Many thanks to Lenny Terris for scanning this.

Before beginning any service procedure, refer to the 1994 RX-7 Body Electrical Troubleshooting Manual; see section S for air bag system service warnings and section J1 for audio antitheft system alarm conditions.

FUEL AND EMISSION CONTROL SYSTEMS

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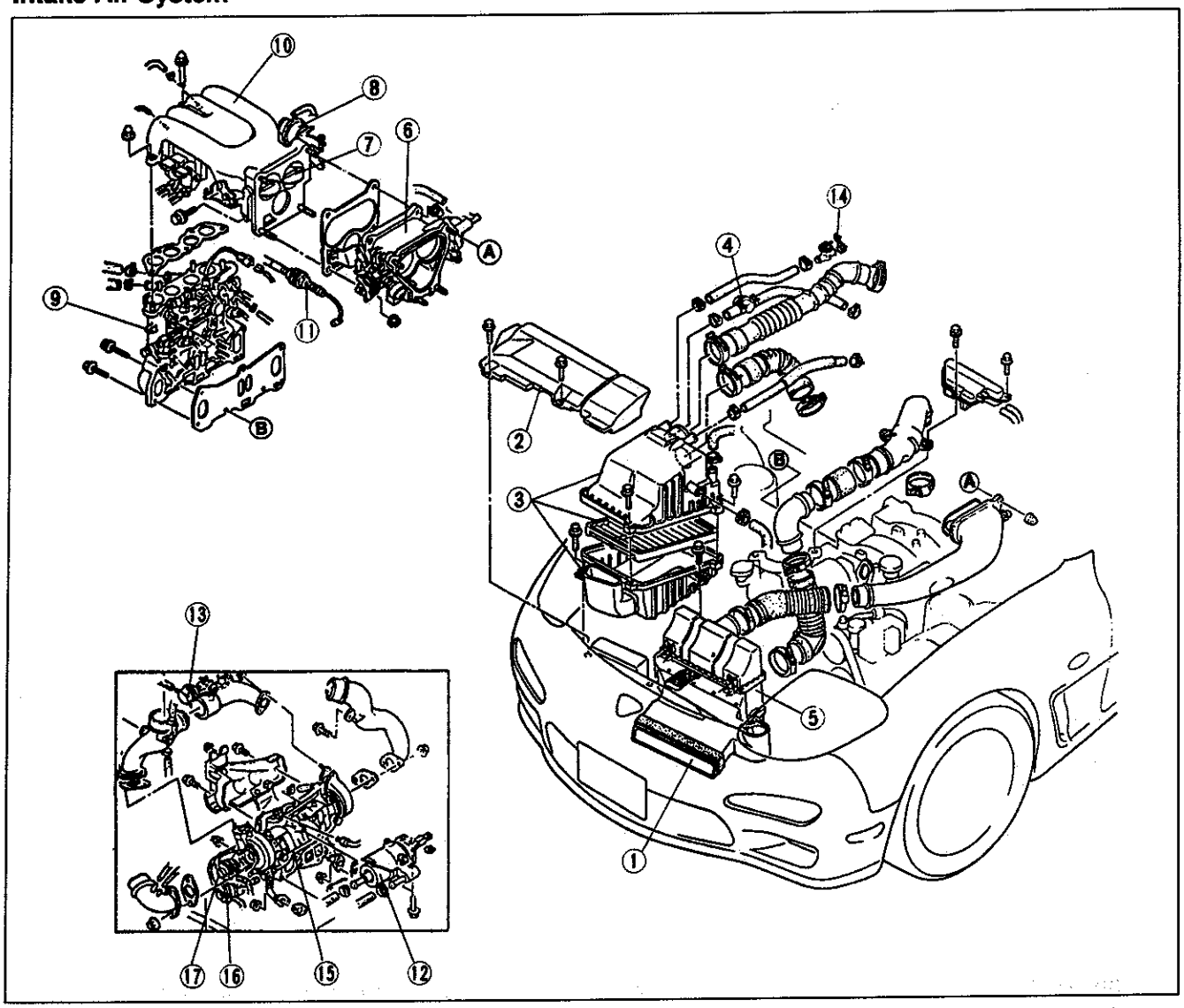
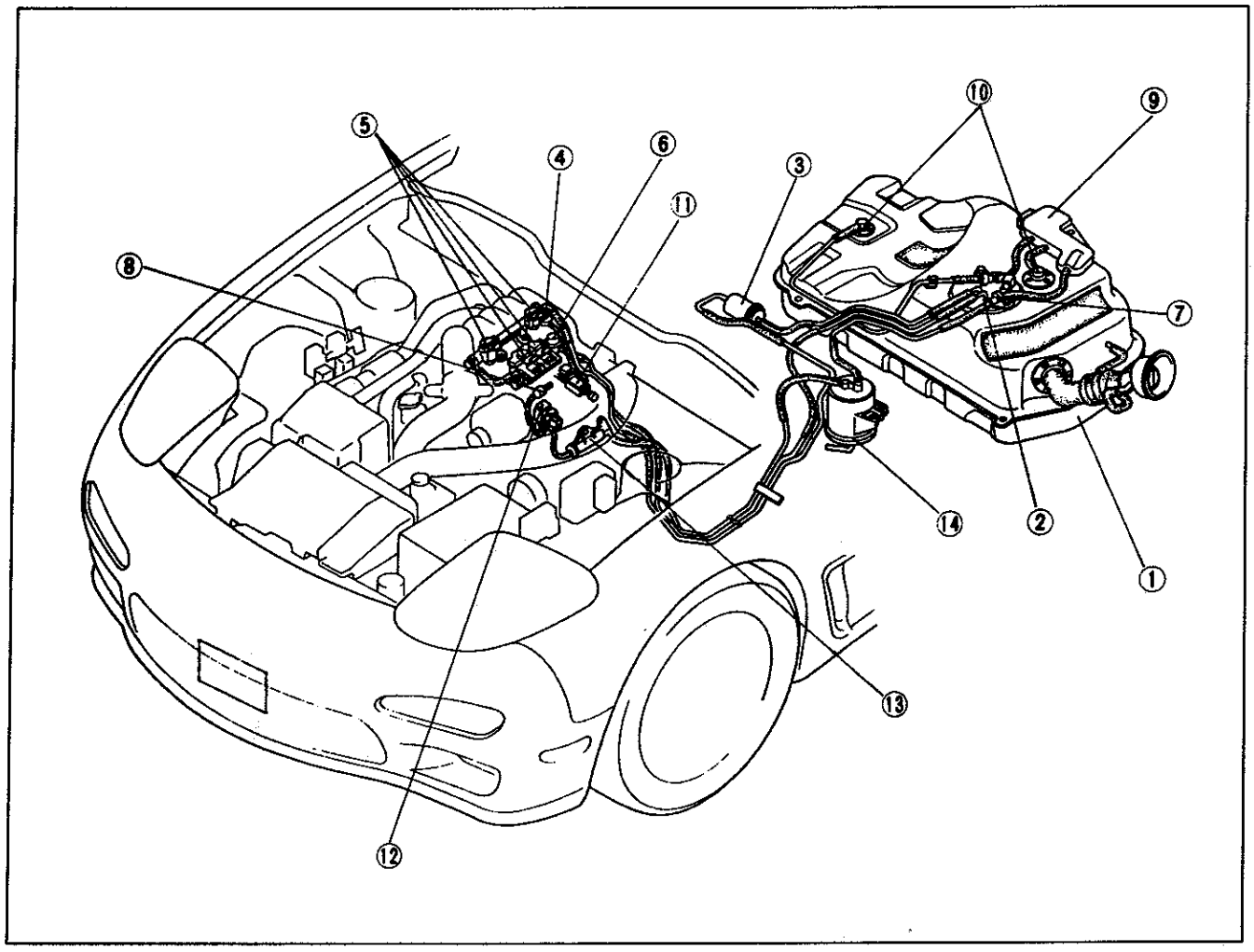
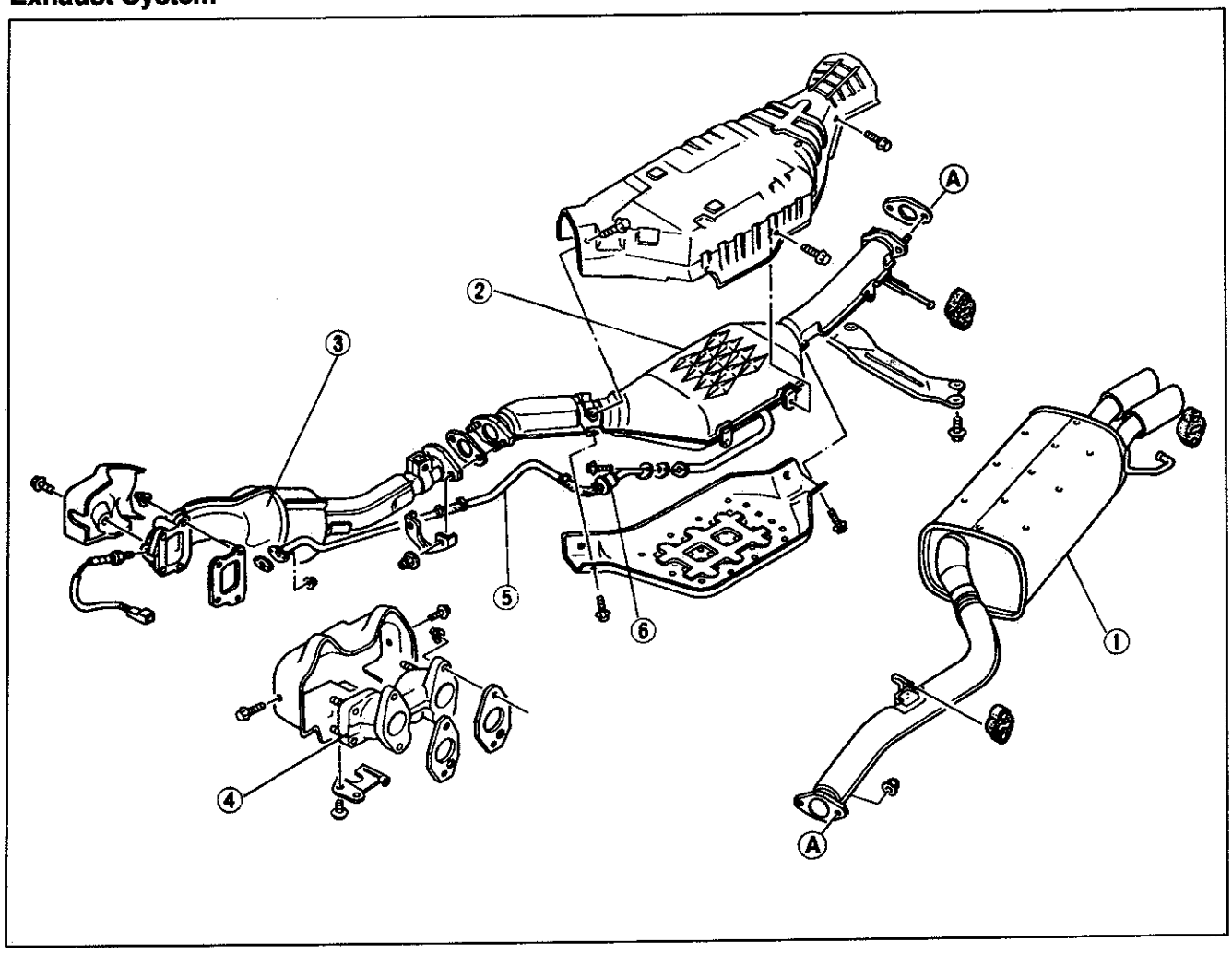
Intake Air System



Fuel System and Evapolative Emission Control System



Exhaust System



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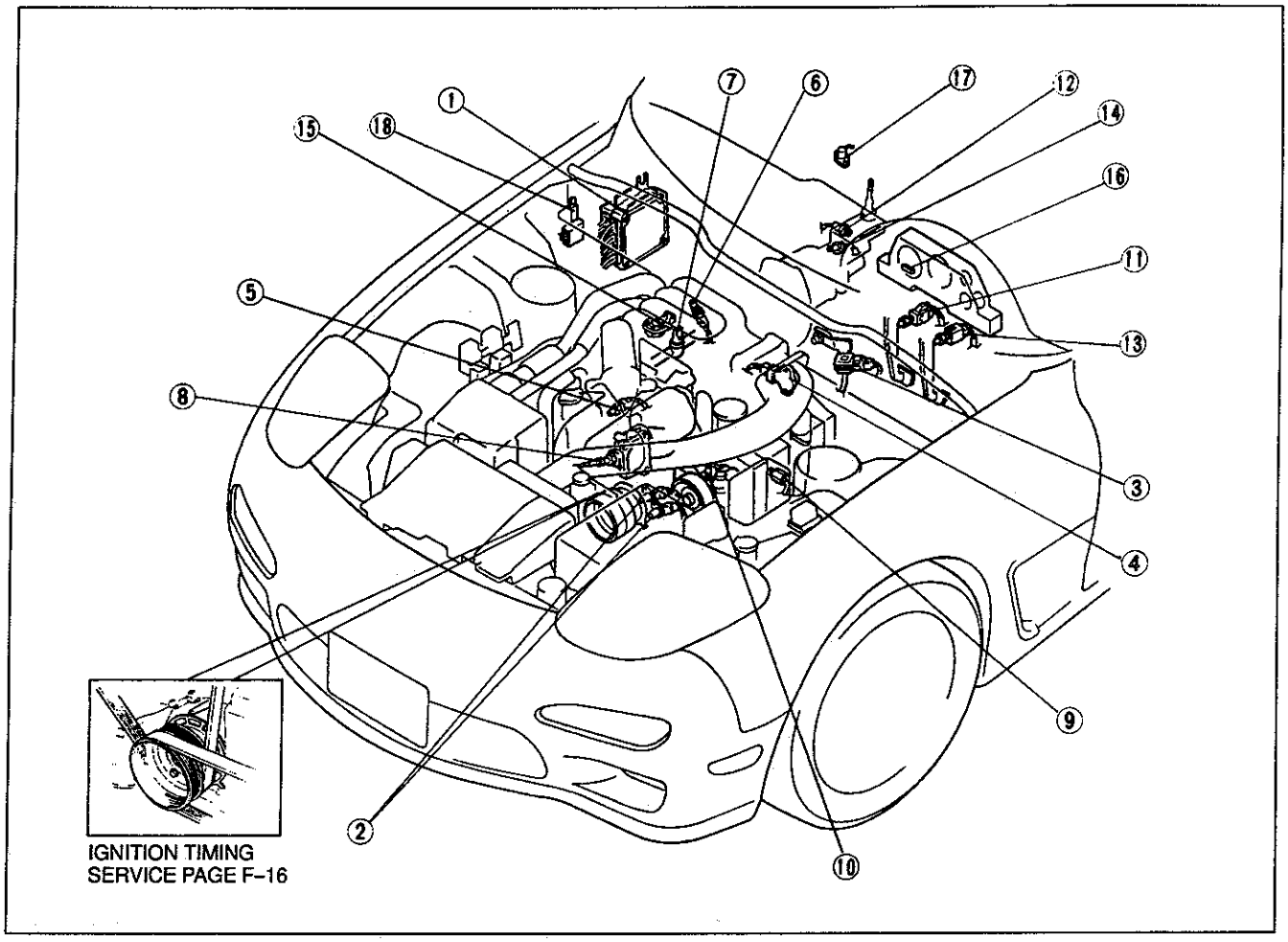

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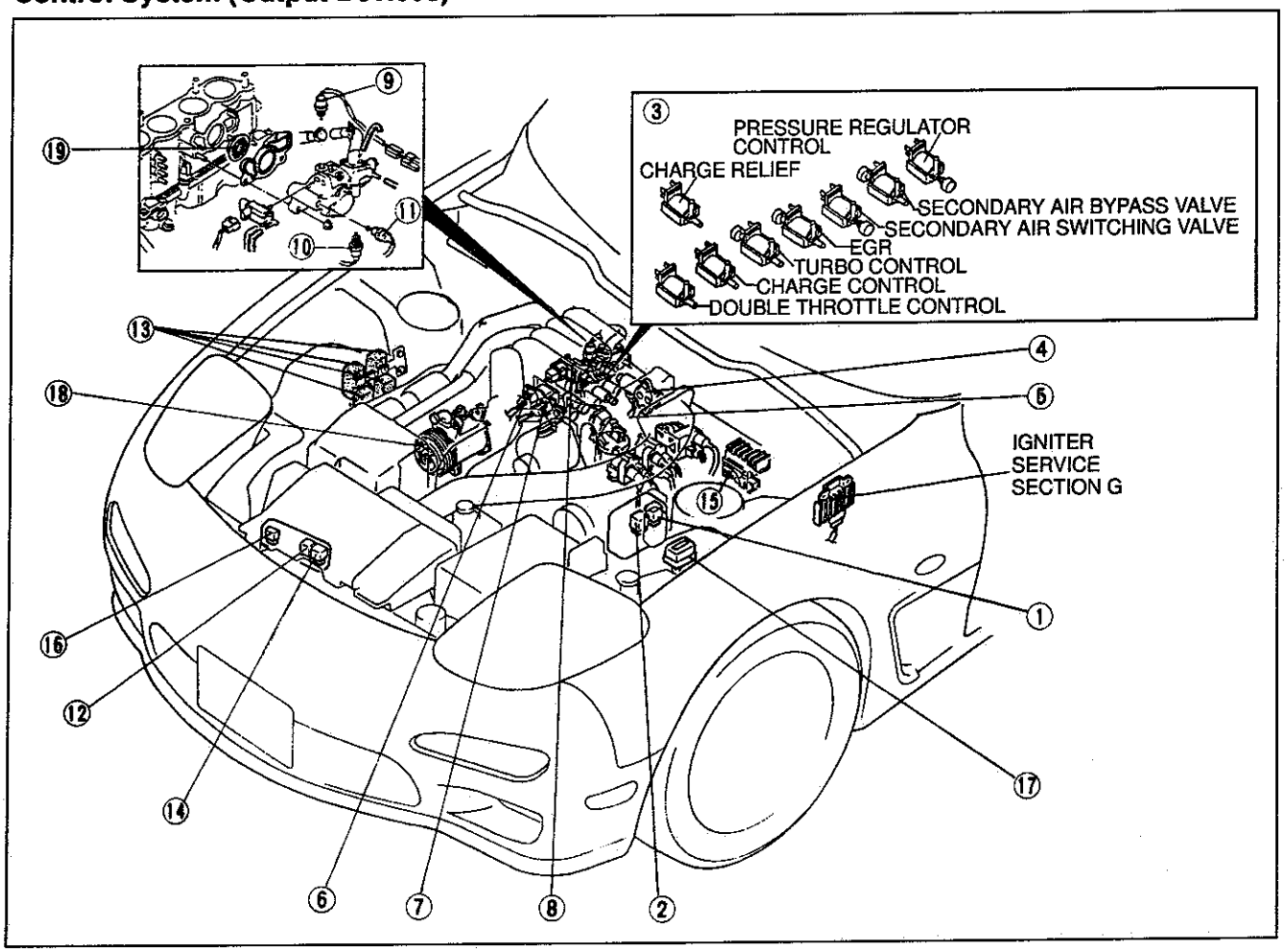
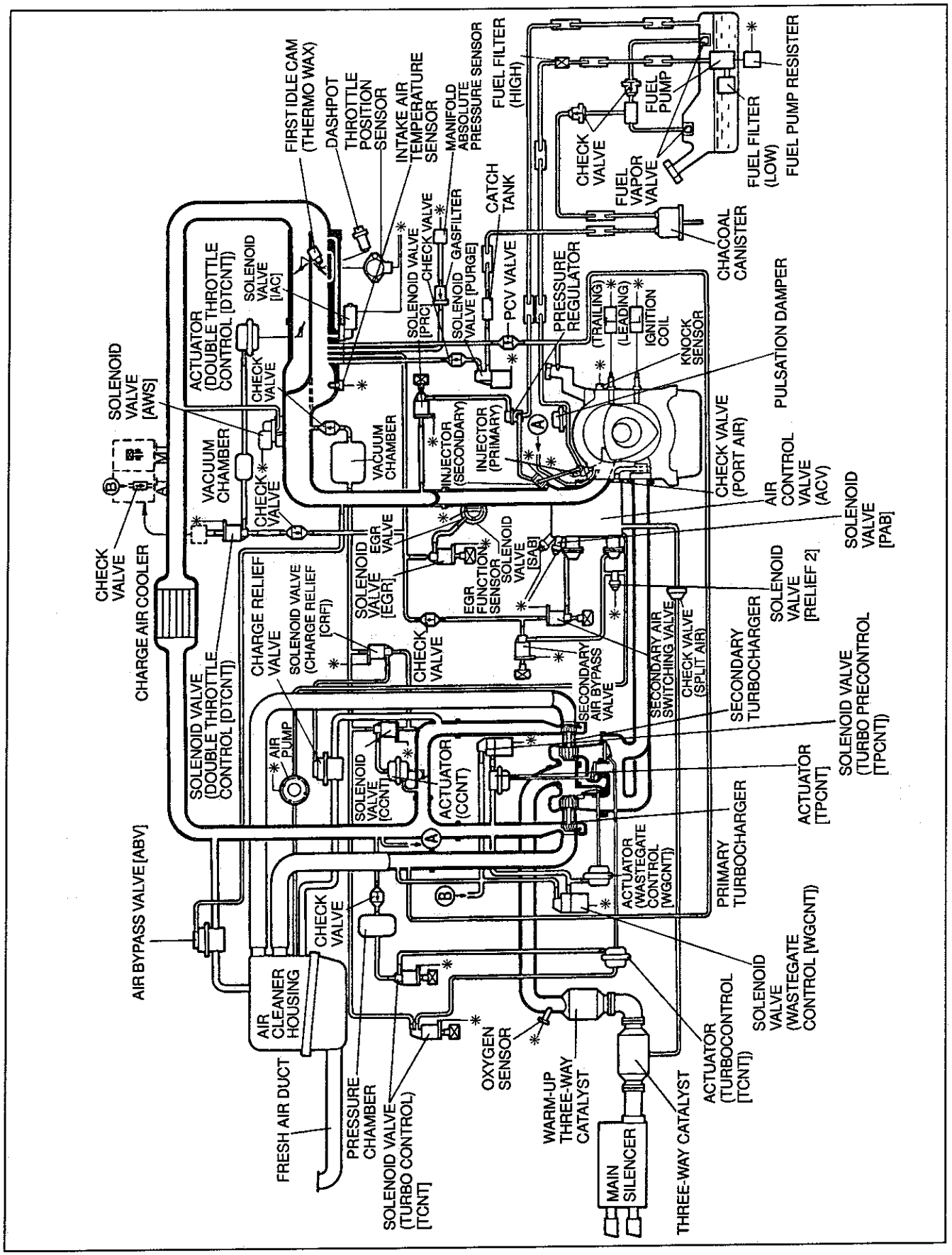
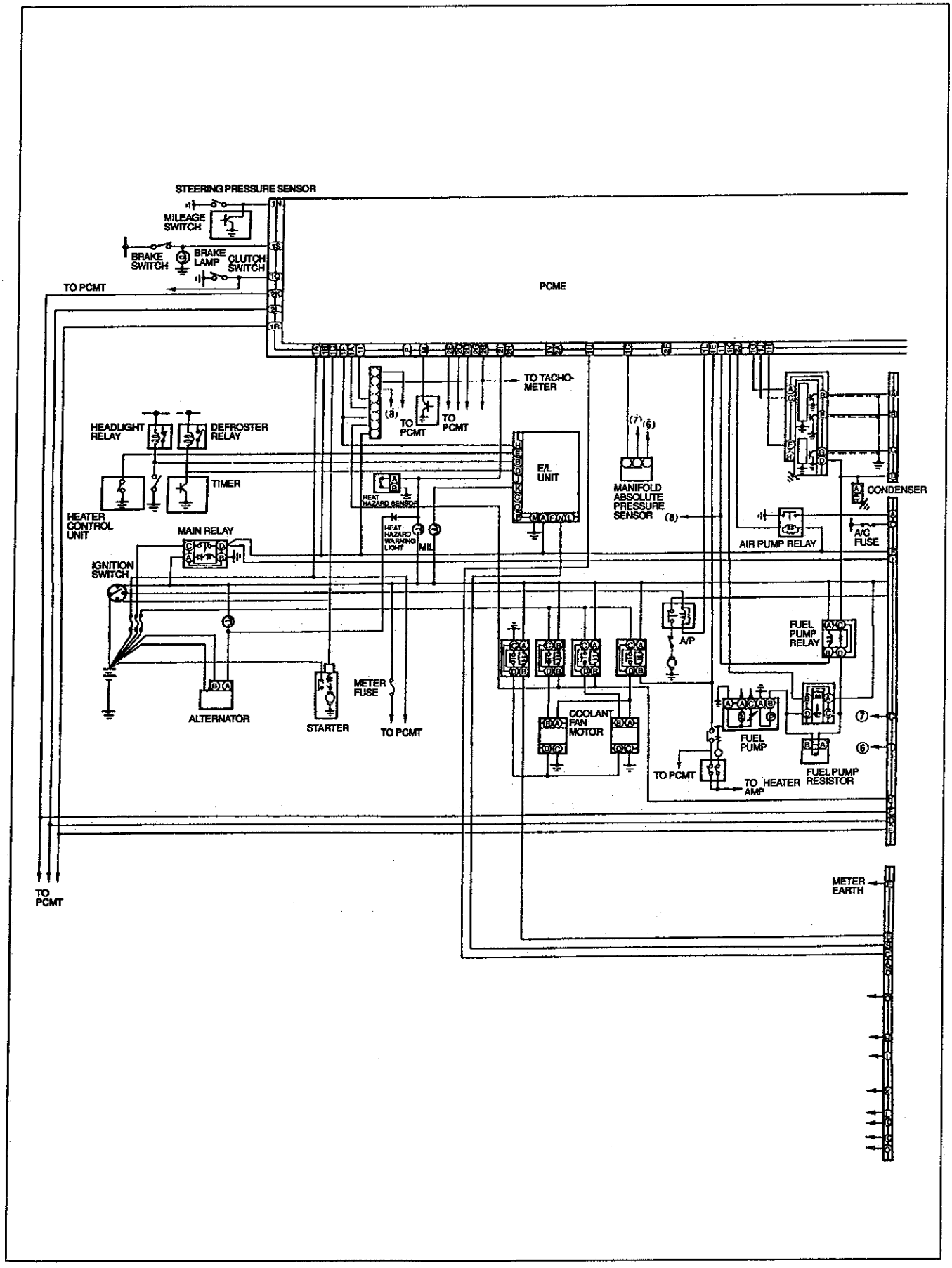


