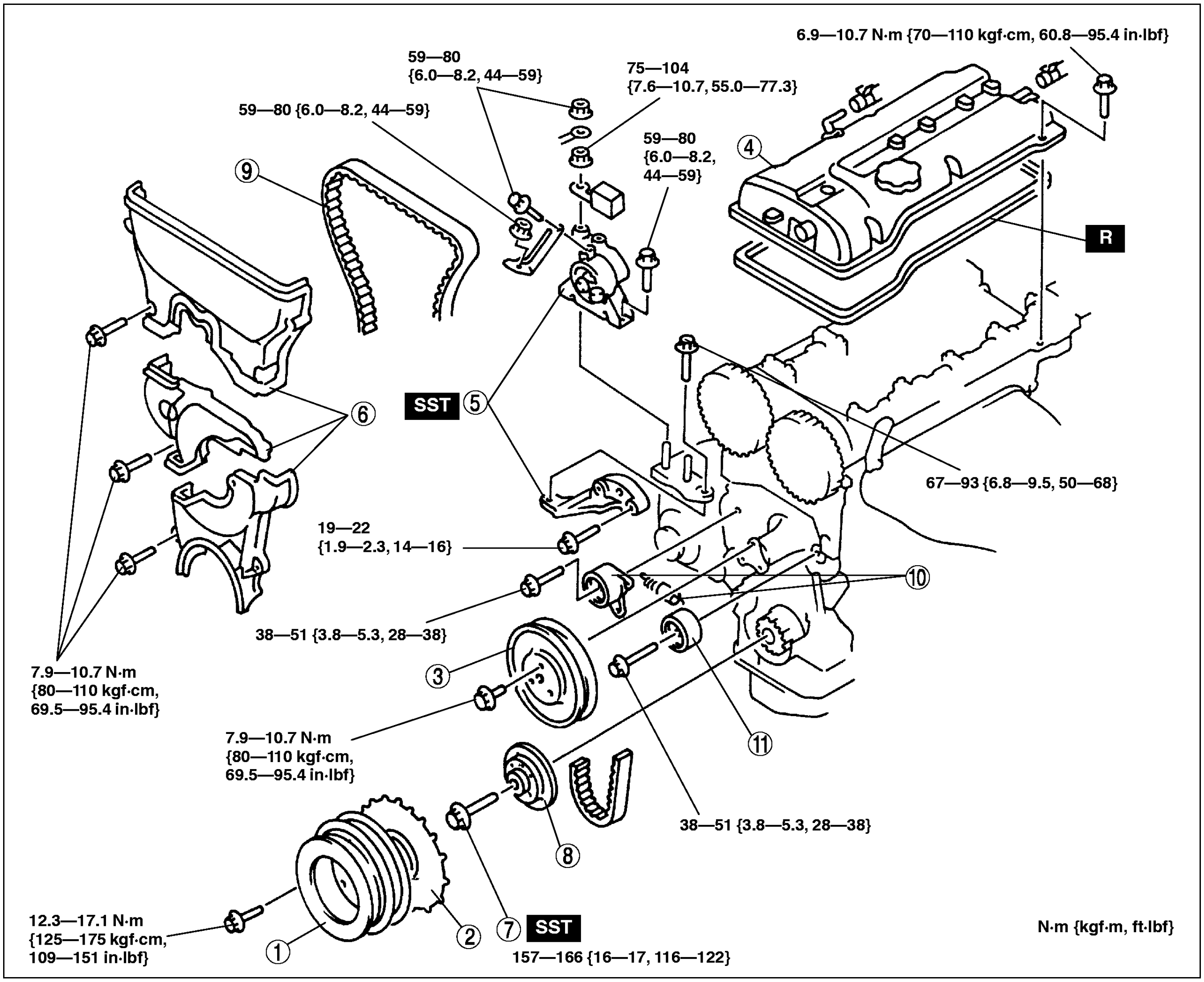
Tightening torque
15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

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.)



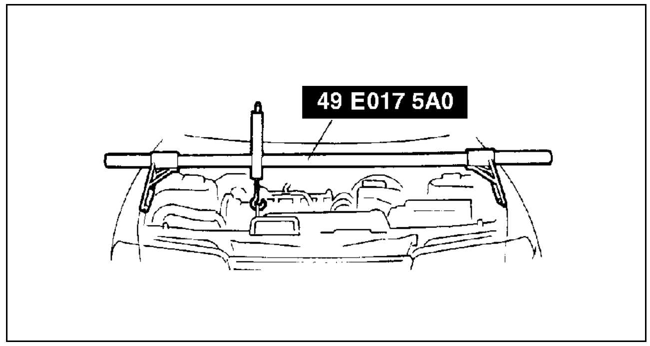
X3U110WAH

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

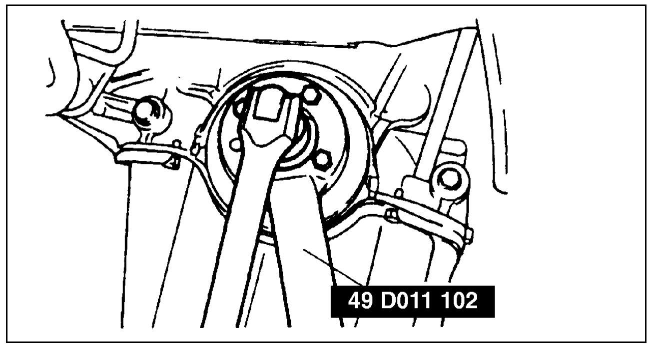
1. Suspend the engine using the **SST**.



Z3U110WAJ

Pulley Lock Bolt Removal/Installation Note

1. Remove the crankshaft using the **SST**.



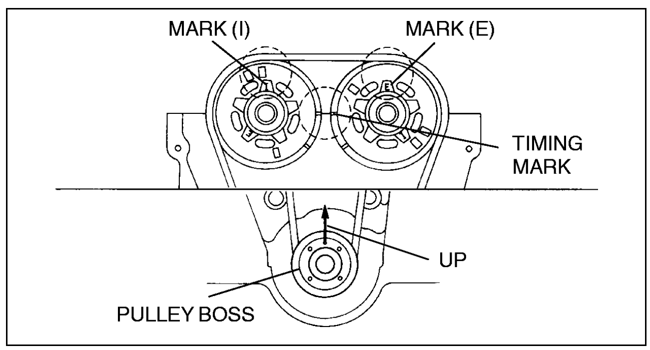
X3U110WAK

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.

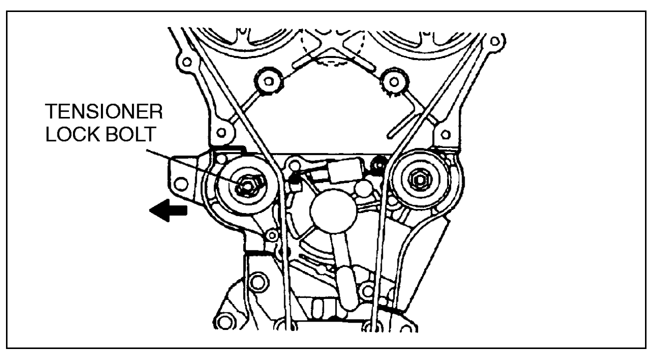


X3U110WAL

3. Loosen the tensioner lock bolt.
4. Push the tensioner in the direction of the arrow and hand-tighten the lock bolt.

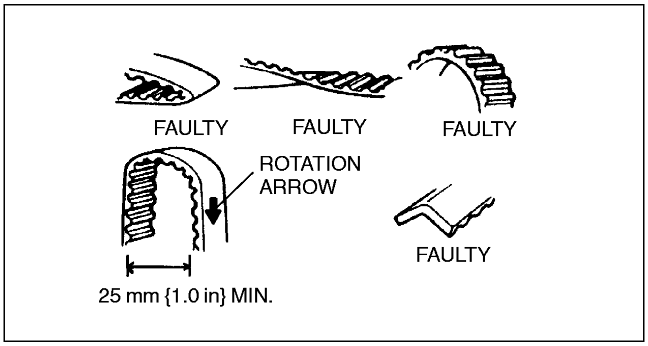
Caution

- **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.



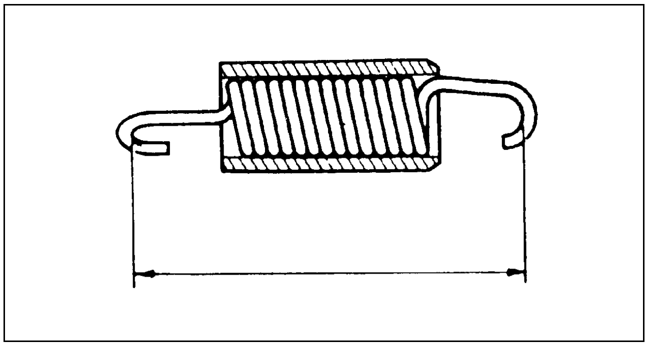
X3U110WAN

Tensioner, Tensioner Spring Installation Note

1. Measure the tensioner spring free length.
   - If not as specified, replace the tensioner spring.

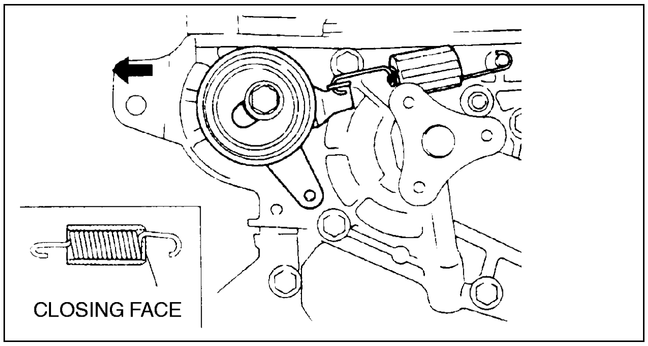
   Free length
   61.8 mm {2.43 in}

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.

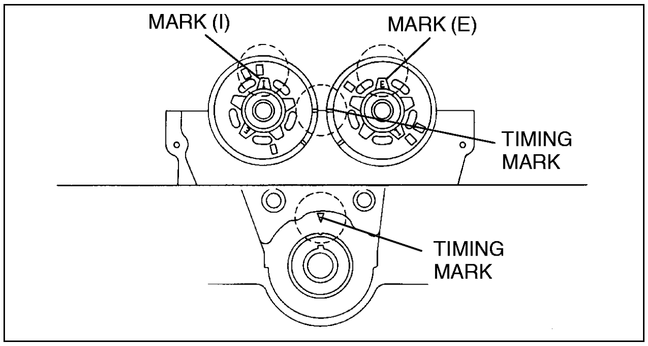


X3U110WAQ

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.

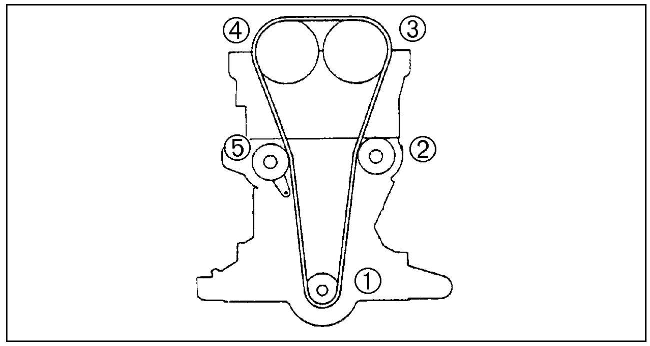


X3U110WAR

2. Install the timing belt in the order shown to prevent looseness.

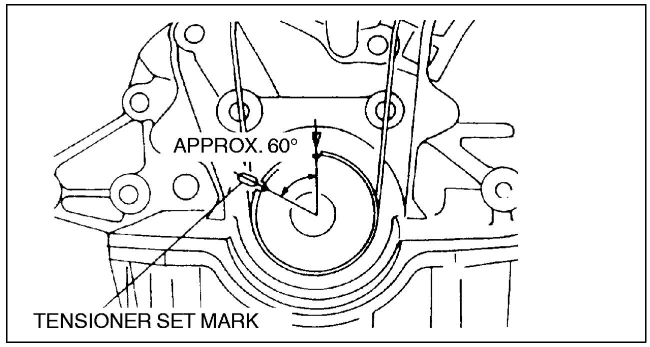
Caution
- **Be sure not to apply tension other than that of the tensioner spring.**

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.

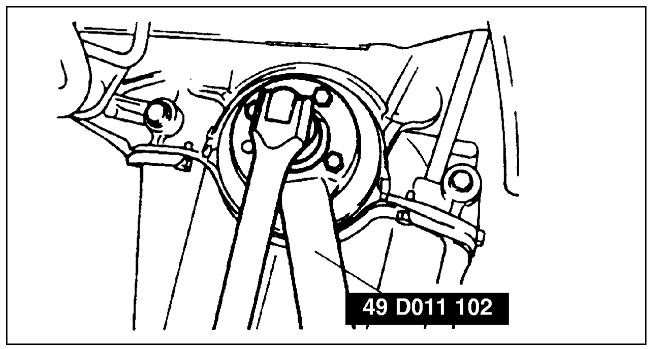


X3U110WAT

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.**

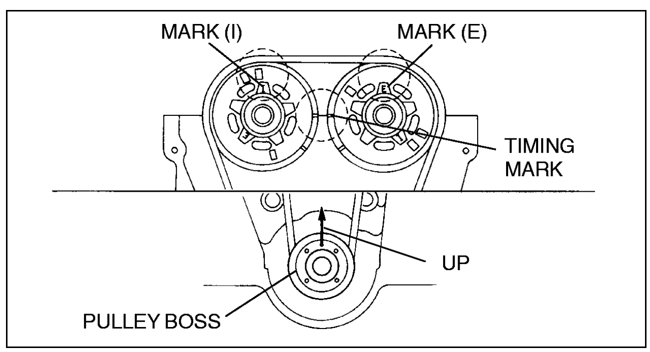
8. Tighten the tensioner lock bolt.
9. Install the pulley boss and the pulley lock bolt.
10. Turn the crankshaft **2 and 1/6 times**, and face the pin on the pulley boss straight up.



X3U110WAU

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.)

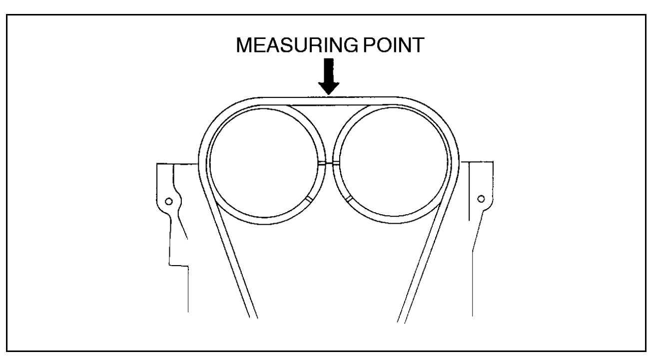
Note
- Timing is normal if: the pulley boss position pin and the camshaft pulley marks (I) and (E) are facing straight up. the timing marks are aligned to the horizontal surface on cylinder head.



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

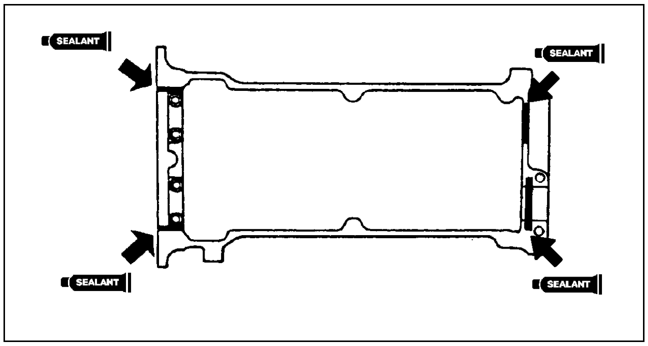
No.3 Engine Mount Installation Note

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

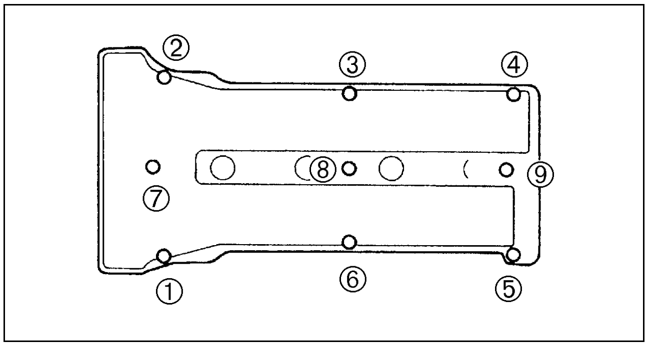
1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install the cylinder head cover gasket into the cylinder head cover.
3. Apply silicone sealant to the cylinder head as shown.

   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

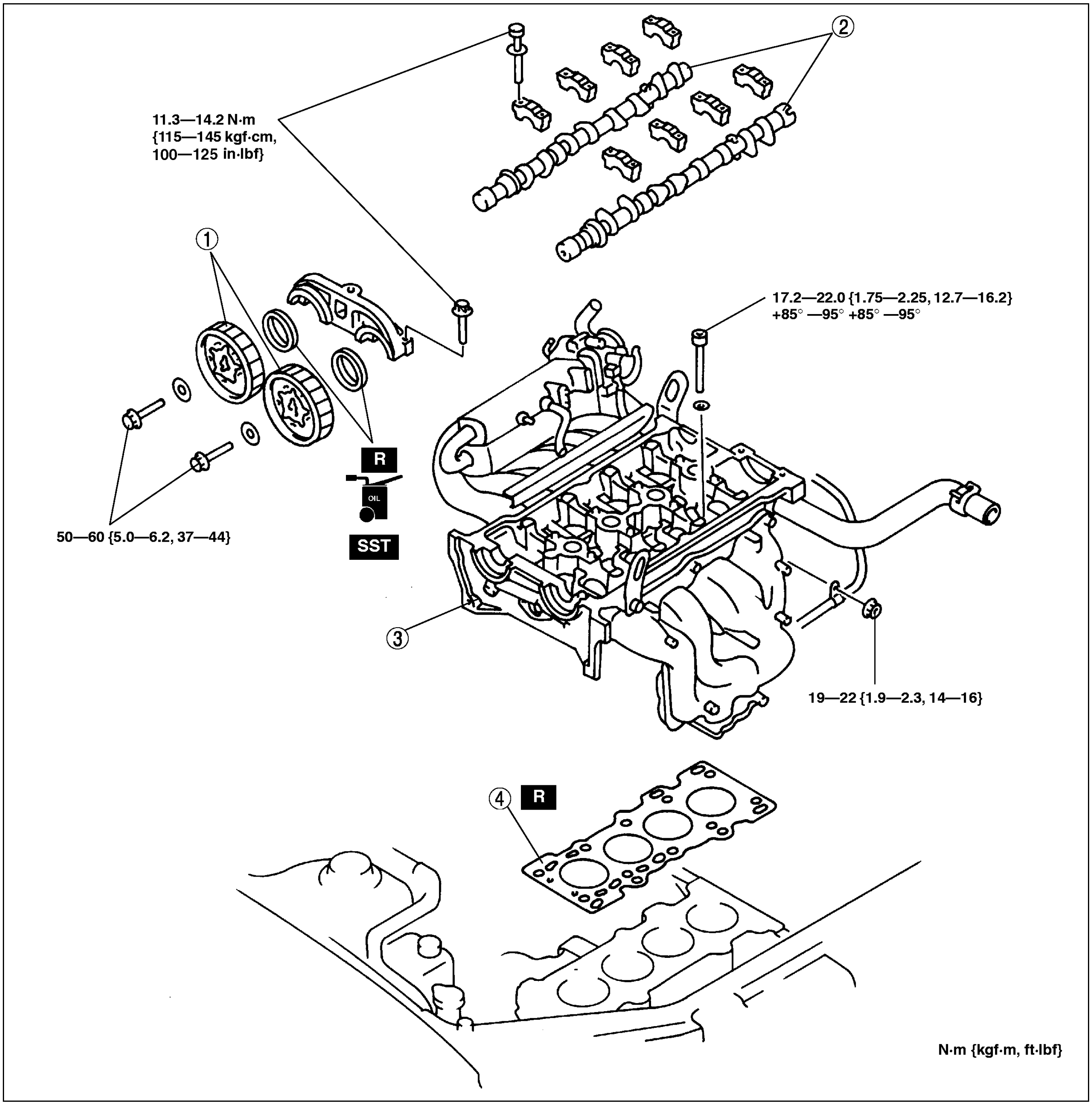
CYLINDER HEAD GASKET REPLACEMENT [ZM]

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

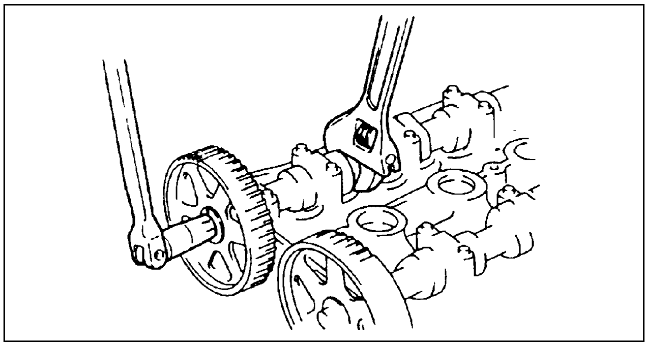
1	Camshaft pulley (See 01–10A–14 Camshaft Pulley Removal Note) (See 01–10A–17 Camshaft Pulley Installation Note)
2	Camshaft (See 01–10A–15 Camshaft Removal Note) (See 01–10A–16 Camshaft Installation Note)

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).

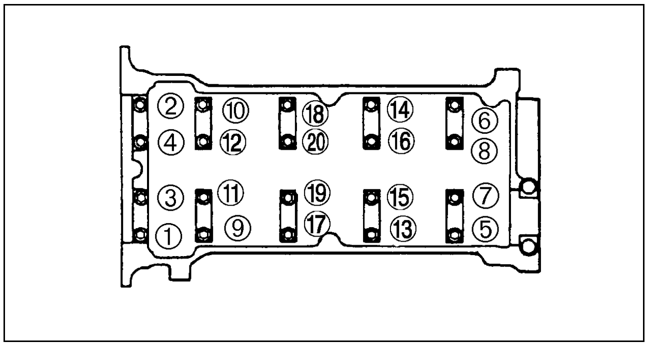
3. Hold the camshaft using a wrench on the cast hexagon as shown.



X3U110WB0

Camshaft Removal Note

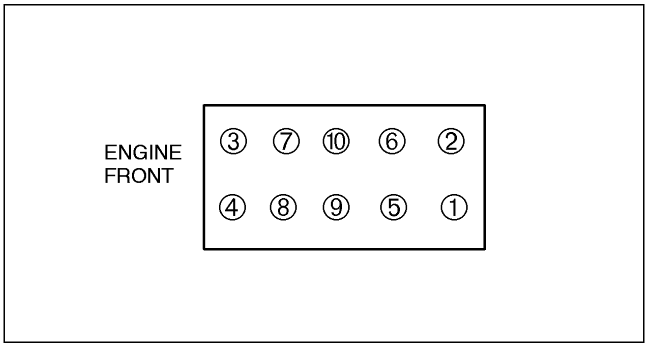
1. Loosen the camshaft cap bolts a few turns in the order shown.
2. Remove the camshaft cap.



X3U110WB1

Cylinder Head Removal Note

1. Loosen the cylinder head bolts a few turns in the order shown.

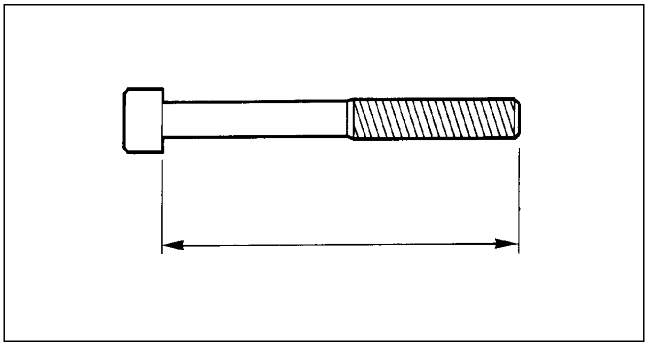


X3U110WB2

Cylinder Head Installation Note

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

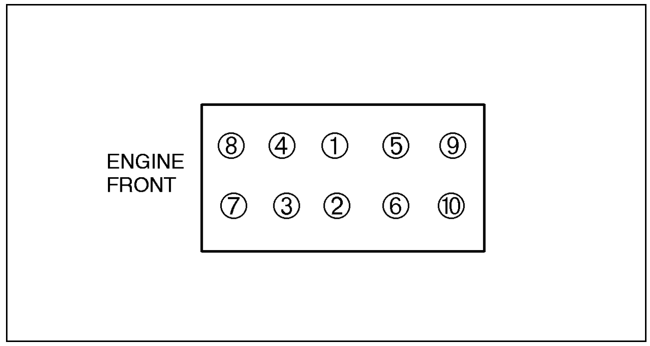
   Standard length
   99.2—99.8 mm {3.91—3.92 in}
   Maximum length
   100.5 mm {3.956 in}



X3U110WB3

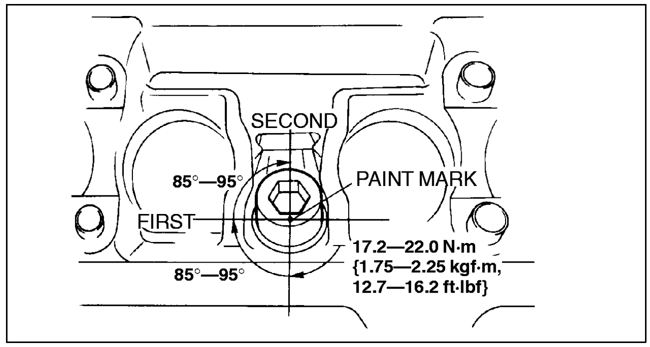
2. Tighten the cylinder head bolts a few turns in the order shown.

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.



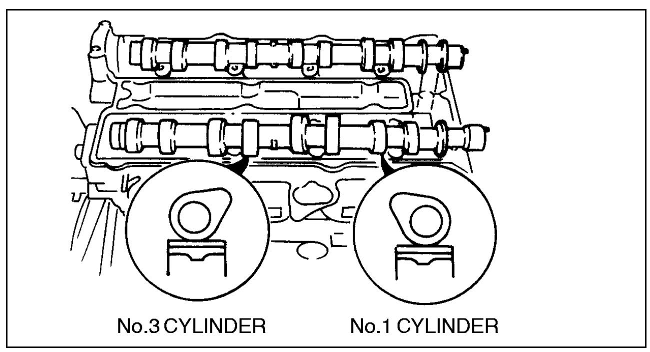
X3U110WB5

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.

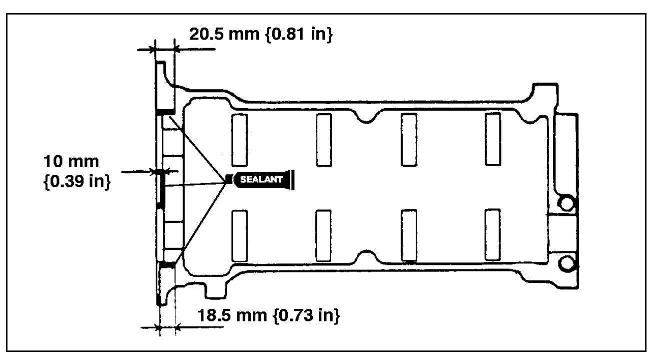


X3U110WB6

2. Apply silicone sealant to the areas shown.

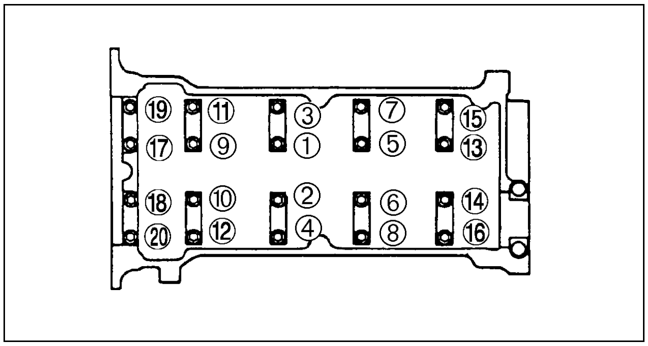
Thickness
1.0 mm {0.04 in}

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.



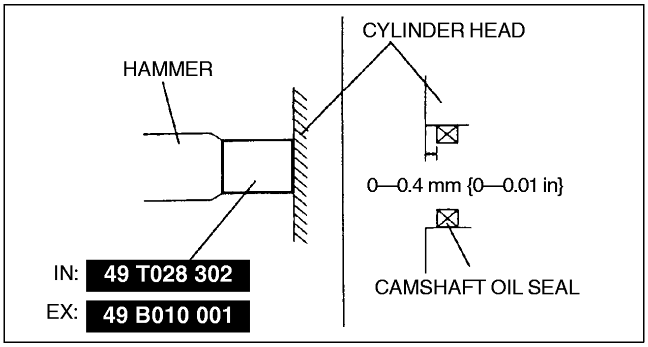
X3U110WB7

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

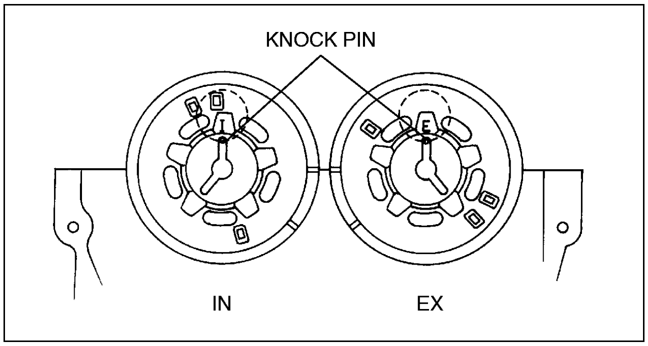
10. Tap the oil seals in evenly using the **SST** and a hammer.



Y3U110WA1

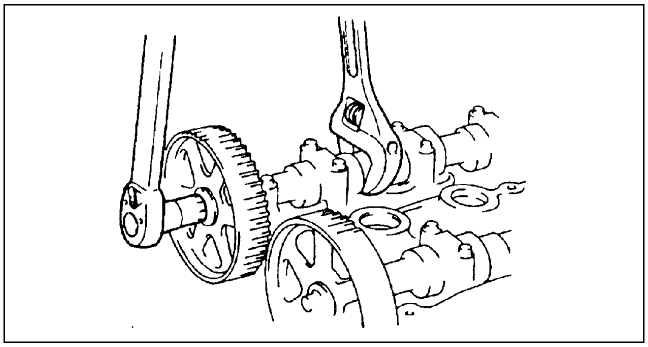
Camshaft Pulley Installation Note

1. Install the camshaft pulleys with the “I” mark (intake side) or “E” mark (exhaust side) straight up.



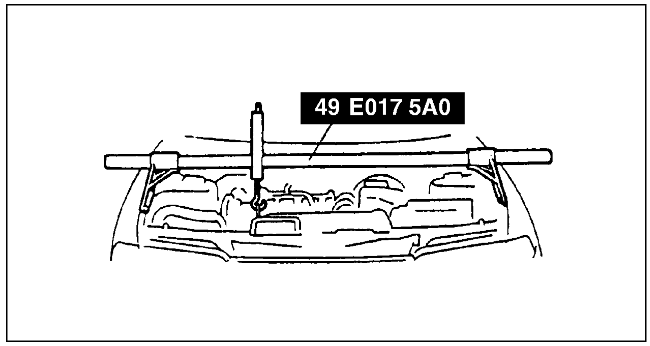
X3U110WBA

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.

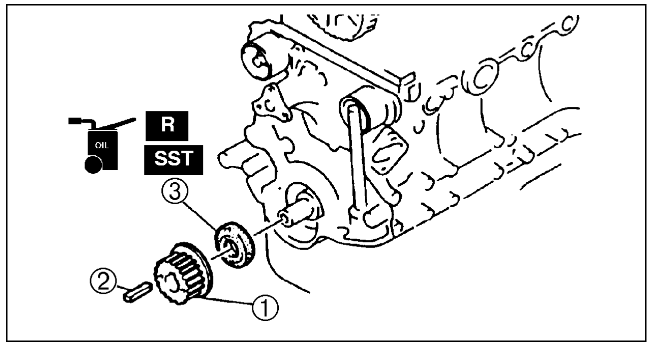


Z3U110WBC

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.



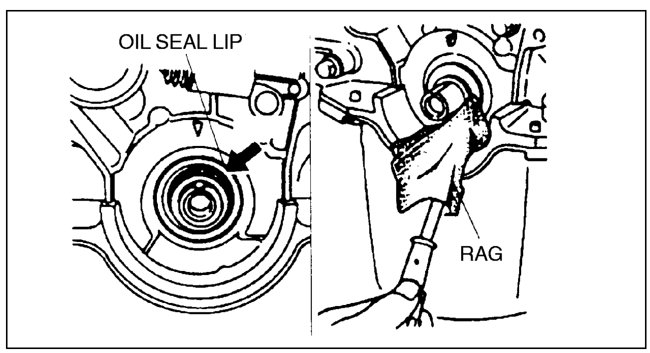
X3U110WBD

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.

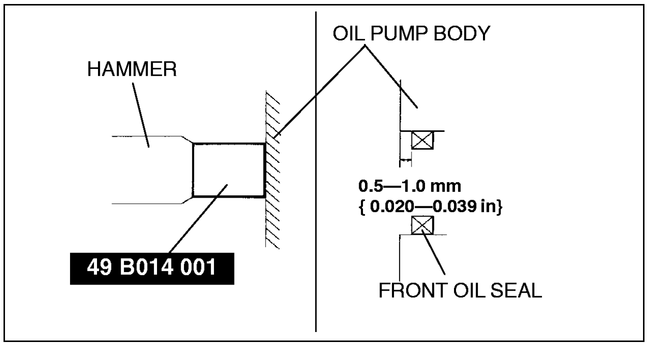


X3U110WBE

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

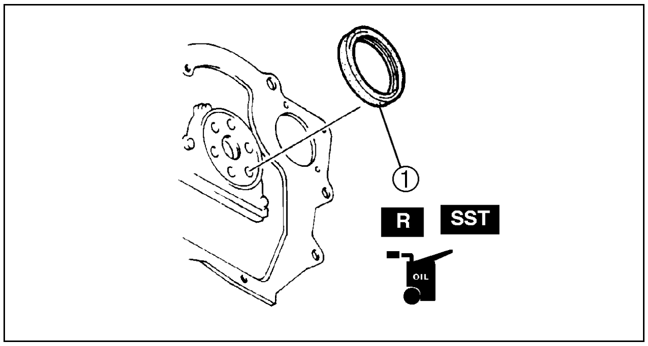
REAR OIL SEAL REPLACEMENT [ZM]

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)

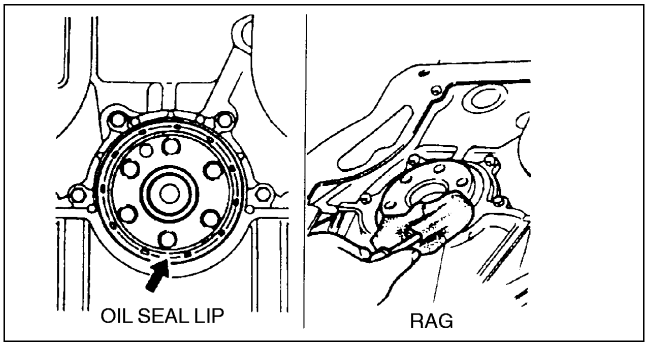
4. Install in the reverse order of removal.



X3U110WBG

Rear Oil Seal Removal Note

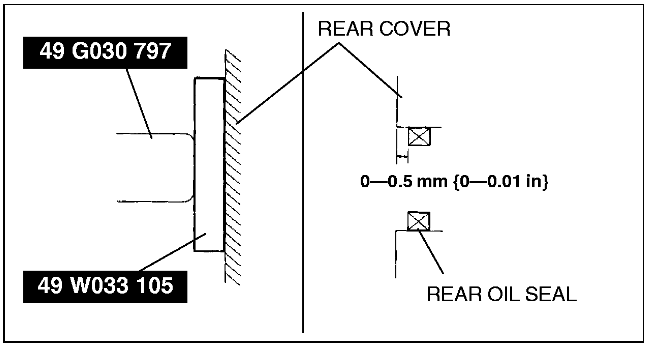
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



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

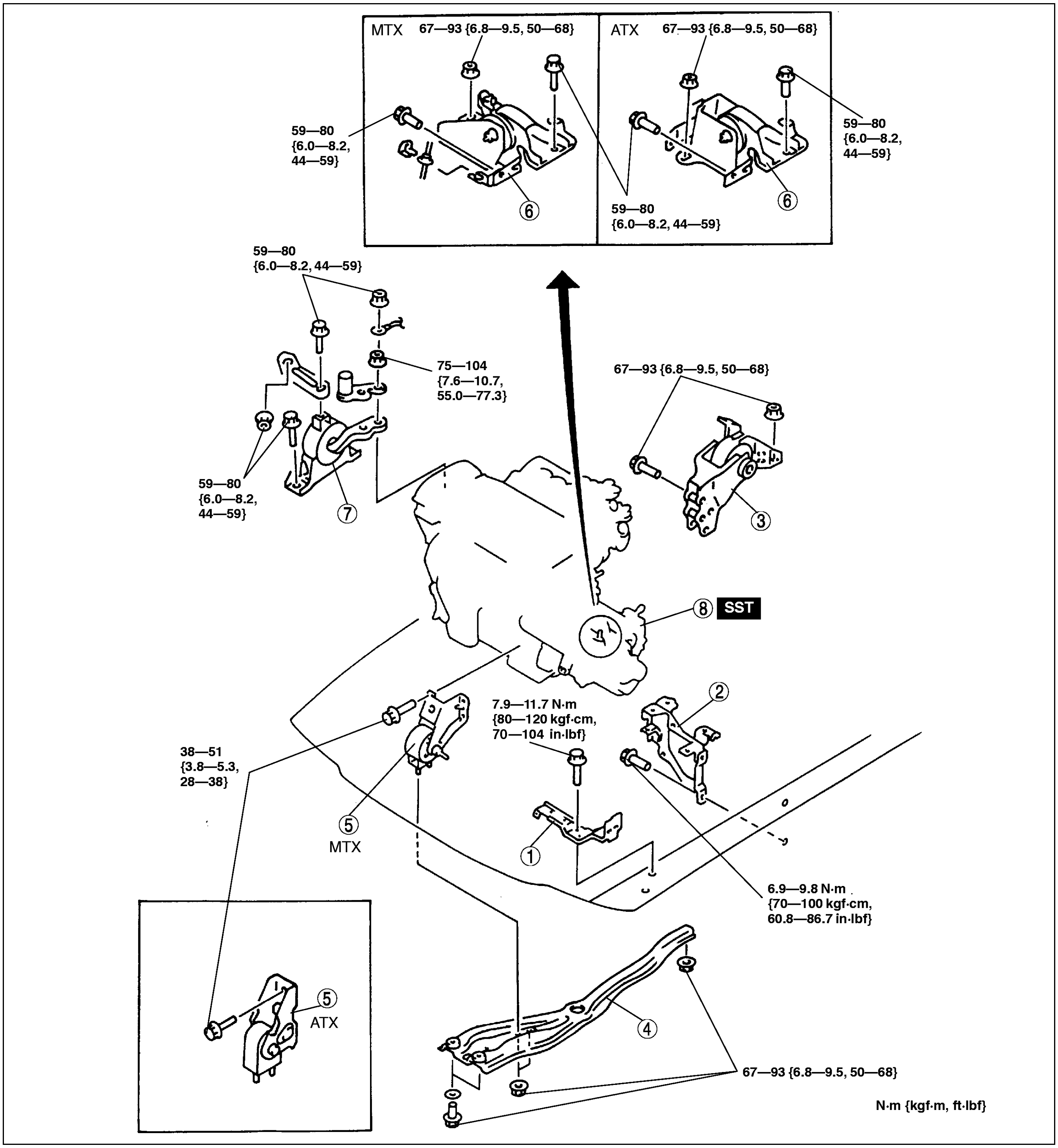
ENGINE REMOVAL/INSTALLATION [ZM]

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.

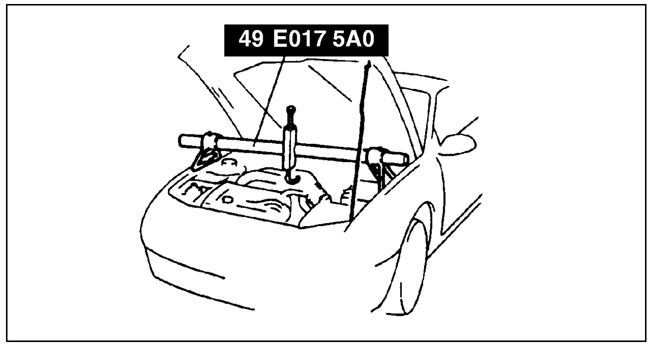


Y3U110WA3

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

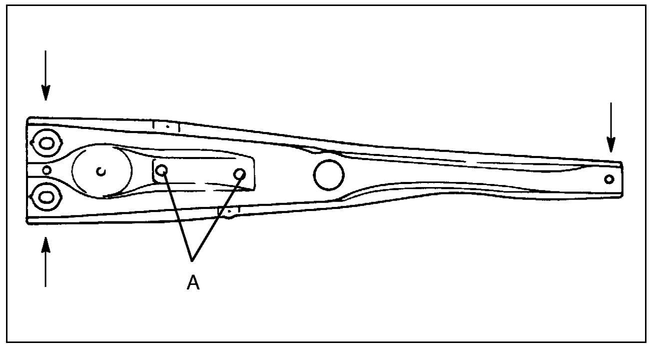
1. Suspend the engine using the **SST**.



Z3U110WBL

Engine Mount Member Removal Note

1. Remove the No.2 engine mount nut A.
2. Remove the engine mount member bolt and nut.



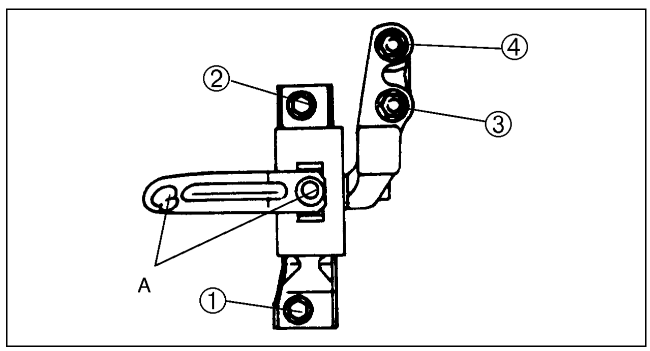
X3U110WBM

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

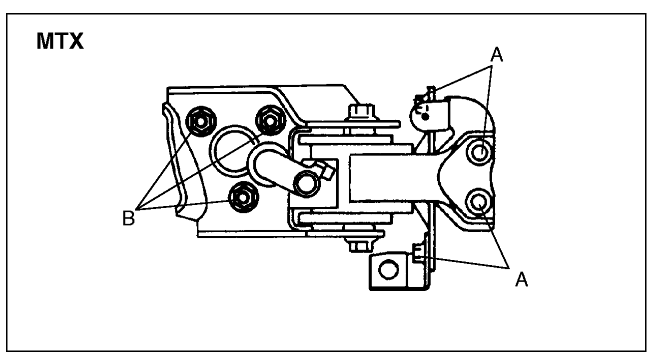
1. Tighten the No.3 engine mount bolt and nut in the order shown.
2. Tighten the No.3 engine mount stay bolt and nut A.



X3U110WBN

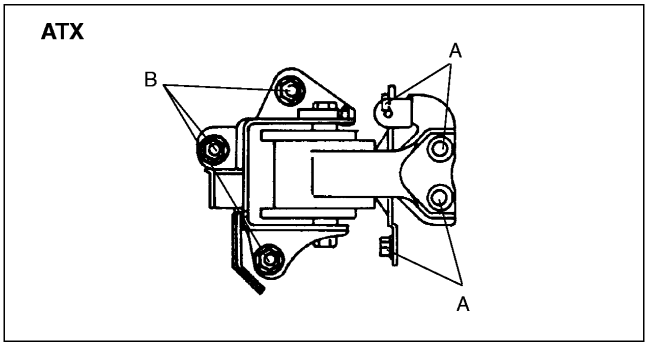
No.4 Engine Mount Installation Note

1. Tighten the No.4 engine mount bolt A.



X3U110WBP

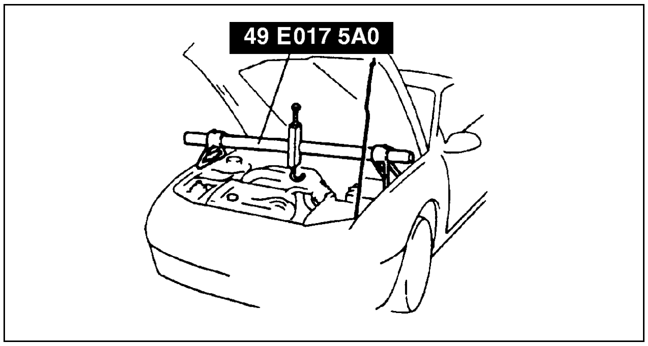
2. Tighten the No.4 engine mount nut B.



X3U110WBQ

No.2 Engine Mount Installation Note

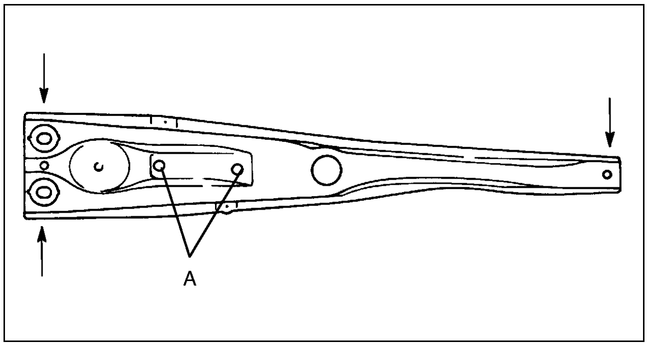
1. Remove the chain block.
2. Suspend the engine using the **SST**.



Z3U110WBR

Engine Mount Member Installation Note

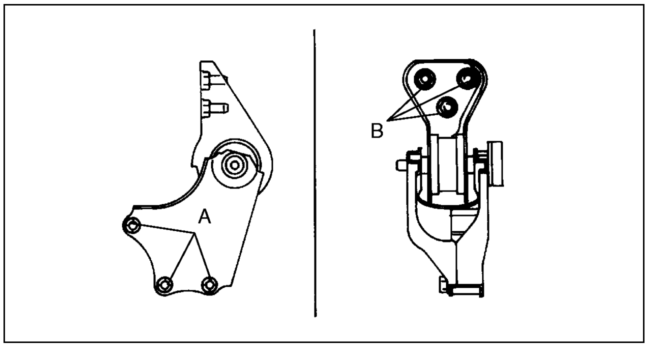
1. Tighten the No.2 engine mount nut A.
2. Tighten the engine mount member bolt and nut.



X3U110WBS

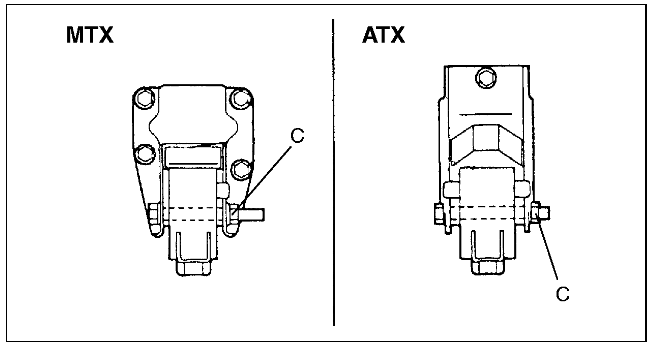
No.1 Engine Mount Installation Note

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.

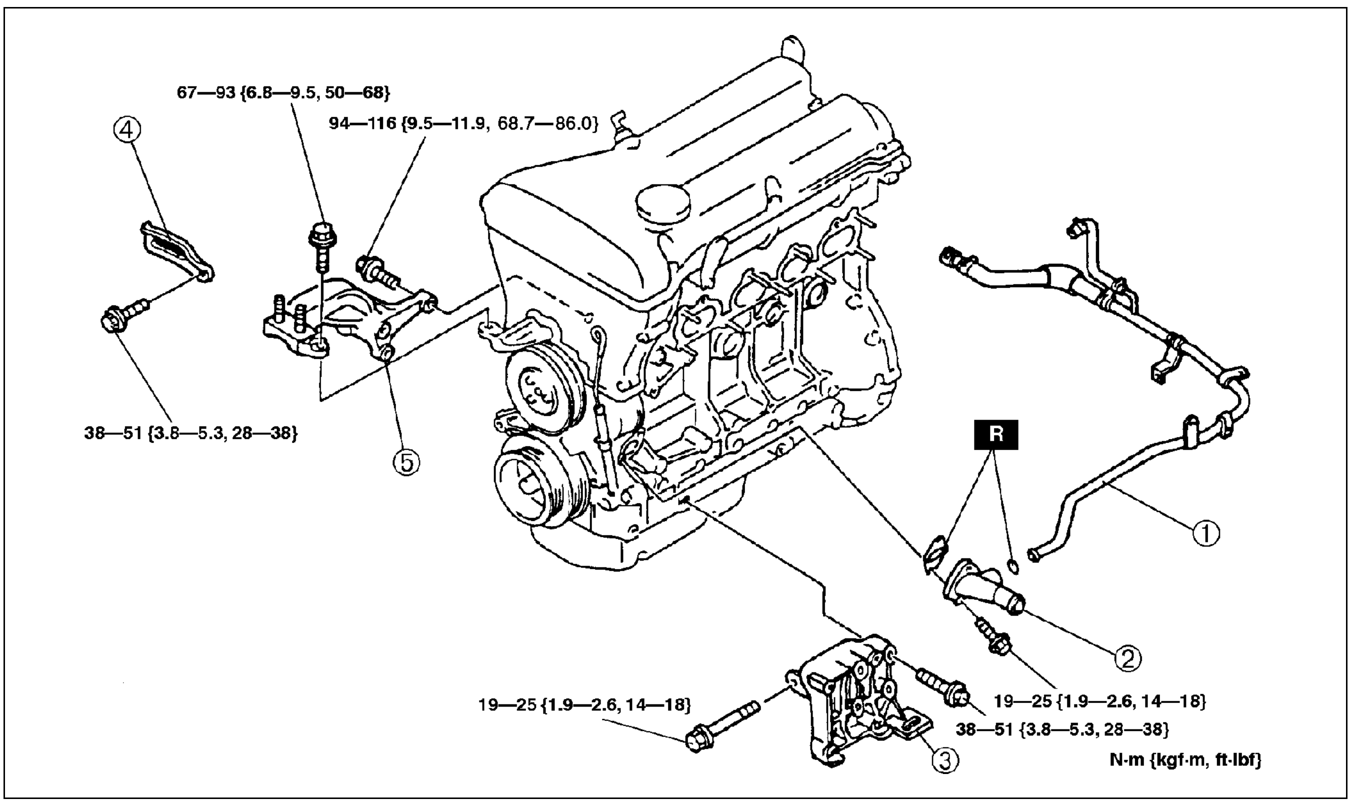


X3U110WBU

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

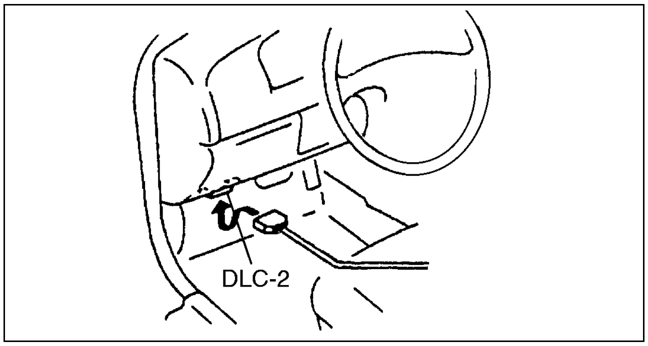
1	Water bypass pipe
2	Water inlet pipe
3	A/C compressor bracket (with A/C compressor)
4	Generator strap
5	No.3 engine bracket

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

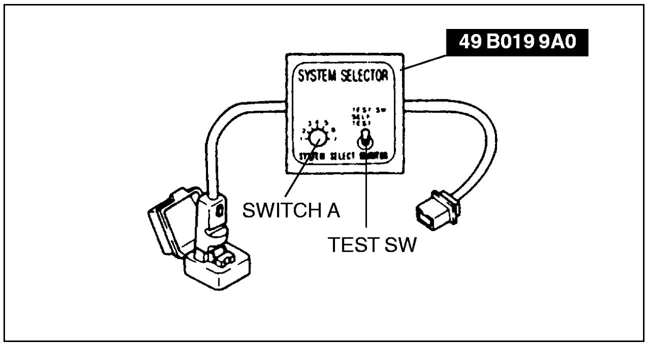
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
    - If not as specified, adjust the idle speed. (See 01–10A–26 Idle Speed Adjustment.)

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].)

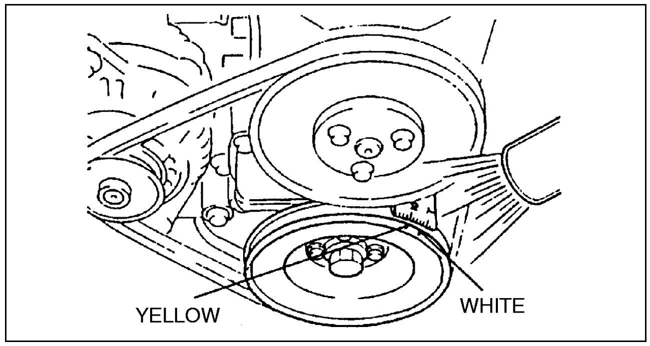
Ignition timing
BTDC 9°—11° (10°±1°) (TIMING MARK [YELLOW])

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

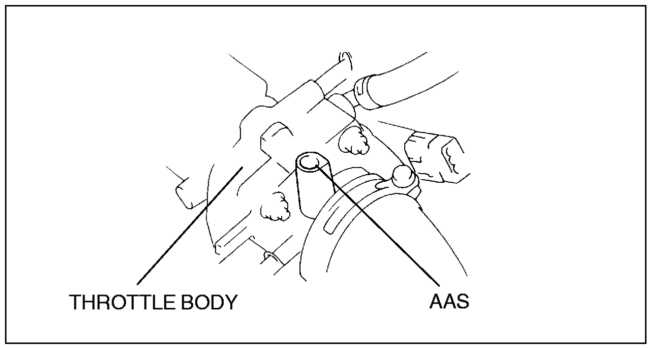
Specification
BTDC 6°—18°

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.

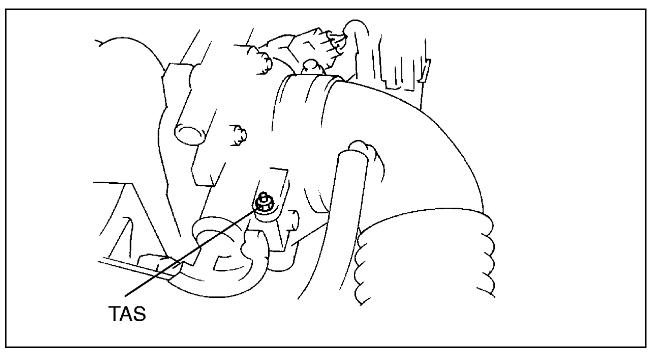
Specification
650—750 (700±50) rpm

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]

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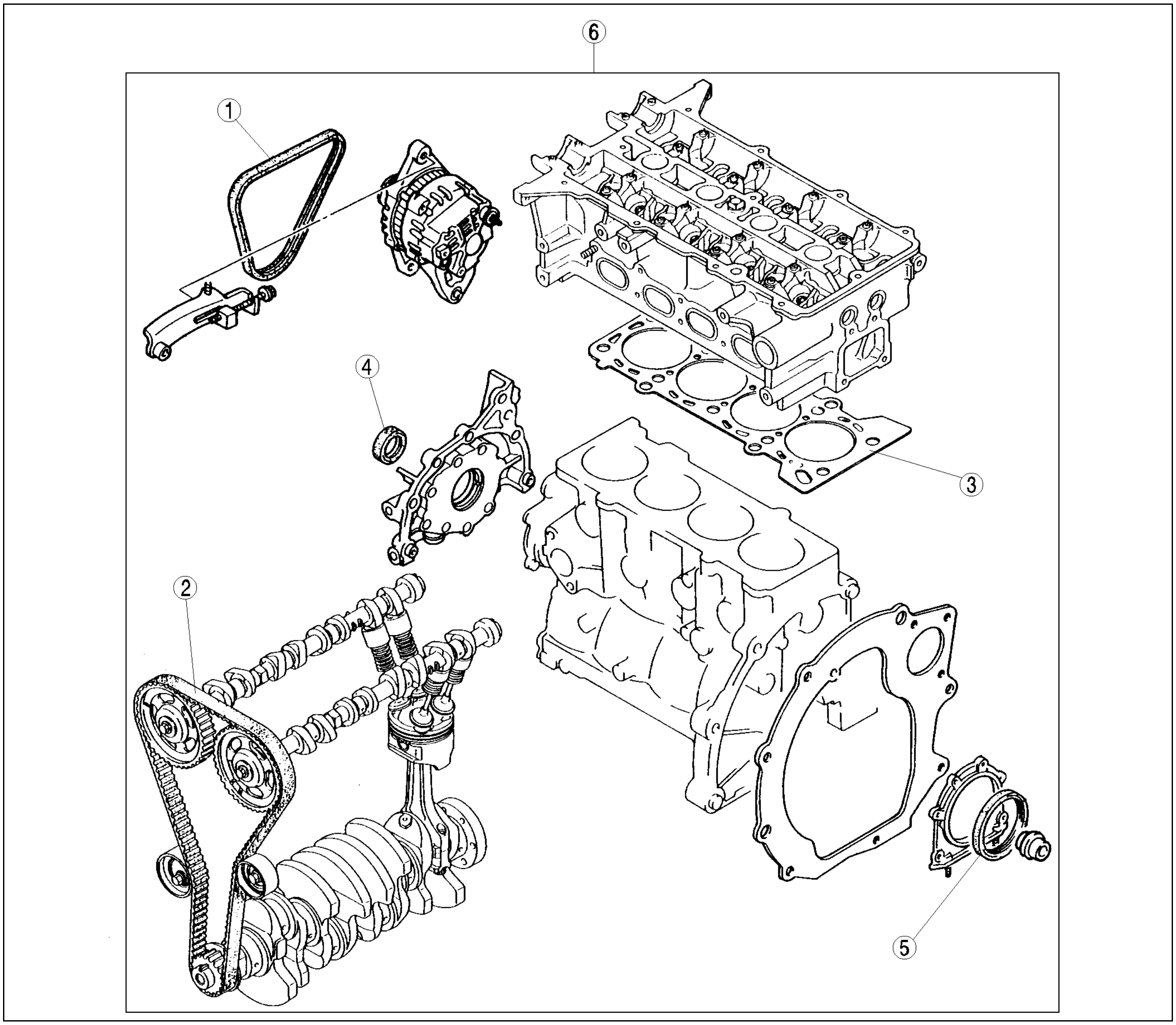


Z3U0110W100

1	Drive belt (See 01–10B–3 DRIVE BELT INSPECTION [FS]) (See 01–10B–4 DRIVE BELT ADJUSTMENT [FS])		4	Front oil seal (See 01–10B–19 FRONT OIL SEAL REPLACEMENT [FS])
2	Timing belt (See 01–10B–8 TIMING BELT REMOVAL/ INSTALLATION [FS])		5	Rear oil seal (See 01–10B–20 REAR OIL SEAL REPLACEMENT [FS])
3	Cylinder head gasket (See 01–10B–14 CYLINDER HEAD GASKET 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

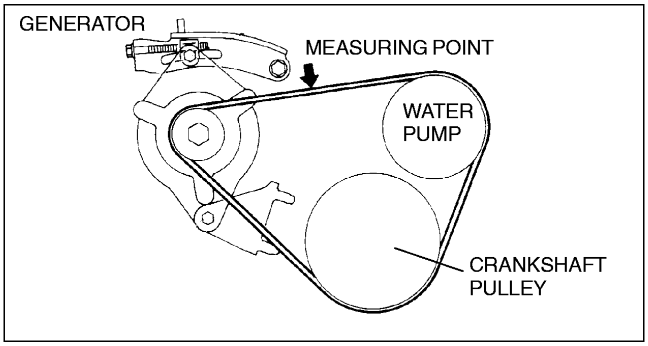
Inspect the drive belt tension or deflection, as necessary.

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.



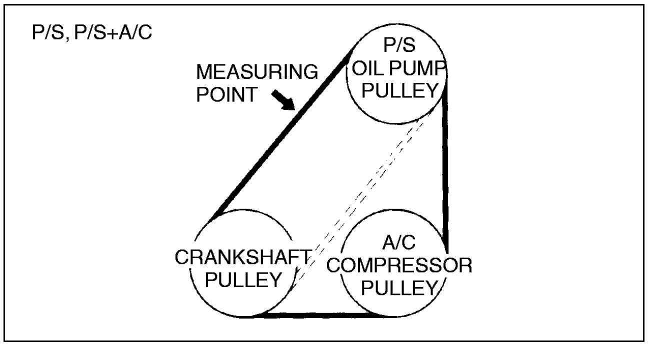
X3U110WF0

- 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

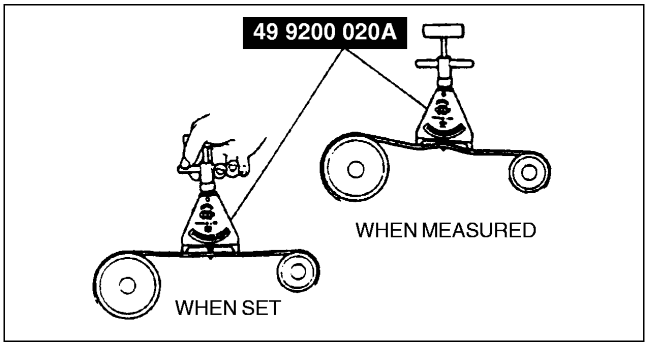
- Belt tension can be inspected in place of belt deflection. Inspect the drive belt tension when the engine is cold, or **at least 30 min** after the engine has been stopped.

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}

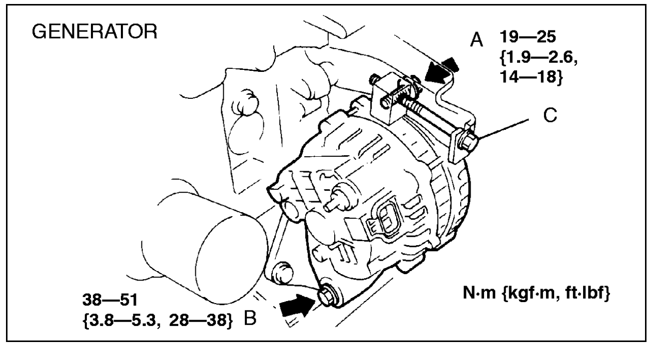


X3U110WF2

DRIVE BELT ADJUSTMENT [FS]

A3U011015800W02

1. Loosen mounting bolt A and B.

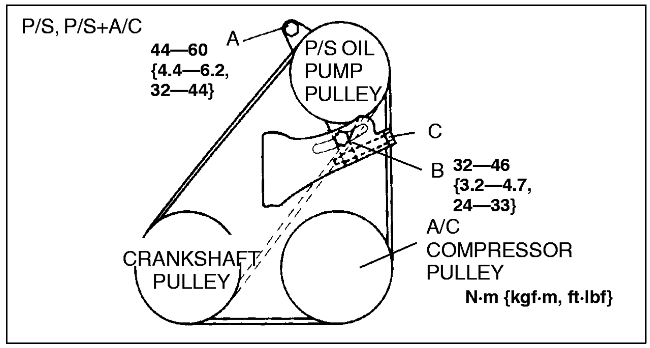


X3U110WF3

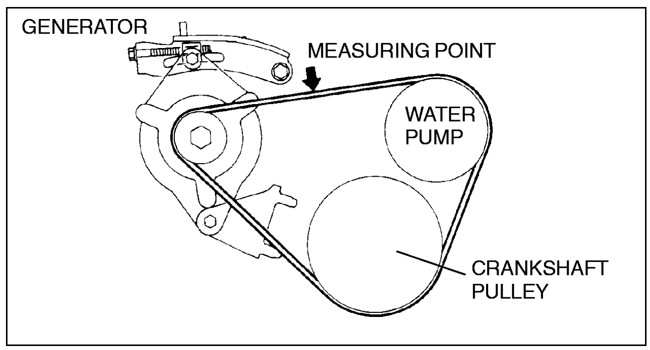
2. Adjust the belt deflection or tension by turning the adjusting bolt C.

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

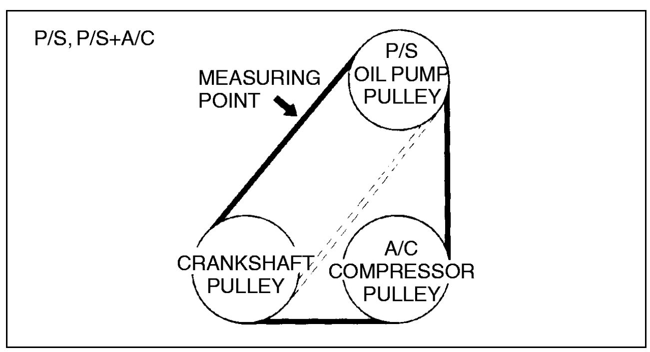


X3U110WF0

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}



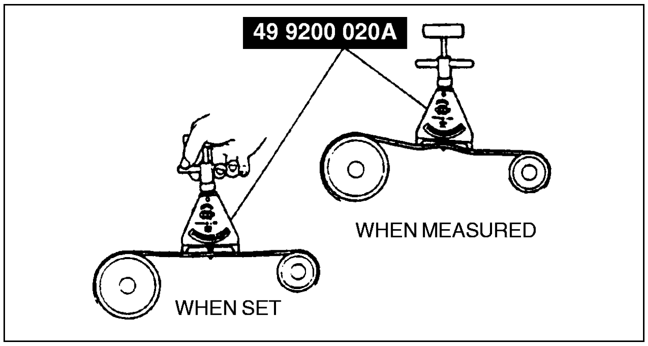
X3U110WF1

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}

3. Tighten mounting bolt A and B.
4. Inspect the belt deflection or tension.
    - If not as specified, repeat from Step 1.

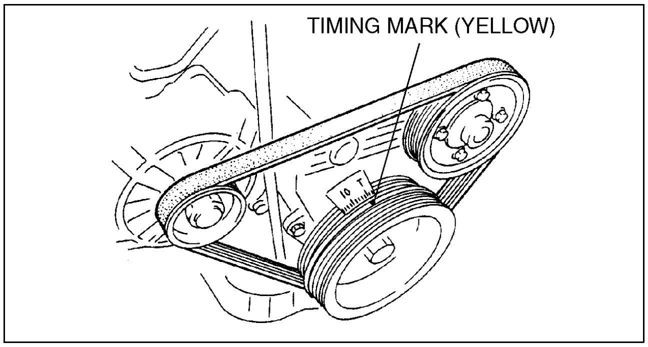


X3U110WF2

VALVE CLEARANCE INSPECTION [FS]

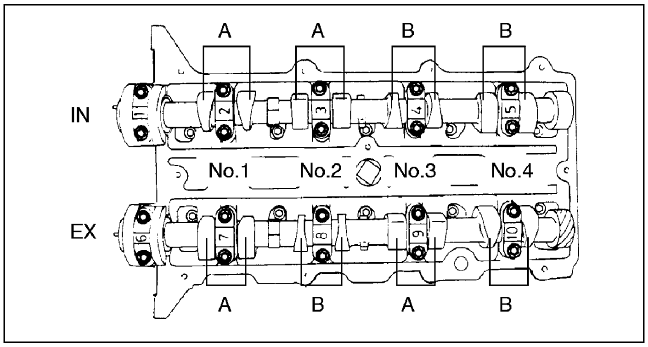
A3U011012010W01

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

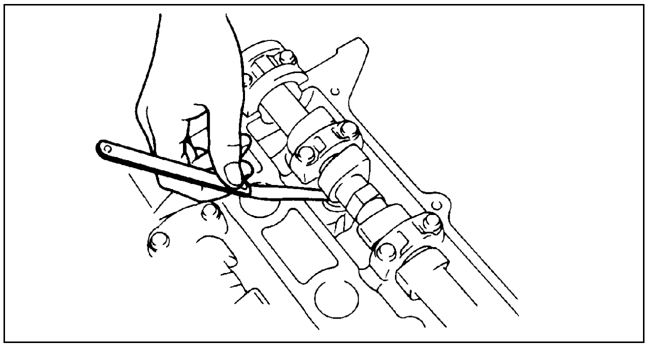
    (2) Measure the valve clearance at A in the figure.



X3U110WF6

- If the valve clearance exceeds the standard, replace the adjustment shim. (See 01–10B–6 VALVE CLEARANCE ADJUSTMENT [FS].)

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})



X3U110WF7

    (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]

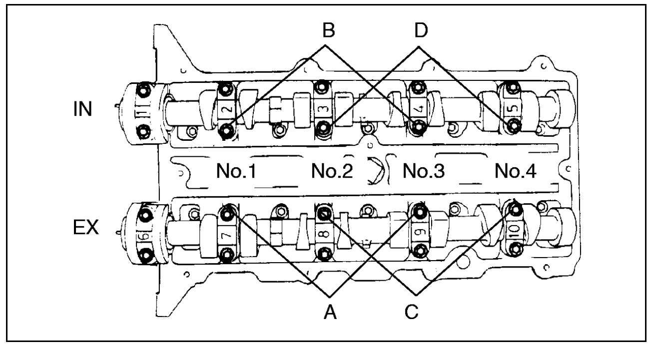
A3U011012010W02

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.

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.

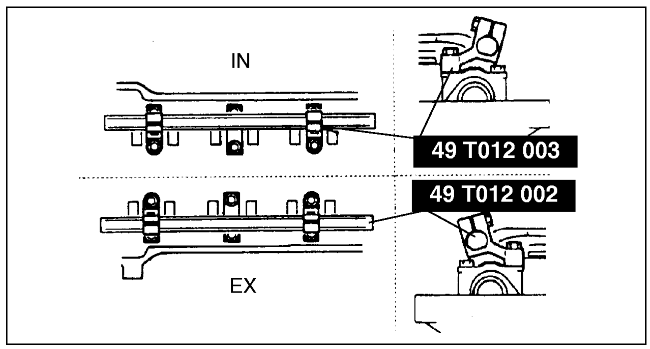


X3U110WF8

Note

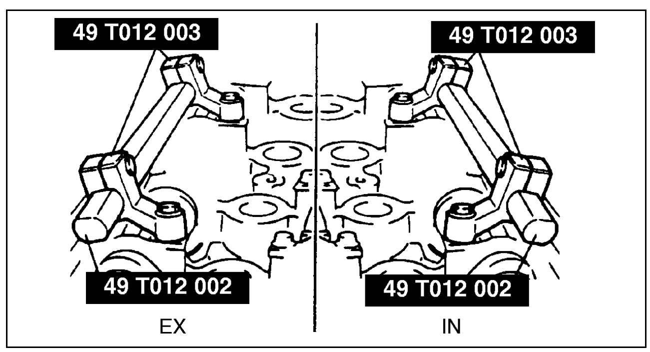
- For EX side No.2, 3 cylinder adjustment shim removal, remove bolts either A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove bolts either B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.



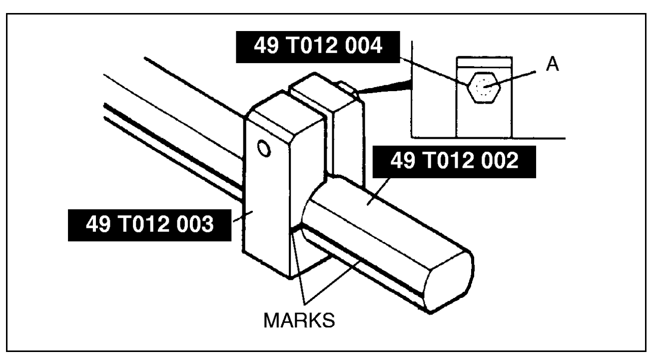
X3U110WF9

Tightening torque
11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}



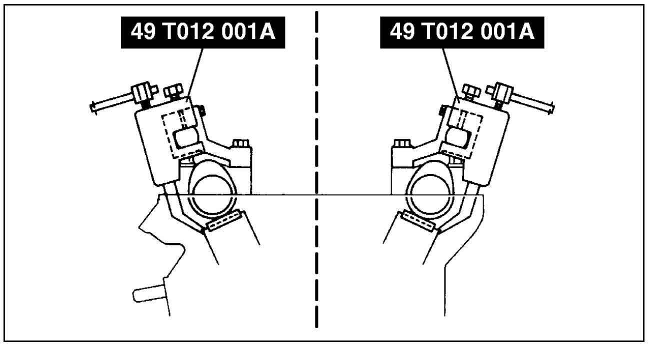
X3U110WFA

4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts A to secure the **SST** (shaft).



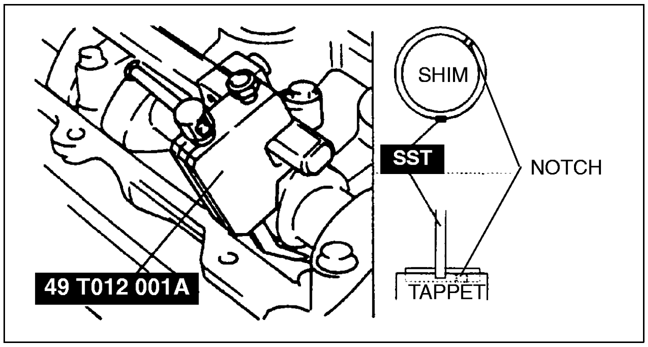
X3U110WFB

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.

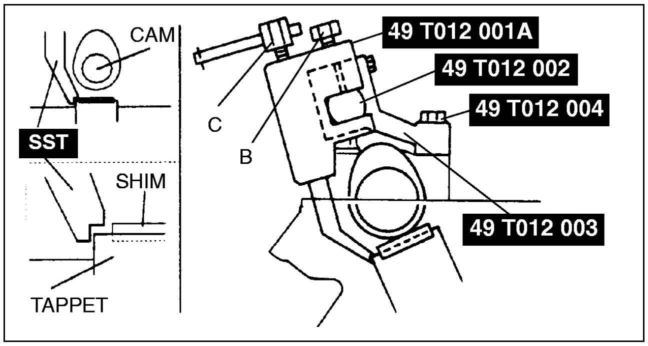


X3U110WFD

9. Tighten bolt B to secure the **SST** (body).

   Caution
   - **Cylinder head can be damaged when the tappet is pressed down.**

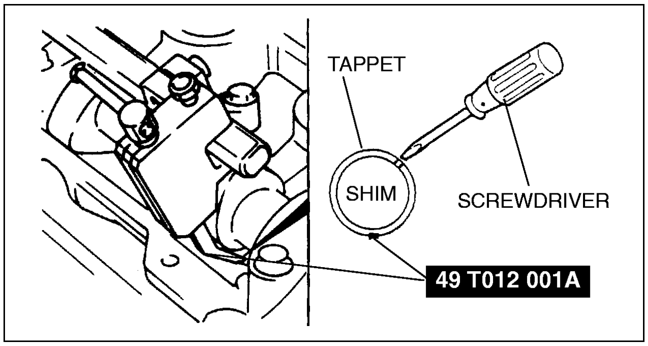
10. Tighten bolt C, and press down the tappet.



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})



X3U110WFF

13. Push the selected shim into the tappet.
14. Loosen bolt C to allow the tappet to move up.
15. Loosen bolt B and remove the **SST** (body).
16. Remove the **SSTs** and tighten the camshaft cap bolts.

    Tightening torque
    11.3—14.2 N·m {115—145 kgf·cm, 100—125 in·lbf}

17. Verify the valve clearance. (See 01–10B–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.

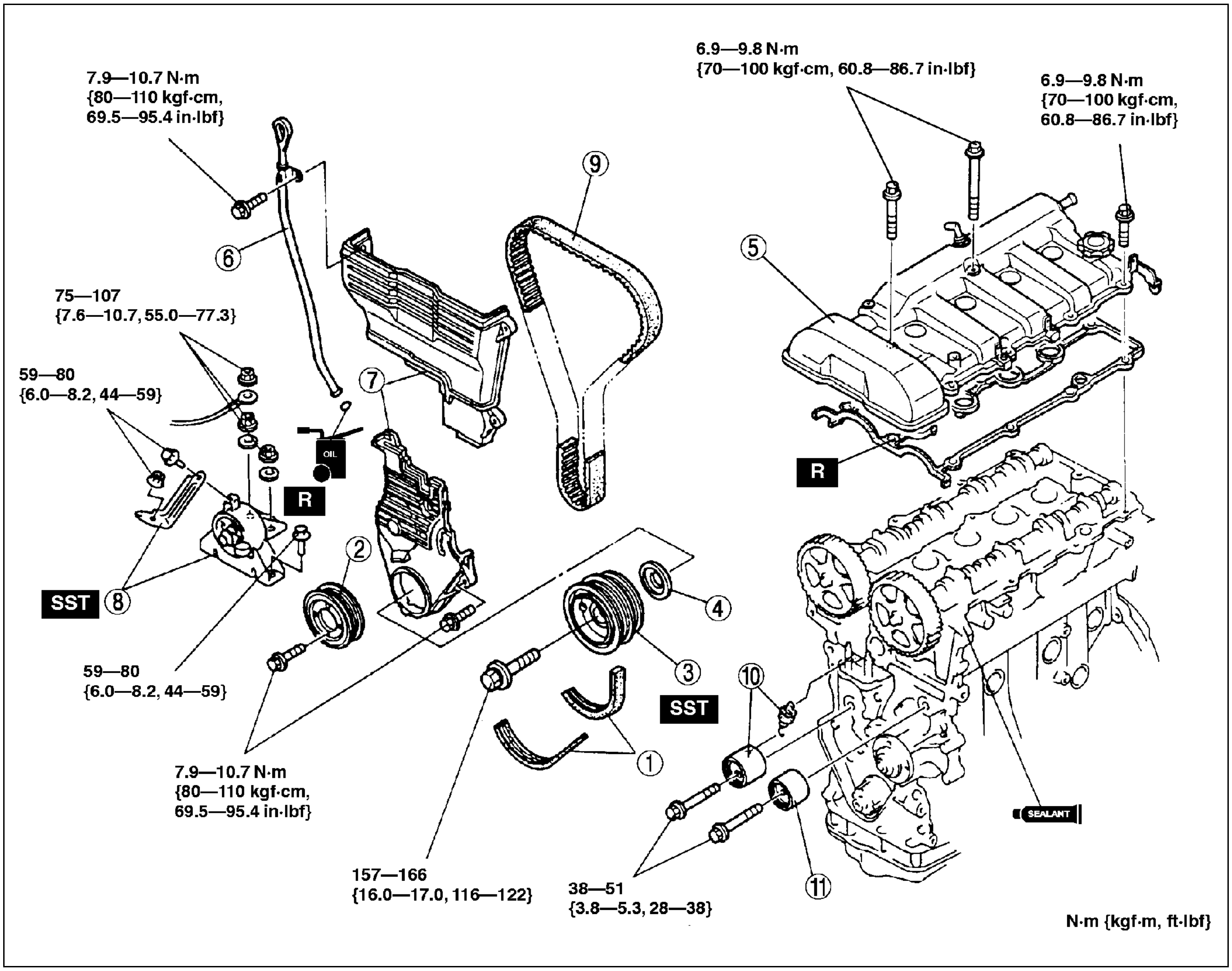
Tightening torque
15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

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.)