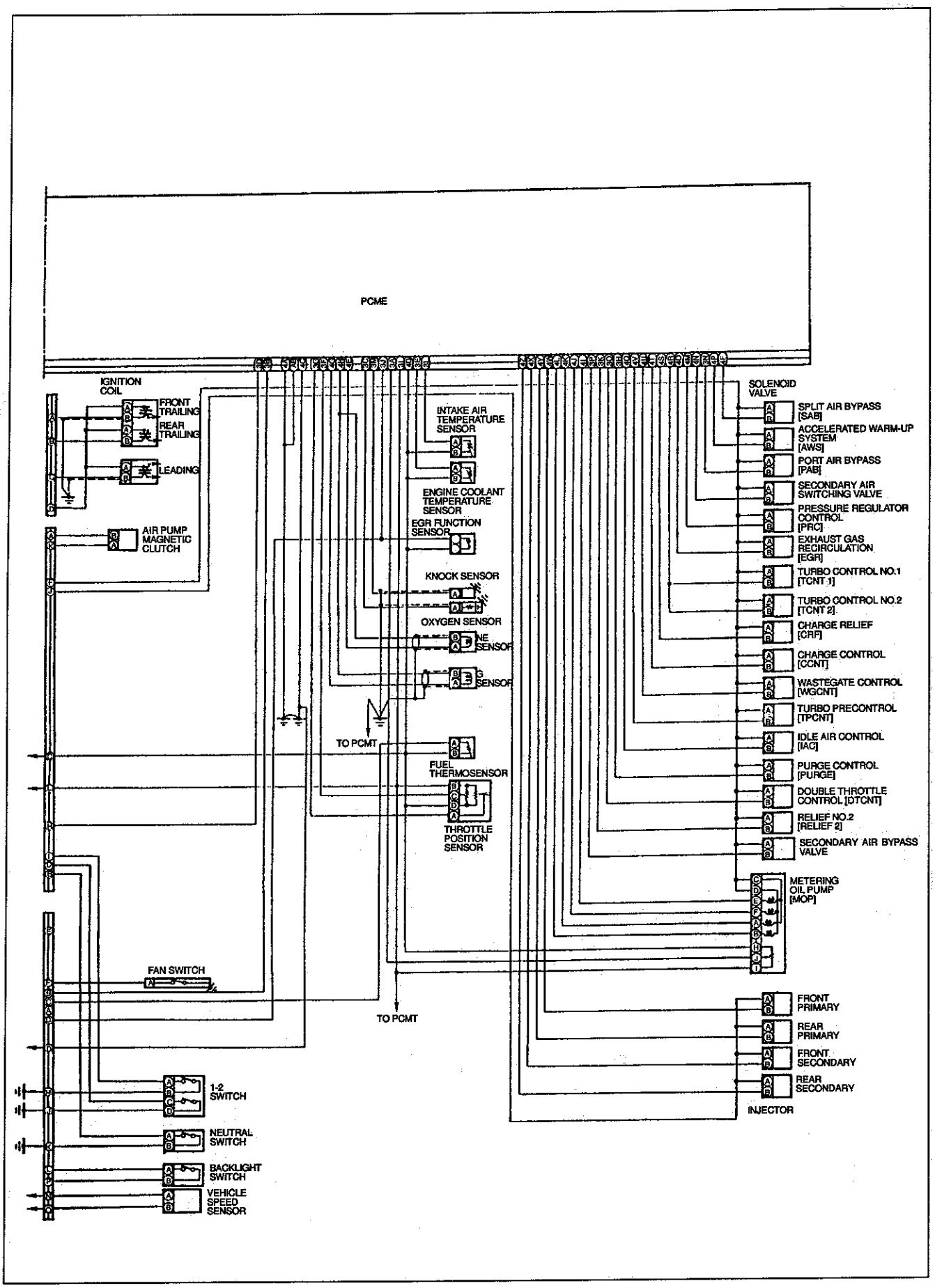
OUTLINE

SYSTEM DIAGRAM



WIRING DIAGRAM




PCME
IGNITION COIL
FRONT TRAILING
REAR TRAILING
LEADING
AIR PUMP MAGNETIC CLUTCH
INTAKE AIR TEMPERATURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
EGR FUNCTION SENSOR
KNOCK SENSOR
OXYGEN SENSOR
NE SENSOR
G SENSOR
TO PCMT
FUEL THERMOSENSOR
THROTTLE POSITION SENSOR
FAN SWITCH
TO PCMT
1-2 SWITCH
NEUTRAL SWITCH
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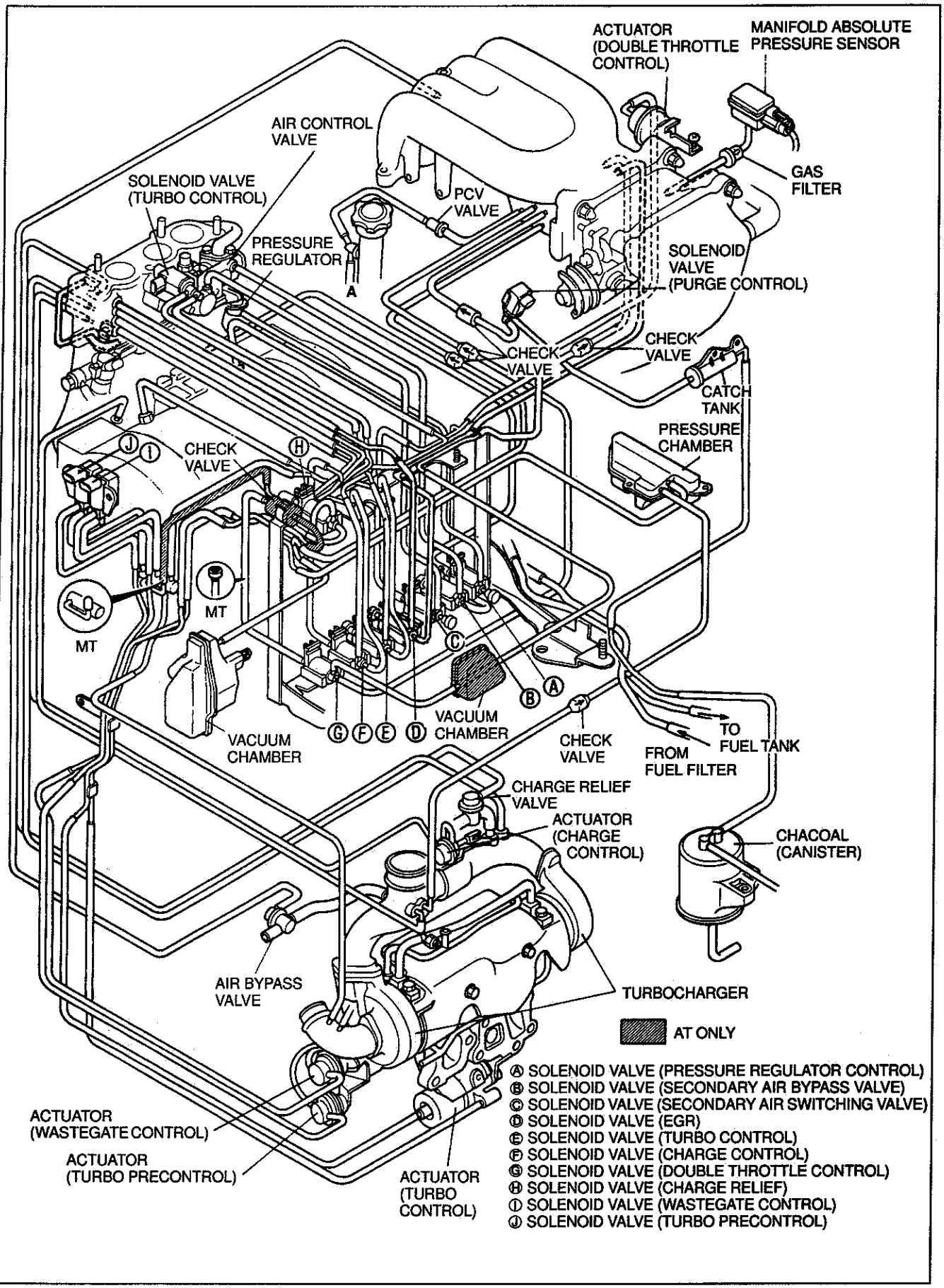
SECONDARY AIR SWITCHING VALVE
PRESSURE REGULATOR CONTROL [PRC]
EXHAUST GAS RECIRCULATION [EGR]
TURBO CONTROL NO.1 [TCNT 1]
TURBO CONTROL NO.2 [TCNT 2]
CHARGE RELIEF [CRF]
CHARGE CONTROL [CCNT]
WASTEGATE CONTROL [WGCNT]
TURBO PRECONTROL [TPCNT]
IDLE AIR CONTROL [IAC]
PURGE CONTROL [PURGE]
DOUBLE THROTTLE CONTROL [DTCNT]
RELIEF NO.2 [RELIEF 2]
SECONDARY AIR BYPASS VALVE
METERING OIL PUMP [MOP]
FRONT PRIMARY
REAR PRIMARY
FRONT SECONDARY
REAR SECONDARY
INJECTOR

VACCUM HOSE ROUTING DIAGRAM



SPECIFICATIONS

Item			Specification
Idle speed*		rpm	700–750 (720 $^{+30}_{-20}$)
Ignition timing*	Leading	ATDC	5°
	Trailing	ATDC	20°
Air cleaner housing			
Element type			Oil permeated
Throttle body			
Type			Horizontal draft {2 stage–3 barrel}
Throat diameter	Primary	mm {in}	45 {1.772}
	Secondary	mm {in}	50 {1.969} × 2
Dashpot touch angle		°	8
Water thermovalve Operation (full open) temperature		°C {°F}	55–65 {131–149} or more
Charge air cooler			
Type			Air cooled
Core size {w × h × t}		mm {in}	294 × 114 × 65 {11.575 × 4.4882 × 2.5591}
Turbocharger			
System type			Sequential twin turbo charged
Cooling method			water + engine oil
Boost control actuator			turbo pre-control + wastegate control
Boost control method			Solenoid valve (duty-controled) × 2
Fuel filter			
Type	Low-pressure		Nylon element
	High-pressure		paper element
Pressure regulator			
Type			Diaphragm
Regulated pressure		kPa {kgf/cm^2, psi}	250–260 {2.5–2.6, 35.6–37.0}
Fuel pump			
Type			Impeller (In tank)
Output pressure		kPa {kgf/cm^2, psi}	490–740 {50–7.5, 71.1–106.7}
Injector			
Type			Side-feeding
Injection volume	Primary	ml {cc, fl oz}/min	550 {550, 16.5}
	Secondary	ml {cc, fl oz}/min	850 {850, 25.5}
Three-way catalyst			
Type	Warm-up three-way catalyst		Metal
	Three-way catalyst		Monolithic
Air pump			
Capacity		cm^3 {cc}/rev	375 {375}
Output		L/min	MT 130–200, AT 160–200
Fuel			
Specification			Unleaded premium (RON95 or higher)

* TEN terminal of data link connector is grounded.

COMPONENT DESCRIPTIONS

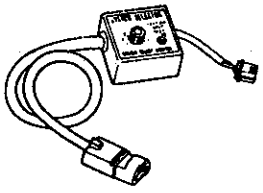
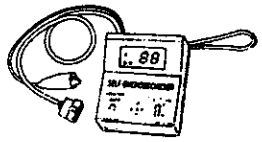
Component	Function	Remark
1-2 switch	Detects gear position (1st, 2nd)	MT only
Actuator (charge control)	Controls charge control valve	—
Actuator (Double throttle control)	Controls double throttle valve	Installed on extension manifold
Actuator (Turbo control)	Controls turbo control valve	Controlled by two solenoid valves
Actuator (Turbo precontrol)	Controls turbo precontrol valve	Part of turbocharger assembly
Actuator (Wastegate control)	Controls wastegate control valve	Part of turbocharger assembly
Air Bypass Valve	Reduces sound of intake air entering air cleaner housing from turbocharger deceleration	
Air Cleaner Element	Filters air entering throttle chamber	Oil permeated type
Air Control Valve	Directs air to one of three locations: exhaust port, three-way catalyst, or relief air silencer	Consists of two valves: Secondary air bypass valve Secondary air switching valve
Air pump	Supplies secondary air to air control valve	With electromagnetic clutch
Barometric Absolute Pressure Sensor	Detects atmospheric pressure; sends signal to PCME	Built in PCME
Charcoal Canister	Stores fuel tank fumes when engine is stopped	Vented to atmosphere through charcoal and air filter
Clutch switch	Detects clutch condition (engaged / disengaged)	MT only
Crankshaft position Sensor	Detects eccentric shaft angle at 30° intervals and front rotor position; sends signal to PCME	—
Dashpot	Prevents sudden throttle valve closing during deceleration	—
Data link connector	**Service connector terminals:** 1. CIS self-diagnosis 2. PCMT on-board diagnosis [AT] 3. Initial set 4. Fuel pump check 5. Engine speed output 6. Switch and oxygen sensor monitor 7. Supply battery positive voltage 8. Ground 9. A/C self-diagnosis 10. Cruise control self-diagnosis 11. Electrical coolant fan self-diagnosis	**25-pin (located near fuse box)** 1. FEN terminal 2. TAT and FAT terminal 3. TEN terminal 4. F/P terminal 5. IG- terminal 6. MEN terminal 7. +B terminal 8. GND terminal 9. TAC and FAC terminal 10. TSC and FSC terminal 11. TFA terminal
Engine coolant temperature sensor	Detect coolant temperature; send signals to PCME	• Installed in engine
Fuel filter	Filters particles from fuel	
Fuel pump	Provides fuel to injectors	• Operates while engine running • In fuel tank
Fuel pump relay	Voltage for fuel pump while engine running	—
Igniter	Receives spark signal from PCME and generates high voltage in ignition coil	
Ignition switch (START position)	Sends engine cranking signal to PCME	—
Injector	Injects fuel into intake port	• Controlled by signal from PCME (side-feed type)
Intake air temperature sensor	Detects intake air temperature; sends signal to PCME	• Installed in extension manifold
Knock sensor	Detects engine knocking; sends signal to PCME	—
Main relay	Supplies current to output devices and PCME	—
Manifold absolute pressure sensor	Detects intake manifold pressure; sends signal to PCME	—
Neutral/Clutch switches (MT)	Detects in-gear condition; sends signal to PCME	• Switch is ON in neutral
Oxygen sensor	Detects oxygen concentration; sends signal to PCME	• Zirconic and platinum coat

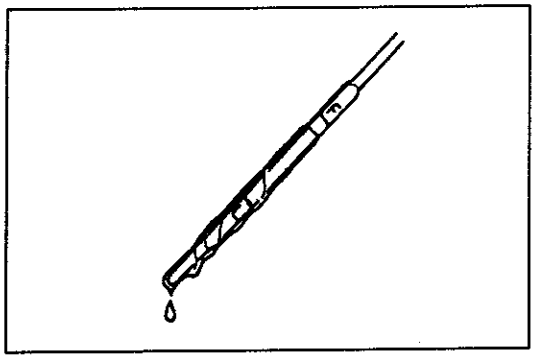
Component	Function	Remark
Park/neutral switch (AT)	Detects load condition; sends signal to PCME	—
PCV valve	Controls blowby gas introduced into engine	—
Powertrain control module (engine) (PCME)	**Detects the following:** 1. Engine speed 2. Knocking signal 3. Vehicle speed 4. Engine coolant temperature 5. Intake air temperature 6. Throttle valve opening angle (full range) 7. Intake manifold pressure 8. Atmospheric pressure 9. Oxygen concentration 10. Air/Fuel ratio 11 Throttle valve opening angle (narrow range) 12. Metering oil pump (MOP) position signal 13. Fuel temperature 14. Gear position 15. Clutch condition 16. In-gear condition 17. Power steering operation 18. Braking signal 19. Starter signal 20. Electrical Load (E/L) condition 21. EGR condition **Control operation of the following** 1 Fuel injection system 2. Ignition control system 3. Idle speed control system 4. Pressure negulaton control system 5. Secondary air injection 6. Accelerated warm-up System 7 Sequential twin turbocharger control system 8. Exhaust Gas Recirculation control system 9 Double throttle control system 10. A/C control system 11 Electric coolant fan control system 12. Lock-up control system 13. Slip control system 14. On-board diagnosis function 15. Monitor function 16. Back up function	1 Crankshaft position sensor 2. Knock sensor 3. Vehicle speed sensor 4. Engine coolant temperature sensor 5. Intake air temperature sensor 6. Throttle position sensor (full range) 7 Manifold absolute pressure sensor 8. Barometric absolute pressure sensor 9. Oxygen sensor 10. Oxygen sensor 11. Throttle position sensor (narrow range) 12. MOP position sensor 13. Fuel thermosensor 14. 1-2 switch (MT) 15. Clutch switch (MT) 16. Neutral switch (MT) 17. Steering pressure sensor 18. Stoplight switch 19. Ignition switch 20 E/L unit 21. EGR function sensor Injector Igniter Solenoid valve (Idle air control [IAC]) Solenoid valve (Pressure Regulator control [PRC]) Solenoid valve (Split air bypass [SAB]) Solenoid valve (Port air bypass [PAB]) Secondary air switching valve Solenoid valve (Relief No.2 [RELIEF2]) Secondary air bypass valve Solenoid valve (AWS) Solenoid valve (Turbo control No.1 [TCNT1]) Solenoid valve (Turbo control No.2 [TCNT2]) Solenoid valve (Wastegate control [WGCNT]) Solenoid valve (Turbo precontrol [TPCNT]) Solenoid valve (Change control [CCNT]) Solenoid valve (Change relief [CRF]) Solenoid valve (EGR) Solenoid valve (DTCNT) A/C relay Fan relay PCMT PCMT Self-diagnosis checker Self-diagnosis checker
Pressure regulator	Adjusts fuel pressure supply to injectors	—
Pulsation dumper	Absorbs fuel pulsations	—
Secondary air bypass valve	Controls relief valve	• Installed below extension manifold
Secondary air switching valve	Controls switching valve of air control valve	• Installed below extension manifold
Solenoid valve (IAC)	Supplies bypass air into intake manifold	• Controlled by duty signal from PCME
Solenoid valve (PRC)	Controls vacuum to pressure regulator	• Installed below extension manifold
Solenoid valve (SAB)	Controls split air volume	• Installed in ACV
Solenoid valve (RELIEF2)	Controls relief valve	• Installed in ACV
Solenoid valve (PAB)	Controls port air volume	• Installed in ACV
Solenoid valve (AWS)	Controls accelerated warm-up system	• Installed in extension manifold
Solenoid valve (TCNT1)	Controls turbo control valve	• Installed in ACV (pressure applied)
Solenoid valve (TCNT2)	Controls turbo control valve	• Installed below extension manifold (vacuum applied)

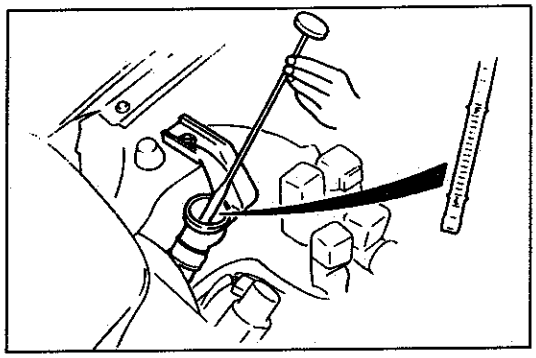
Component	Function	Remark
Solenoid valve (WGCNT)	Controls wastegate valve	• Controlled by duty signal from PCME
Solenoid valve (TPCNT)	Controls turbo precontrol valve	• Controlled by duty signal from PCME
Solenoid valve (CCNT)	Controls charge control valve	• Installed below extension manifold
Solenoid valve (CRF)	Controls charge relief valve	• Installed below extension manifold
Solenoid valve (EGR)	Controls EGR valve	• Installed below extension manifold
Solenoid valve (DTCNT)	Controls double throttle valve	• Installed below extension manifold
Solenoid valve (PURGE)	Controls evapolative fumes from chacoal canister to intake manifold	• Controlled by duty signal from PCME
Steering pressure sensor	Detects P/S operation	• Steering pressure sensor ON when steering wheel turned
Stoplight switch	Detects braking; sends signal to PCME	—
Three-Way Catalyst	Reduces HO, CO and NOx	—
Throttle body	Controls intake air amount	—
Throttle position sensor	Detects throttle valve opening angle	• Installed on throttle body
Vehicle speed sensor	Detects vehicle speed; sends signal to PCME	• Installed in instrument cluster

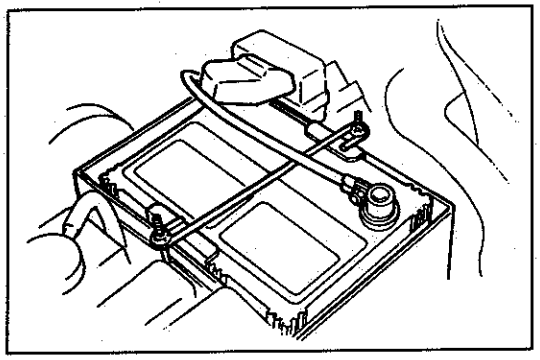
ENGINE TUNE-UP

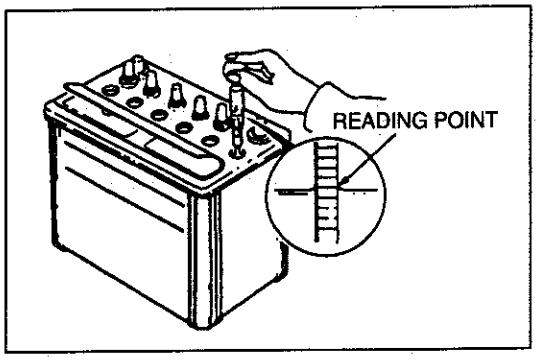
PREPARATION
SST

498 B019 9A0 System Selector 	For inspection of ignition timing and idle speed and diagnosis	49 H018 9A1 Self-Diagnosis Checker 	For diagnosis









BASIC INSPECTION
Engine Oil
1. Remove the dipstick and check the engine oil level and condition.
2. Add or change oil as necessary.

Coolant (engine cold)

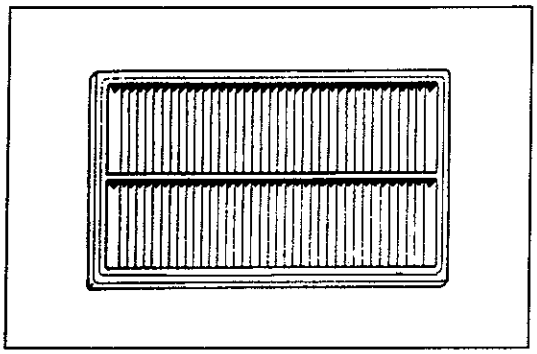
Warning
- **Removing the radiator cap or the coolant filler cap while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counter-clockwise to the first stop. Step back while the pressure escapes.**
- **When you're sure all the pressure is gone, press down on the cap-still using a cloth-turn it, and remove it.**

1. Remove the coolant level gauge from the coolant recervir.
2. Verify that the coolant level is between the and marks of the gauge.
3. Add coolant if necessary.

Battery
Terminal and cable
1. Remove any corrosion on the clamps or battery posts and coat them with grease.
2. Verify that the battery top is clean. If necessary, clean with baking soda and water.
3. Verify that cables are not frayed or corroded. Repair or replace if necessary.
4. Verify that cable clamps are tight.
5. Verify that the rubber protector completely covers the positive terminal and clamp.

Electrolyte level and specific gravity
1. Verify that the electrolyte level is between the "Upper" and "Lower" level marks.
2. Add distilled water if necessary. Do not over fill.
3. Check the specific gravity with a hydrometer.

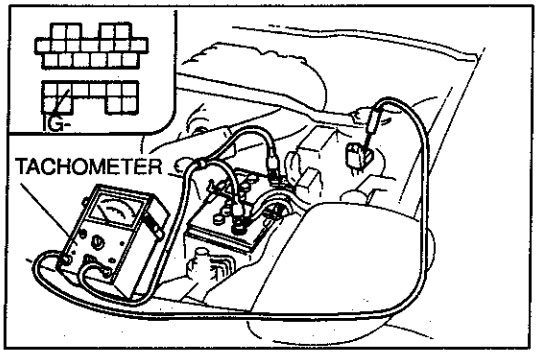
Specific Gravity: 1.27–1.29 {at 20°C [68°F]}



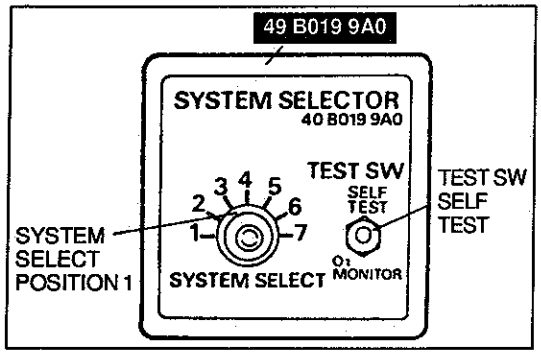
Air Cleaner Element
Inspection
1. Check the air cleaner element for excessive dirt and for oil and damage.

Caution
- **Cleaning the element with compressed air will reduce the element's ability to filter the air. Don't use compressed air to clean the element.**

2. Replace the element if necessary.

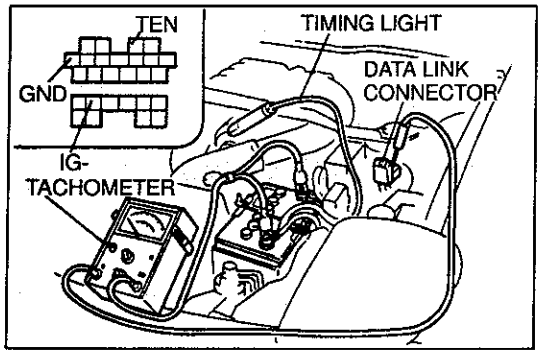


ADJUSTMENT
Preparation
1. Warm up the engine to normal operating temperature.
2. Turn all electric loads OFF.
3. Connect the **SST** to the data link connector.
4. Connect a tachometer to the data link connector **IG-** terminal as shown.

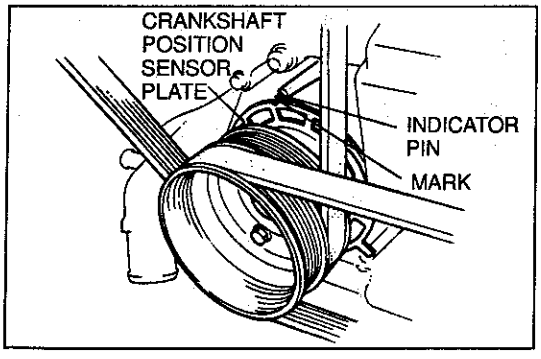


Ignition Timing
The ignition timing is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.

1. Perform preparation (refer to above.)
2. Verify that the electric coolant fan does not operate.
3. Remove the fuel filler cap.
4. Set SYSTEM SELECT to position 1.
5. Set TEST SW to SELF-TEST.
6. If the **SST** is not used, connect a jumper wire between the TEN terminal and the GND terminal of the data link connector.
7. Make sure the idle speed is within specification; if not, adjust the idle speed.
8. Connect a timing light to the high-tension lead of the front trailing-side.

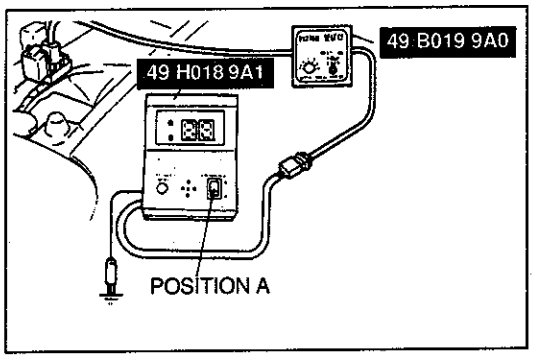


Note
- Some timing lights will not illuminate even if the ignition is working properly.



9. Verify that the timing mark (white) on the crankshaft position sensor plate is aligned with the indicator pin.

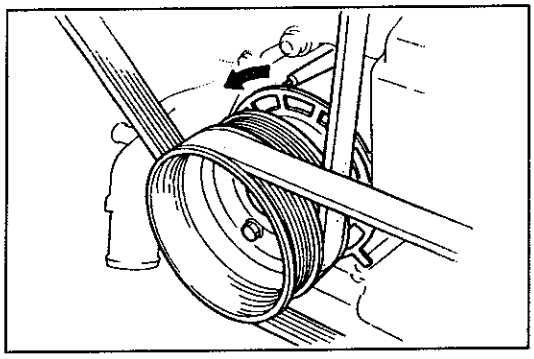
Ignition timing: Trailing side: 20° ATDC (–20° BTDC)
Leading side: 5° ATDC (–5° BTDC)
Idle speed (Neutral or P range): 550–950 rpm



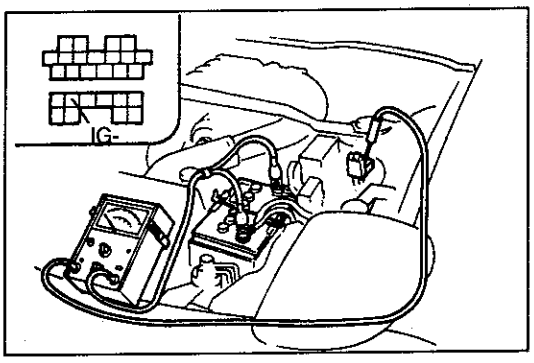
10. If the timing is incorrect, check the following procedure.
    - Verify that no trouble code number is present. If trouble code number present, check for cause by referring to the specified check sequence. (Refer to page F–20)
    - 05–knock sensor
    - 13–Manifold absolute pressure sensor

Input devices
- E/L, P/S, A/C, Coolant fan
- Crankshaft position sensor (NE, signal)
- Manifold absolute pressure sensor
- Throttle position sensor
- Neutral SW / Clutch SW (MT)
- Park / Neutral signal (AT)

Others
PCME terminal 3I (Refer to page F–152)

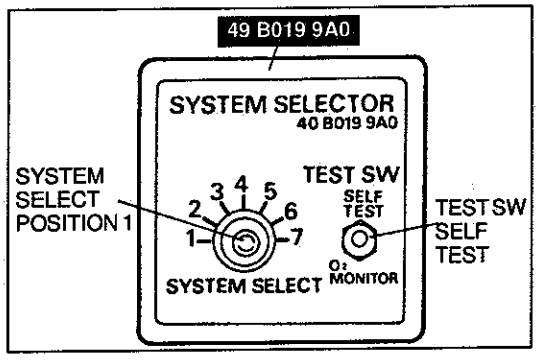


11. Disconnect the **SST**.
12. Verify that the ignition timing advances when the engine is above 1,500 RPM.



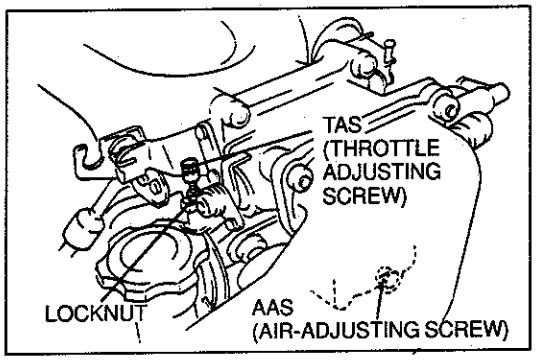
Idle Speed
Because the idle speed is controlled automatically by the PCME, it is usually not necessary to check and adjust the idle speed control valve. However, if the engine is idling roughly, use the following procedure to make adjustments.

1. Perform "Preparation". (Refer to page F–16)



2. Set SYSTEM SELECT to position 1
3. Set TEST SW to SELF TEST
4. With the coolant fan off, verify that the idle speed is within specification.

Idle speed: 700–750 (720 $^{+30}_{-20}$ rpm)



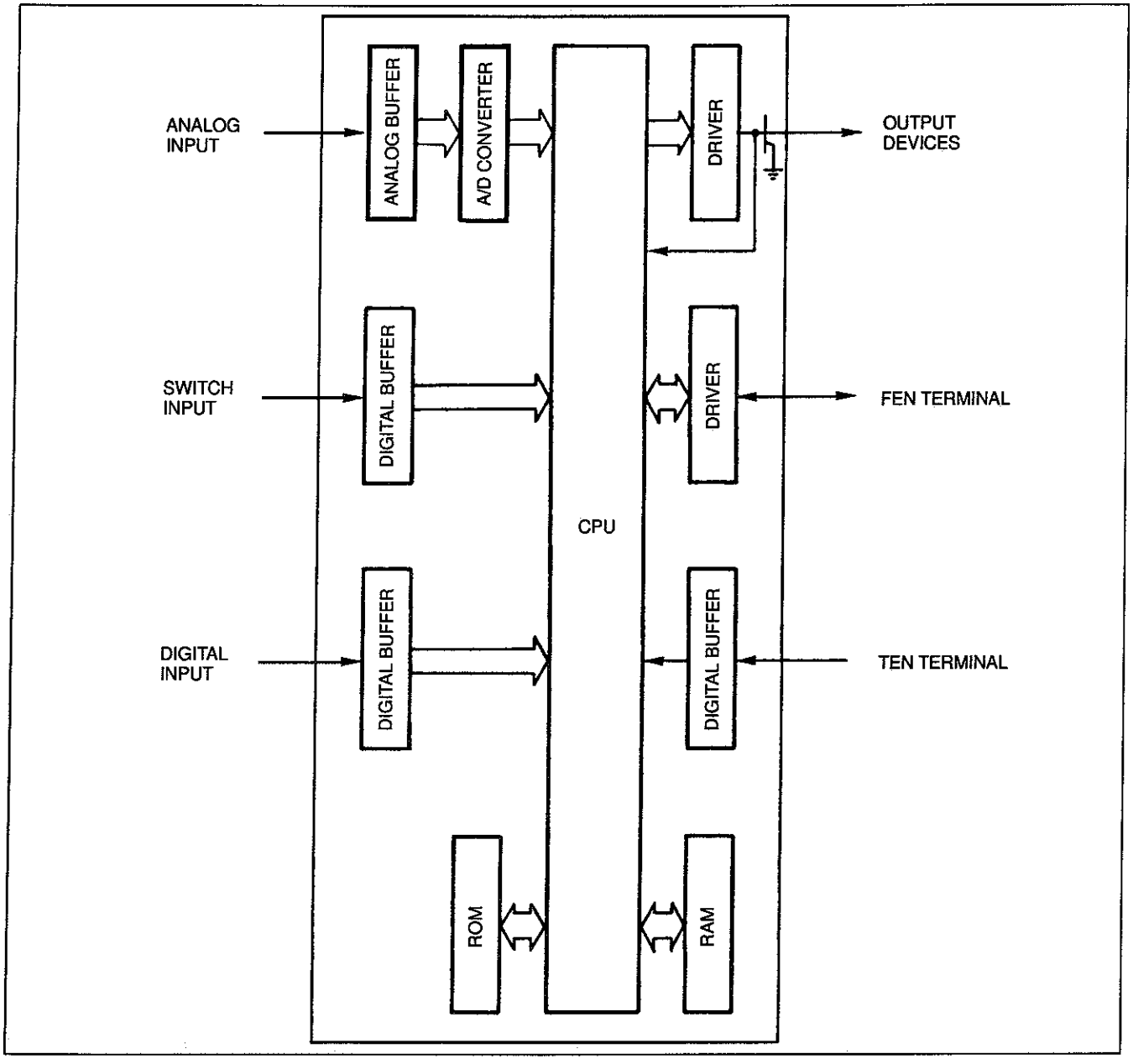
5. If not within the specification, adjust the idle by turning the air-adjusting screw (AAS).
6. If not within the specification when air adjusting screw fully closed, loosen the locknut and turn the throttle adjusting screw to set the idle.
7. Tighten the locknut and put a paint mark on the nut and throttle body.
8. Disconnect the **SST**.

ON-BOARD DIAGNOSIS FUNCTION

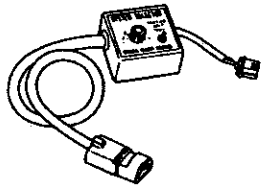
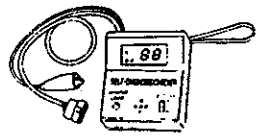
DESCRIPTION

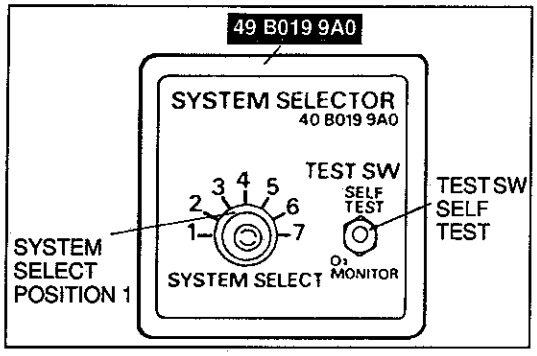
When trouble occurs in the main input or output devices, check for the cause by using the **SST**. Failure of input and output devices is indicated and retrieved from the powertrain control module (engine) (PCME) as diagnostic trouble code numbers.

For input devices, the PCME continuously checks for malfunctions. For output devices, it checks for malfunctions only in a three-second period after the ignition switch is turned to ON, or the TEN terminal of the data link connector is grounded.



PREPARATION
SST

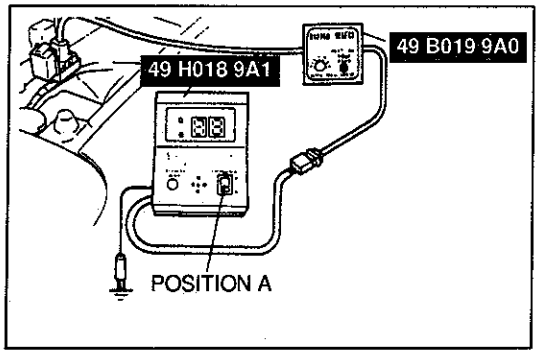
49 B019 9A0 System Selector 	For diagnosis	49 H018 9A1 Self-Diagnosis Checker 	For diagnosis



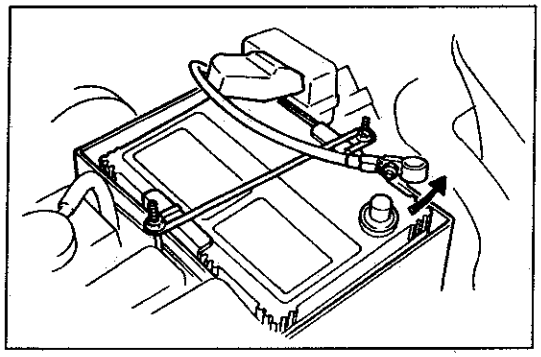
DIAGNOSTIC TROUBLE CODE NUMBER

Inspection Procedure

1. Connect the **SST** to the Self-Diagnosis Checker to the data link connector.
2. Set system select to position 1.
3. Set the test switch to SELF TEST.



4. Connect the **SST** to the System Selector and a ground.
5. Set the select switch to position A.
6. Turn the ignition switch ON.
7. Verify the "88" flashes on the digital display and the buzzer sounds for **3 sec.** after turning the ignition switch ON.
8. If "88" does not flash, check the main relay (refer to page F–174), power supply circuit, and data link connector wiring.
9. If "88" flashes and the buzzer sounds continuously for more than **20 sec.**, check for a short circuit between the PCME terminal 1 F and the data link connector. Replace the PCME if necessary, perform Steps 3 and 7 again.



10. Note any code numbers and check for the causes by referring to the check sequences shown on pages **F–26 through F–65**. Repair as necessary.
11. After repairs, cancel the code numbers by performing the "After-repair procedure". (Refer to page F–66.)

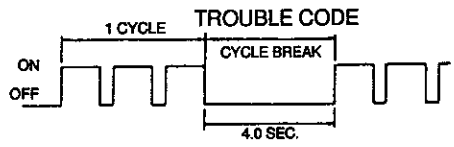
Principle of Code Cycle

Trouble codes are determined as shown below.

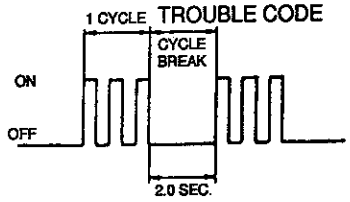
1. Code cycle break

The time between trouble code cycles is 4.0 seconds (the time the buzzer is off).

SELF-DIAGNOSIS CHECKER



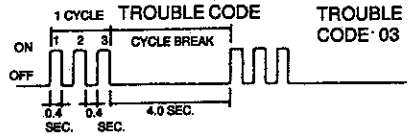
DIGTAL CODE CHECKER WITH SIGNAL ADAPTER



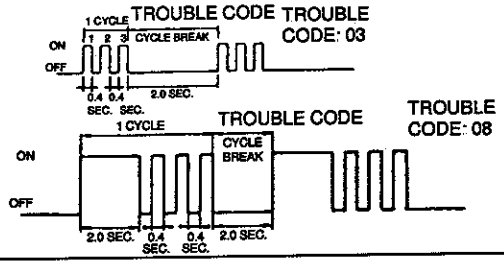
2. Second digit of trouble code (ones position)

The digit in the ones position of the trouble code represents the number of times the buzzer sounds 0.4 second during one cycle.

SELF-DIAGNOSIS CHECKER



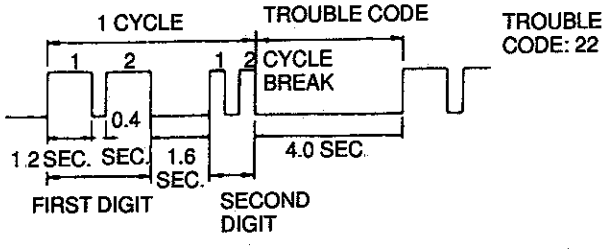
DIGITAL CODE CHECKER WITH SIGNAL ADAPTER



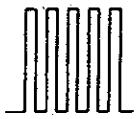
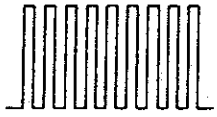
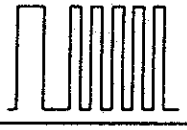
3. First digit of trouble code (tens position)

The digit in the tens position of the trouble code represents the number of times the buzzer is on 1.2 seconds during one cycle.

The buzzer is off for 1.6 seconds between the long and short pulses.



Diagnostic Trouble Code Numbers

No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
02	ON / OFF 	Crankshaft position sensor (NE signal)	No NE signal	• Crankshaft position sensor connector • Wiring from crankshaft position sensor to PCME • Crankshaft position sensor	Yes	F-26
03	ON / OFF 	Crankshaft position sensor (G signal)	No G signal	• Crankshaft position sensor connector • Wiring from crankshaft position sensor to PCME • Crankshaft position sensor	Yes	F-27
05	ON / OFF 	Knock sensor	Open or shout circuit	• Knock sensor connector • Wiring from knock sensor to PCME • Knock sensor	Yes	F-28
06	ON / OFF 	Vehicle speed Sensor	No vehicle speed sensor signal	• Vehicle speed sensor connector • Wiring from vehicle speed sensor to PCME	Yes	F-29
09	ON / OFF 	Engine coolant temprature sensor	Open or short circuit	• Engine coolant temperature sensor connector • Wiring from engine coolant temperature sensor to PCME • Engine coolant temperature sensor resistance	Yes	F-30
11	ON / OFF 	Intake air temprature sensor		• Intake air temperature sensor connector • Wiring from intake air temperature sensor to PCME • Intake air temperature sensor resistance	Yes	F-31
12	ON / OFF 	Throttle position sensor (Full range)		• Throttle position sensor connector • Wiring from throttle position sensor to PCME	Yes	F-32
13	ON / OFF 	Manifold absolute pressure sensor		• Manifold absolute pressure sensor connector • Wiring from manifold absolute pressure sensor to PCME • Manifold absolute pressure sensor resistance	Yes	F-33
14	ON / OFF 	Barometric absolute pressure sensor (in PCME)		• PCME	Yes	F-34
15	ON / OFF 	Oxygen sensor (Inactivation)	Sensor output continues less than 0.55V 25 sec. in closed loop zone	• Oxygen sensor connector • Wiring from oxygen sensor to PCME • Oxygen sensor	Yes	F-34
16	ON / OFF 	EGR function sensor	Open or short circuit	• EGR function sensor connector • Wiring from EGR function sensor to PCME • EGR function sensor	Yes	F-35
17	ON / OFF 	Oxygen sensor (Inversion)	Sensor output not changed 120 sec. in closed loop zone	• Fuel pressure • Injection fuel leakage • Ignition system • Air leakage • PCME	Yes	F-36
18	ON / OFF 	Throttle position sensor (Narrow range)	Open or short circuit	• Throttle position sensor connector • Wiring from throttle position sensor to PCME	Yes	F-38

No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
20	ON OFF 	Metering oil pump position sensor	Open or Short circuit	• MOP connector • Wiring from MOP position sensor to PCME • MOP position sensor continuity	Yes	F-39
23	ON OFF 	Fuel thermosensor		• Fuel thermosensor connector • Wiring from Fuel thermosensor to PCME • Fuel thermosensor resistance	Yes	F-40
25	ON OFF 	Solenoid valve (pressure regulator control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-41
26	ON OFF 	Metering oil pump (stepping moter)		• MOP connector • Wiring from MOP to PCME • MOP continuity	Yes	F-42
27	ON OFF 	Metering oil pump	Open or short circuit or Sticking of MOP sensor	• MOP connector • Wiring from MOP to PCME • Mop continuity	Yes	F-43
28	ON OFF 	Solenoid valve (EGR)	Open or short circuit	• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-44
30	ON OFF 	Solenoid valve (Split air bypass)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-45
31	ON OFF 	Secondary air bypass valve		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-46
32	ON OFF 	Secondary air switching valve		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	Yes	F-47
33	ON OFF 	Solenoid valve (Port air bypass)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-48
34	ON OFF 	Solenoid valve (Idle air control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-49
37	ON OFF 	Metering Oil Pump	Low battery positive voltage	• Charging system • MOP connector • Wiring from MOP to PCME	Yes	F-50

No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
38	ON / OFF 	Solenoid valve (Accelerated warm-up system)	Open or Short Circuit	• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-51
39	ON / OFF 	Solenoid valve (Relief 2)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-52
40	ON / OFF 	Solenoid valve (Purge control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-53
42	ON / OFF 	Solenoid valve (Turbo precontrol)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-54
43	ON / OFF 	Solenoid valve (Wastegate control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-55
44	ON / OFF 	Solenoid valve (Turbo control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	Yes	F-56
45	ON / OFF 	Solenoid valve (Charge control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	Yes	F-57
46	ON / OFF 	Solenoid valve (Charge relief)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-58
50	ON / OFF 	Solenoid valve (Double throttle control)		• Solenoid valve connector • Wiring from solenoid valve to PCME • Solenoid valve continuity	No	F-59
51	ON / OFF 	Fuel pump relay (speed)		• Fuel pump relay connector • Wiring from relay to PCME • Relay continuity	Yes	F-60
54	ON / OFF 	Air pump relay		• Air pump relay connector • Wiring from relay to PCME • Relay continuity	No	F-61

No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
71	ON / OFF 	Injector (Front secondary)	Open circuit	• Injector connector • Wiring from Injector to PCME • Injector resistance	Yes	F-62
73	ON / OFF 	Injector (Rear secondary)		• Injector connector • Wiring from injector to PCME • Injector resistance	Yes	F-63
76	ON / OFF 	Slip lock up off signal (PCMT)	Open or Short circuit	• PCMT connector • Wiring from PCMT to PCME	No	F-64
77	ON / OFF 	Torque reduced signal (PCMT)		• PCMT connector • Wiring from PCMT to PCME	No	F-65

Note
- If more than one failure is present, the code numbers will be indicated in numerical order.

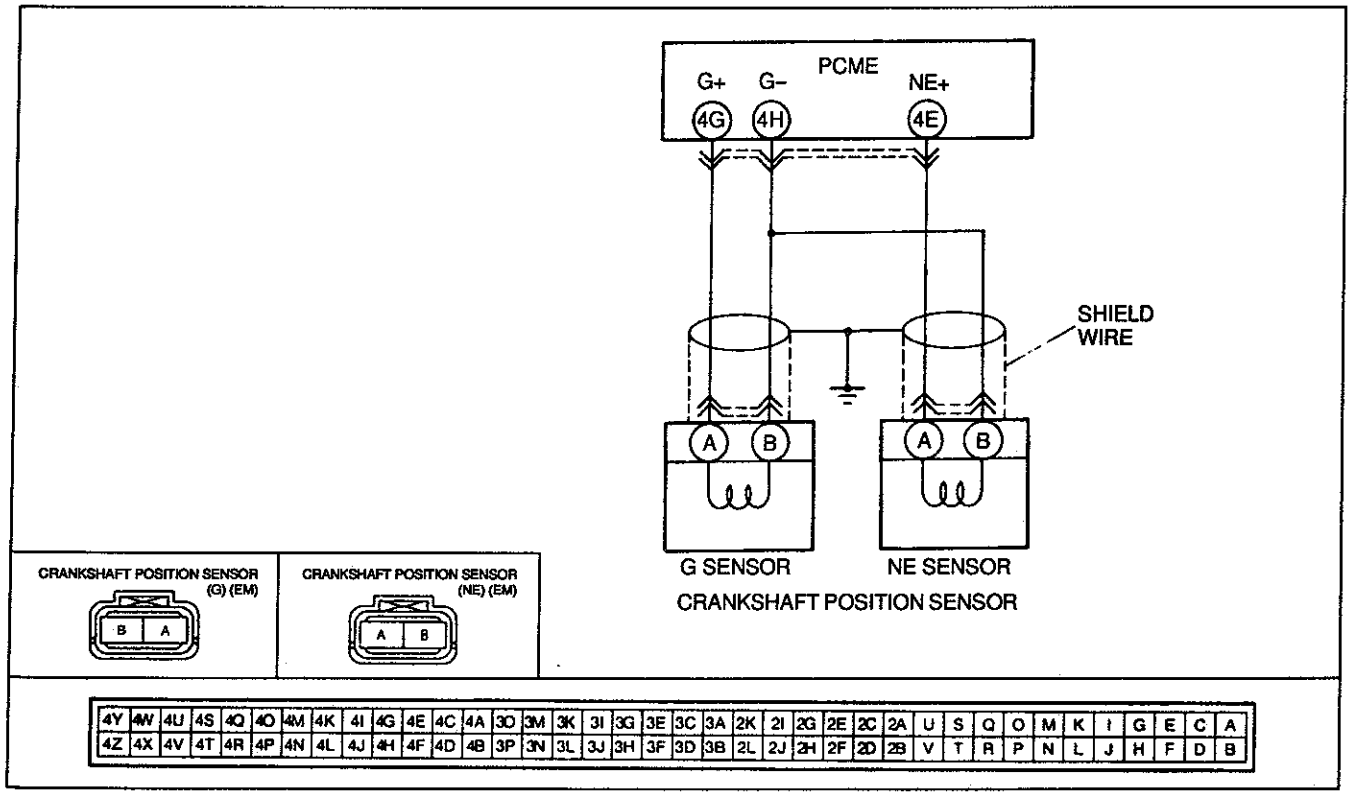
After repairs, cancel the code numbers by performing the "After-repair procedure".
(Refer to page F-66.)

Troubleshooting

If a trouble code number is shown on the **SST**, check for the cause by referring to the related chart.

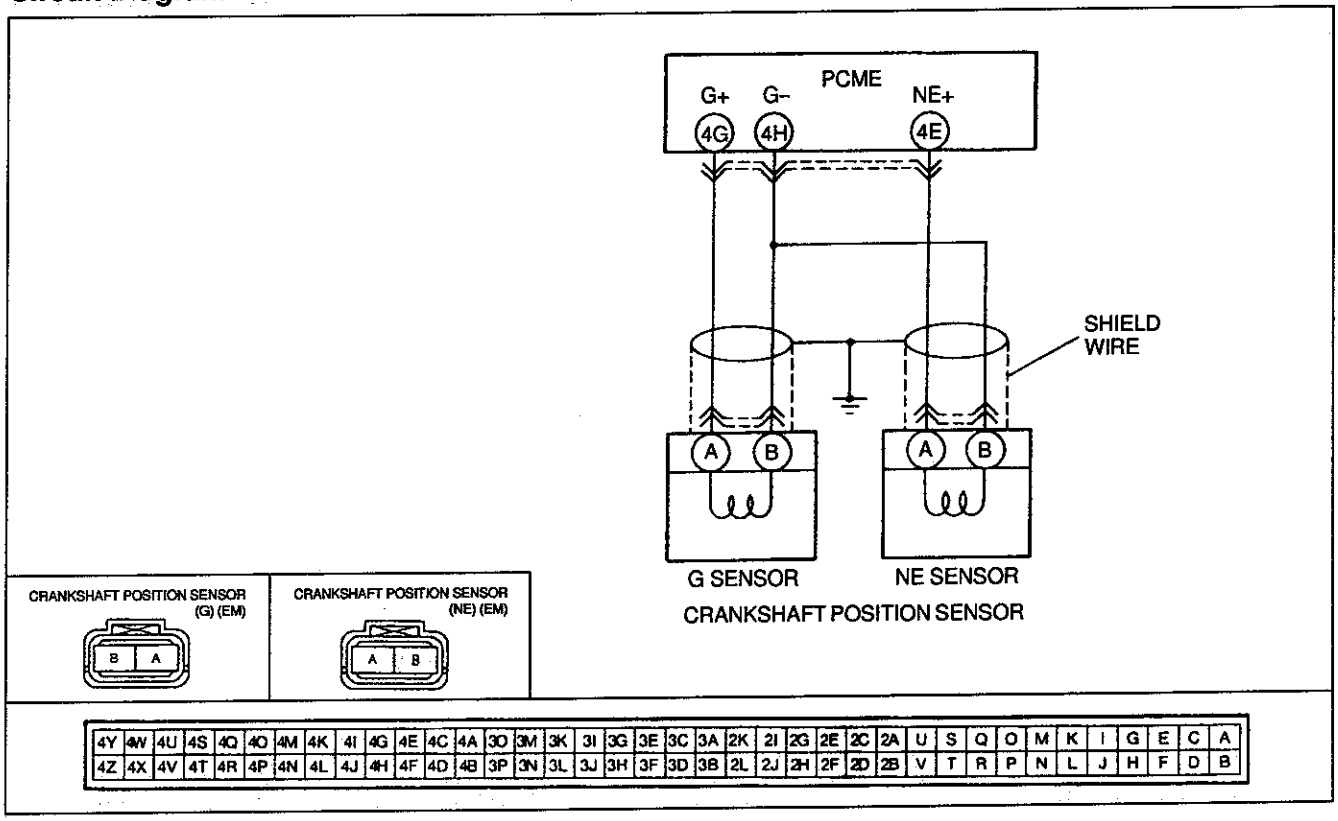
CODE No.	02 (CRANKSHAFT POSITION SENSOR [NE SENSOR])		
STEP	**INSPECTION**		**ACTION**
1	Is Code No.03 also present?	Yes	Go to next step
		No	Go to step 5
2	Does crankshaft position sensor circuit have poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
3	Is resistance of crankshaft position sensor [NE SENSOR] OK? **Resistance: 0.95–1 .25 kΩ (20°F [68°F])**	Yes	Go to next step
		No	Replace crankshaft position sensor [NE SENSOR] **☞page F–166**
4	Is clearance of crankshaft position sensor [NE signal] OK? **Clearance: 1.0–2.0 mm (0.039–0.078 in)**	Yes	Go to next step
		No	Adjust clearance **☞page F–166**
5	Is there continuity between ground and 4E or ground and 4H terminal? (at harness side)	Yes	Check for short circuit in wiring (Crankshaft position sensor–4H or 4E terminal)
		No	Go to next step
6	Disconnect connector from PCME; is resistance between 4E and 4H terminals OK? **Resistance: 0.95–1.25 KΩ (20°C [68°F])**	Yes	Replace PCME **☞page F–150**
		No	Check for open circuit in wiring (Crankshaft position sensor–4H or 4E terminal)

Circuit Diagram



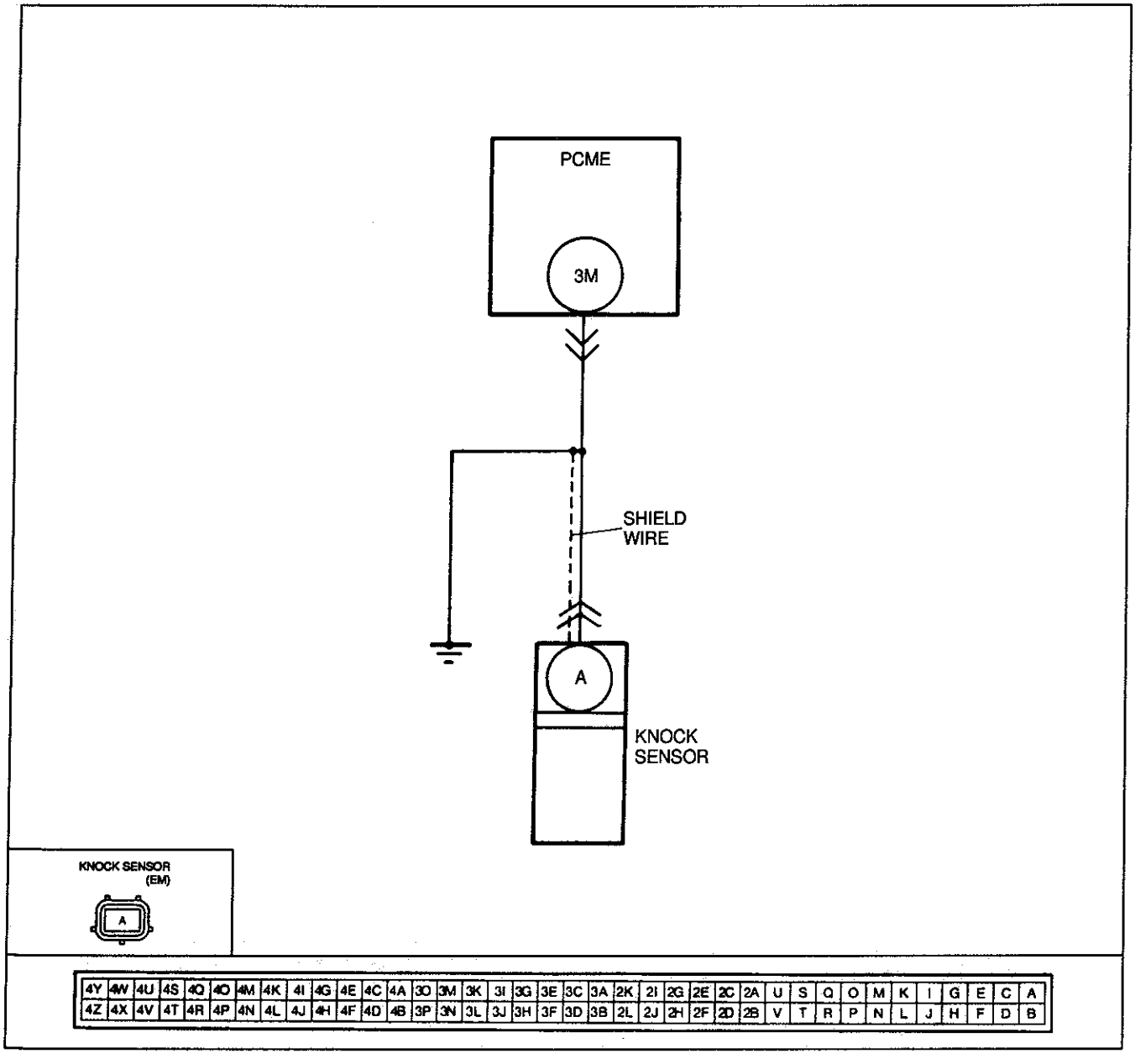
CODE No.	03 (CRANKSHAFT POSITION SENSOR [G SENSOR])		
STEP	INSPECTION		ACTION
1	Is Code No.02 also present?	Yes	Go to next step
		No	Go to step 5
2	Does crankshaft position sensor circuit have poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
3	Is resistance of crankshaft position sensor [G SENSOR] OK? **Resistance: 0.95–1.25 KΩ (20°F [68°F])**	Yes	Go to next step
		No	Replace crankshaft position sensor [G SENSOR] ☞page F–166
4	Is clearance of crankshaft position sensor [G signal] OK? **Clearance: 1.0–2.0 mm (0.039–0.0178 in)**	Yes	Go to step
		No	Adjust clearance ☞page F–166
5	Is there continuity between ground and 4G or ground and 4H terminal? (at harness side)	Yes	Check for short circuit in wiring (Crankshaft position sensor-4H or 4G terminal)
		No	Go to next step
6	Disconnect connector from PCME; is resistance between 4G and 4H terminals OK? **Resistance: 0.95–1.25 KΩ (20°C [68°F])**	Yes	Replace PCME ☞page F–150
		No	check for open circuit in wiring (Crankshaft position sensor–4G or 4H terminal)