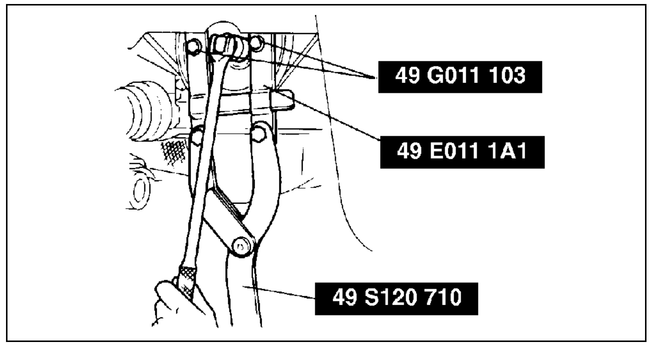
Y3U110WAD

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

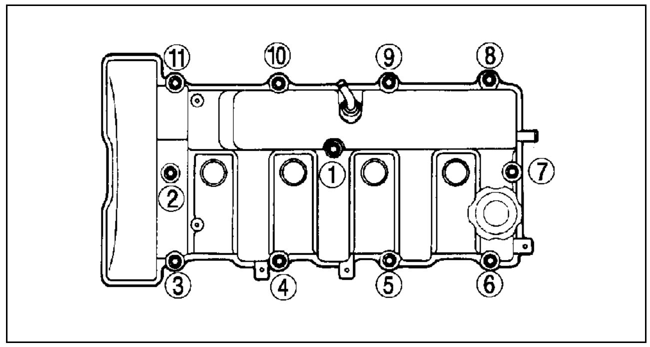
1. Remove the crankshaft using the **SST**.



X3U110WFH

Cylinder Head Cover Removal Note

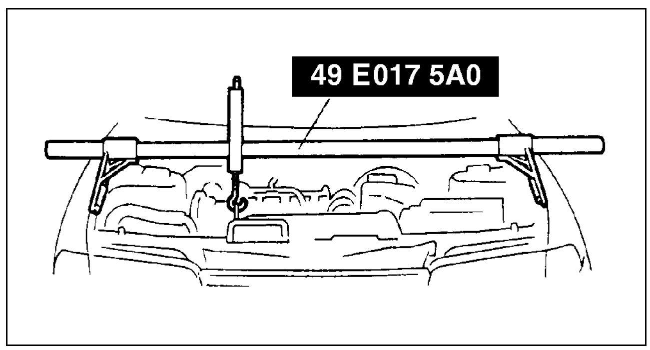
1. Remove the cylinder head cover bolts a few turns in the order shown.



X3U110WFJ

No.3 Engine Mount Rubber Removal Note

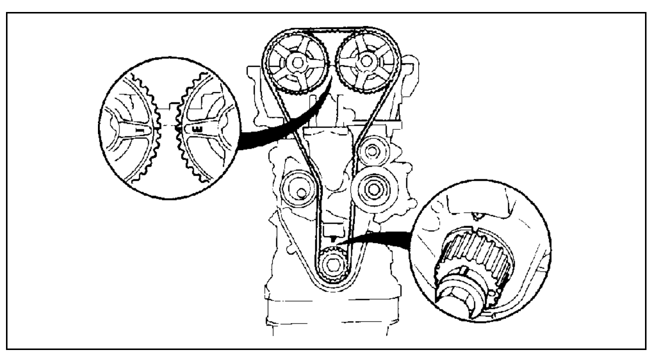
1. Suspend the engine using the **SST**.



Z3U110WFK

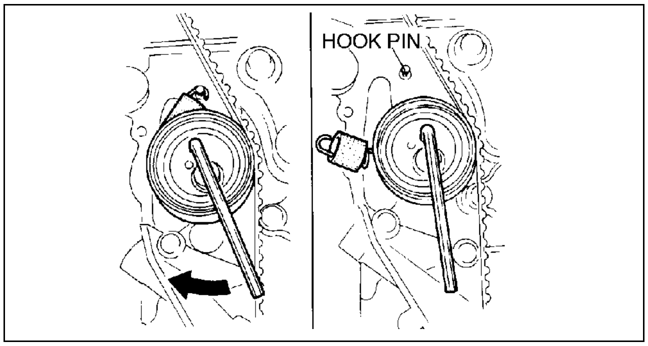
Timing Belt Removal Note

1. Install the pulley lock bolt.
2. Turn the crankshaft clockwise and align the timing marks.



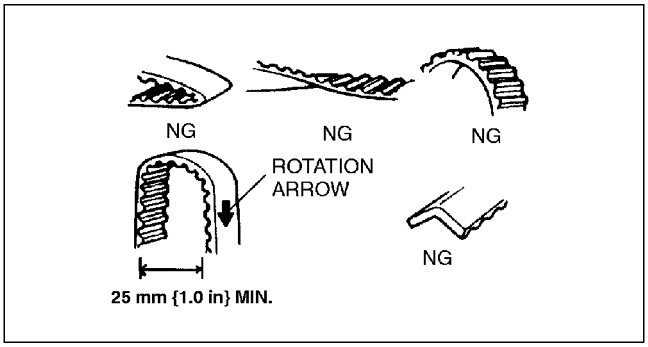
X3U110WFL

3. Turn the tensioner clockwise using an Allen wrench.
4. Disconnect the tensioner spring from the hook pin.



X3U110WFM

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.**



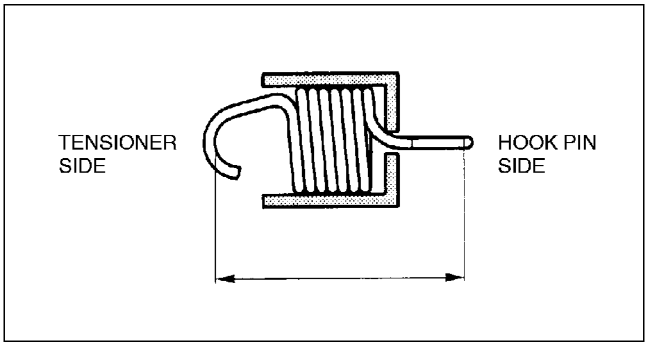
X3U110WFN

Note
- Mark the timing belt rotation on the belt for proper reinstallation.

Tensioner, Tensioner Spring Installation Note

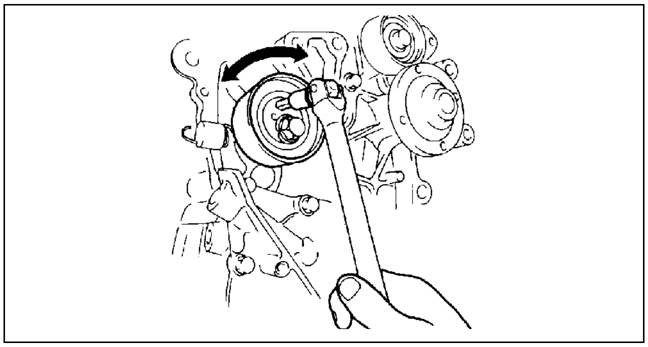
1. Measure the tensioner spring free length.
   - If not within the specification, replace the tensioner spring.

Free length
36.6 mm {1.44 in}



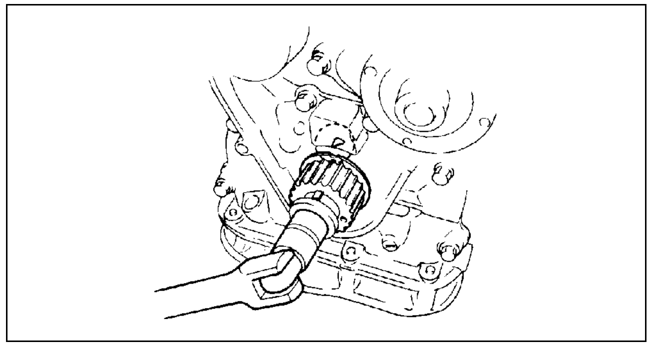
X3U110WFP

2. Install the tensioner.
3. Rotate the tensioner.
   - If tensioner rotates with no resistance or does not rotate, replace the tensioner.

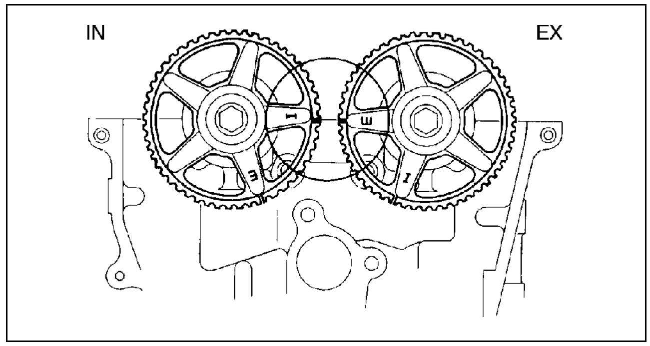

X3U110WFQ

Timing Belt Installation Note

1. Verify that the timing belt pulley mark and camshaft pulley marks are aligned with the timing marks as shown.

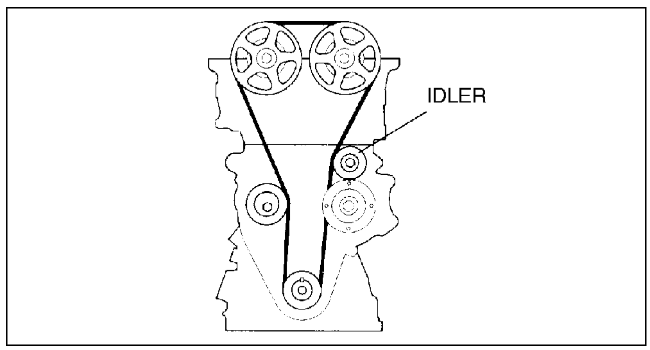


X3U110WFR



X3U110WFS

2. Install the timing belt so that there is no looseness at the idler side.

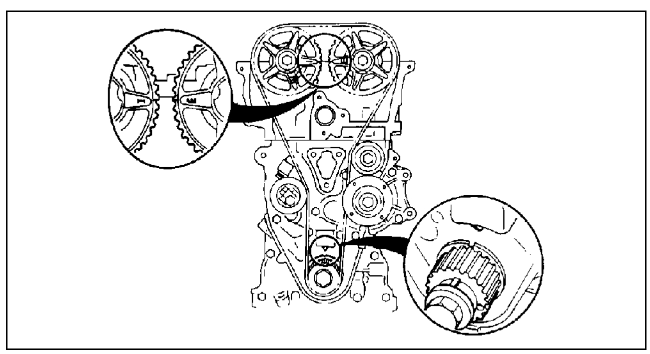


X3U110WFT

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.

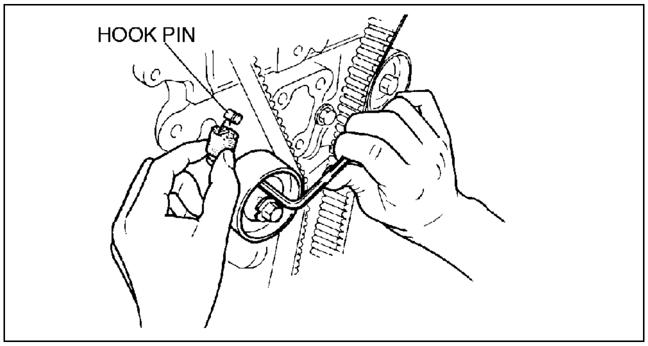
Caution
- **Be sure not to apply tension other than that of the tensioner spring.**

5. Turn the tensioner clockwise using an Allen wrench.



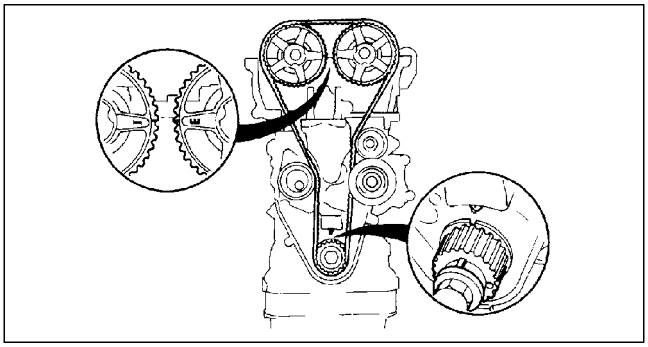
X3U110WFU

6. Connect the tensioner to the hook pin.



X3U110WFV

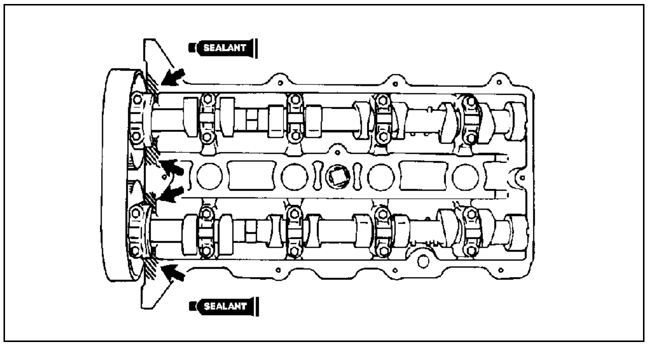
7. Turn the crankshaft clockwise twice, and verify that all timing marks are aligned.
   - If not aligned, repeat from Step 1.



X3U110WFL

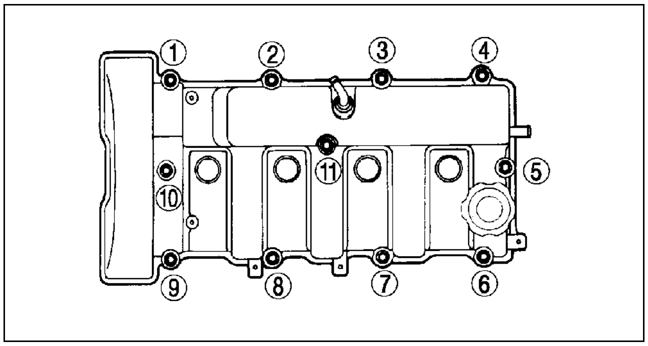
Cylinder Head Cover Installation Note

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

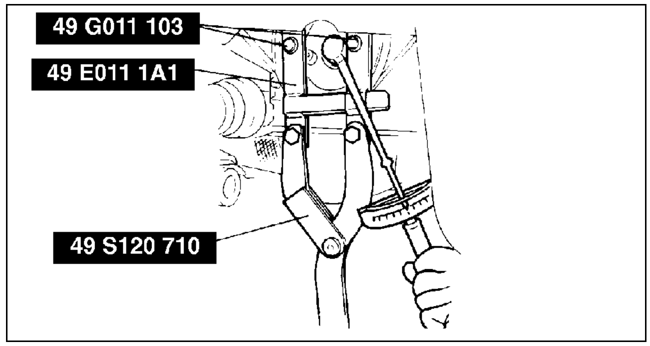
4. Tighten the cylinder head cover bolts a few turns in the order shown.



X3U110WFX

Crankshaft Pulley Installation Note

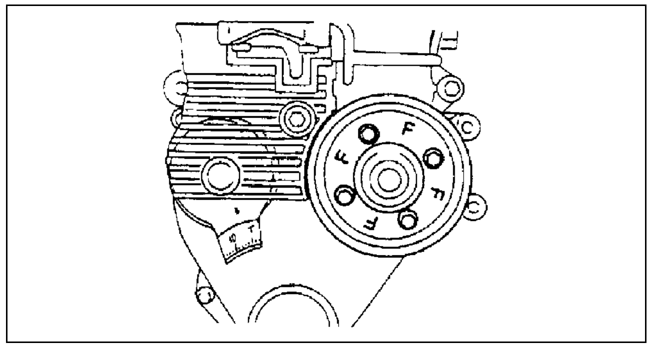
1. Install the crankshaft using the **SST**.



X3U110WFY

Water Pump Pulley Installation Note

1. Install the water pump pulley by facing the “F” marks outward.



X3U110WGL

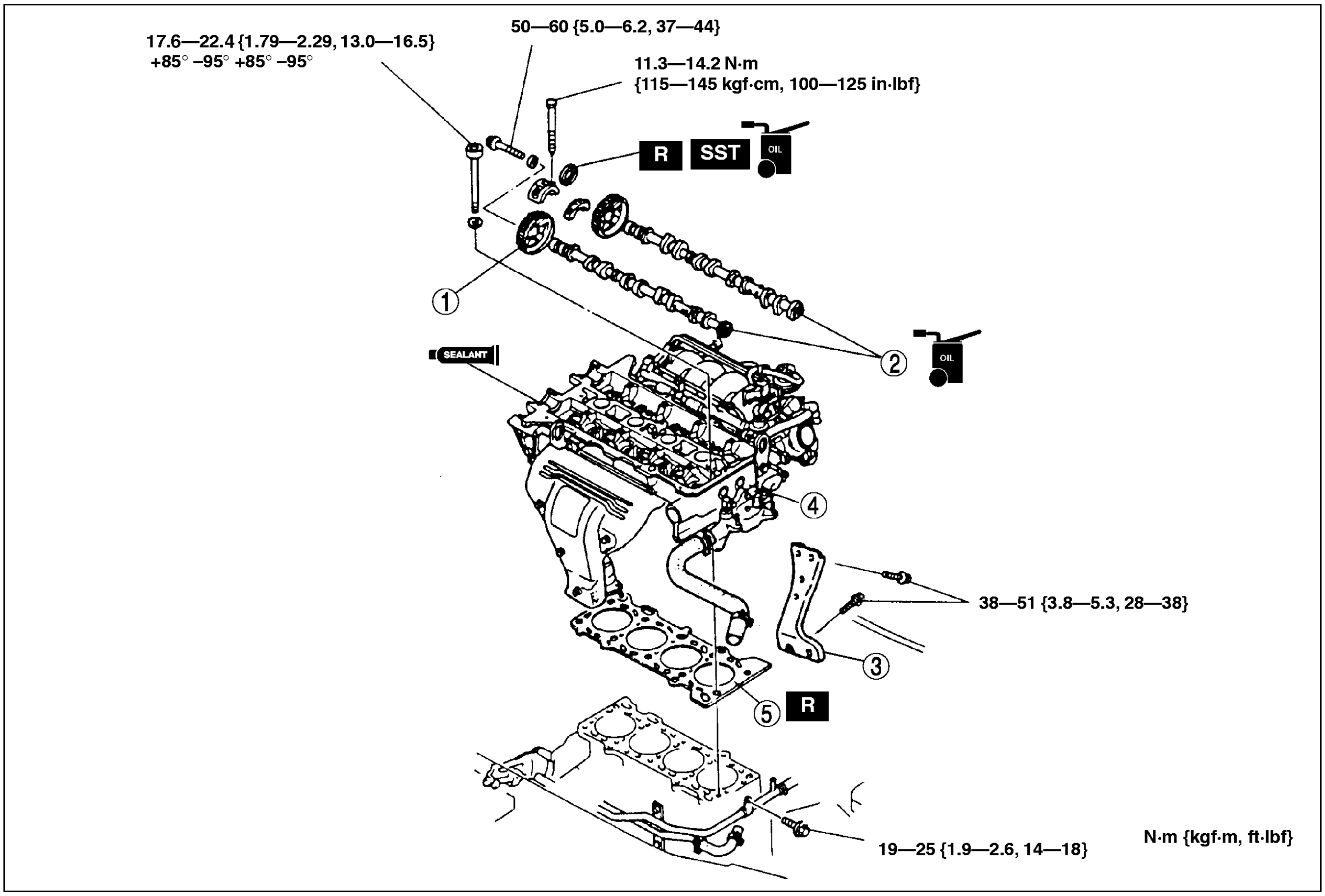
CYLINDER HEAD GASKET REPLACEMENT [FS]

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.)



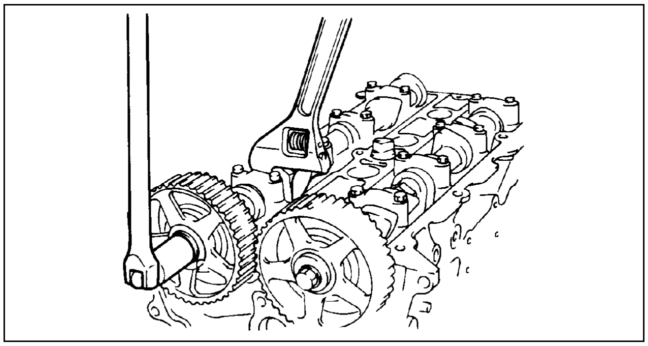
Y3U110WA6

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

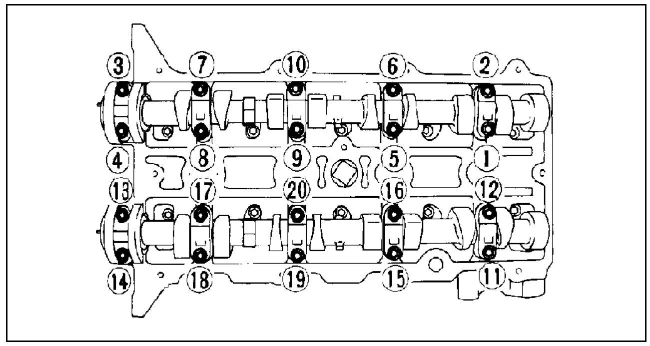
1. Hold the camshaft using a wrench on the cast hexagon as shown.



X3U110WG0

Camshaft Removal Note

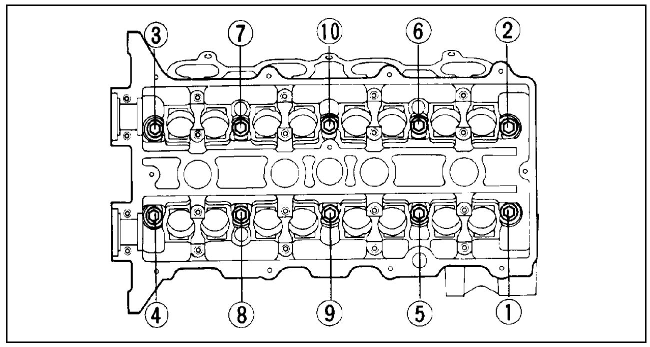
1. Loosen the camshaft cap bolts a few turns in the order shown.



Z3U110WG1

Cylinder Head Removal Note

1. Loosen the cylinder head bolts a few turns in the order shown.

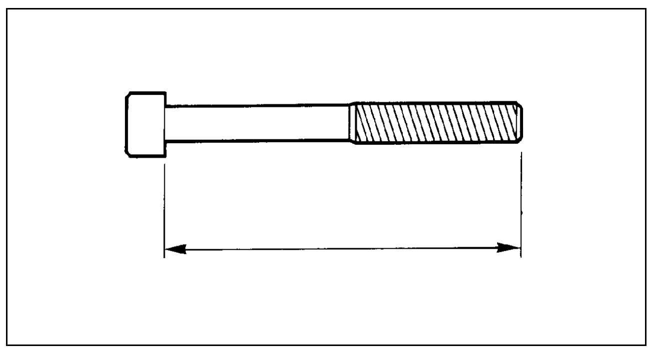


X3U110WG2

Cylinder Head Installation Note

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

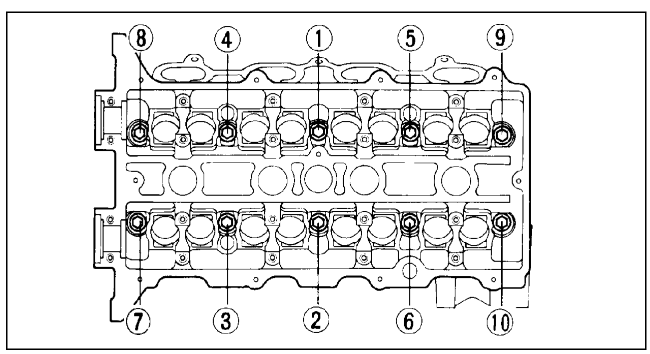
   Standard length
   104.2—104.8 mm {4.103—4.125 in}
   Maximum length
   105.5 mm {4.153 in}



X3U110WG3

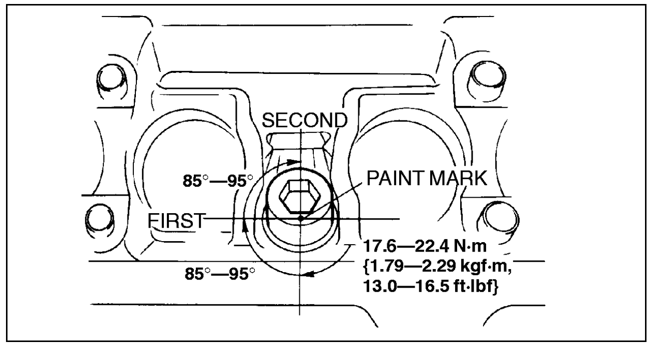
2. Tighten the cylinder head bolts a few turns in the order shown.

   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.



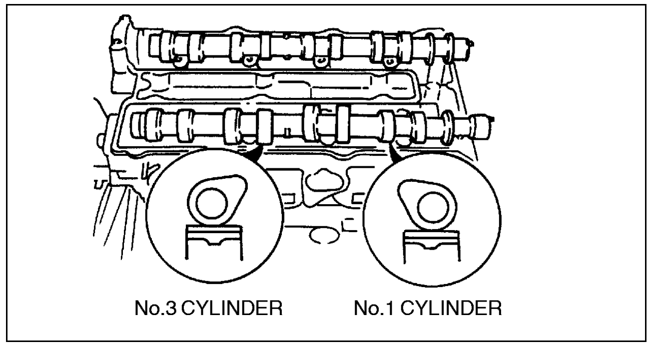
Y3U110WA7

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.



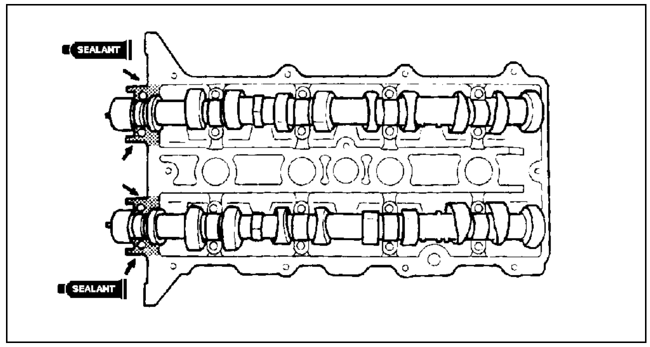
X3U110WG6

2. Apply silicone sealant to the areas shown.

Note

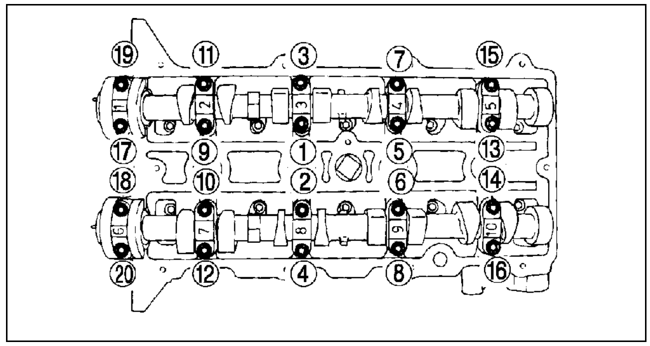
- Keep the camshaft sliding surface free of sealant to prevent engine damage.

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.



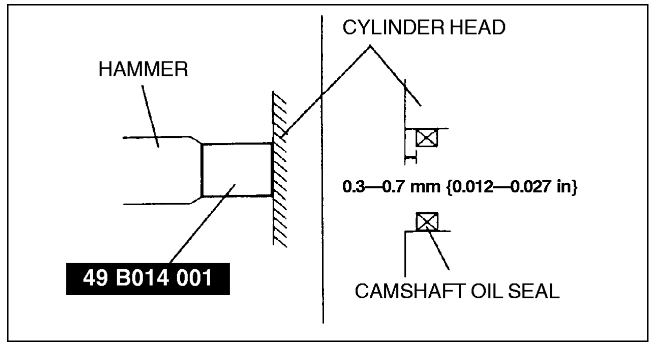
Z3U110WG7

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

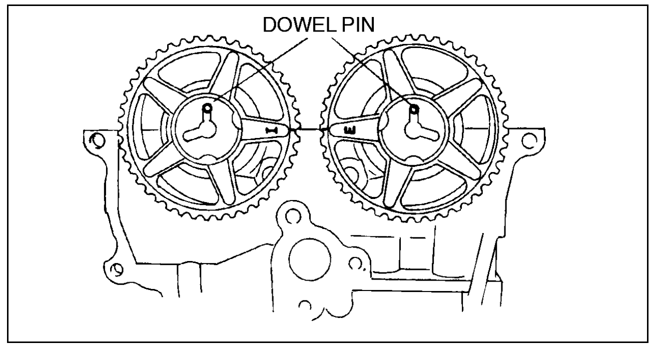
10. Tap the oil seals in evenly using the **SST** and a hammer.



X3U110WG9

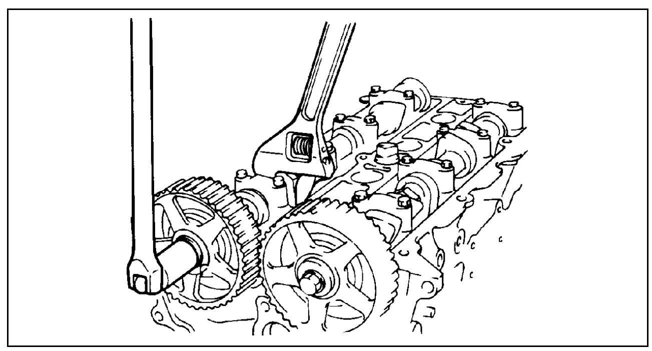
Camshaft Pulley Installation Note

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

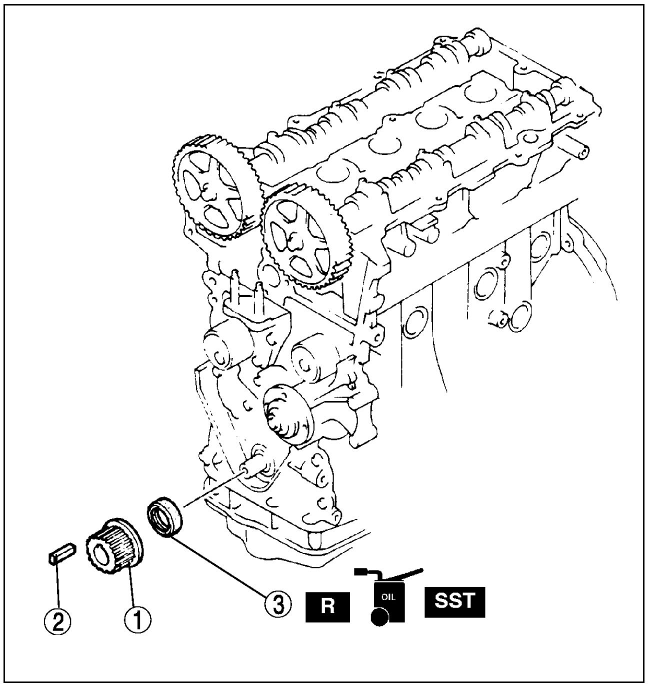
FRONT OIL SEAL REPLACEMENT [FS]

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)

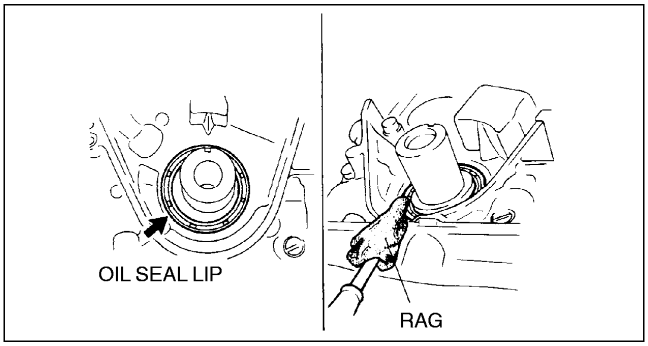
4. Install in the reverse order of removal.



X3U110WGB

Front Oil Seal Removal Note

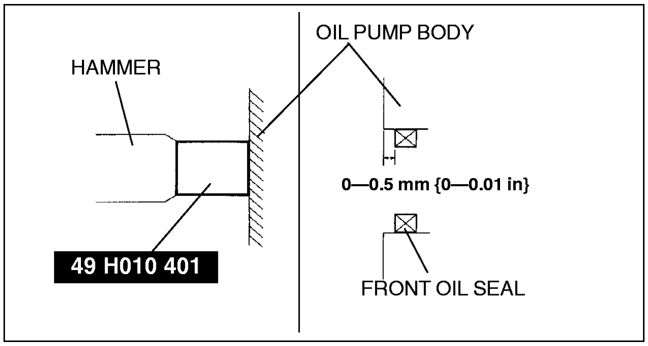
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



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

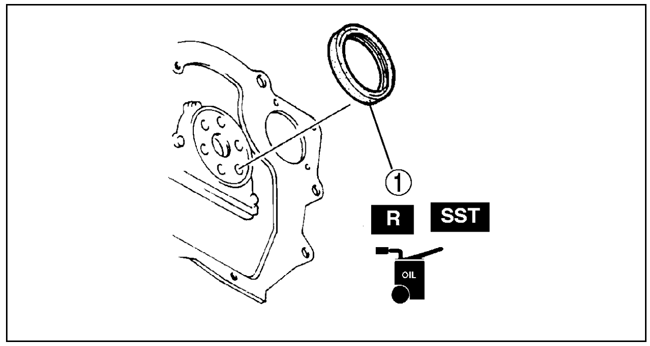
REAR OIL SEAL REPLACEMENT [FS]

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)

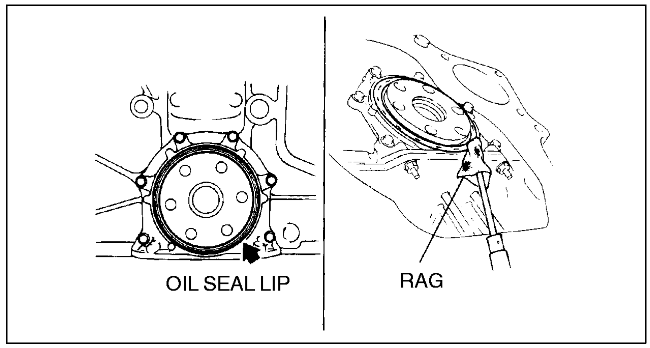
4. Install in the reverse order of removal.



X3U110WGE

Rear Oil Seal Removal Note

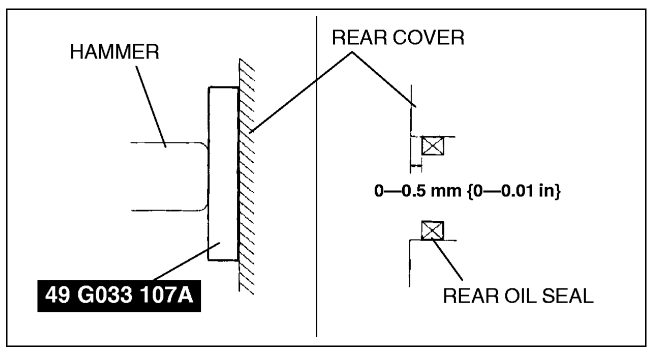
1. Cut the oil seal lip using a razor.
2. Remove the oil seal using a screwdriver protected with a rag.



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

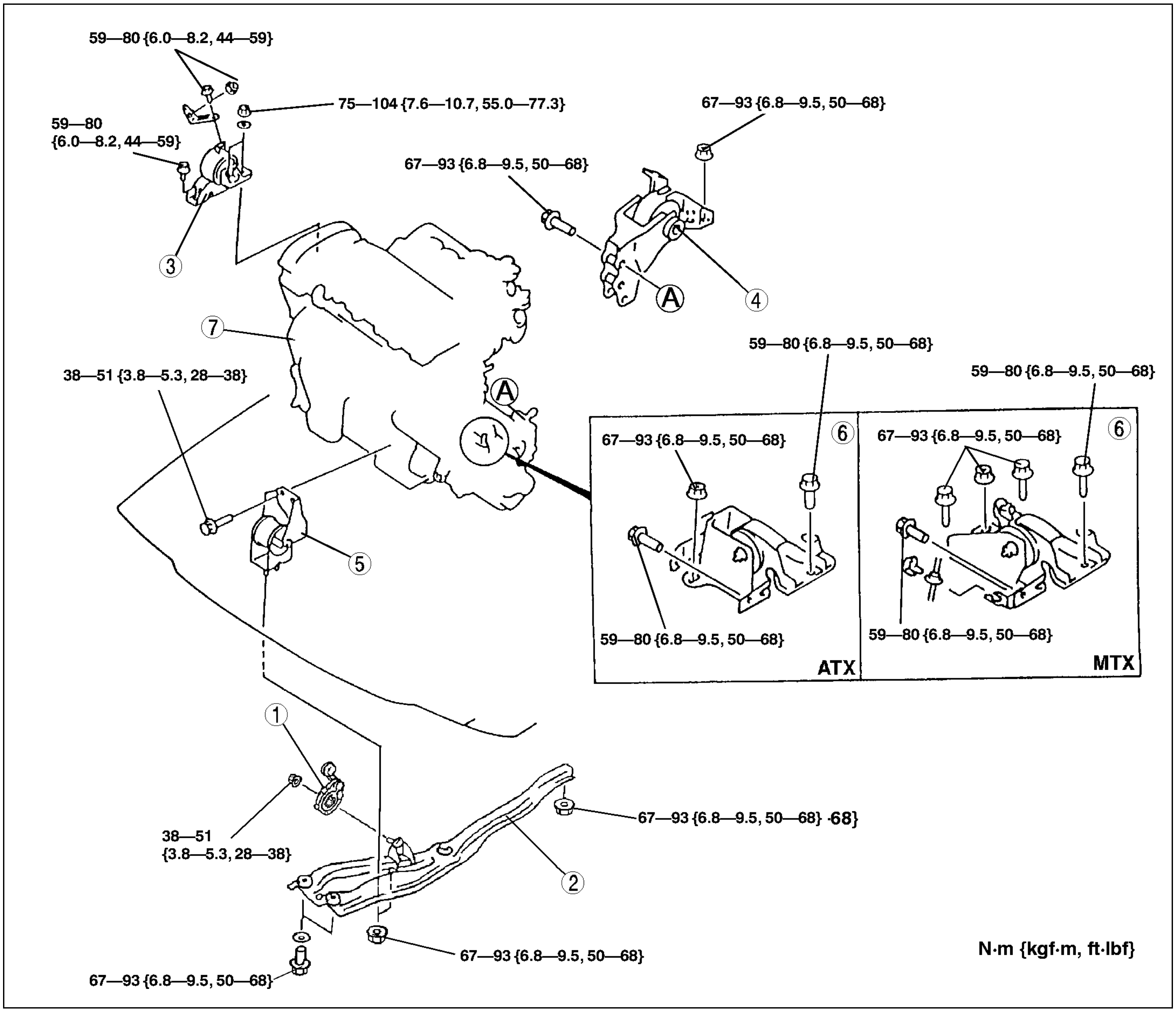
ENGINE REMOVAL/INSTALLATION [FS]

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.

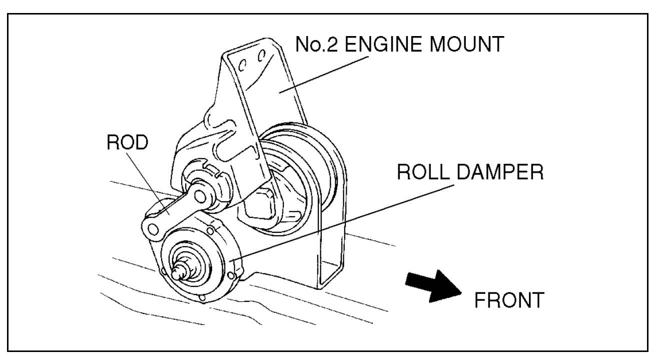


Z3U0110W997

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.

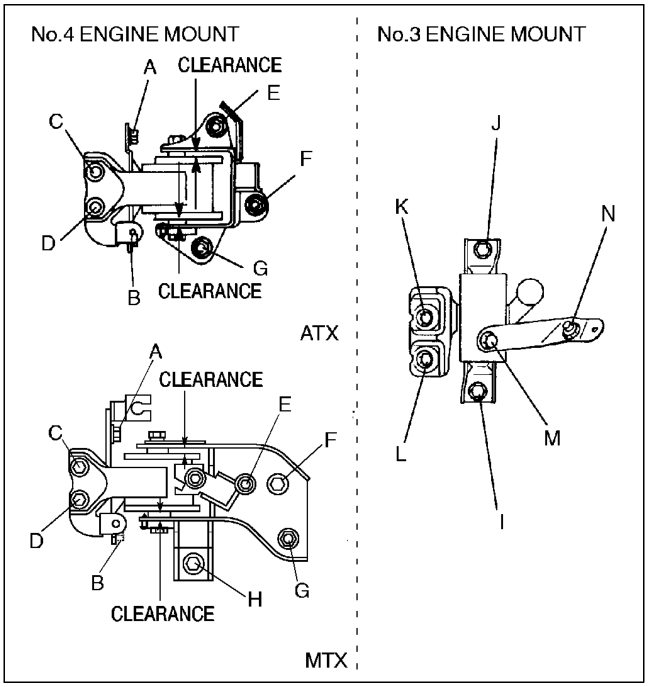


Z3U0110W991

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}

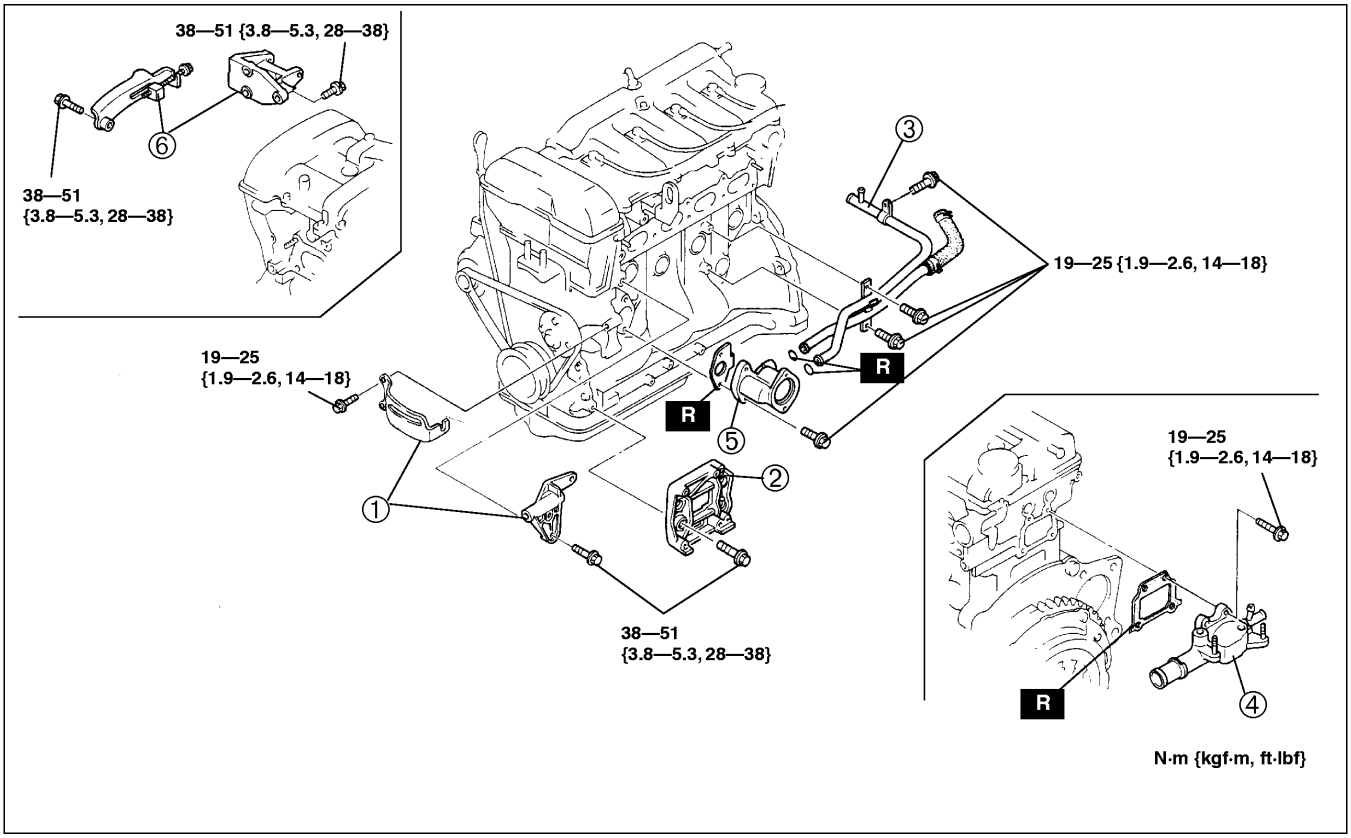


Z3U0110W996

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

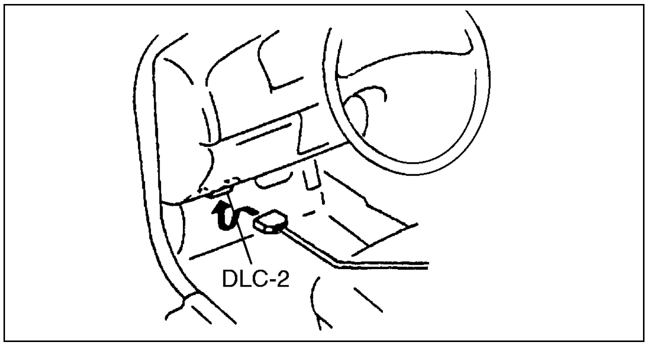
4	Water outlet
5	Thermostat housing
6	Generator bracket

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

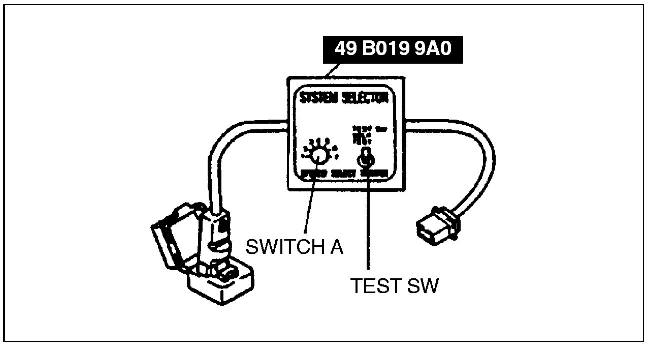
1. Perform “Engine Tune-up Preparation”.
2. Verify that the RPM PID is within the specification.
   - If not as specified, adjust the idle speed. (See 01–10B–26 Idle Speed Adjustment.)

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].)

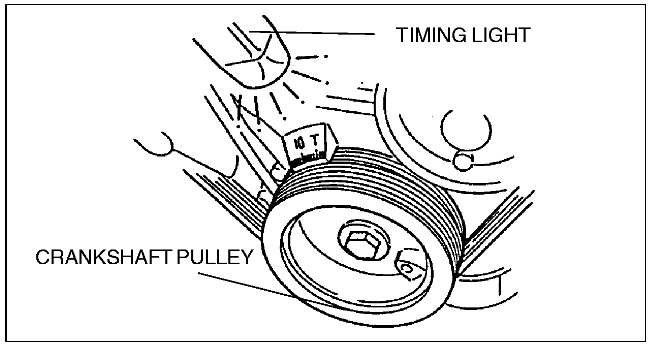
Ignition timing
BTDC 9°—11° (10°±1°) (TIMING MARK [YELLOW])

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].)

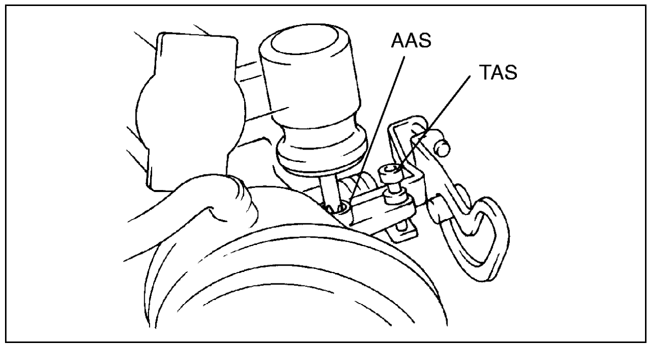


X3U110WGN

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



X3U110WGP

Caution
- **The TAS is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.**

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.

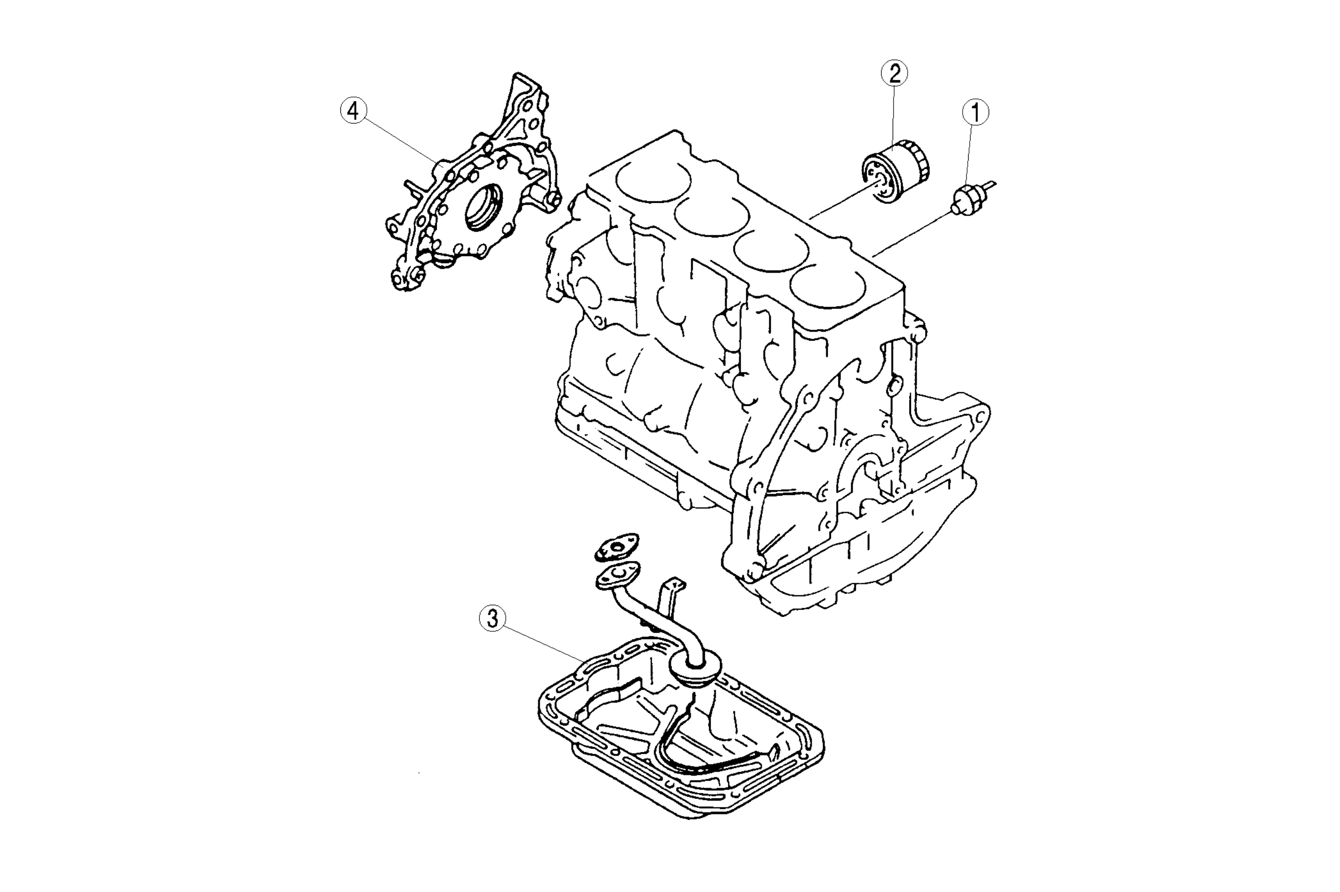
6. Verify that the CO and HC concentrations are within the specified limits.
   - If not within the specified limits, inspect the following:
     — On-board diagnostic system (See 01–02B–15 DTC TABLE [FS].)
     — HO2S (See 01–40B–37 HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS].)
     — Intake manifold 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

01–11

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

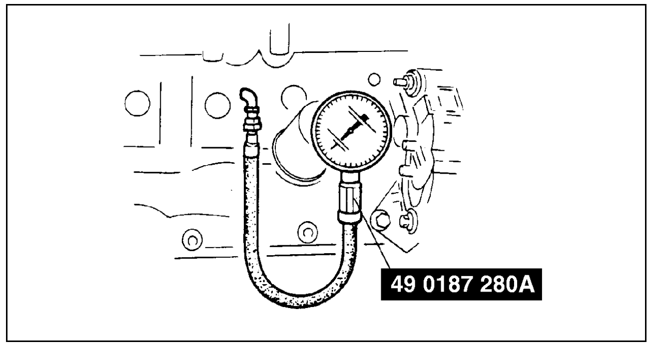
Warning

- **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.

Note

- The oil pressure can vary with oil viscosity and temperature.



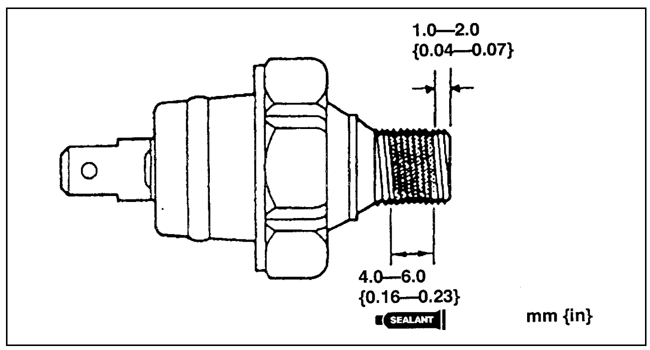
X3U111WA1

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.

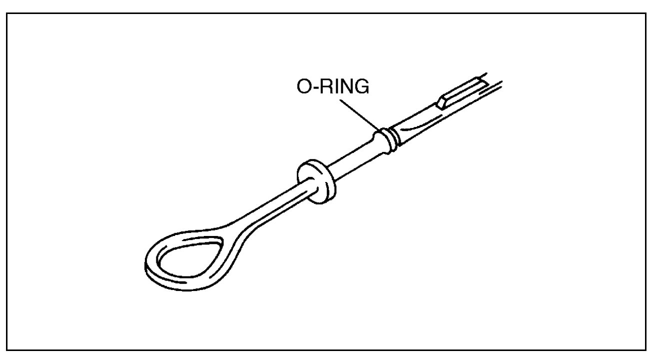


Y3U111WA0

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}

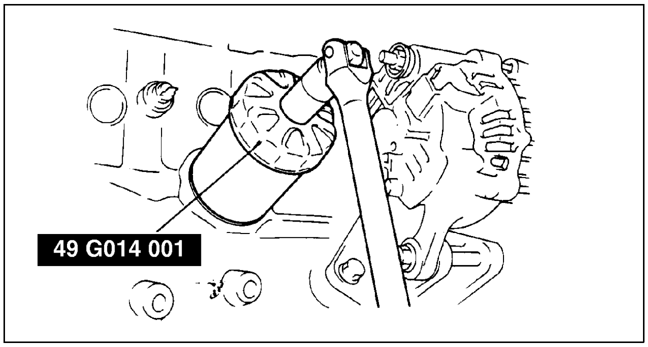
* : Approximate quantity

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.)

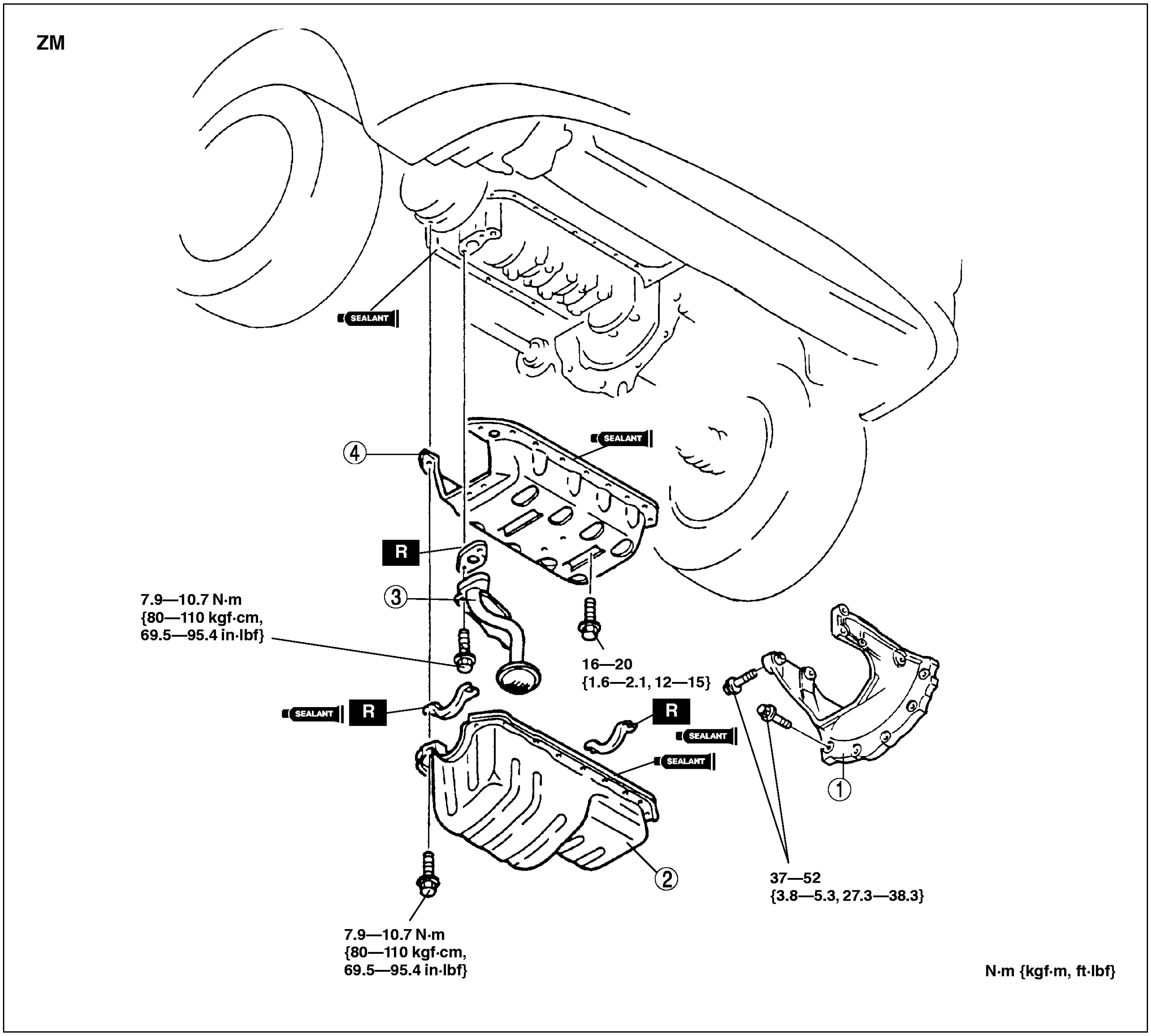


X3U111WA4

OIL PAN REMOVAL/INSTALLATION

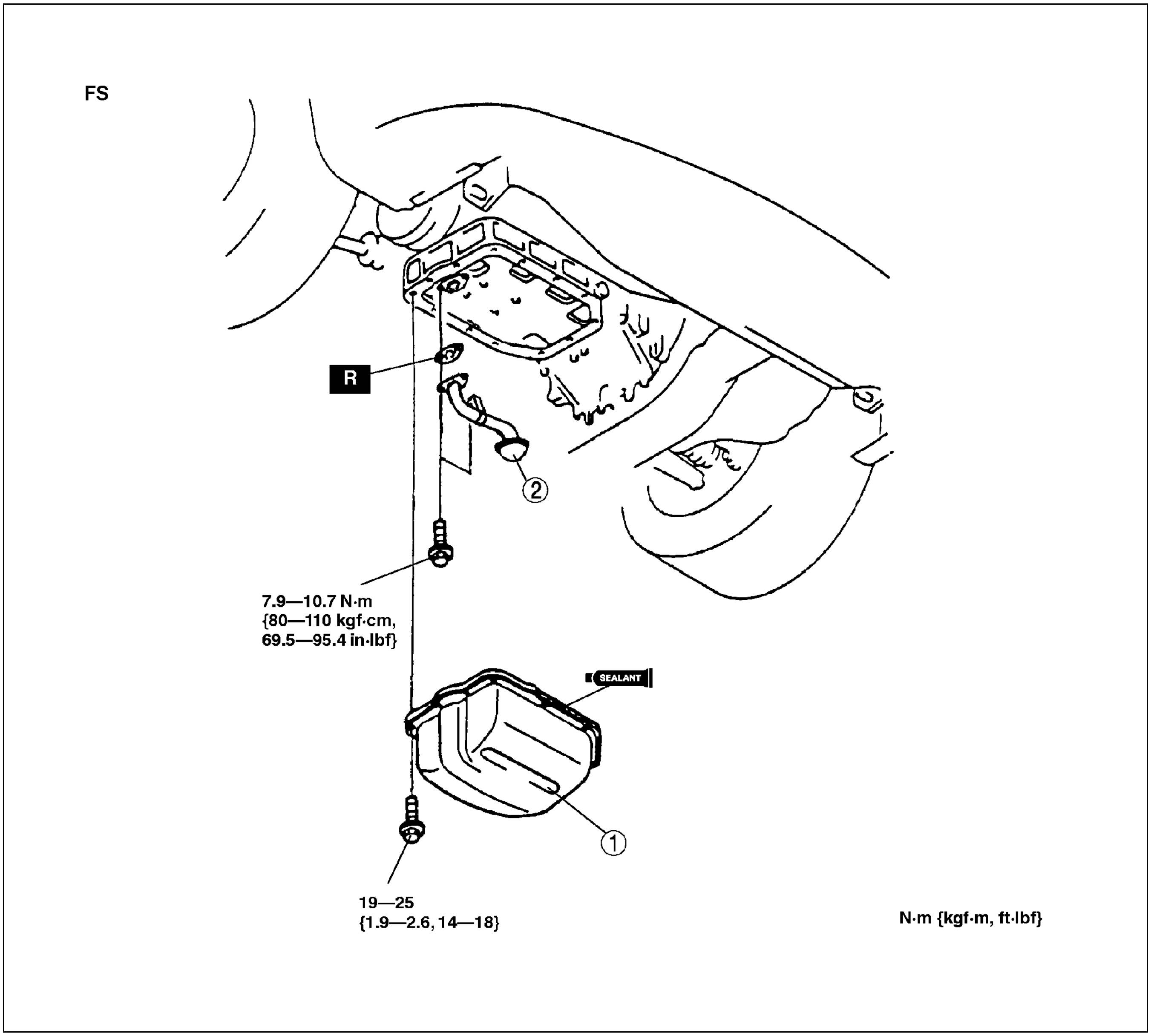
A3U011110040W01

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)

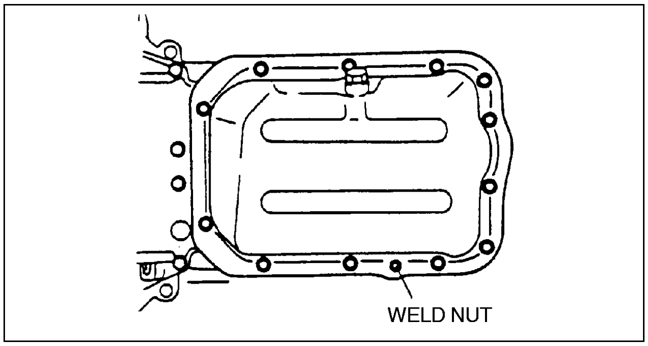
2	Oil strainer (See 01–11–7 Oil Strainer Installation Note)

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)

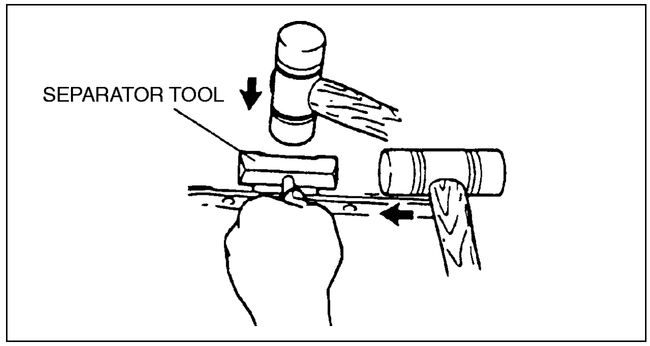
Caution

- **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

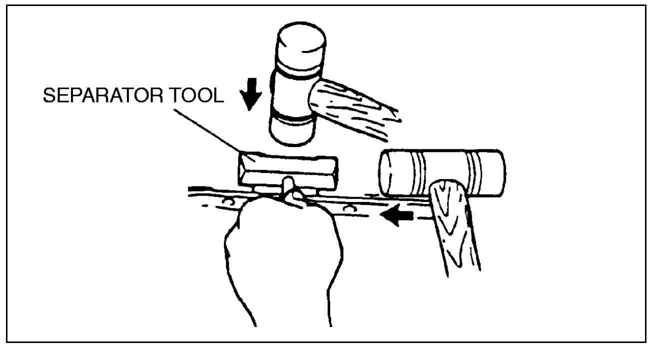
3. Remove the oil pan using a separator tool.



X3U111WA9

MBSP (Main bearing support plate) Removal Note ZM

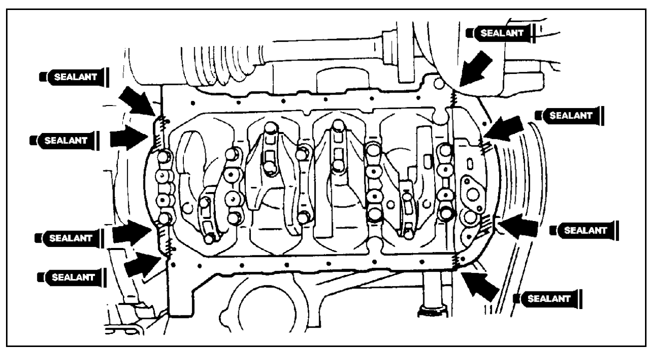
1. Using a separator tool, separate the MBSP.



X3U111WAA

MBSP (Main bearing support plate) Installation Note ZM

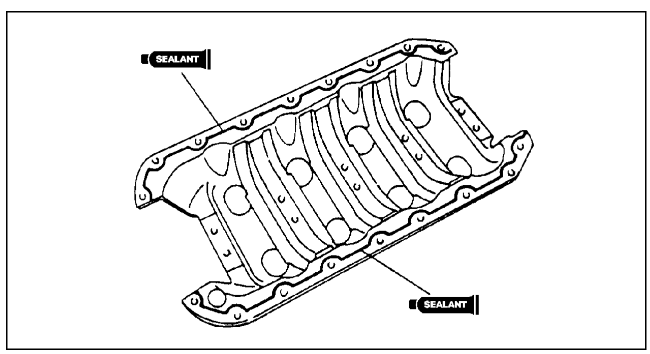
1. Apply silicon sealant to the shaded areas as shown.



X3U111WAB

2. Apply silicone sealant to the MBSP along the inside of the bolt holes.

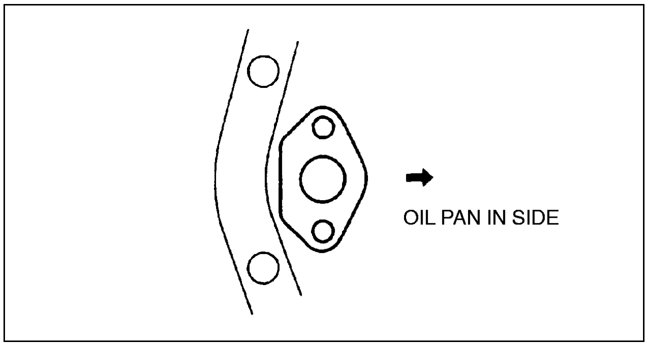
   Thickness
   2.5—3.5 mm {0.099—0.137 in}



X3U111WAC

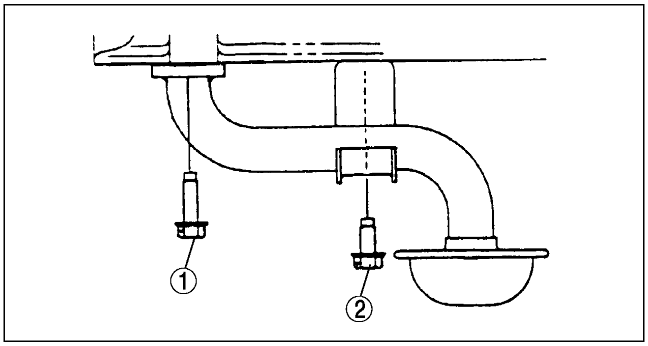
Oil Strainer Installation Note
FS

1. Install the oil strainer gasket as shown.



X3U111WAD

2. Tighten the bolts in the order shown.

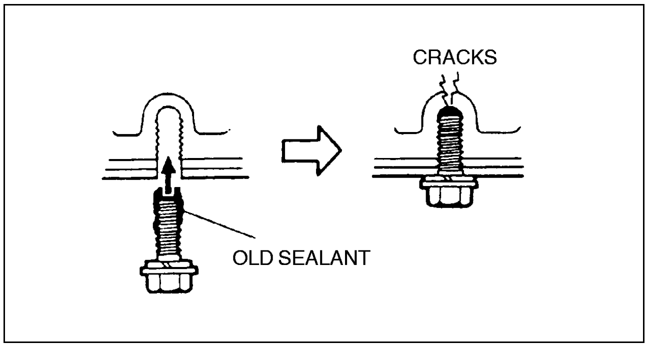


X3U111WAE

Oil Pan Installation Note

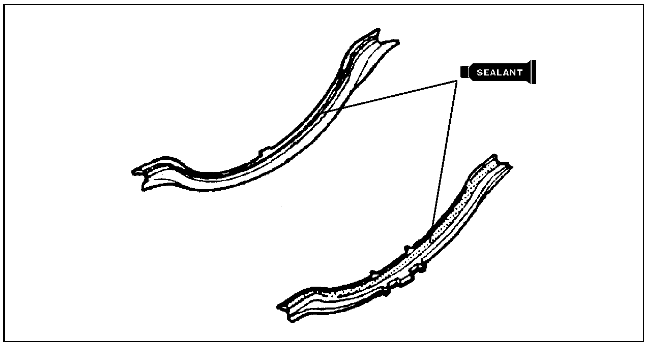
Caution

- **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.**



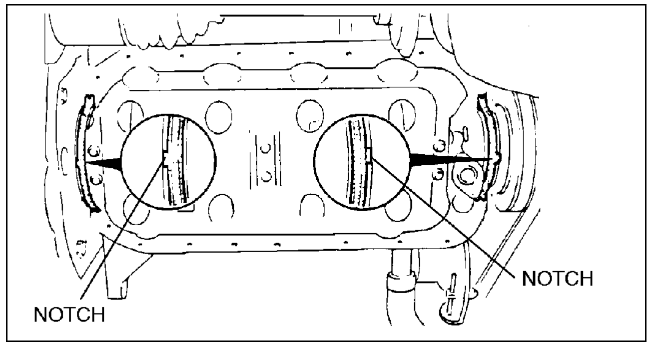
X3U111WAF

1. Apply silicone sealant to the contact surfaces of new oil pan gaskets as shown. (ZM model)



X3U111WAG

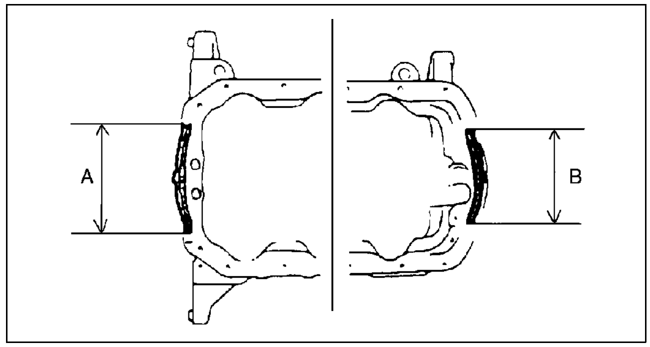
2. Install the new gaskets onto the oil pump body and the rear cover with the projections in the notches as shown. (ZM model)



X3U111WAH

3. Apply silicone sealant onto the area of oil pan gasket indicated by A and B. (ZM model)

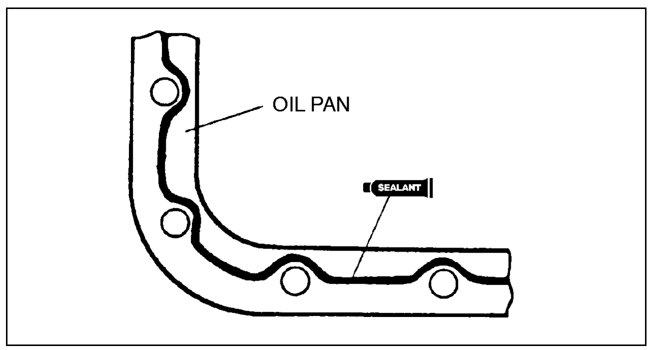
   Thickness
   2.0 mm {0.079 in}



X3U111WAJ

4. Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.

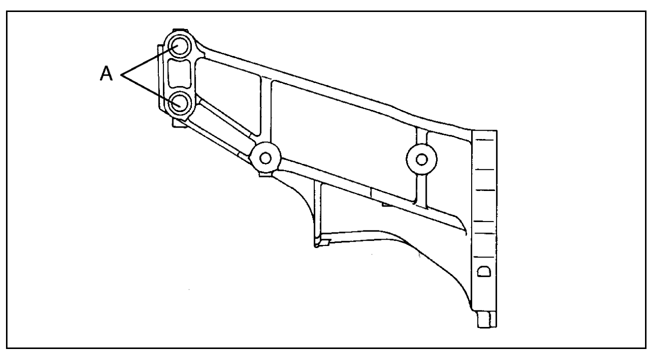
   Thickness
   ZM: 2.5—3.5 mm {0.099—0.137 in}
   FS: 2.0—3.0 mm {0.079—0.118 in}



X3U111WAK

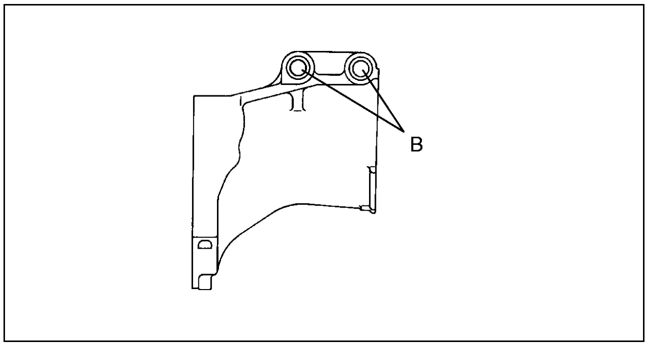
Integrated Stiffener Installation Note
ZM

1. Hand-tighten the lock bolt A.



X3U111WAL

2. Hand-tighten the lock bolt B.



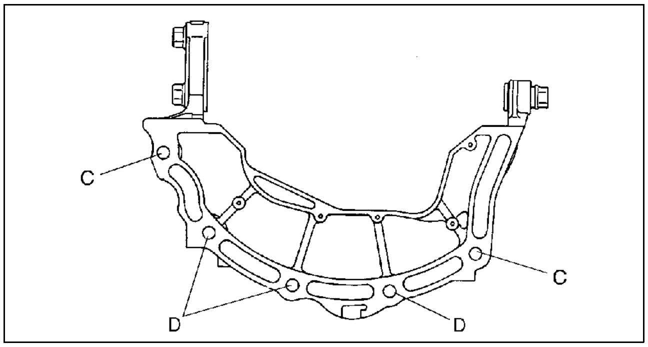
X3U111WAM

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.