Circuit Diagram



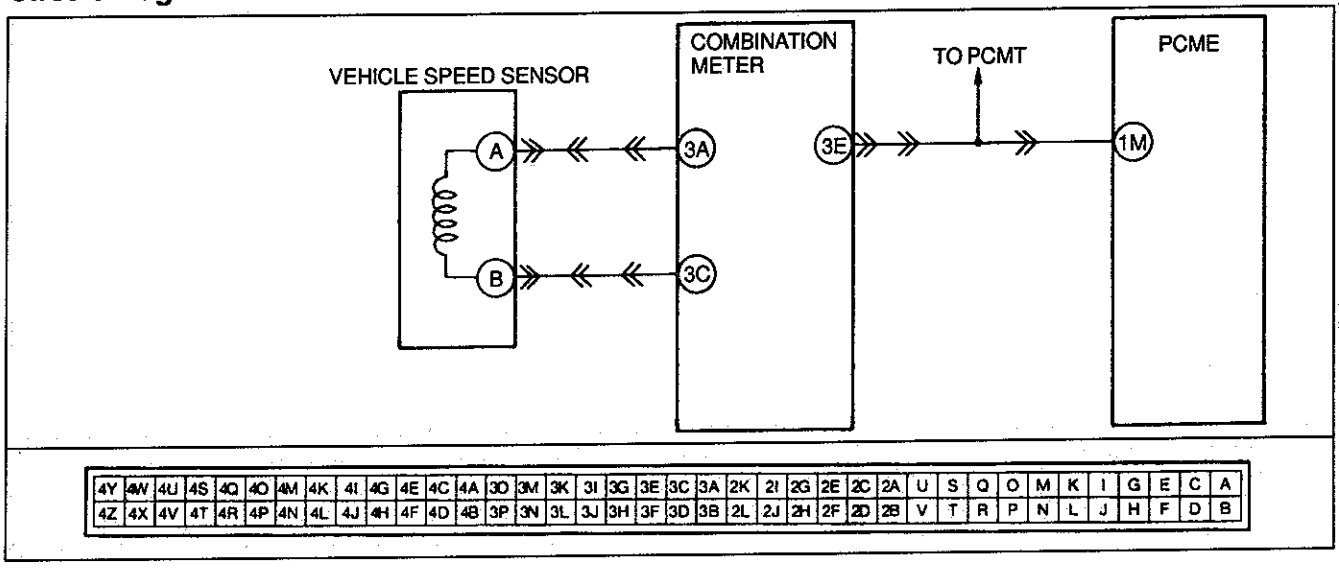
CODE No.	05 (KNOCK SENSOR)		
STEP	INSPECTION		ACTION
1	Does knock sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is there continuity between knock sensor and PCME terminal 3M?	Yes	Check continuity between PCME terminal 3M and ground ⇨ If continuity, repair or replace wiring ⇨ If no continuity, go to next step
		No	Repair wiring harness
3	Try known good knock sensor, is same code No. present?	Yes	Replace PCME ☞page F–166
		No	Replace knock sensor ☞page F–171

Circuit Diagram



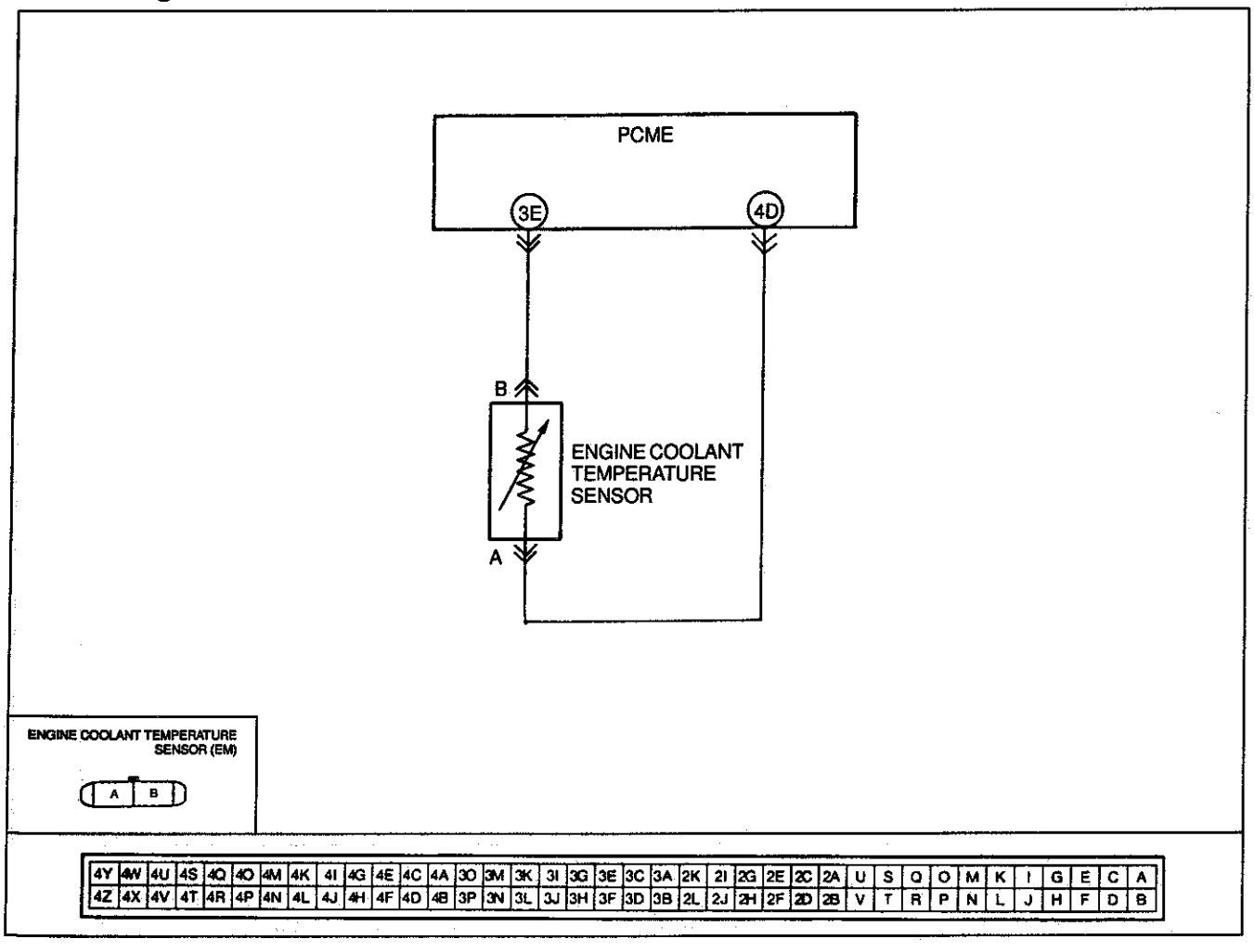
CODE No.	06 (VEHICLE SPEED SENSOR)		
STEP	INSPECTION		ACTION
1	Is speedometer working correctry	Yes	Go to next step
		No	Go to step 5
2	Check for PCMT trouble code Is code No.07 also present?	Yes	Go to step 5
		No	Go to next step
3	Does vehicle speed sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
4	Is there vehicle speed sensor terminal 1M voltage OK? Condition: While driving — Voltage: 2–2.5V Condition: Idle — Voltage: 0V or 4–5V	Yes	Check for open or short circuit wiring harness (Vehicle speed sensor terminal 3E-PCME terminal 1M) ⇨ If OK go to step 8 ⇨ If not OK, repair wiring harness
		No	Go to next step
5	Remove vehicle speed sensor Is resistance felt when turning sensor driven gear by hand?	Yes	Go to next step
		No	Replace vehicle speed sensor
6	Disconnect vehicle speed sensor connector and connect circuit tester Does pointer of circuit fester move slightly when driven gear is slowly turned?	Yes	Go to next step
		No	Replace vehicle speed sensor
7	Disconnect vehicle speed sensor connector Is resistance of sensor OK? **Resistance: Approx. 290 Ω (20°C [68°F]); (reference)**	Yes	Check wiring and connectors from vehicle speed sensor to speedometer ⇨ If OK, go to next step ⇨ It not OK, repair wiring and/or connector
		No	Replace vehicle speed sensor
8	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME ☞page F–150
		No	Intermittent poor connection Check for cause

Circuit Diagram



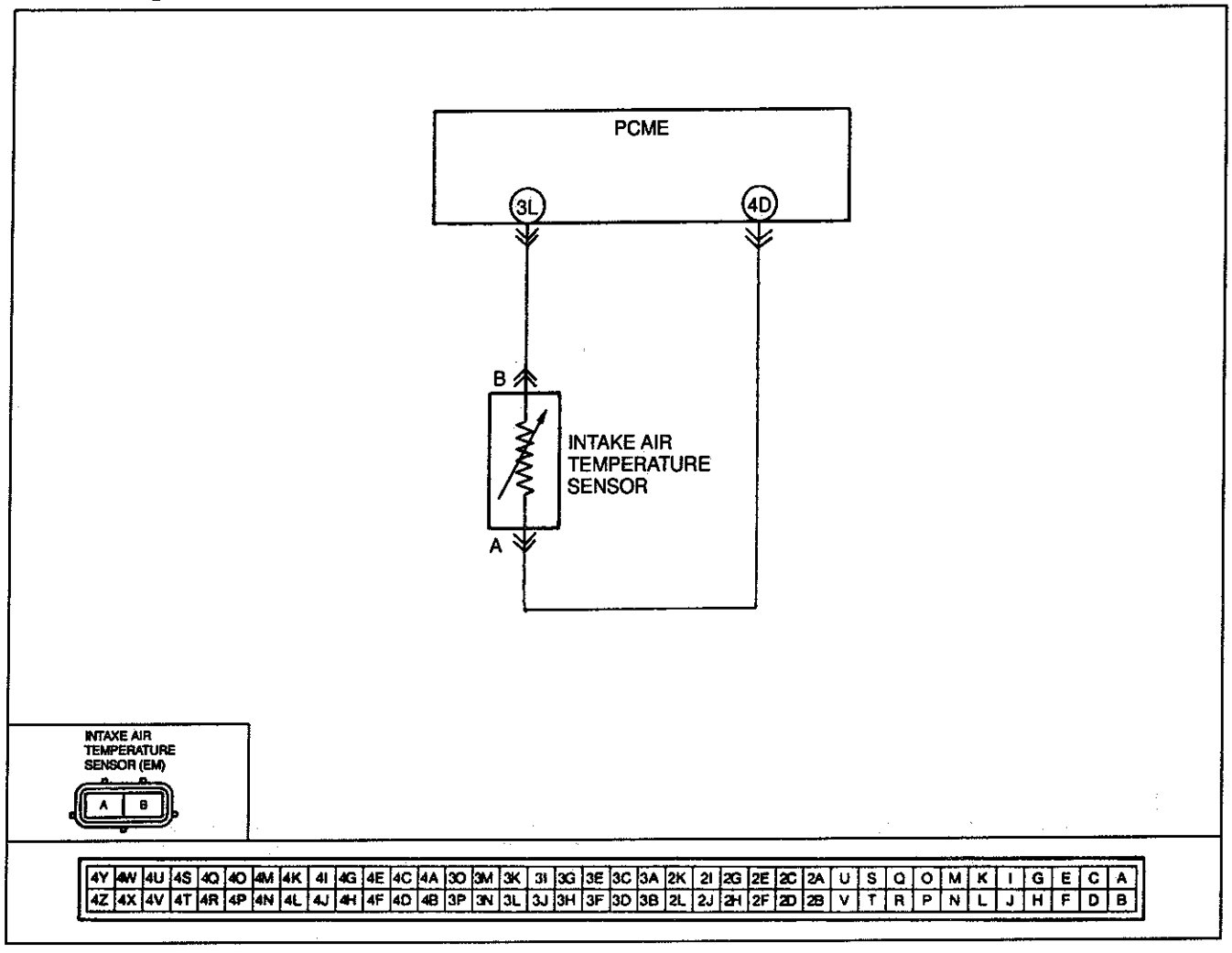
CODE No.	09 (ENGINE COOLANT TEMPERATURE SENSOR)		
STEP	INSPECTION		ACTION
1	Does the engine coolant temperature sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is engine coolant temperature sensor B terminal voltage OK with engine coolant temperature sensor connector disconnected? Condition: Ignition switch ON — Voltage: Approx. 5.0V	Yes	Go to next step
		No	Check for short or open circuit in wiring harness (Engine coolant temperature sensor B terminal-PCME terminal 3E) ⇨ If OK, replace PCME ⇨ If not OK, repair wiring harness
3	Is there continuity between engine coolant temperature sensor A terminal and a ground	Yes	Go to next step
		No	Repair wiring harness
4	Is resistance of engine coolant temperature sensor OK? Coolant temp. −20°C {−4°F}: 14.6–17.8 kΩ Coolant temp. 20°C {68°F}: 2.2–2.7 kΩ Coolant temp. 80°C {176°F}: 0.29–0.35 kΩ	Yes	Replace PCME ☞page F–150
		No	Replace engine coolant temperature sensor ☞page F–169

Circuit Diagram



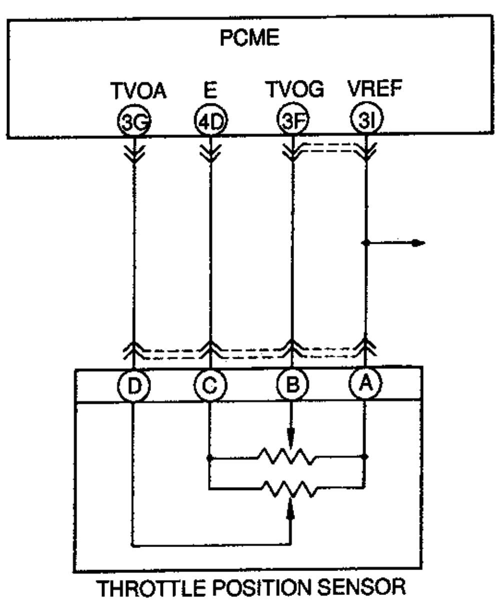
CODE No.	11 (INTAKE AIR TEMPERATURE SENSOR)		
STEP	INSPECTION		ACTION
1	Does the engine coolant temperature sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is Intake air temperature sensor B terminal voltage OK with intake air temperature sensor connector disconnected? Condition: Ignition switch ON — Voltage: Approx. 5.0V	Yes	Go to next step
		No	Check for short or open circuit in wiring harness (Intake air temperature sensor B terminal-PCME terminal 3L) ⇨ If OK, replace PCME ⇨ If not OK, repair wiring harness
3	Is there continuity between intake air temperature sensor A terminal and a ground	Yes	Go to next step
		No	Repair wiring harness
4	Is resistance of intake air temperature sensor OK? Temperature: 20°C {68°F} — Resistance (kΩ): 2.2–2.7 Temperature: 85°C {185°F} — Resistance (kΩ): 0.29–0.35	Yes	Replace PCME ☞page F–150
		No	Replace intake air temperature sensor ☞page F–169

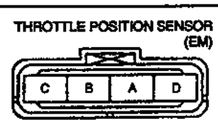
Circuit Diagram

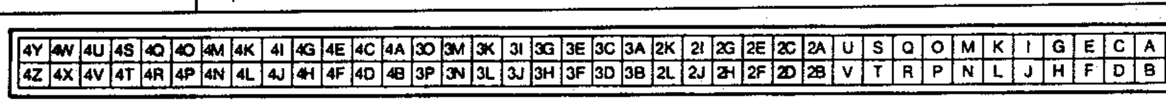


CODE No.	12 (THROTTLE POSITION SENSOR [FULL RANGE])		
STEP	**INSPECTION**		**ACTION**
1	Does throttle position sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is throttle position sensor A terminal voltage OK with throttle position sensor disconnected? **Condition**: Ignition switch ON — **Voltage**: Approx. 5.0V	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Throttle position sensor A terminal-PCME terminal 3I) ⇨ If OK, replace PCME ⇨ If not OK, repair wiring harness
3	Is there continuity between throttle position sensor and PCME? **Throttle position sensor terminal** / **PCME**: D / 3G; C / 4D	Yes	Check for short circuit in wiring harness (Throttle position sensor D terminal-PCME terminal 3G) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is there continuity between terminals A and D with throttle valve closed throttle position to fully opened OK?	Yes	Replace PCME ☞page F-150
		No	Replace throttle position sensor ☞page F-168

Circuit Diagram

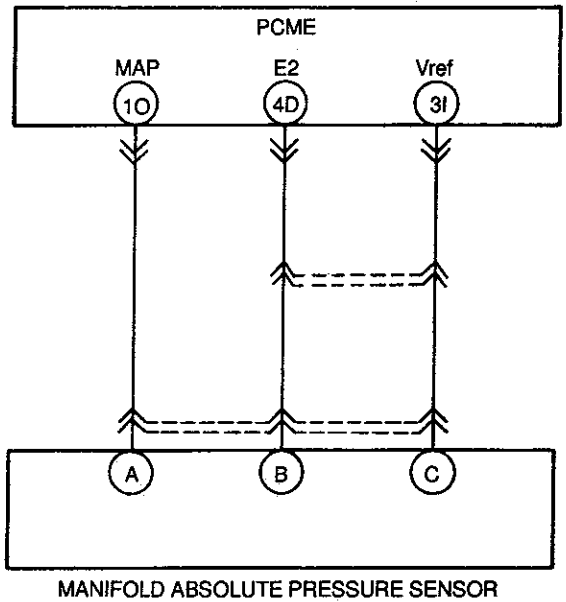




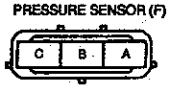


CODE No.	13 (MANIFOLD ABSOLUTE PRESSURE SENSOR)		
STEP	INSPECTION		ACTION
1	Does manifold absolute pressure sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector C terminal voltage OK with manifold absolute pressure sensor connector disconnected? Condition: Ignition switch ON — Voltage: Approx. 5.0V	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (manifold absolute pressure sensor C terminal-PCME terminal 3I
3	Is there continuity between manifold absolute pressure sensor B terminal and PCME terminal 4D	Yes	Go to next step
		No	Repair wiring harness
4	Is output A terminal voltage of manifold absolute pressure sensor OK? 66 kPa {500 mmHg, 19.7 inHg} (Vaccum) — 1.3–1.6V 0 kPa {0 mmHg, 0 inHg} — 2.3–2.8V 98.7 kPa {740 mmHg, 29.1 inHg} (Pressure) — 4.3–4.6V	Yes	Replace PCME ☞page F–150
		No	Replace manifold absolute pressure sensor ☞page F–167

Circuit Diagram



MANIFOLD ABSOLUTE PRESSURE SENSOR

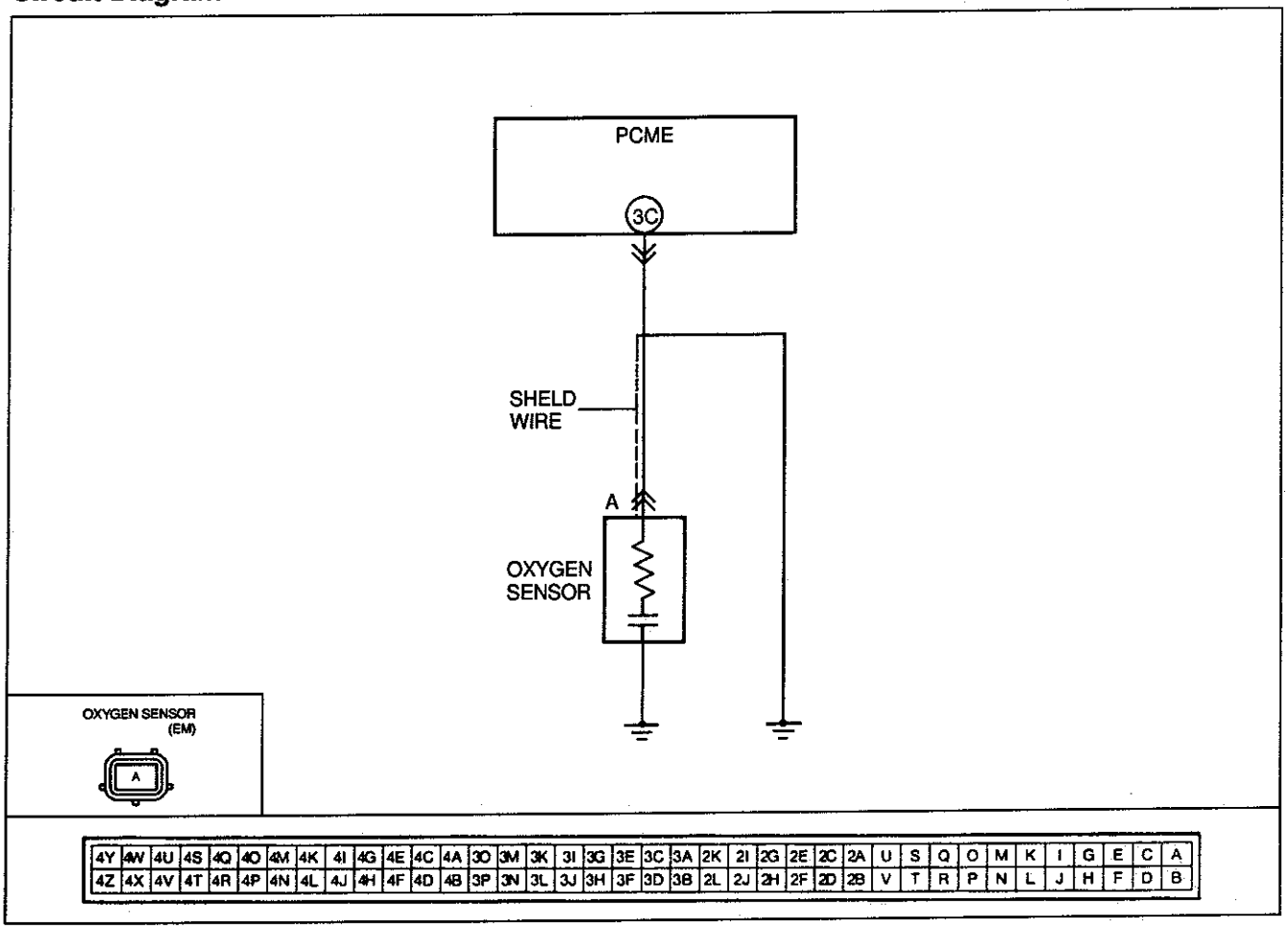


4Y	4W	4U	4S	4Q	4O	4M	4K	4I	4G	4E	4C	4A	3O	3M	3K	3I	3G	3E	3C	3A	2K	2I	2G	2E	2C	2A	U	S	Q	O	M	K	I	G	E	C	A
4Z	4X	4V	4T	4R	4P	4N	4L	4J	4H	4F	4D	4B	3P	3N	3L	3J	3H	3F	3D	3B	2L	2J	2H	2F	2D	2B	V	T	R	P	N	L	J	H	F	D	B

CODE No.	14 (BAROMETRIC ABSOLUTE PRESSURE SENSOR-IN PCME)
STEP	ACTION
1	Replace PCME ☞page F–150

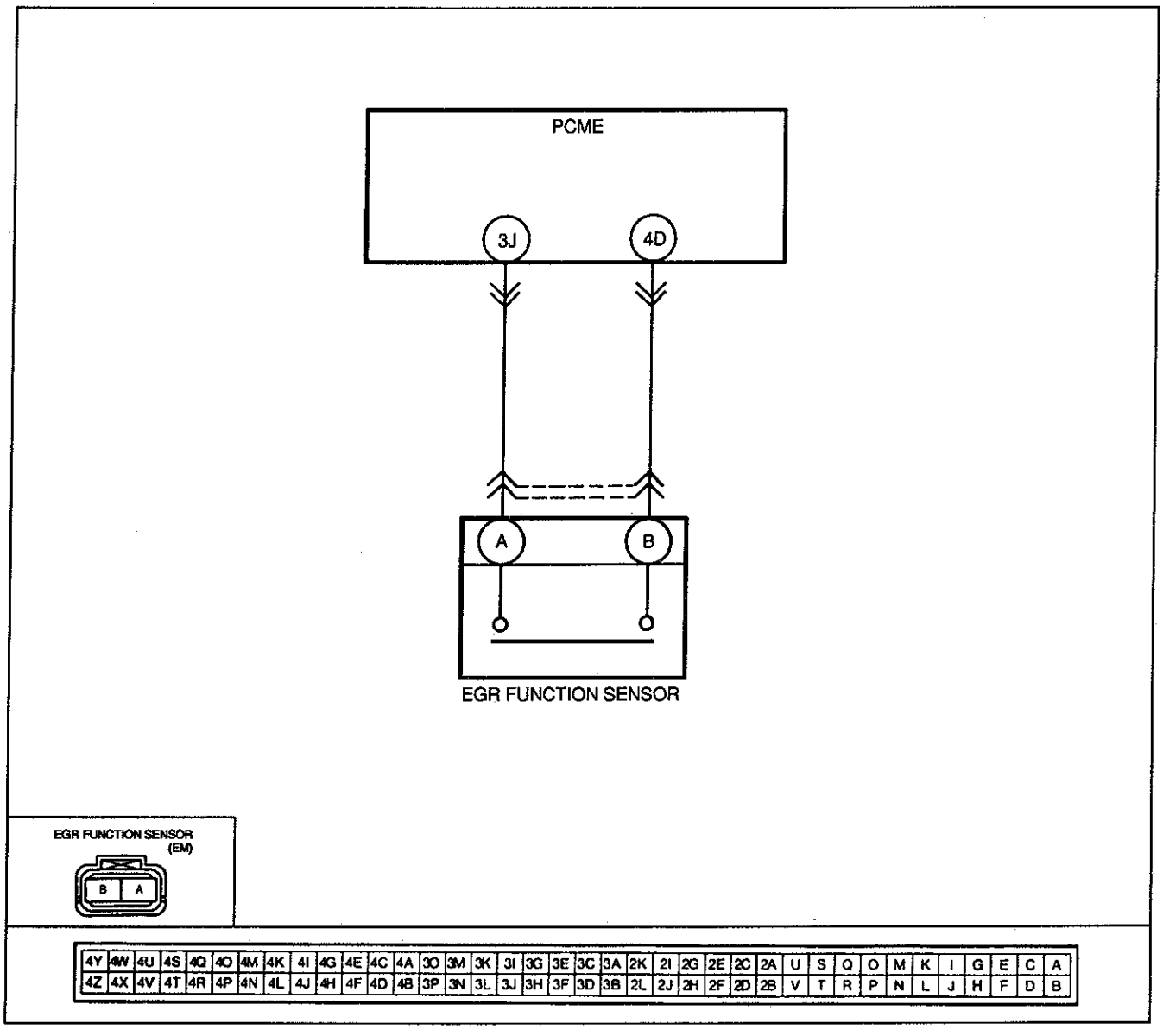
CODE No.	15 (OXYGEN SENSOR-INACTIVATION)		
If Code No.15 and 17 are both present, first perform the checking procedure for Code No.17.			
STEP	INSPECTION		ACTION
1	Does oxygen sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is oxygen sensor output voltage OK?	Yes	Go to next step
		No	Replace oxygen sensor ☞page F–113
3	Is there continuity between oxygen sensor and PCME terminal 3C?	Yes	Check for short circuit in wiring ☞page F–150 ⇨ If OK, replace PCME ⇨ If not OK, repair wire harness
		No	Repair wiring harness