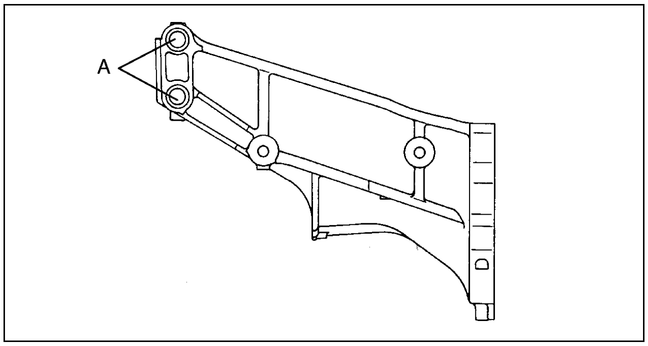
   Tightening torque
   37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}



Y3A1111W001

5. Tighten the lock bolt A .

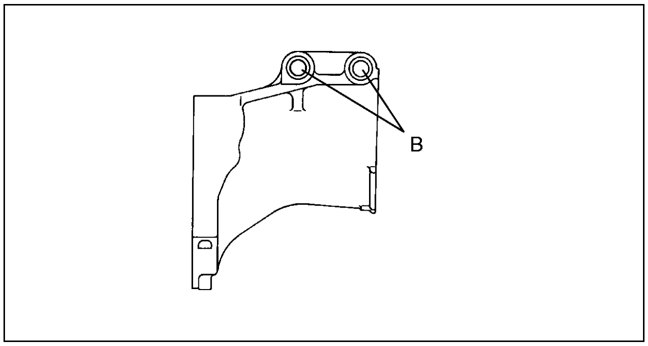
   Tightening torque
   37—52 N·m {3.8—5.3 kgf·m, 27.3—38.3 ft·lbf}



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}

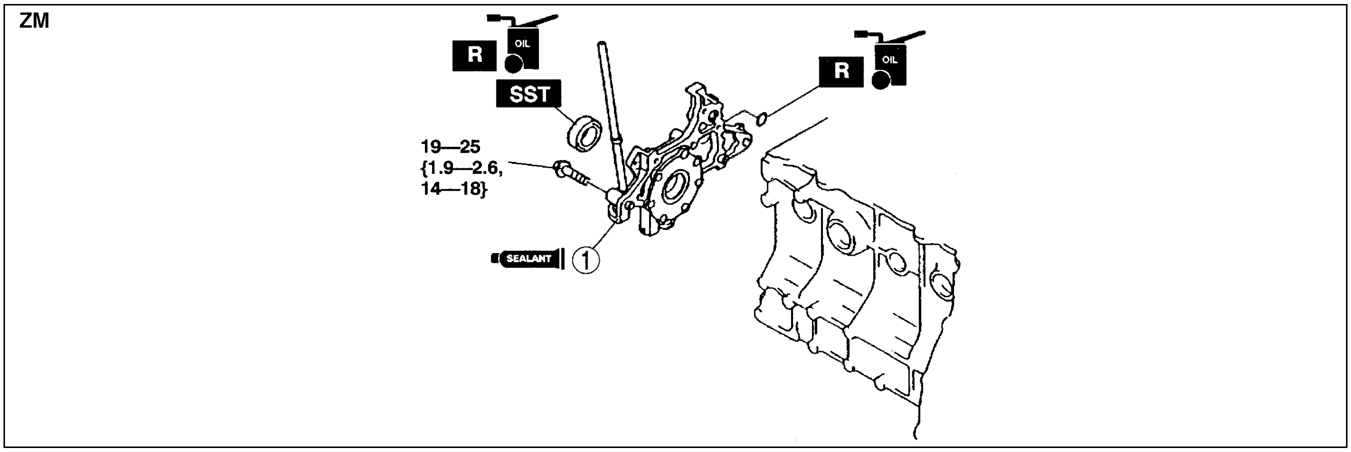


X3U111WAM

OIL PUMP REMOVAL/INSTALLATION

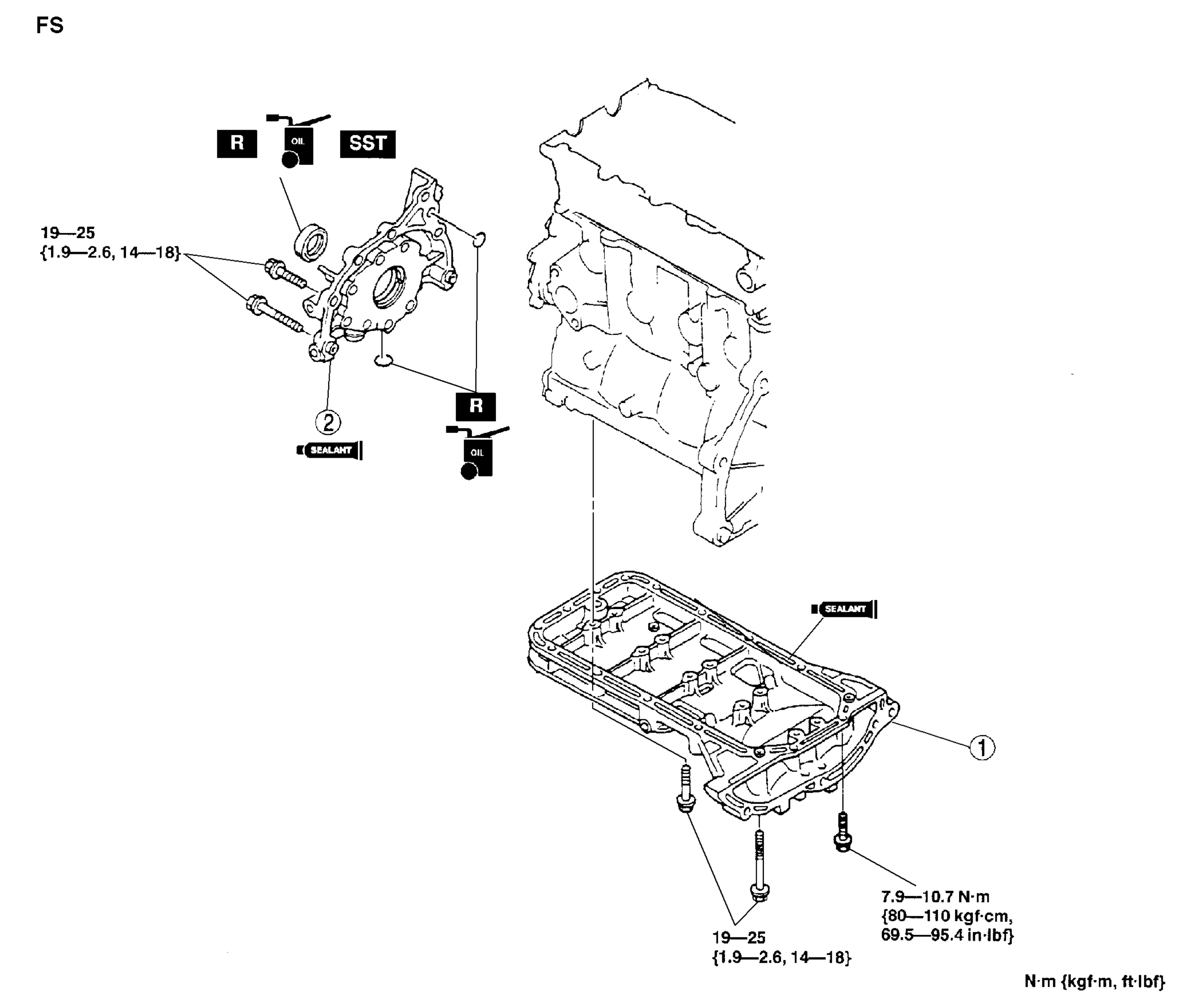
A3U011119220W01

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.



Y3U111WA1

1	Oil pump (See 01–11–12 Oil Pump Removal Note) (See 01–11–12 Oil Pump Installation Note)



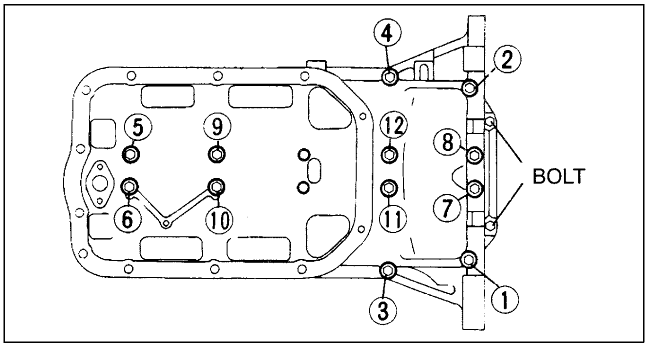
Z3U0111W998

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)

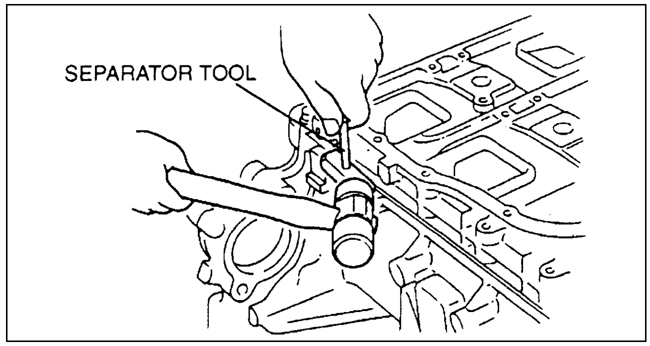
Oil Pan Upper Block Removal Note

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

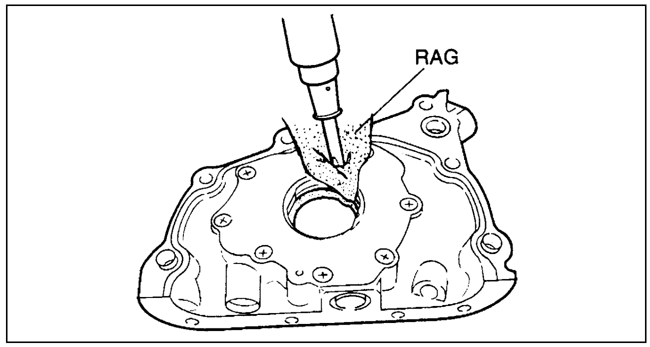
3. Remove the oil pan upper block using the separator tool.



Y3U111WA4

Oil Pump Removal Note

1. Remove the front oil seal using a screwdriver protected with a rag.

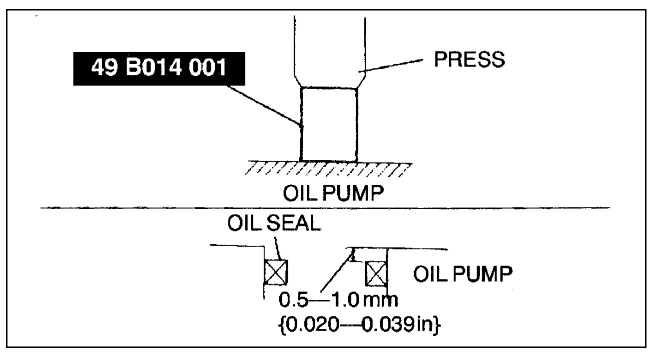


Y3U111WA5

Oil Pump Installation Note

ZM

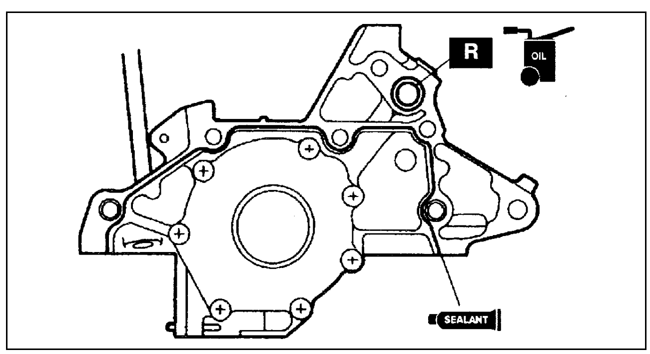
1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal evenly using the **SST**.



Y3U111WA6

4. Apply silicone sealant to the oil pump as shown.

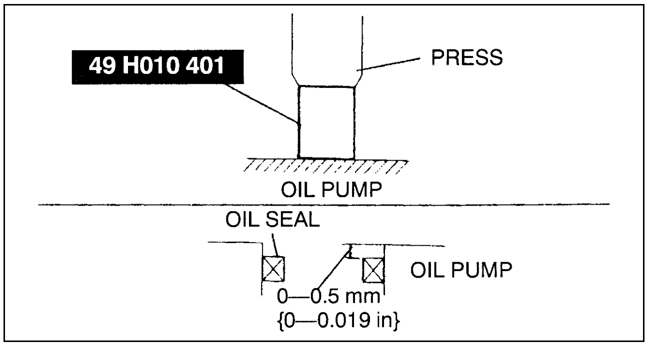
Thickness
1.0—2.0 mm {0.040—0.078 in}



Y3U111WA7

FS

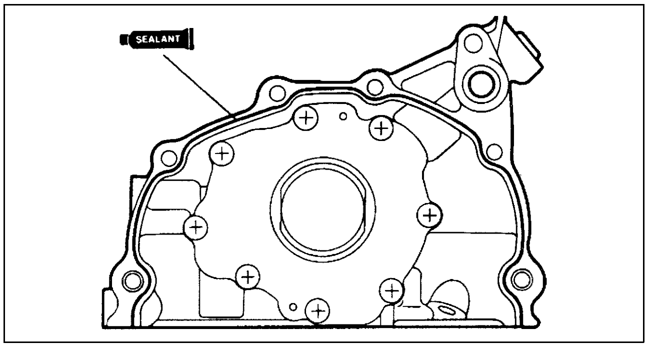
1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal evenly using the **SST**.



Y3U111WA8

4. Apply silicone sealant to the oil pump as shown.

   Thickness
   1.0—2.0 mm {0.040—0.078 in}



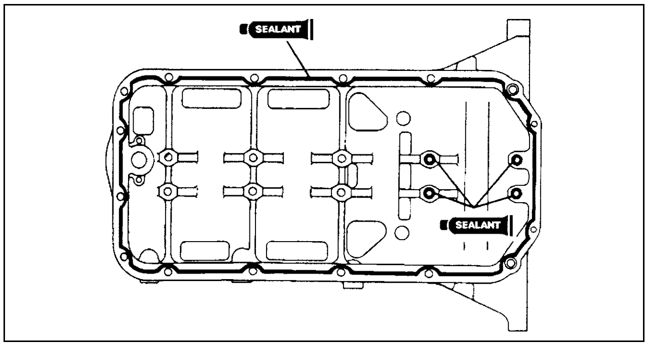
Y3U111WA9

Oil Pan Upper Block Installation Note

1. Apply silicone sealant to the oil pan upper block as shown.

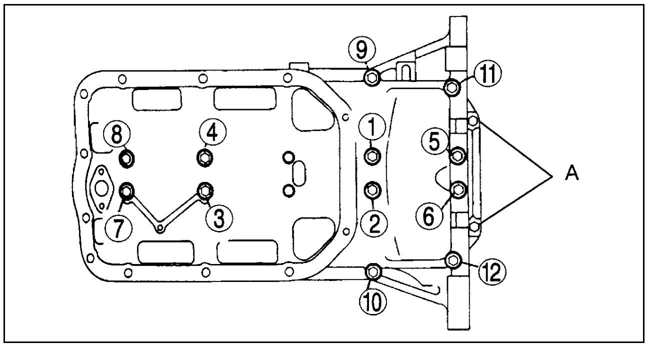
   Thickness
   2.0—3.0 mm {0.08—0.11 in}

2. Tighten the bolts A.



Y3U111WAA

3. Tighten the oil pan upper block bolts in 2 or 3 steps in the order shown.



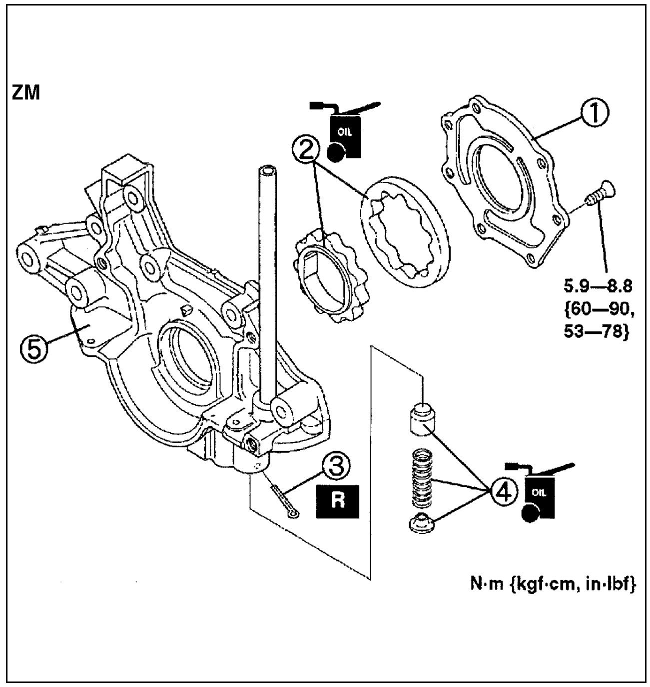
Y3U111WAB

OIL PUMP DISASSEMBLY/ASSEMBLY

A3U011119220W02

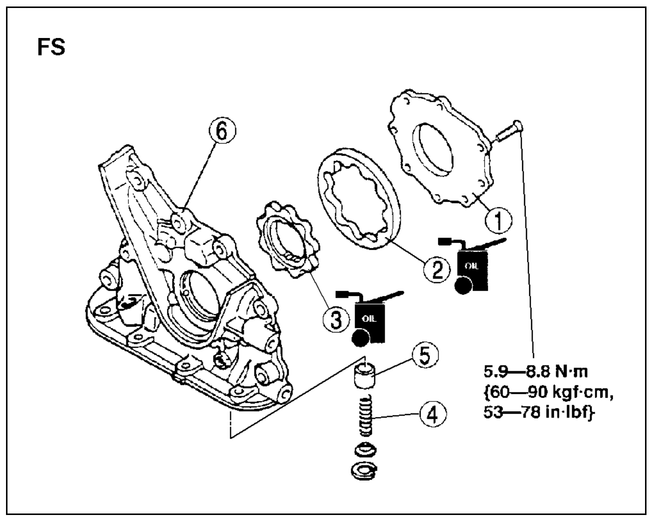
1. Remove the oil pump. (See 01–11–10 OIL PUMP REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

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

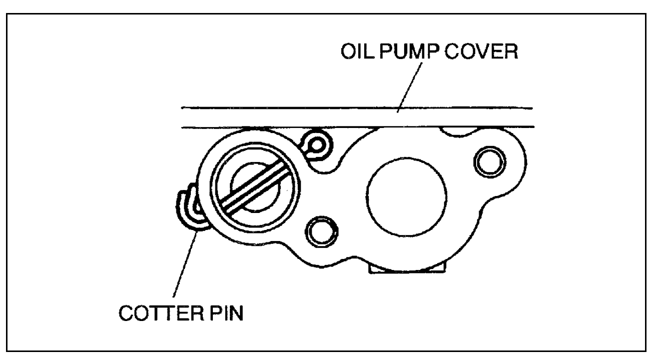
1	Oil pump cover
2	Outer rotor
3	Inner rotor
4	Pressure spring
5	Control plunger
6	Oil pump body



Z3U0111W997

Cotter Pin Assembly Note

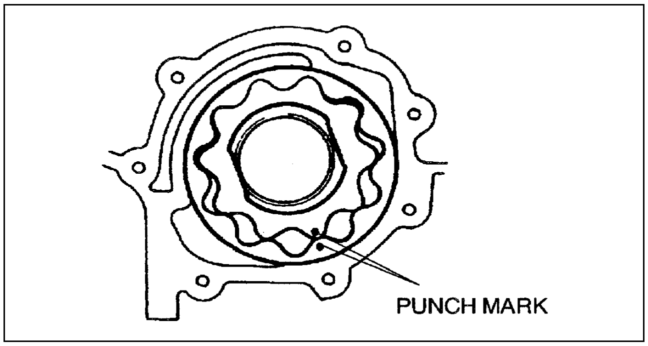
1. Bend the cotter pin so that its tip does not project from the oil pump cover mounting surface.



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.



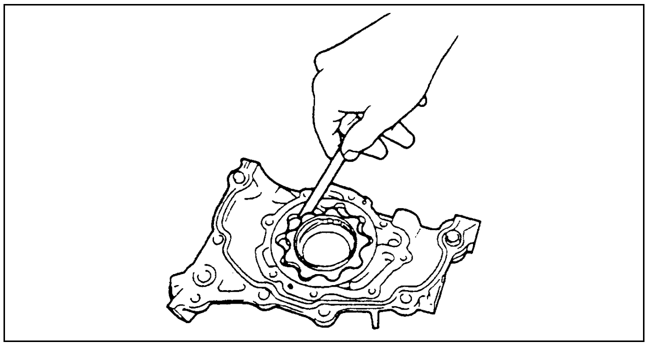
Y3U111WAF

OIL PUMP INSPECTION

A3U011119220W03

Rotor Clearance Inspection

1. Measure the following clearance.
   - Replace the rotor and/or pump body if necessary.



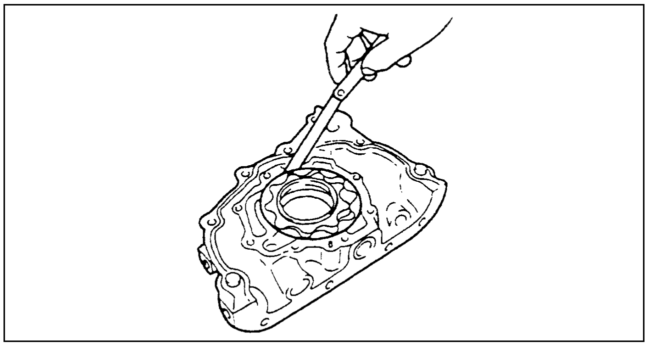
Y3U111WAG

ZM

Standard tip clearance
0.02—0.18 mm {0.0008—0.0070 in}
Maximum tip clearance
0.22 mm {0.0087 in}

FS

Standard tip clearance
0.130—0.206 mm {0.00512—0.00811 in}
Maximum tip clearance
0.30 mm {0.012 in}



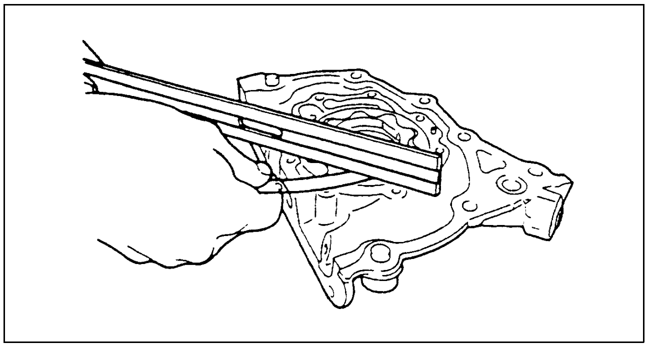
Y3U111WAH

ZM

Standard tip clearance
0.09—0.18 mm {0.0036—0.0070 in}
Maximum tip clearance
0.22 mm {0.0087 in}

FS

Standard tip clearance
0.113—0.186 mm {0.00445—0.00732 in}
Maximum tip clearance
0.22 mm {0.0087 in}



Y3U111WAJ

ZM

Standard tip clearance
0.03—0.11 mm {0.0012—0.0043 in}
Maximum tip clearance
0.14 mm {0.0055 in}

FS

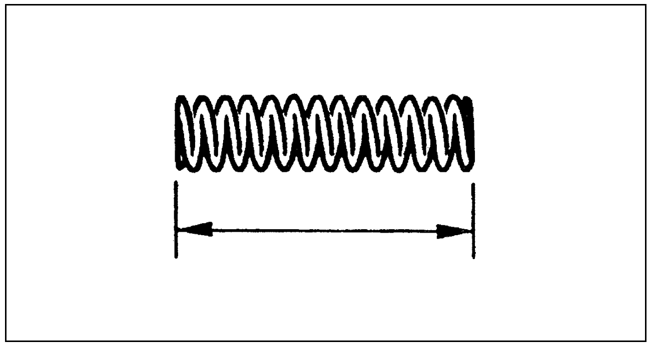
Standard tip clearance
0.035—0.095 mm {0.0014—0.0037 in}
Maximum tip clearance
0.14 mm {0.0055 in}

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}

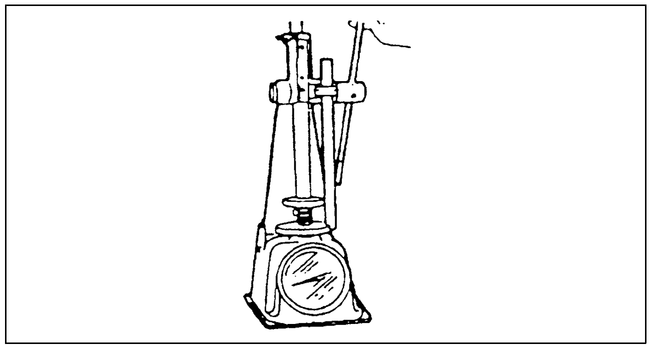


Y3U111WAK

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}

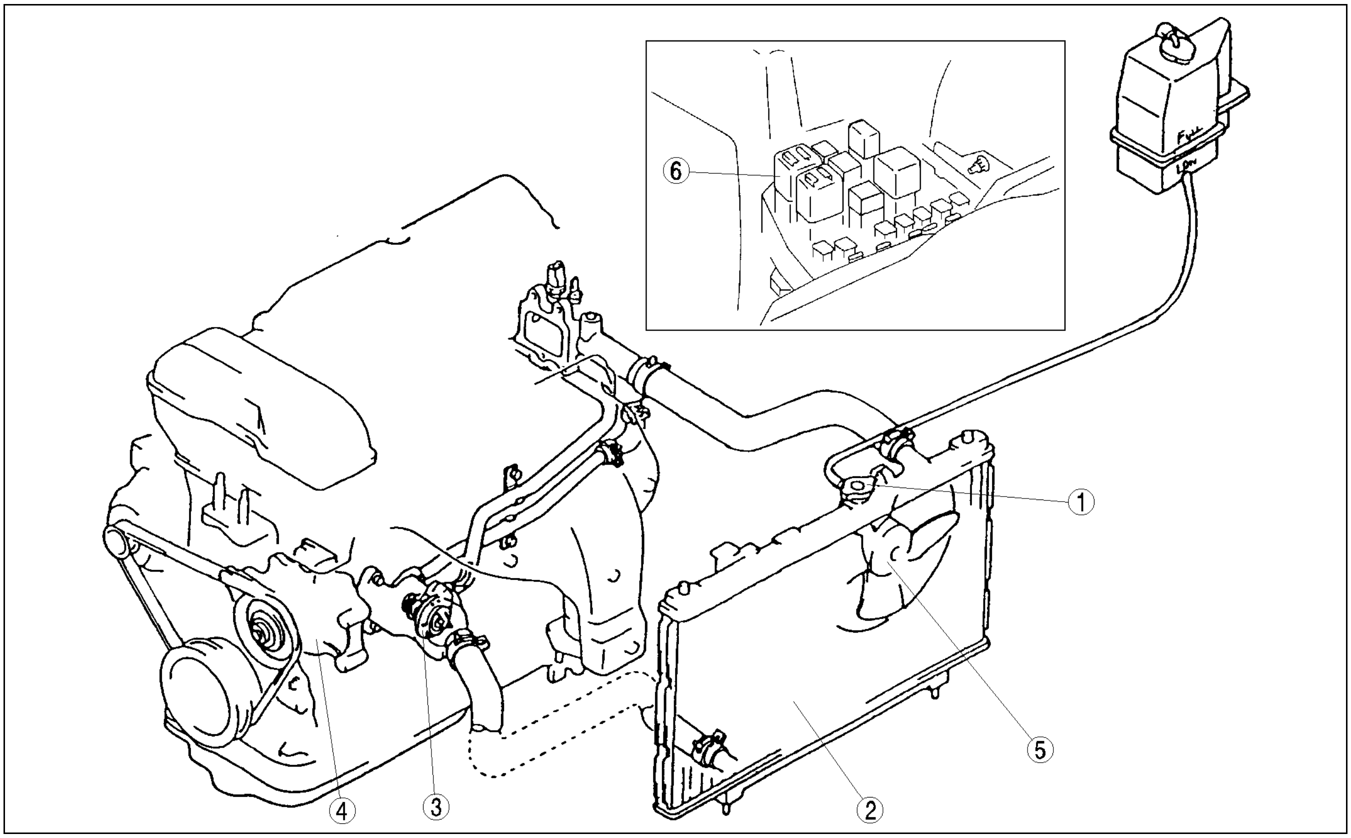


Y3U111WAL

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

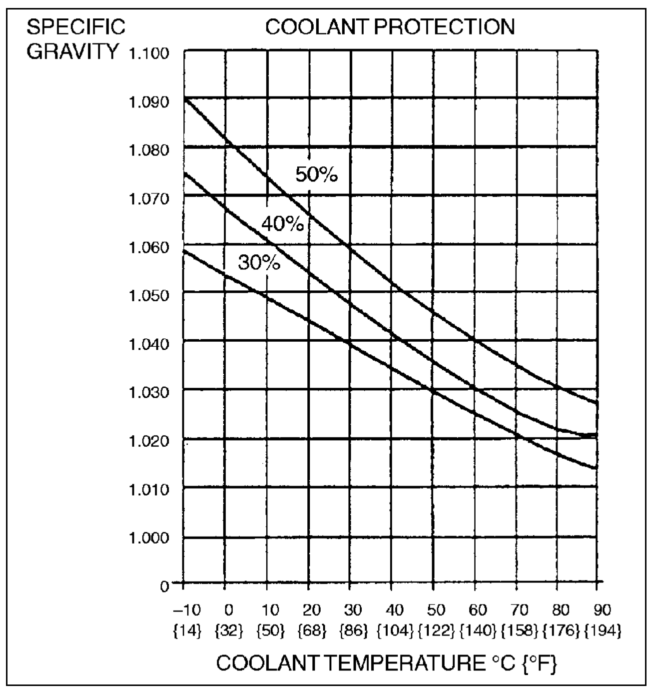
A3U011215001W02

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.



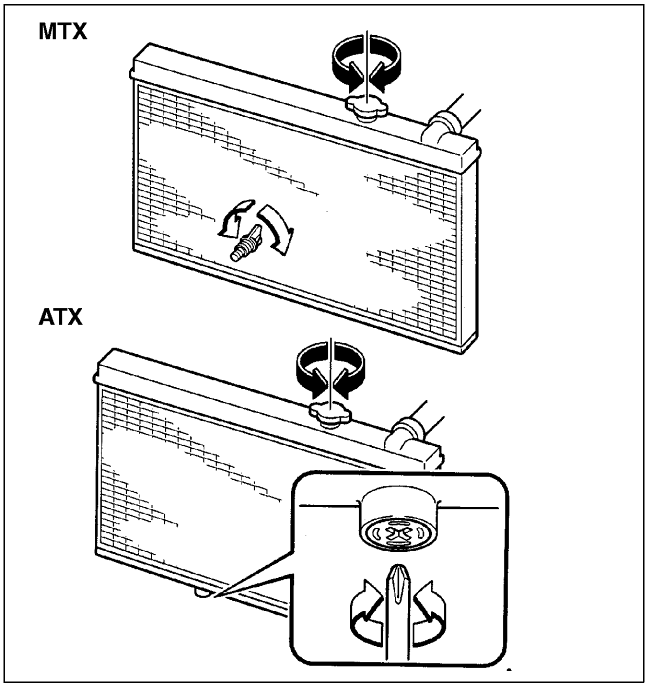
X3U112WA2

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

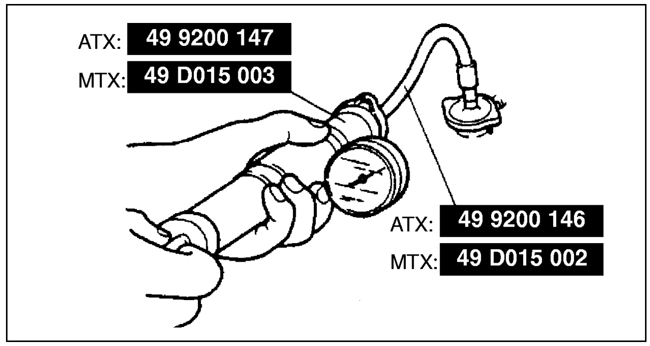
1. Inspect the coolant level.
2. Remove the radiator cap.
3. Connect a radiator cap tester and the **SST** to the radiator filler neck.

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.



X3U112WA3

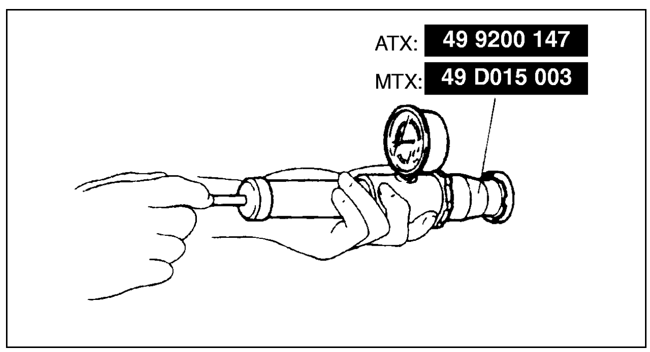
RADIATOR CAP INSPECTION

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.

Pressure
94—122 kPa {0.95—1.25 kgf/cm^2, 13.5—17.7 psi}

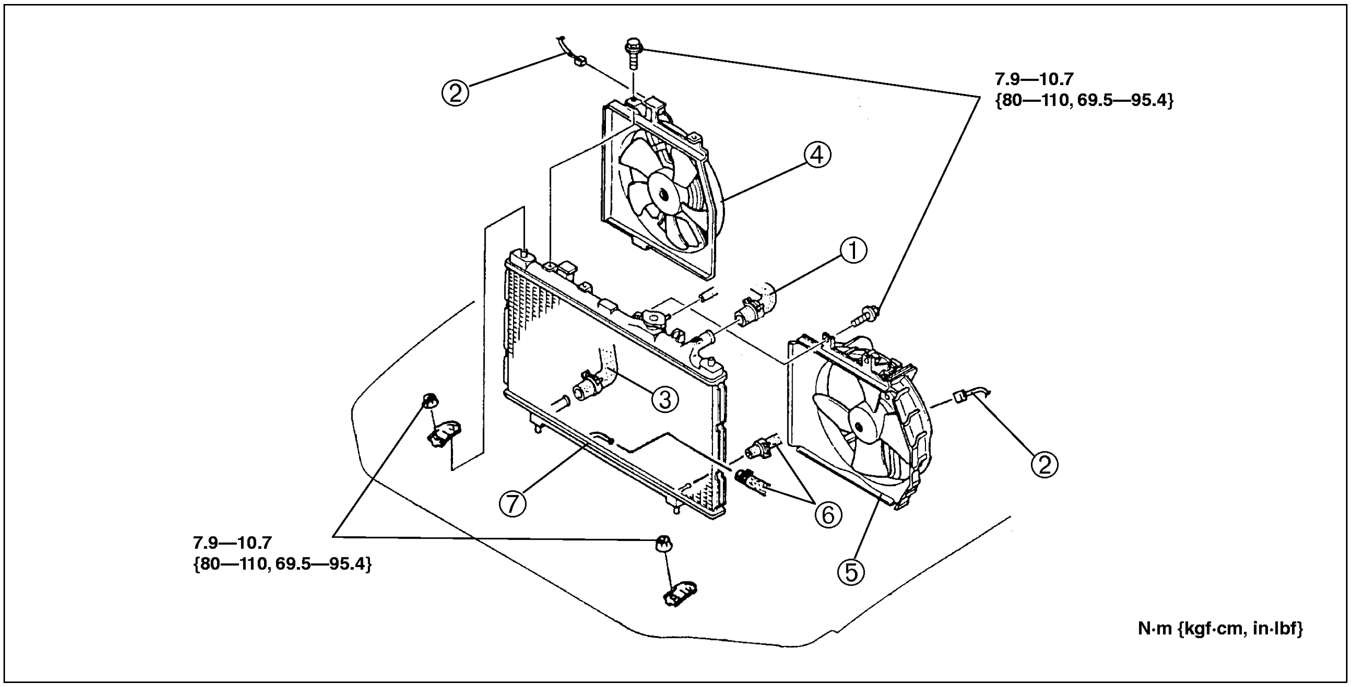


X3U112WA4

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

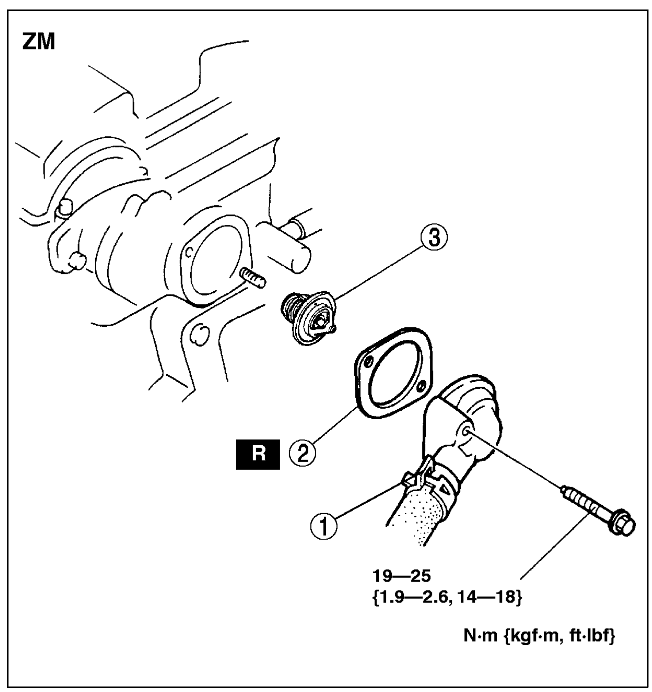
5	Cooling fan
6	Oil hose (ATX) (See 05–17–41 OIL COOLER REMOVAL/ INSTALLATION)
7	Radiator

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.

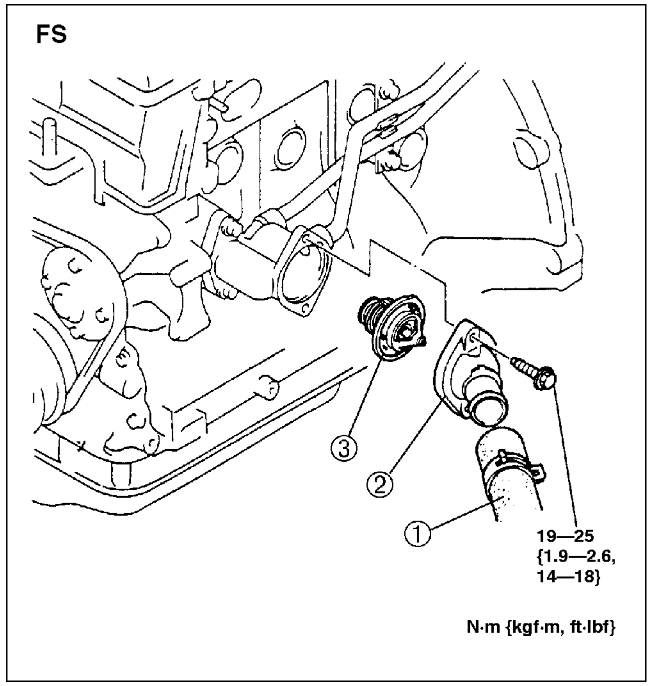
1	Thermostat cover
2	Thermostat cover gasket (See 01–12–7 Thermostat Cover Gasket Installation Note)
3	Thermostat (See 01–12–6 Thermostat Installation Note)



Y3U112WA1

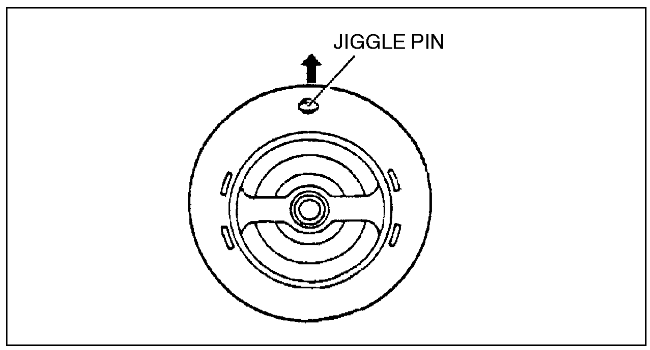
1	Lower radiator hose
2	Thermostat cover
3	Thermostat (See 01–12–6 Thermostat Installation Note)

6. Install in the reverse order of removal.



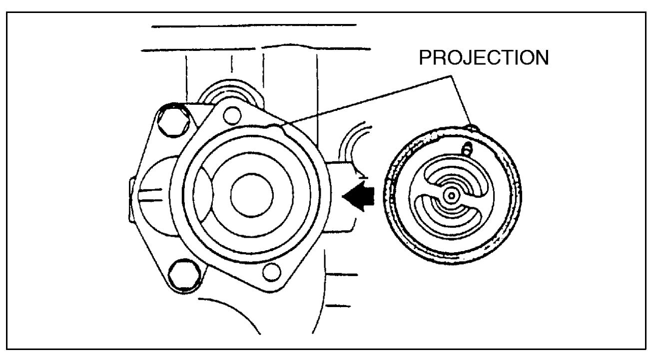
Z3U0112W999

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.

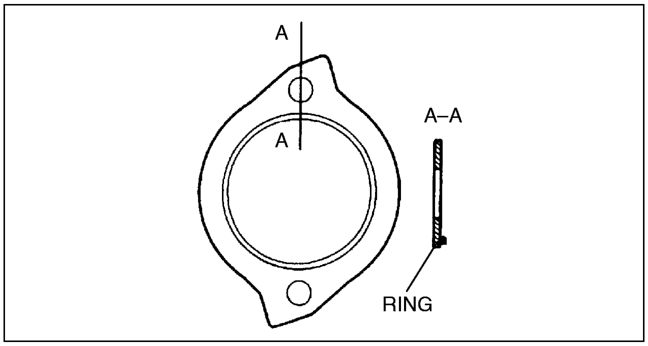


X3U112WA9

Thermostat Cover Gasket Installation Note

ZM

1. Install a new gasket with the seal ring side facing the cylinder head.



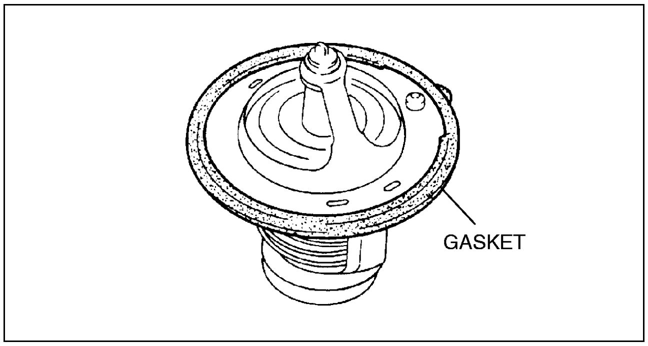
X3U112WAA

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.

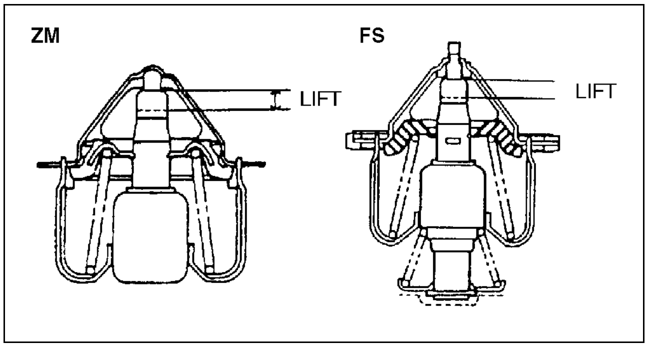
   Warning
   - **During inspection, the thermostat and water are extremely hot and they can cause severe burns. Do not touch the thermostat and water directly.**



X3U112WAK

4. Heat the water and check the following.
   - If not as specified, replace the thermostat.

Item	Engine ZM	Engine 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.	



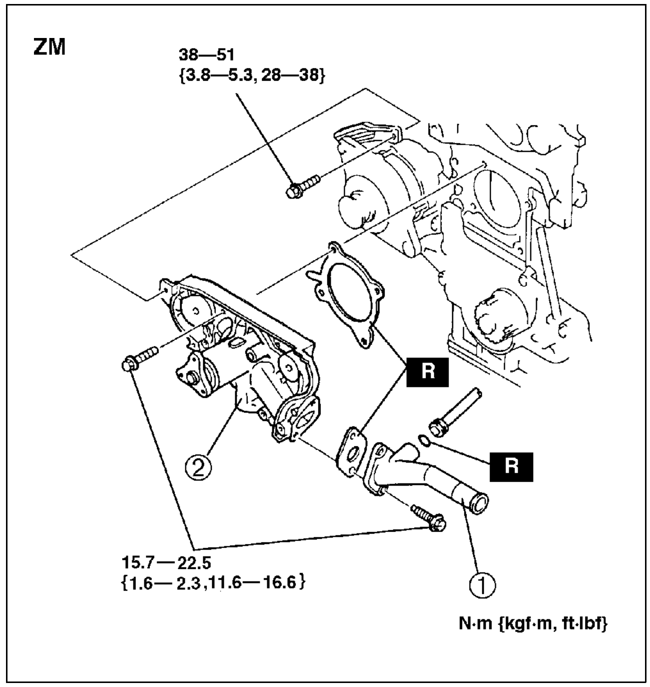
Z3U0112W998

WATER PUMP REMOVAL/INSTALLATION

A3U011215010W01

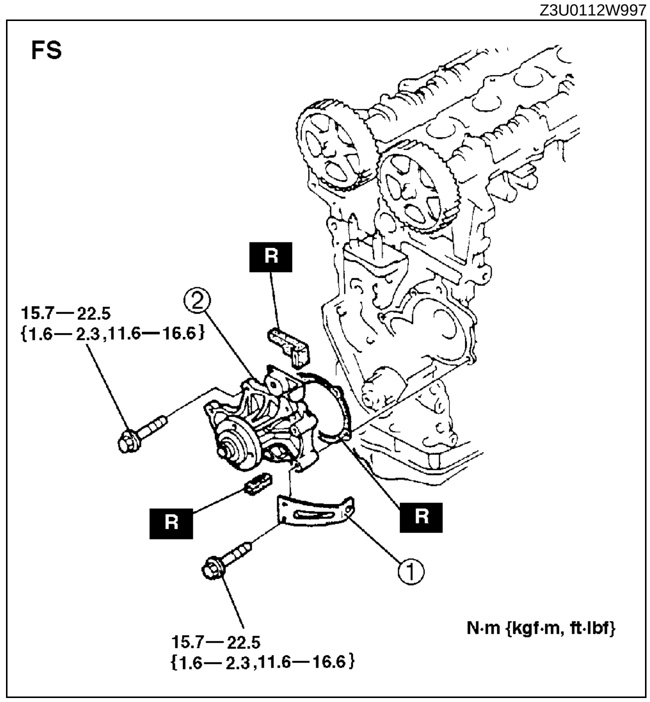
1. Drain the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
2. Remove the fresh air duct and air cleaner. (ZM model)
3. Remove the exhaust manifold insulator. (ZM model)
4. Remove the timing belt. (See 01–10A–9 TIMING BELT REMOVAL/INSTALLATION [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



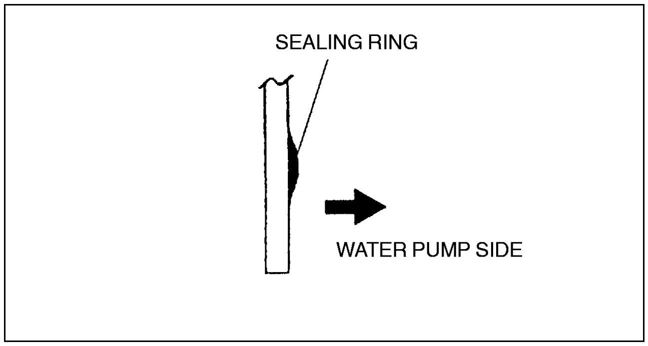
Z3U0112W996

8. Install in the reverse order of removal.

Water Pump Installation Note

ZM

1. Install a new gasket with the sealing ring facing the water pump.



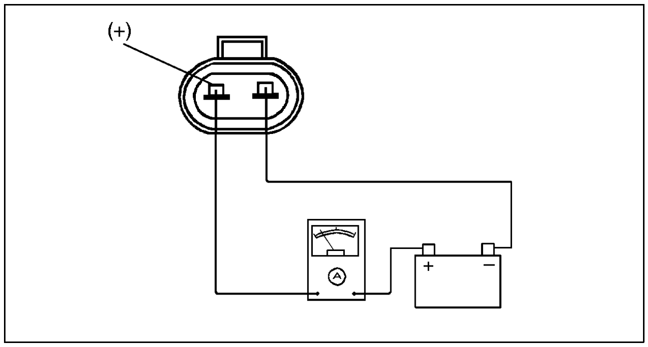
X3U112WAD

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

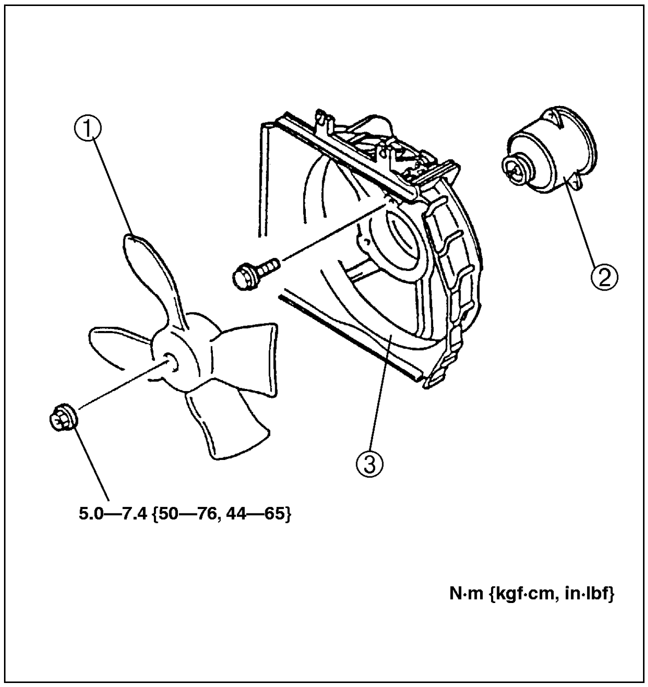
COOLING FAN MOTOR REMOVAL/INSTALLATION

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.

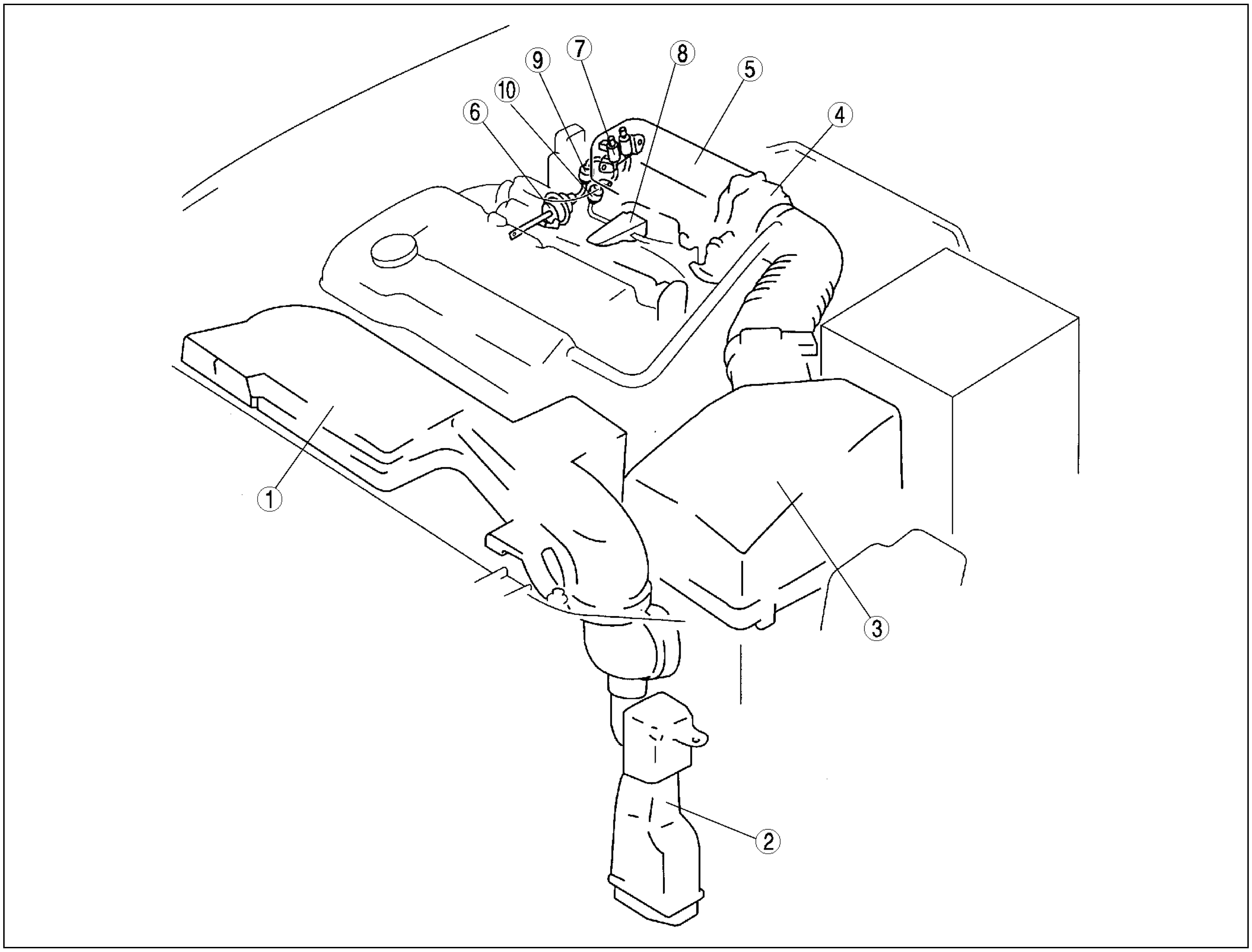


X3U112WAG

01–13A INTAKE-AIR SYSTEM [ZM]

INTAKE-AIR SYSTEM LOCATION INDEX [ZM]

A3U011301005W03



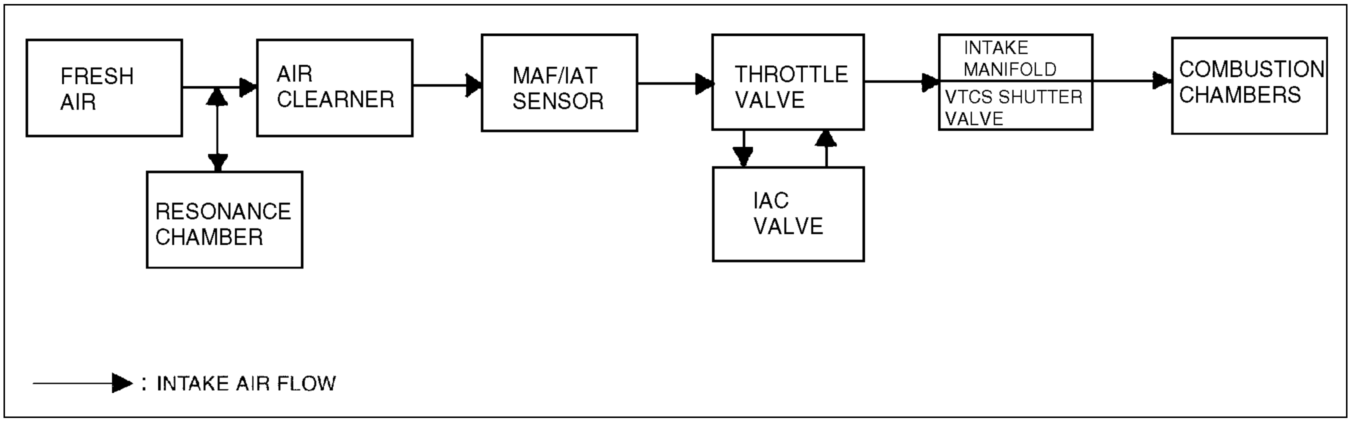
Z3U0113W001

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]

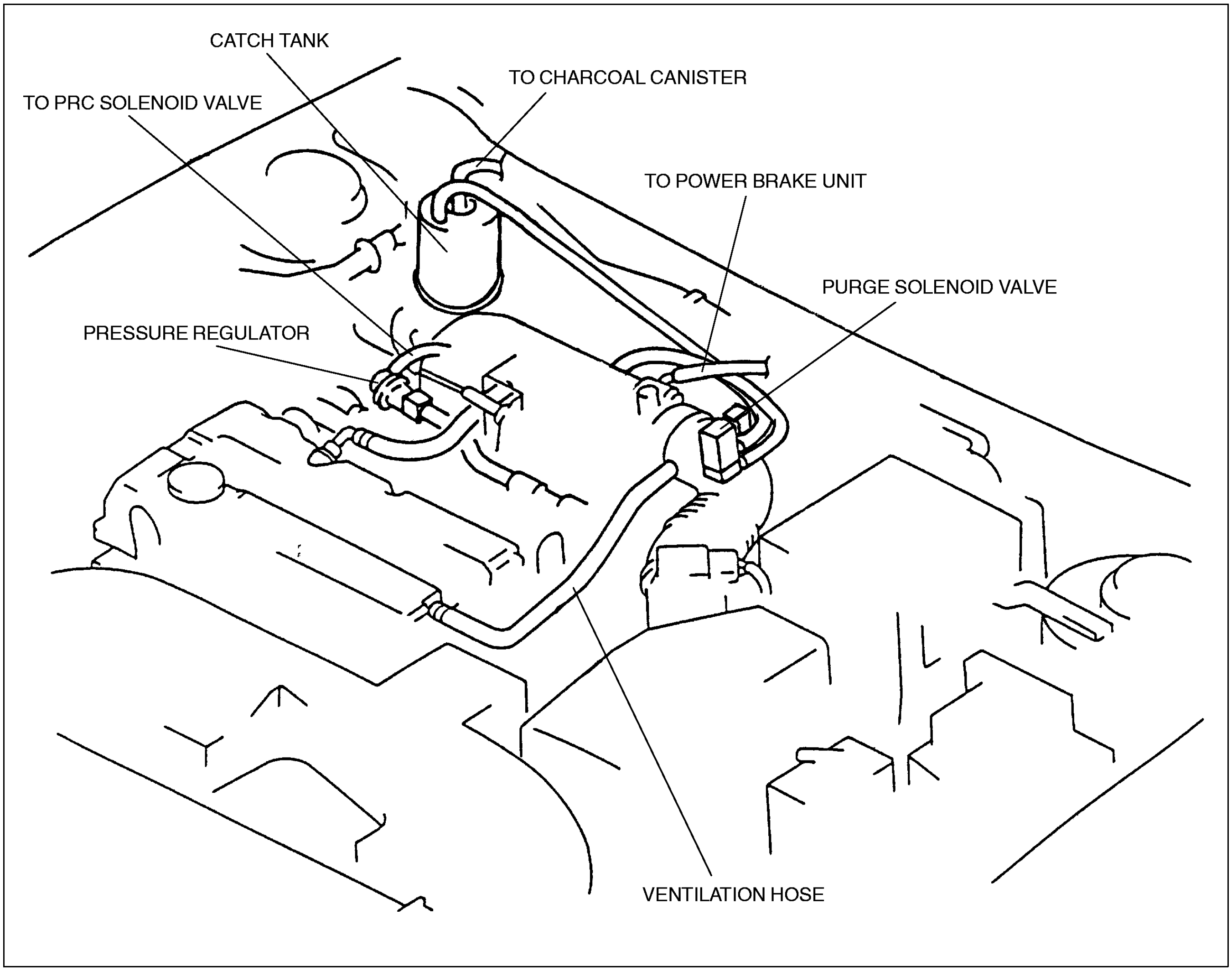
A3U011301005W04



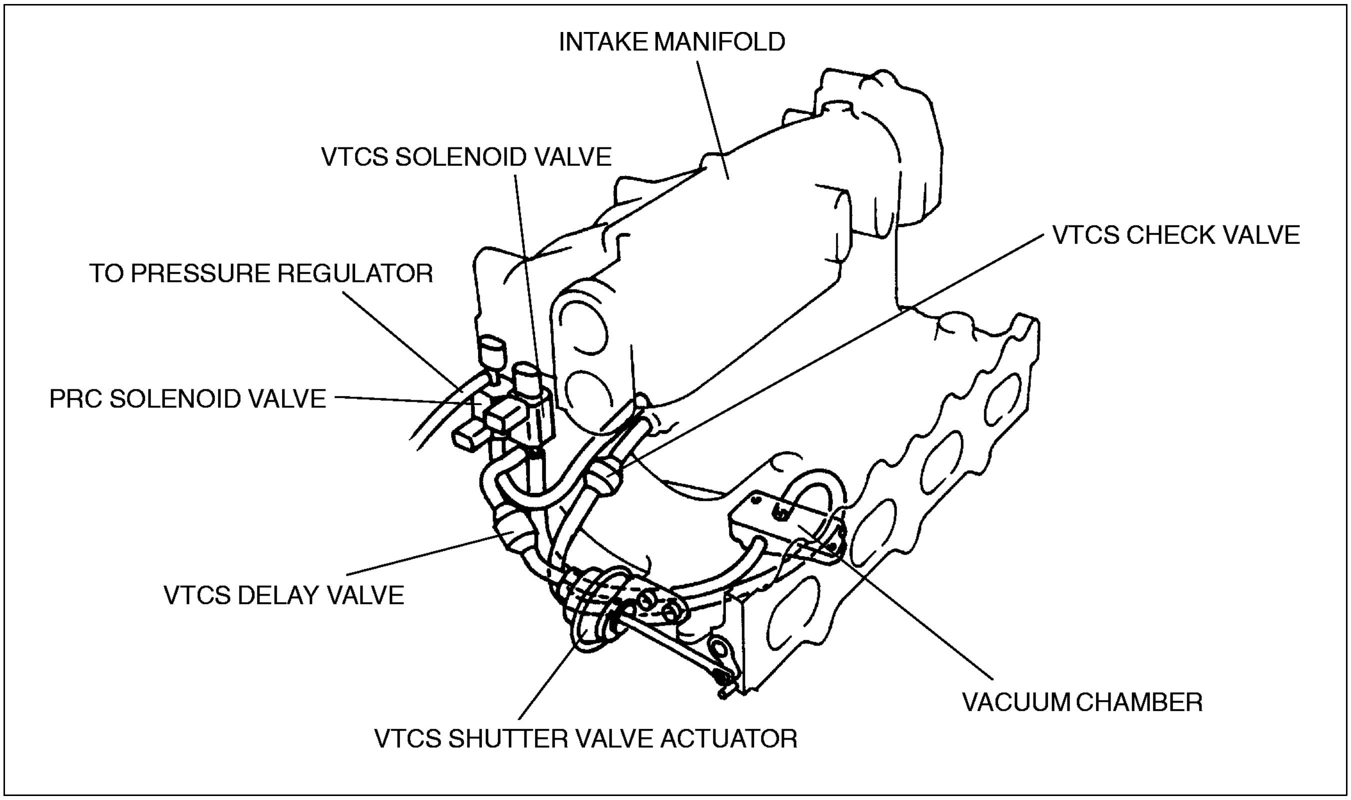
Z3U0113W002

VACUUM HOSE ROUTING DIAGRAM [ZM]

A3U011320030W02



Y3U113WA5



Z3U0113W015

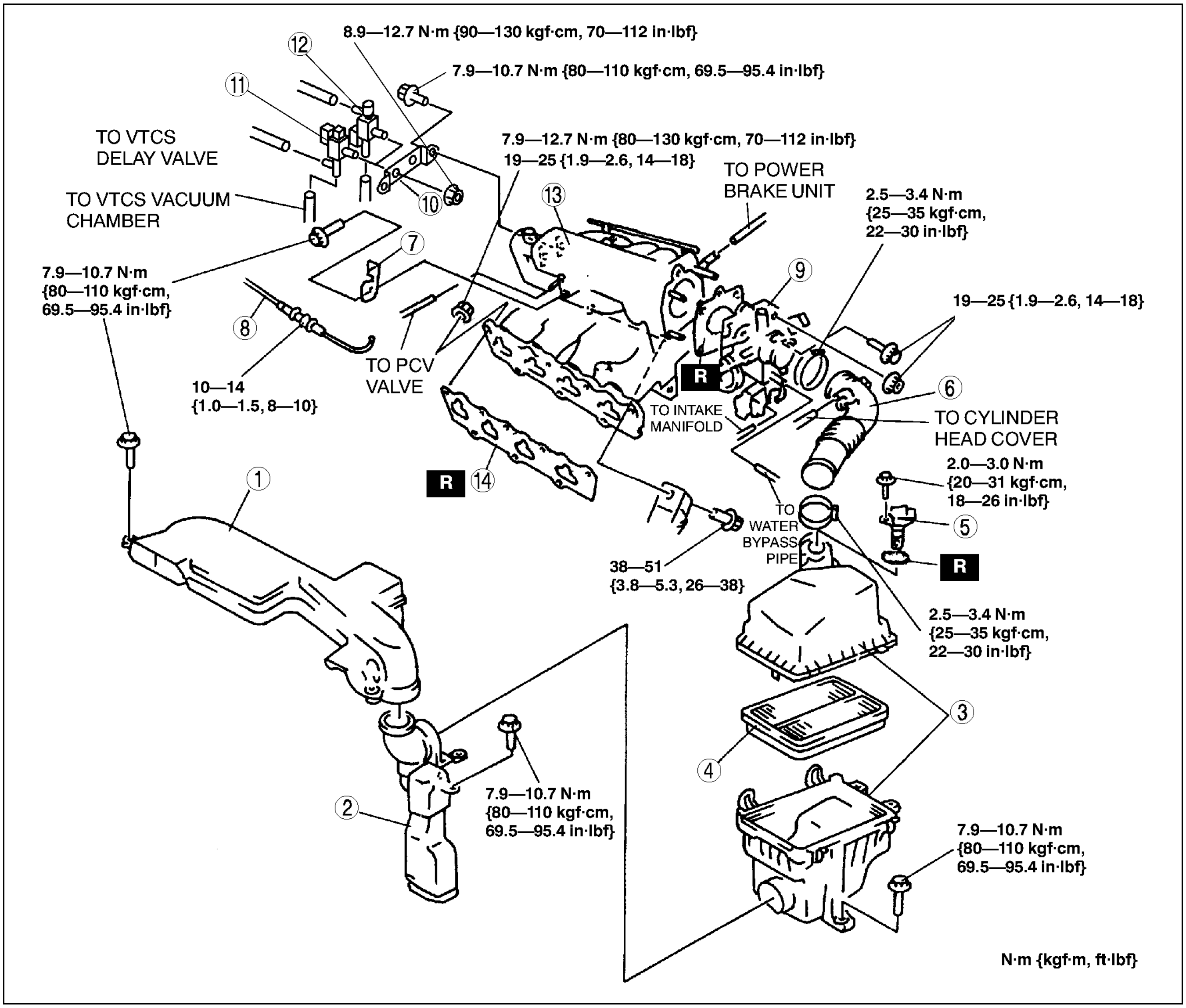
INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM]

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

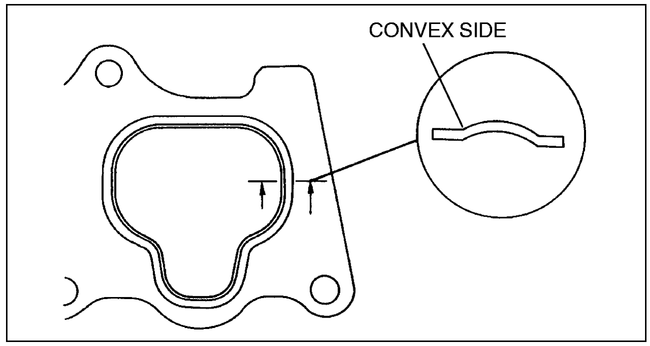
- Drain the engine coolant from the radiator. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

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].)

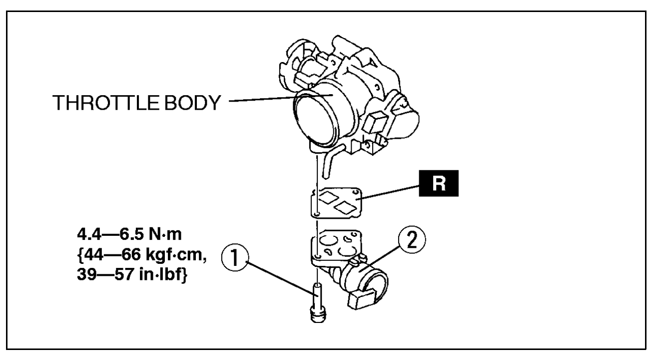
IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [ZM]

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

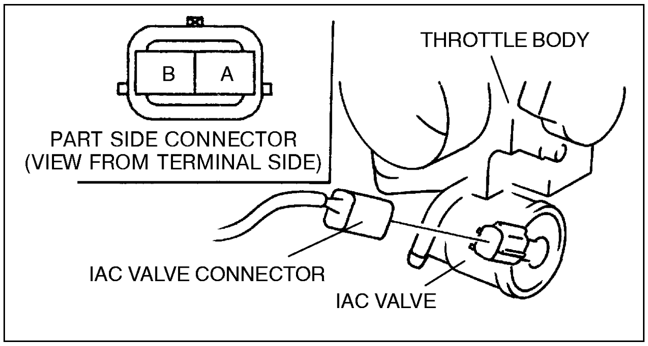
IDLE AIR CONTROL (IAC) VALVE INSPECTION [ZM]

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.



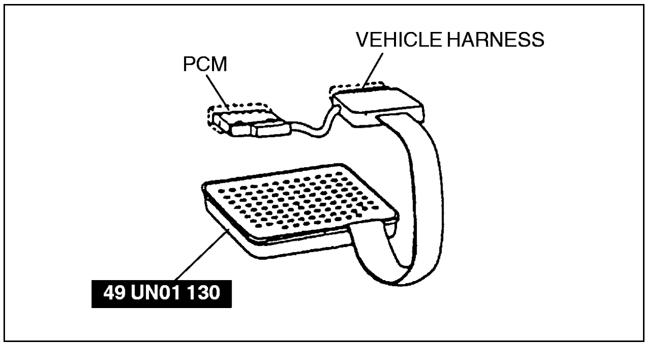
Y3U113WA3

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.

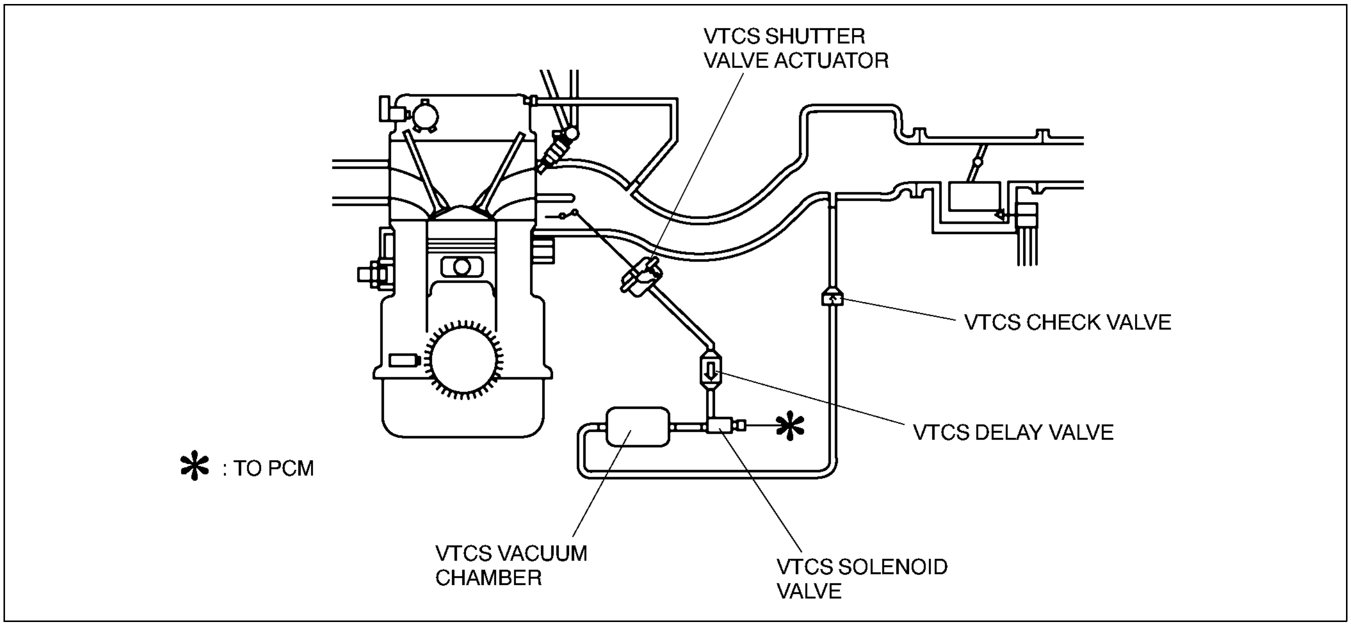
Open circuit
- Power circuit (IAC valve connector terminal A and PCM connector terminal 54)
- GND circuit (IAC valve connector terminal B and PCM connector terminal 83)

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

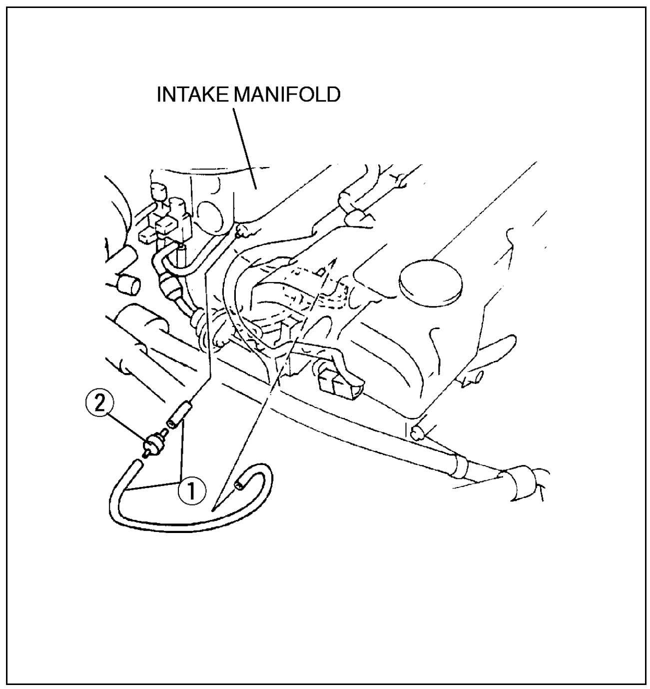
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [ZM]

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.

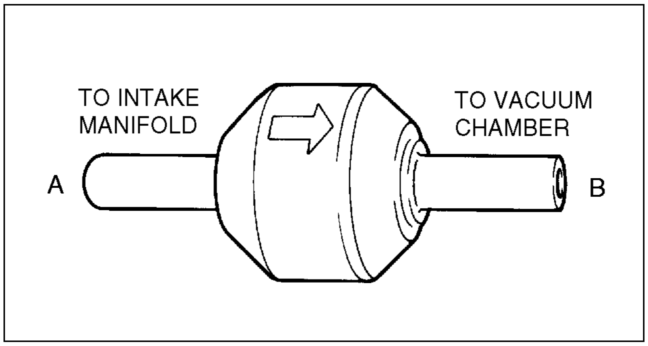


X3U113WA5

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

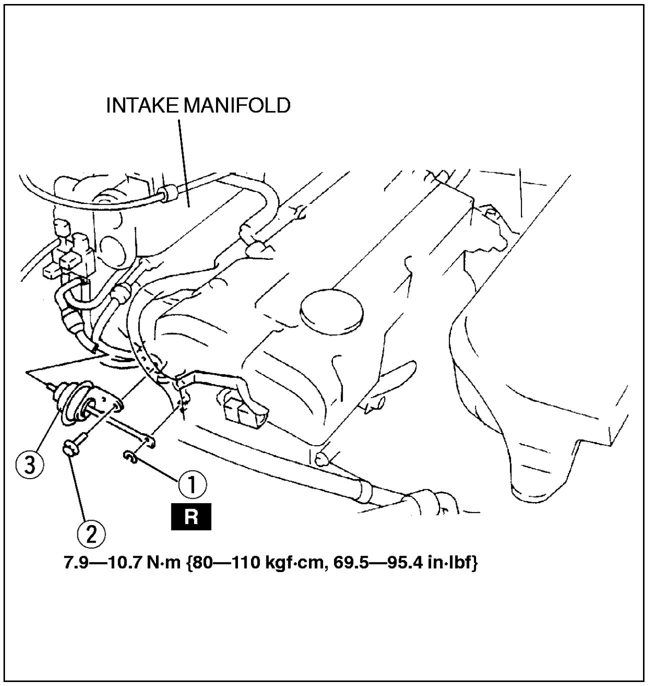
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [ZM]

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

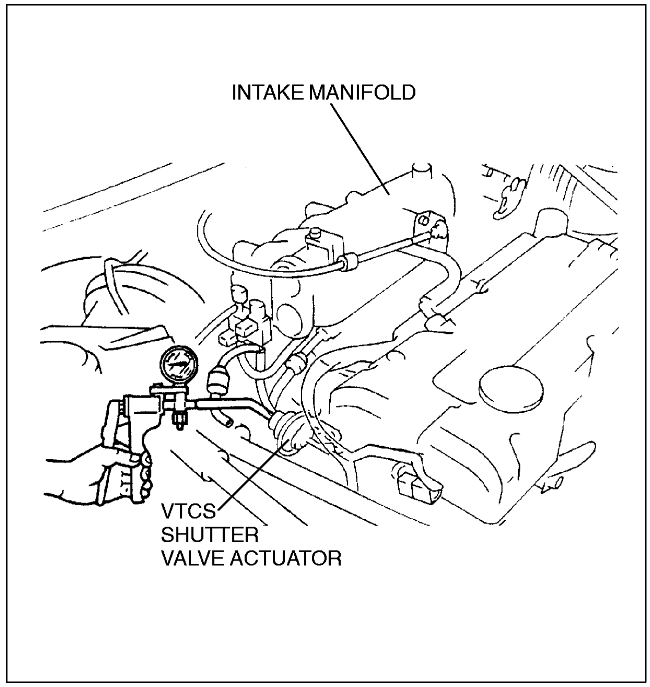
Operating Inspection

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

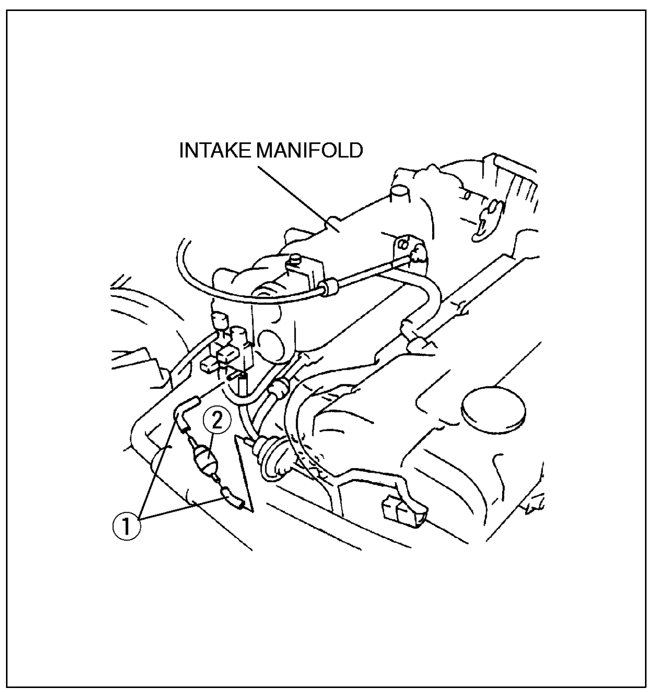
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [ZM]

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.

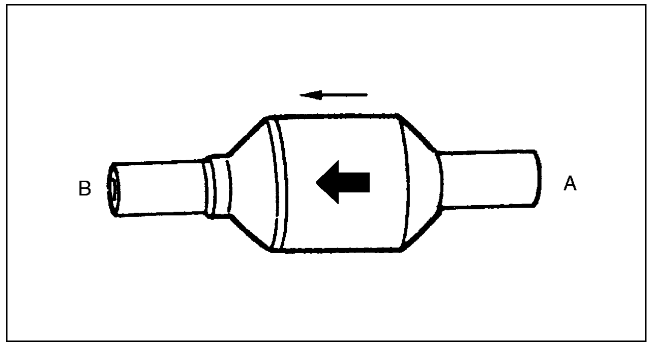


X3U113WA9

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

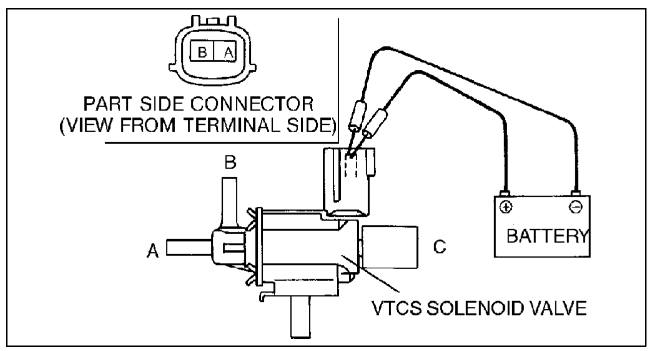
1. Carry out the “VTCS Operation Inspection”. (See 01–03A–58 Variable Tumble Control System (VTCS) Inspection.)
   - If not as specified, perform the further inspection for the VTCS solenoid valve.

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

O—O : Continuity O═O : Airflow

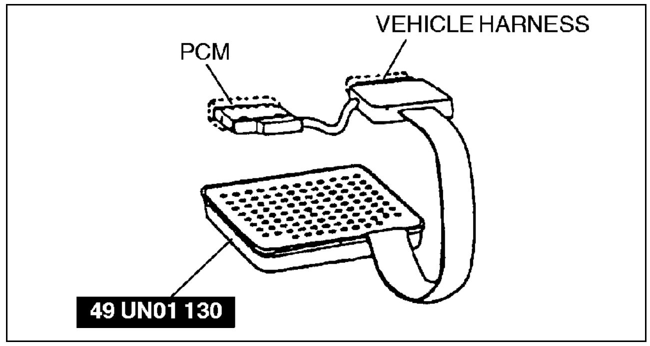
Step	Terminal		Port		
	A	B	A	B	C
1	O——	——O		O══	══O
2	B+	GND	O══	══O	

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.

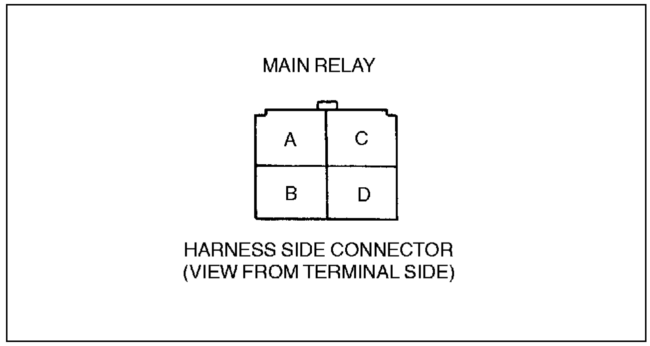
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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)
5. Reconnect the VTCS solenoid valve connector.
6. Reconnect the negative battery cable.



Z3U0113W998

ACCELERATOR CABLE REMOVAL/INSTALLATION [ZM]

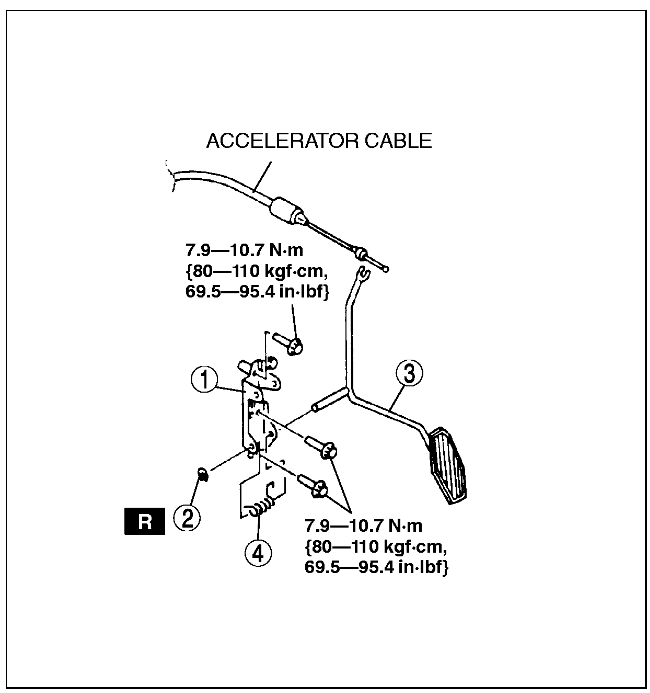
A3U011341660W04

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.

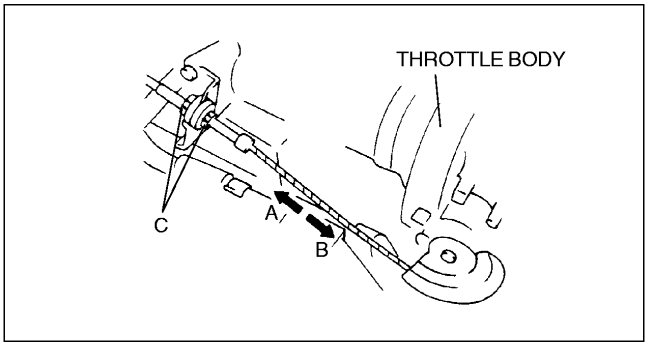
ACCELERATOR CABLE INSPECTION/ADJUSTMENT [ZM]

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}

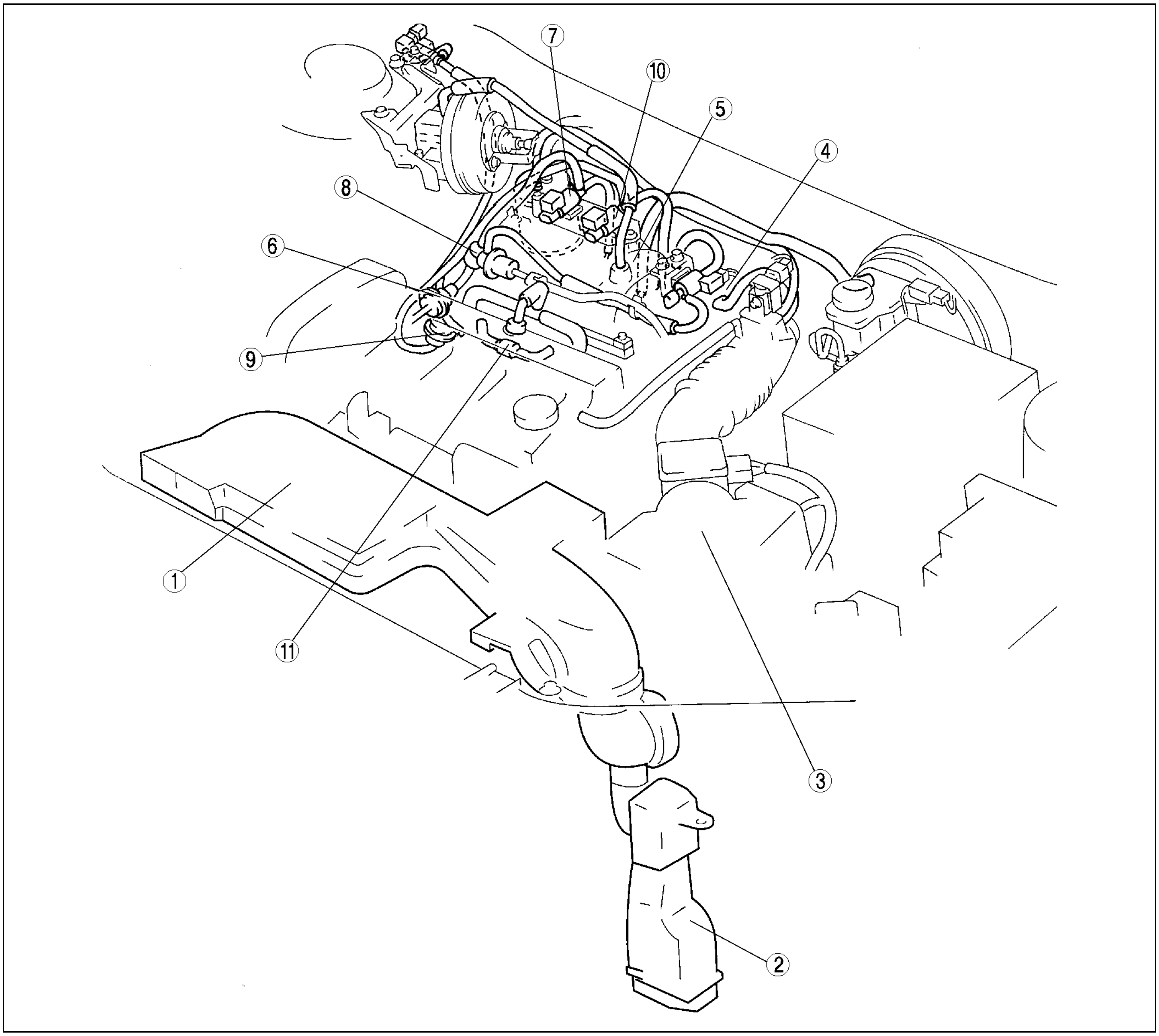


X3U113WAE

01–13B INTAKE-AIR SYSTEM [FS]

INTAKE-AIR SYSTEM LOCATION INDEX [FS]

A3U011301005W01



Z3U0113W005

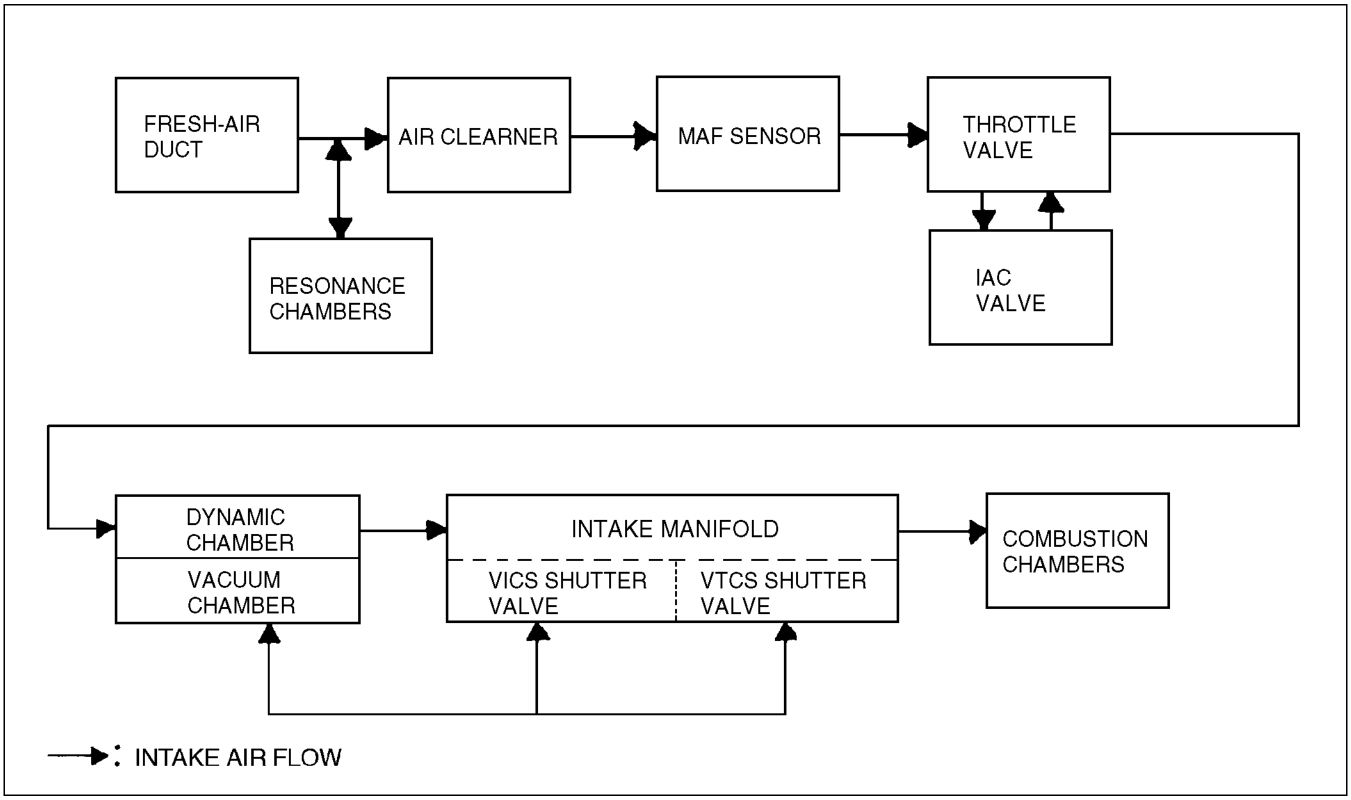
1	Fresh-air duct (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
2	Resonance chamber (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
3	Air cleaner (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [FS])
4	Throttle body (See 01–13B–6 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [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]

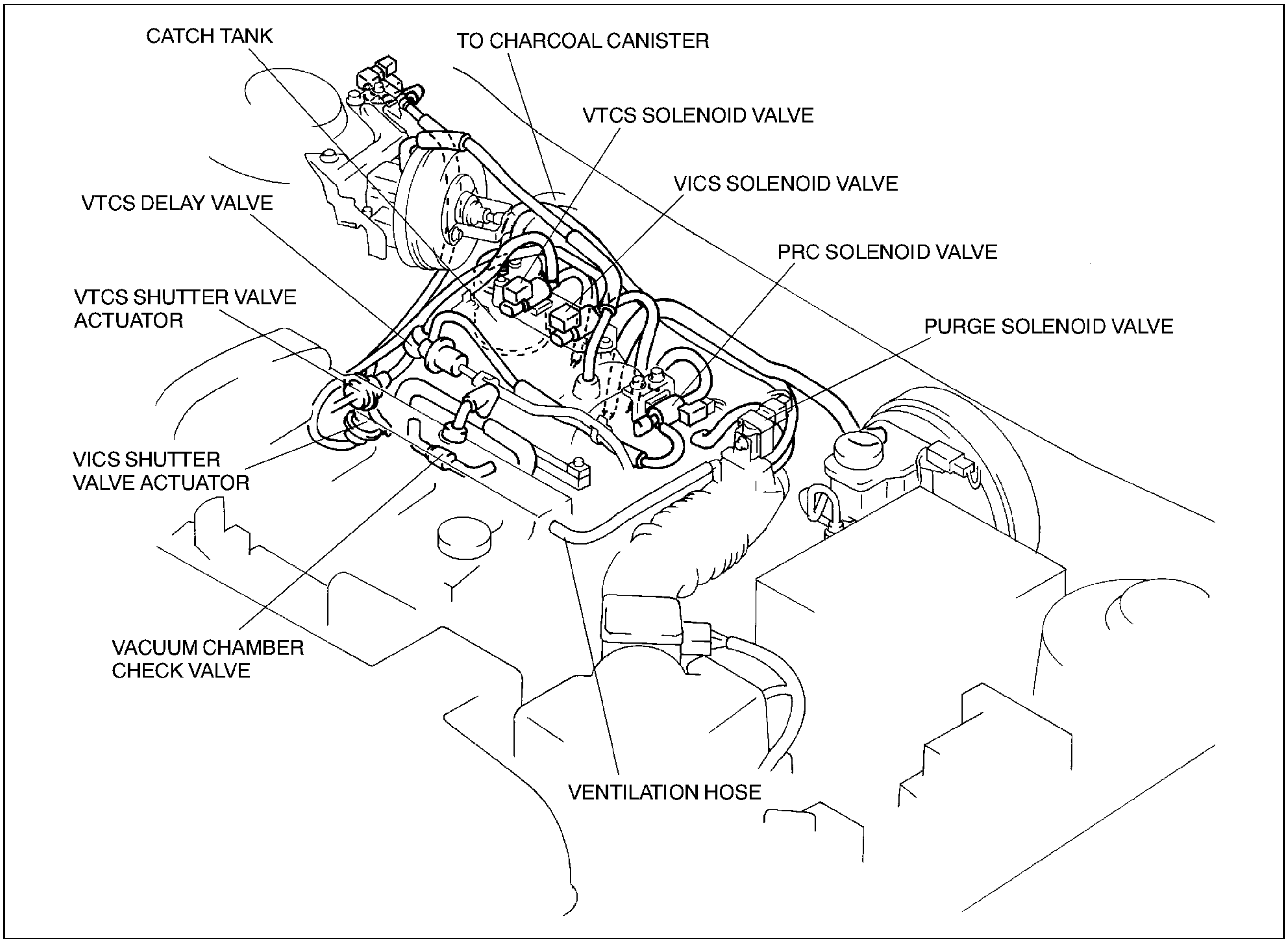
A3U011301005W02



Z3U0113W006

VACUUM HOSE ROUTING DIAGRAM [FS]

A3U011320030W01



Z3U0113W007

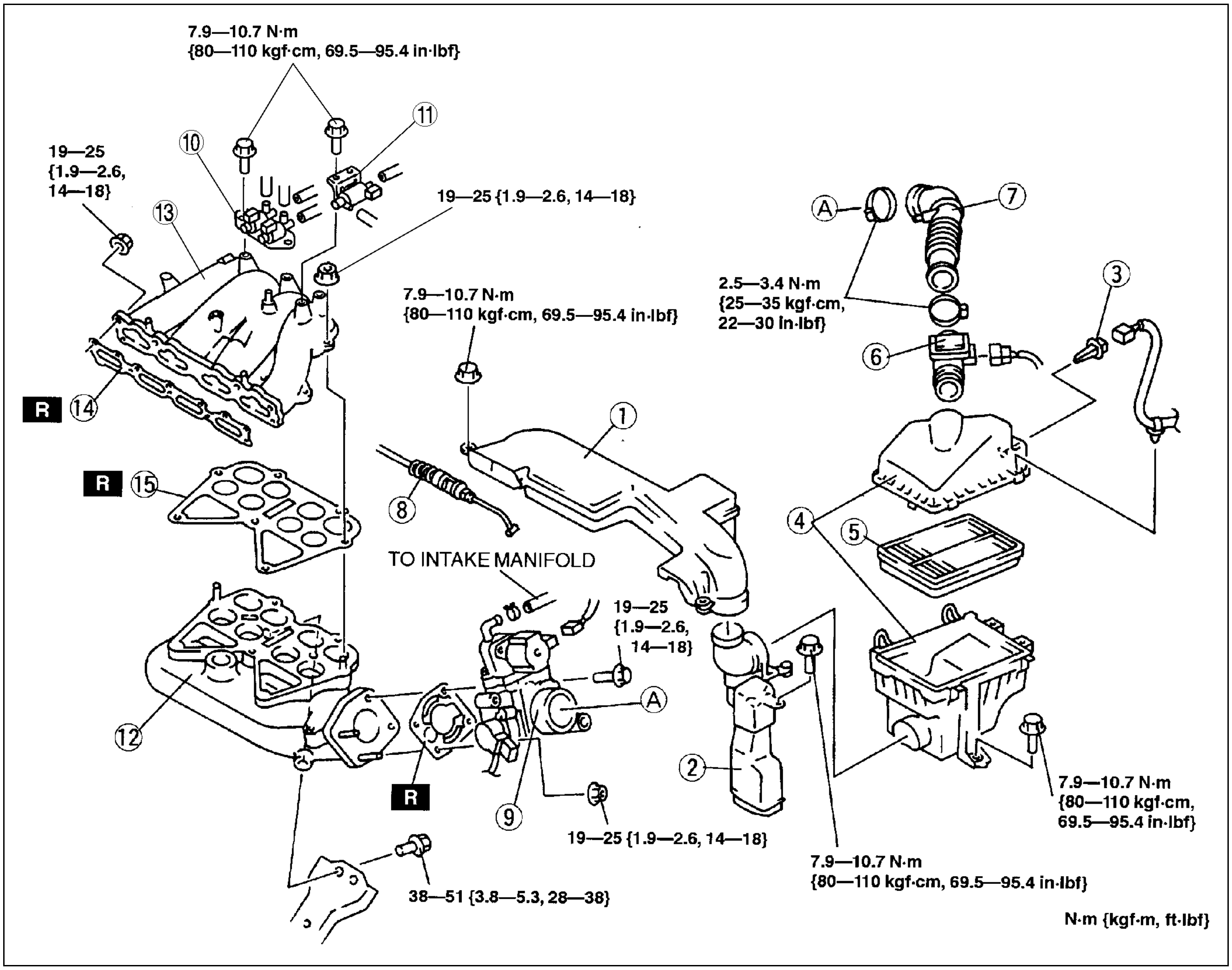
INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS]

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

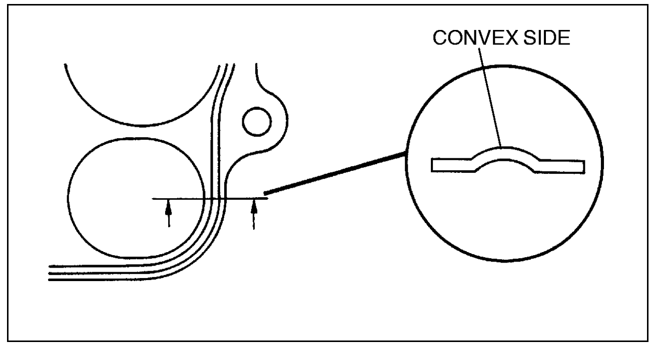
1. Drain the engine coolant from the radiator before removing the throttle body. (See 01–12–3 ENGINE COOLANT REPLACEMENT.) (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

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

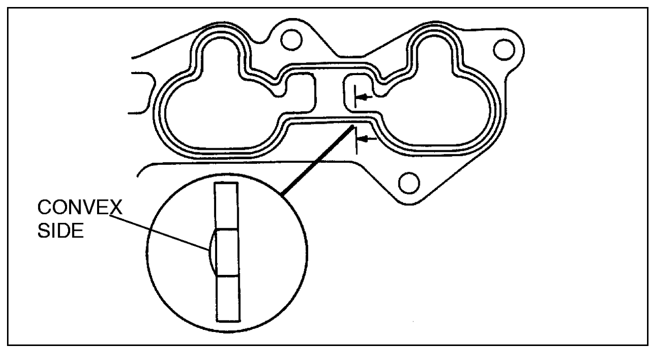
1. To install the dynamic chamber gasket, make sure that the convex side of the gasket is facing the intake manifold side.



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].)

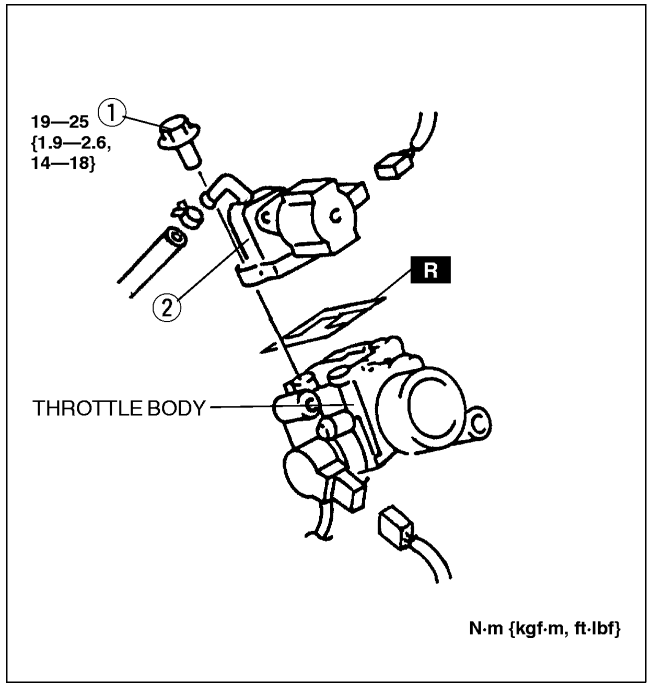
IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [FS]

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]

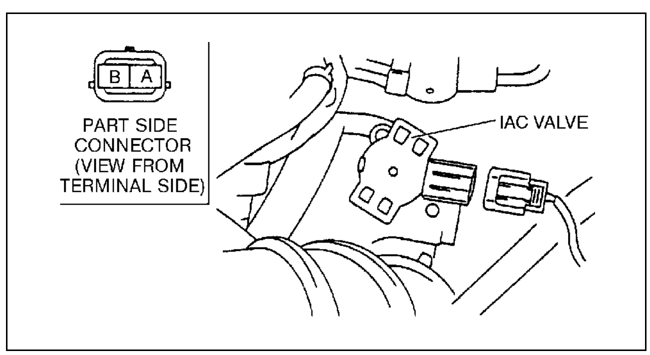
A3U011320661W02

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

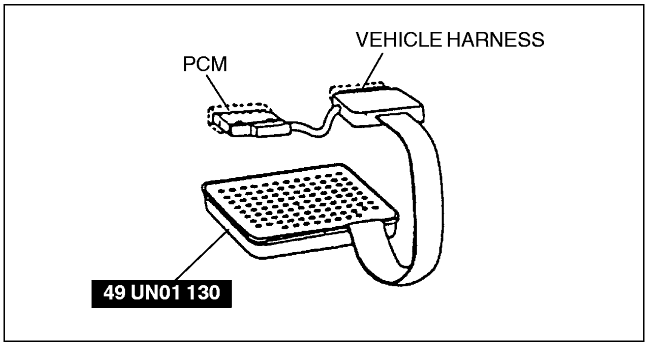
1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}

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.



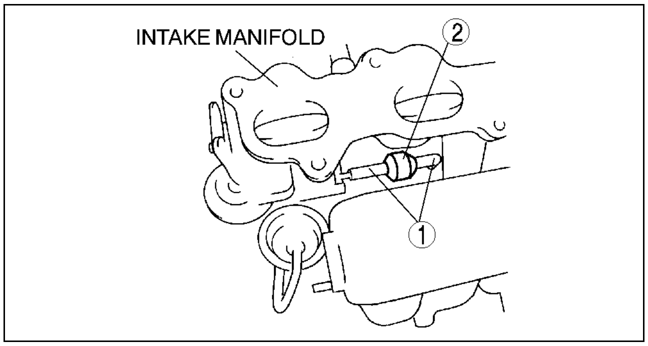
X3U113WDG

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

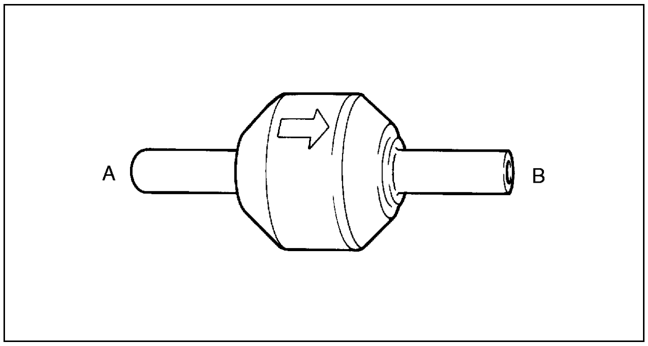


Z3U0113W009

VACUUM CHAMBER CHECK VALVE INSPECTION [FS]

A3U011342910W02

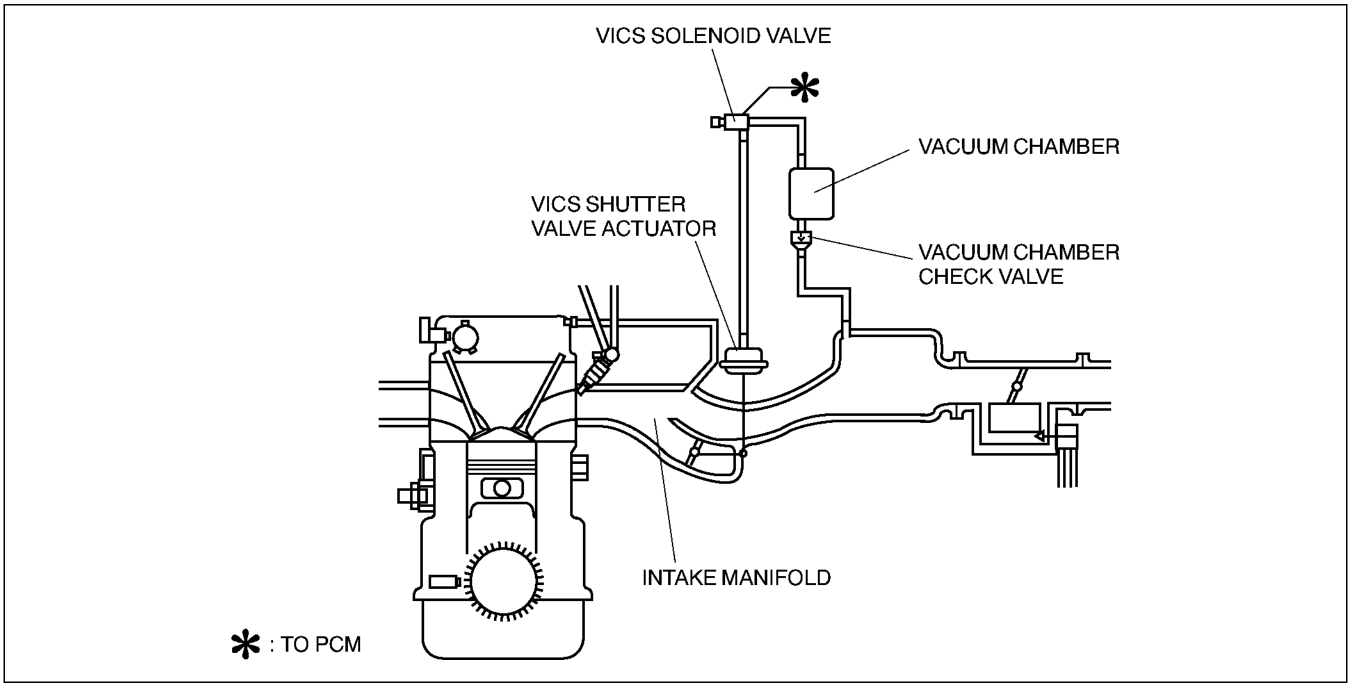
1. Remove the vacuum chamber check valve. (See 01–13B–9 VACUUM CHAMBER CHECK VALVE REMOVAL/INSTALLATION [FS].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the vacuum chamber check valve.
3. Blow through port B and verify that the air does not flow from port A.
   - If not as specified, replace the vacuum chamber check valve.



X3U113WD8

VARIABLE INERTIA CHARGING SYSTEM (VICS) DIAGRAM [FS]

A3U011313011W01



Z3U0113W010

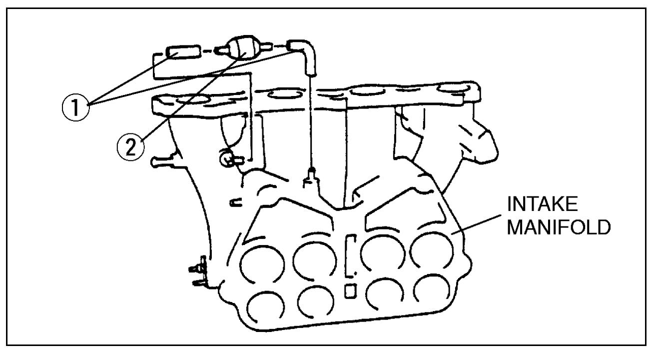
VARIABLE INERTIA CHARGING SYSTEM (VICS) CHECK VALVE (ONE-WAY) REMOVAL/INSTALLATION [FS]

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.

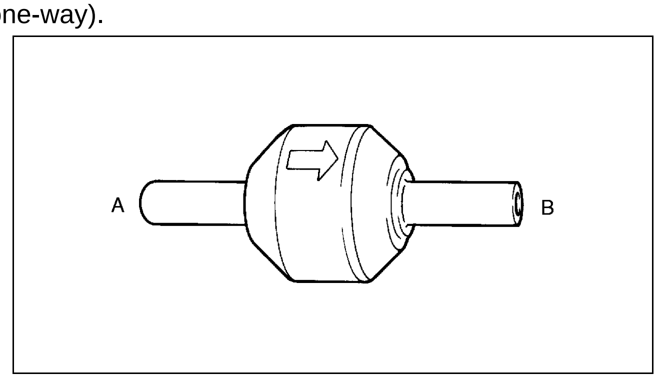


X3U113WD7

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

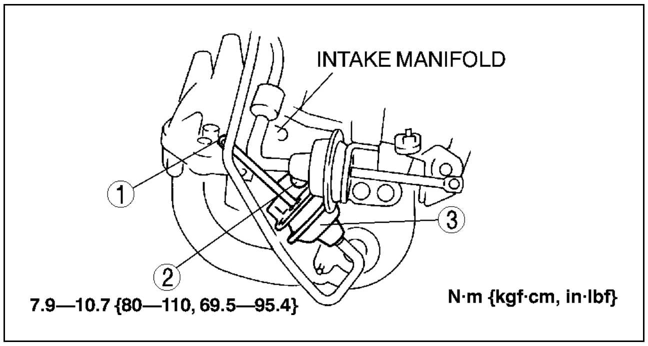
VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]

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

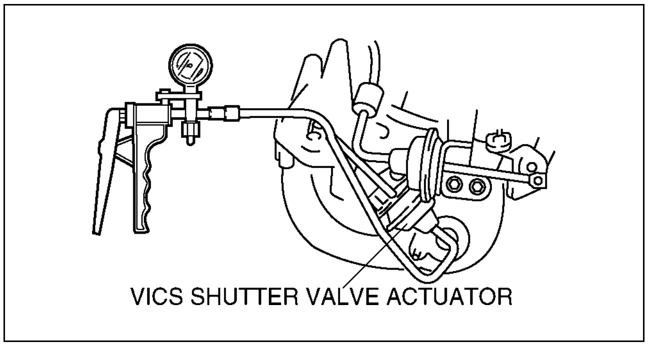
VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS]

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.

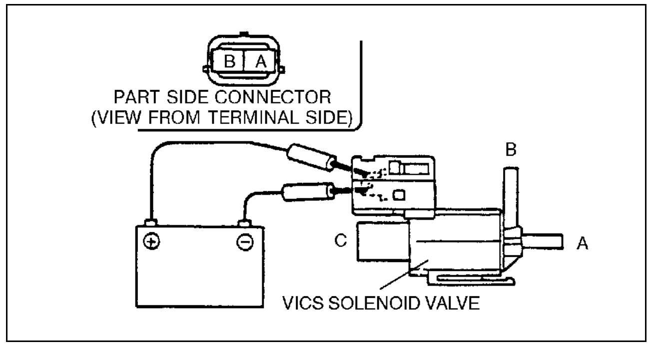
VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS]

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

O—O : Continuity O═O : Airflow

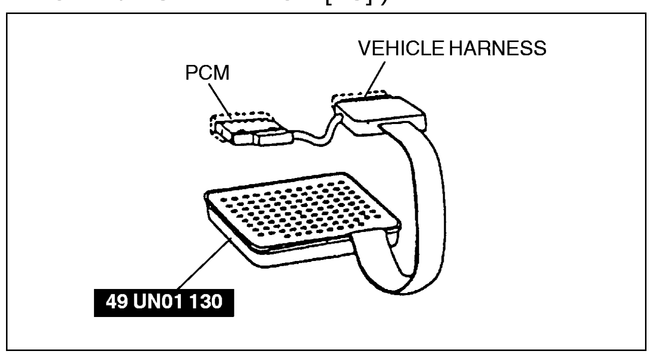
Step	Terminal		Port		
	A	B	A	B	C
1	O—	—O		O═	═O
2	B+	GND	O═	═O	

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

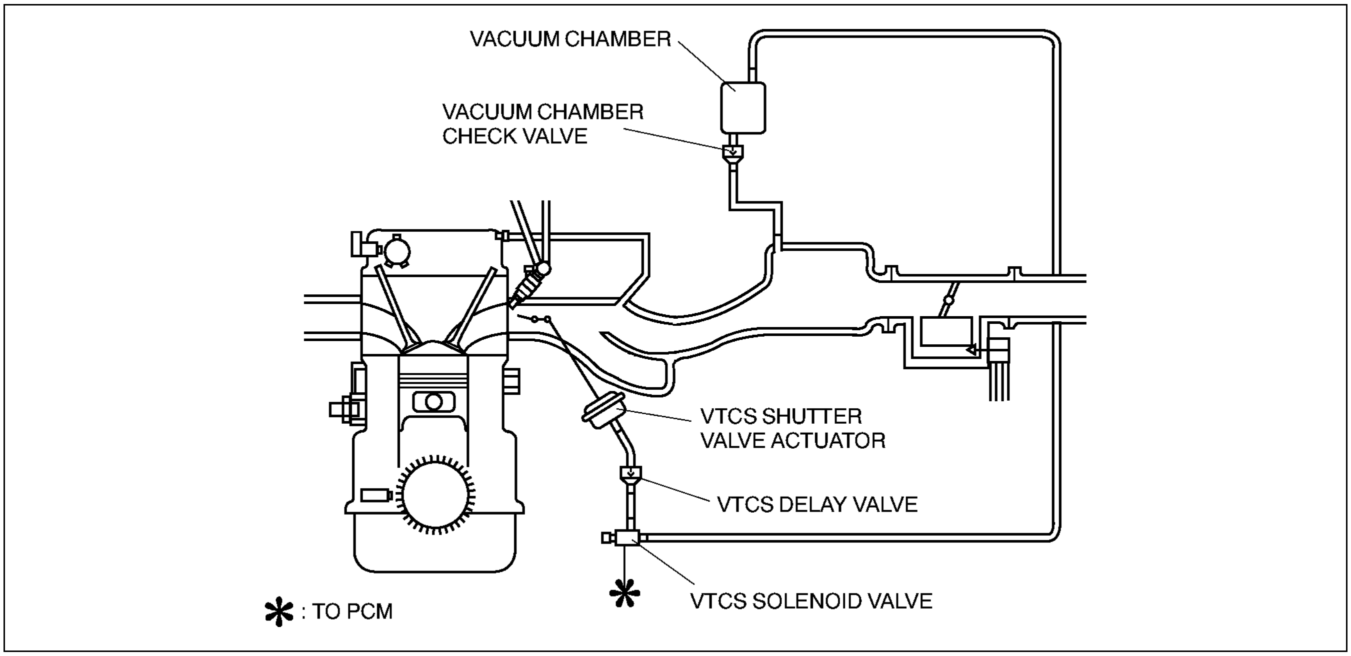
4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and **SST** (104 Pin Breakout Box) terminals with ohmmeter leads.

   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

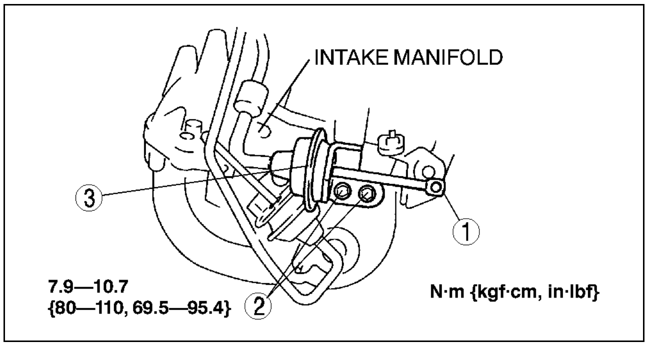
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]

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

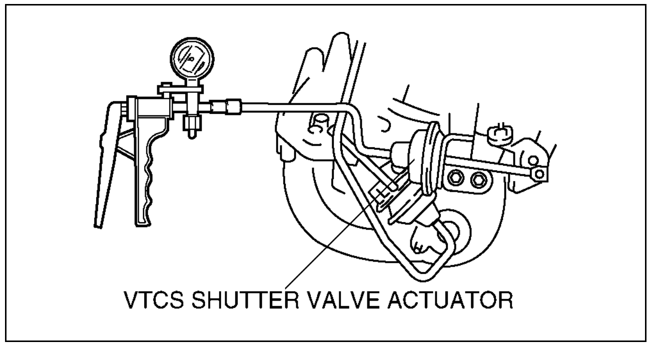
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [FS]

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.

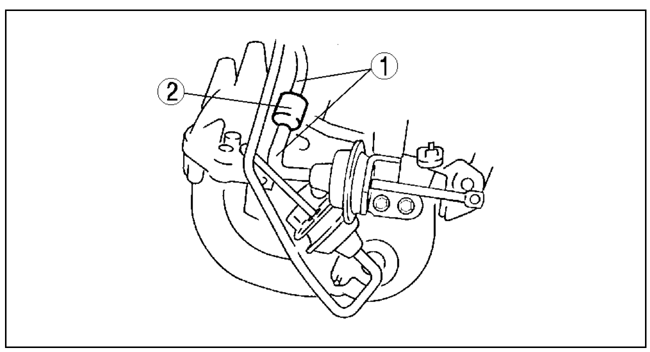
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [FS]

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.

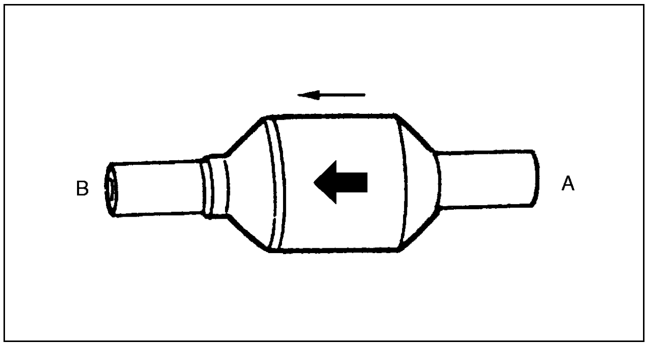


Z3U0113W016

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

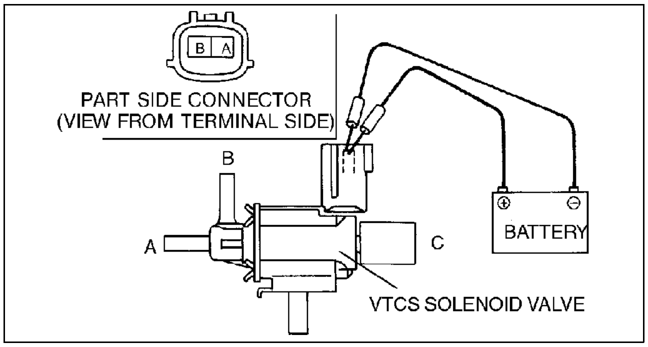
Simulation Test

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

O—O : Continuity O═O : Airflow

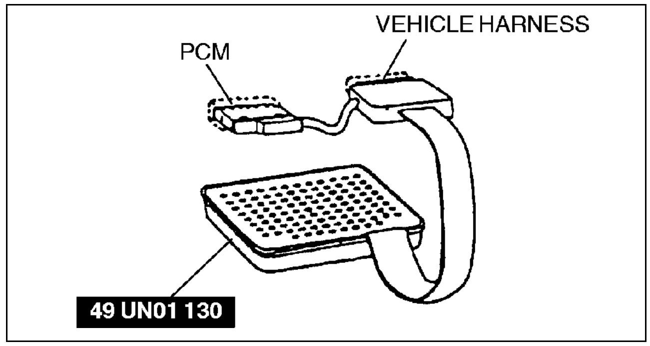
Step	Terminal		Port		
	A	B	A	B	C
1	O—	—O		O═	═O
2	B+	GND	O═	═O	

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.

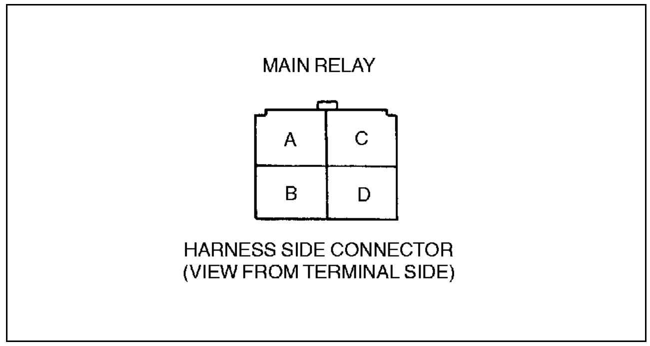
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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)
5. Reconnect the VTCS solenoid valve connector.
6. Reconnect the battery negative cable.



Z3U0113W998

ACCELERATOR CABLE REMOVAL/INSTALLATION [FS]

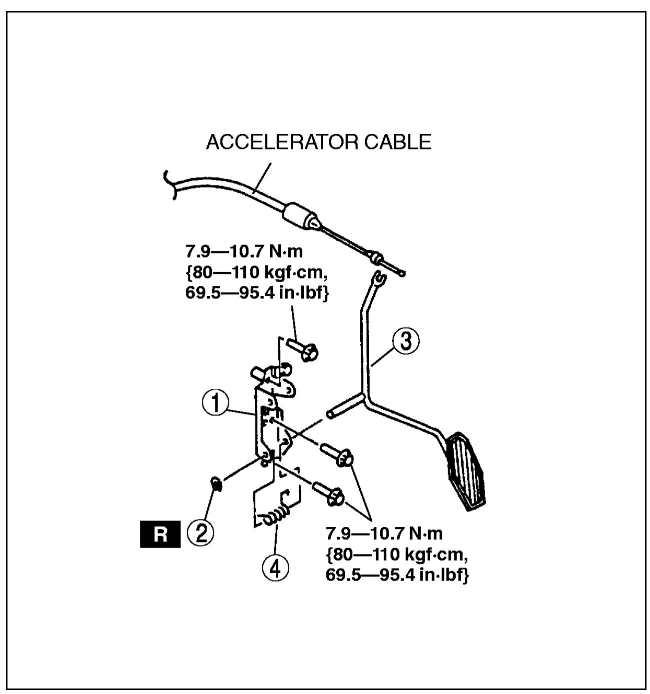
A3U011341660W01

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

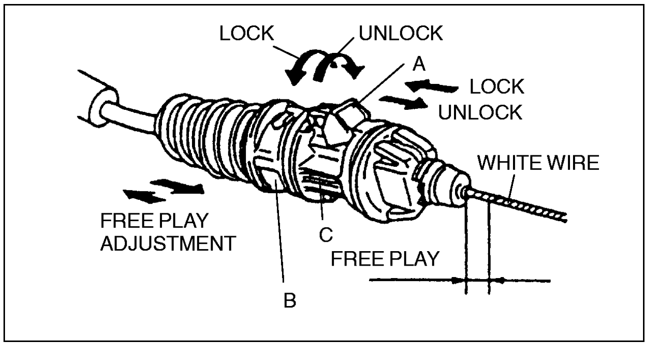
- To measure cable free play, push the cable into the housing and put a white mark on the cable at the end of the housing, then pull it out and measure distance from the white mark to the end of the cable housing.

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}

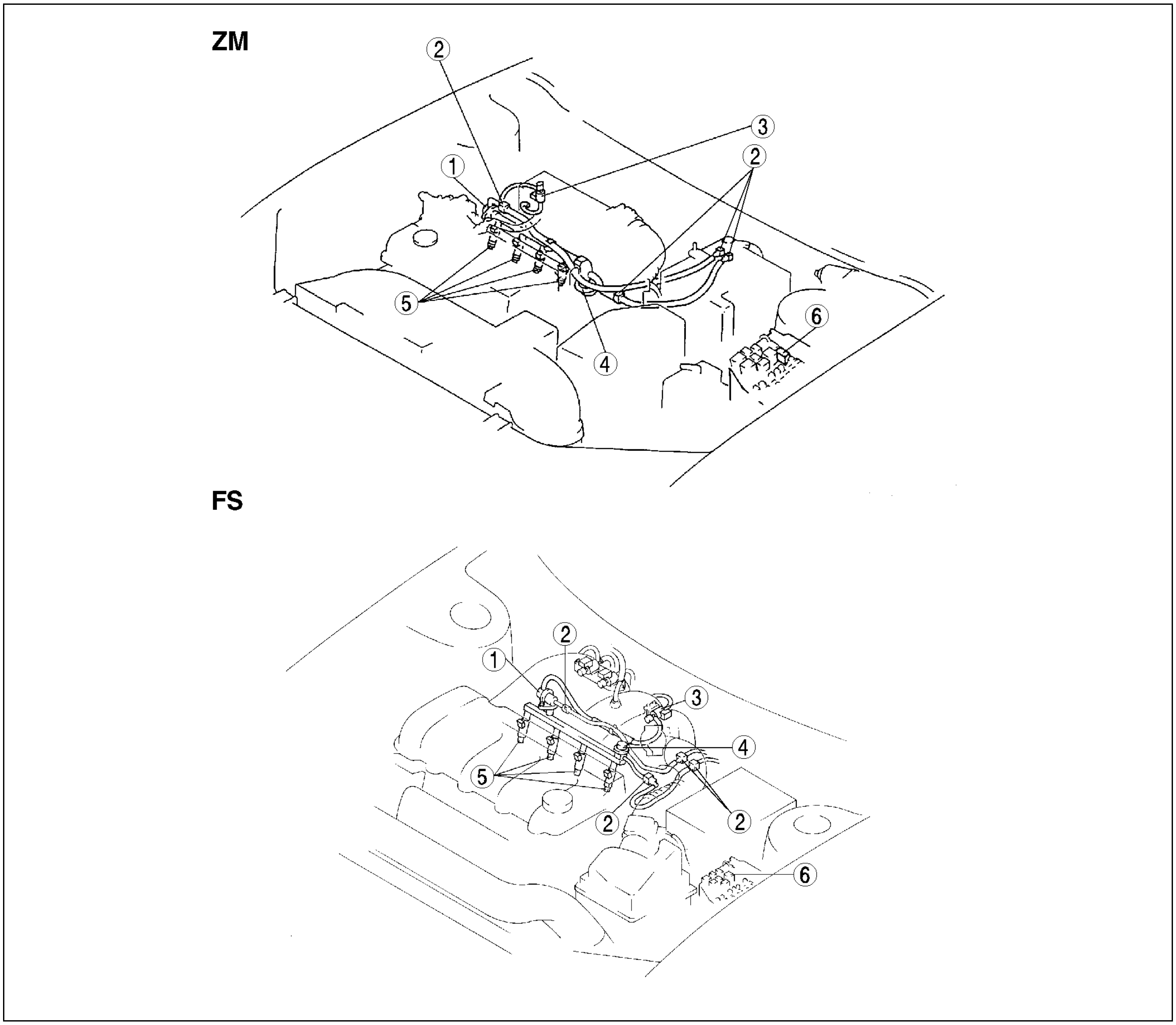
5. Measure the throttle cable free play, making sure that it is within the specification.
6. Move the white locking tab A to the lock position.
7. Verify correct accelerator operation.

01–14 FUEL SYSTEM

FUEL SYSTEM LOCATION INDEX

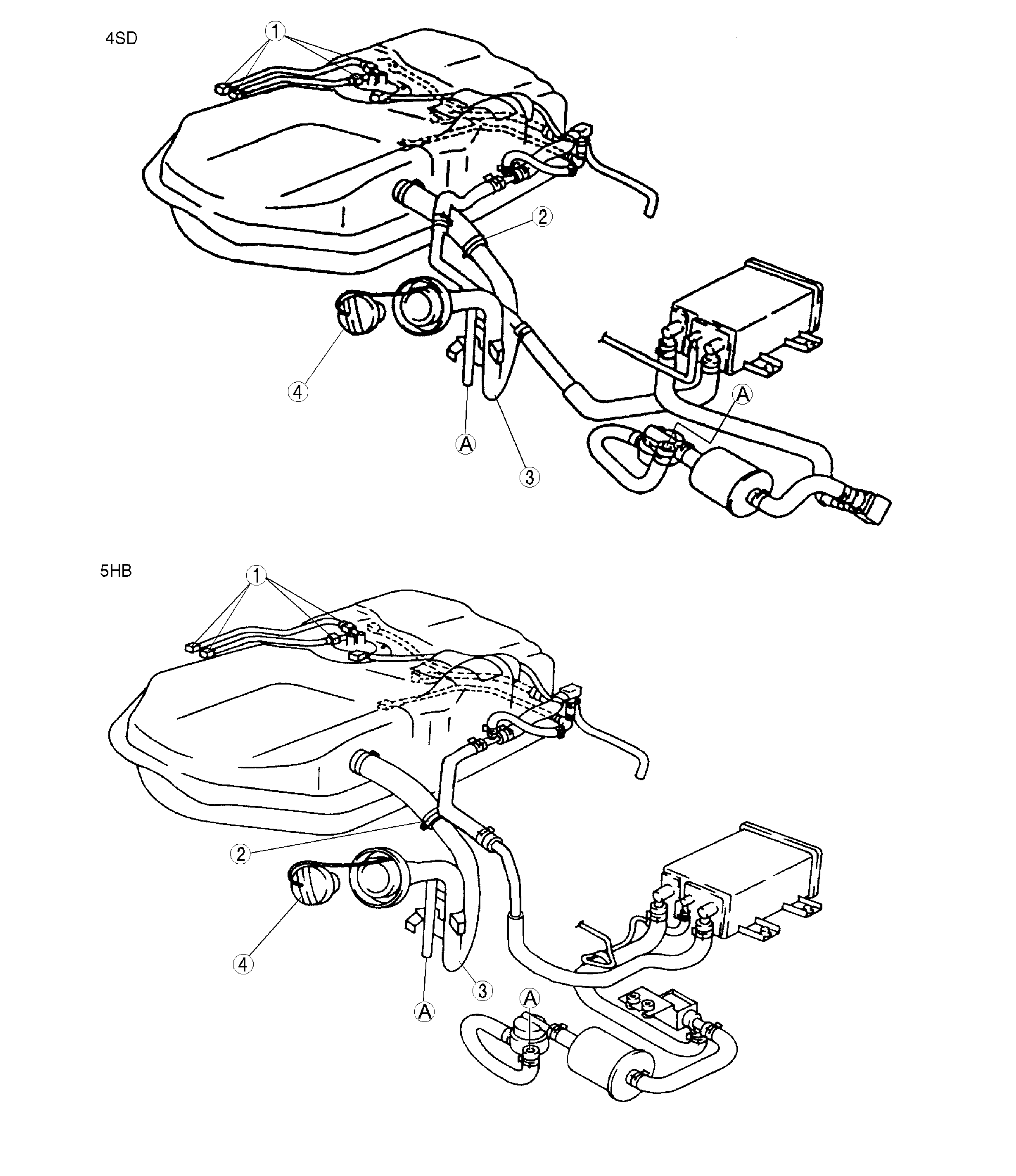
A3U011401006W01

Engine Room Side



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)



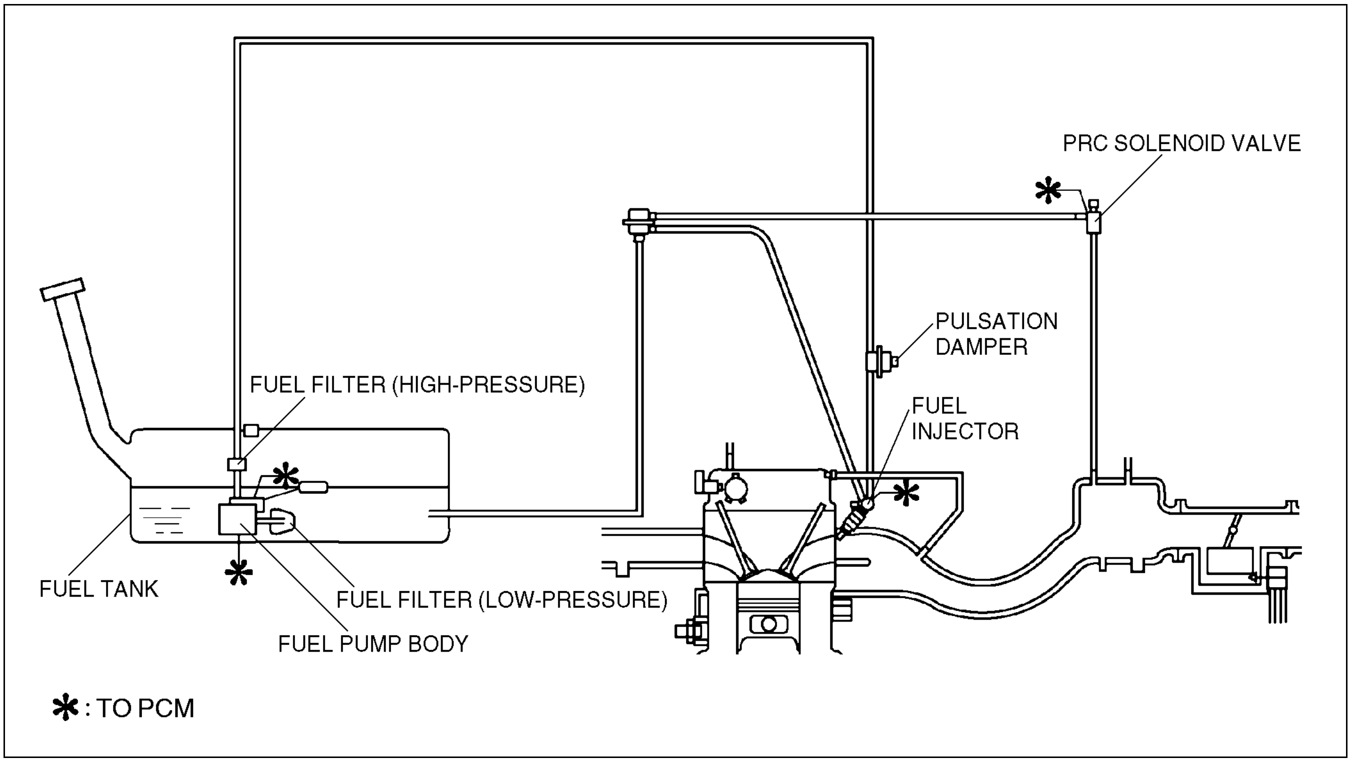
A3U0114W003

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

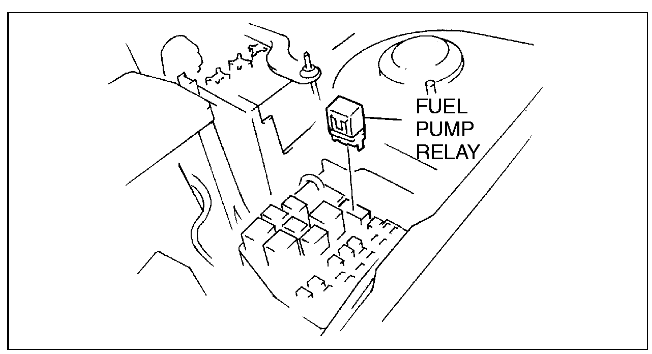
- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, 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

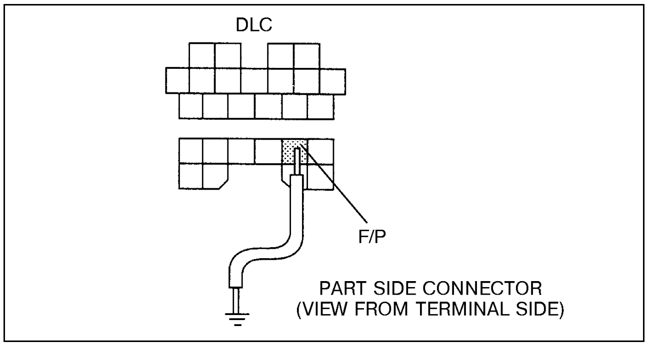
Warning

- **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

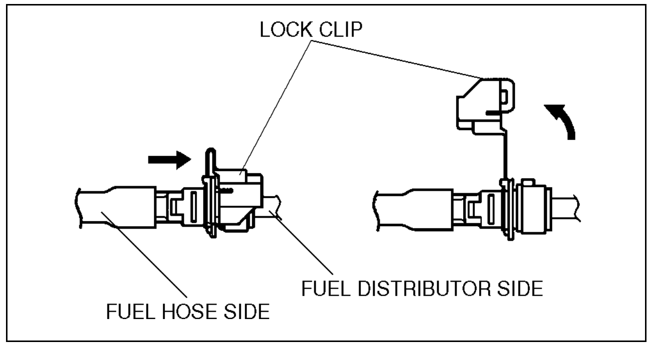
Warning

- **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.

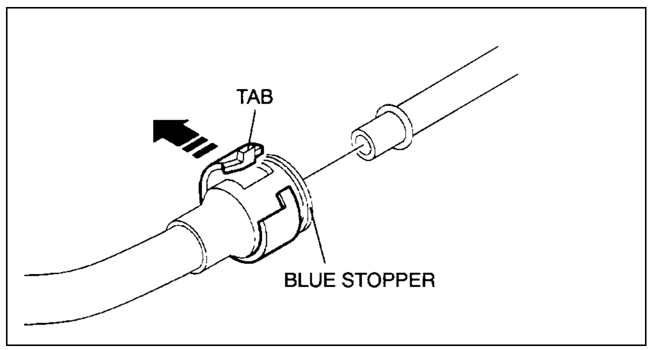


Y3E3912W201

   (2) Lift the tab on the blue locking coupler until the fuel line can be released.
   (3) Pull the fuel hose straight back.

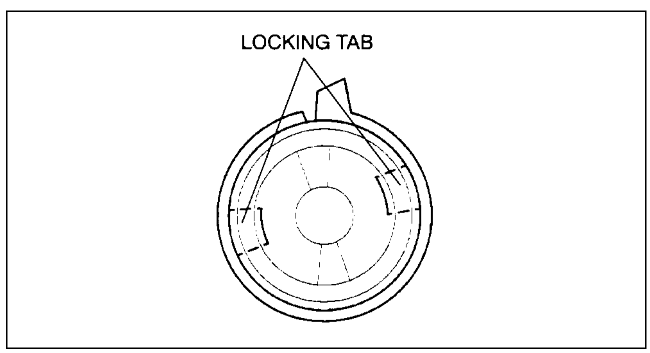
Note

- 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

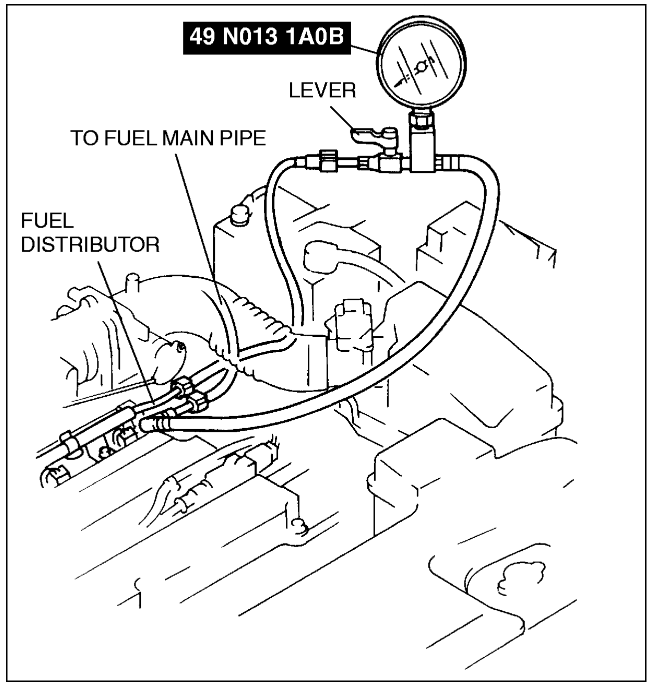
- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



Z3U0114W993

3. Push the **SST** quick release connector into the fuel distributor and fuel main hose into the **SST** until a click is heard.

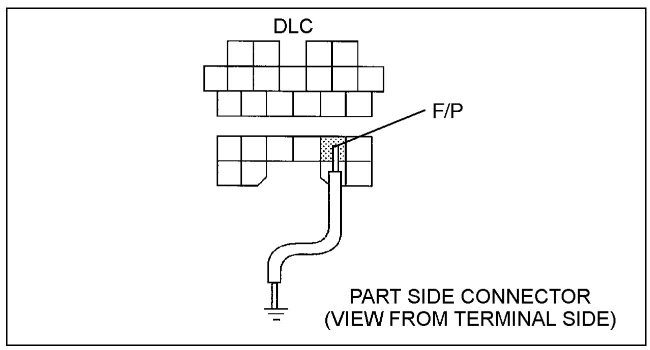
4. Turn the lever on the **SST** as shown.



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).

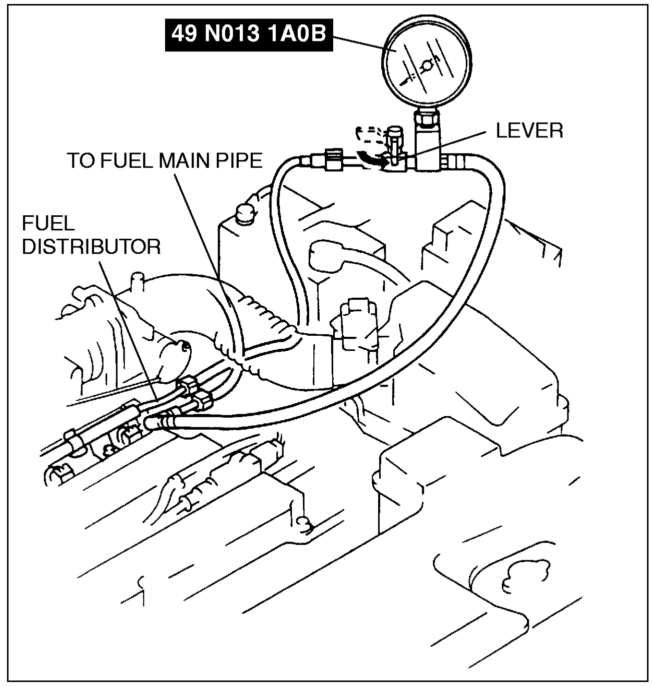
   Fuel line pressure
   270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

   (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).

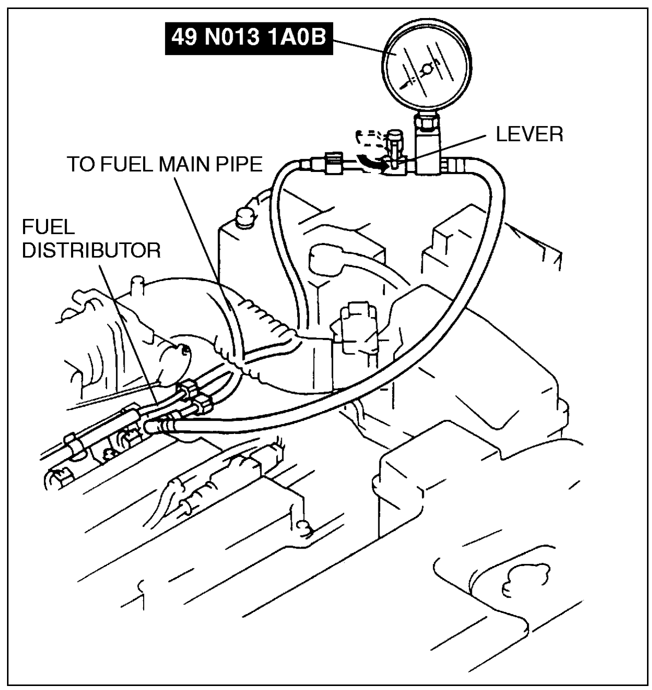
Fuel hold pressure
More than 150 kPa {1.5 kgf/cm^2, 22 psi}

(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

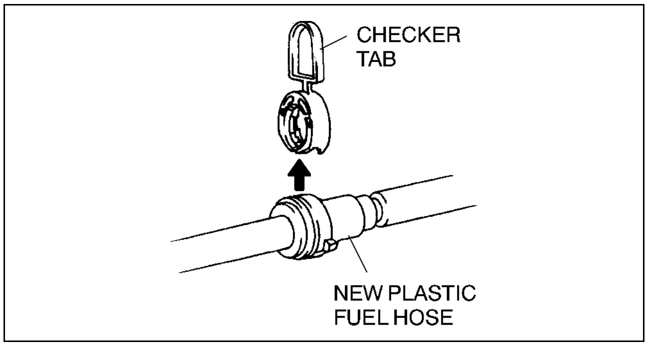
10. Disconnect the **SST**.



Y3U114WB3

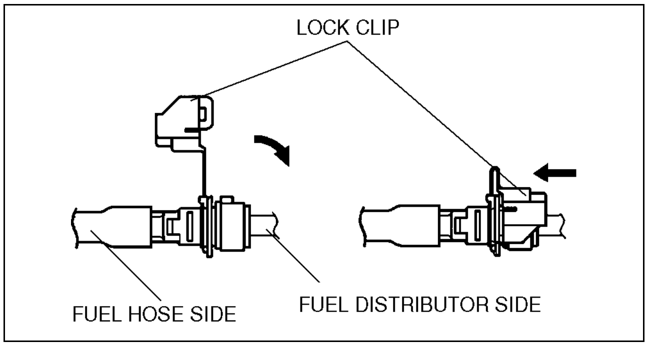
Note

- 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

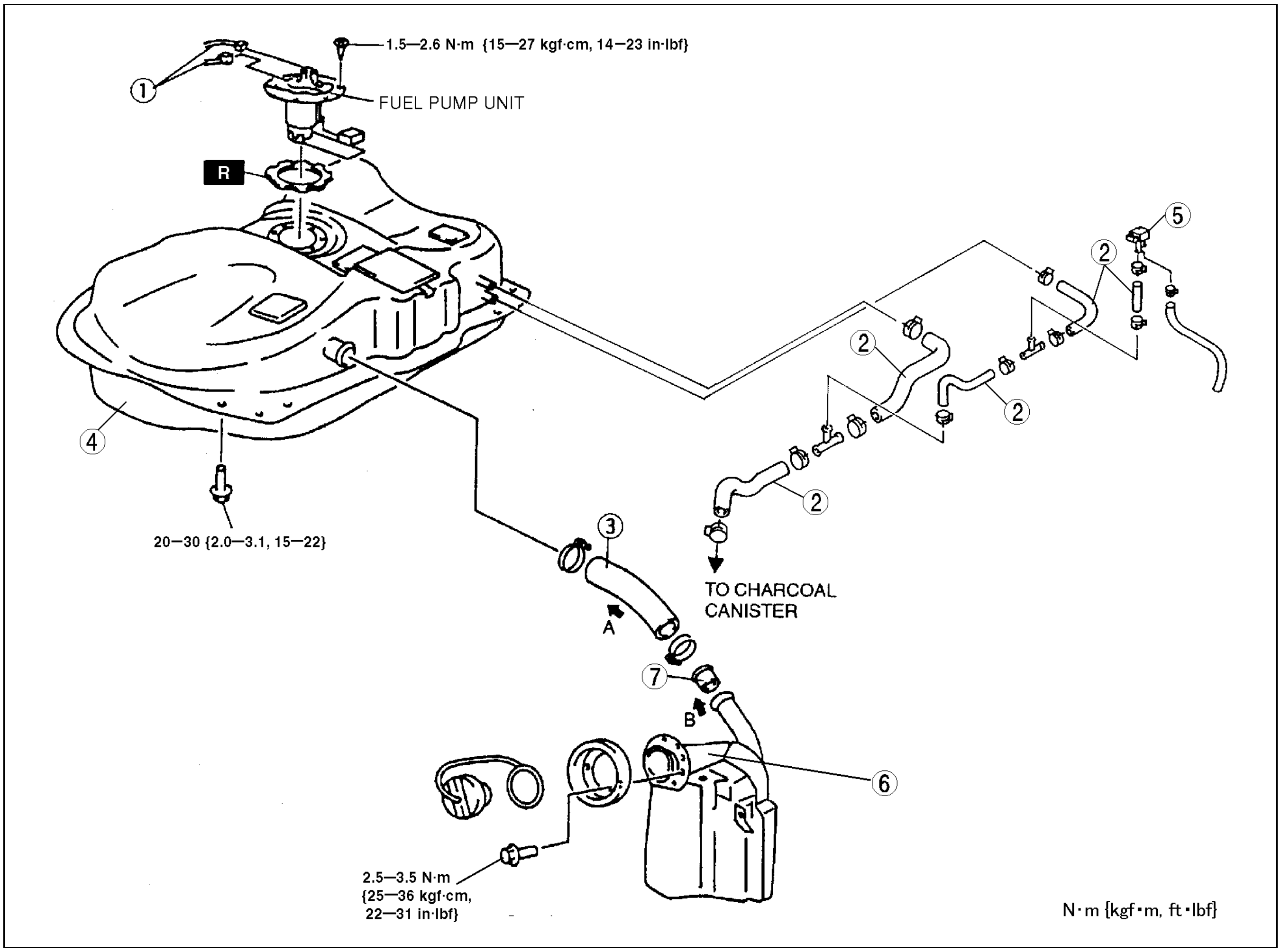
- **Repairing a fuel tank that has not been properly steam cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death 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.)

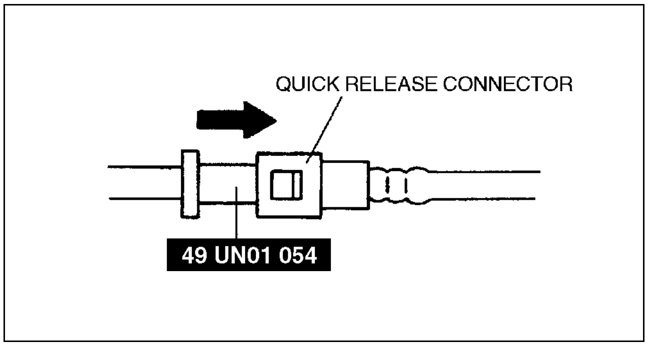
4	Fuel tank
5	Fuel tank pressure sensor
6	Fuel-filler pipe
7	Nonreturn valve (See 01–14–11 Nonreturn Valve Installation Note.)

Plastic Fuel Hose Removal Note

Caution

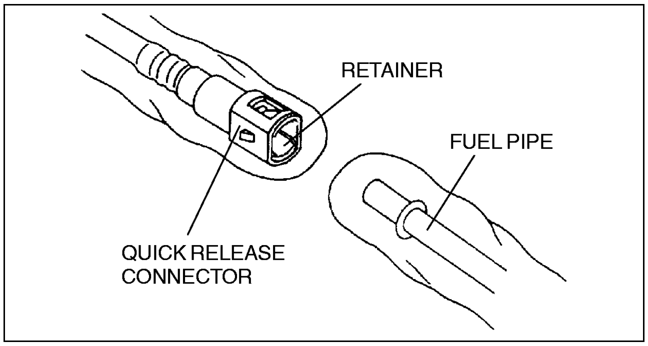
- **The retainer must be replaced if removed from the fuel pipe without using the SST. Otherwise, effectiveness of the retainer will be reduced.**

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

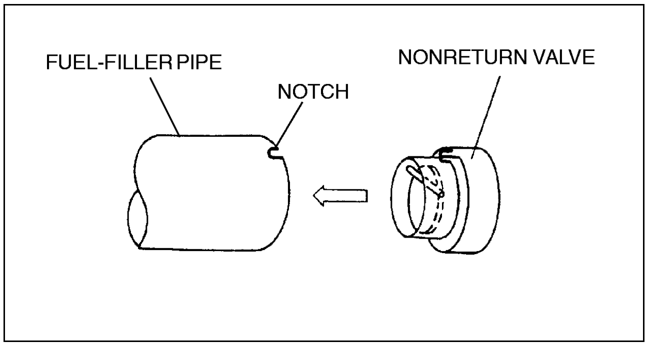
4. Cover the disconnected quick release connector and fuel pipe to prevent them from being scratched or contaminated with foreign material.



X5U114WC6

Nonreturn Valve Installation Note

1. Align the nonreturn valve with the notch in the fuel-filler pipe as shown, then install.

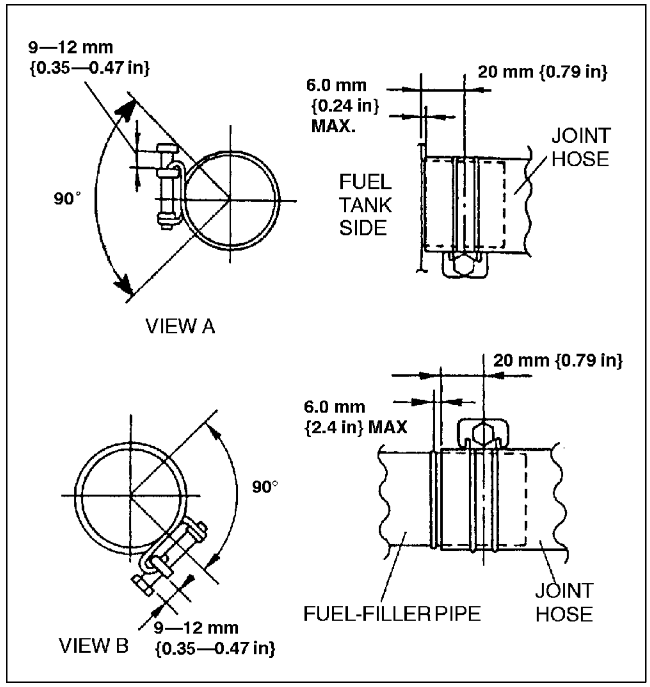


X3U114WA3

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}

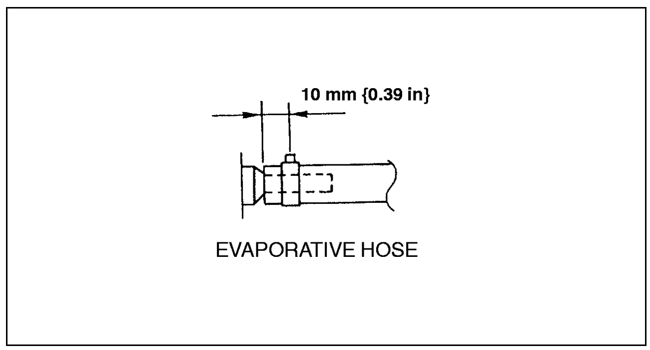


A3U0114W001

Evaporative Hose Installation Note

1. Fit evaporative hose onto the respective fittings within the specification, and install clamps as shown.

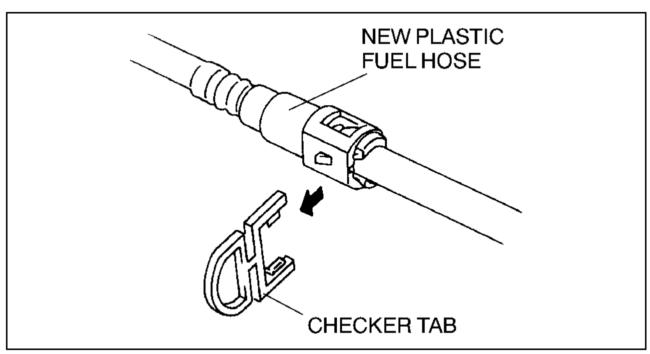
   Specification
   10 mm {0.39 in}



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.