Circuit Diagram



CODE No.	16 (EGR FUNCTION SENSOR)		
STEP	INSPECTION		ACTION
1	Does EGR function sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with EGR function sensor connector disconnected.	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (EGR function sensor A terminal-PCME terminal 3J)
3	Is there continuity between EGR function sensor B terminal and PCME terminal 4D?	Yes	Go to next step
		No	Repair wiring harness
4	Is EGR function sensor OK? ☞page F-127	Yes	Replace PCME ☞page F-150
		No	Replace EGR valve

Circuit Diagram

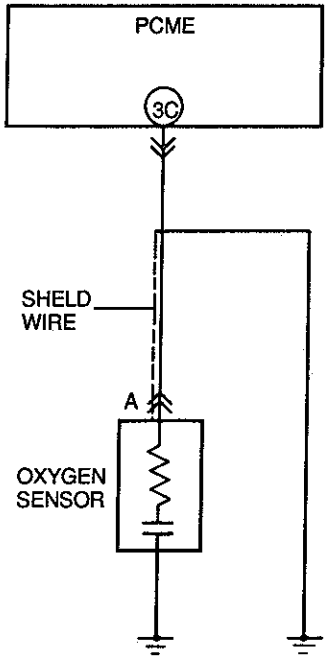


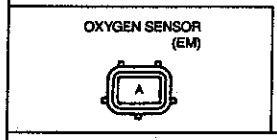
CODE No.	17 (OXYGEN SENSOR (INVERSION))		
STEP	INSPECTION		ACTION
1	Is the same Code No. present following after repair procedure? ☞page F-66	Yes	Go to next step
		No	Check oxygen sensor circuit for a poor connection ⇨ If OK, perform troubleshooting Code No.15
2	Does monitor lamp of Self-Diagnosis Checker illuminate at idle after the engine has been warmed up and run at **2500–3000 rpm** for **3 min**?	Yes	Go to next step A/F mixture rich
		No	Go to Step 6 A/F mixture is lean or misfire is occurring
3	Is there air leakage in intake air system components?	Yes	Go to next step
		No	Repair or replace ☞page F-76
4	Is fuel line pressure correct at idle? ☞page F-104 **Fuel line pressure:** **190–220 kPa {1.9–2.3 kgf/cm 2, 28–32 psi}**	Yes	Go to next step
		No	**High pressure** ☞page F-104 Check if fuel return hose is clogged or restricted ⇨ If OK, replace pressure regulator
5	Is there fuel leakage at injector? ☞page F-107	Yes	Replace injector ☞page F-105
		No	Check engine coolant temperature sensor? ☞page F-169 ⇨ If it is OK, replace oxygen sensor ⇨ If it is not OK, replace it
6	Disconnect each high tension lead at idle; does engine speed decrease equally at each rotor?	Yes	Go to next step
		No	Go to Step 8
7	Is fuel line pressure correct at idle? ☞page F-97 **Fuel line pressure:** **190–220 kPa {1 .9–2.3 kgf/cm2, 28–32 psi}**	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If it **quickly** increases, check pressure regulator ☞page F-104 ⇨ If it **gradually** increases, check for clogging between fuel pump and pressure regulator ⇨ If hose is not clogged, check fuel pump maximum pressure ☞page F-101
8	Is there a misfire of a dead rotor from step 6 inspection?	Yes	Repair or replace ignition system component(s)
		No	Go to next step

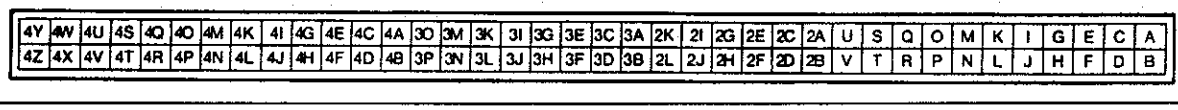
B+: Battery positive voltage

STEP	INSPECTION		ACTION
9	Is there an injector operating sound at idle of dead rotor from step 6 inspection?	Yes	Go to next step
		No	Check for approx. B+ at injector terminal wire ⇨ If there is, replace injector ☞page F–105 ⇨ If there is not, check for a short or open circuit in wire harness
10	Replace injector at dead rotor from step 6 inspection ☞page F–105 Is the same Code No. present following afterrepair procedure?	Yes	Try known good oxygen sensor ⇨ If it is OK, replace oxygen sensor ⇨ If it is not OK, replace PCME
		No	System OK

Circuit Diagram

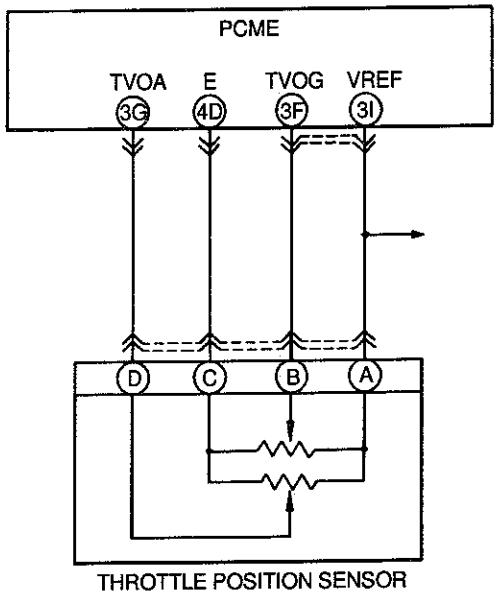




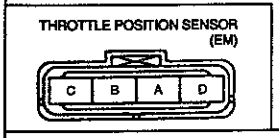


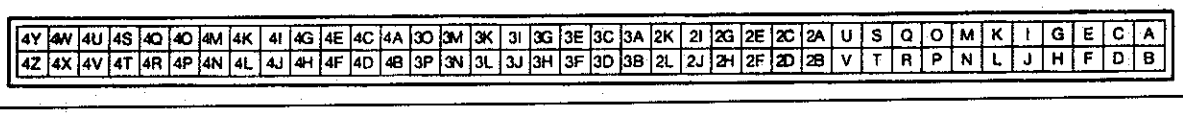
CODE No.	18 (THROTTLE POSITION SENSOR [NARROW RANGE])		
STEP	INSPECTION		ACTION
1	Does throttle position sensor circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is throttle position sensor A terminal voltage OK with throttle position sensor disconnected? Condition: Ignition switch ON — Voltage: Approx. 5.0V	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Throttle position sensor A terminal -PCME terminal 3I) ⇨ If OK, replace PCME ⇨ If not OK, repair wiring harness
3	Is there continuity between throttle position sensor and PCME? Throttle position sensor terminal: B — PCME: 3F Throttle position sensor terminal: C — PCME: 4D	Yes	Check for short circuit in wiring harness (Throttle position sensor B terminal-PCME terminal 3F) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is there continuity between terminals A and B with throttle valve closed to fully opened OK?	Yes	Replace PCME ☞page F–150
		No	Replace throttle position sensor ☞page F–168

Circuit Diagram



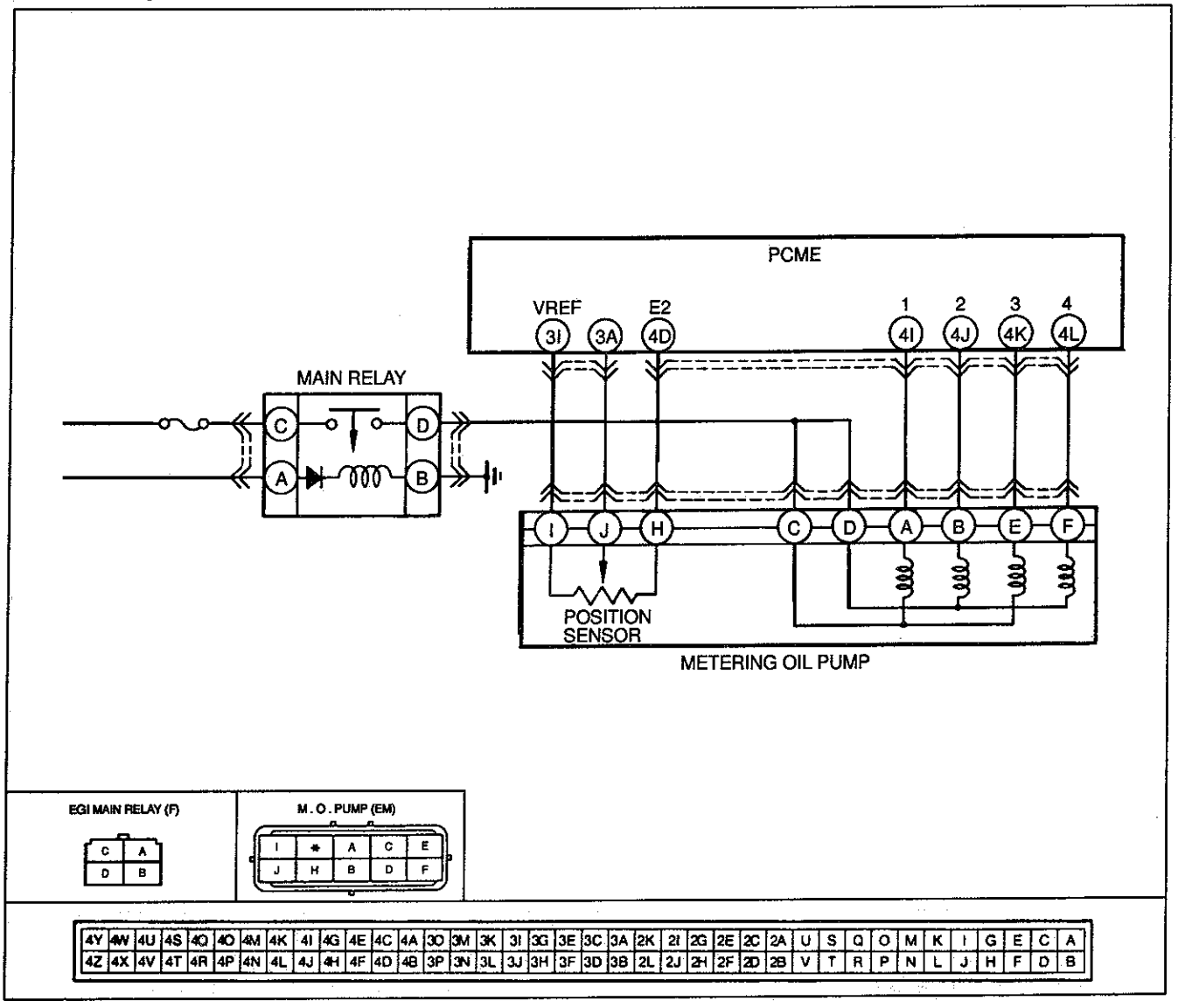
THROTTLE POSITION SENSOR





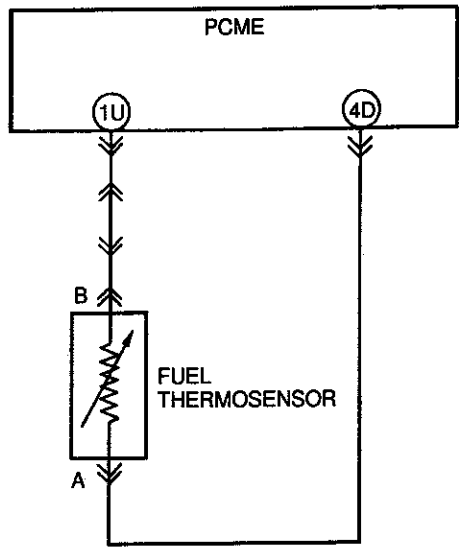
CODE No.	20 (METERING OIL PUMP POSITION SENSOR)		
STEP	INSPECTION		ACTION
1	Are there any poor connections at metering oil pump and PCME connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCME terminal 3A voltage OK? Condition: Idle — Voltage: 1.1V Condition: Acceleration — Voltage: 1.1V–4.2V	Yes	Go to step 4
		No	Go to next step
3	Is resistance of MOP position sensor OK? Resistance: J–H 0.4–12 kΩ J–I 1.0–2 kΩ H–I 9.4–12 kΩ	Yes	Repair wiring harness (Mop position sensor-PCME terminal 3A)
		No	Replace MOP
4	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME
		No	Intermittent poor connection check for cause.

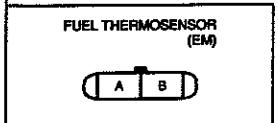
Circuit Diagram

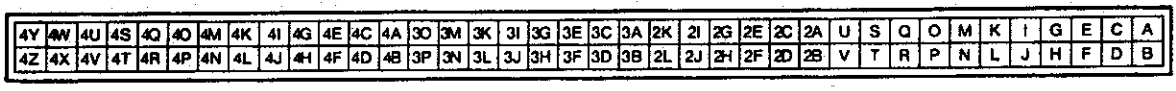


CODE No.	23 (FUEL THERMOSENSOR)		
STEP	INSPECTION		ACTION
1	Does the fuel thermosensor circuit have a poor connection?	Yes	Repair connector and/or harness
		No	Go to next step
2	Is fuel thermosensor B terminal voltage OK with fuel thermosensor connector disconnected? Condition: Ignition switch ON — Voltage: Approx. 5.0V	Yes	Go to next step
		No	Check for short or open circuit in wiring harness (Fuel thermosensor B terminal -PCME terminal 1U) ⇨ If OK, replace PCME ⇨ If not OK, repair wiring harness
3	Is there continuity between fuel thermosensor A terminal and a ground?	Yes	Go to next step
		No	Repair wiring harness
4	Is resistance of fuel thermosensor OK? Fuel temp: –20°C {–4°F} — Resistance {kΩ}: 14.6–17.8 Fuel temp: 20°C {68°F} — Resistance {kΩ}: 2.2–2.7 Fuel temp: 80°C {176°F} — Resistance {kΩ}: 0.29–0.35	Yes	Replace PCME ☞page F–150
		No	Replace fuel thermosensor ☞page F–170

Circuit Diagram

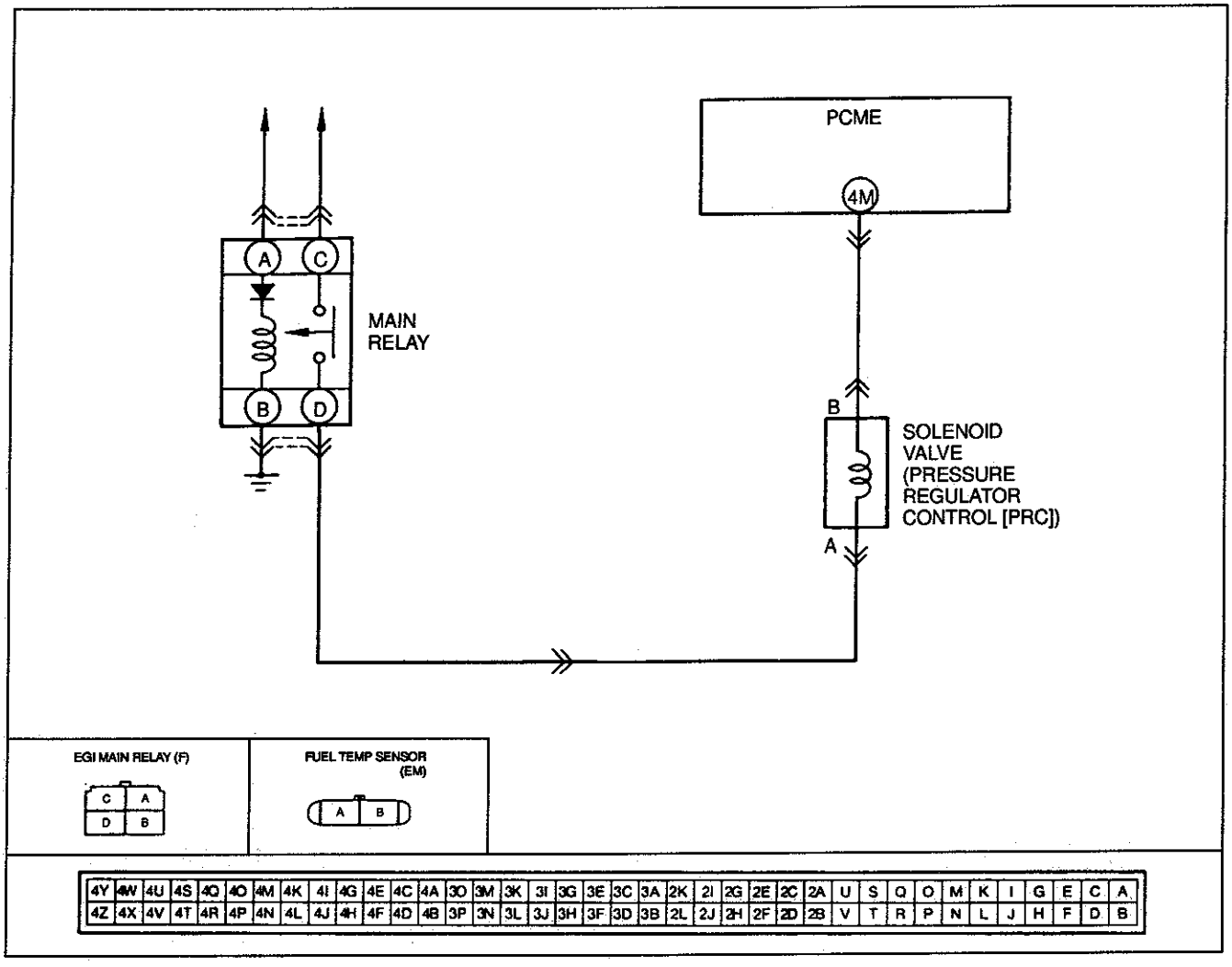






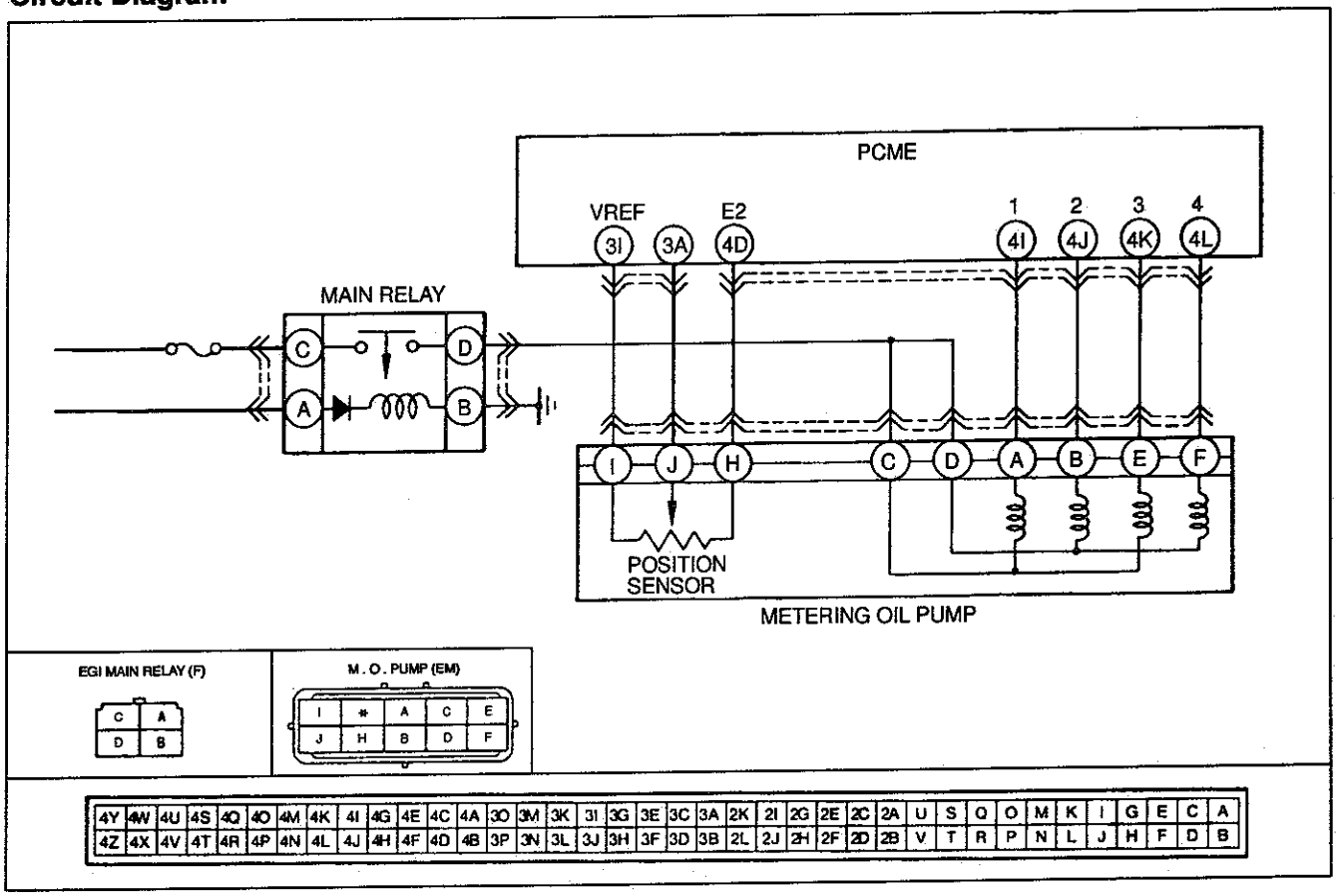
CODE No.	25 (SOLENOID VALVE–PRESSURE REGULATOR CONTROL [PRC])		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve A terminal–Main relay D terminal)
3	Is there continuity between solenoid valve B terminal and PCME terminal 4M?	Yes	Check for short circuit in wiring harness (Solenoid valve B terminal–PCME terminal 4M) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



CODE No.	26 (METERING OIL PUMP STEPPING MOTOR)		
STEP	INSPECTION		ACTION
1	Are there any poor connections at metering oil pump and PCME connector?	Yes	Repair or replace connector
		No	Go to next step
2	Is resistance of MOP stepping motor OK? terminal: C – SM A, C – SM E, D – SM B, D – SM F Resistance {kΩ}: 16–31	Yes	Go to next step
		No	Replace MOP
3	Is continuity between MOP stepping motor and PCME terminals OK? MOP terminal / PCME terminal: SM A – 4I; SM B – 4J; SM E – 4K; SM F – 4L	Yes	Repair wiring harness (MOP-Main relay)
		No	Repair wiring harness (MOP-PCME terminals)
4	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME
		No	Intermittent poor connection check for cause

Circuit Diagram



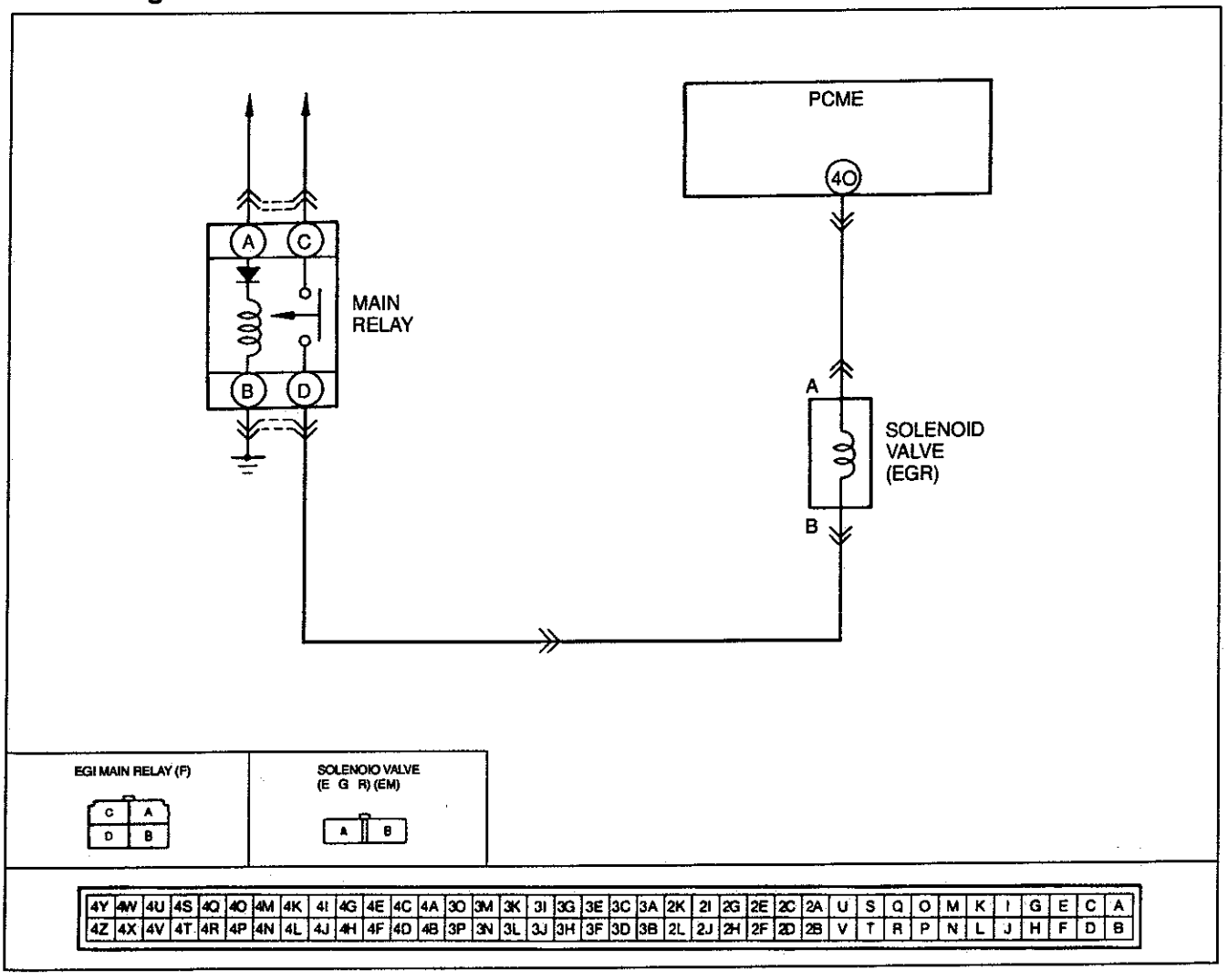
B+: Battery positive voltage

<table>
<tr><th>CODE No.</th><th colspan="3">27 (METERING OIL PUMP)</th></tr>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>1</td><td>Are there any poor connections at metering oil pump and PCME connector?</td><td>Yes</td><td>Repair or replace connector</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>2</td><td>Is PCME terminal 3A voltage OK?
<table><tr><th>Condition</th><th>Voltage</th></tr><tr><td>Idle</td><td>1.1V</td></tr><tr><td>Acceleration</td><td>1.0V–4.2V</td></tr></table></td><td>Yes</td><td>Go to step 4</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>3</td><td>Is resistance of MOP position sensor OK?
Resistance: J–H 0.4–12 kΩ
J–I 10–2 kΩ
H–I 0.4–12 kΩ</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace MOP</td></tr>
<tr><td>4</td><td>Is PCME terminals voltage OK?
Specification: (Idle)
<table><tr><th>Stepping Motor</th><th>PCME terminal</th><th>Output voltage</th></tr><tr><td>SM A</td><td>4I</td><td rowspan="4">One terminal: B+
Three terminals: 5–9 V</td></tr><tr><td>SM B</td><td>4J</td></tr><tr><td>SM E</td><td>4K</td></tr><tr><td>SM F</td><td>4L</td></tr></table></td><td>Yes</td><td>Go to step 7</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>5</td><td>Is resistance of MOP stepping motor OK?
<table><tr><th>terminal</th><th>Resistance { kΩ}</th></tr><tr><td>C – SM A</td><td rowspan="4">16–31</td></tr><tr><td>C – SM E</td></tr><tr><td>D – SM B</td></tr><tr><td>D – SM F</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace MOP</td></tr>
<tr><td>6</td><td>Is continuity between MOP stepping motor and PCME terminals OK?
<table><tr><th>MOP terminal</th><th>PCME terminal</th></tr><tr><td>SM A</td><td>4I</td></tr><tr><td>SM B</td><td>4J</td></tr><tr><td>SM E</td><td>4K</td></tr><tr><td>SM F</td><td>4L</td></tr></table></td><td>Yes</td><td>Repair wiring harness (MOP-Main relay)</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair wiring harness (MOP-PCME terminals)</td></tr>
<tr><td>7</td><td>Disconnect negative battery cable for at least 20 seconds
Connect battery cable and recheck for trouble code
Is trouble code displayed?</td><td>Yes</td><td>Replace PCME</td></tr>
<tr><td></td><td></td><td>No</td><td>Intermittent poor connection check for cause</td></tr>
</table>