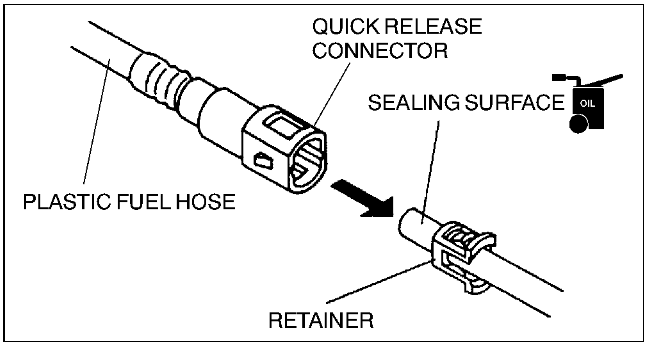
YMU114WF0

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.

(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.

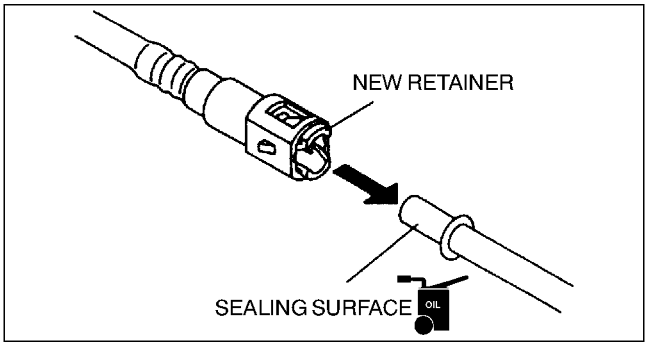
(1) Inspect the plastic fuel hose and fuel pump unit sealing surface for damage and deformation, and replace if necessary.
- If the quick release connector O-ring is damaged or has slipped, replace the plastic fuel hose.

(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.



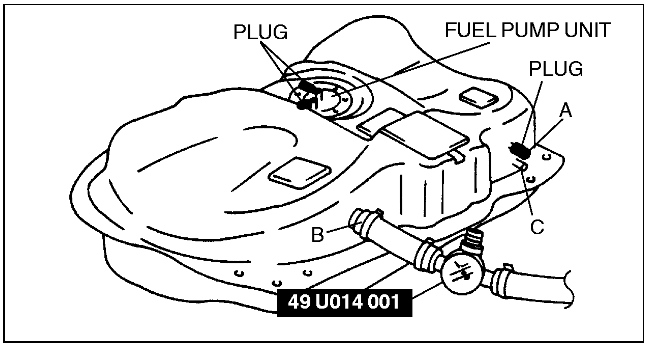
YMU114WAP

FUEL TANK INSPECTION

A3U011442110W02

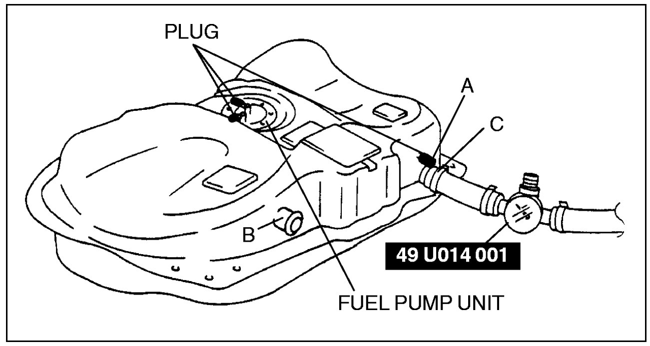
Note
- This inspection is for the 2 rollover valves integrated in the fuel tank. The evaporative gas check valve (two-way) is integrated with each rollover valve.

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.

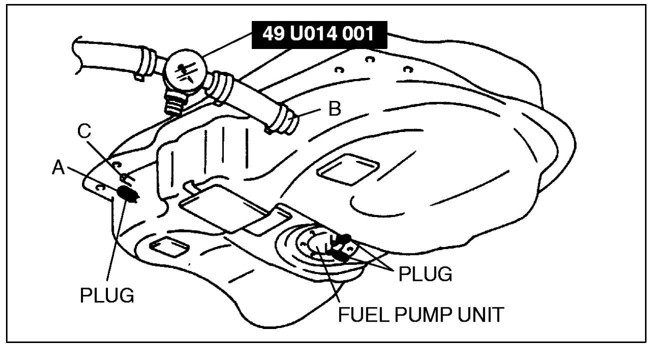


X3U114WA8

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

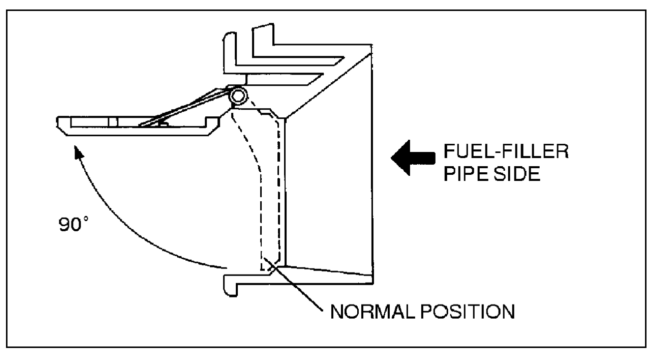
A3U011442990W01

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

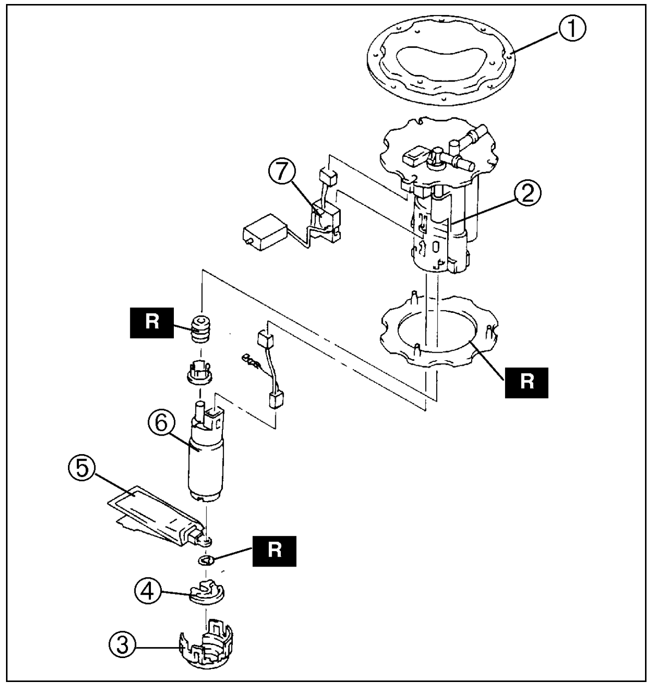
A3U011413350W02

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

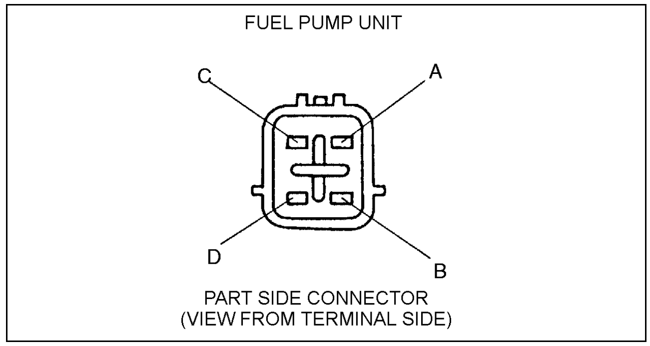
FUEL PUMP UNIT INSPECTION

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”.

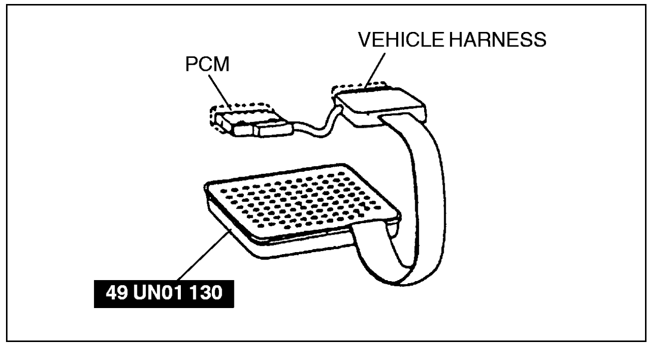


Y3U114WA6

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}



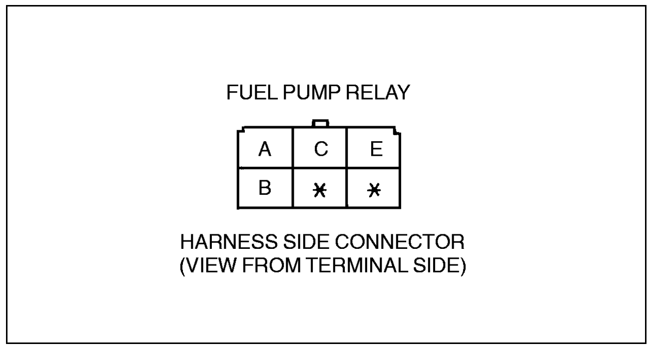
Y3U114WB7

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.**

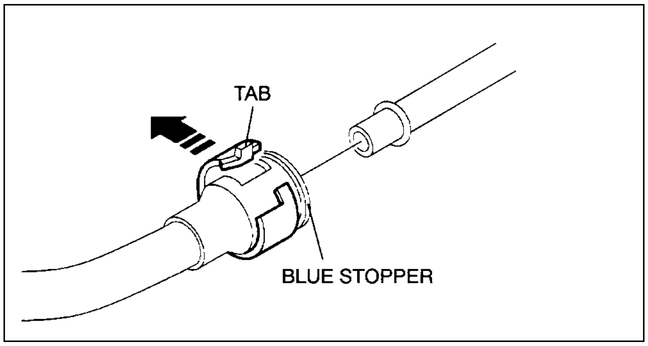
Caution

- **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.

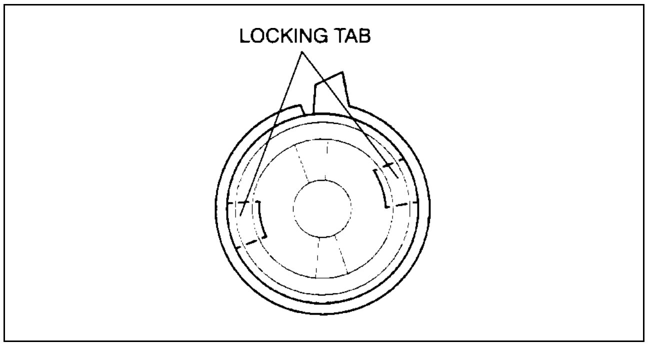
1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push the tab on the orange locking coupler 90° until it stops.
   (2) Pull the fuel hose straight back.



Z3U0114W986

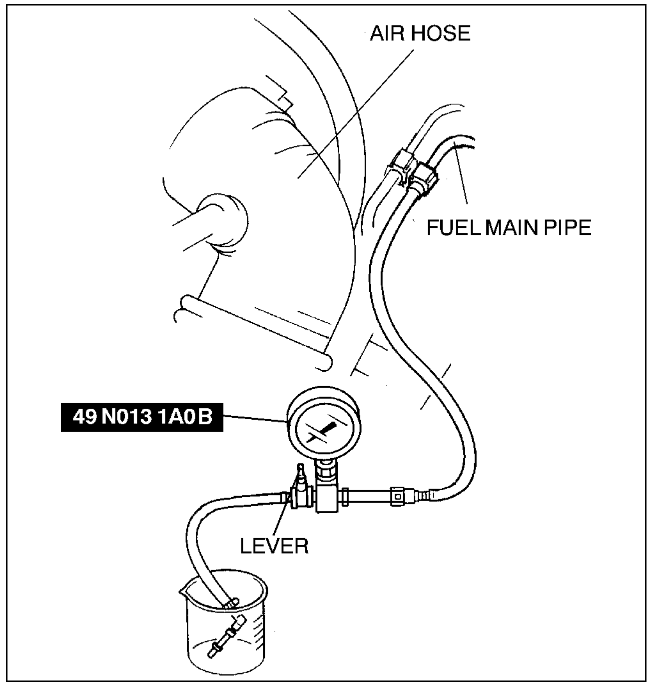
Note

- 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.
- 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

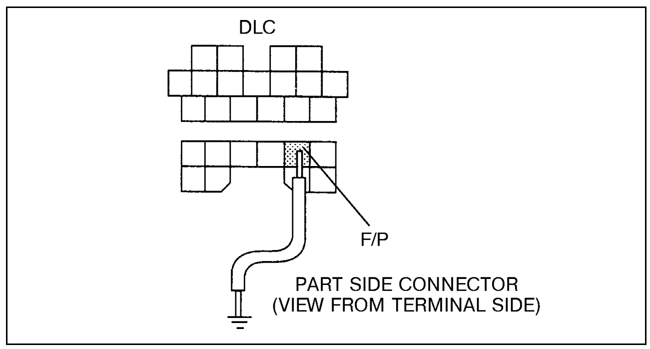
4. Turn the lever to plug the **SST** outlet.
5. Push the **SST** quick release connector into the fuel main pipe until a click is heard.
6. Set the fuel hose into a container to avoid fuel spills.



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.**



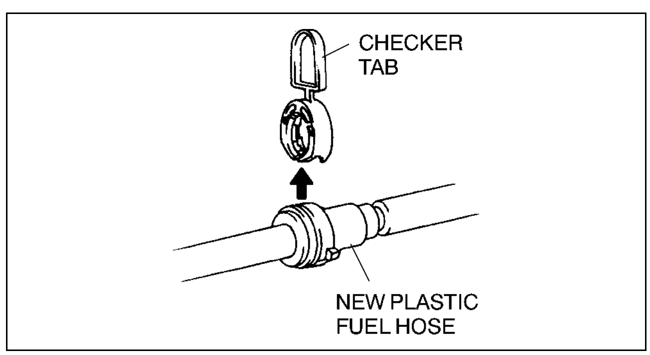
Y3U114WA7

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.)

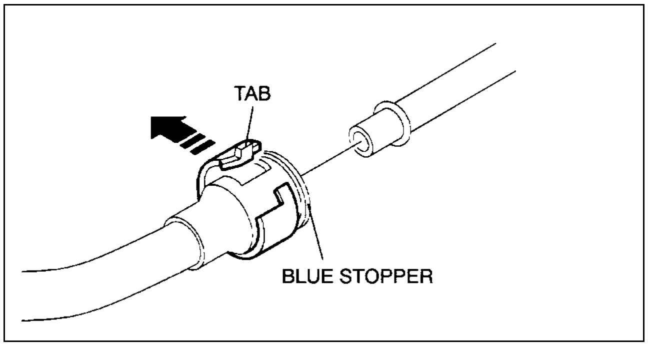
Fuel Pump Hold Pressure Inspection

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.**

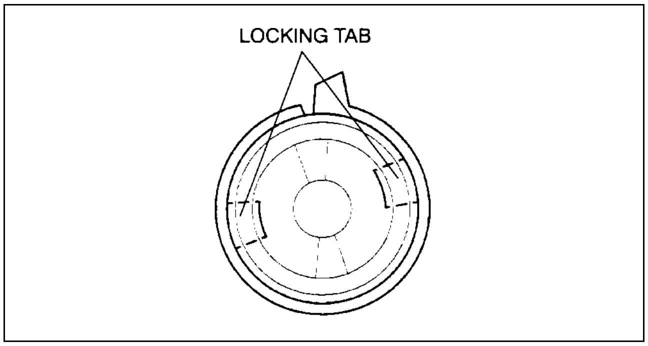
Note
- Perform the following test only when directed.

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.



Z3U0114W986

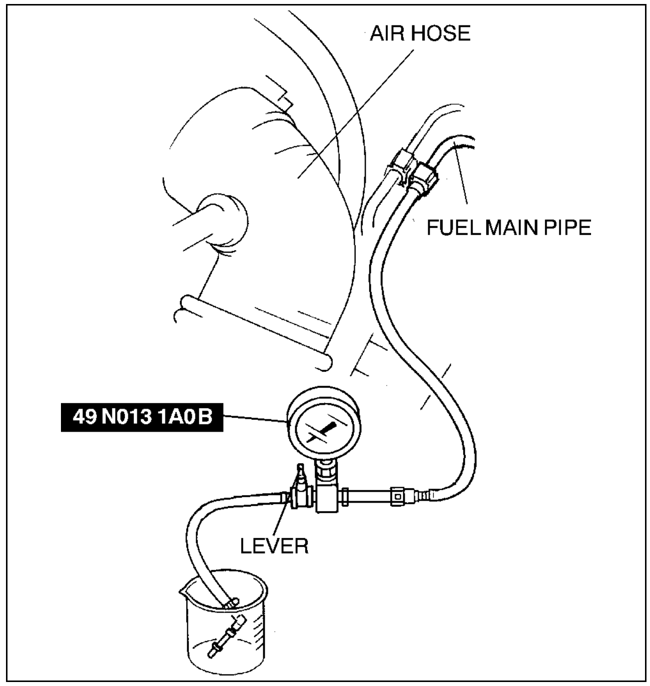
Note
- The blue stopper may be removed from the quick connector. Take care not to lose it. Reinstall it to the quick release connector before reconnecting the fuel line.
- The orange locking coupler has two internal locking tabs which retrain the pulsation damper pipe. Be sure that the tab on the locking 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.

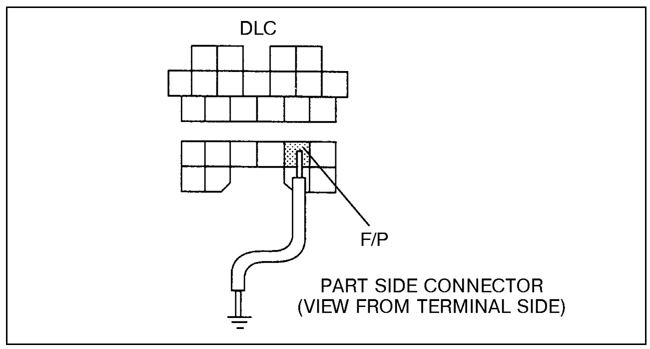
6. Set the fuel hose into a container to avoid fuel spills.



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.**



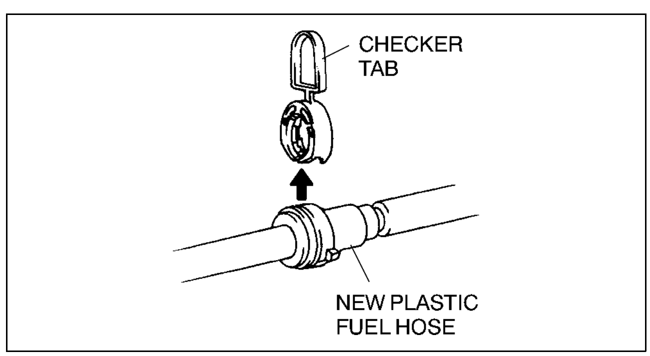
Y3U114WA8

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

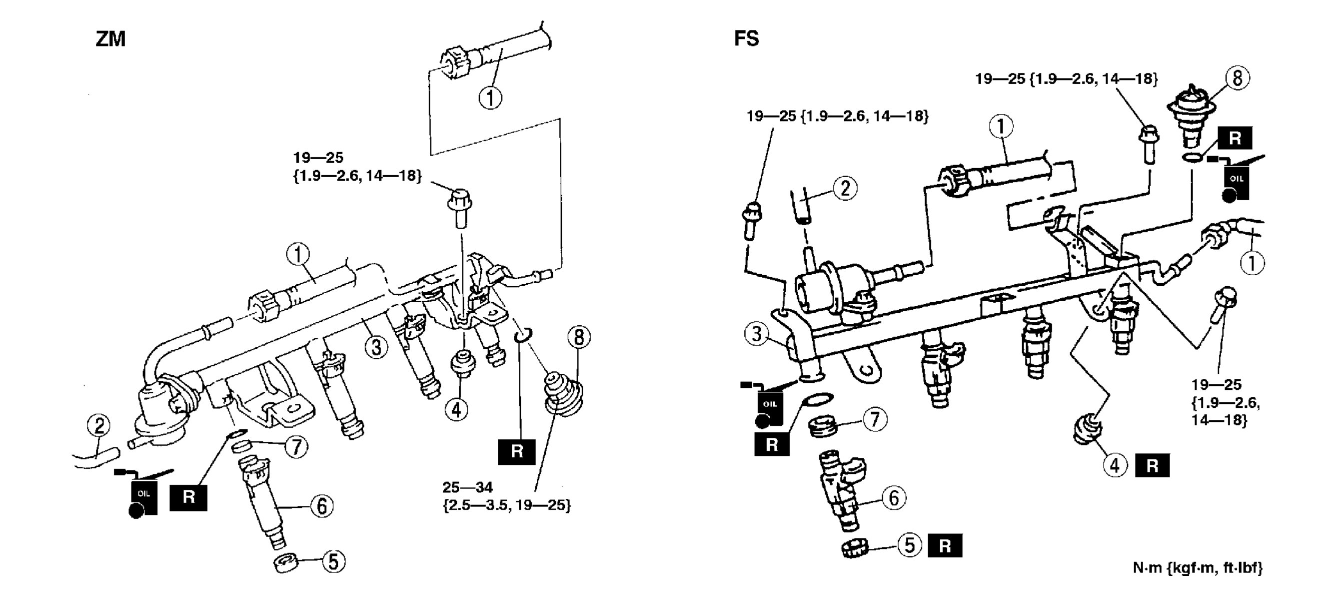
1. Remove and install the fuel filter (high-pressure). (See 01–14–15 FUEL PUMP UNIT DISASSEMBLY/ ASSEMBLY.)

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

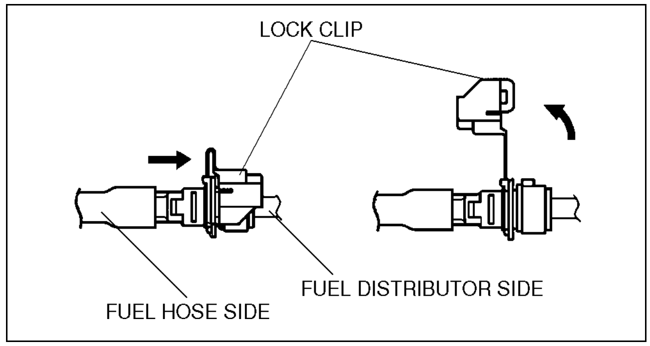
5	Fuel injector insulator
6	Fuel injector (See 01–14–23 Fuel Injector Installation Note (FS only))
7	Grommet
8	Pulsation damper

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.

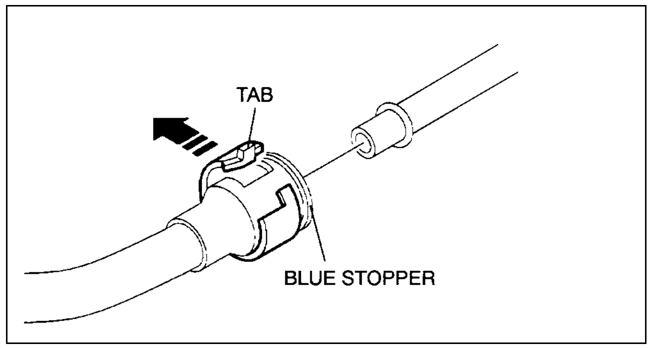


Y3E3912W201

   (2) Lift the tab on the blue locking coupler until the fuel line can be released.
   (3) Pull the fuel hose straight back.

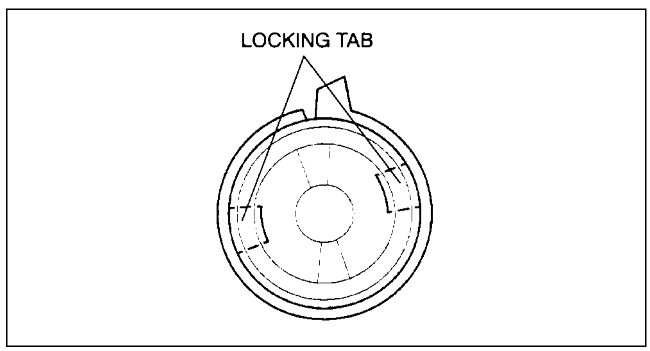
Note

- 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.

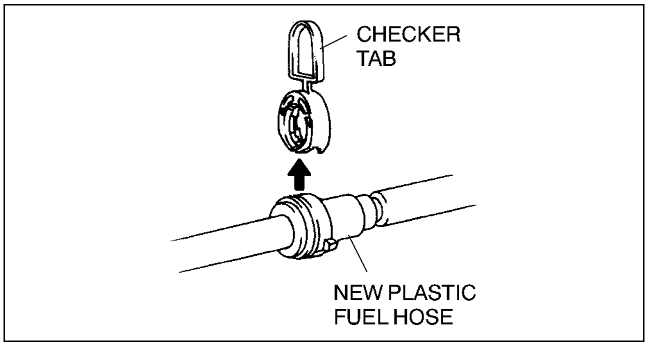


Z3U0114W993

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.

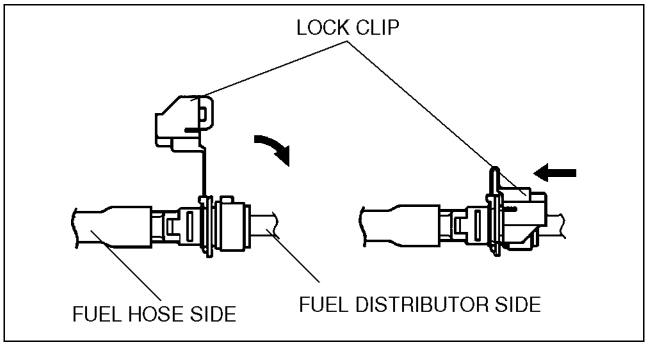
Plastic Fuel Hose Installation Note

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.



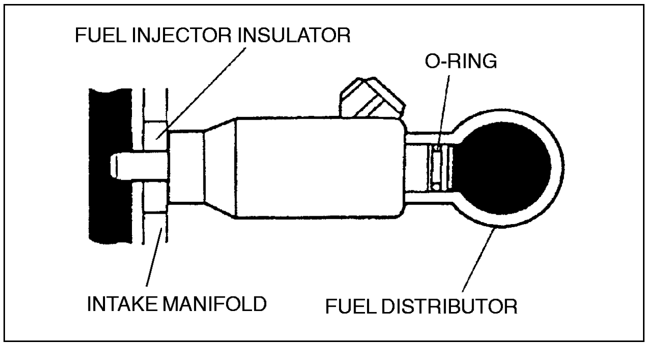
Y3E3912W202

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

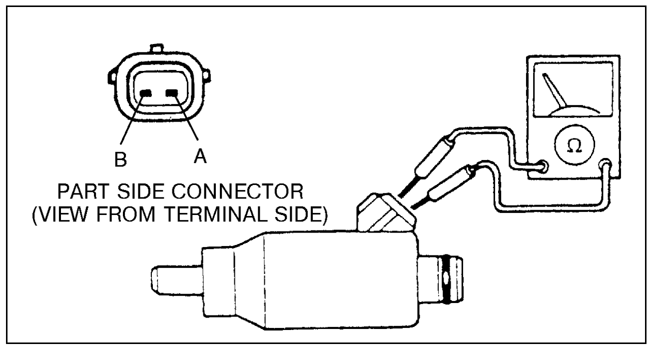
1. Carry out the “Fuel Injector Operation Inspection”. (See 01–03A–60 Fuel Injector Operation Inspection.) (See 01–03B–59 Fuel Injector Operation Inspection.)
   - If not as specified, perform the further inspection for the fuel injectors.

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

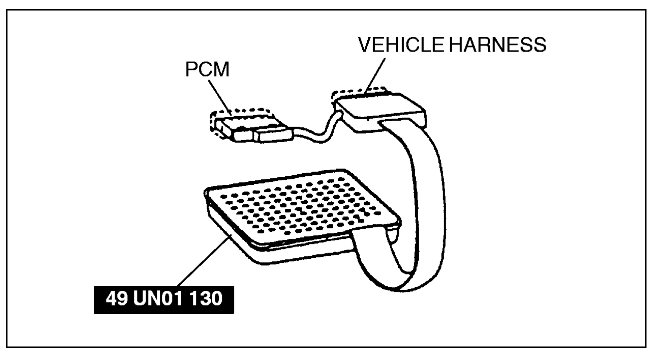


Y3U114WA9

Circuit Open/Short Inspection

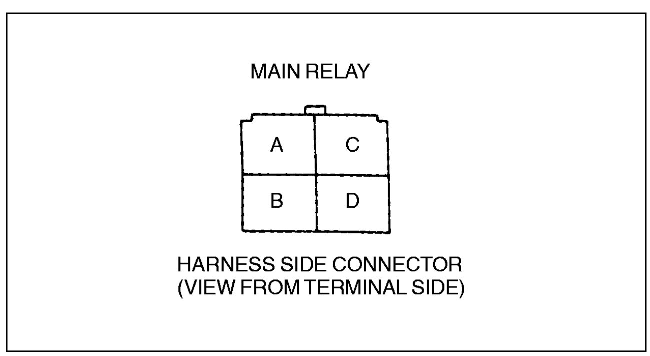
1. Disconnect the PCM connector.
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

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

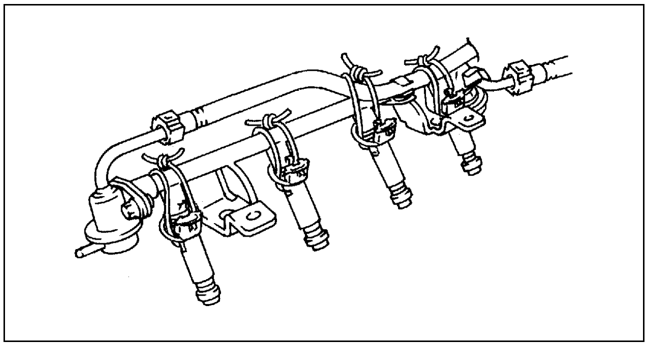
Warning

- **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.

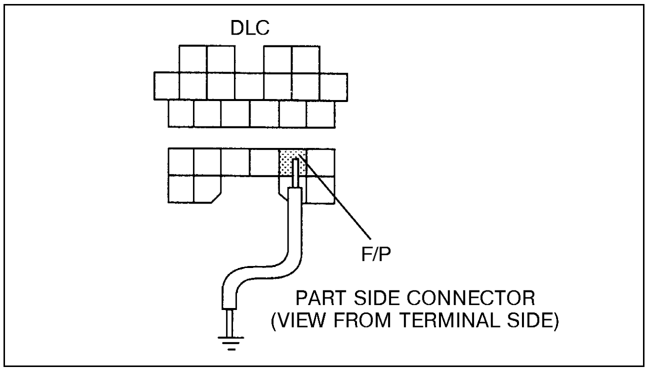


X3U114WC9

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.**

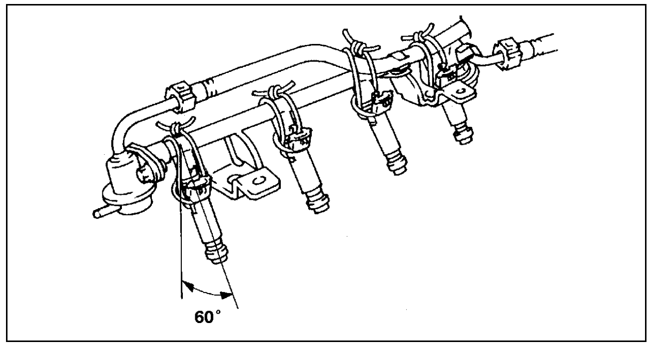


Y3U114WAA

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

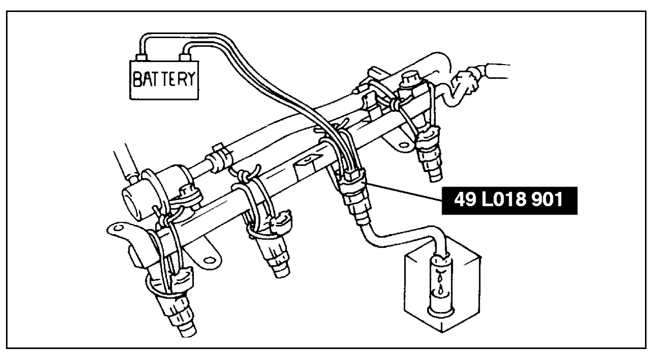
Volume Test

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.

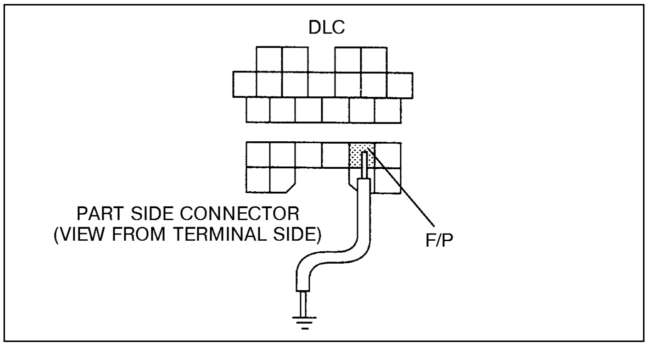
Using the SST
1. Remove the fuel injectors together with the fuel distributor with connected to fuel hose. (See 01–14–21 FUEL INJECTOR REMOVAL/INSTALLATION.
2. Fasten the fuel injectors firmly to the fuel distributor with wires.
3. Connect the fuel injector to the **SST** or the fuel injector tester 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

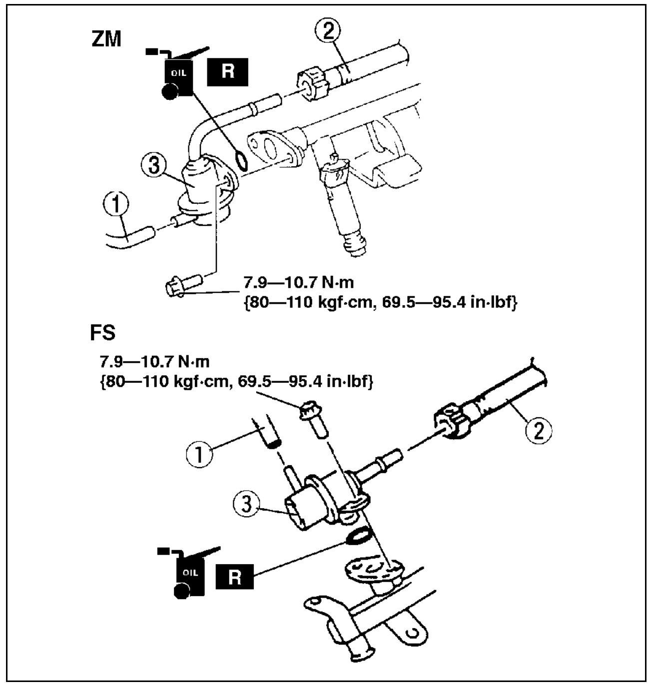
Caution
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

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

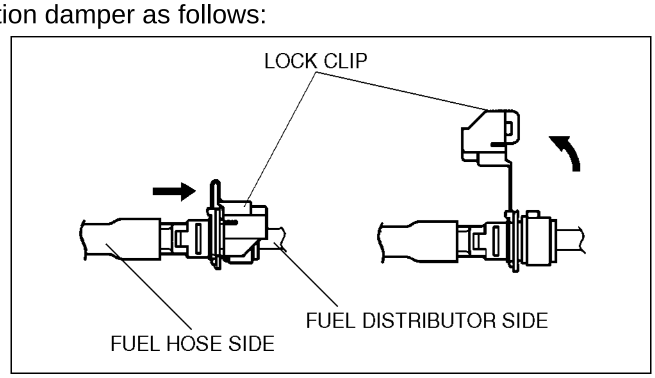
1. Carry out the “FUEL PRESSURE INSPECTION”. (See 01–14–6 FUEL PRESSURE INSPECTION.)
   - If not as specified, perform the further inspection for the pressure regulator.

Operation Inspection

Note

- Perform the following test only when directed.

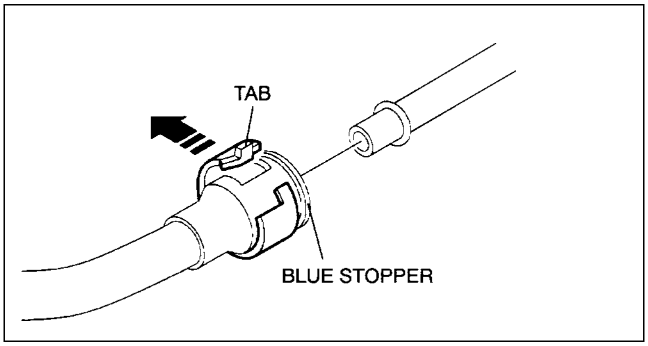
1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01–14–4 BEFORE REPAIR PROCEDURE.)
2. Disconnect the battery negative cable.
3. Disconnect the quick release connector from the pulsation damper as follows:
   (1) Push apart the lock clip and unlock it.



Y3E3912W201

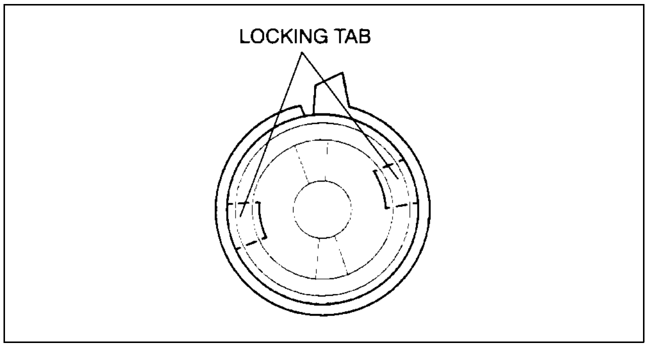
(2) Lift the tab on the blue locking coupler until the fuel line can be released.
(3) Pull the fuel hose straight back.

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

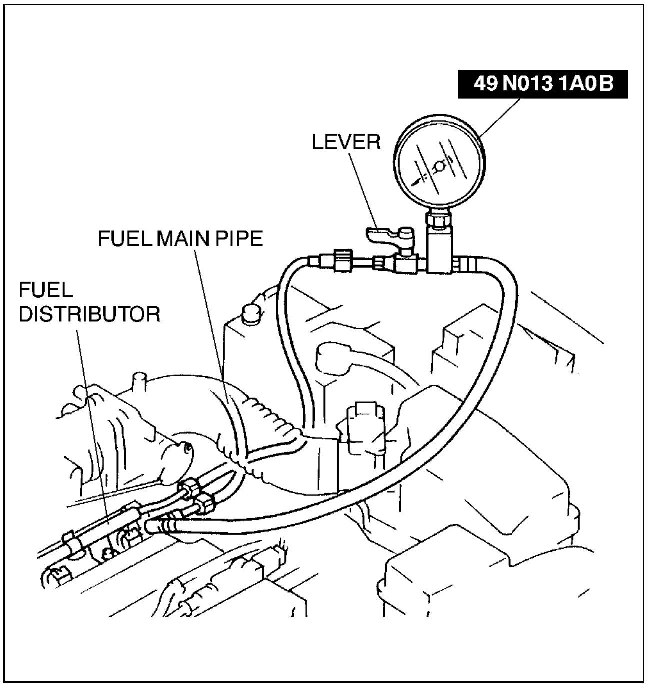
- The orange locking coupler has two internal locking tabs which retain the pulsation damper pipe. Be sure that the tab on the locking coupler is rotated until it stops to release two internal locking tabs.



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}

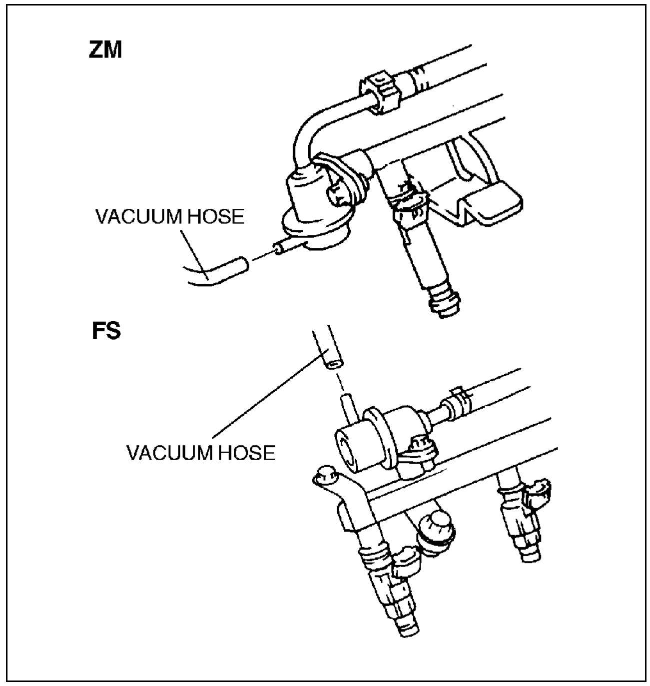


Y3U114WB4

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}

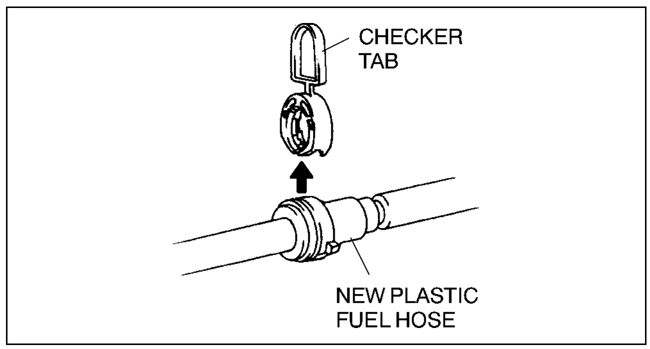
10. Turn the ignition switch off.



Z3U0114W989

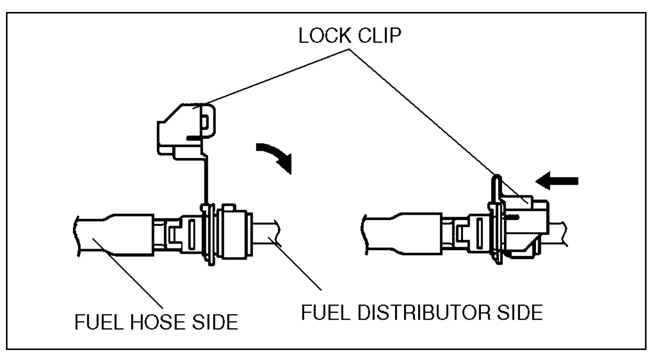
11. Disconnect the **SST**.

   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].)

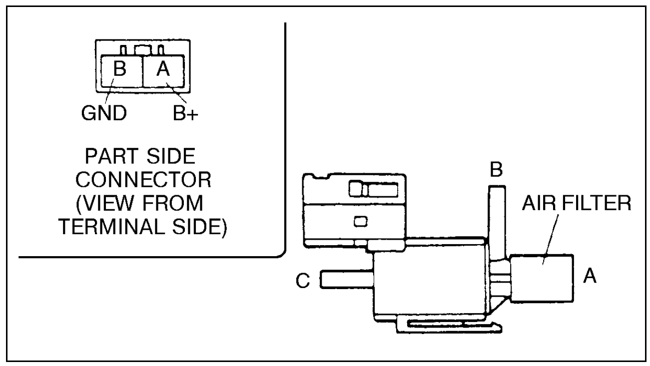
PRC SOLENOID VALVE INSPECTION

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

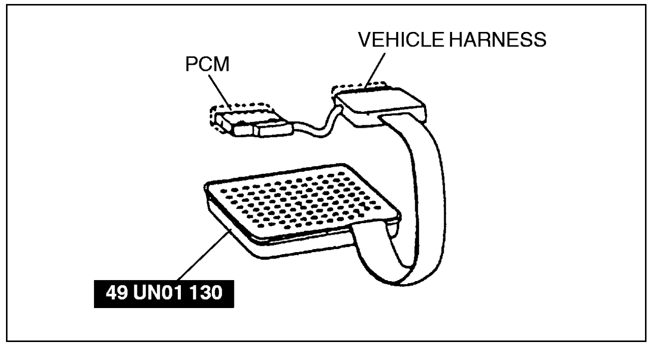
Step	Terminal		Port		
	A	B	A	B	C
1	○—	—○		○═	═○
2	B+	GND	○═	═○	

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.

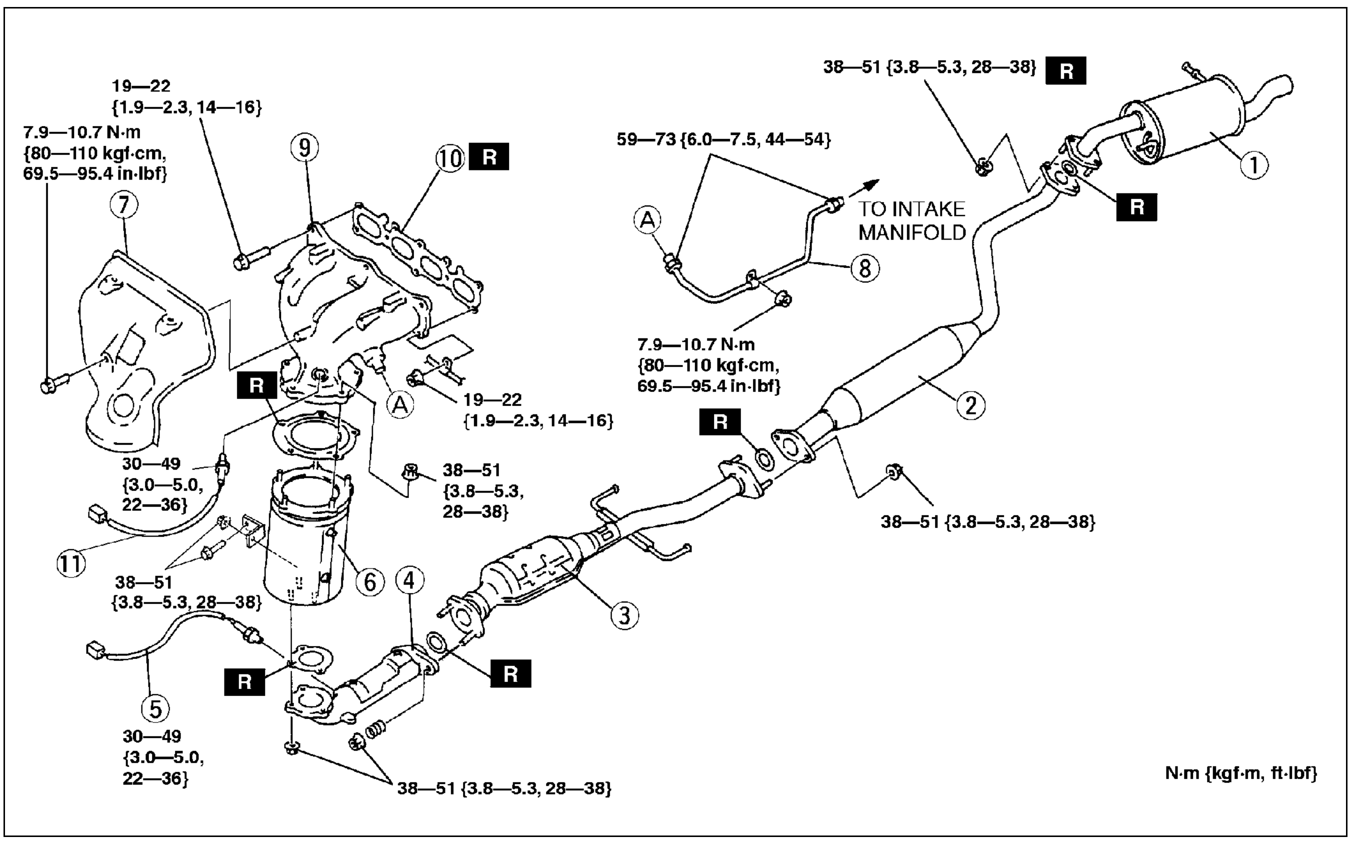
EXHAUST SYSTEM REMOVAL/INSTALLATION

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.**

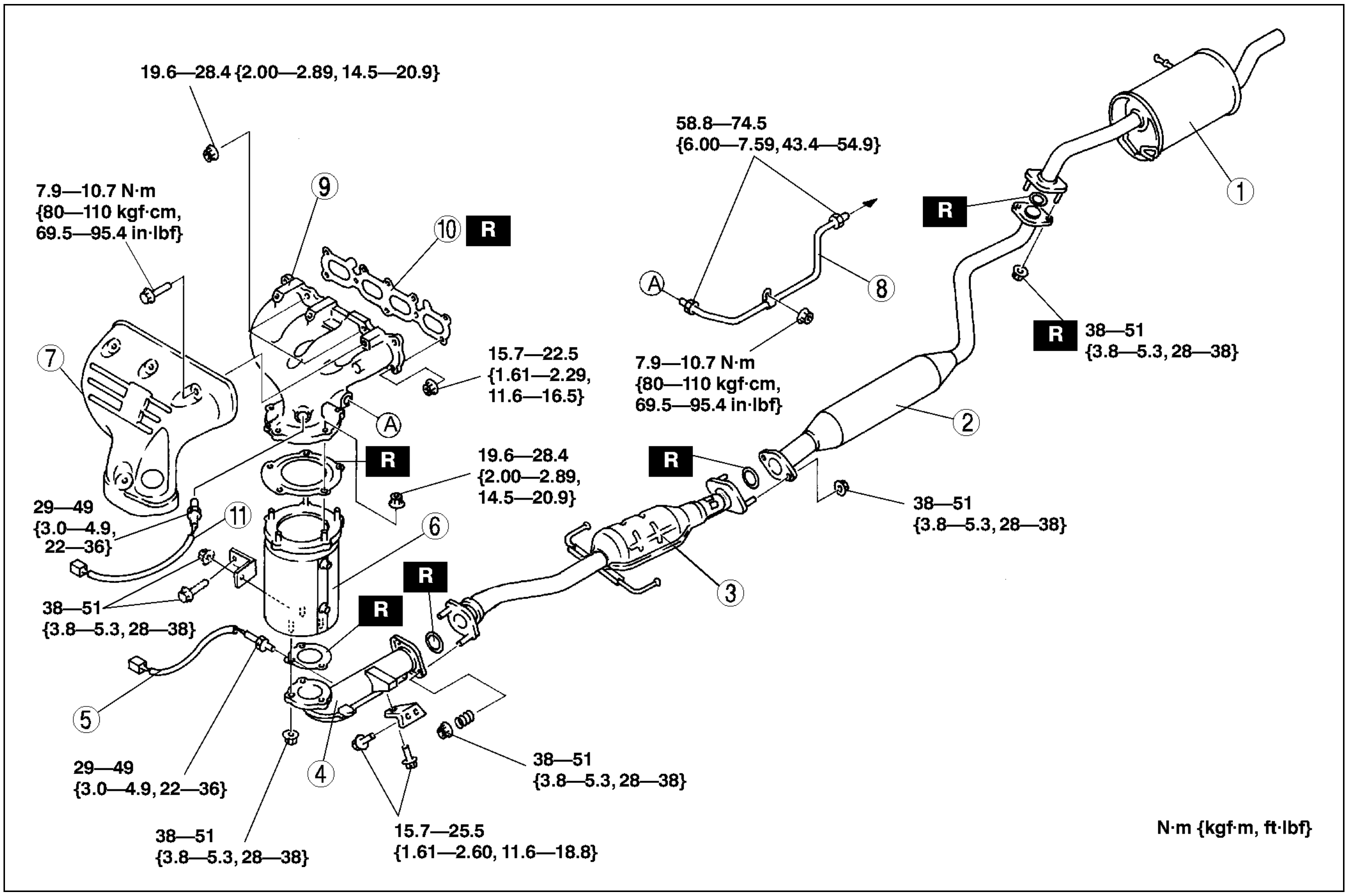
1. Disconnect the battery negative cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

ZM



A3U0115W002

FS



A3U0115W001

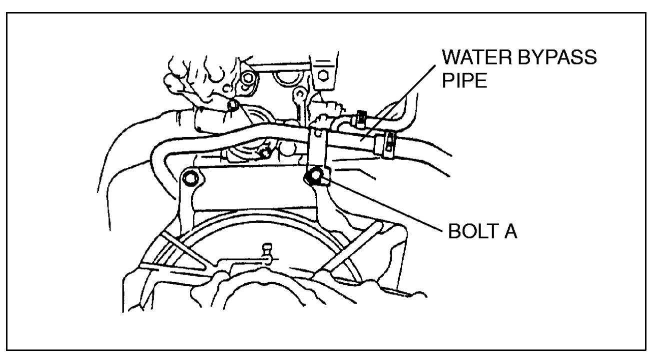
1	Main silencer
2	Presilencer
3	TWC
4	Front pipe
5	HO2S (rear)
6	WU-TWC
7	Exhaust manifold insulator

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.

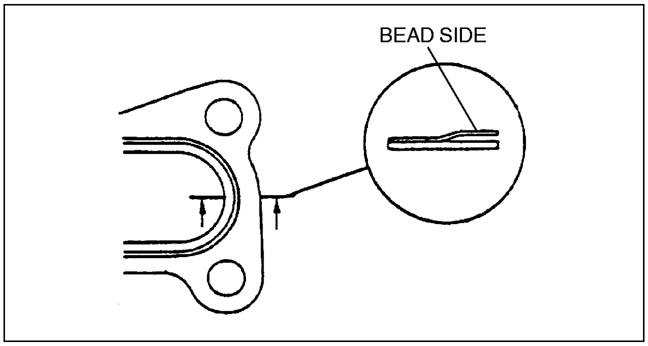
Tightening torque
64—89 N·m {6.5—9.1 kgf·m, 48—65 ft·lbf}



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.



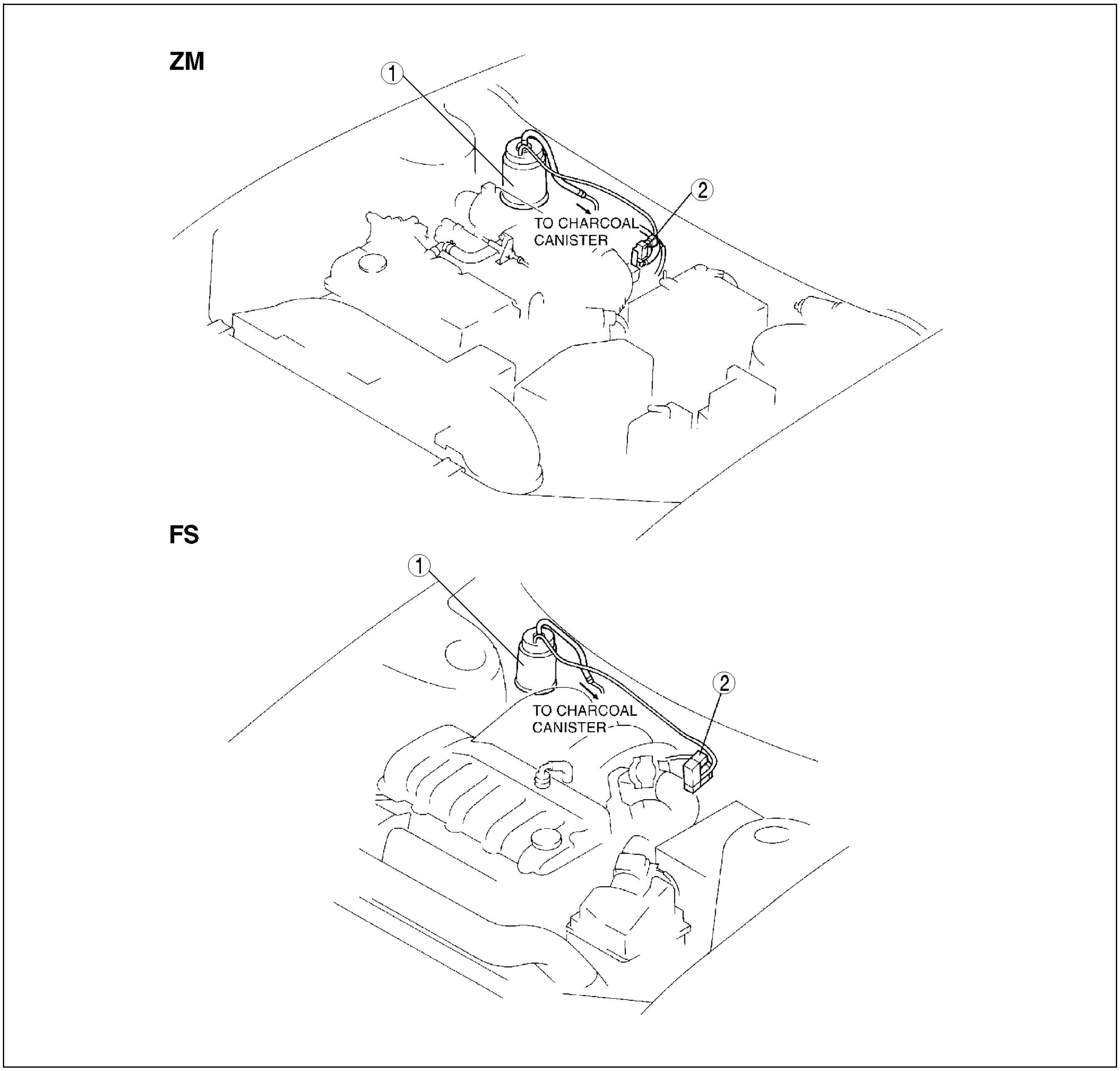
X3U115WA3

01–16 EMISSION SYSTEM

EMISSION SYSTEM LOCATION INDEX

A3U011601074W01

Evaporative Emission (EVAP) Control System
Engine room side

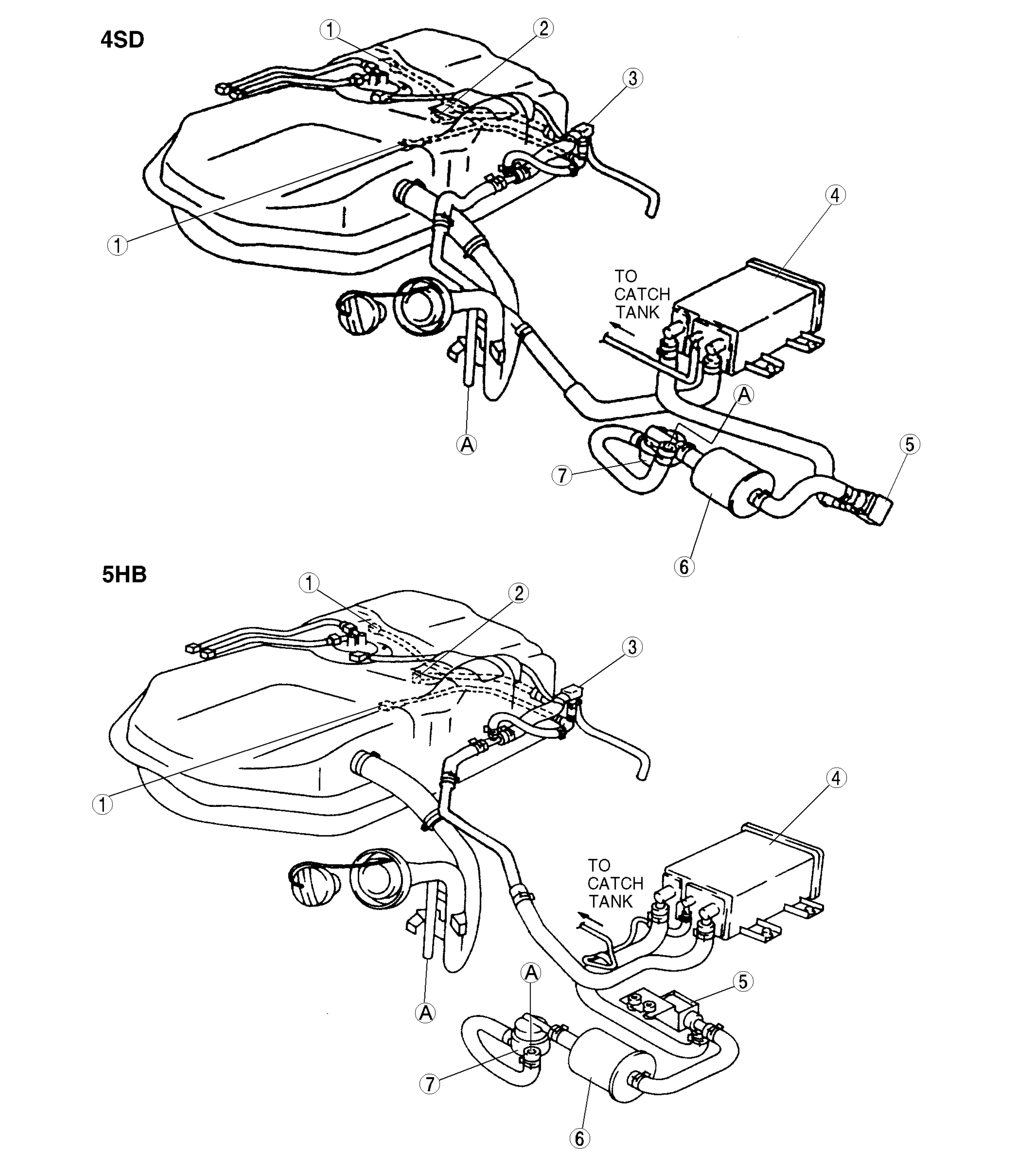


Z3U0116W996

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



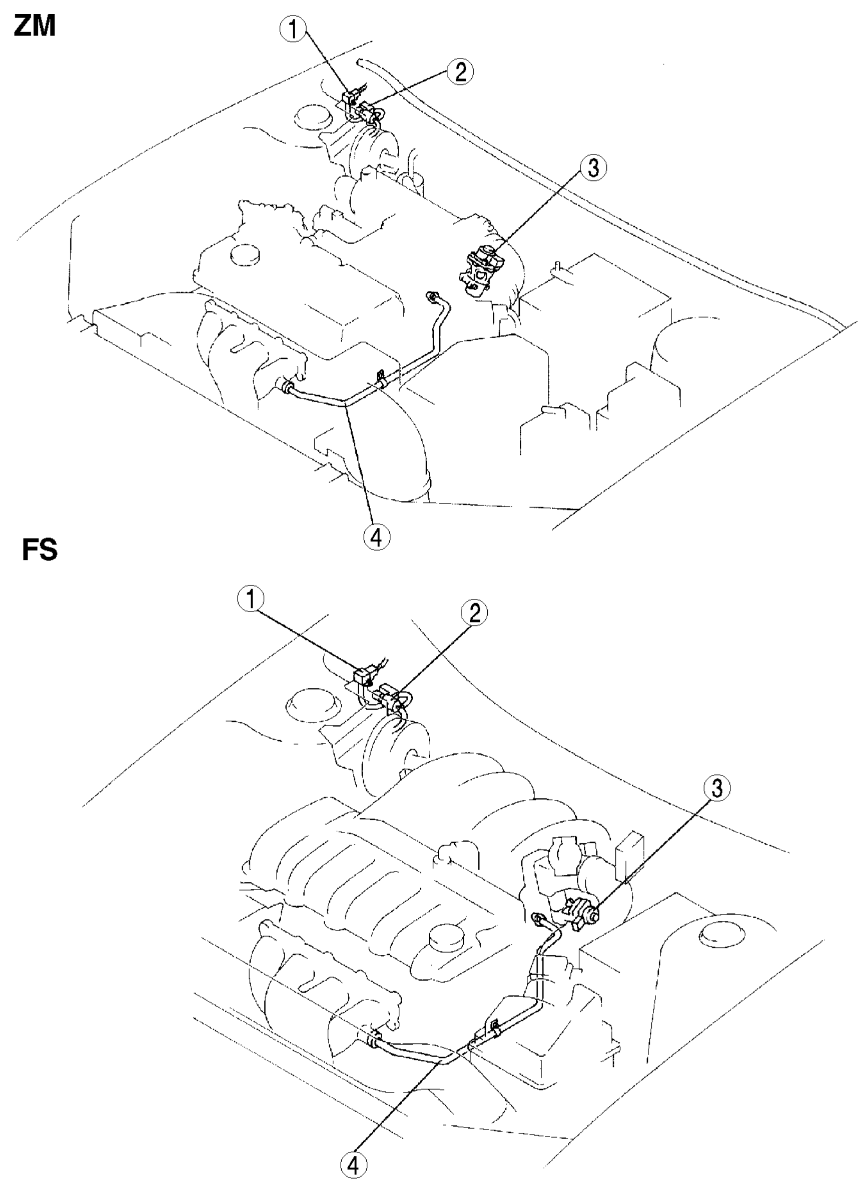
A3U0116W001

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



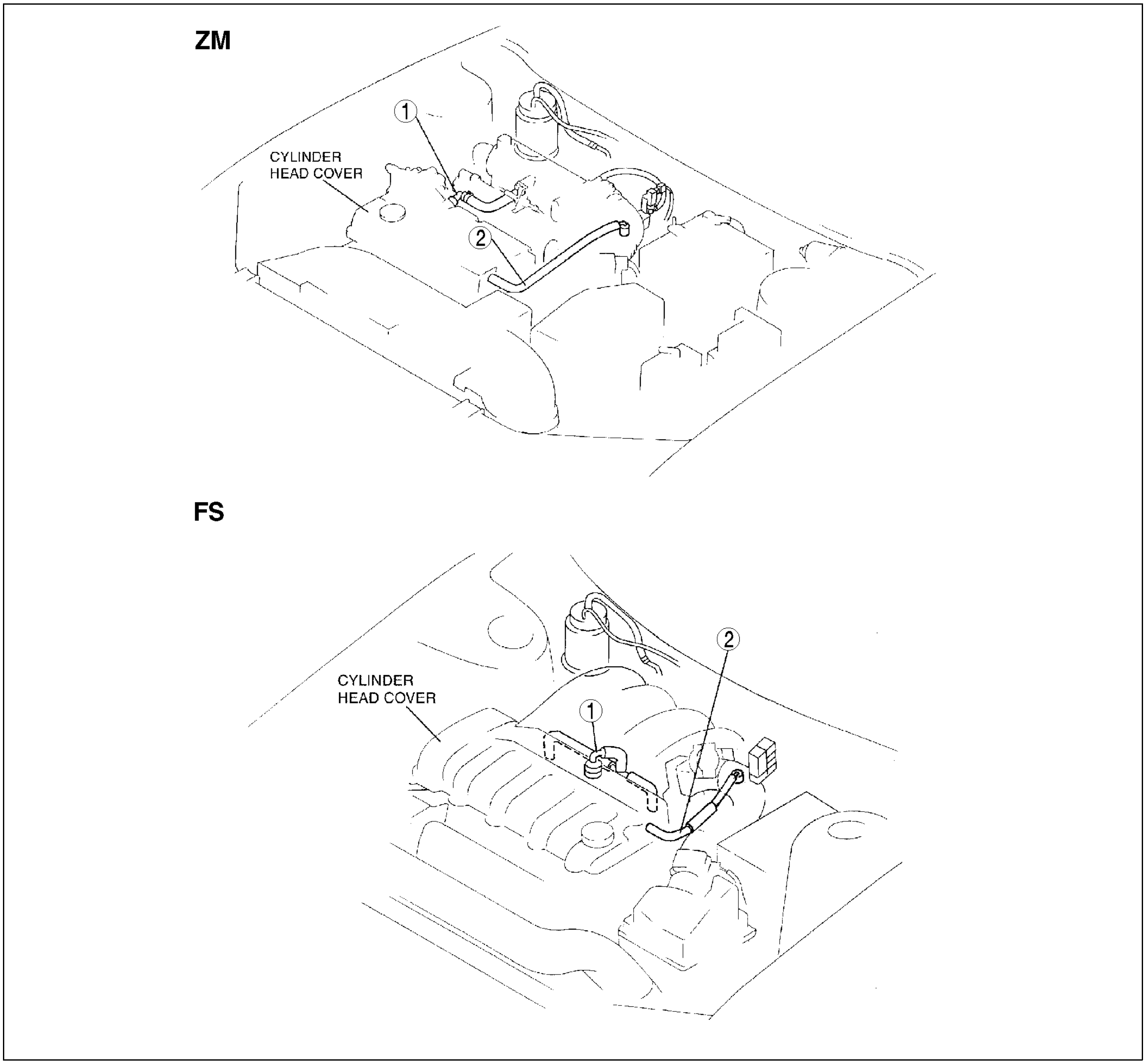
Z3U0116W995

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



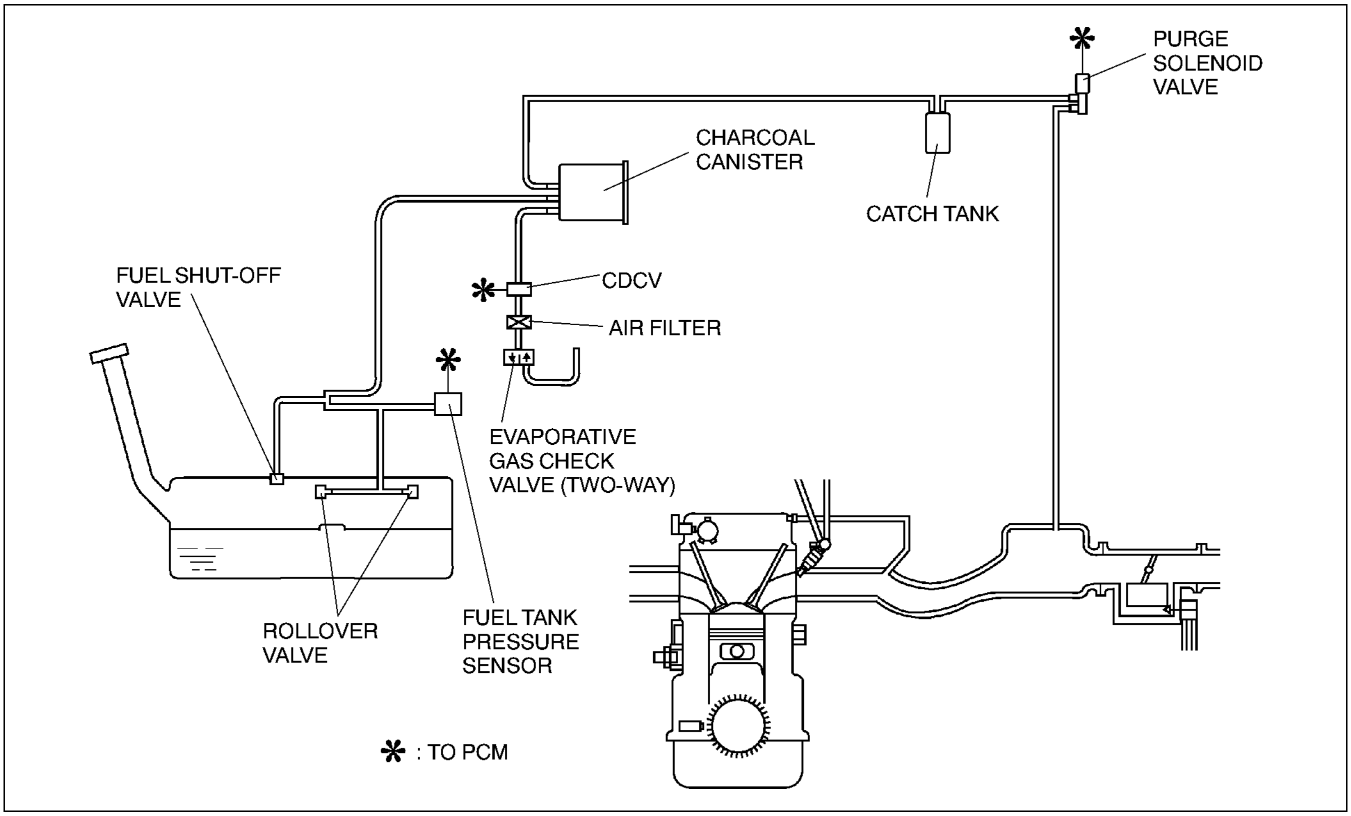
Z3U0116W994

1	PCV valve (See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION)

2	Ventilation hose

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM DIAGRAM

A3U011601074W02



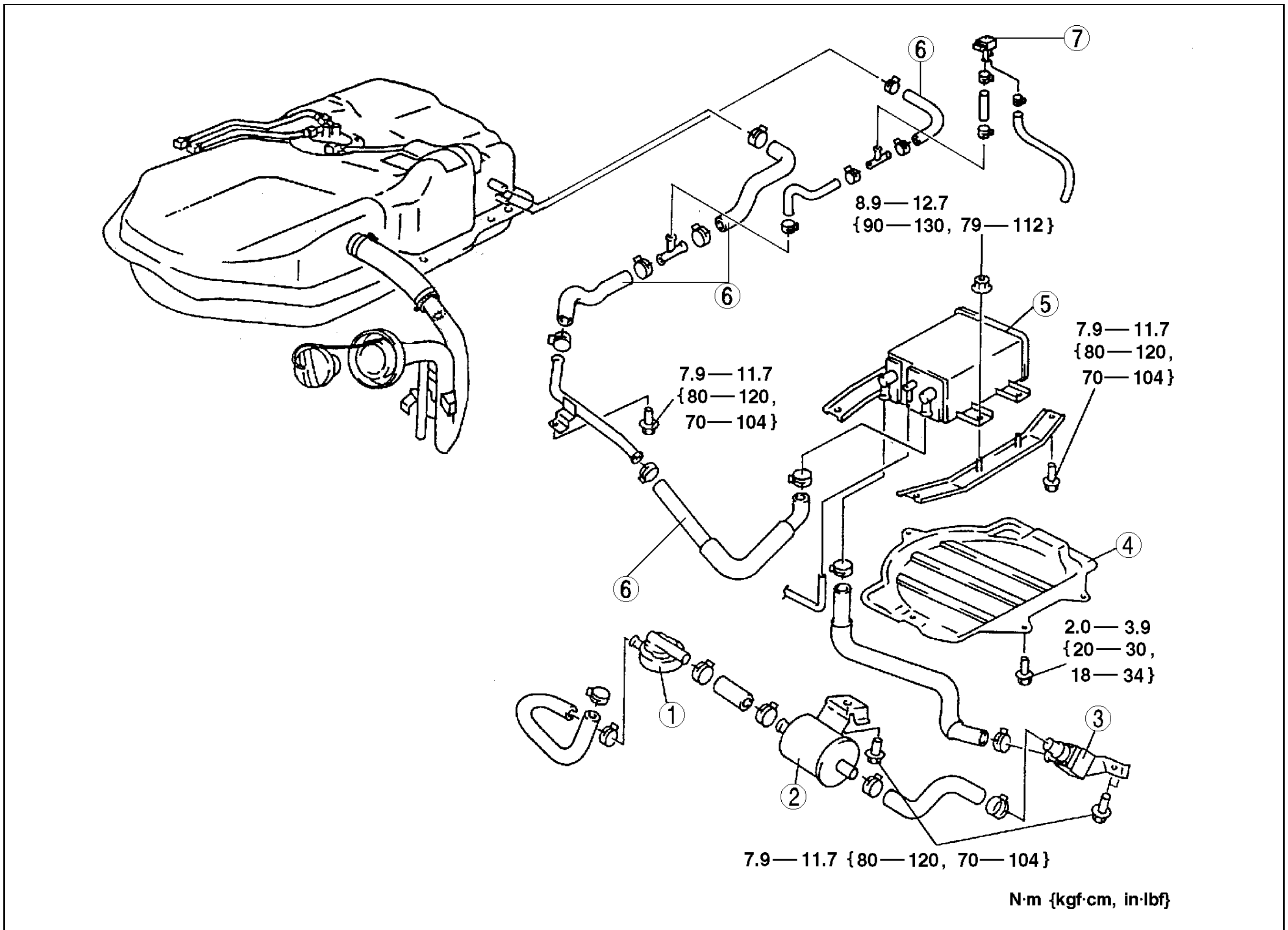
Z3U0116W002

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

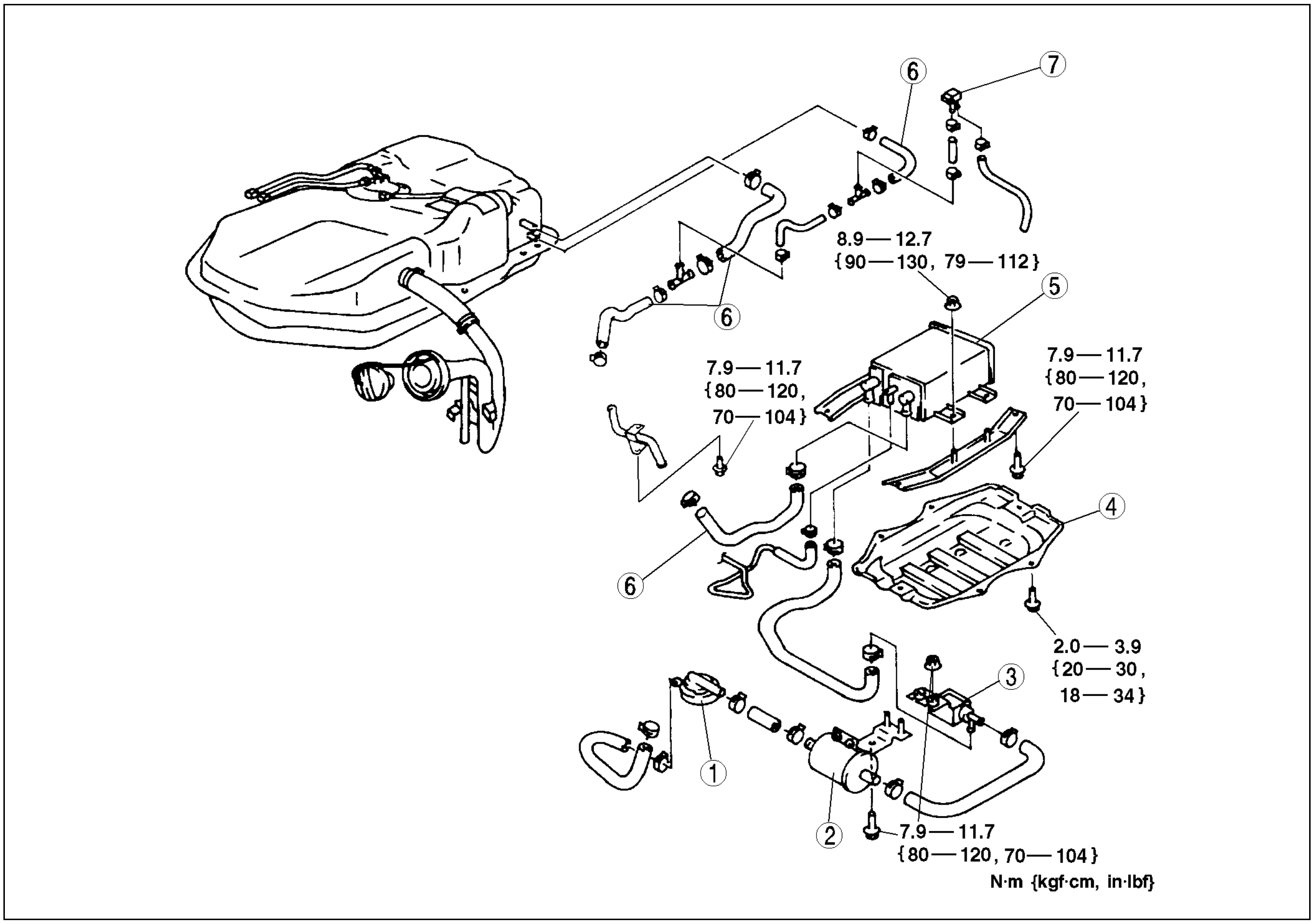


A3U0116W003

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

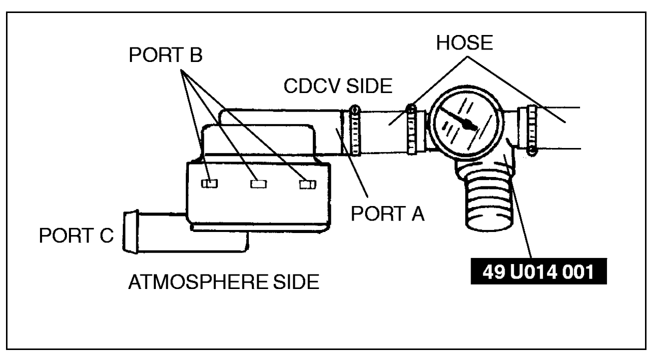
1	Evaporative gas check valve (two-way)
2	Air filter
3	CDCV
4	Charcoal canister insulator

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).

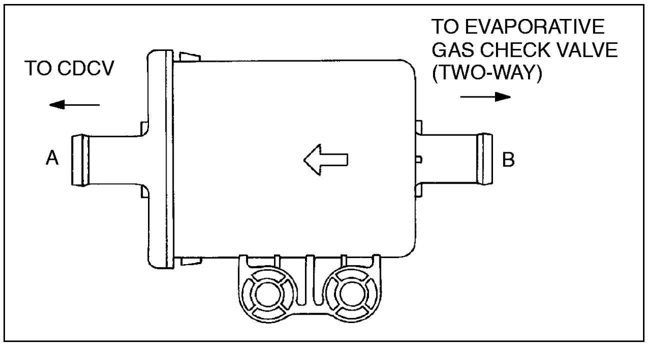


X3U116WB9

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.



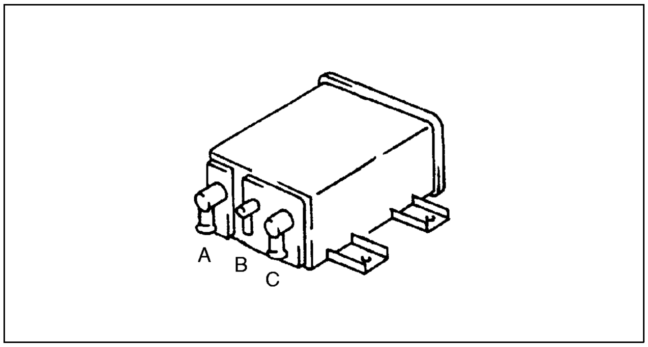
X3U116WA1

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

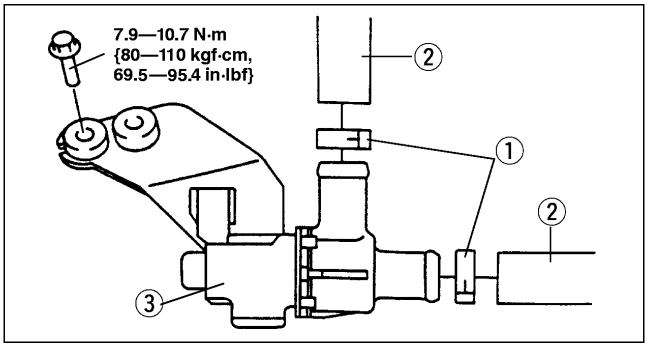
CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION

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

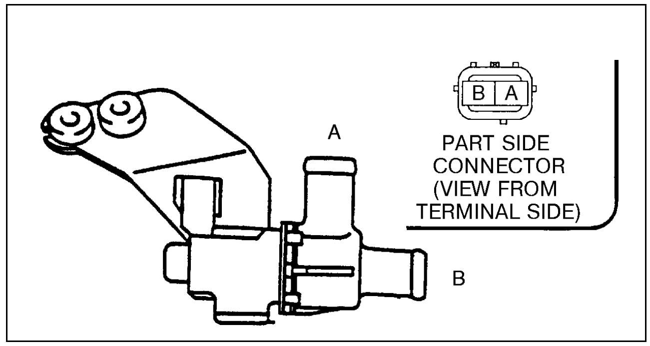
1. Carry out the “Evaporative Emission Control System Inspection”. (See 01–03A–56 Evaporative System Leak Inspection Using Vacuum Pump.) (See 01–03B–55 Evaporative System Leak Inspection Using Vacuum Pump.)
    - If not as specified, perform the following inspection for the CDCV.

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

O—O : Continuity O═O : Airflow

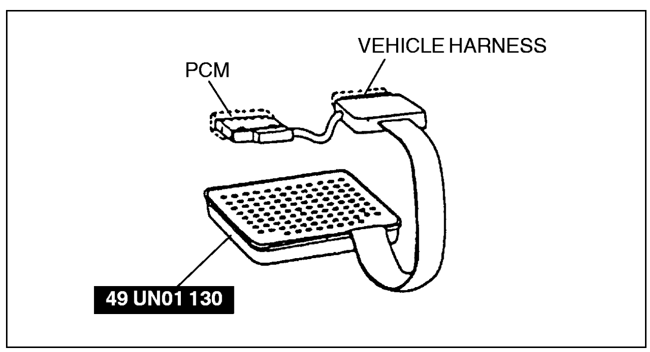
Step	Terminal A	Terminal B	Port A	Port B
1	O—	—O	O═	═O
2	B+	GND		

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.

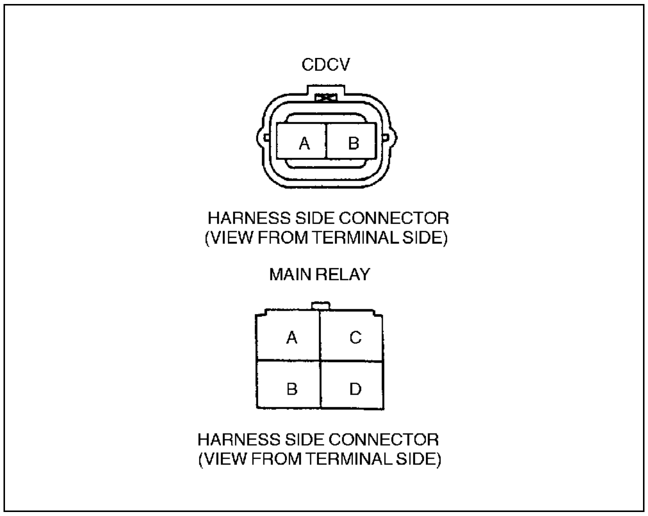
Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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.

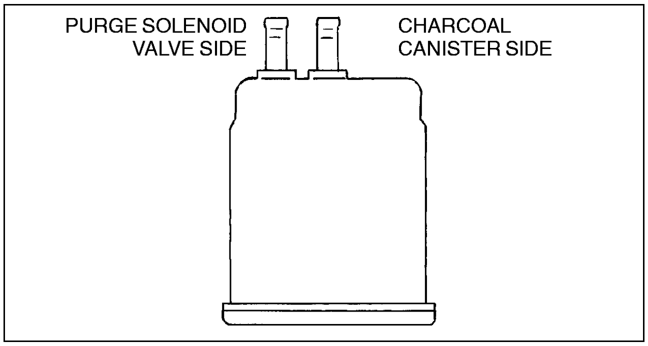


Z3U0116W997

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

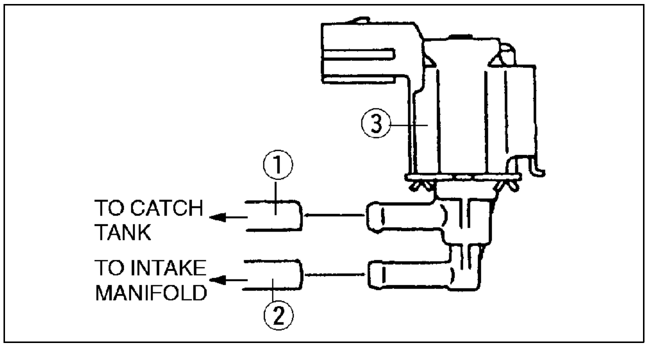
PURGE SOLENOID VALVE REMOVAL/INSTALLATION

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.

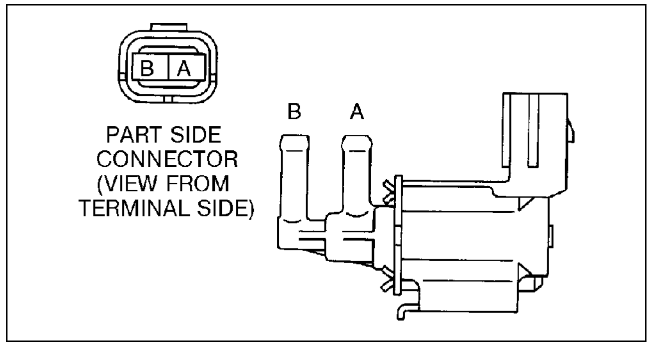
PURGE SOLENOID VALVE INSPECTION

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

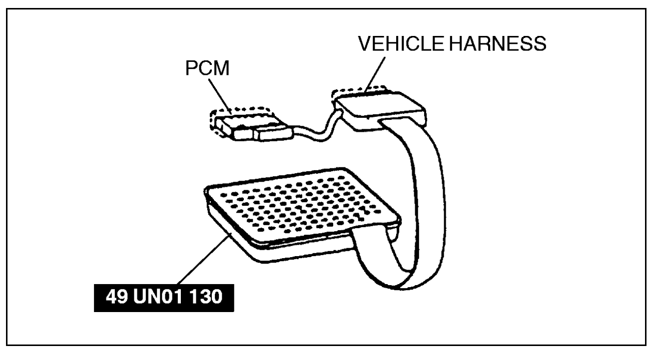
Step	Terminal A	Terminal B	Port A	Port B
1	○——	——○		
2	B+	GND	○══	══○

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.

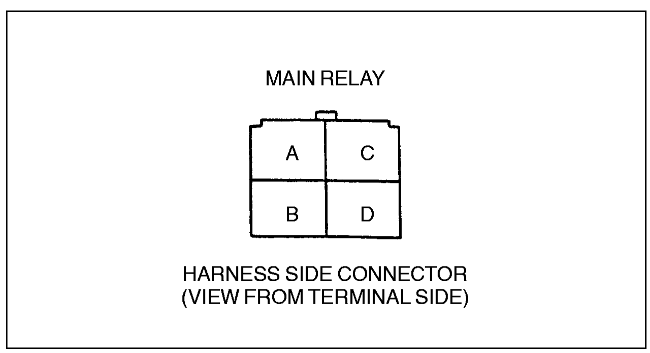
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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

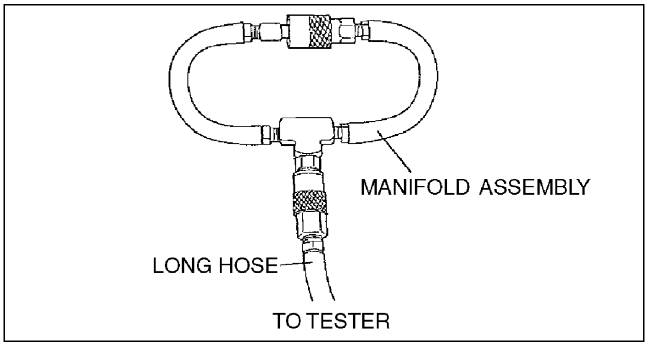
A3U011642250W01

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.



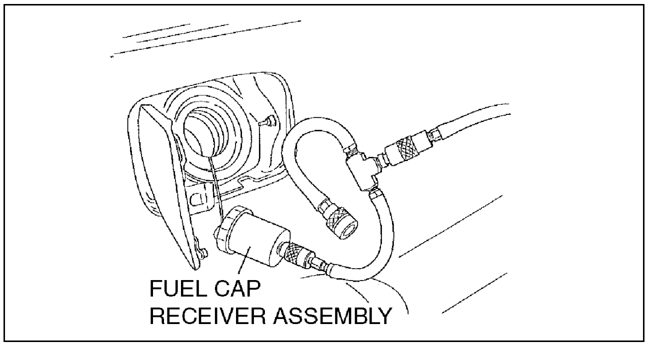
YMU116WZ1

(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**).

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.



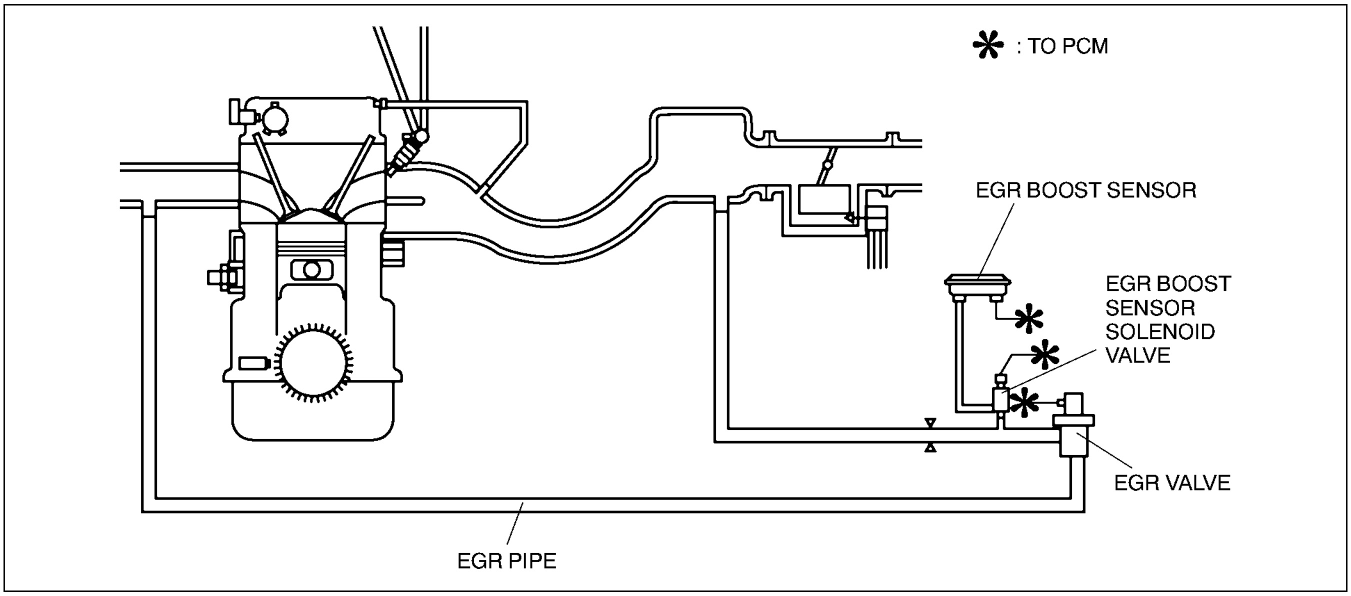
YMU116WZ2

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.

EGR SYSTEM DIAGRAM

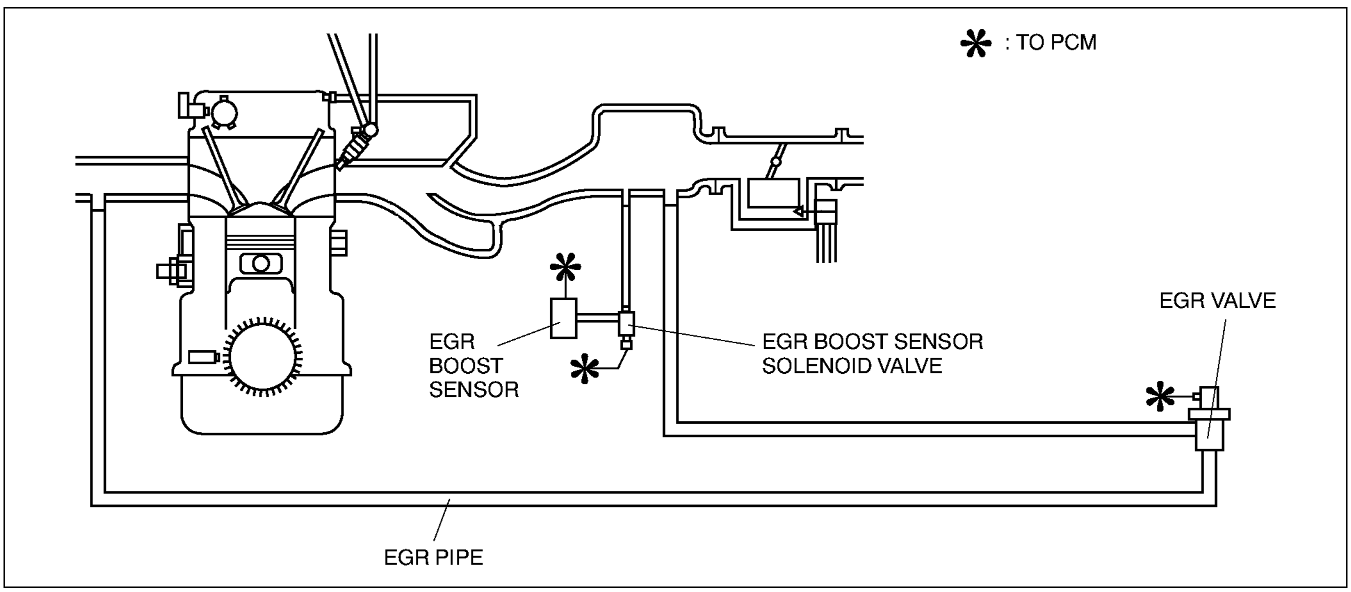
A3U011620000W01

ZM



Z3U0116W004

FS



Z3U0116W005

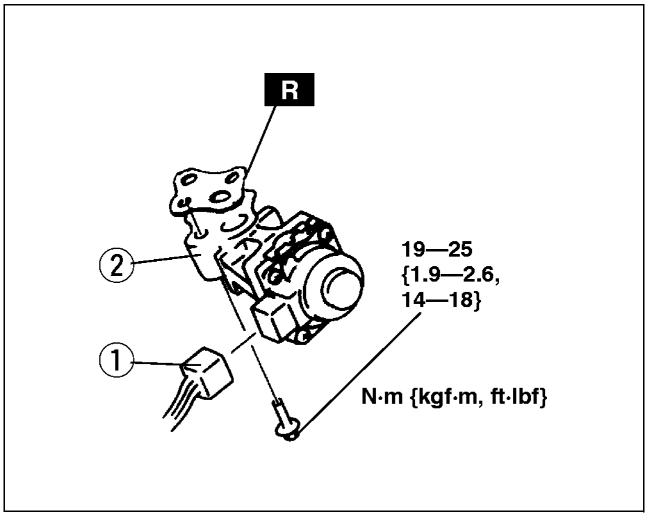
EGR VALVE REMOVAL/INSTALLATION

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

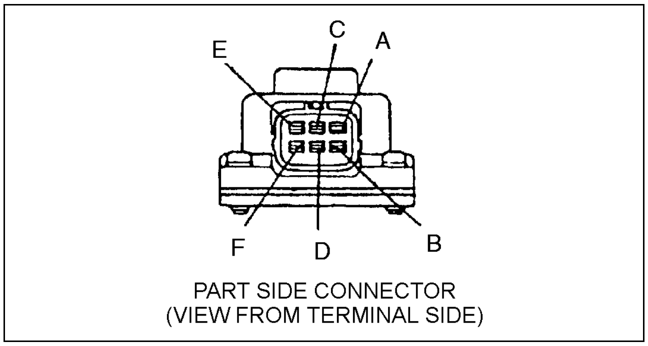
A3U011620300W02

Resistance Inspection

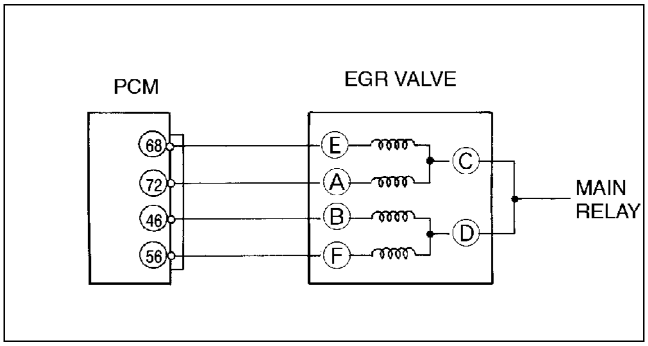
Note
- Perform the following test only when directed.

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

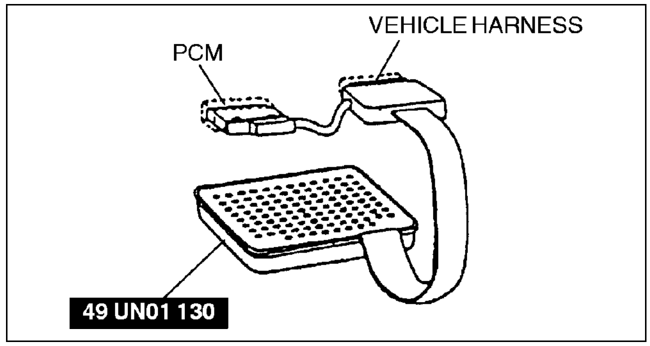


X3U116WB4

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.

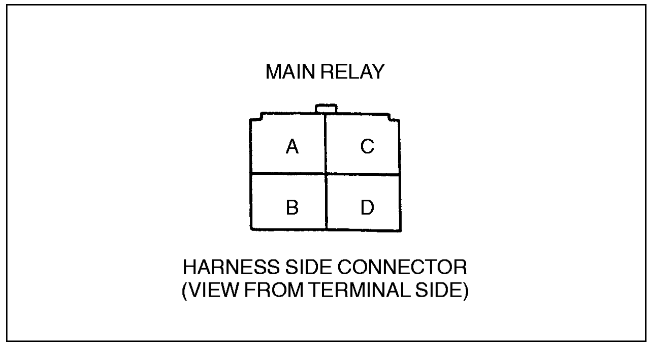
   Tightening torque
   7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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.
   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)



X3U116WB5

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.

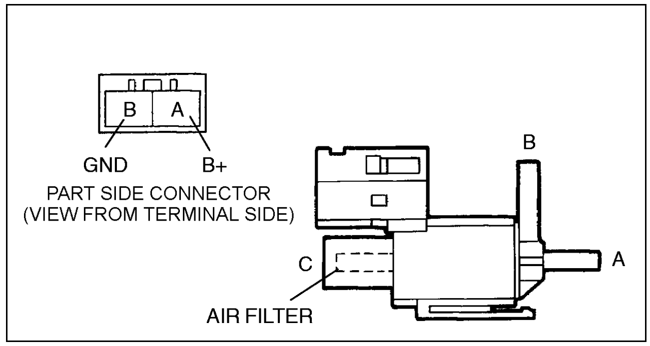
EGR BOOST SENSOR SOLENOID VALVE INSPECTION

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	○═	═○	

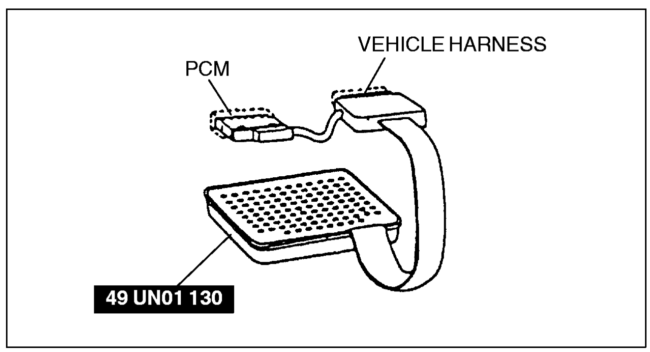
X3U116WCB

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.

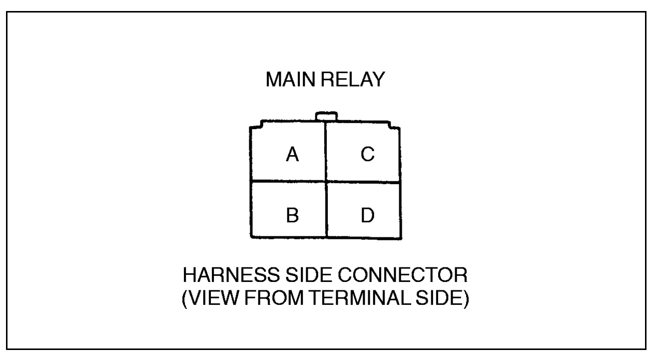
Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



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)



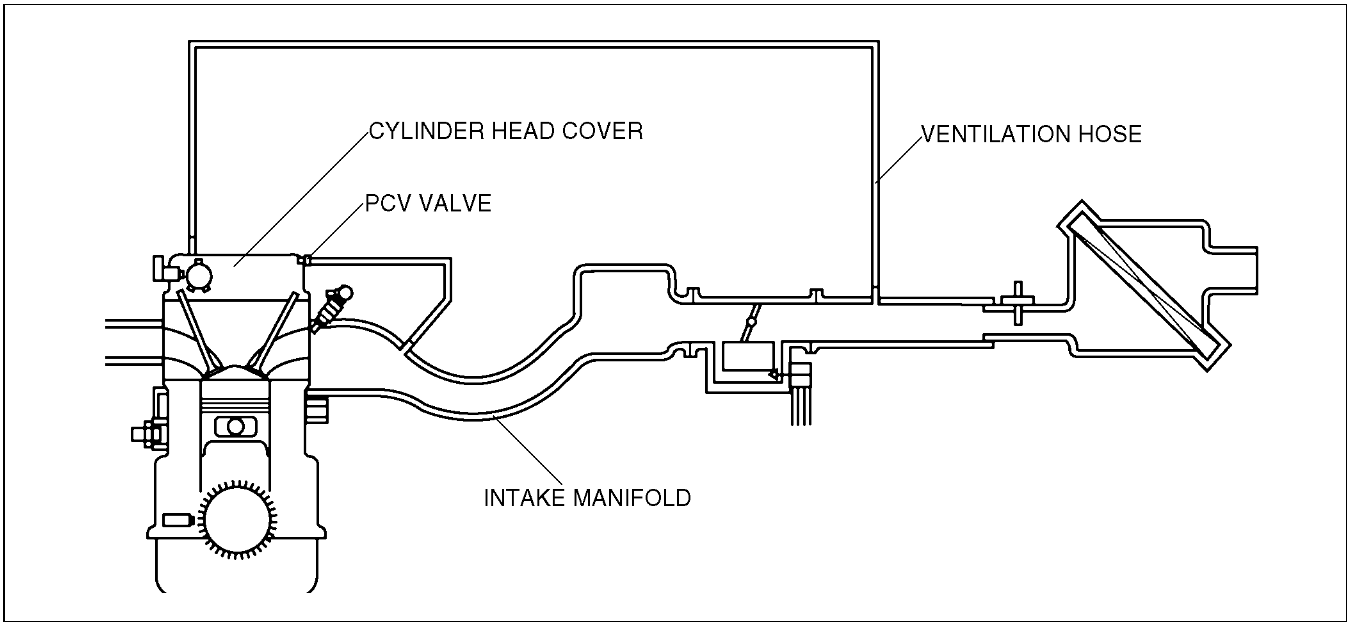
X3U116WB7

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

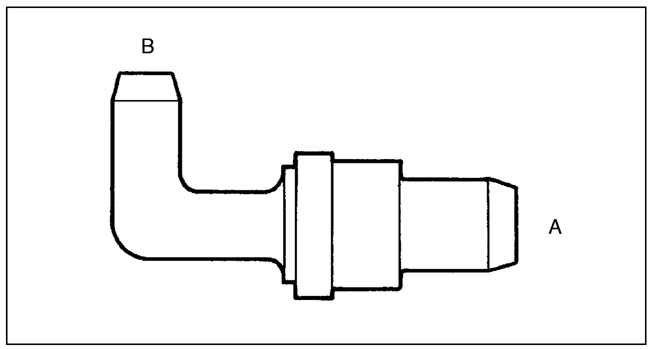
POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION

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.

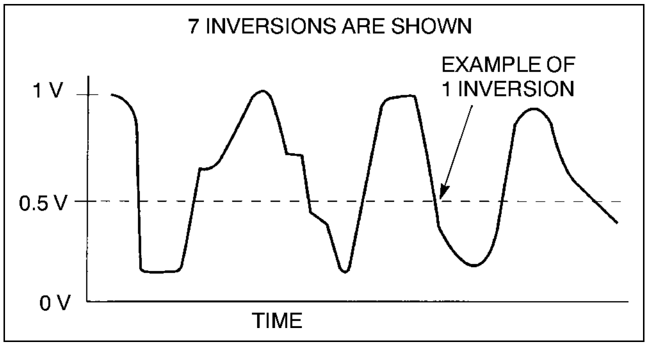
1. Connect the WDS or equivalent and monitor PIDs as following.
   - Monitor the WU-TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.
2. Begin to monitor the appropriate PIDs.
3. Drive the vehicle for **10 min** at **65—96 km/h {40—60 mph}** to ensure the WU-TWC reaches operating 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.

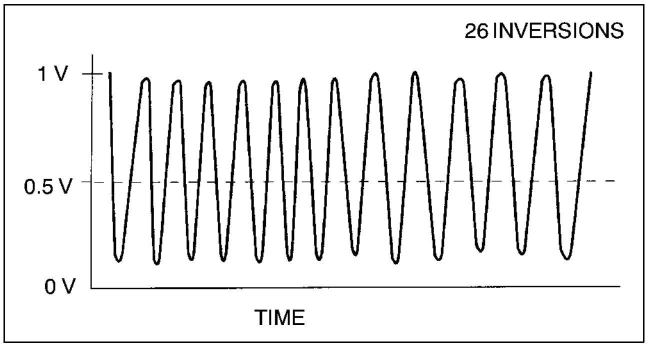
Equation
RATIO = Upstream HO2S inversion ÷ downstream HO2S inversion

- 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

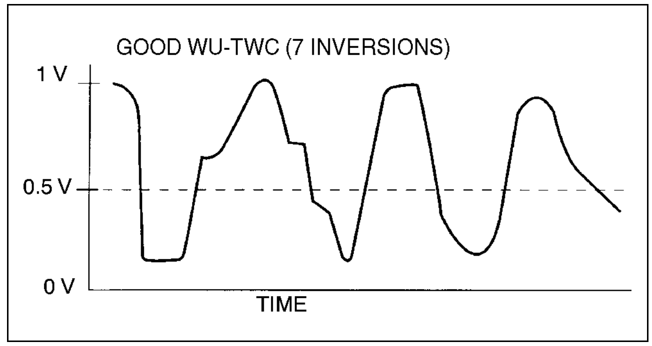


Y3U116WAA

Downstream HO2S graphline example 1

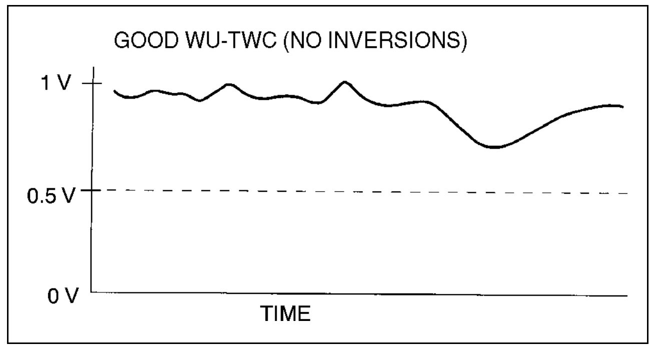
Equation

RATIO = 26 inversions (upstream HO2S inversions) ÷ 7 inversions (downstream HO2S inversions) = 3.7 (good WU-TWC)



Z3U0116W008

Downstream HO2S graphline example 2

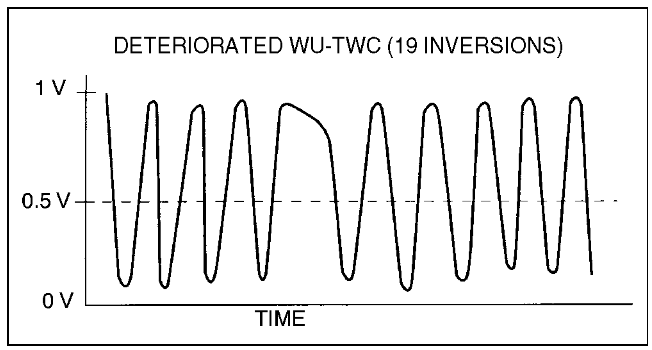


Z3U0116W009

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

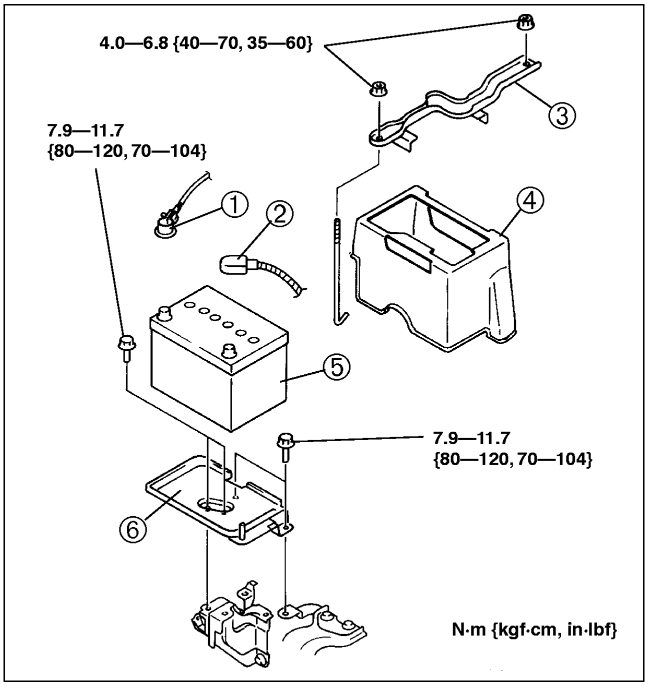
BATTERY REMOVAL/INSTALLATION

A3U011718520W01

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.



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.

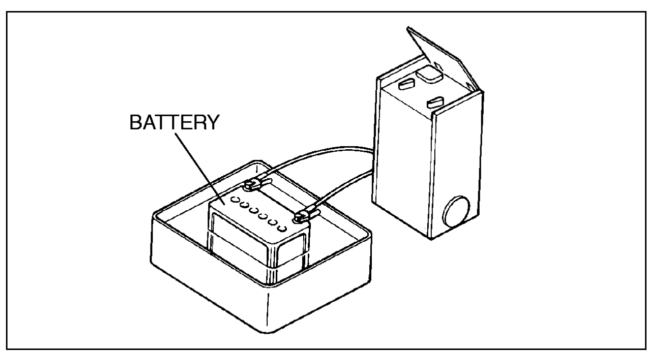
BATTERY RECHARGING

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

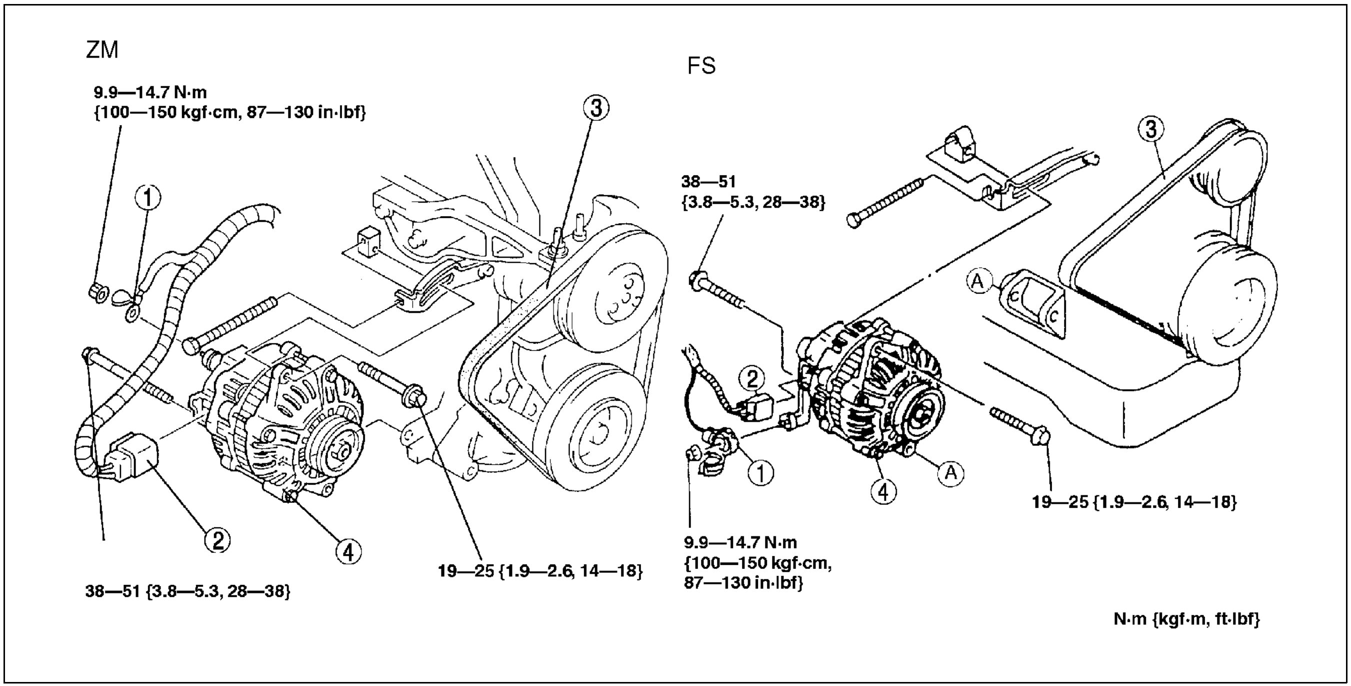
GENERATOR REMOVAL/INSTALLATION

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

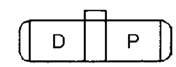
Generator Warning Light

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

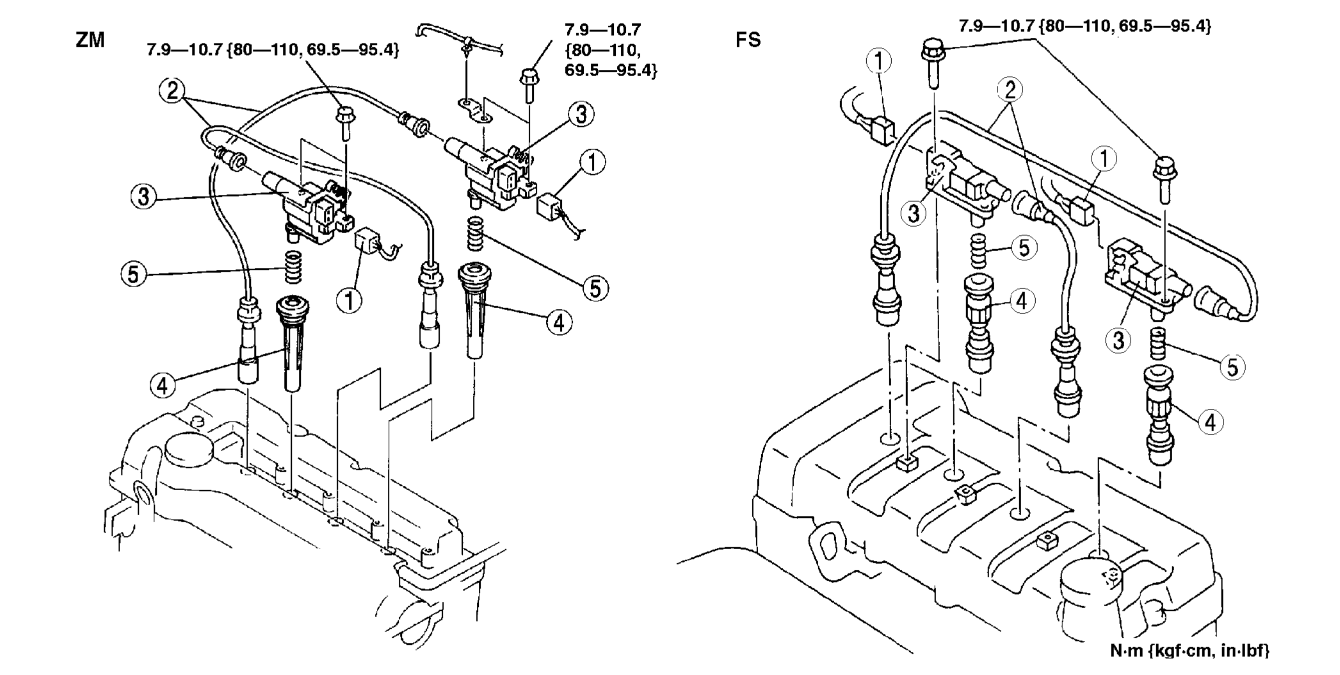
IGNITION COIL REMOVAL/INSTALLATION

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

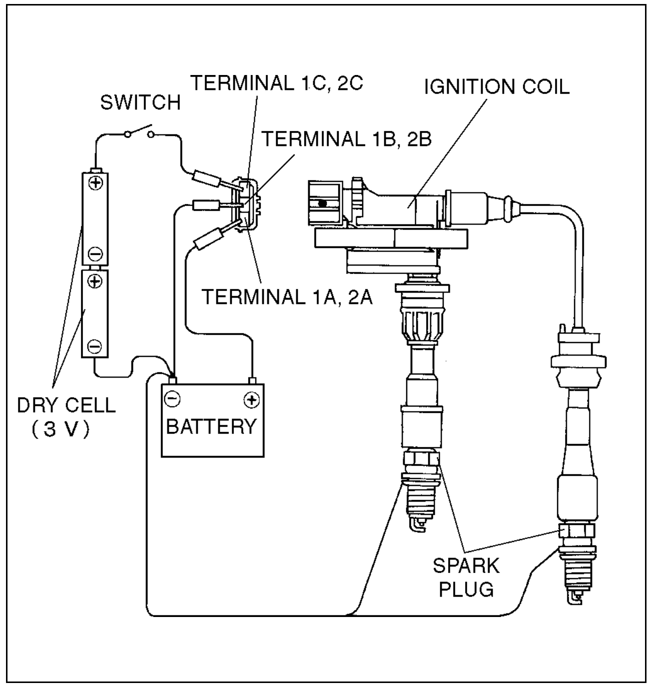
1. Remove ignition coils, high-tension leads, and spark plugs.
2. Connect the ignition coil, high-tension lead, spark plug, and the battery as shown in the figure.

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.



Z3U0118W003

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.**

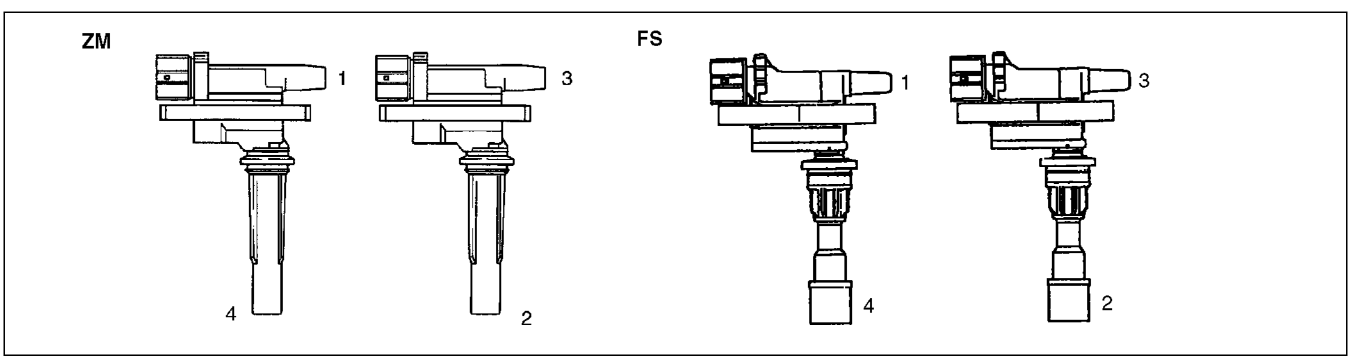
Note

- 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

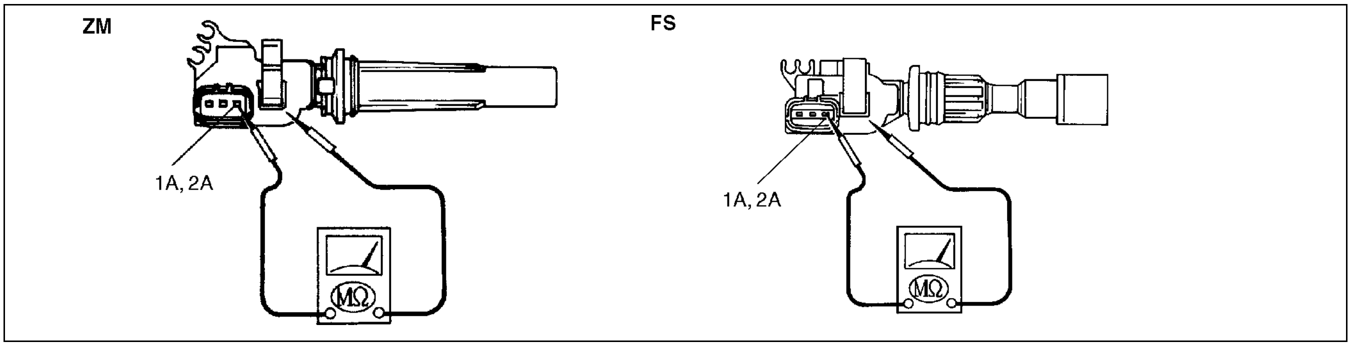


Z3U0118W004

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

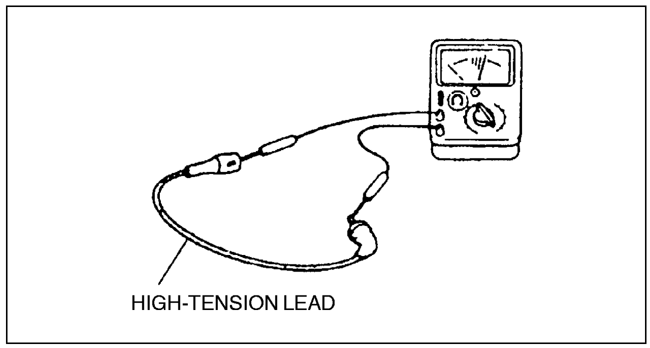
A3U011818140W02

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

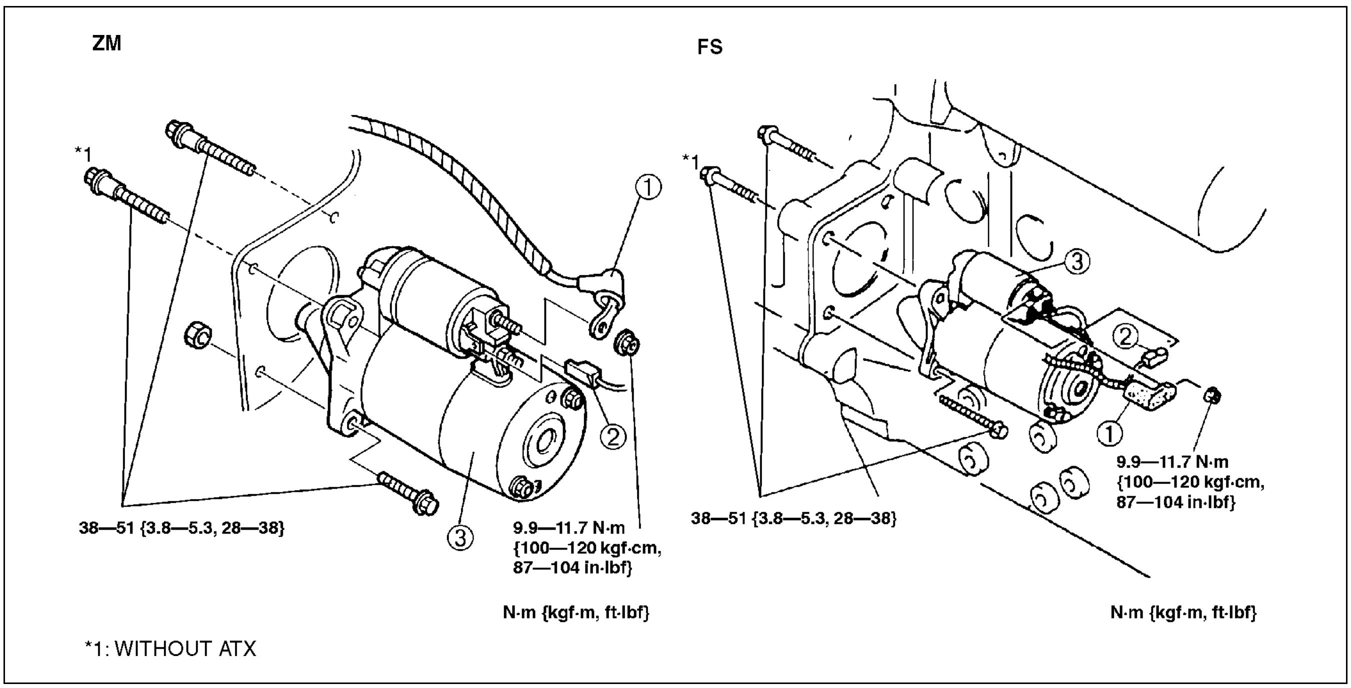
STARTER REMOVAL/INSTALLATION

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	3	Starter
2	Terminal S wire		

STARTER INSPECTION

A3U011918400W02

On-Vehicle Inspection

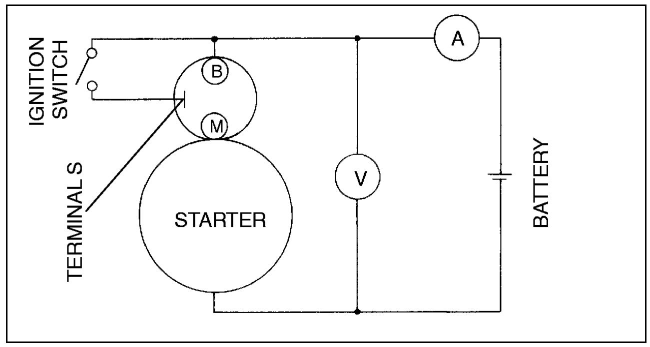
1. Verify that the battery is fully charged.
2. Crank the engine and verify that the starter rotates smoothly without any noise.
3. Measure the voltage at terminals S and B when the ignition switch is at START position.
   - If the voltage is within the specification, remove the starter and inspect the 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.

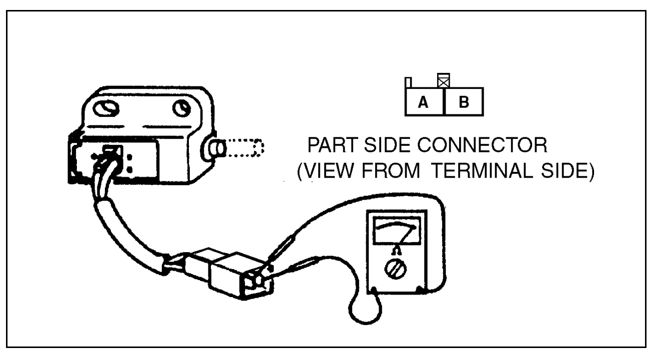
Continuity Inspection

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.

O—O : Continuity

Condition	Terminal	
	A	B
Clutch pedal not depressed		
Clutch pedal depressed	O—	—O

X3U119WA3

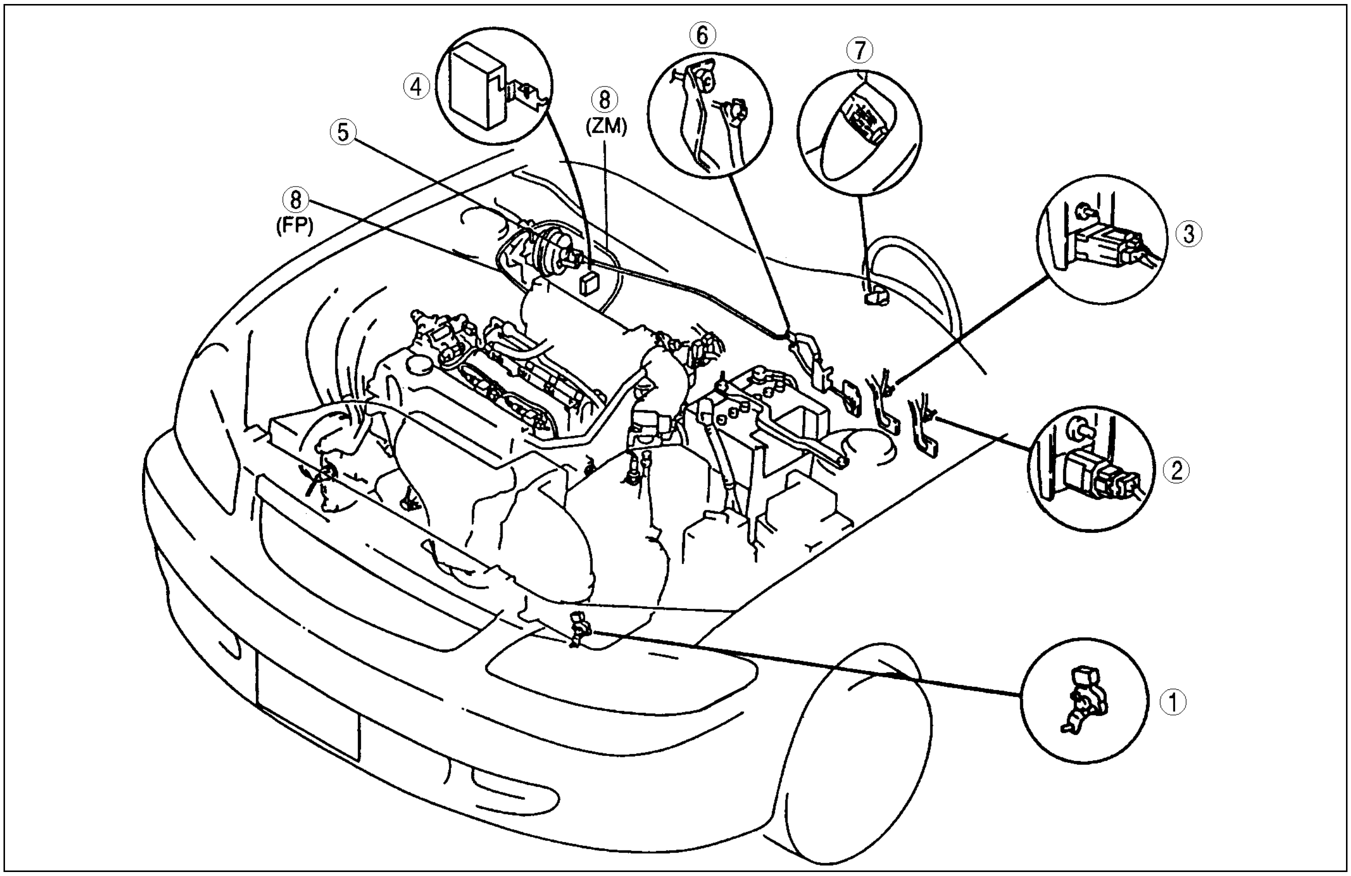


Y3U119WA0

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

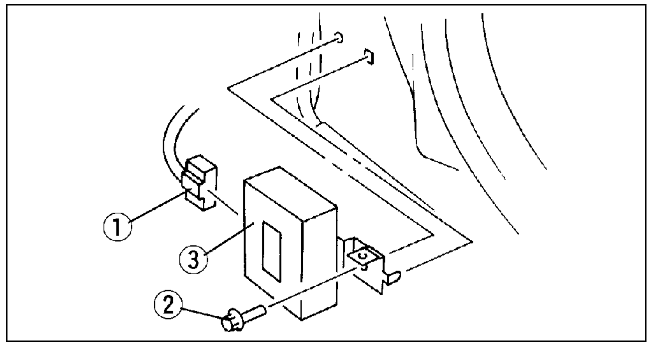
CRUISE CONTROL MODULE REMOVAL/INSTALLATION

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.



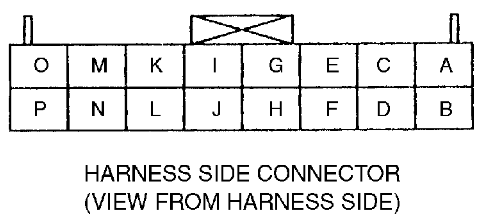
X3U120WA0

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)



Y3U120WA0

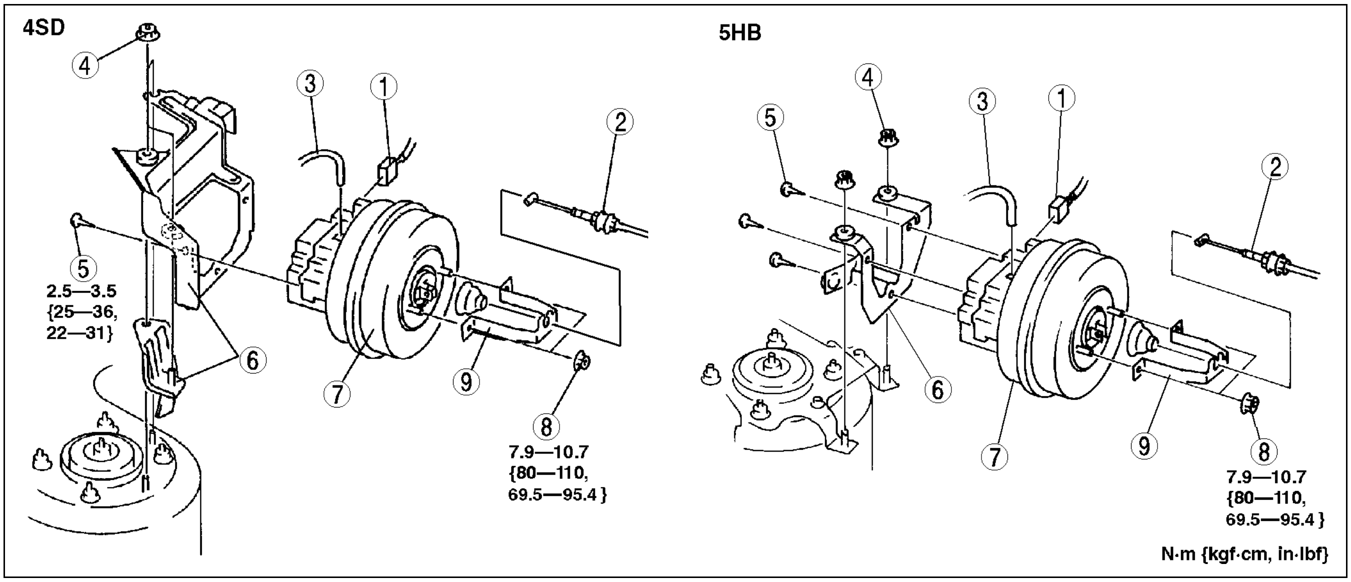
Terminal	Signal	Connected to	Test condition		Voltage (V) /Continuity	Action
A	Cruise actuator control	Cruise actuator (Vent 1)	Ignition switch at ON position	Cruise control main switch at ON position	B+	• Inspect brake switch (See 04–11–5 BRAKE SWITCH INSPECTION) • Inspect cruise actuator (See 01–20–4 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: Selecto r 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

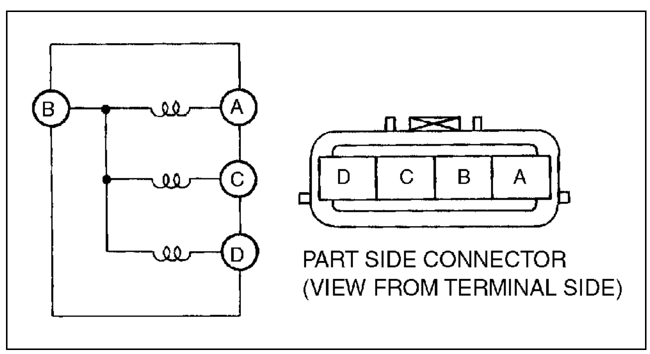
1. Disconnect the negative battery cable.
2. Disconnect the cruise actuator connector.
3. Measure the resistance between the cruise actuator terminals using an ohmmeter.

○-W-○ : Resistance

Step	Terminal			
	A	B	C	D
1	○—W—	—○		R_1
2		○—W—	—○	R_2
3		○—	—W—	—○ R_3

R_1: Approx. 55 ohms R_2: Approx. 21 ohms
R_3: Approx. 55 ohms

Z3U0120W003



Y3U120WA2

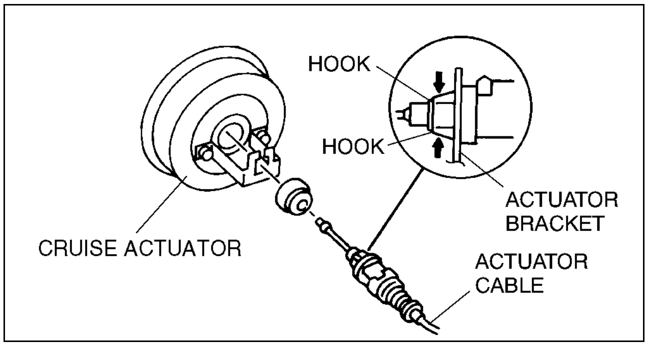
4. Disconnect the actuator cable from the accelerator pedal.
5. Allow the engine to idle.
6. Connect B+ and a ground to the terminals as shown and confirm the operation of the actuator cable.
   - If not as specified, replace the cruise actuator.

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

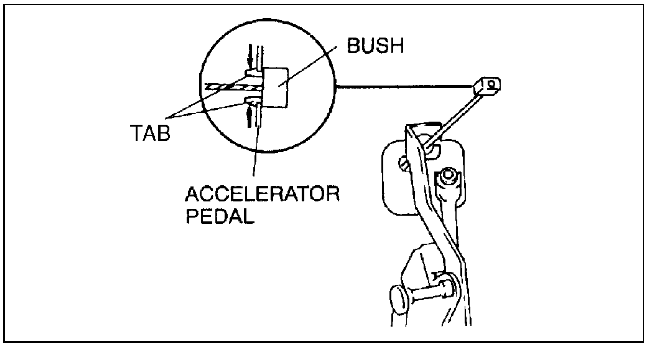
A3U012066311W01

1. Loosen the nut, and remove the actuator cable.



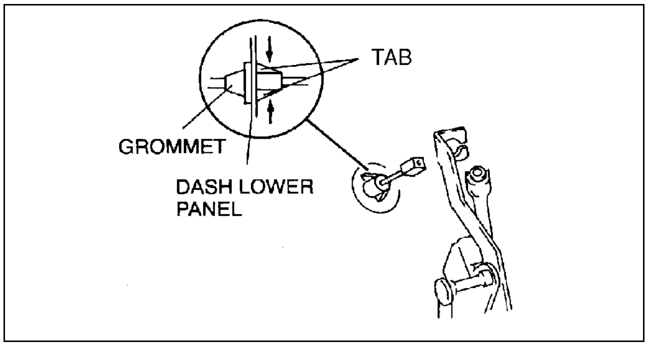
Z3U0120W004

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.

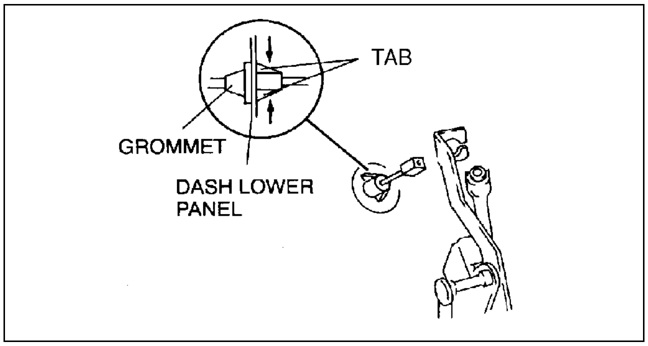


Y3U120WA6

ACTUATOR CABLE INSTALLATION

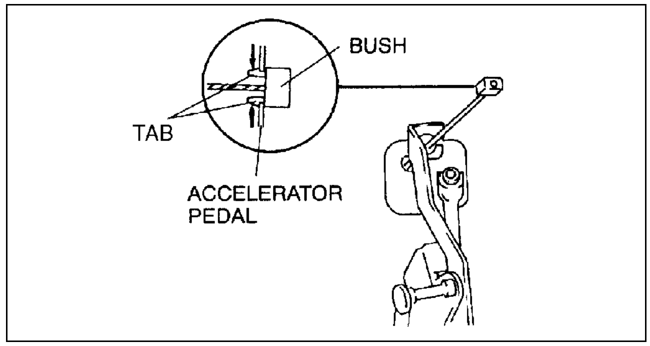
A3U012066311W02

1. Install the grommet to the dash lower panel.



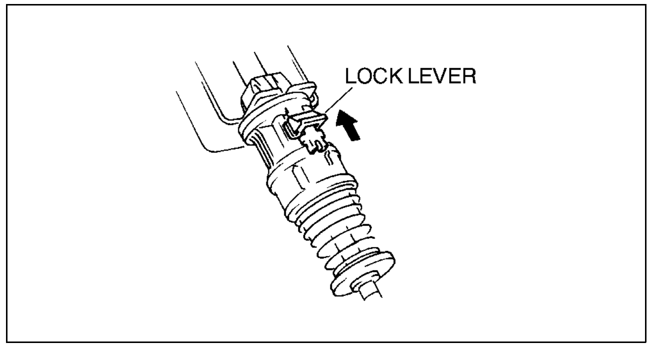
Y3U120WA6

2. Install the actuator cable to the accelerator pedal.



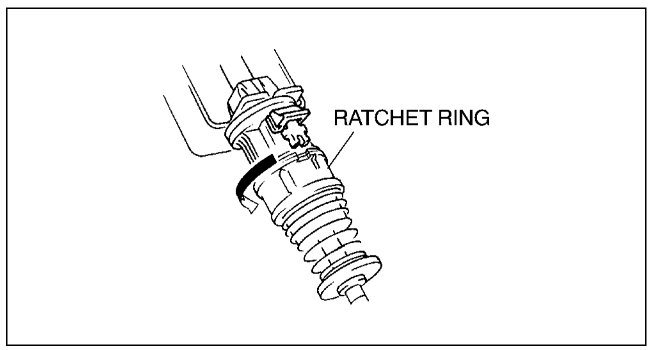
Y3U120WA5

3. Slide the lock lever in the direction shown by the arrow to unlock the adjuster.



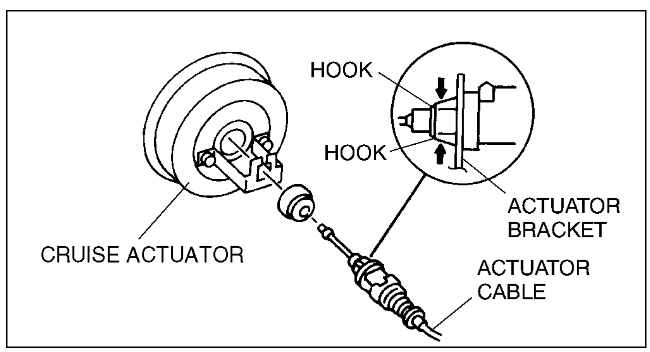
YMU120WAA

4. Turn the ratchet ring to release lock in the direction shown by the arrow.



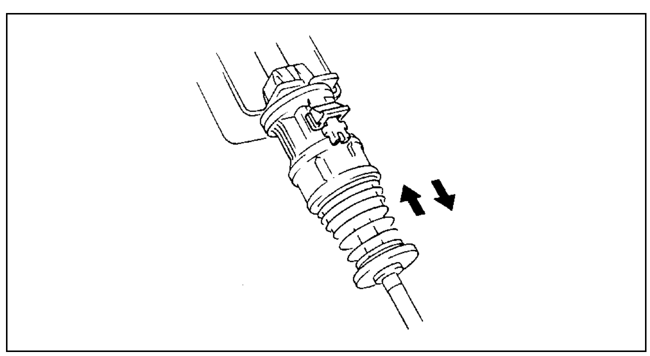
YMU120WAB

5. Insert the grommet into the actuator bracket.



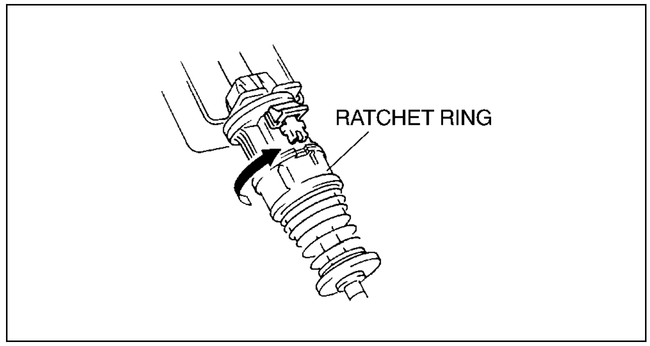
Z3U0120W004

6. To adjust the free play, push or pull the actuator cable directly behind the spring **two times**.



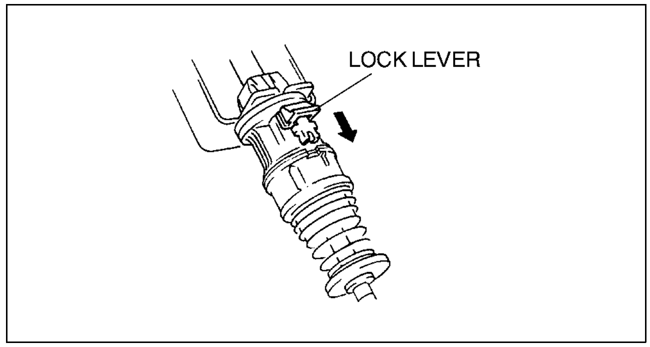
YMU120WAJ

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

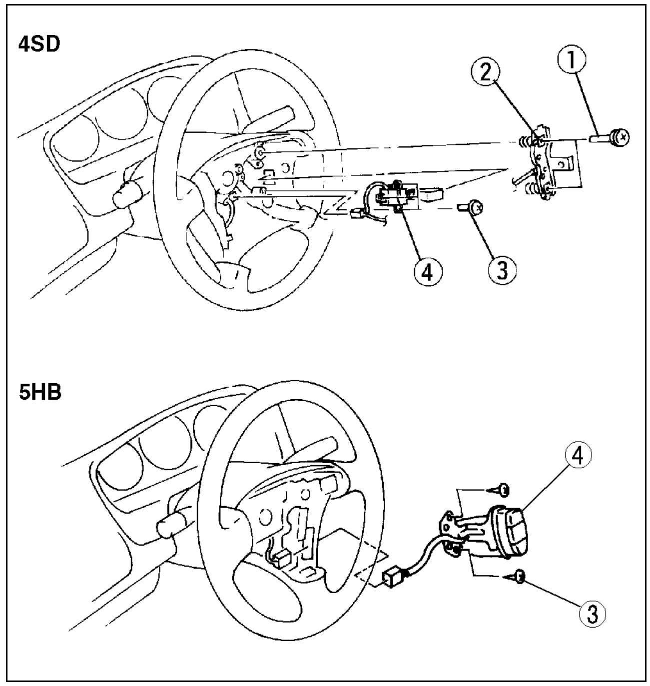
CRUISE CONTROL SWITCH REMOVAL/INSTALLATION

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.

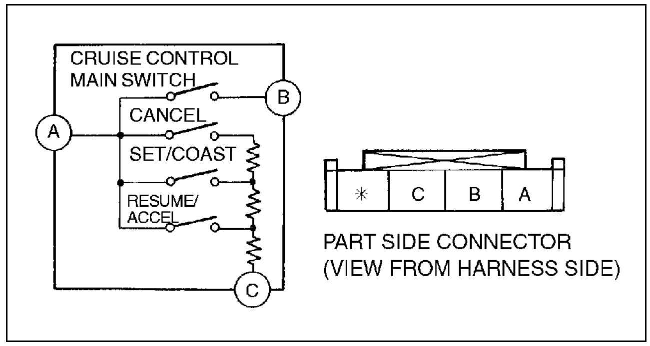


A3U0120W102

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.