Circuit Diagram
(Refer to page F–42)

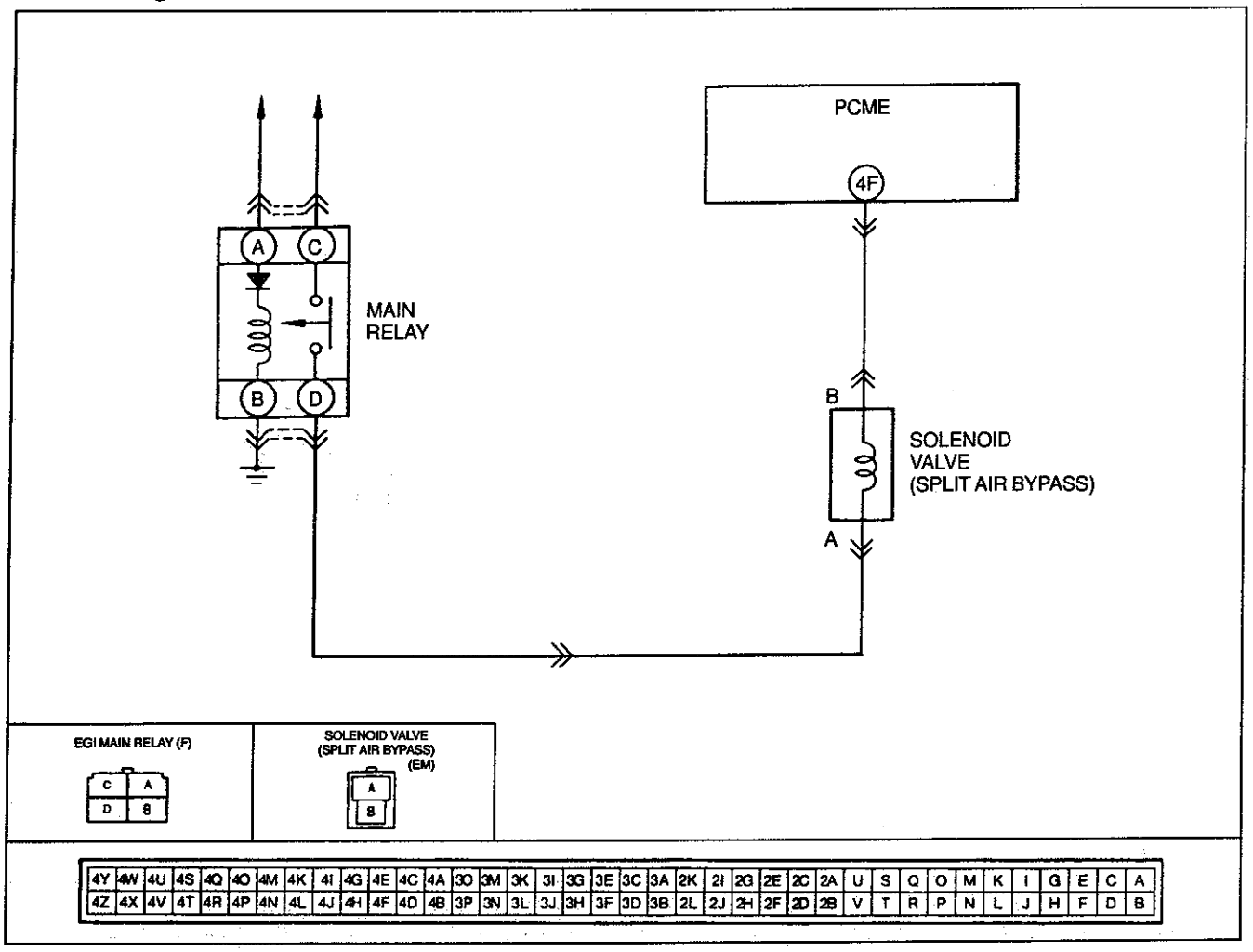
CODE No.	28 (SOLENOID VALVE–EGR)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there Continuity between solenoid valve A terminal and PCME terminal 4O?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4O) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



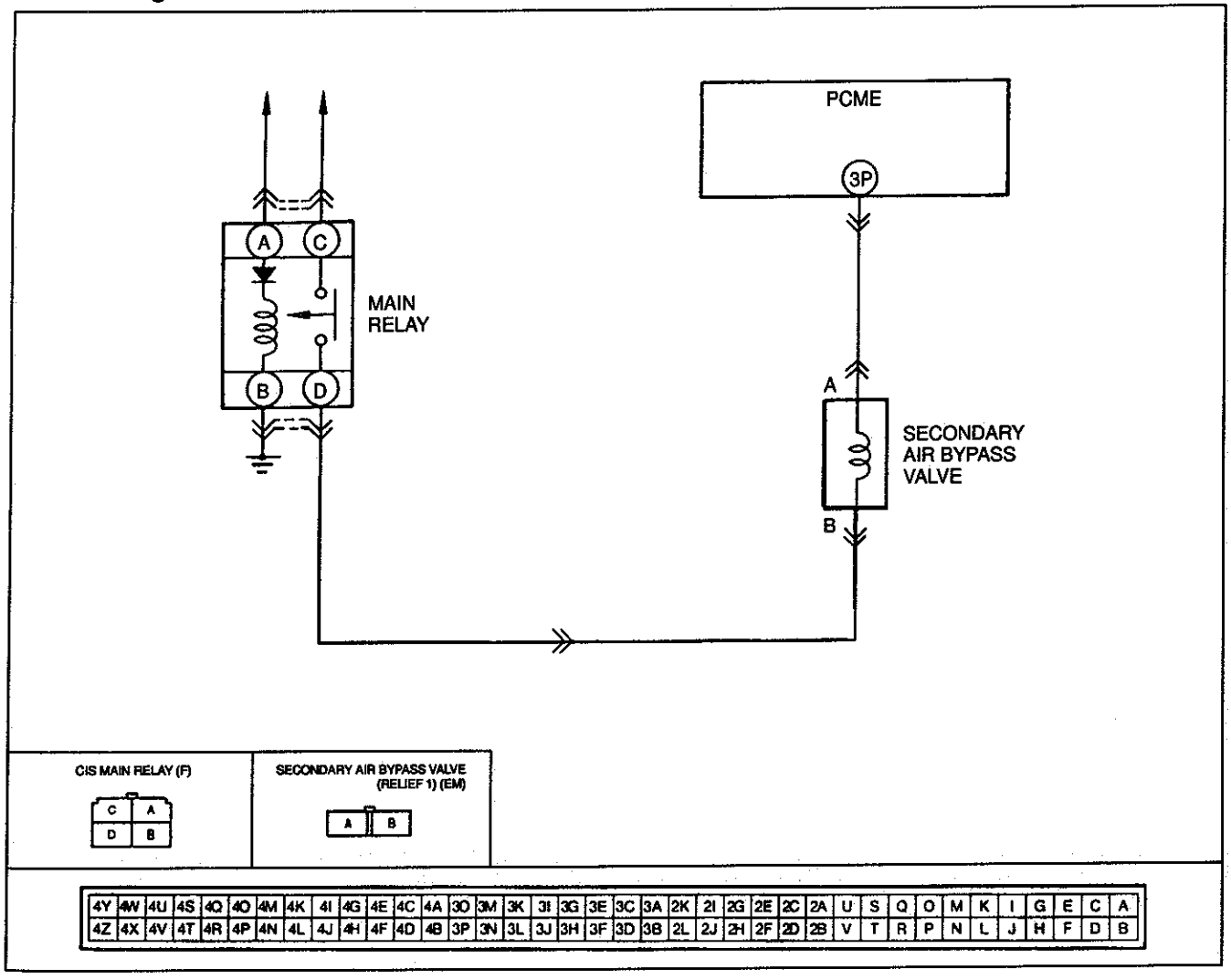
CODE No.	30 (SOLENOID VALVE–SPLIT AIR BYPASS)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve A terminal–Main relay D terminal)
3	Is there continuity between solenoid valve B terminal and PCME terminal 4F?	Yes	Check for short circuit in wiring harness (Solenoid valve B terminal–PCME terminal 4F) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–120	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



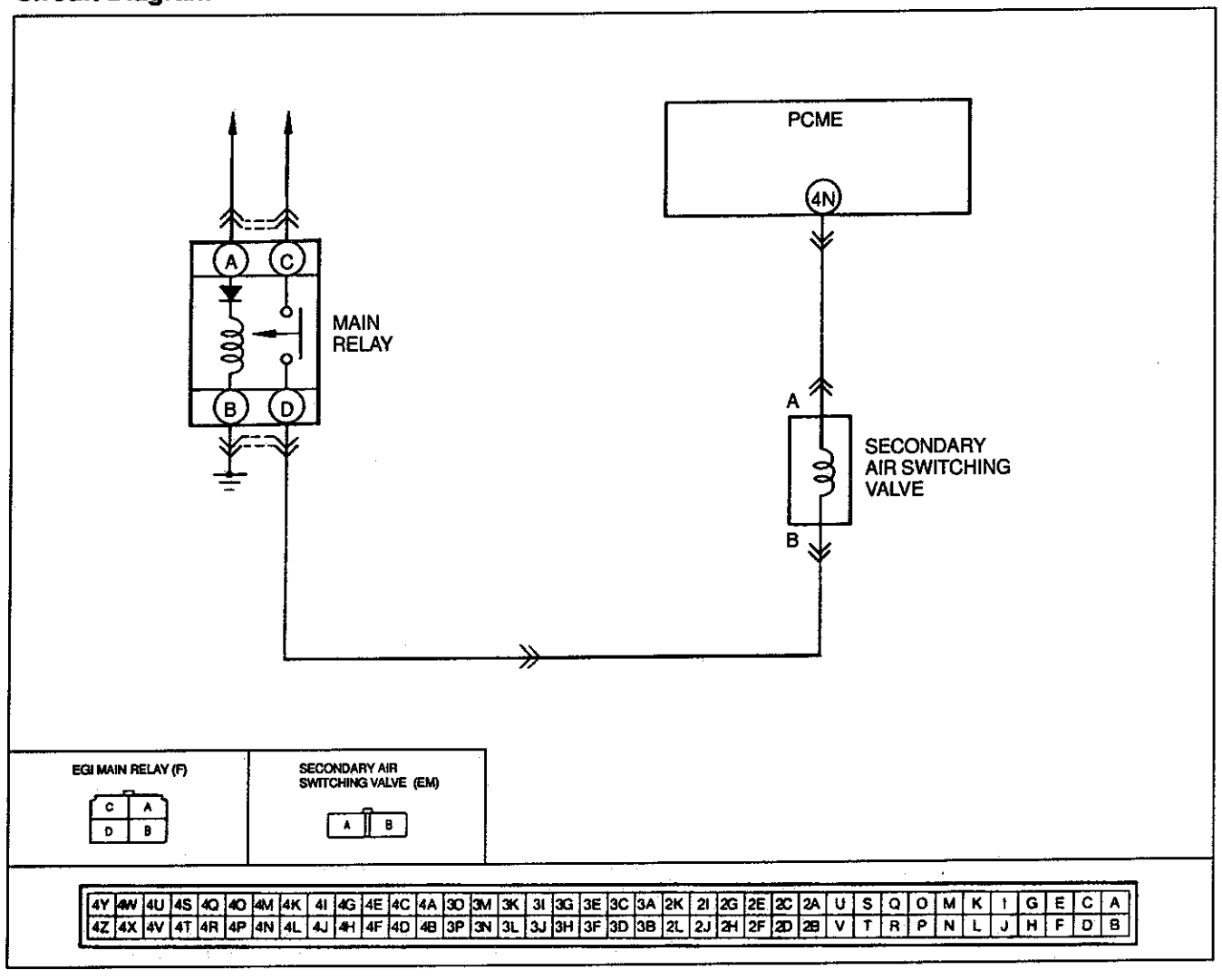
CODE No.	31 (SECONDARY AIR BYPASS VALVE)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 3P?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 3P) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–123	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



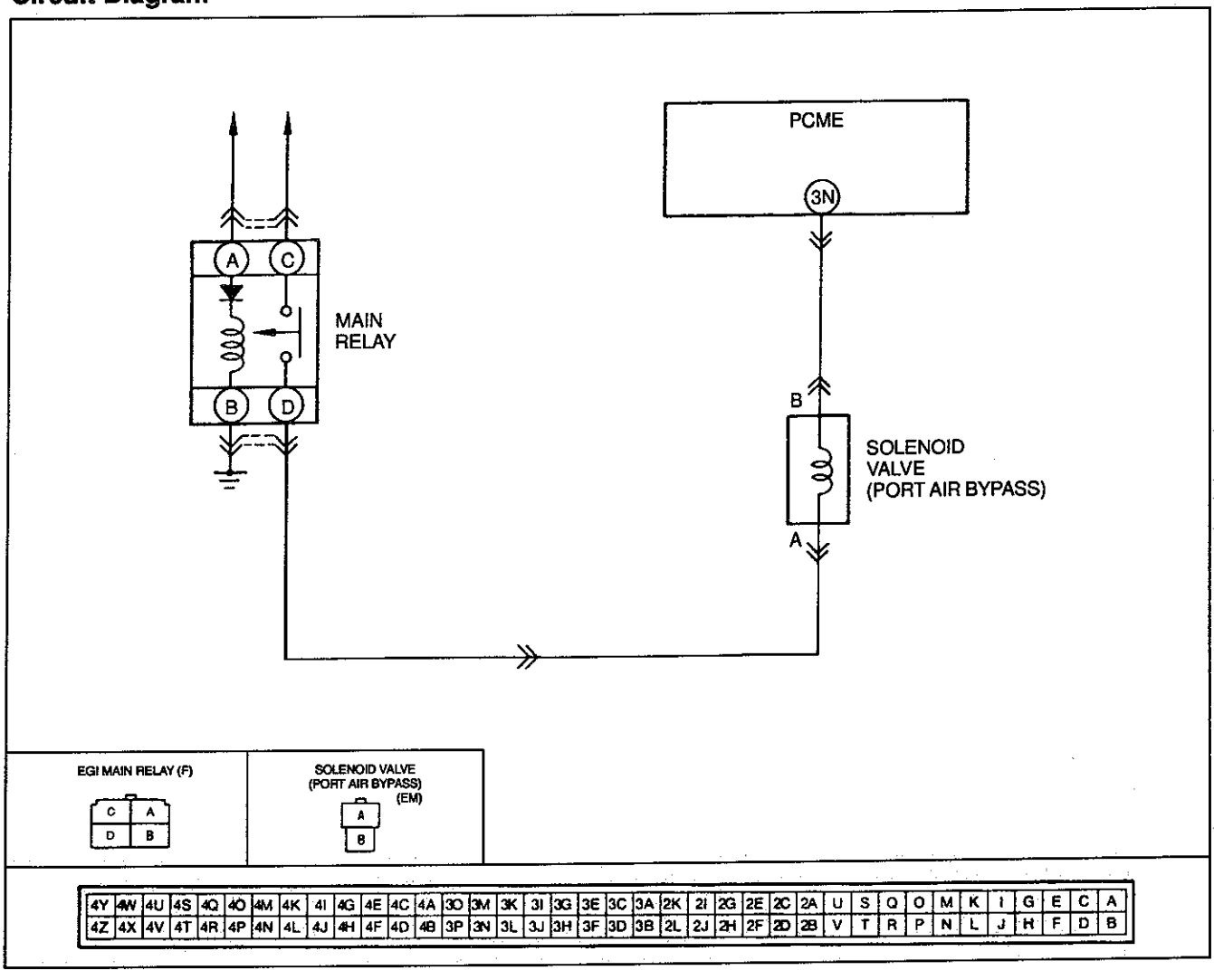
CODE No.	32 (SECONDARY AIR SWITCHING VALVE)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4N?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4N) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



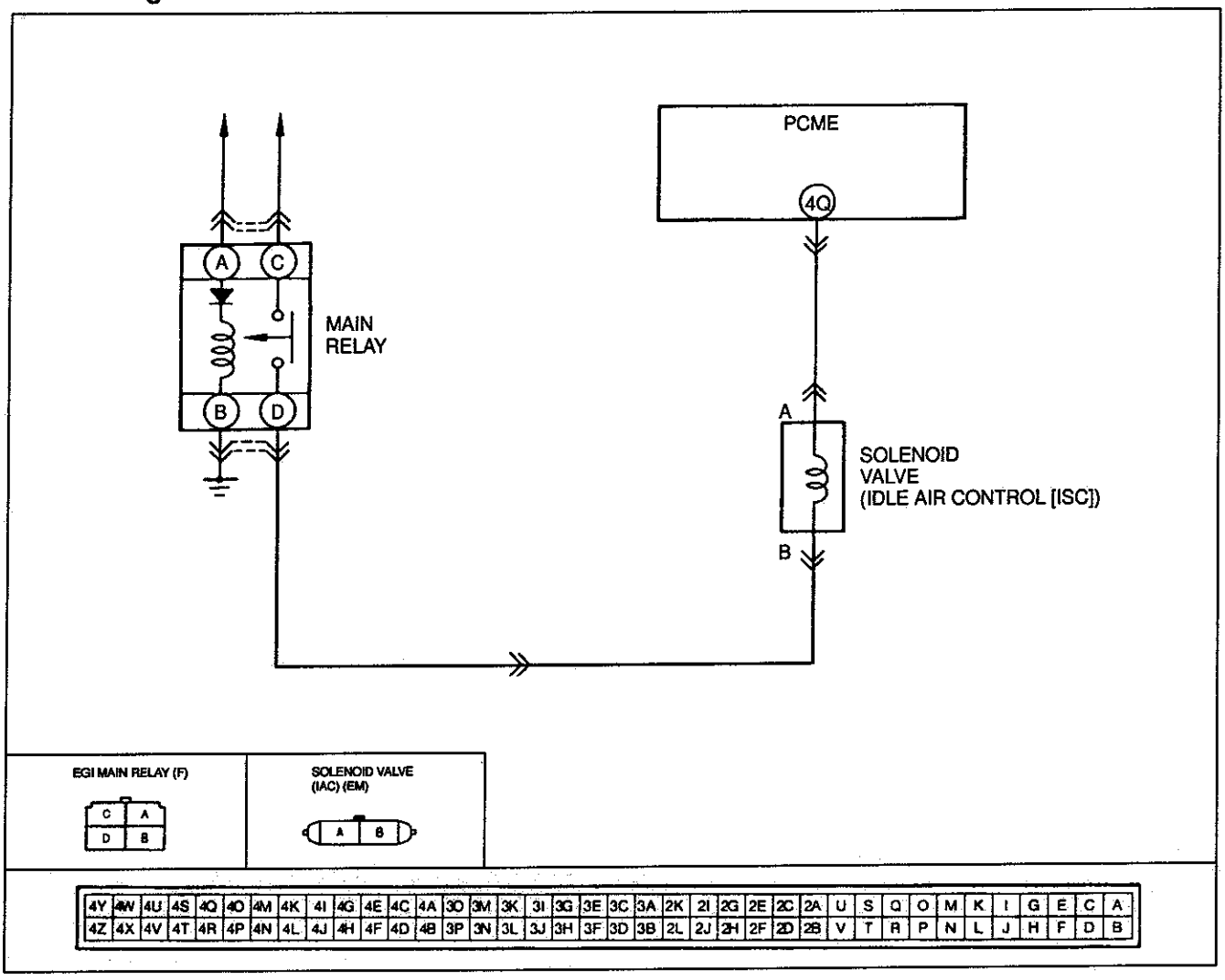
CODE No.	33 (SOLENOID VALVE–PORT AIR BYPASS)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve A terminal–Main relay D terminal)
3	Is there continuity between solenoid valve B terminal and PCME terminal 3N?	Yes	Check for short circuit in wiring harness (Solenoid valve B terminal–PCME terminal 3N) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–119	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



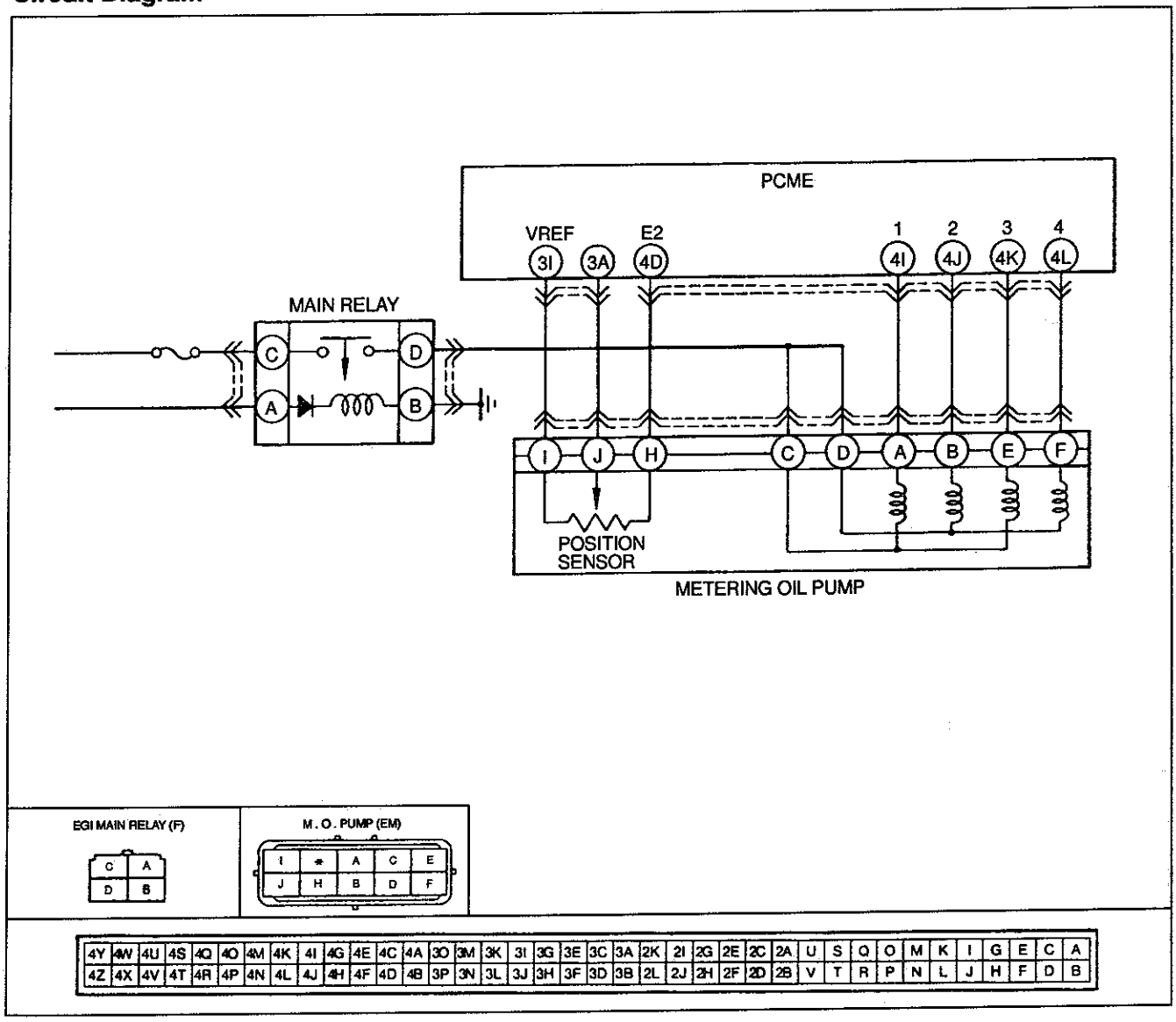
CODE No.	34 (SOLENOID VALVE–IDLE AIR CONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4Q?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4Q) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–83	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



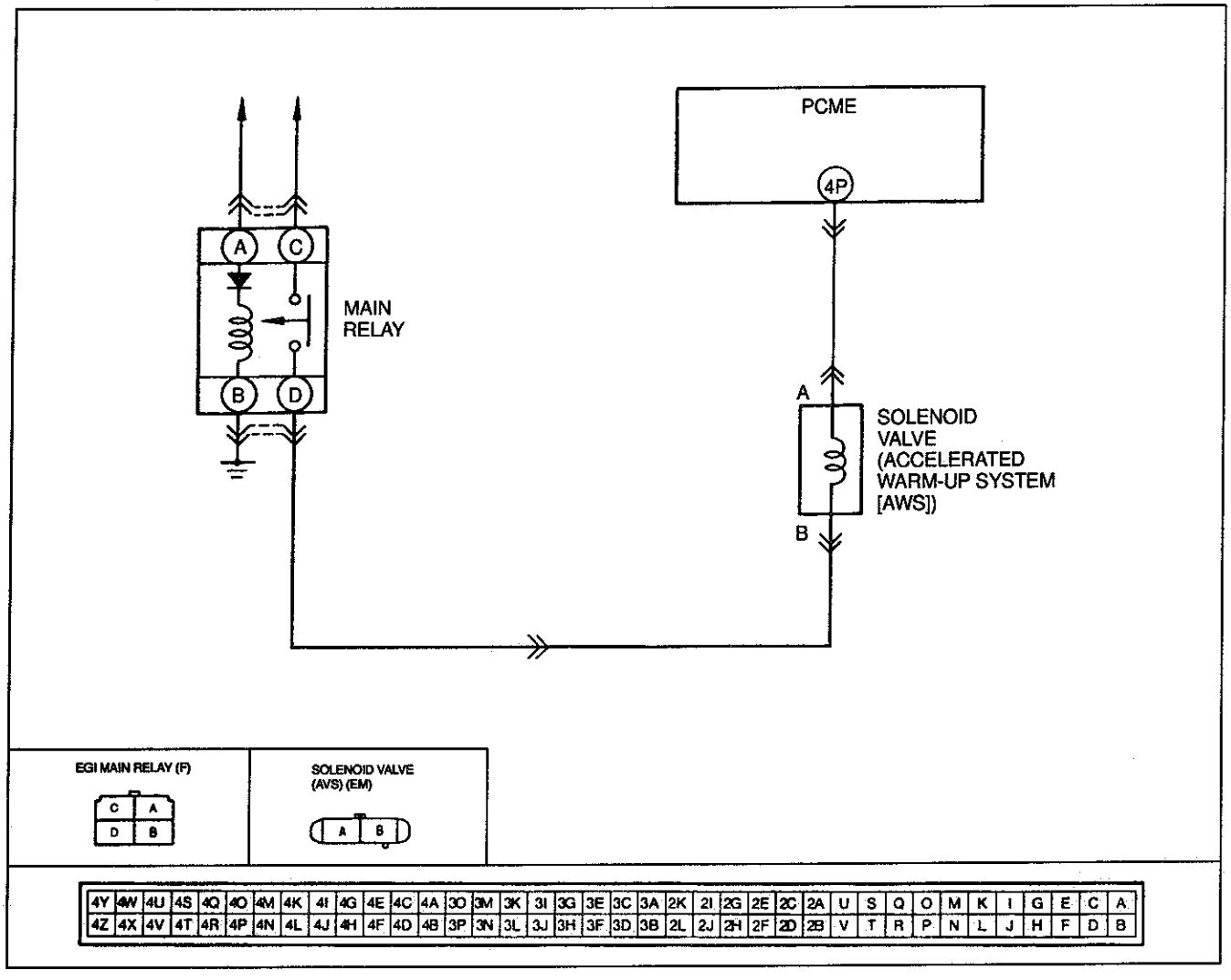
CODE No.	37 (METERING OIL PUMP)		
STEP	INSPECTION		ACTION
1	Is battery positive voltage OK? **Specification: 12–14V (at Idle)**	Yes	Go to next step
		No	Repair charging system and/or Battery
2	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME ☞page F–150
		No	Intermittent poor connection Check for cause

Circuit Diagram



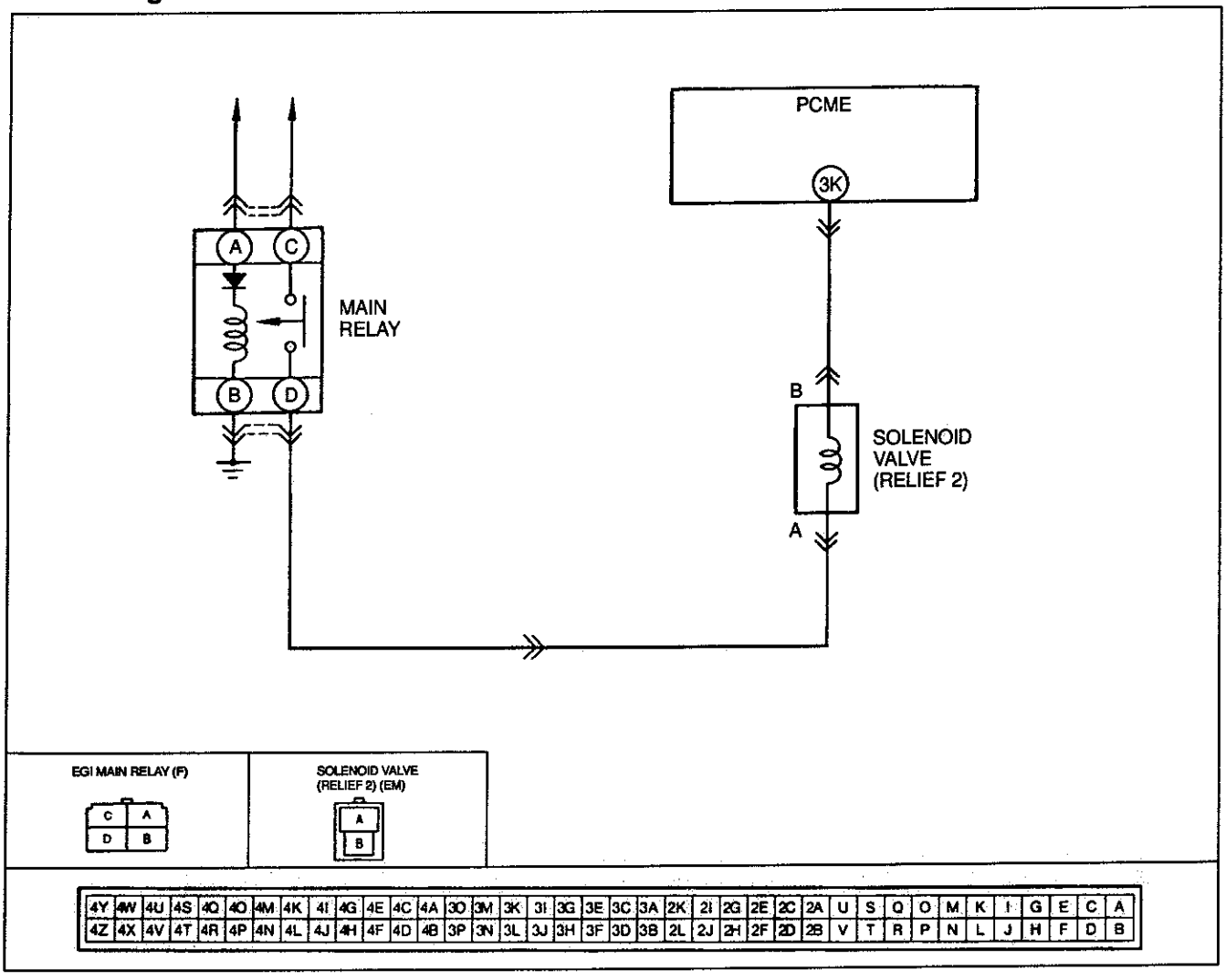
CODE No.	38 (SOLENOID VALVE–ACCELERATED WARM-UP SYSTEM [AWS])		
STEP	**INSPECTION**		**ACTION**
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? **Condition**: Ignition switch ON; **Voltage**: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4P?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4P) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–83	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



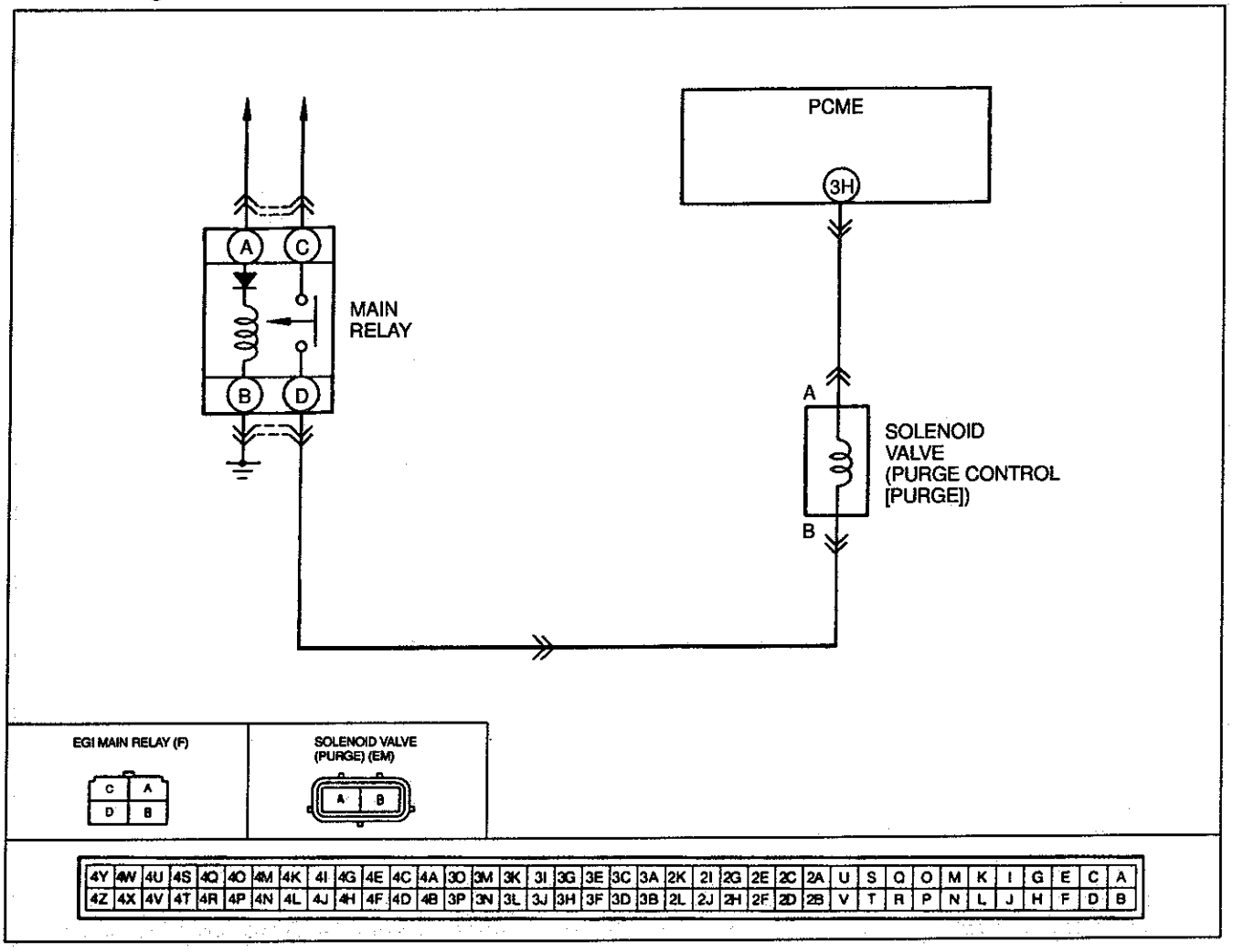
CODE No.	39 (SOLENOID VALVE–RELIEF 2)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve A terminal–Main relay D terminal)
3	Is there continuity between solenoid valve B terminal and PCME terminal 3K?	Yes	Check for short circuit in wiring harness (Solenoid valve B terminal–PCME terminal 3K) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–123	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



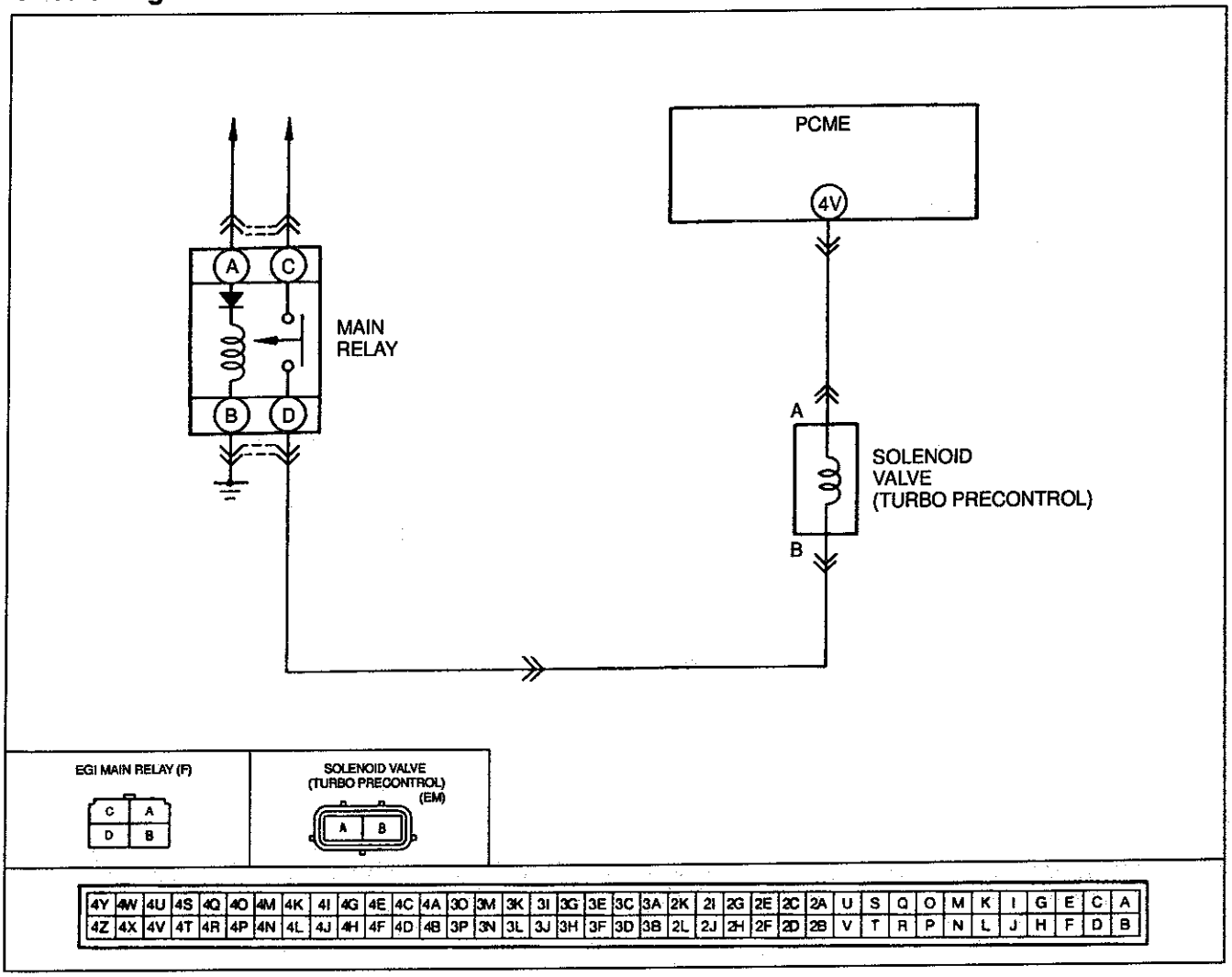
CODE No.	40 (SOLENOID VALVE–PURGE CONTROL [PURGE])		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 3H?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 3H) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–131	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



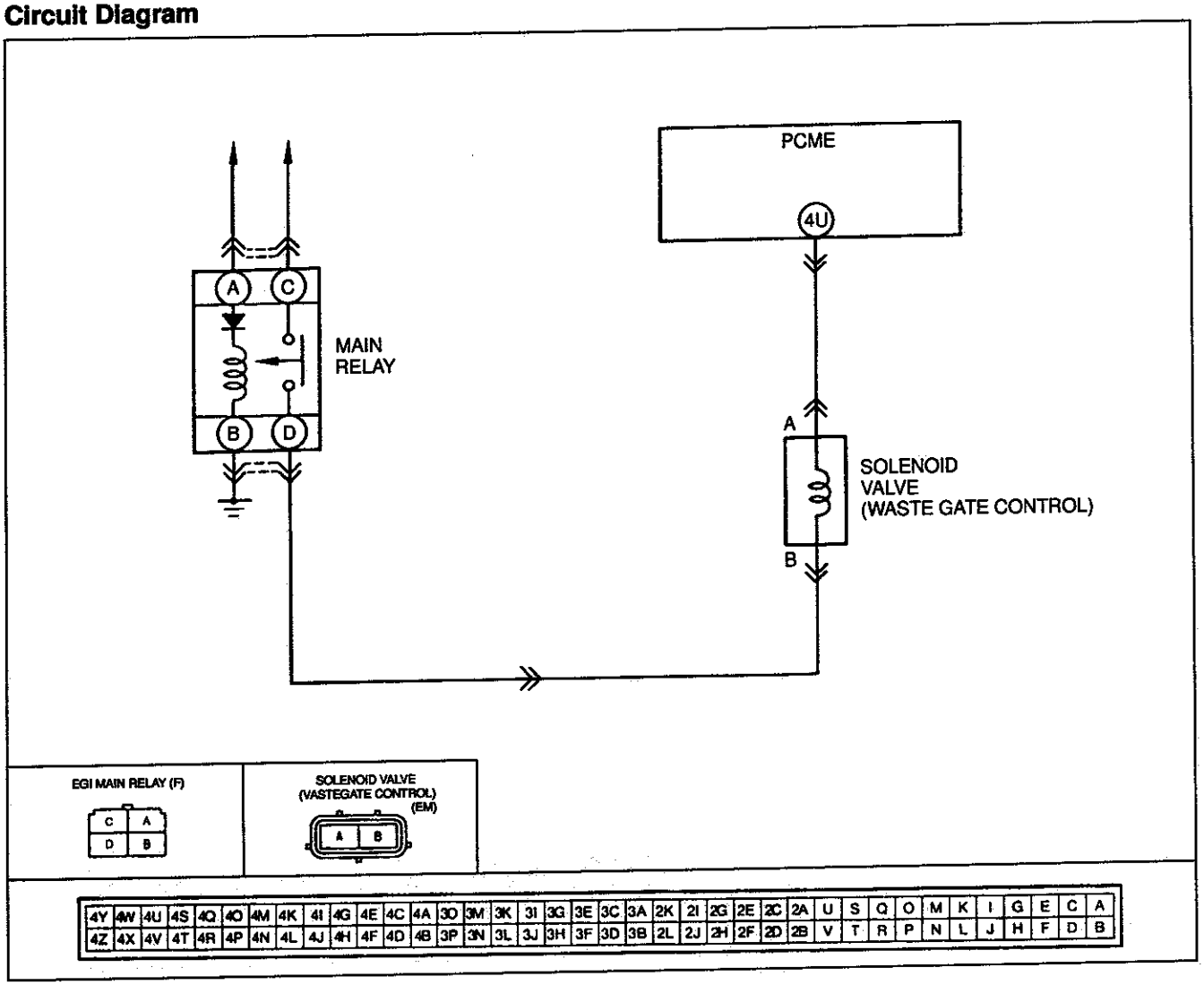
CODE No.	42 (SOLENOID VALVE–TURBO PRECONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4V?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4V) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–93	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



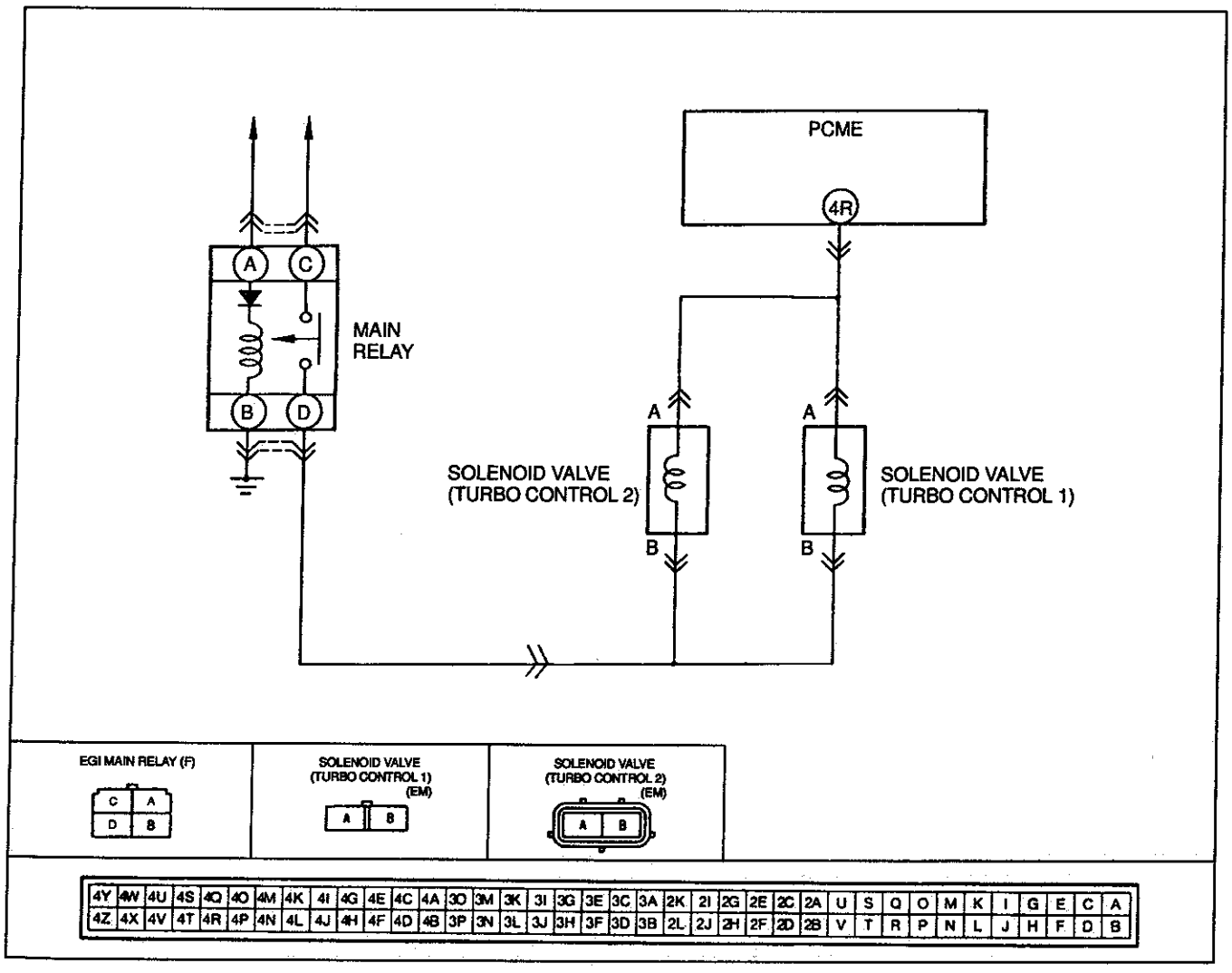
CODE No.	43 (SOLENOID VALVE–WASTEGATE CONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4U?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4U) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–93	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



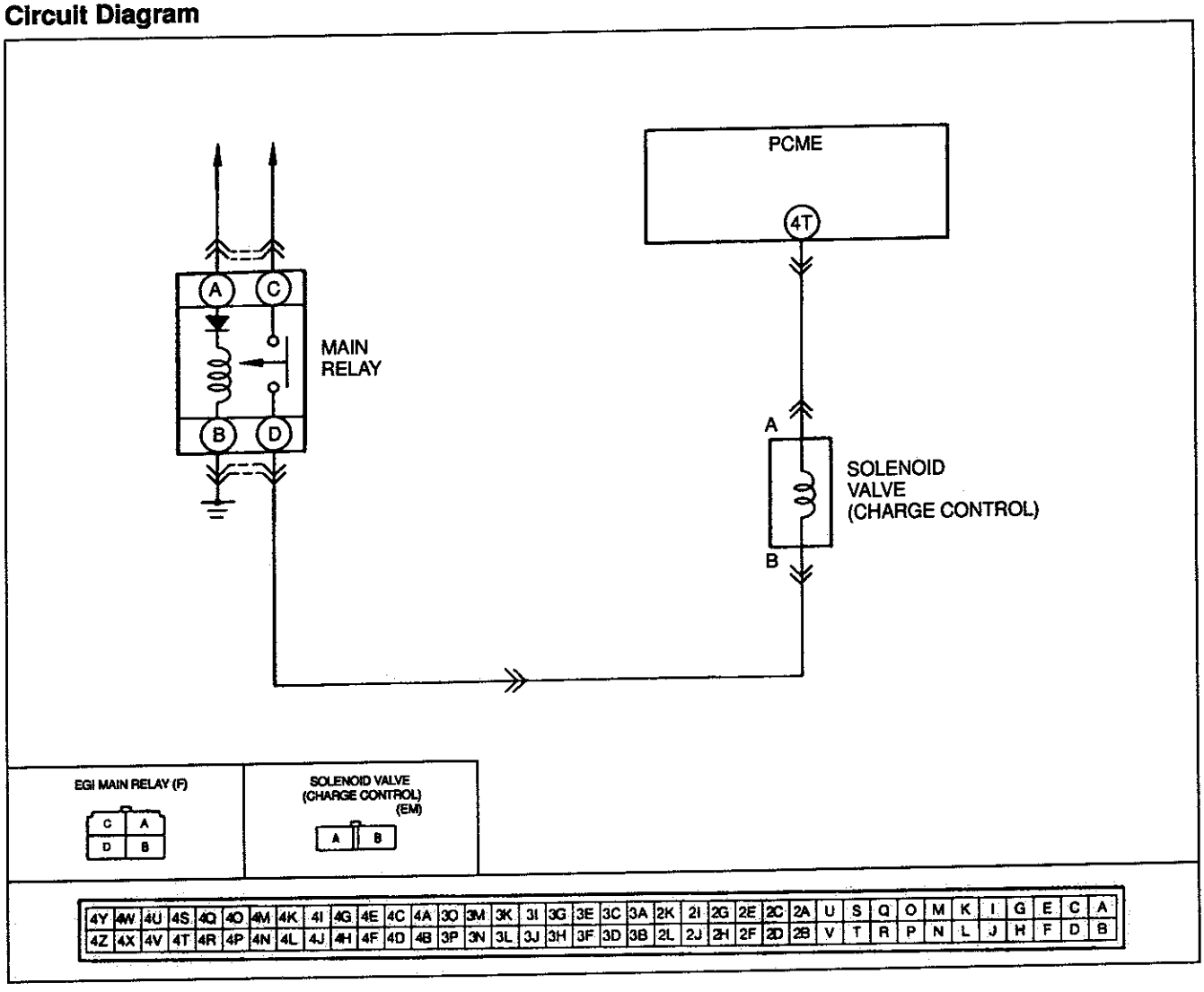
CODE No.	44 (SOLENOID VALVE–TURBO CONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valves circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valves B terminal–Main relay D terminal)
3	Is there continuity between solenoid valves A terminal and PCME terminal 4R?	Yes	Check for short circuit in wiring harness (Solenoid valves A terminal–PCME terminal 4R) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–93	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



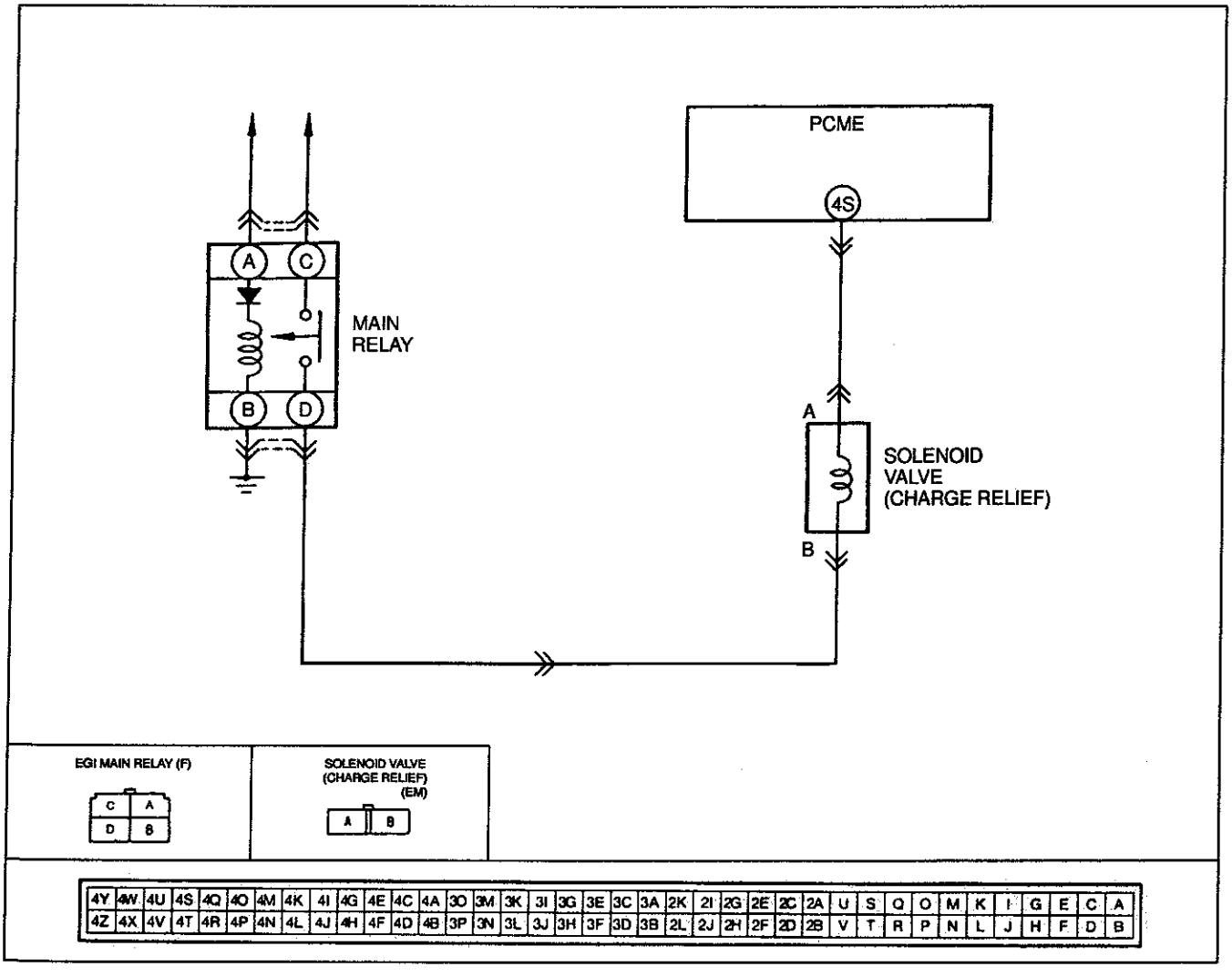
CODE No.	45 (SOLENOID VALVE–CHARGE CONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4T?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 4T) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