Y3U120WA4

○—○ : 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

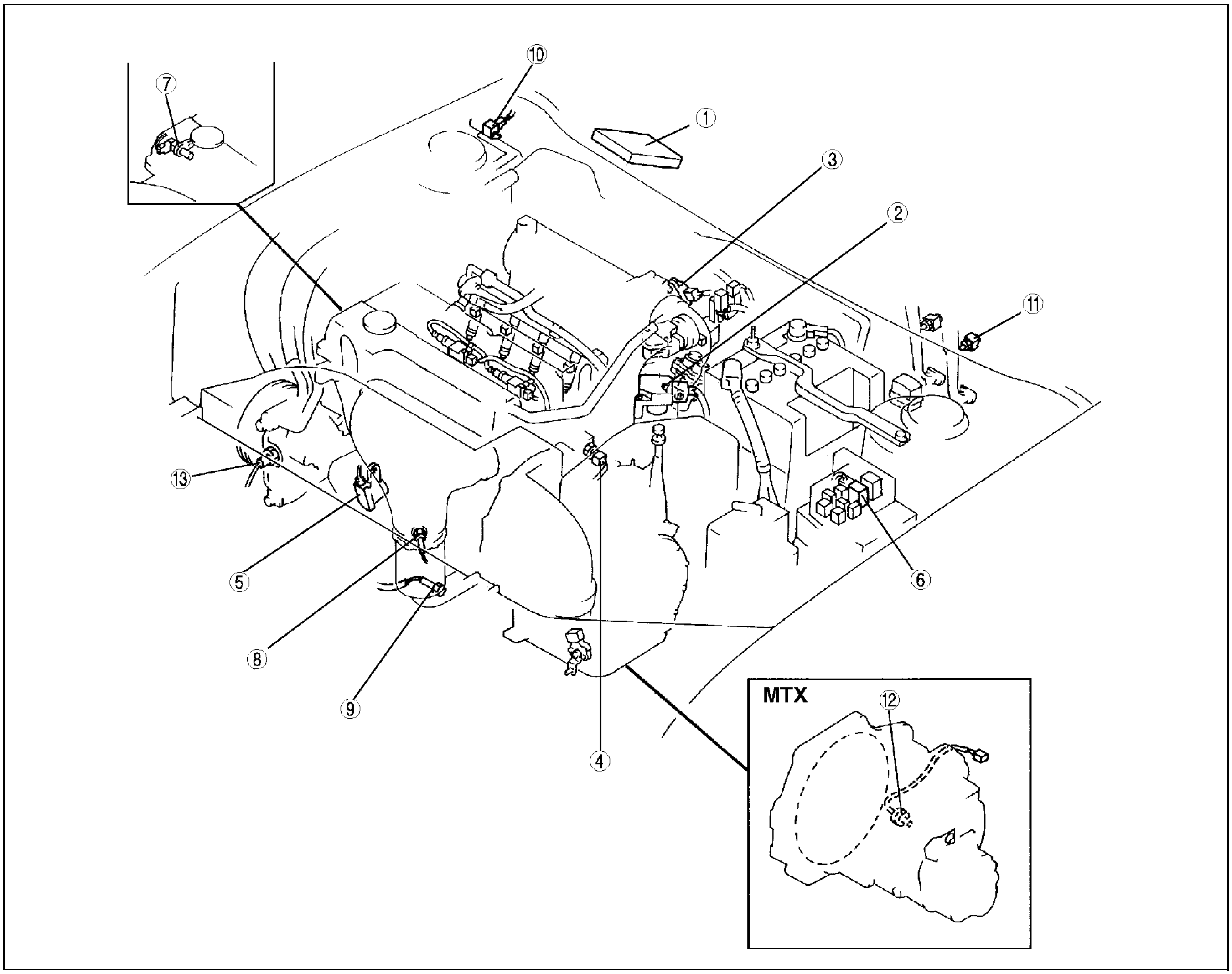
Z3U0120W005

01–40A CONTROL SYSTEM [ZM]

CONTROL SYSTEM COMPONENT LOCATION INDEX [ZM]

A3U014018881W05

Engine compartment side



Z3U0140W001

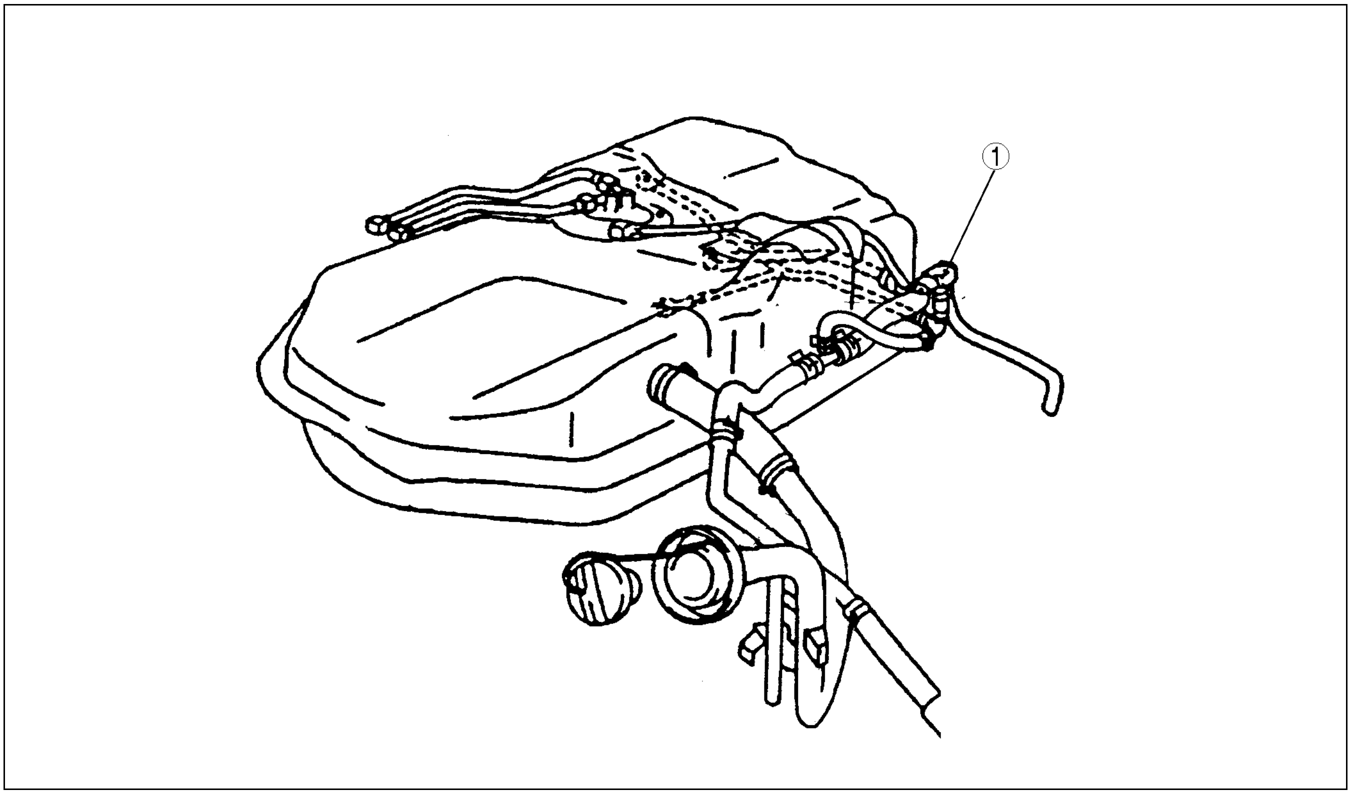
1	PCM (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM]) (See 01–40A–7 PCM INSPECTION [ZM])
2	Mass air flow (MAF)/intake air temperature (IAT) sensor (See 01–40A–26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [ZM])
3	Throttle position (TP) sensor (See 01–40A–28 THROTTLE POSITION (TP) 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

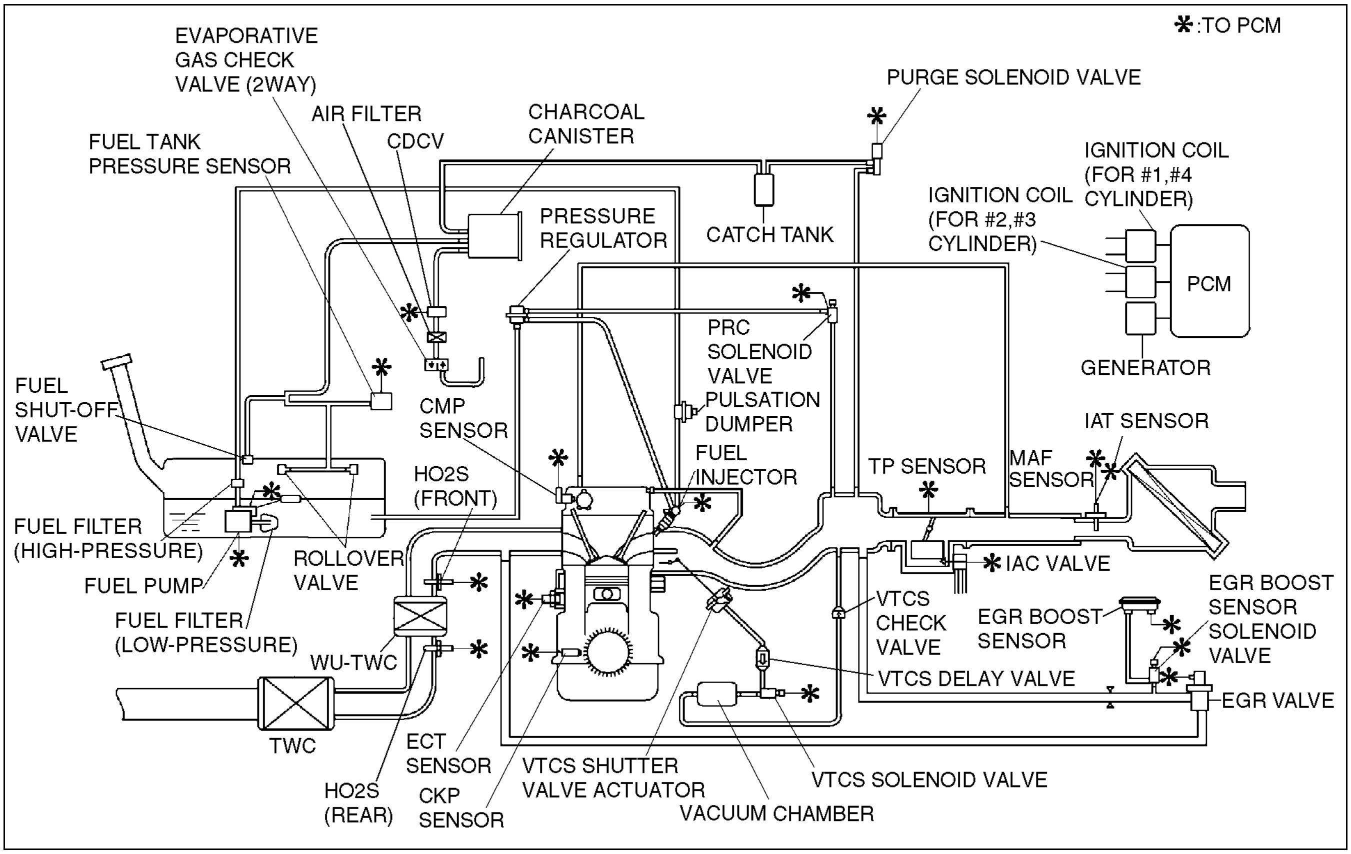


Z3U0140W002

1	Fuel tank pressure sensor (See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])

CONTROL SYSTEM DIAGRAM [ZM]

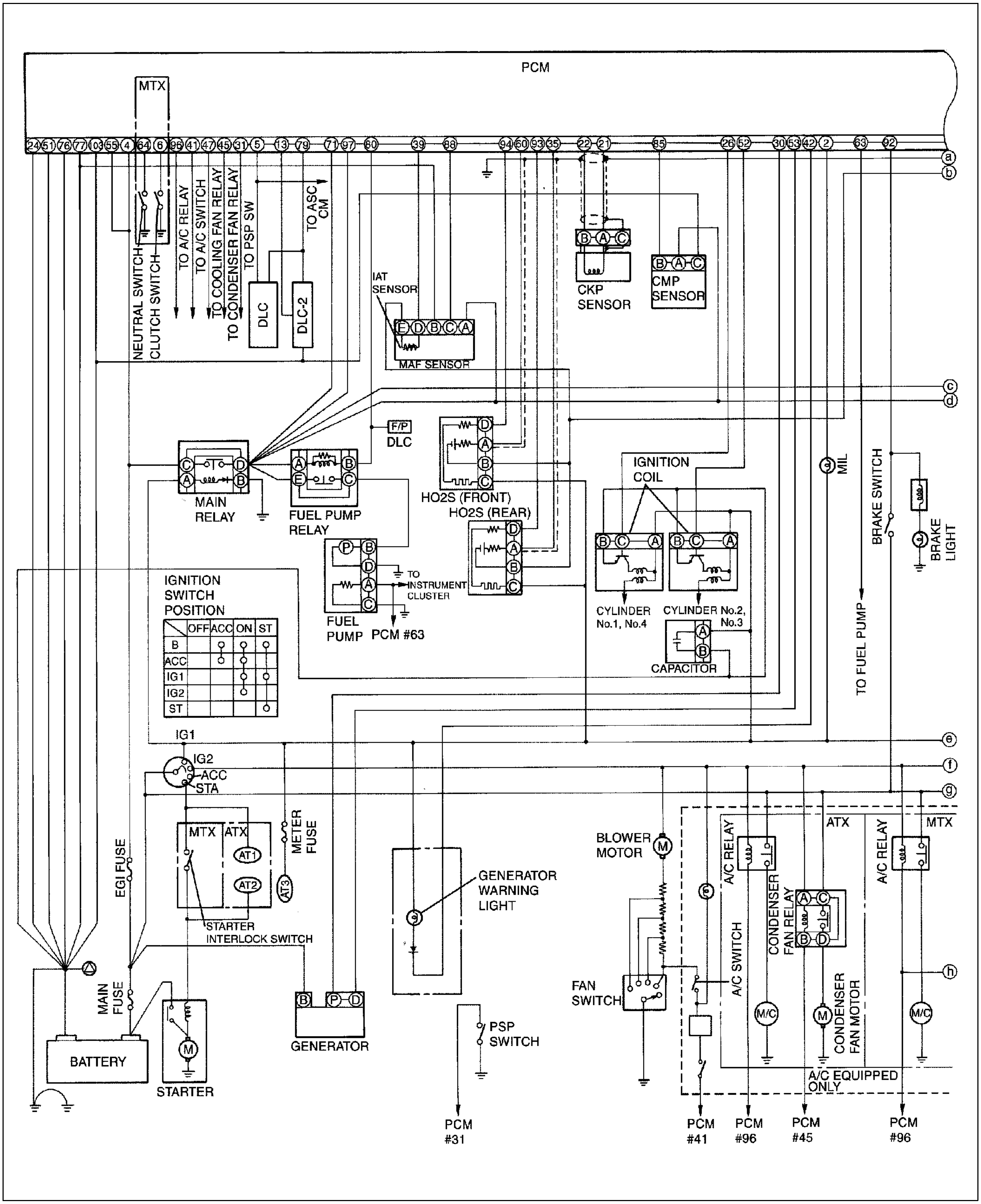
A3U014018881W06



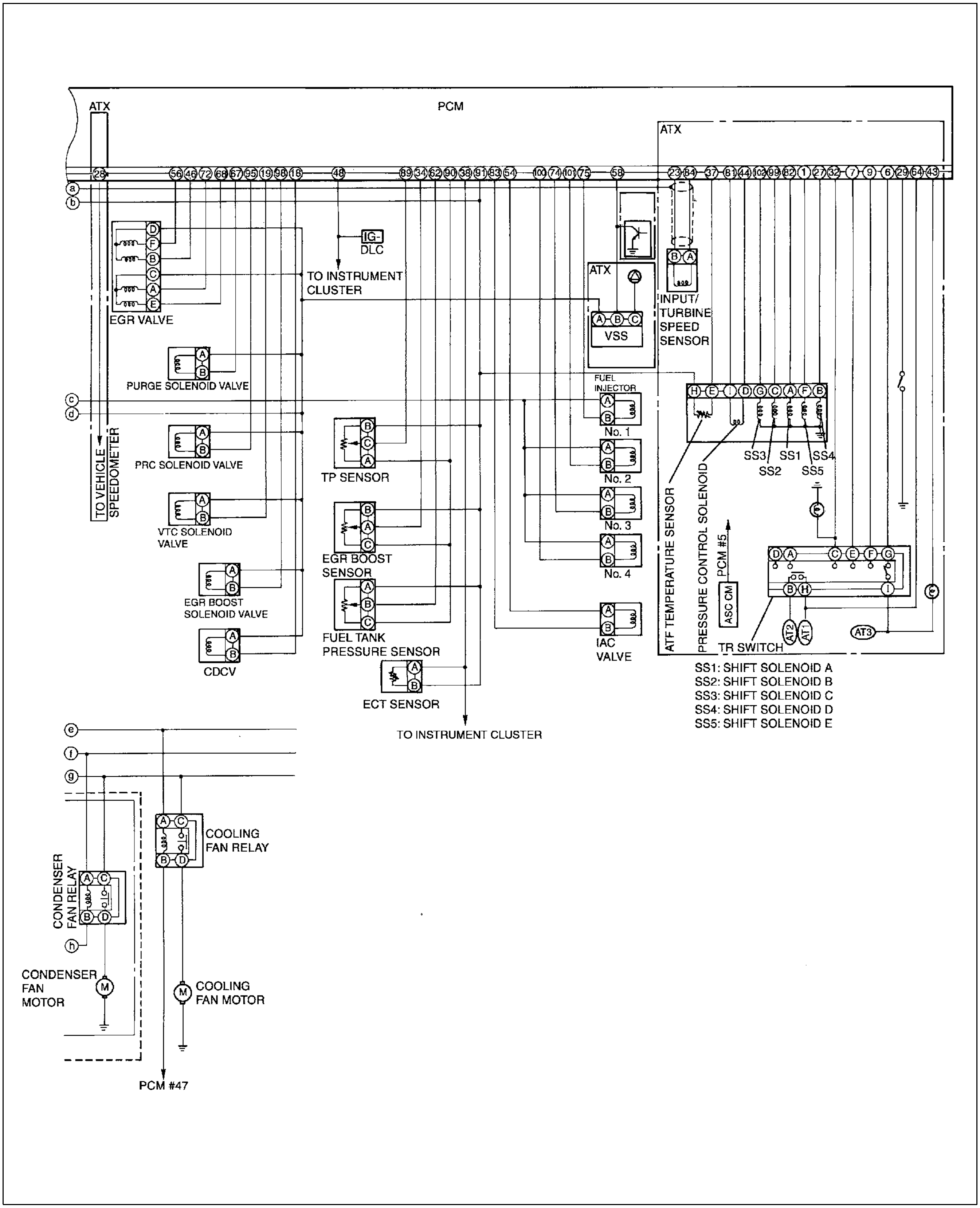
Z3U0140W003

CONTROL SYSTEM WIRING DIAGRAM [ZM]

A3U014018881W07



A3U0140W005



Z3U0140W005

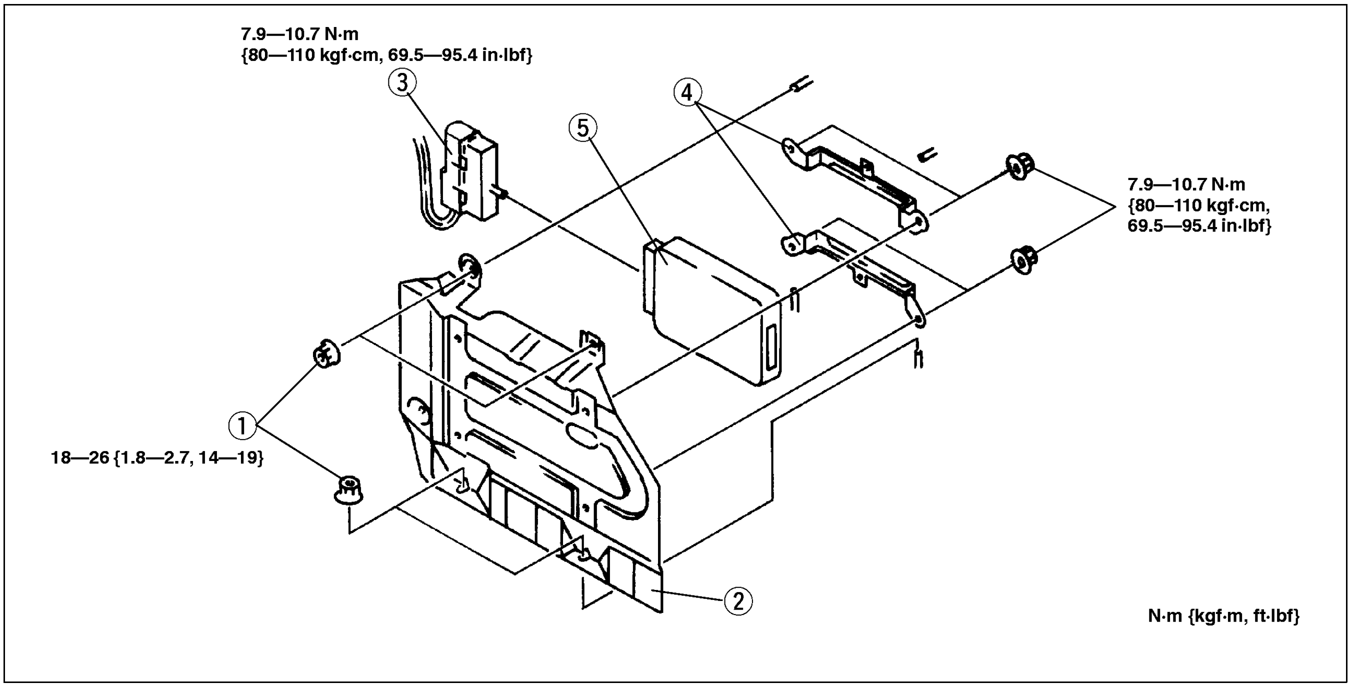
PCM REMOVAL/INSTALLATION [ZM]

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

<table>
<tr><th>Monitor item (Definition)</th><th colspan="2">Unit/ Condition</th><th>Condition/Specification (Reference)</th><th>Action</th><th>PCM terminal</th></tr>
<tr><td>FAN3 (Cooling fan control)</td><td colspan="2">ON/OFF</td><td>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</td><td>Inspect following PIDs: RPM, TP, ECT, ACSW, TEST
Inspect cooling fan relay
(See 09–21–5 RELAY INSPECTION)</td><td>47</td></tr>
<tr><td>FP (Fuel pump relay)</td><td colspan="2">ON/OFF</td><td>Ignition switch ON: OFF
Idle: ON Cranking: ON</td><td>Inspect following PID: RPM
Inspect fuel pump relay
(See 09–21–5 RELAY INSPECTION)</td><td>80</td></tr>
<tr><td>FPRC (PRC solenoid valve)</td><td colspan="2">ON/OFF</td><td>Ignition switch ON: OFF
Idle: OFF
After hot start: ON</td><td>Inspect PRC solenoid valve
(See 01–14–31 PRC SOLENOID VALVE INSPECTION)</td><td>95</td></tr>
<tr><td>FTL V (Fuel tank level signal voltage)</td><td colspan="2">V</td><td>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.</td><td>Inspect fuel gauge sender unit
(See 09–22–4 Fuel Gauge)</td><td>63</td></tr>
<tr><td rowspan="2">FTP (Fuel tank pressure)</td><td>kPa</td><td>inHg</td><td>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.</td><td>Inspect fuel tank pressure sensor
(See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])</td><td>62</td></tr>
<tr><td colspan="2">V</td><td>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.</td><td>Inspect fuel tank pressure sensor
(See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])</td><td>62</td></tr>
<tr><td>FTP1SV</td><td colspan="2">kPa</td><td colspan="2" rowspan="2">Perform “DTC INSPECTION”.
(See 01–02A–15 DTC TABLE [ZM])</td><td rowspan="2">—</td></tr>
<tr><td>FTP2SV</td><td colspan="2">kPa</td></tr>
<tr><td>FUELPW1 (Fuel injection duration)</td><td colspan="2">ms</td><td>Ignition switch ON: 0 msec
Idle: 2.5—4.0 msec</td><td>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])</td><td>74, 75, 100, 101</td></tr>
<tr><td>GEAR
(Gear position)</td><td colspan="2">1/2/3/4</td><td>1GR: 1
2GR: 2
3GR: 3
4GR: 4</td><td>Inspect following PIDs: SSA/SS1, SSB/SS2, SSC/SS3, SSD/SS4, SSE/SS5</td><td>1, 27, 82, 99, 102</td></tr>
<tr><td>HTR11 (HO2S heater (Front))</td><td colspan="2">ON/OFF</td><td>Ignition switch ON (engine stopped): OFF
Approx. 15 seconds after engine start with ECT 20—30 °C {68—86°F}: ON
Others: ON ⇔ OFF</td><td>Inspect following PIDs: ECT, MAF
Inspect HO2S heater
(See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection)</td><td>94</td></tr>
<tr><td>HTR12 (HO2S heater (Rear))</td><td colspan="2">ON/OFF</td><td>ECT above 70 °C {158 °F}: ON
HO2S (Rear) heater is malfunctioning: OFF</td><td>Inspect following PIDs: ECT, MAF
Inspect HO2S heater
(See 01–40A–37 HO2S Heater (Front and Rear) Resistance Inspection)</td><td>93</td></tr>
</table>

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
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 05–17–20 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

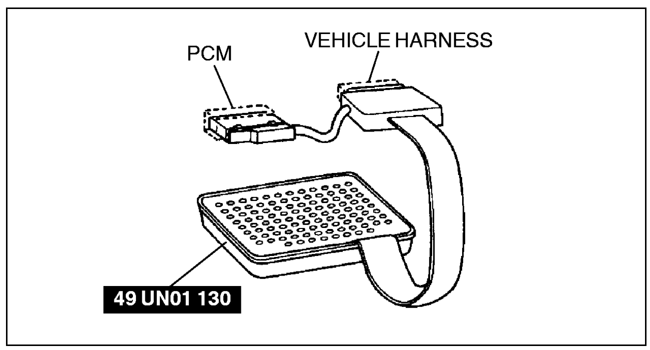
*1 : ATX only
*2 : MTX only

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
			Ignition switch ON: 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	
			Idle: 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	
			Idle: 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 / After warm up	0.5—1.0	
			Deceleration / After warm up	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
			Ignition switch ON / 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
			Ignition switch ON / 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
			Ignition switch ON: 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)

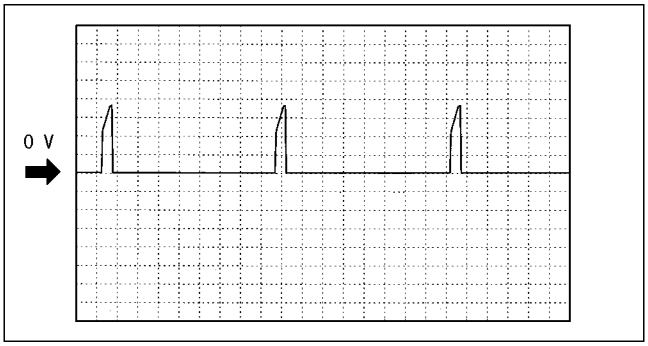
Ne signal

- PCM terminal: 21(+)-22(-)
- Oscilloscope setting: 2 V/DIV(Y), 2ms/DIV(X), AC range
- Vehicle condition: idle after warm up

Z3U0140W006

IGT signal

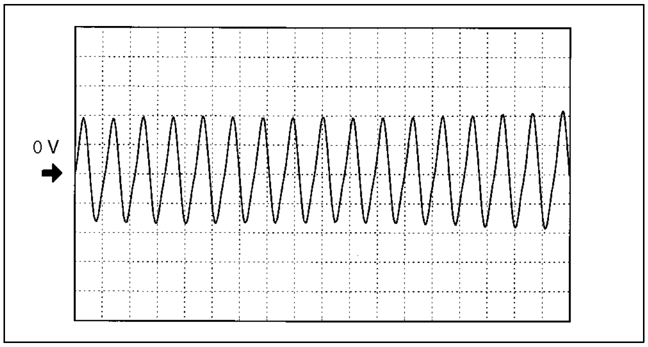
- PCM terminal:
  - — IGT1: 26(+)-103(-)
  - — IGT2: 52(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 10ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W007

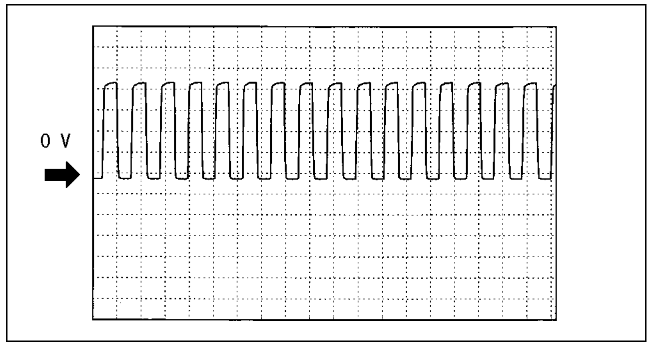
Input/turbine speed signal

- PCM terminal: 84(+)-23(-)
- Oscilloscope setting: 0.4 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



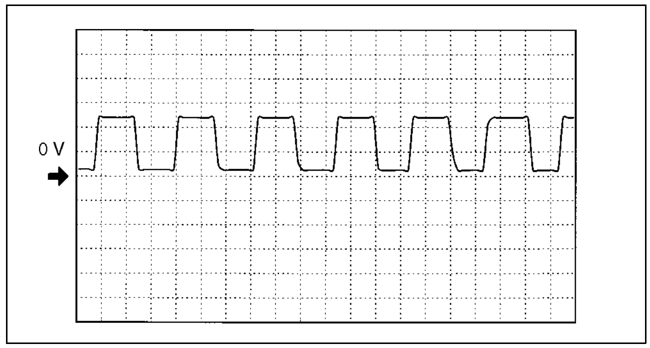
Z3U0140W008

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



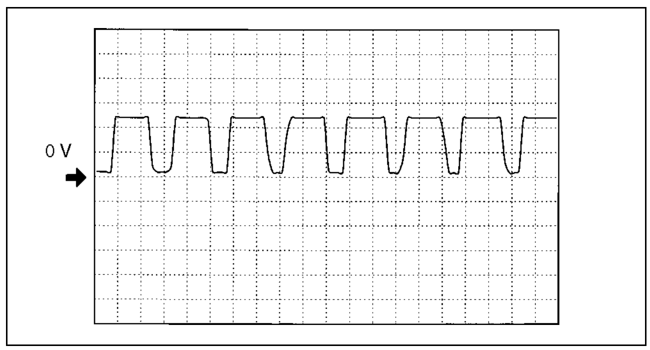
Z3U0140W009

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.



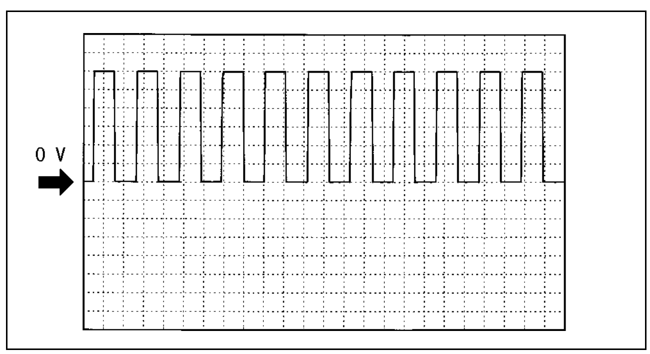
Z3U0140W010

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



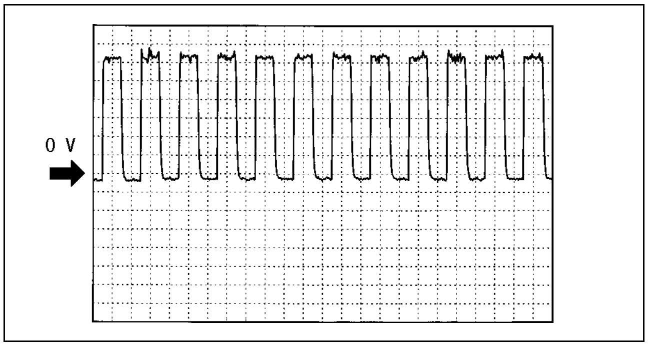
Z3U0140W019

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



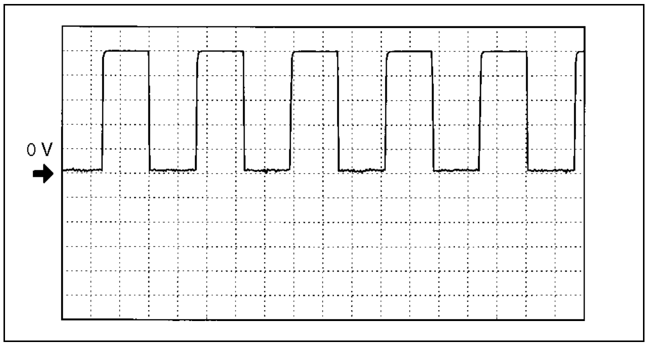
Z3U0140W011

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



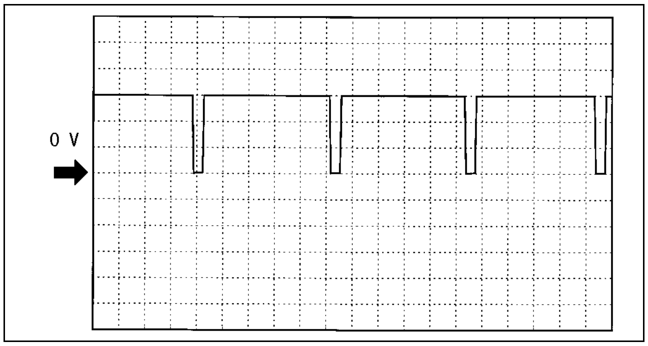
Z3U0140W012

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]



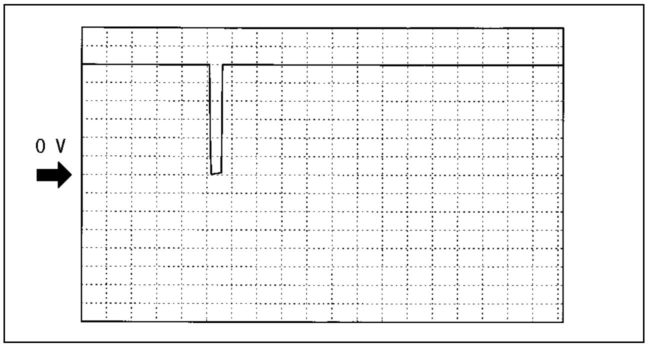
Z3U0140W013

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

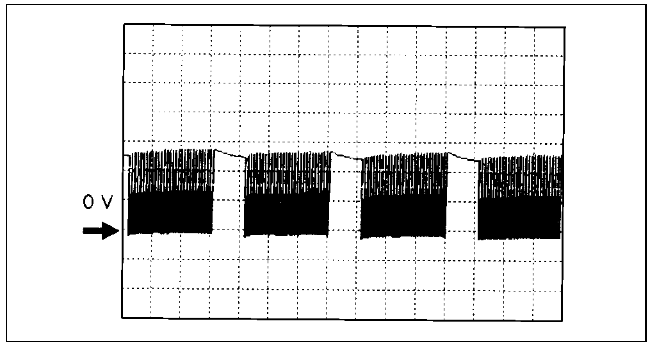
Fuel injection signal
- PCM terminal
  — No.1:75(+)-103(-)
  — No.2:101(+)-103(-)
  — No.3:74(+)-103(-)
  — No.4:100(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W015

Shift solenoid A control

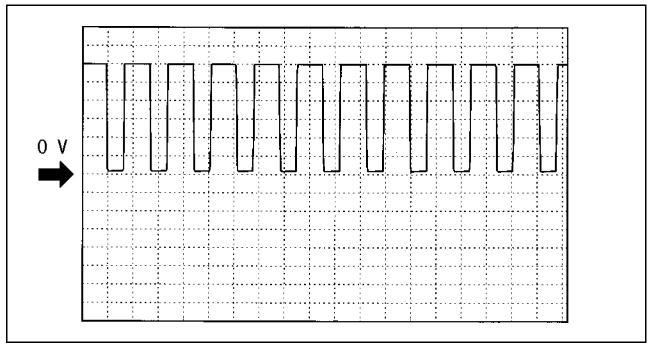
- PCM terminal: 82(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: drive in the 4th gear



Z3U0140W016

IAC signal

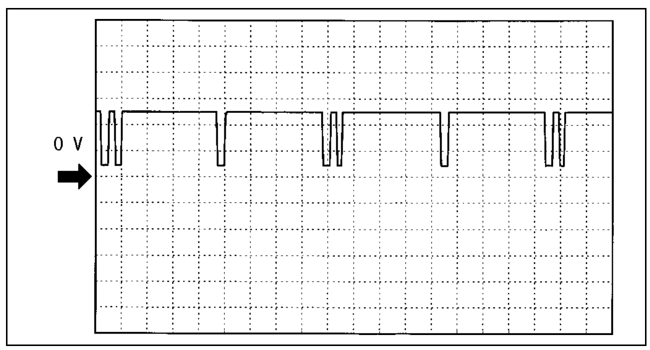
- PCM terminal: 83(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 0.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W017

SGC signal

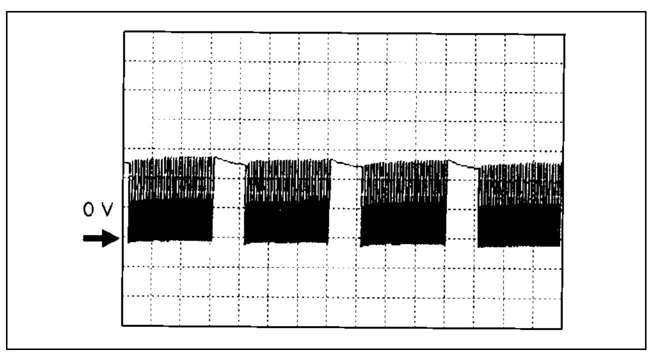
- PCM terminal: 85(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W018

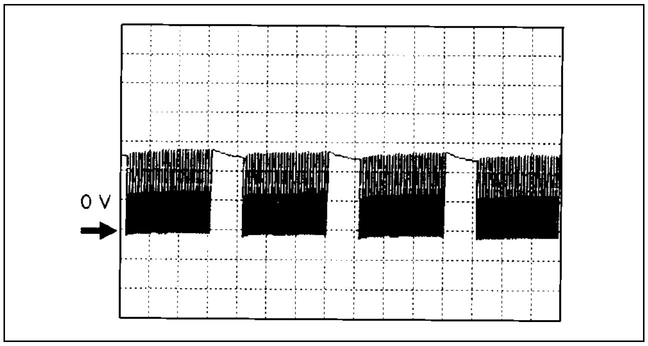
Shift solenoid B control signal

- 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



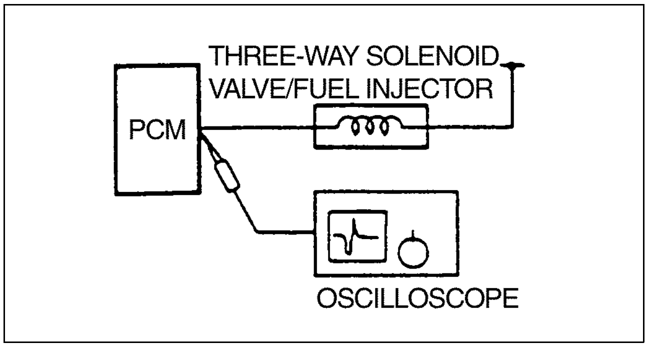
Z3U0140W016

INSPECTION USING AN OSCILLOSCOPE (REFERENCE) [ZM]

A3U014018881W08

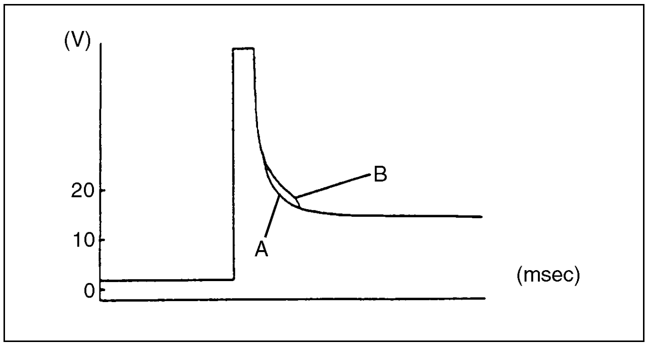
Note
- “INSPECTION USING AN OSCILLOSCOPE (REFERENCE)” is a general inspection for the following output devices.
  — Fuel injector
  — Purge solenoid valve
  — PRC solenoid valve
  — VTCS solenoid valve
  — EGR boost sensor solenoid valve

Purpose
1. The use of oscilloscope makes the inspection of a part such as a stuck solenoid value possible without actually removing parts.



YLU140WBT

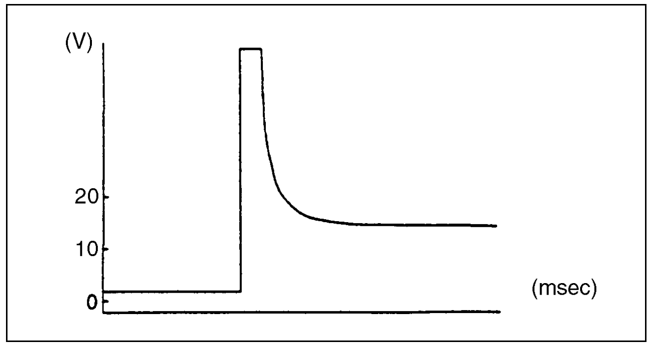
When normal
1. Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



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.

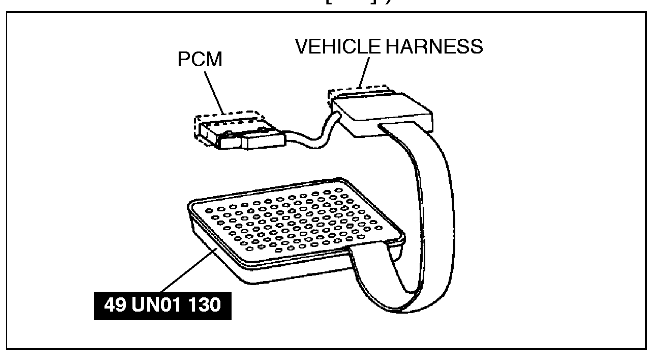
MAF Sensor Inspection

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}

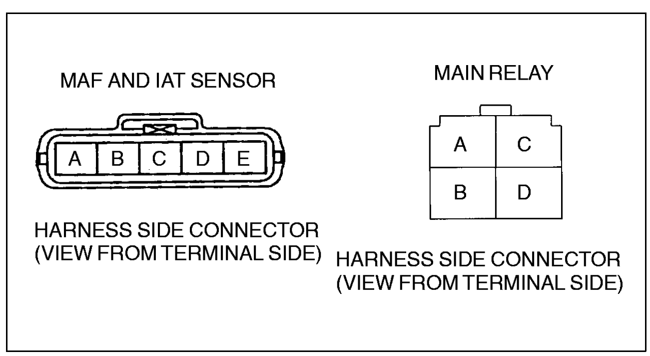


X3U140WBN

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.



X3U140WA3

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—2.2	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

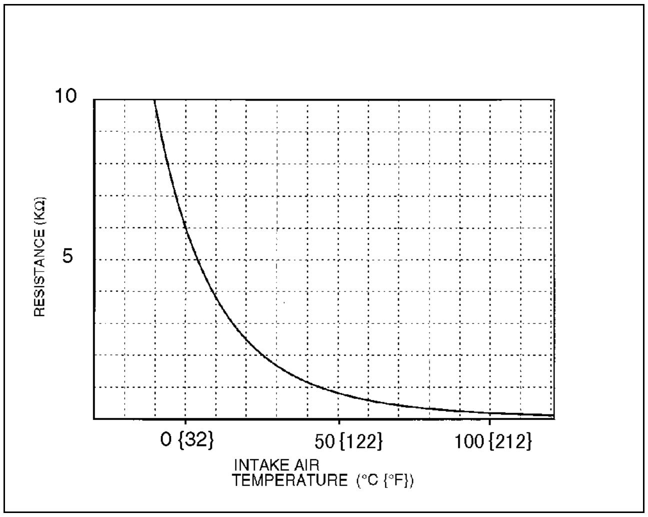
IAT Sensor Resistance Inspection

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

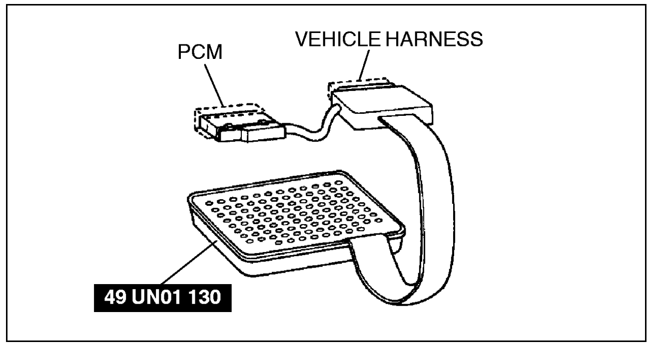
IAT sensoir signal characteristic (reference)



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.



X3U140WBN

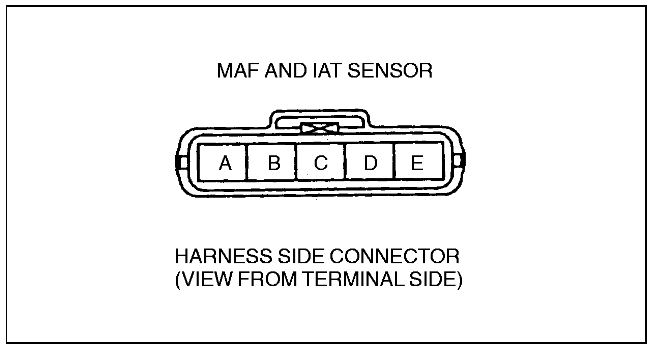
Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

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 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]

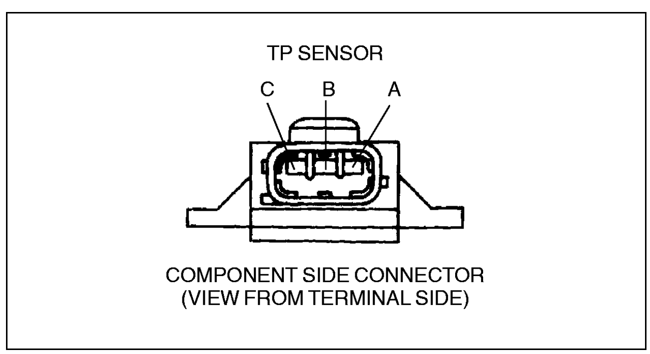
A3U014018910W02

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

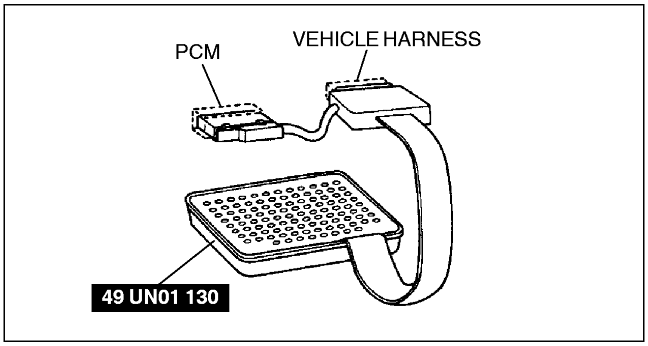


X3U140WA5

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}

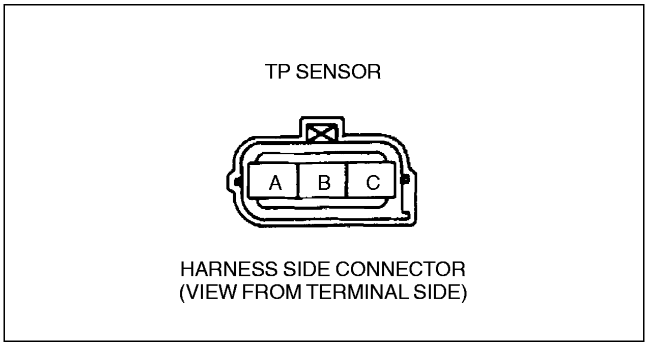


X3U140WBN

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

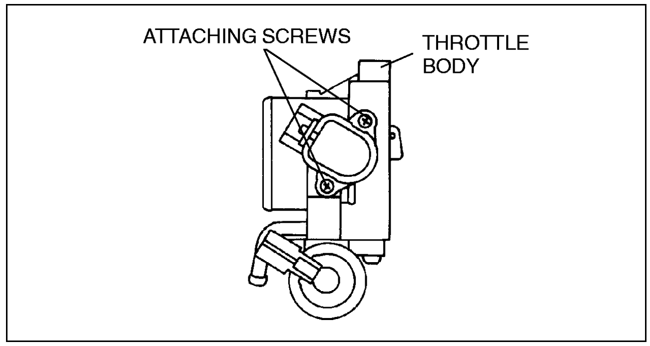
THROTTLE POSITION (TP) SENSOR REMOVAL/INSTALLATION [ZM]

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.



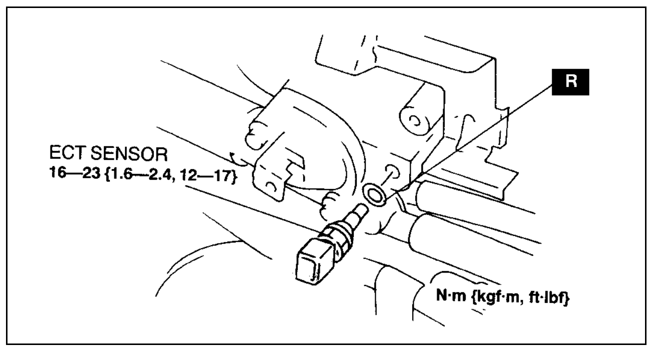
X3U140WA7

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

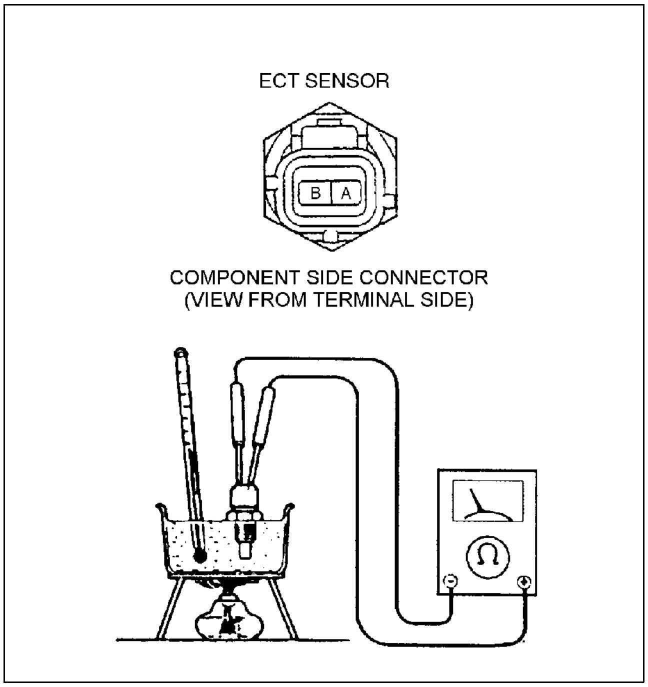
Note
- Perform the following test only when directed.

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”.

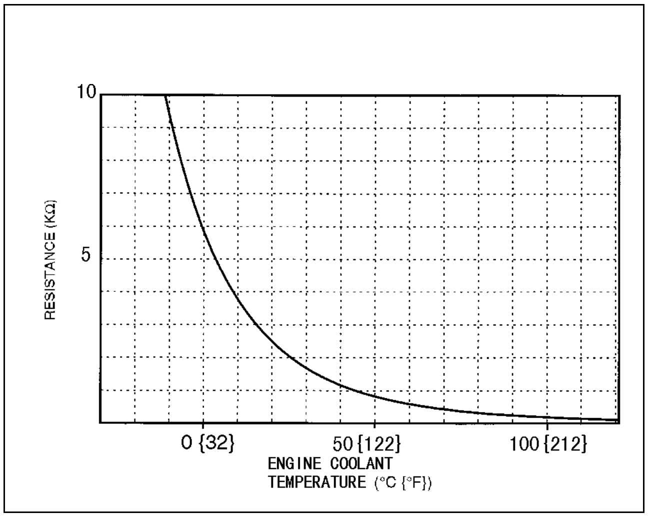
Specification

Water temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.2—2.6
80 {176}	0.29—0.34



Z3U0140W025

ECT sensor signal characteristic (reference)



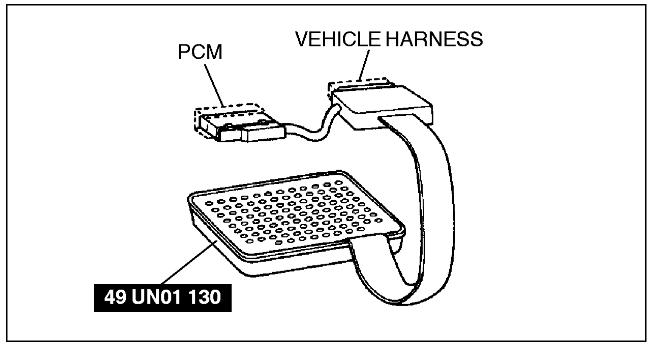
Z3U0140W022

01–40A

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}

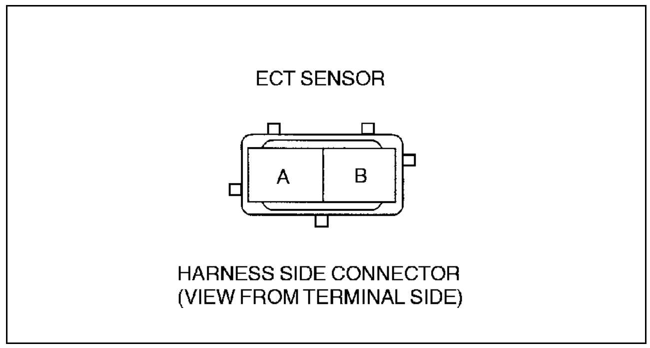


X3U140WBN

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]

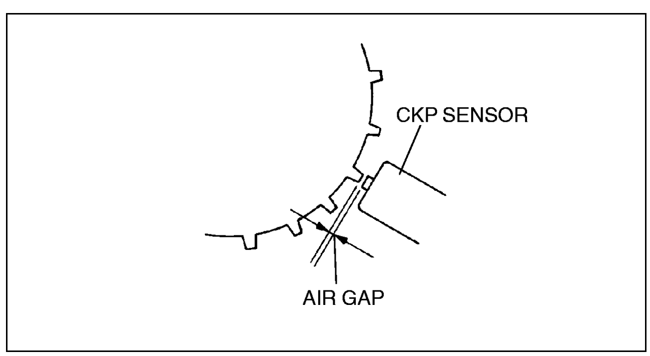
A3U014018230W03

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}

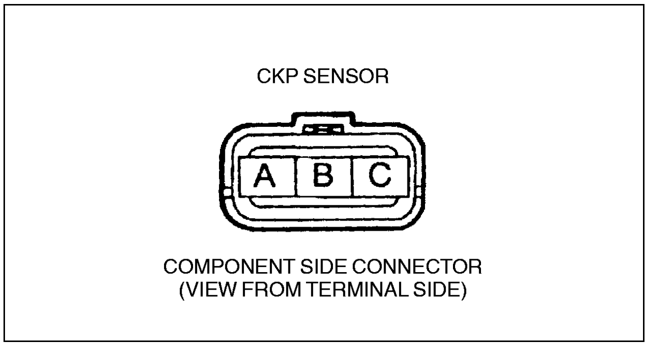


X3U140WAB

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

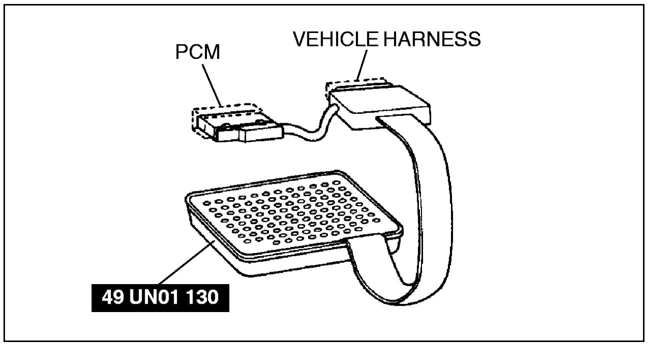


X3U140WBT

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}



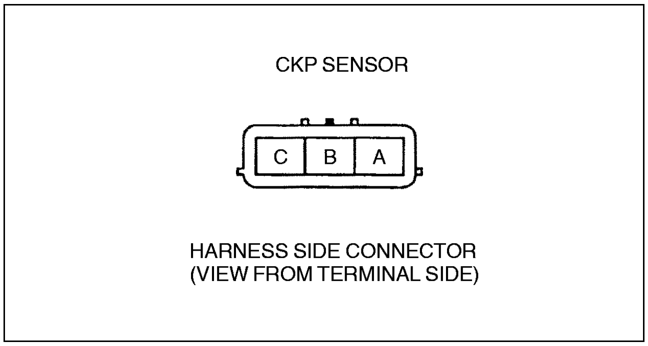
X3U140WBN

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.

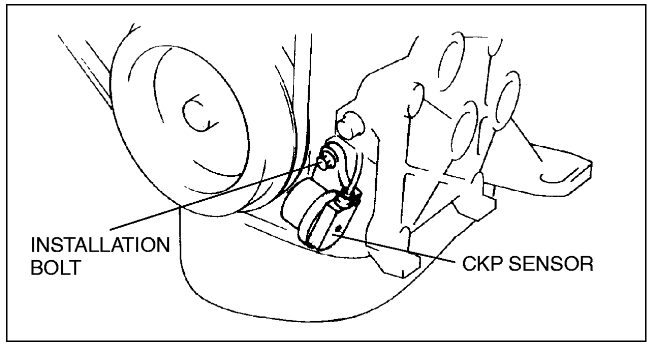


Y3U140WAF

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].)



X3U140WAD

Specification
0.5—1.5 mm {0.020—0.059 in}

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

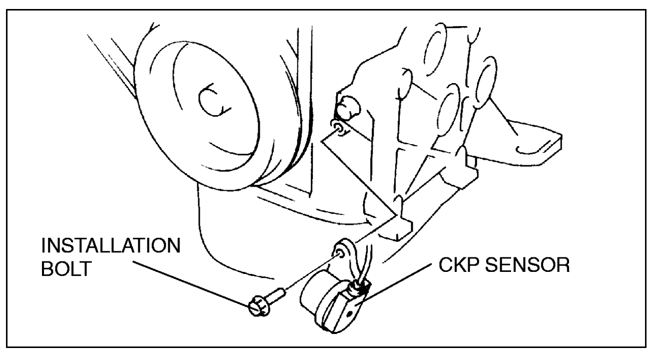
Caution
- **When foreign material such as an iron chip is on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

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].)

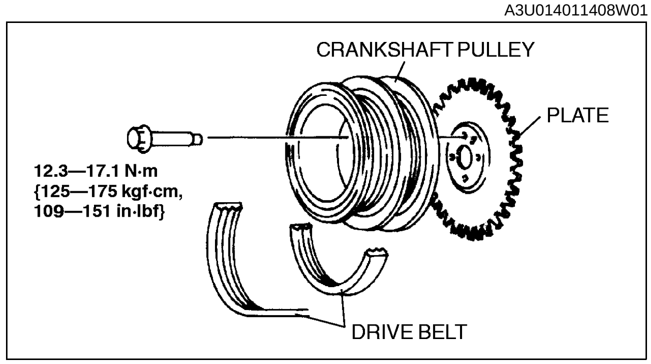
PLATE REMOVAL/INSTALLATION [ZM]

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

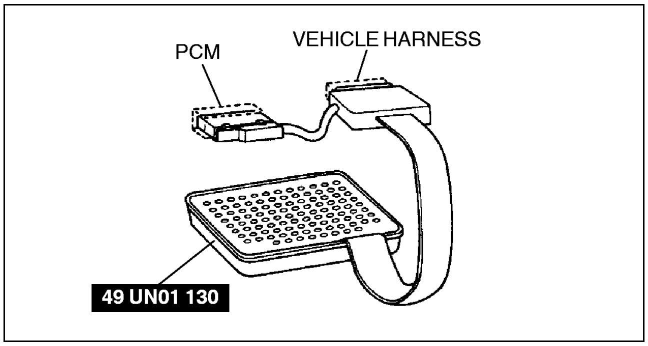
- Make sure that the CMP sensor is free of any metallic shavings or particles.
- If metallic shavings or particles are found on the sensor, clean them off.

2. Install the CMP sensor. (See 01–40A–35 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION [ZM].)

Wave profile Inspection

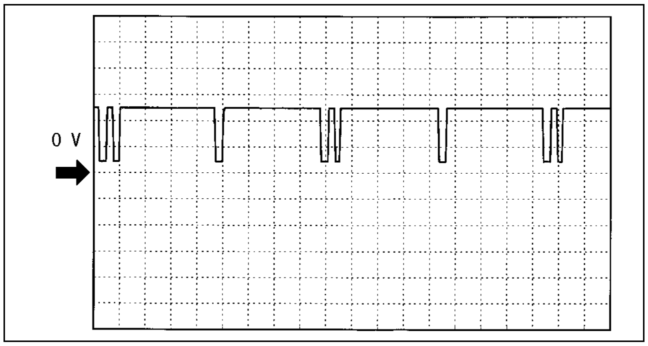
1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U140WBN

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

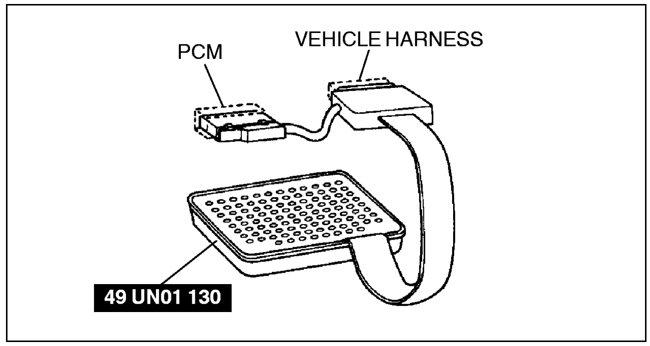


Z3U0140W018

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}

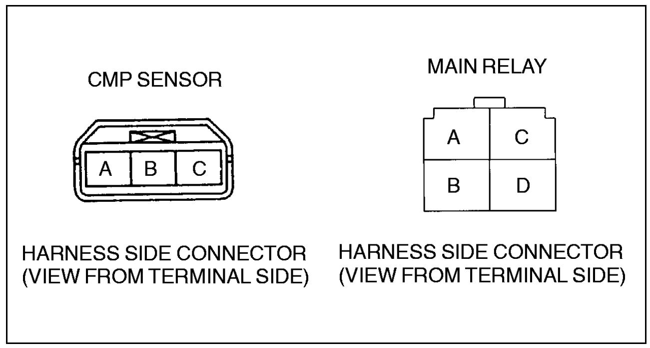


X3U140WBN

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

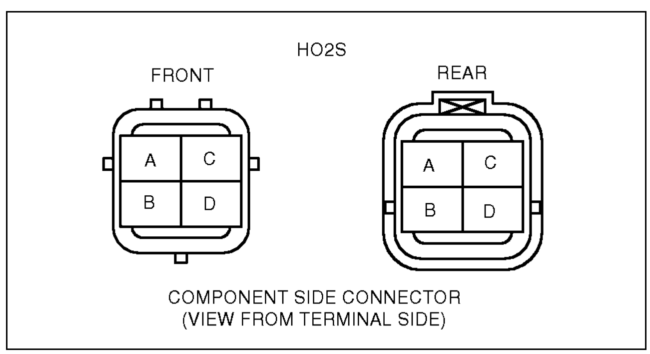
HEATED OXYGEN SENSOR (HO2S) INSPECTION [ZM]

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

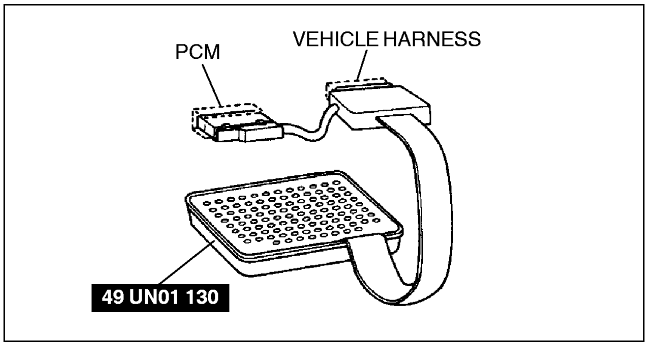
Specification

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}



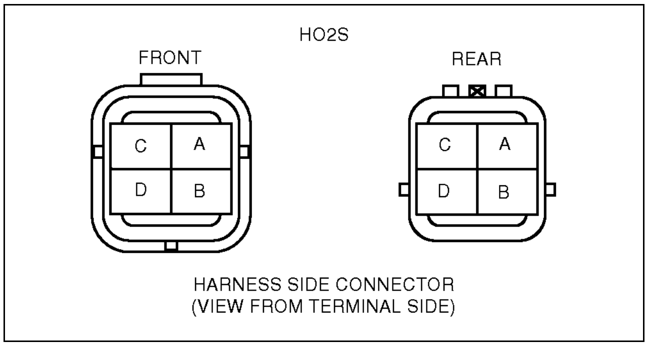
X3U140WBN

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.

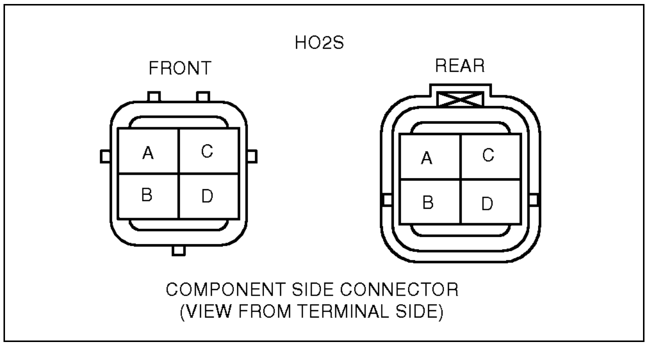


Z3U0140W024

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

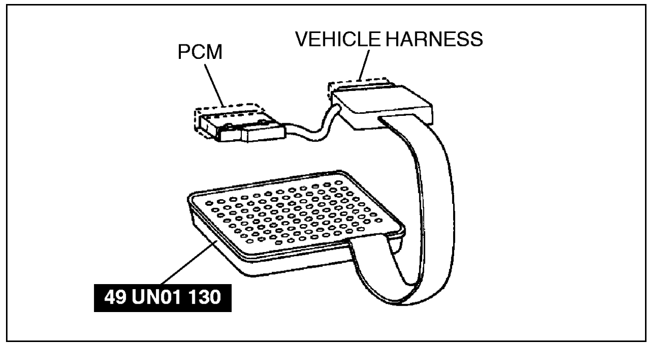


Z3U0140W023

Circuit Open/Short Inspection

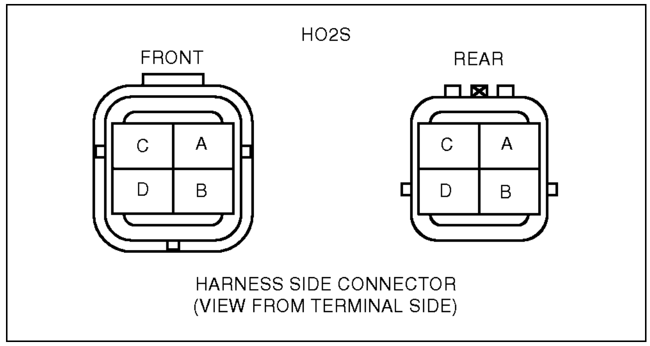
1. Remove the PCM. (See 01–40A–7 PCM REMOVAL/INSTALLATION [ZM].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

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]

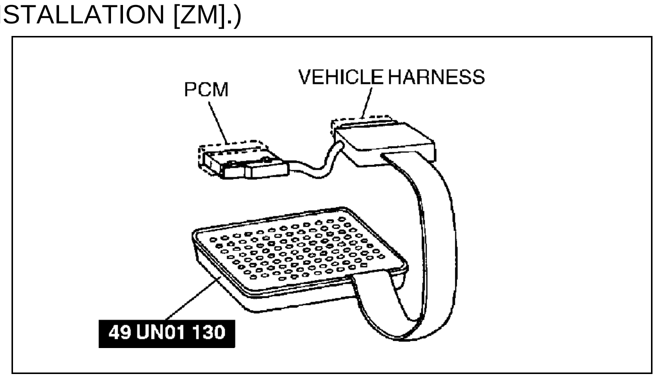
A3U014018211W02

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

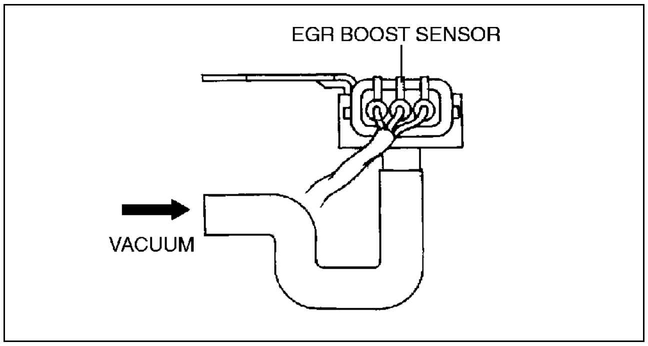
4. Turn the ignition switch to ON.

5. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.

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



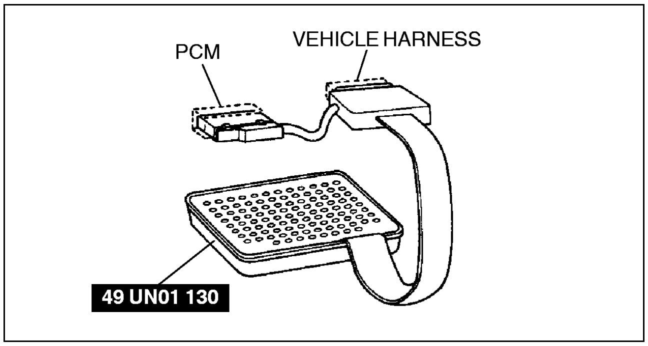
X3U140WAY

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.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}



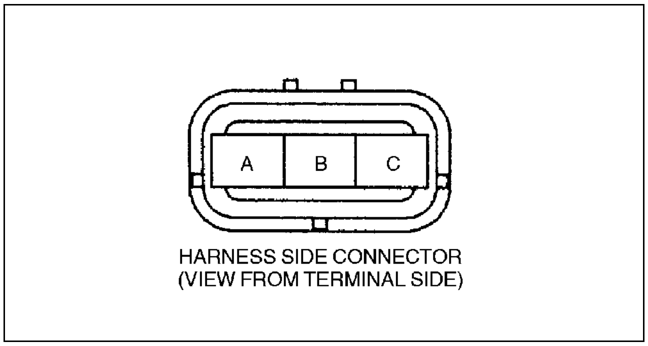
X3U140WBN

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 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]

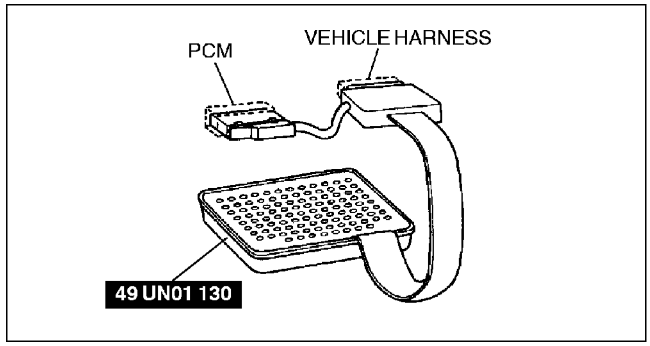
A3U014018212W02

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}

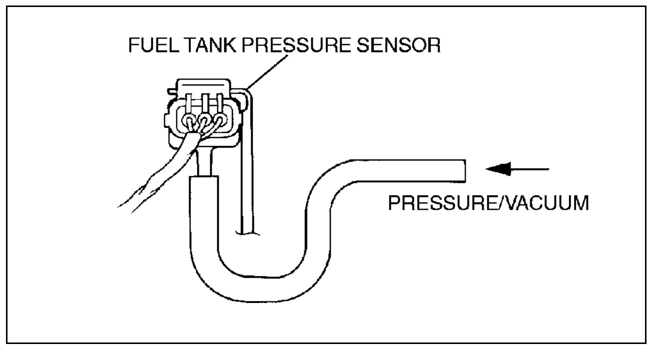
Caution
- **Do not apply vacuum outside of the specified limits, or the fuel tank pressure sensor will be damaged.**



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 **+.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

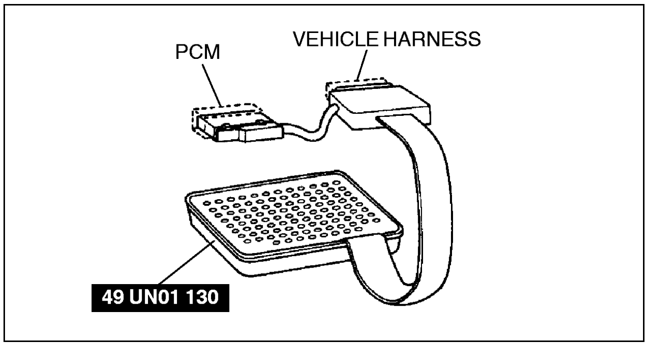
* : Measuring condition is as follows.

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}

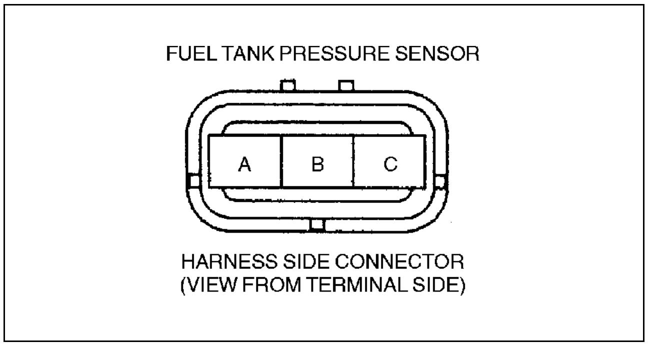


X3U140WBN

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.



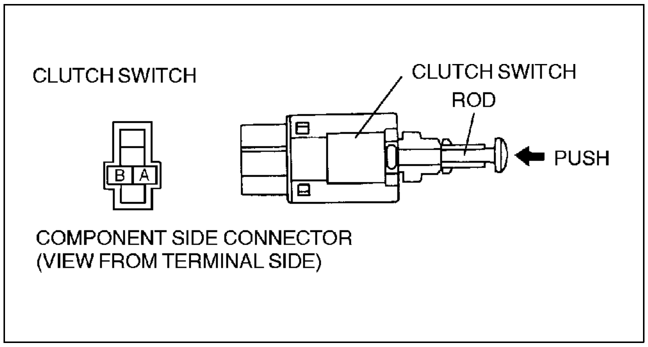
X3U140WB5

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

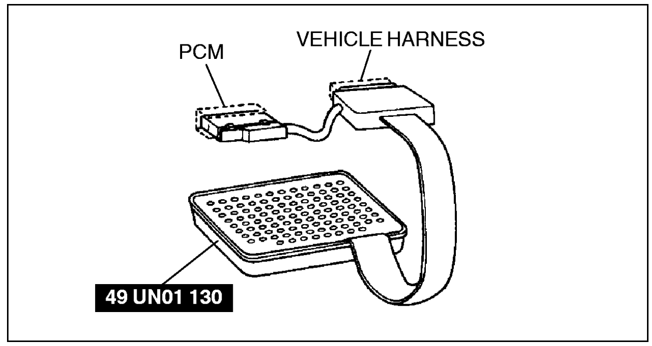
O—O : Continuity

Condition	Terminal A	Terminal B
The rod is pushed		
Except above	O—	—O

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.



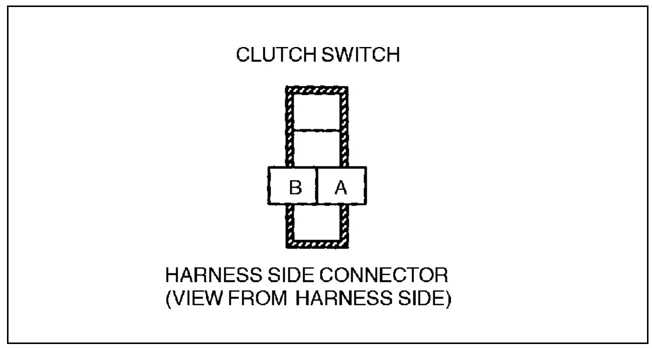
X3U140WBN

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 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

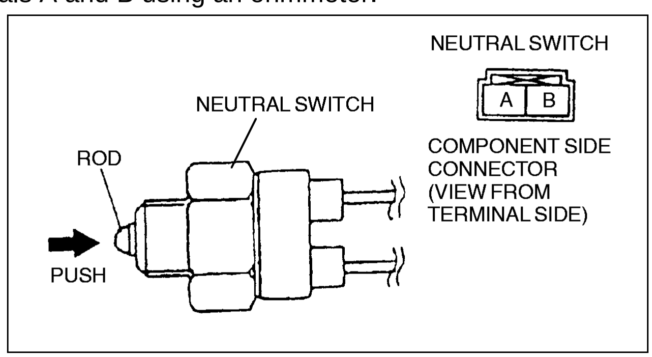
Note
- Perform the following test only when directed.

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

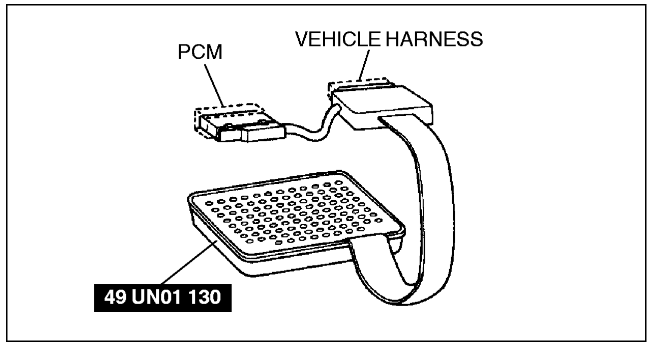


X3U140WBC

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}

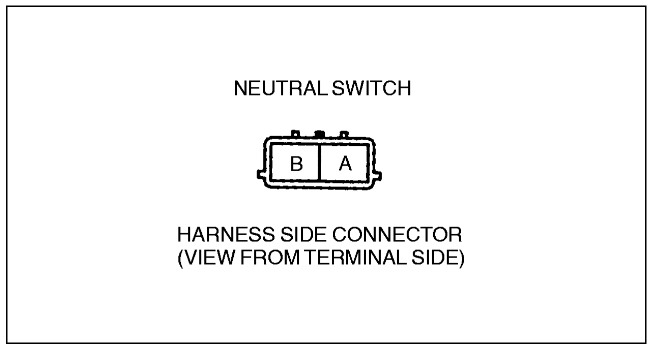


X3U140WBN

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	○	○

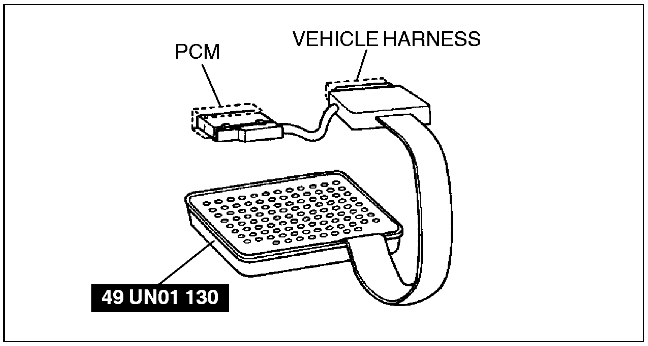
X3U140WBF

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}

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.



X3U140WBN

   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.

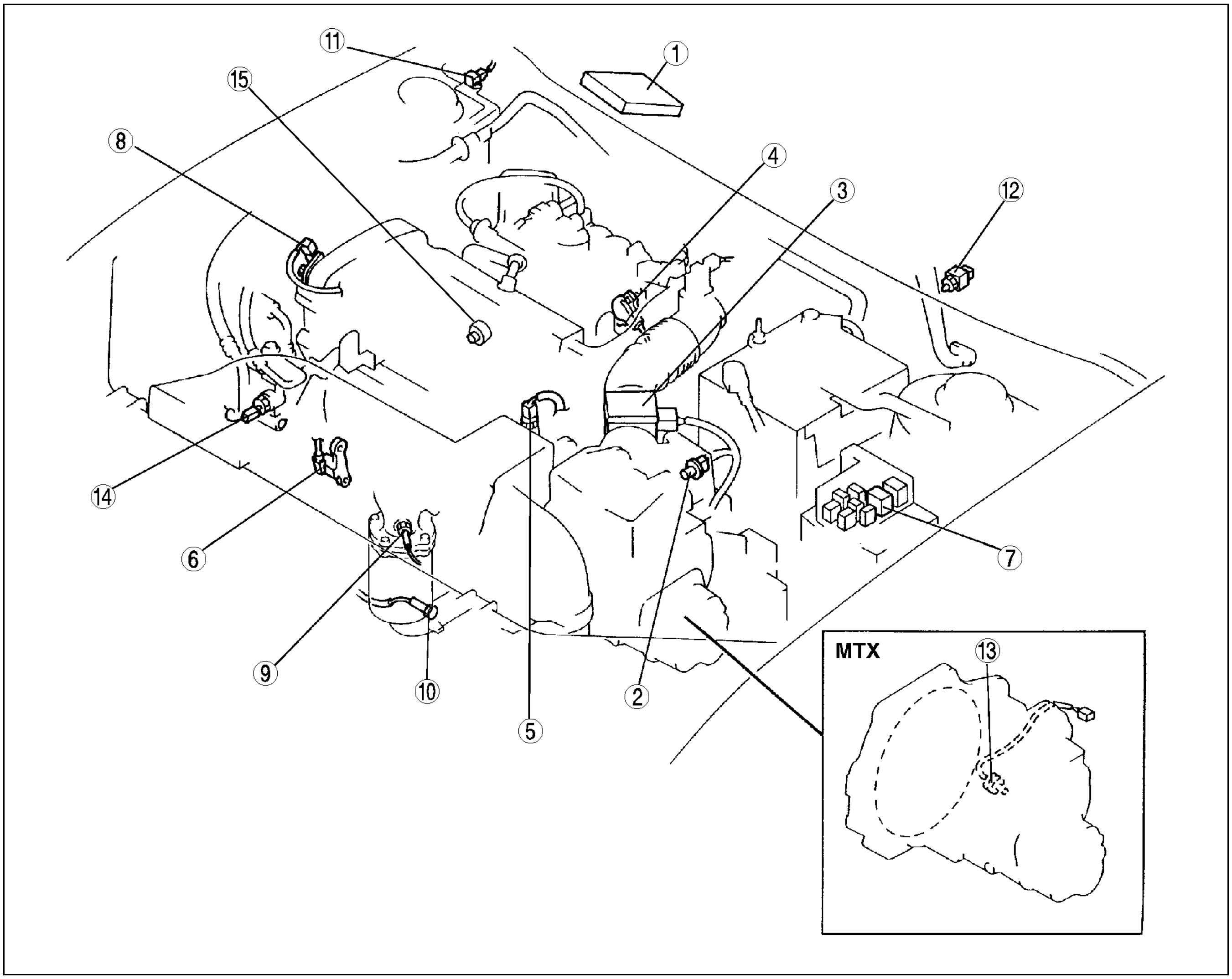
   Short circuit
   - PSP signal circuit (PSP switch connector terminal and PCM connector terminal 31 through common connector to GND)
5. Reconnect the PSP switch connector.

01–40B CONTROL SYSTEM [FS]

CONTROL SYSTEM COMPONENT LOCATION INDEX [FS]

A3U014018881W01

Engine compartment side

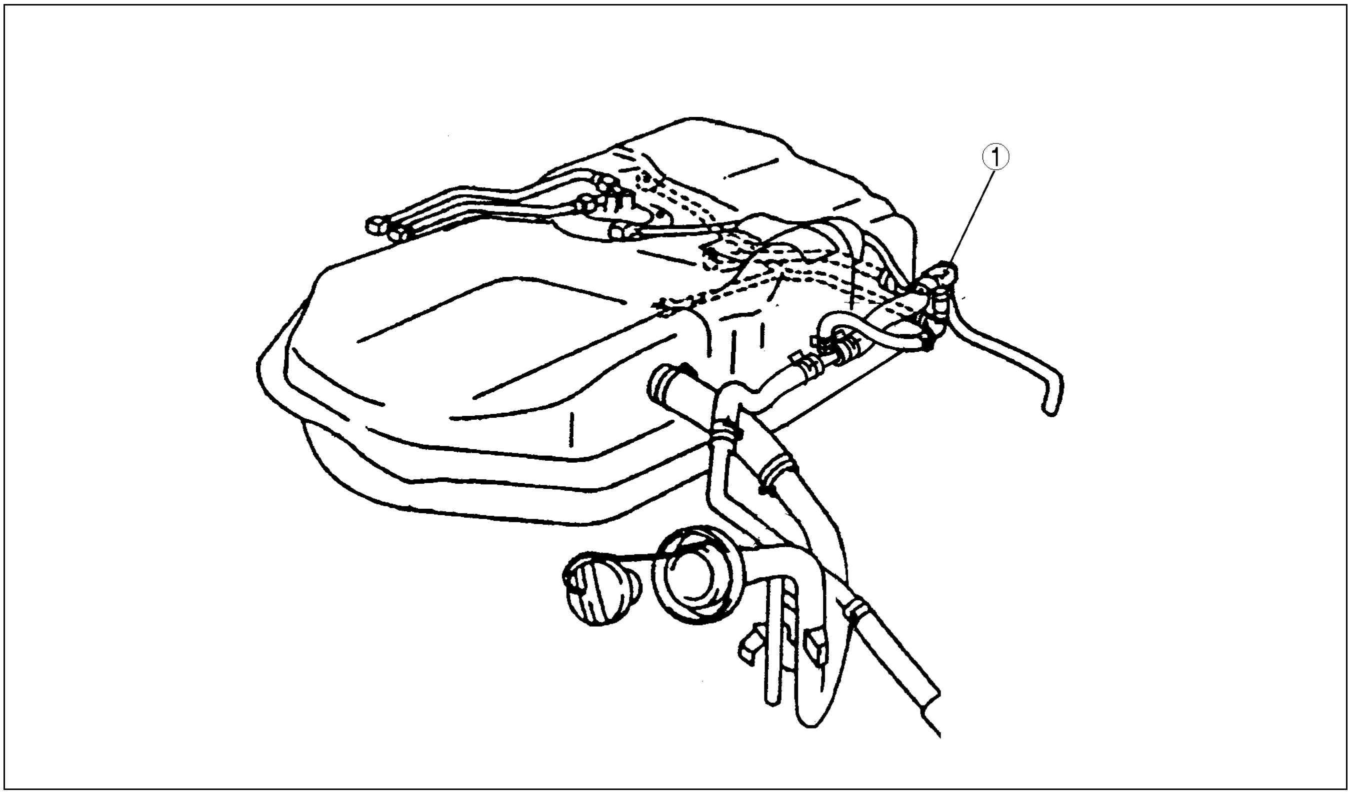


Z3U0140W101

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

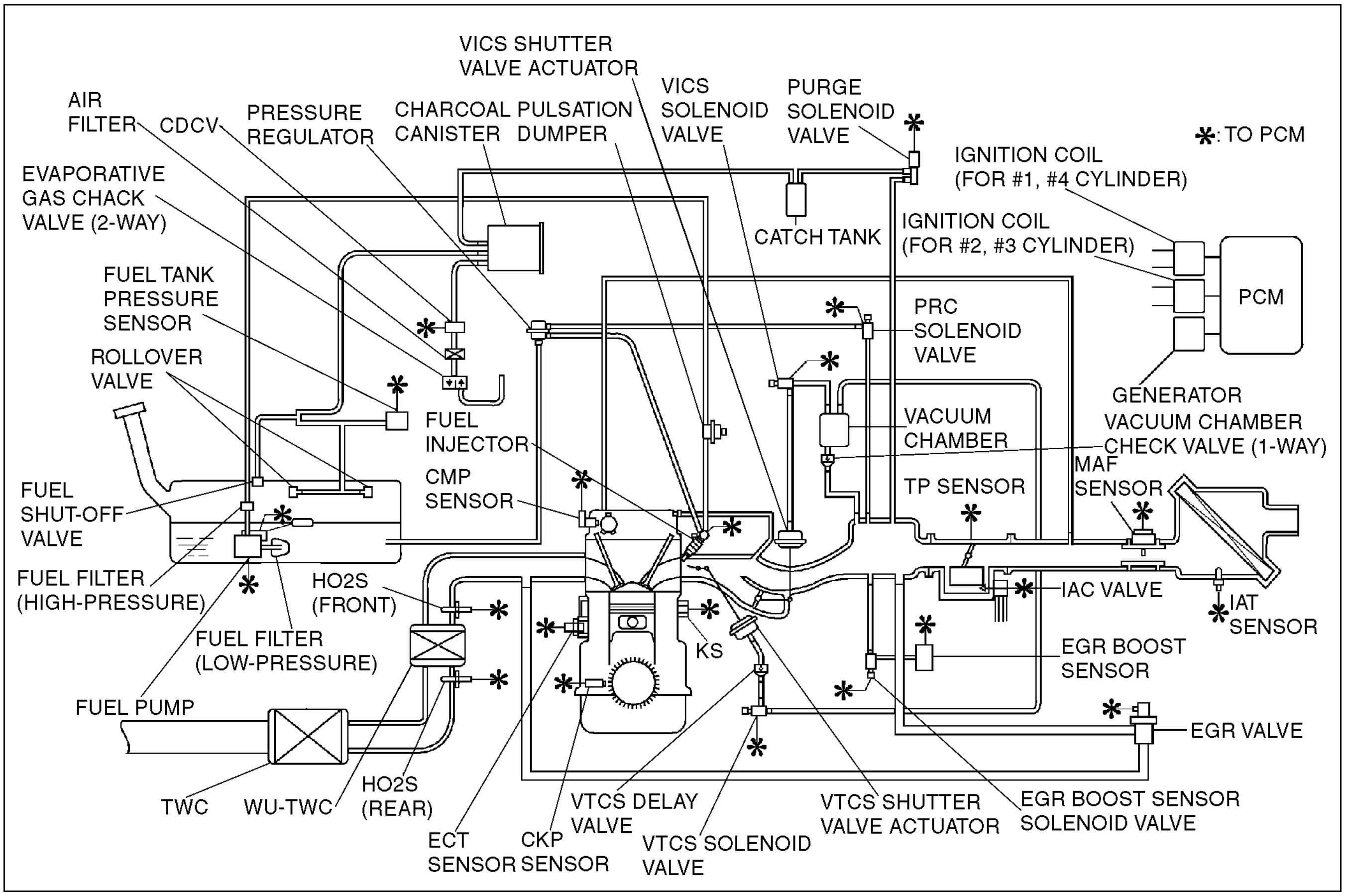


Z3U0140W002

1	Fuel tank pressure sensor (See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS])

CONTROL SYSTEM DIAGRAM [FS]

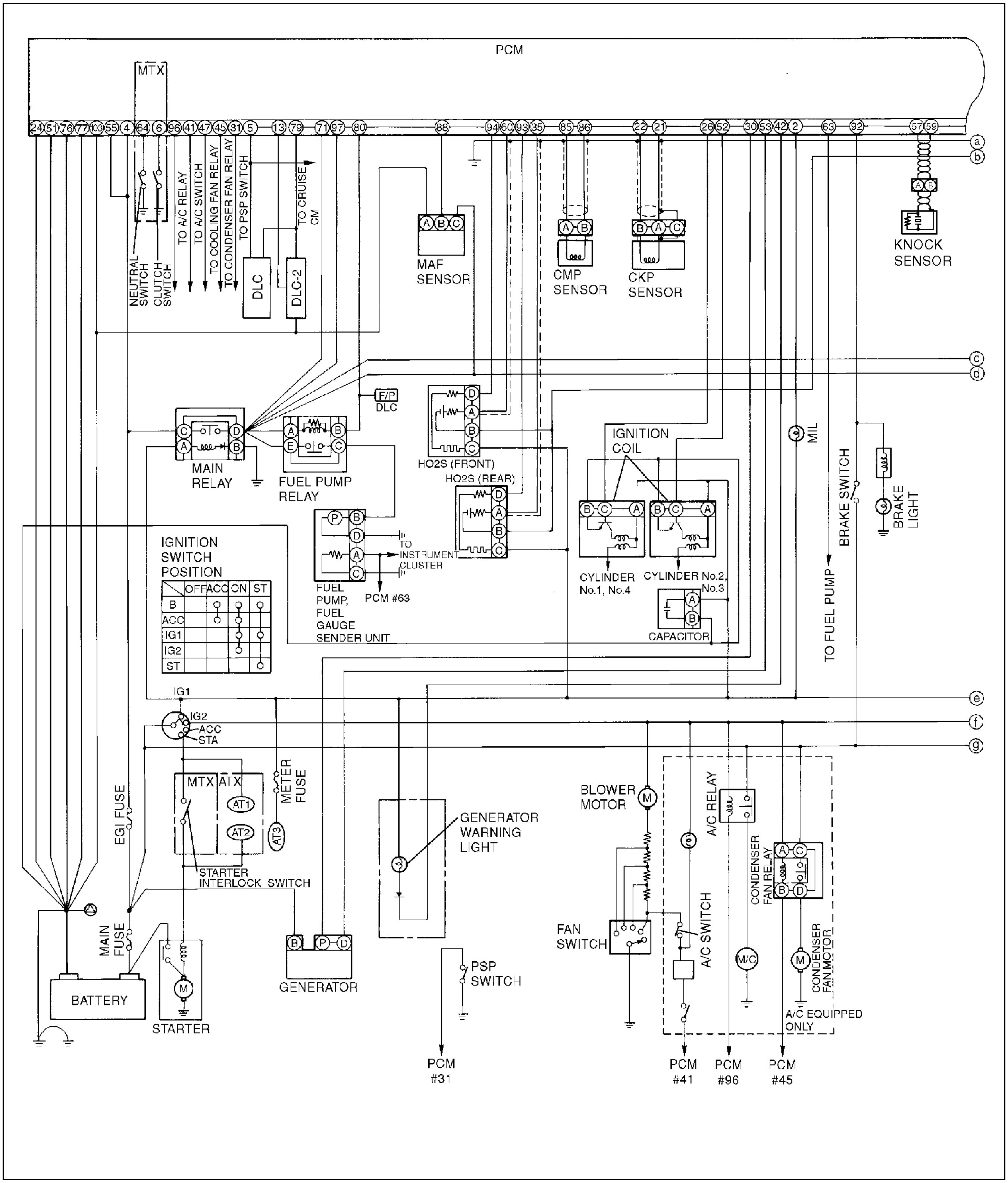
A3U014018881W02



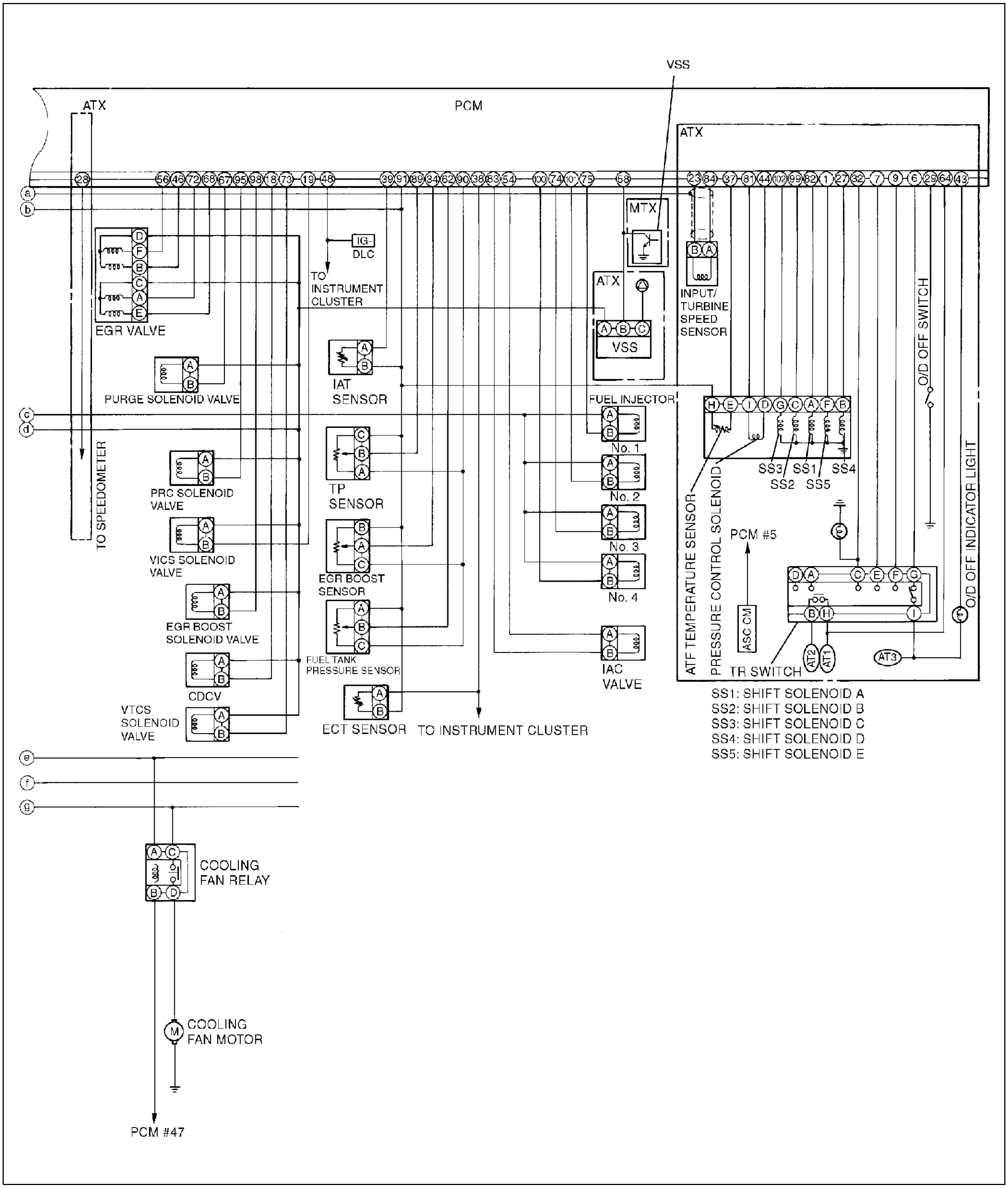
Z3U0140W102

CONTROL SYSTEM WIRING DIAGRAM [FS]

A3U014018881W03



A3U0140W001



Z3U0140W104

PCM REMOVAL/INSTALLATION [FS]

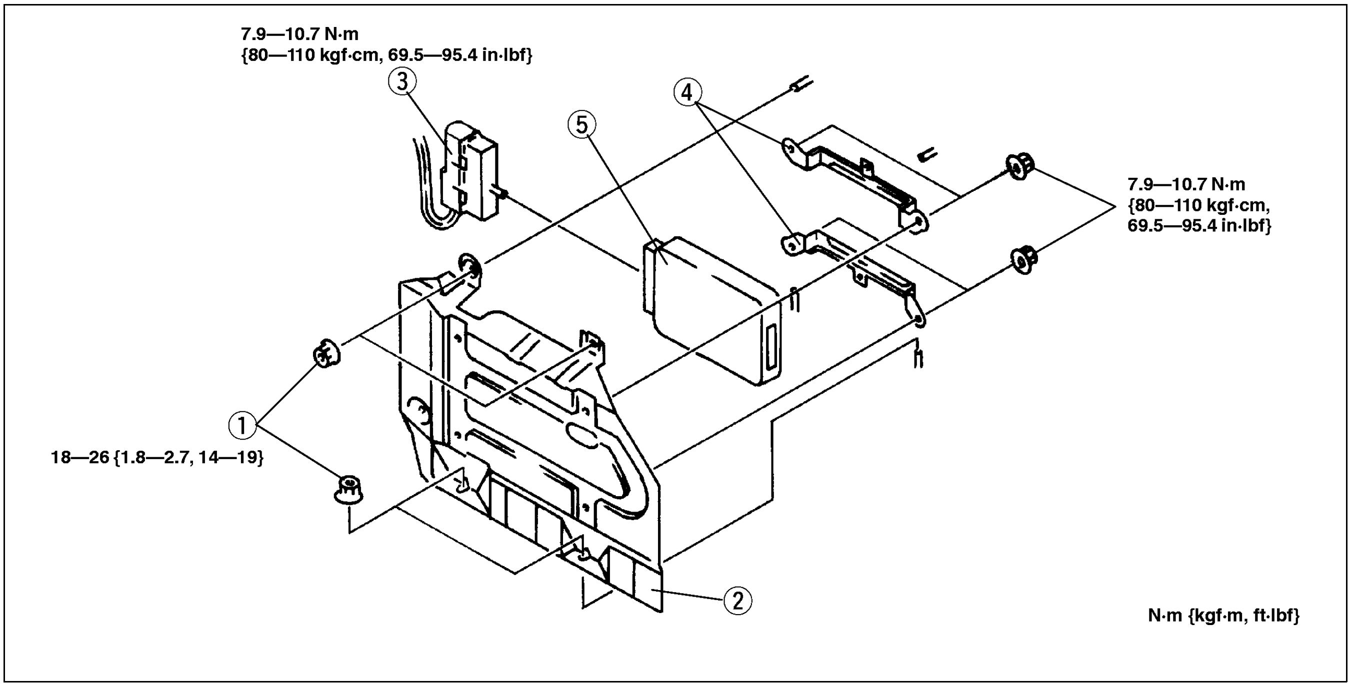
A3U014018880W01

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

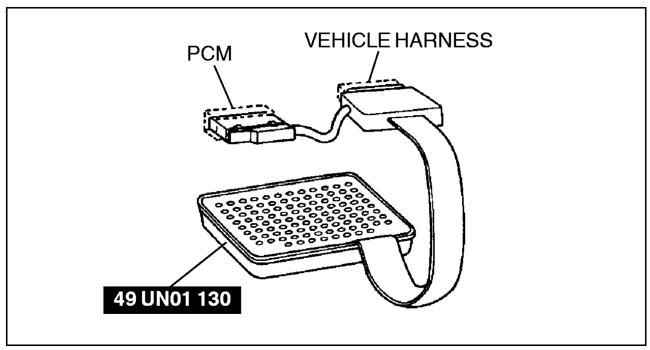
*[1] : ATX only
*[2] : MTX only

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	—	—	—		—	—

<table>
<tr><th>Terminal</th><th>Signal</th><th>Connected to</th><th colspan="2">Test condition</th><th>Voltage (V)</th><th>Action</th></tr>
<tr><td rowspan="2">18</td><td rowspan="2">CDCV control</td><td rowspan="2">CDCV</td><td colspan="2">Ignition switch ON</td><td>B+</td><td rowspan="2">• Inspect CDCV (See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)
• Inspect related harness</td></tr>
<tr><td colspan="2">Diagnosis executed (while on-board device control is carried out)</td><td>Below 1.0</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">VICS control</td><td rowspan="2">VICS solenoid valve</td><td colspan="2">Engine speed: above 4,750 rpm</td><td>B+</td><td rowspan="2">• Inspect VICS solenoid valve (See 01–13B–12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS])
• Inspect related harness</td></tr>
<tr><td colspan="2">Engine speed: below4,750 rpm</td><td>Below 1.0</td></tr>
<tr><td>20</td><td>—</td><td>—</td><td colspan="2">—</td><td>—</td><td>—</td></tr>
<tr><td>21</td><td>NE (+)</td><td>CKP sensor</td><td colspan="3">• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))</td><td>• Inspect CKP sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS])
• Inspect related harness</td></tr>
<tr><td>22</td><td>NE (–)</td><td>CKP sensor</td><td colspan="3">• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))</td><td>• Inspect CKP sensor (See 01–40B–32 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [FS])
• Inspect related harness</td></tr>
<tr><td>23*[1]</td><td>Input/turbine speed (–)</td><td>Input/turbine speed sensor</td><td colspan="3">• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))</td><td>• Inspect input/turbine speed sensor (See 05–17–26 INPUT/TURBINE SPEED SENSOR INSPECTION)
• Inspect related harness</td></tr>
<tr><td>24</td><td>GND</td><td>GND</td><td colspan="2">Under any condition</td><td>Below 1.0</td><td>• Inspect related harness</td></tr>
<tr><td>25</td><td>—</td><td>—</td><td colspan="2">—</td><td>—</td><td>—</td></tr>
<tr><td>26</td><td>IGT1</td><td>Ignition coil (No. 1, 4 cylinders)</td><td colspan="3">• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))</td><td>• Inspect ignition coil (See 01–18–2 IGNITION COIL INSPECTION)
• Inspect related harness</td></tr>
<tr><td rowspan="2">27*[1]</td><td rowspan="2">Shift solenoid D control</td><td rowspan="2">Shift solenoid D</td><td rowspan="2">Idle</td><td>Selector lever is at P, N position and 1 range</td><td>B+</td><td rowspan="2">• Inspect shift solenoid D (See 05–17–28 SOLENOID VALVES INSPECTION)
• Inspect related harness</td></tr>
<tr><td>Others</td><td>Below 1.0</td></tr>
<tr><td>28*[1]</td><td>Vehicle speed output</td><td>Speedometer (in instrument cluster)</td><td colspan="3">• Inspect using the wave profile. (See 01–40B–22 Inspection Using An Oscilloscope (Reference))</td><td>• Inspect speedometer (See 09–22–4 Speedometer)
• Inspect related harness</td></tr>
</table>

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 — After warm up	0.5—1.0	
			Deceleration — After warm up	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)

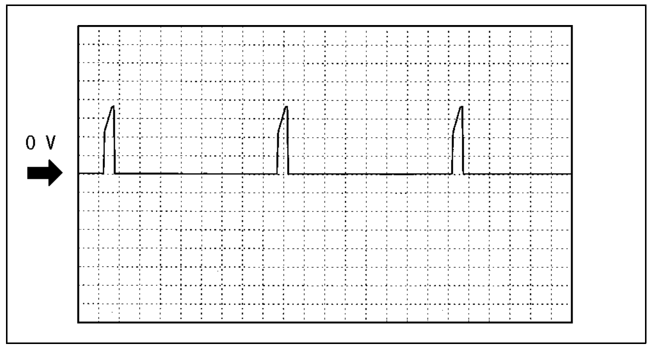
Ne signal

- 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

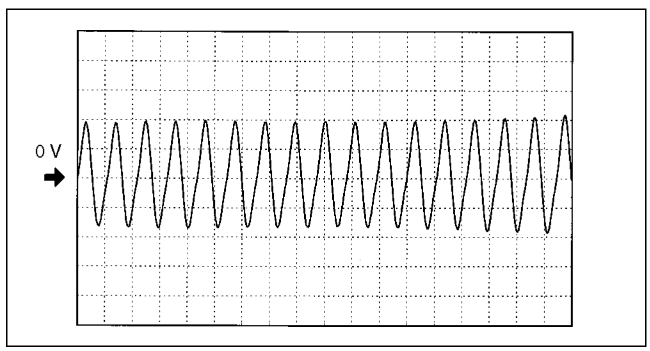
- PCM terminal:
  — IGT1: 26(+)-103(-)
  — IGT2: 52(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 10ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W007

Input/turbine speed signal

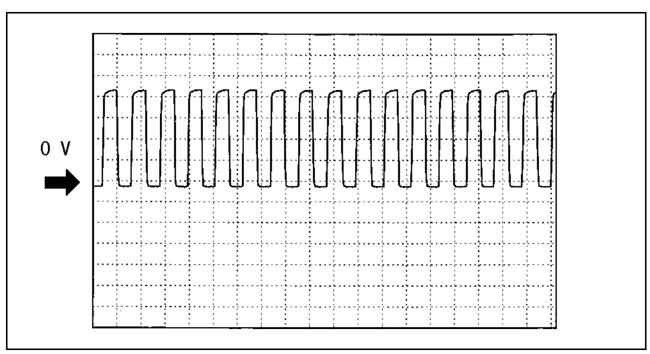
- PCM terminal: 84(+)-23(-)
- Oscilloscope setting: 0.4 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W008

Generator output voltage signal

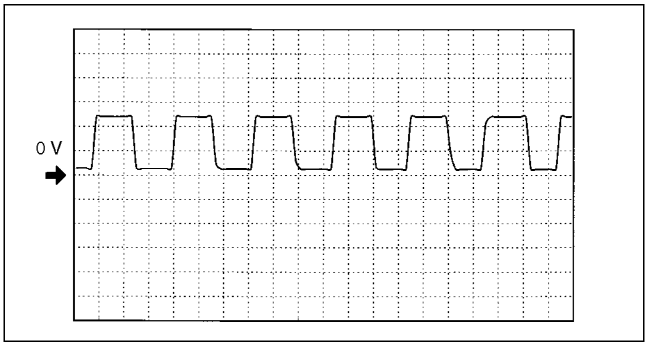
- PCM terminal: 30(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W009

Pressure control solenoid control signal
CTP

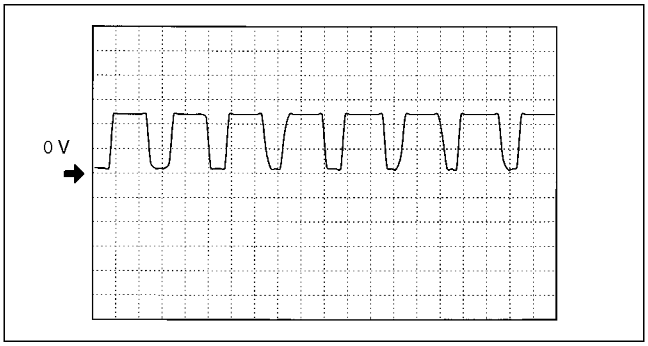
- PCM terminal: 81(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and closed throttle position



Z3U0140W010

WOT

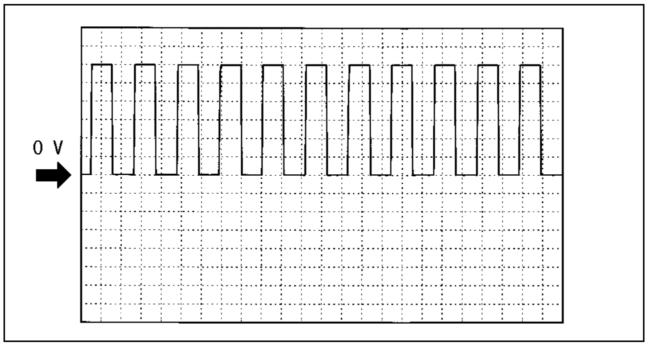
- PCM terminal: 81(+)-103(-)
- Oscilloscope setting: 0.5 V/DIV(Y), 0.1 ms/DIV(X), DC range
- Vehicle condition: ignition key at ON (Engine OFF) and wide open throttle



Z3U0140W019

Engine speed signal

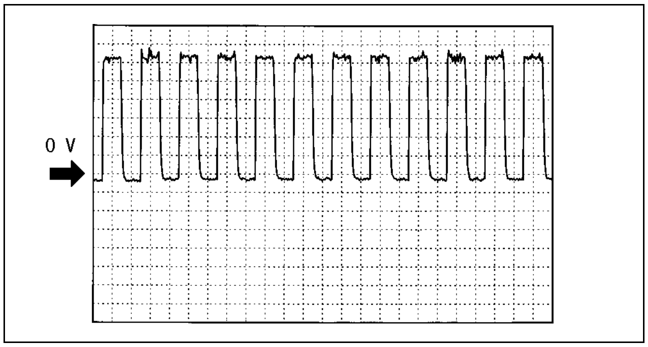
- PCM terminal: 48(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W011

Generator field coil control signal

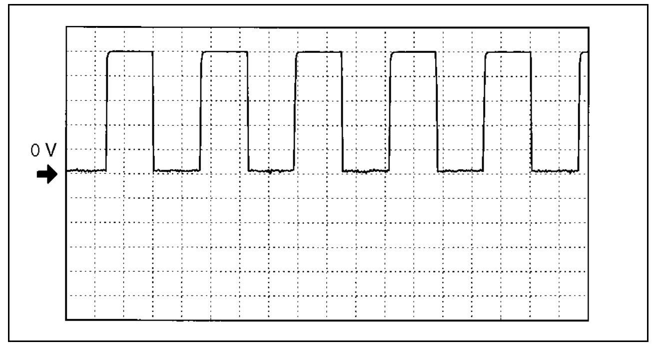
- PCM terminal: 53(+)-103(-)
- Oscilloscope setting: 0.2 V/DIV(Y), 2ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W012

Vehicle speed signal

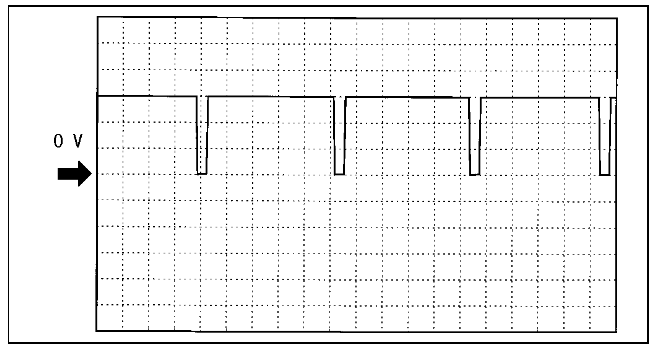
- PCM terminal: 58(+)-103(-)
- Oscilloscope setting: 1 V/DIV(Y), 2.5 ms/DIV(X), DC range
- Vehicle condition: drive the vehicle with 32 km/h [20 mph]



Z3U0140W013

Purge control signal

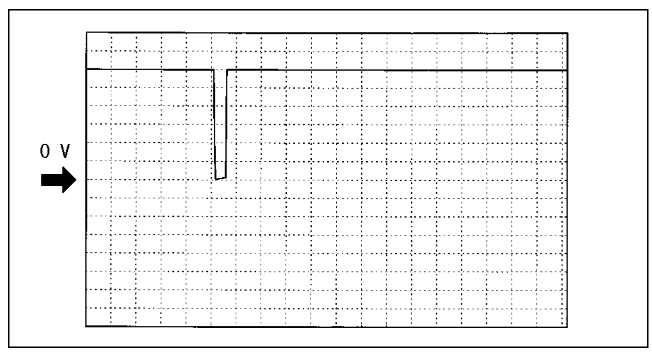
- PCM terminal: 67(+)-103(-)
- Oscilloscope setting: 4 V/DIV(Y), 20 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W014

Fuel injection signal

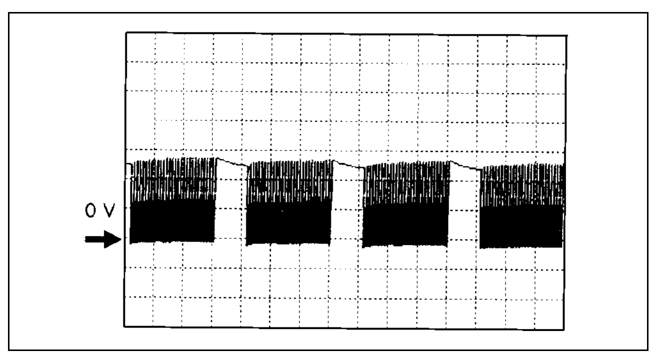
- PCM terminal
  - — No.1:75(+)-103(-)
  - — No.2:101(+)-103(-)
  - — No.3:74(+)-103(-)
  - — No.4:100(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W015

Shift solenoid A control

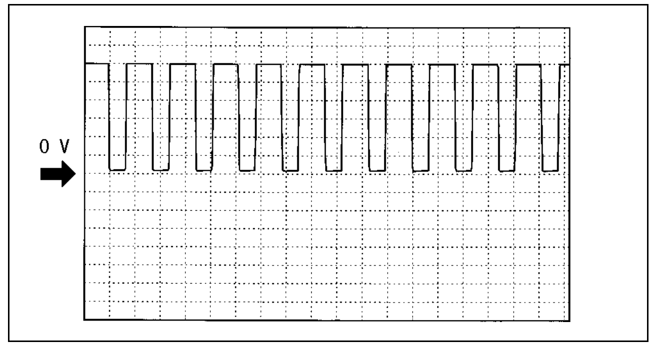
- PCM terminal: 82(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5 ms/DIV(X), DC range
- Vehicle condition: drive in the 4th gear



Z3U0140W016

IAC signal

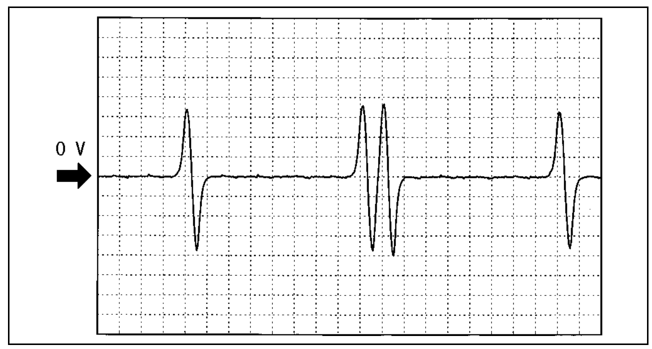
- PCM terminal: 83(+)-103(-)
- Oscilloscope setting: 2 V/DIV(Y), 0.5 ms/DIV(X), DC range
- Vehicle condition: idle after warm up



Z3U0140W017

SGC signal

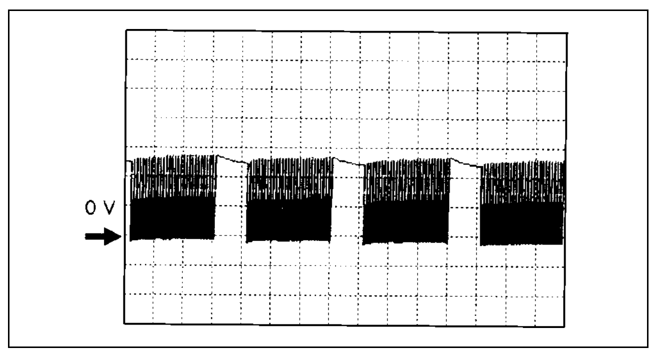
- PCM terminal: 85(+)-86(-)
- Oscilloscope setting: 1 V/DIV(Y), 10 ms/DIV(X), AC range
- Vehicle condition: idle after warm up



Z3U0140W032

Shift solenoid B cointrol signal

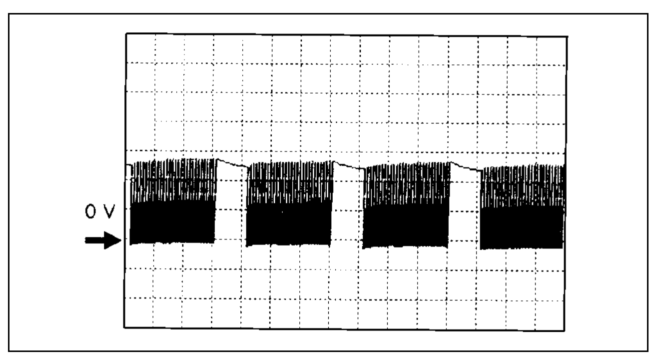
- PCM terminal: 99(+)-103(-)
- Oscilloscope setting: 5 V/DIV(Y), 5ms/DIV(X), DC range
- Vehicle condition: Drive in D range, 1st gear



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



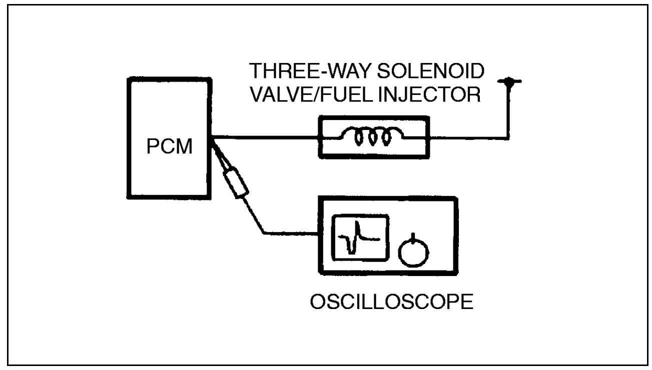
Z3U0140W016

INSPECTION USING AN OSCILLOSCOPE (REFERENCE) [FS]

A3U014018881W04

Purpose

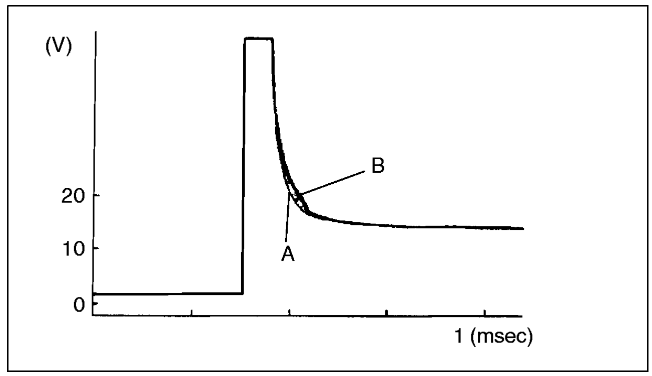
The use of oscilloscope makes the inspection of a part such as a stuck solenoid value possible without actually removing parts.



X3U101WNT

When Normal

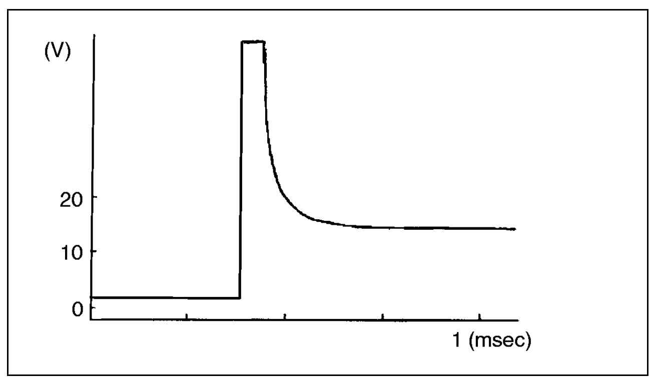
Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



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

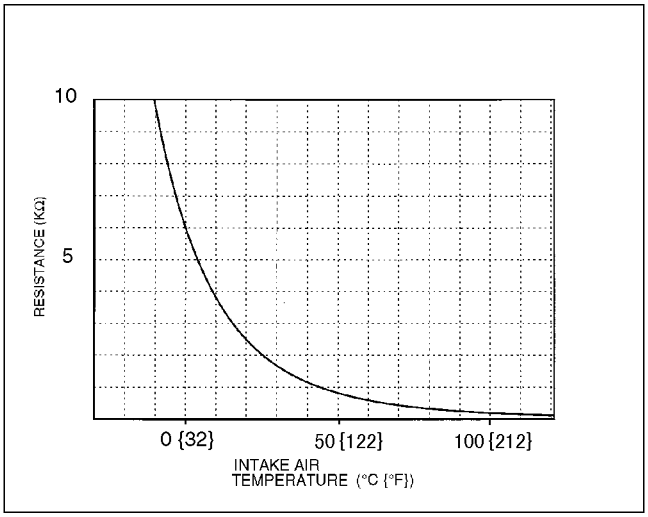
Note
- Perform the following test only when directed.

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)

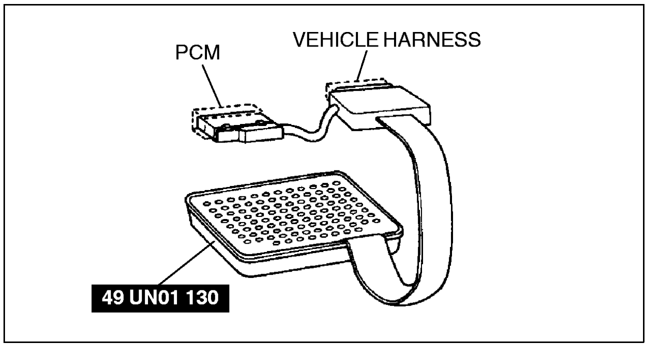


Z3U0140W021

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}



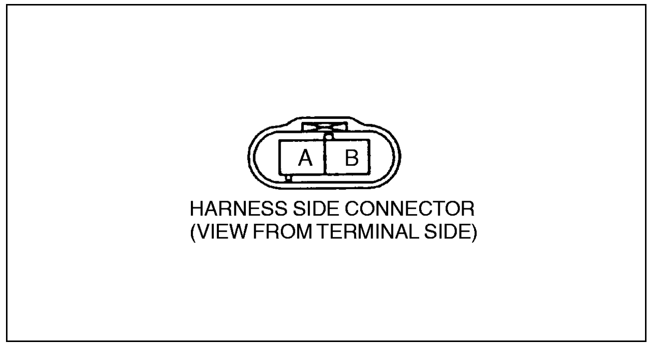
X3U140WE8

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]

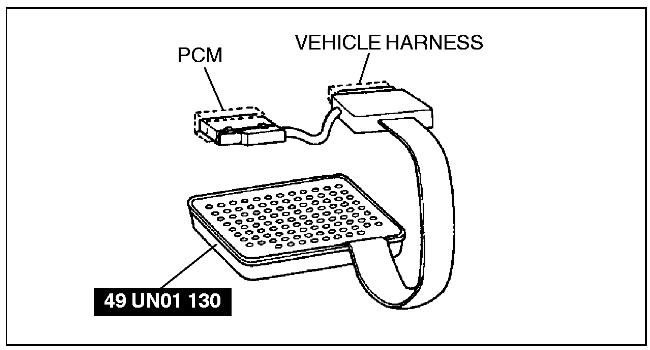
A3U014013210W01

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.

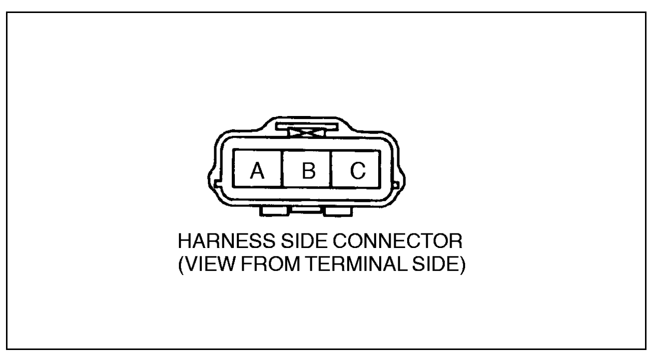
   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·cm, 69.5—95.4 in·lbf}



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]

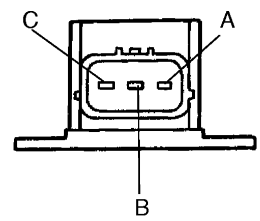
A3U014018910W01

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

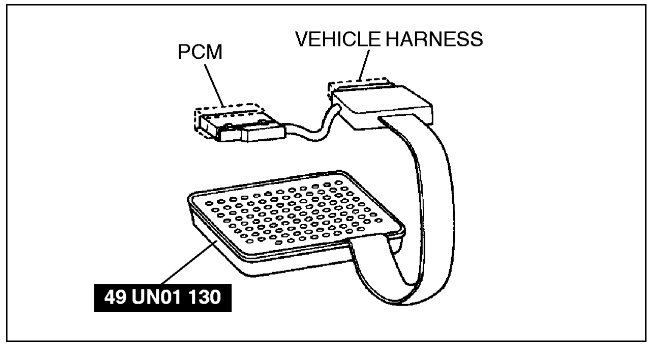


Y3U140WB3

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}

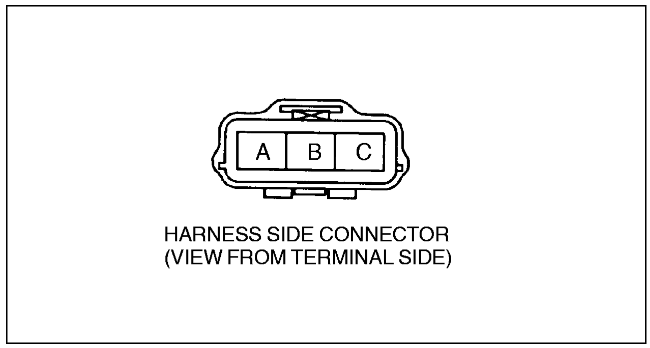


X3U140WE8

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]

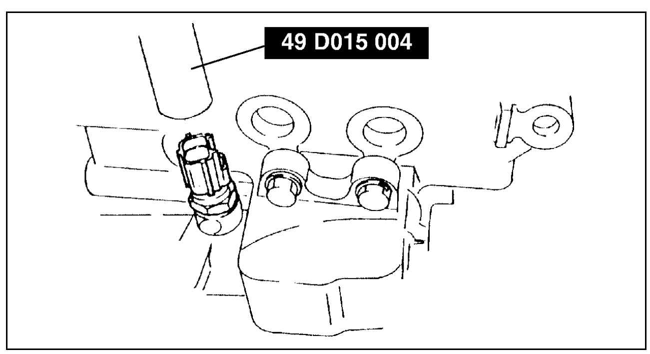
A3U014018840W01

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

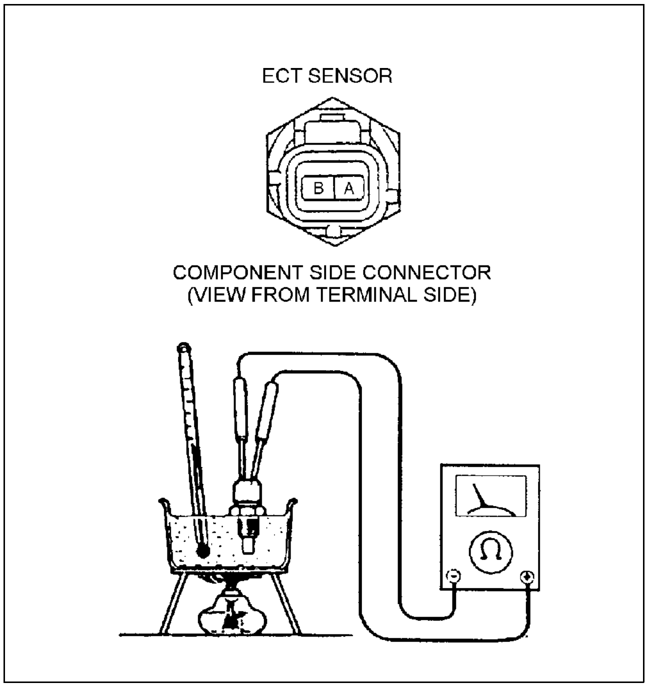
Note
- Perform the following test only when directed.

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”.

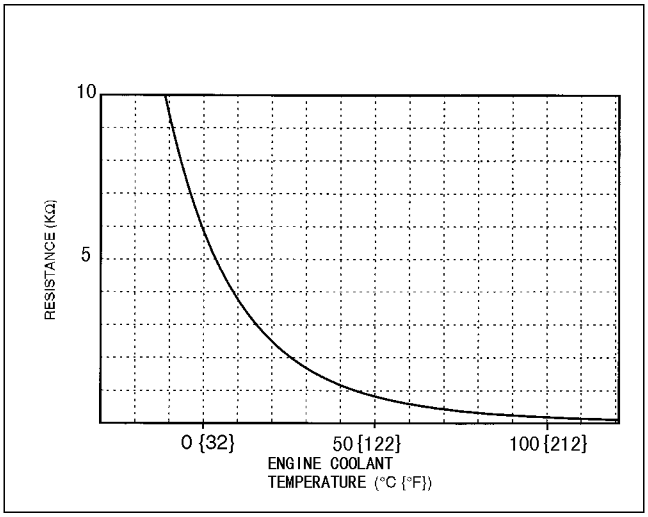
Specification

Water temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.2—2.6
80 {176}	0.29—0.34



Z3U0140W025

ECT sensor signal characteristic (reference)

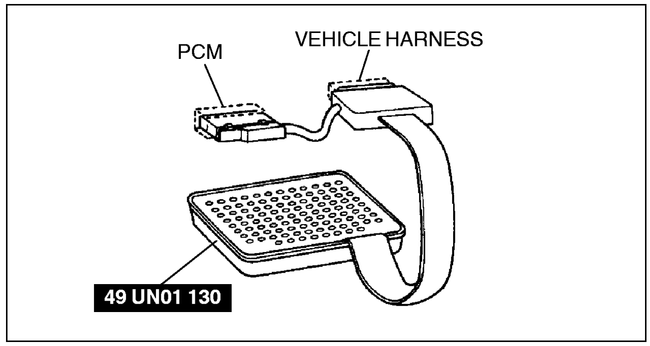


Z3U0140W022

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}

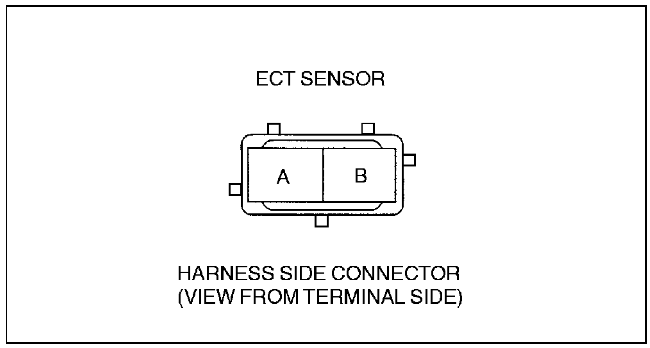


X3U140WE8

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]

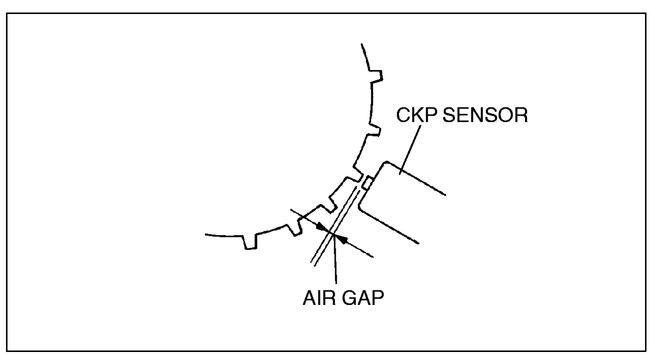
A3U014018230W01

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}

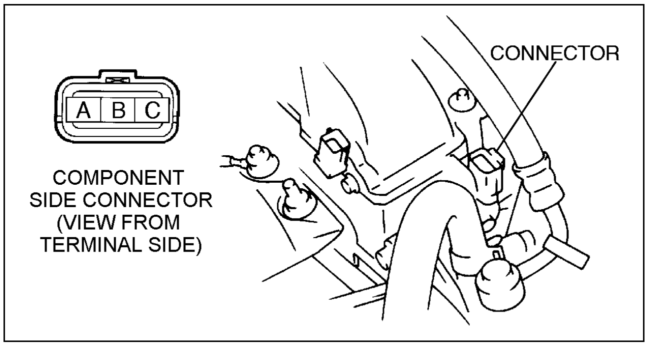


X3U140WDF

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

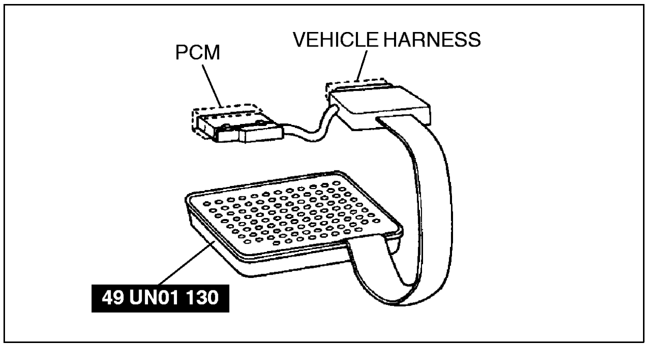


Y3U140WB8

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}

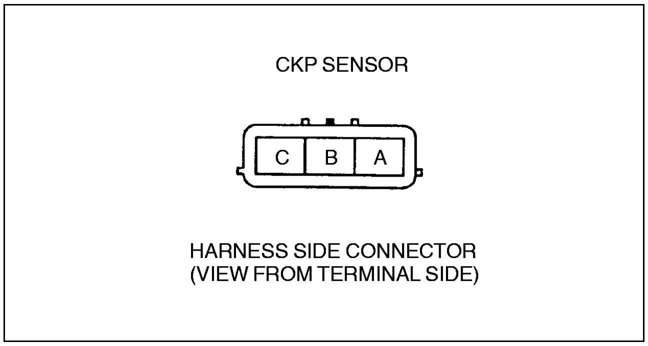


X3U140WE8

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

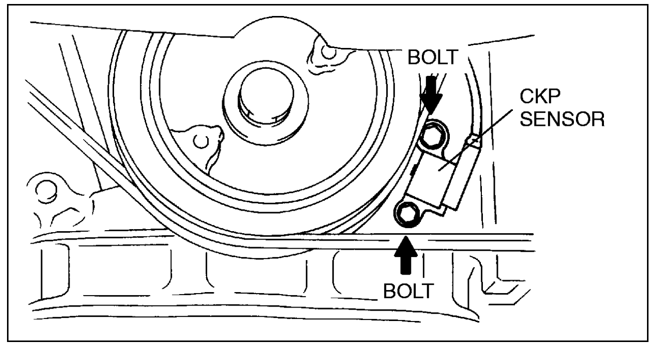
Caution
- **When foreign material such as an iron chip is on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect the engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

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]

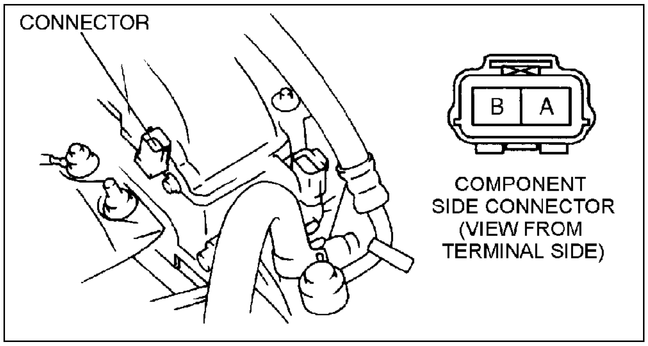
A3U014018200W02

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

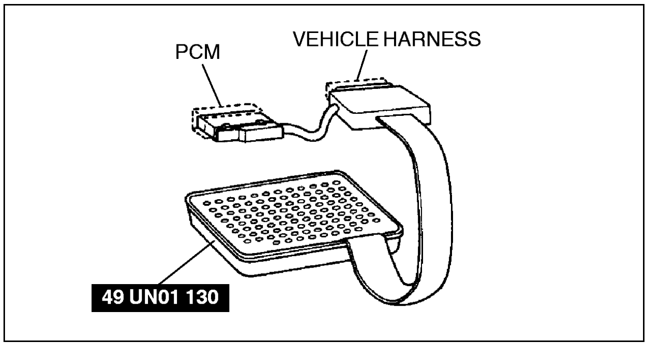


A3U0140W006

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]

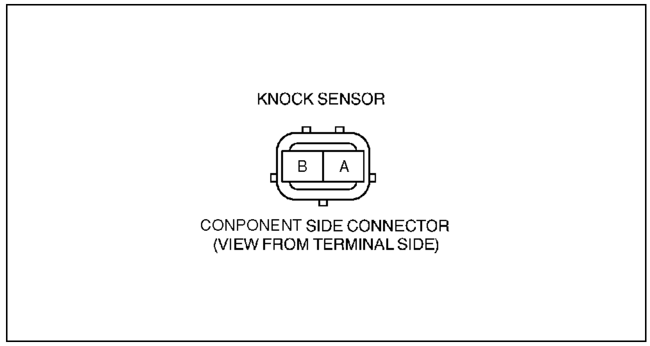
A3U014018921W01

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})

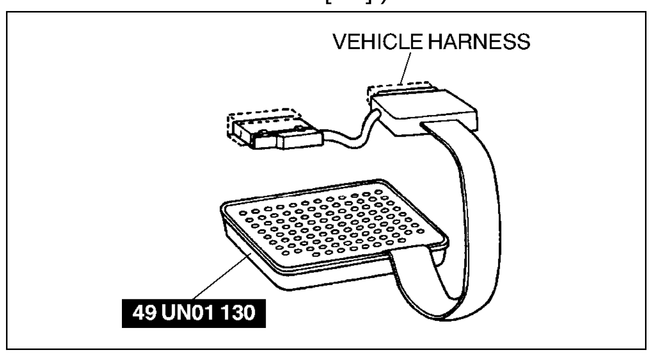


A3U0140W003

Circuit Open/Short Inspection

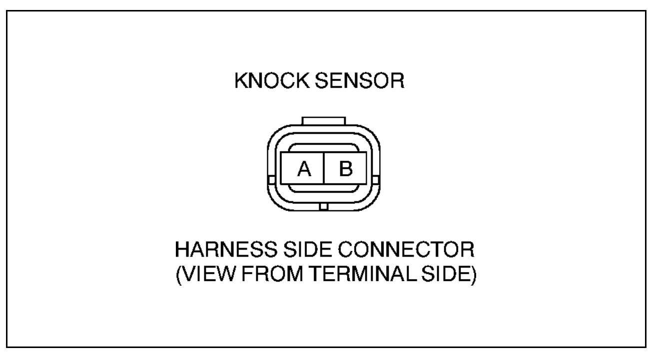
1. Disconnect the PCM connector. (See 01–40B–7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) with the PCM disconnected.
3. Tighten the connector attaching bolt.

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}

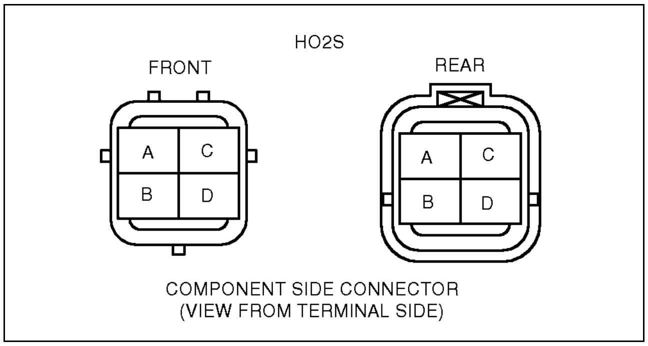
HEATED OXYGEN SENSOR (HO2S) INSPECTION [FS]

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

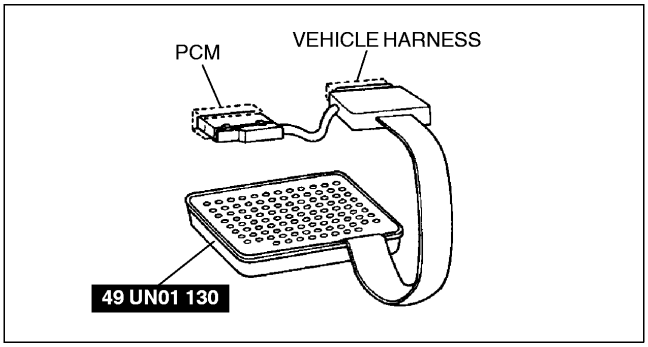
Specification

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}



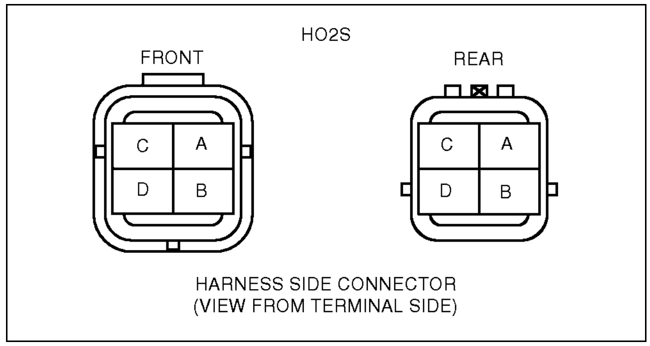
X3U140WE8

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)

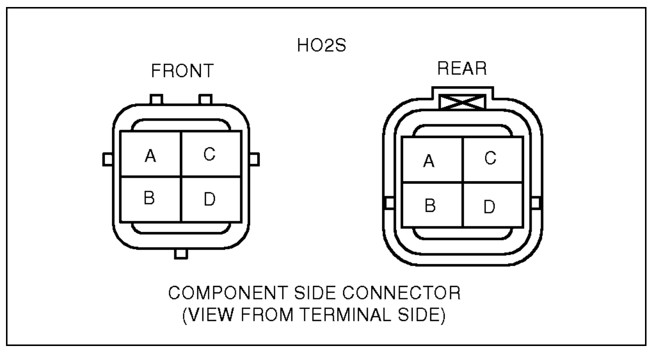
5. Reconnect the HO2S connector.



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”.

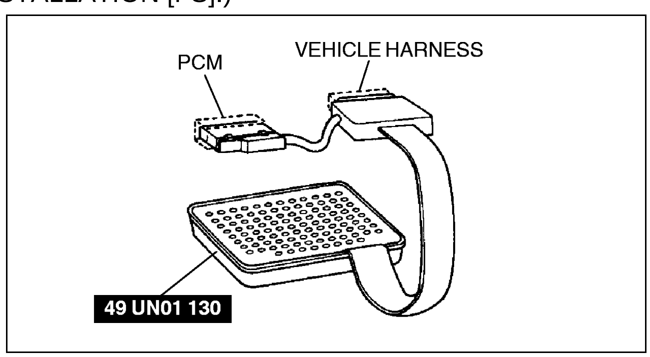
Specification
Front: Approx. 5.6 ohms
Rear: Approx. 15.7 ohms



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}

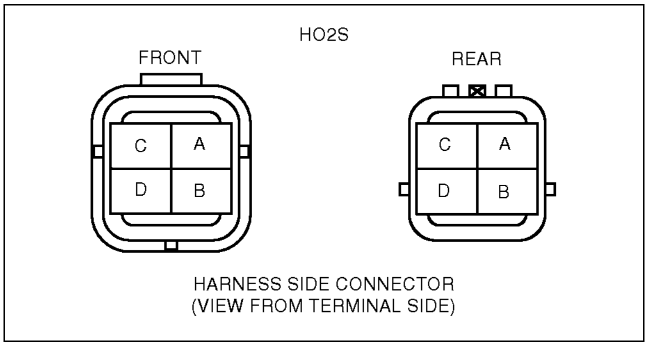


X3U140WE8

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
- 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

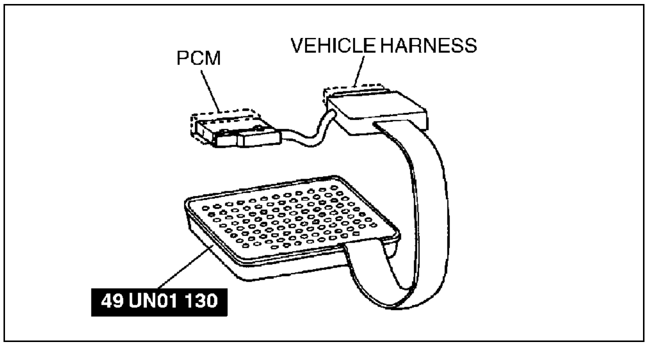
5. Reconnect the HO2S connector.

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.

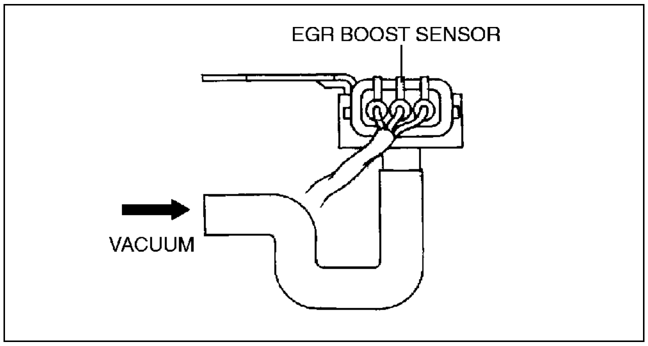


X3U140WAX

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.**

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 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}

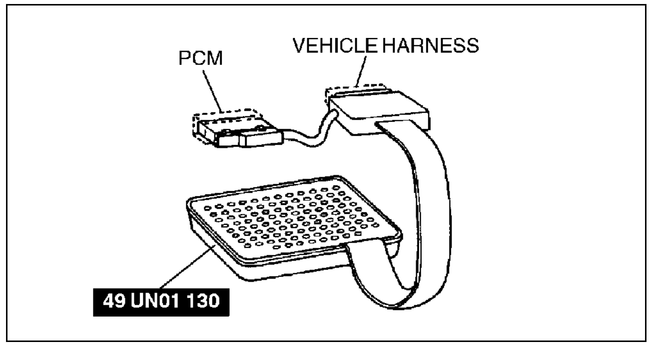
Specification
Measuring voltage: 2.3—4.7 V

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.



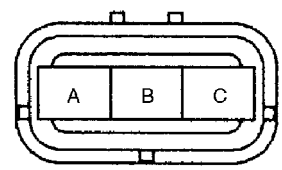
X3U140WAX

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.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

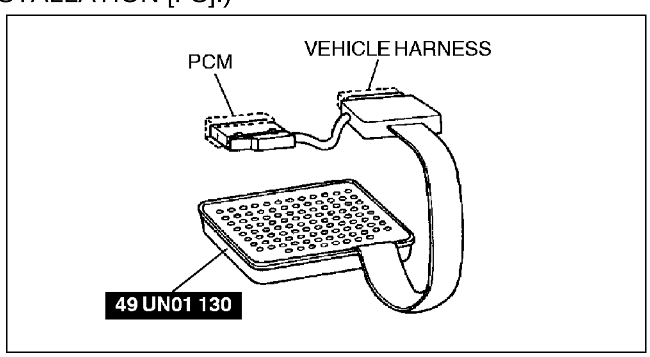
Y3U140WA7

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.



X3U140WB3

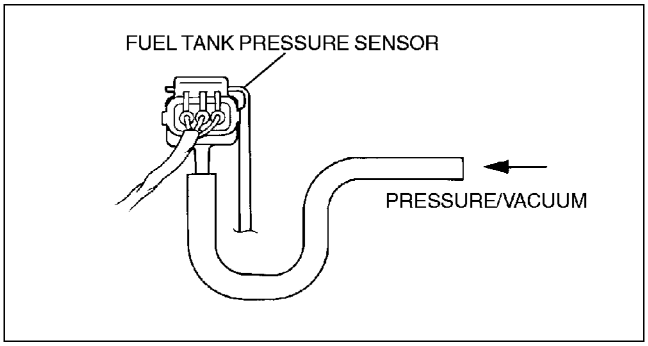
Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

Caution
- **Do not apply vacuum outside of the specified limits, or the fuel tank pressure sensor will be damaged.**

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

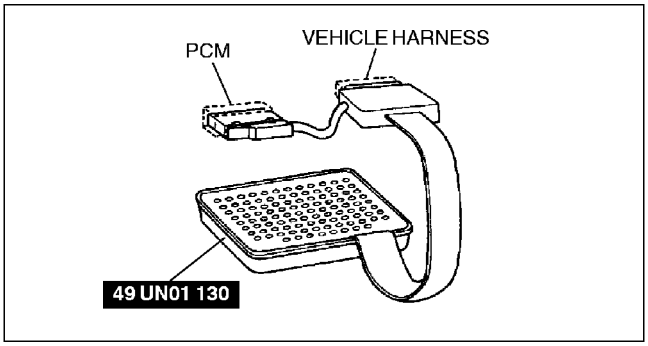
* : Measuring condition is as follows

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}



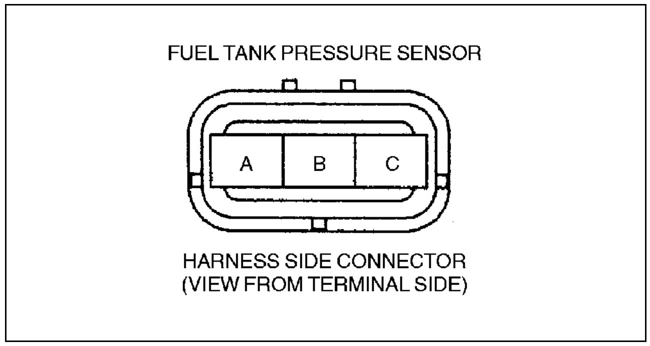
X3U140WB3

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.



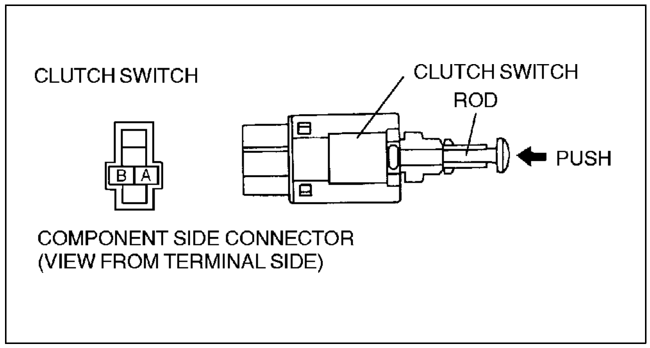
X3U140WB5

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

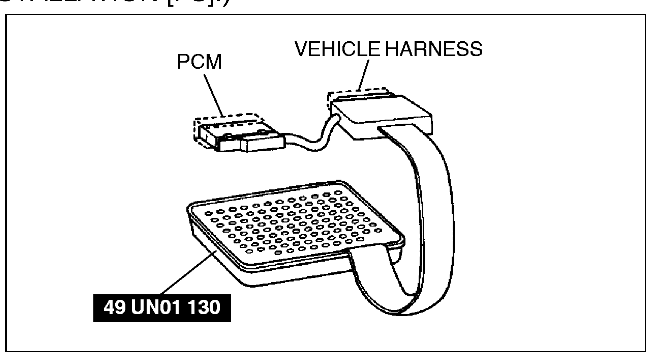
Condition	Terminal	
	A	B
The rod is pushed		
Except above	○—	—○

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}



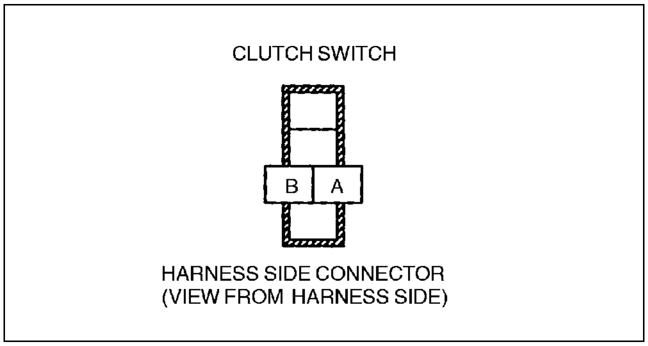
X3U140WE8

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.



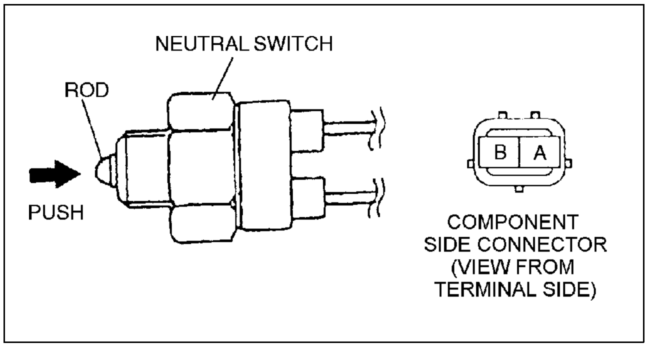
Z3U0140W031

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

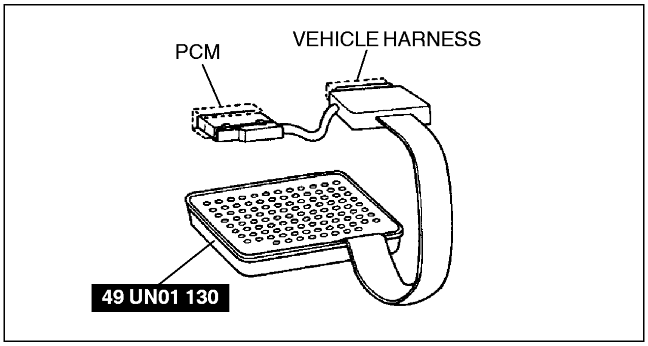
Condition	Terminal	
	A	B
The rod is pushed	○	○
Except above		

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”.

O—O : Continuity

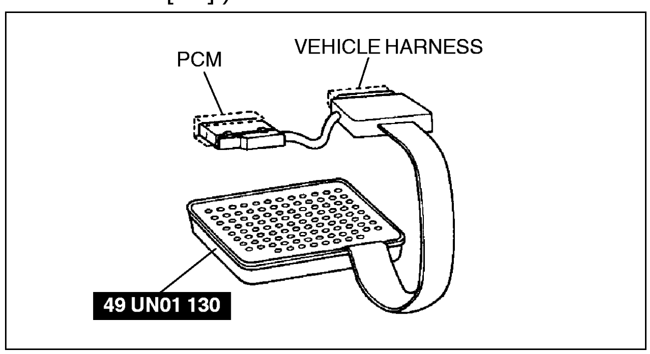
Condition	Terminal	GND
Steering wheel is in straight ahead position		
Steering wheel is fully turned	O—	—O

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 MTX	Engine ZM ATX	Engine FS MTX	Engine FS 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 MTX	Engine ZM ATX	Engine FS MTX	Engine FS 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

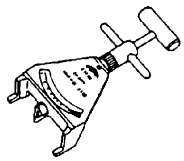
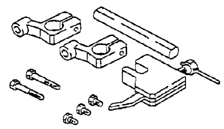
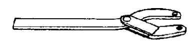
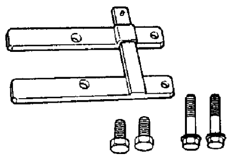
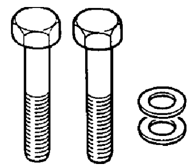
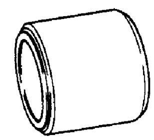
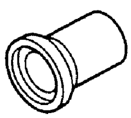
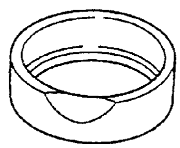
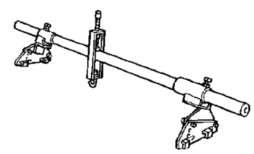
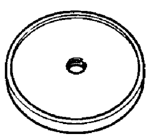
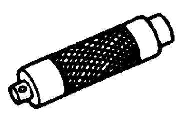
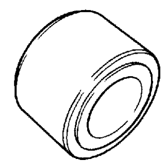
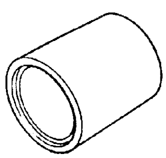
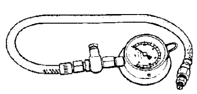
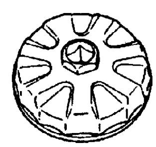
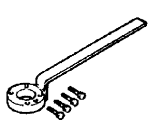
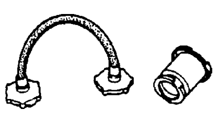
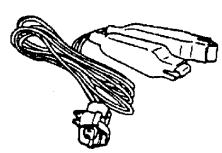
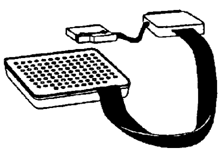
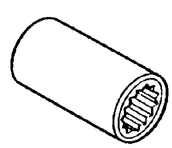
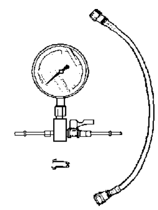
[*1] : Excludes temporary idle speed drop just after the loads (E/L, A/C, P/S) are turned on.
[*2] : Headlight, fan switch (3rd or higher) and cooling fan are turned on.
[*3] : A/C switch and fan switch are tuned on.

*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

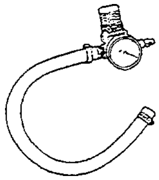
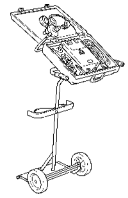
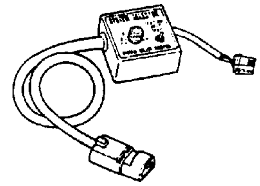
01–60 SERVICE TOOLS

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 

SERVICE TOOLS

49 U014 001 Air pressure tester 	MZ254AT3641 Evaporative emission system tester 	49 B019 9A0 System selector 
418FS475 WDS