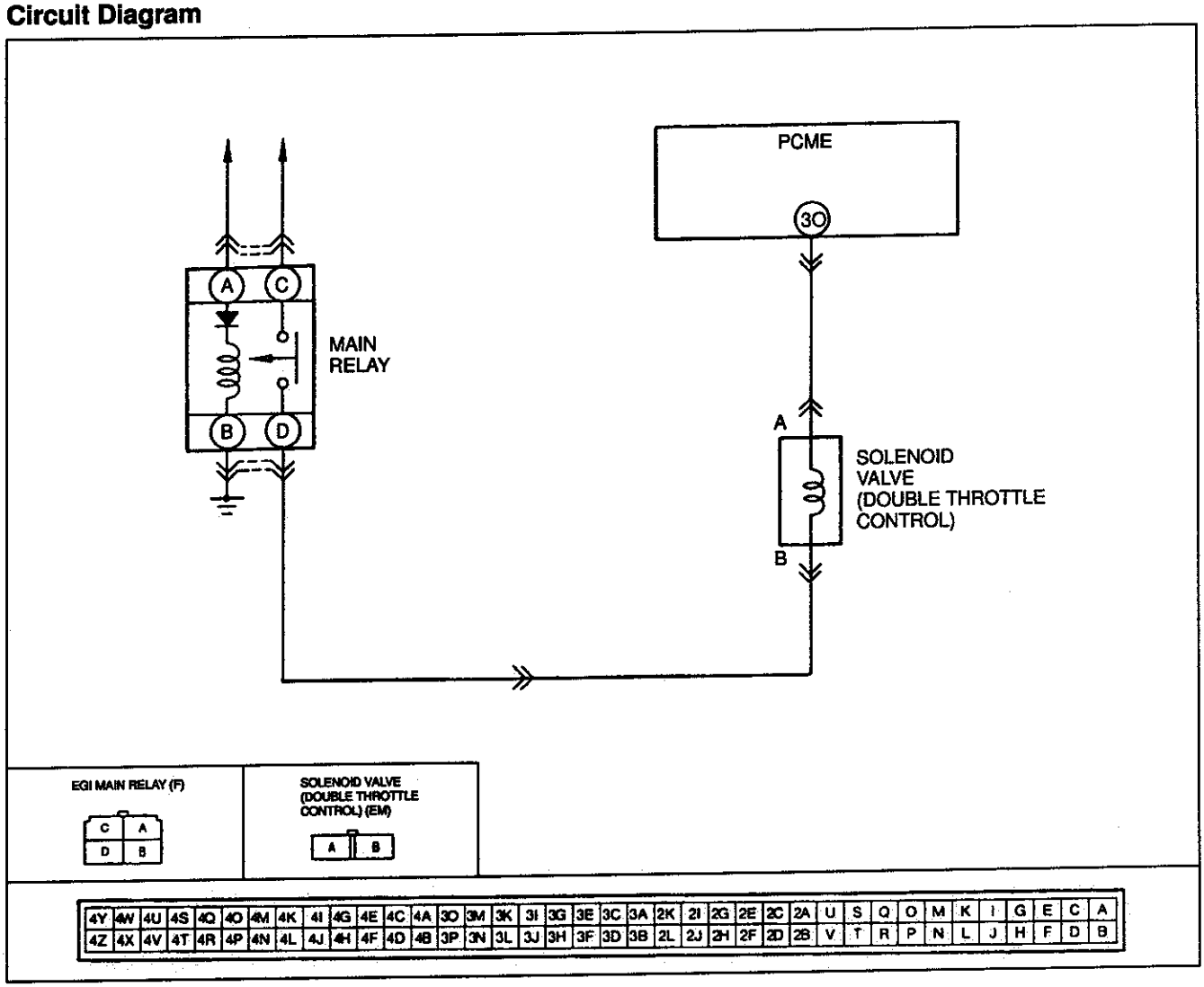
CODE No.	46 (SOLENOID VALVE–CHARGE RELIEF)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 4S?	Yes	Check for short circuit In wiring harness (Solenoid valve A terminal–PCME terminal 4S) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



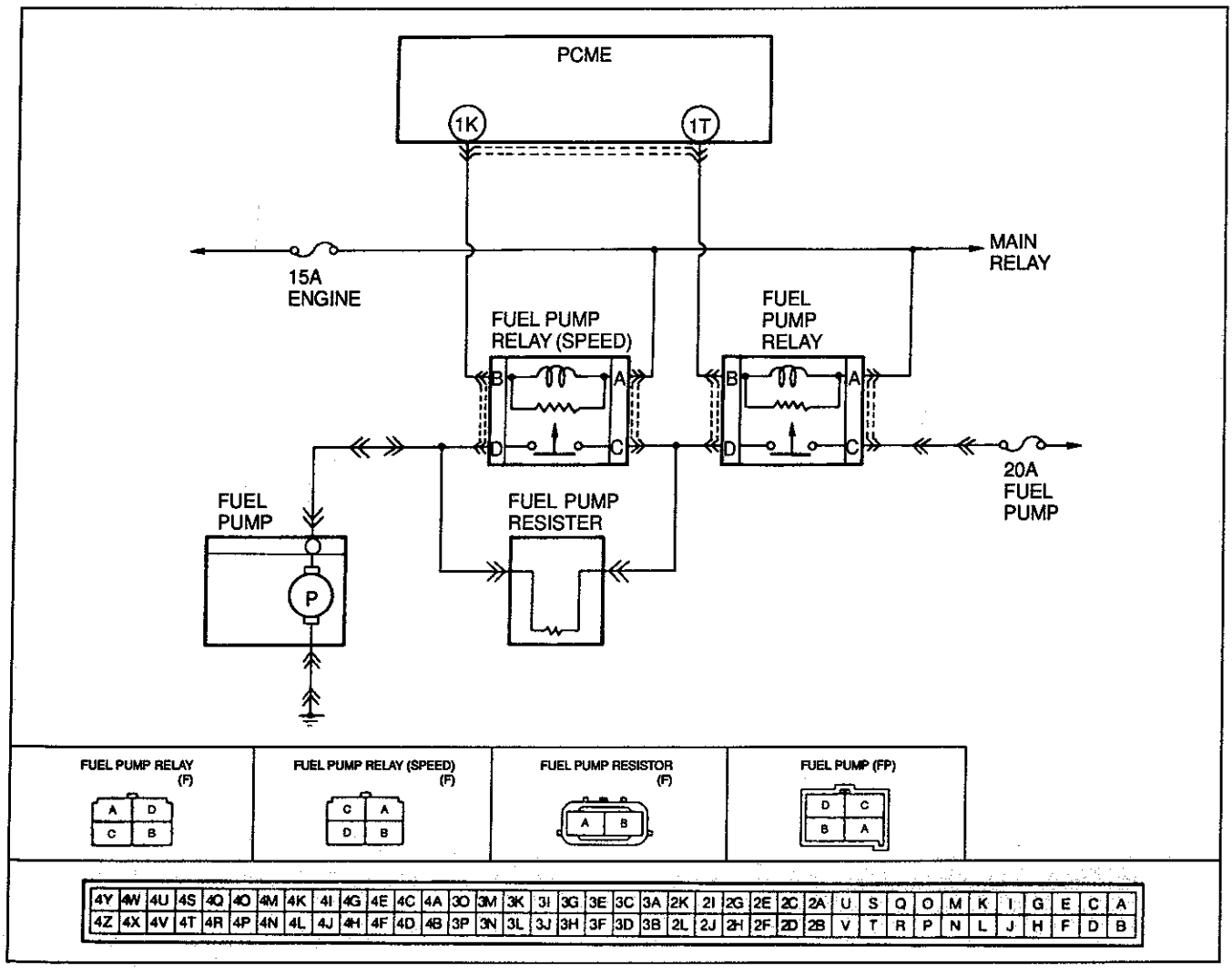
CODE No.	50 (SOLENOID VALVE–DOUBLE THROTTLE CONTROL)		
STEP	INSPECTION		ACTION
1	Does solenoid valve circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with solenoid valve connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Solenoid valve B terminal–Main relay D terminal)
3	Is there continuity between solenoid valve A terminal and PCME terminal 3O?	Yes	Check for short circuit in wiring harness (Solenoid valve A terminal–PCME terminal 3O) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is solenoid valve OK? ☞page F–176	Yes	Replace PCME ☞page F–150
		No	Replace solenoid valve

Circuit Diagram



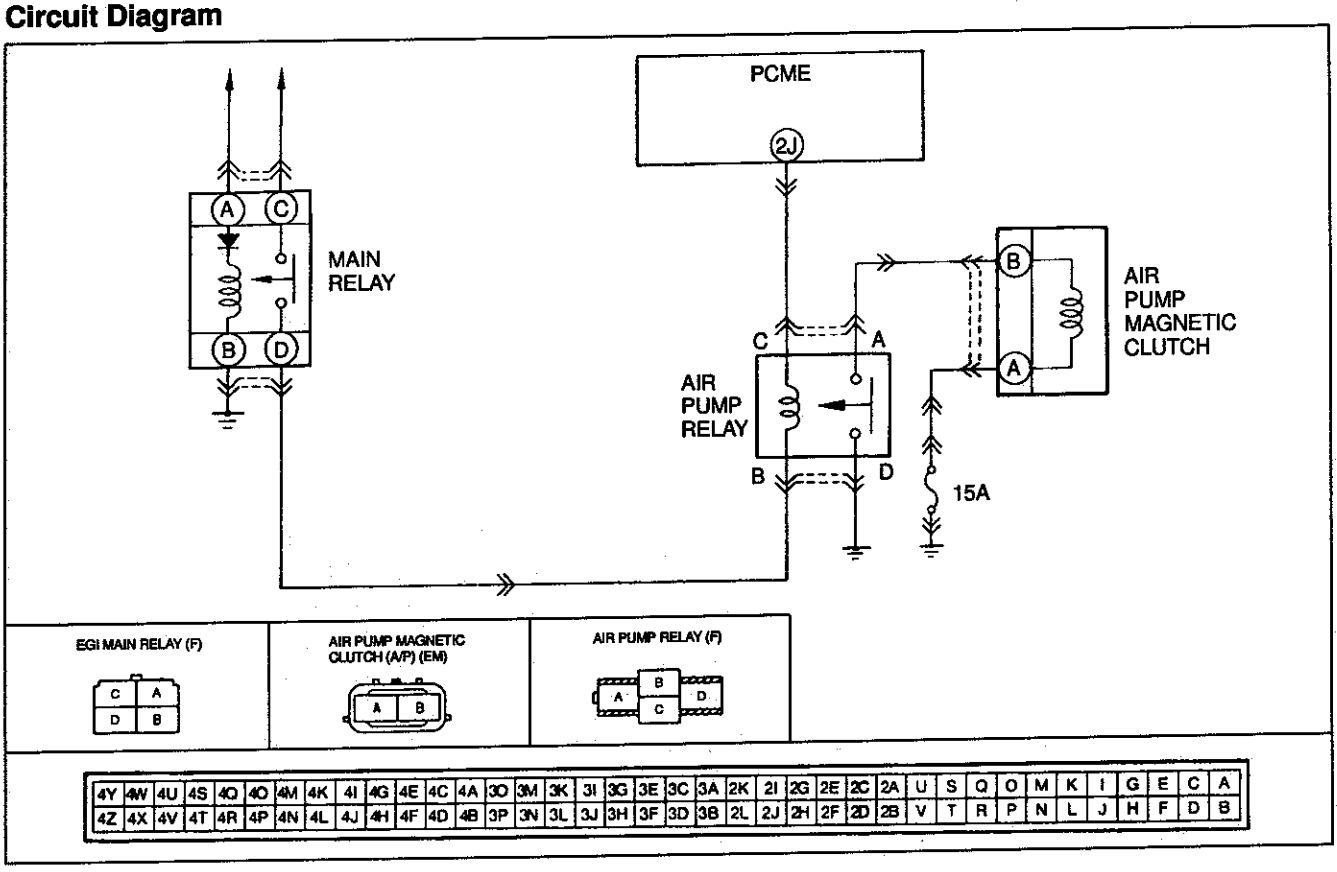
CODE No.	51 (FUEL PUMP RELAY [SPEED])		
STEP	INSPECTION		ACTION
1	Does fuel pump relay (speed) circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with fuel pump relay (speed) connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Fuel pump relay A terminal–Main relay D terminal)
3	Is there Continuity between fuel pump relay (speed) B terminal and PCME terminal 1K?	Yes	Check for short circuit in wiring harness (Fuel pump relay (speed) B terminal–PCME terminal 1K) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is fuel pump relay (speed) OK? ☞page F–110	Yes	Replace PCME ☞page F–150
		No	Replace fuel pump relay (speed)

Circuit Diagram



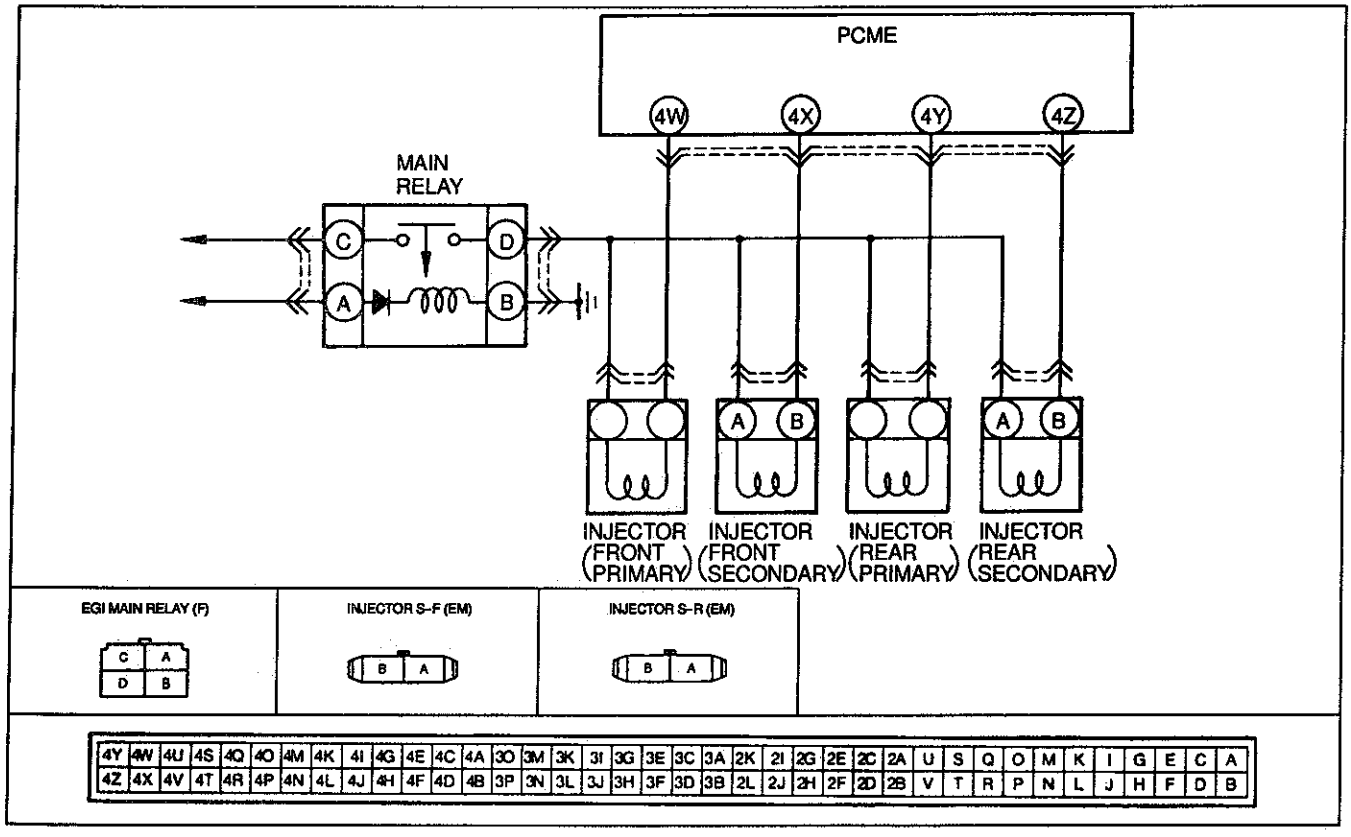
CODE No.	54 (AIR PUMP RELAY)		
STEP	INSPECTION		ACTION
1	Does air pump relay circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector B terminal voltage OK with air pump relay connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Air pump relay B terminal–Main relay D terminal)
3	Is there continuity between air pump relay C terminal and PCME terminal 2J?	Yes	Check for short circuit in wiring harness (Air pump relay C terminal–PCME terminal 2J) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
4	Is air pump relay OK? ☞page F–123	Yes	Replace PCME ☞page F–150
		No	Replace air pump relay

Circuit Diagram



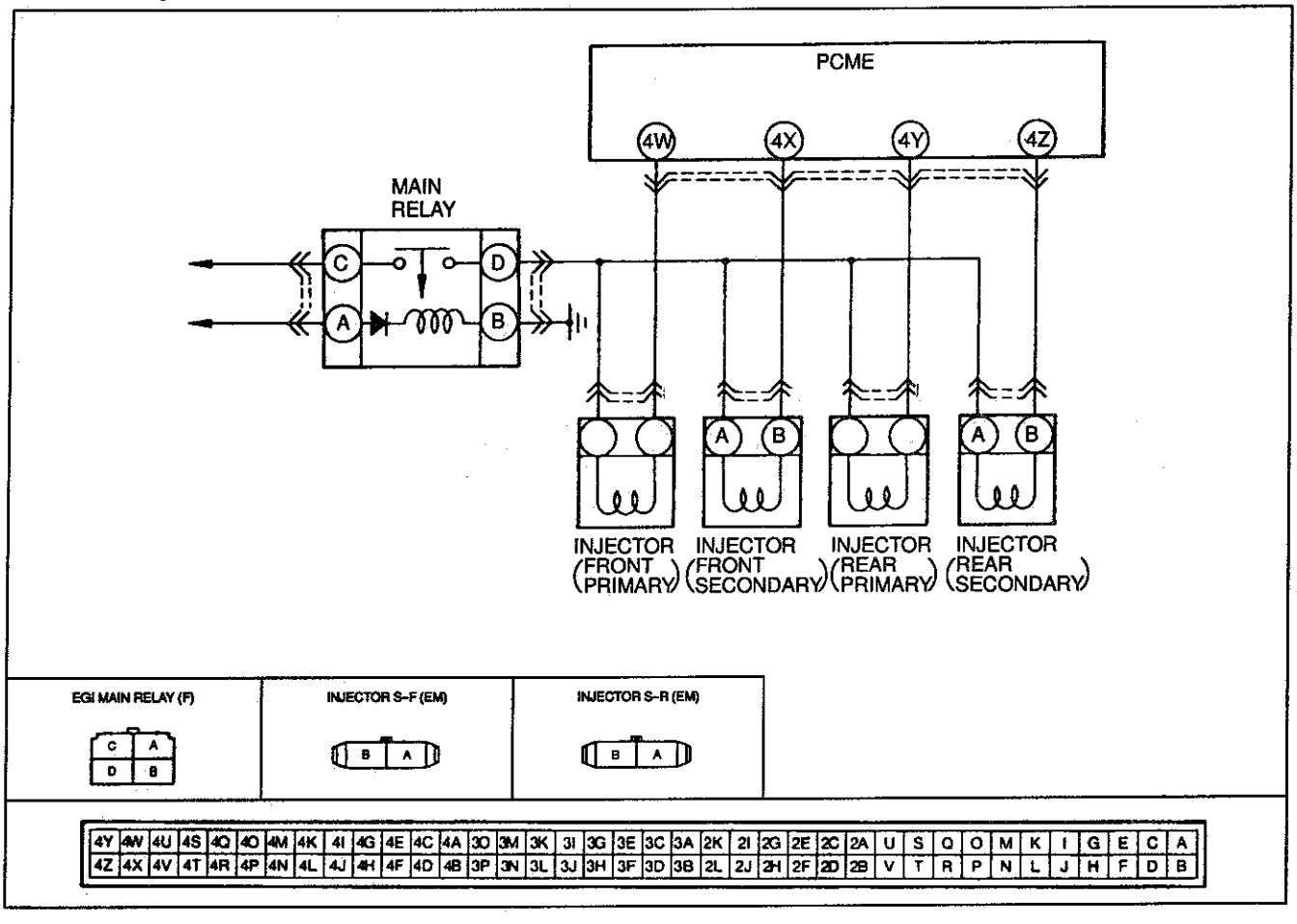
CODE No.	71 (INJECTOR [FRONT SECONDARY])		
STEP	INSPECTION		ACTION
1	Does injector circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with injector connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Injector A terminal–Main relay D terminal)
3	Is injector resistance OK? **Resistance: 13.5 Ω (20°C [68°F])**	Yes	Go to next step
		No	Replace injector
4	Is there continuity between injector terminal and PCME terminal? Injector terminal: B — PCME: 4X	Yes	Check for short circuit in wiring harness (Injector-PCME) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
5	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME ☞page F–150
		No	Intermittent poor connection Check for cause

Circuit Diagram



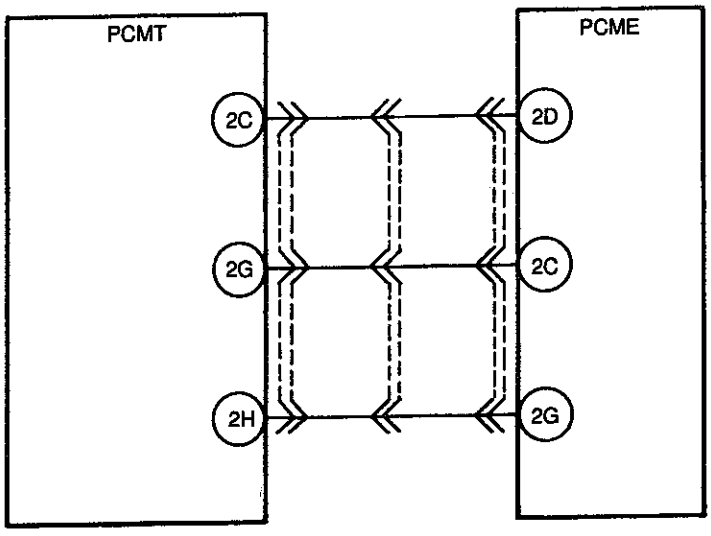
CODE No.	73 (INJECTOR [REAR SECONDARY])		
STEP	INSPECTION		ACTION
1	Does injector circuit have a poor connection?	Yes	Repair connector and/or wiring harness
		No	Go to next step
2	Is connector A terminal voltage OK with injector connector disconnected? Condition: Ignition switch ON — Voltage: Battery positive voltage	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Injector A terminal-Main relay D terminal)
3	Is injector resistance OK? **Resistance: 13.8 Ω (20°C [68°F])**	Yes	Go to next step
		No	Replace injector
4	Is there continuity between injector terminal and PCME terminal? Injector terminal: B — PCME: 4Z	Yes	Check for short circuit in wiring harness (Injector-PCME) ⇨ If OK, go to next step ⇨ If not OK, repair wiring harness
		No	Repair wiring harness
5	Disconnect negative battery cable for at least 20 seconds Connect battery cable and recheck for trouble code Is trouble code displayed?	Yes	Replace PCME ☞page F–150
		No	Intermittent poor connection Check for cause

Circuit Diagram



CODE No.	76 (SLIP LOCKUP OFF SIGNAL)		
STEP	INSPECTION		ACTION
1	Is there poor connection in Lockup off signal circuit between PCME and PCMT?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between PCME terminal 2G and PCMT terminal 2H	Yes	Go to next step
		No	Check for open circuit in wiring harness (PCMT-PCME)
3	Is PCMT terminal 2H voltage OK?	Yes	Go to next step
		No	Check for cause ☞page F–156
4	Is PCME terminal 2G voltage OK?	Yes	Replace PCME ☞page F–150
		No	Check for short circuit in wiring harness (PCMT-PCME)

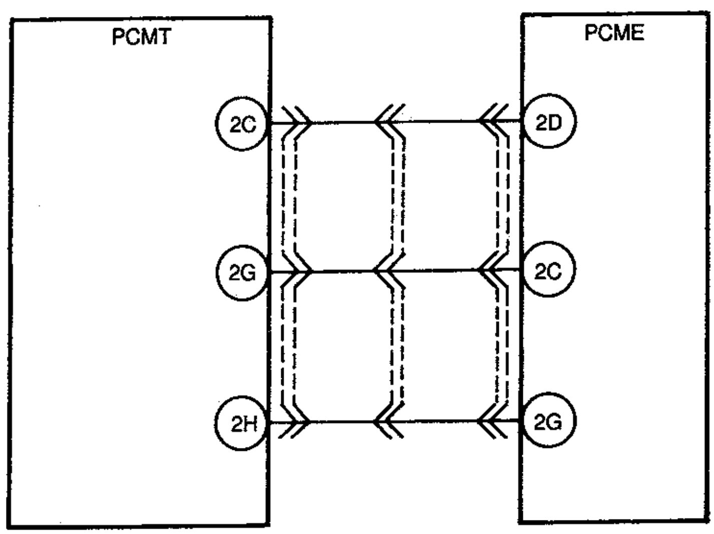
Circuit Diagram



4Y	4W	4U	4S	4Q	4O	4M	4K	4I	4G	4E	4C	4A	3O	3M	3K	3I	3G	3E	3C	3A	2K	2I	2G	2E	2C	2A	U	S	Q	O	M	K	I	G	E	C	A
4Z	4X	4V	4T	4R	4P	4N	4L	4J	4H	4F	4D	4B	3P	3N	3L	3J	3H	3F	3D	3B	2L	2J	2H	2F	2D	2B	V	T	R	P	N	L	J	H	F	D	B

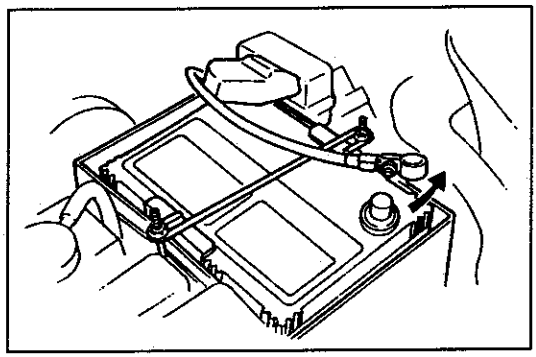
CODE No.	77 (TORQUE REDUCED SIGNAL)		
STEP	INSPECTION		ACTION
1	Is there poor connection in torque reduced signal circuit between PCME and PCMT?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between PCME terminal 2D and PCMT terminal 2C	Yes	Go to next step
		No	Check for open circuit in wiring harness (PCMT-PCME)
3	Is PCMT terminal 2C voltage OK?	Yes	Go to next step
		No	Check for cause ☞ page F–156
4	Is PCME terminal 2D voltage OK?	Yes	Replace PCME ☞ page F–150
		No	Check for short circuit in wiring harness (PCMT-PCME)

Circuit Diagram

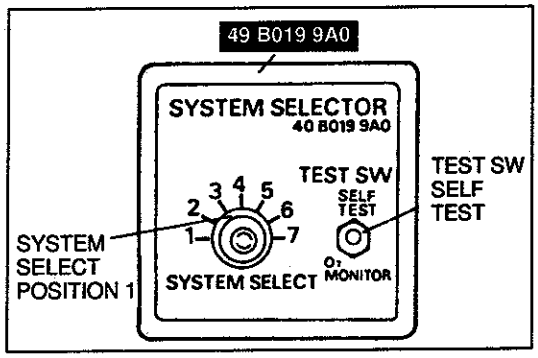


4Y	4W	4U	4S	4Q	4O	4M	4K	4I	4G	4E	4C	4A	3O	3M	3K	3I	3G	3E
4Z	4X	4V	4T	4R	4P	4N	4L	4J	4H	4F	4D	4B	3P	3N	3L	3J	3H	3F

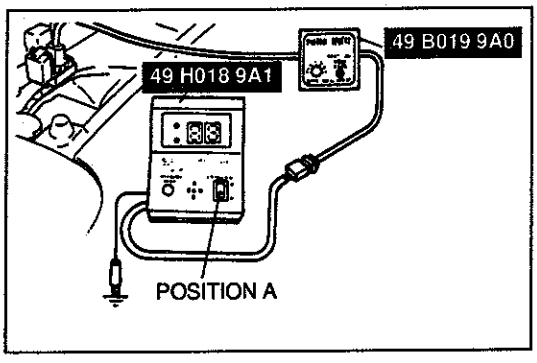
3C	3A	2K	2I	2G	2E	2C	2A	U	S	Q	O	M	K	I	G	E	C	A
3D	3B	2L	2J	2H	2F	2D	2B	V	T	R	P	N	L	J	H	F	D	B



After-repair Procedure
Cancel the memory of trouble code number by disconnecting the negative battery cable for **20 sec** and depress the brake pedal. Reconnect the negative battery cable.



Self-Diagnosis Checker
1. Connect the **SST** (System Selector) to the data link connector.
2. Set system select to position 1.
3. Set the test switch to SELF TEST.



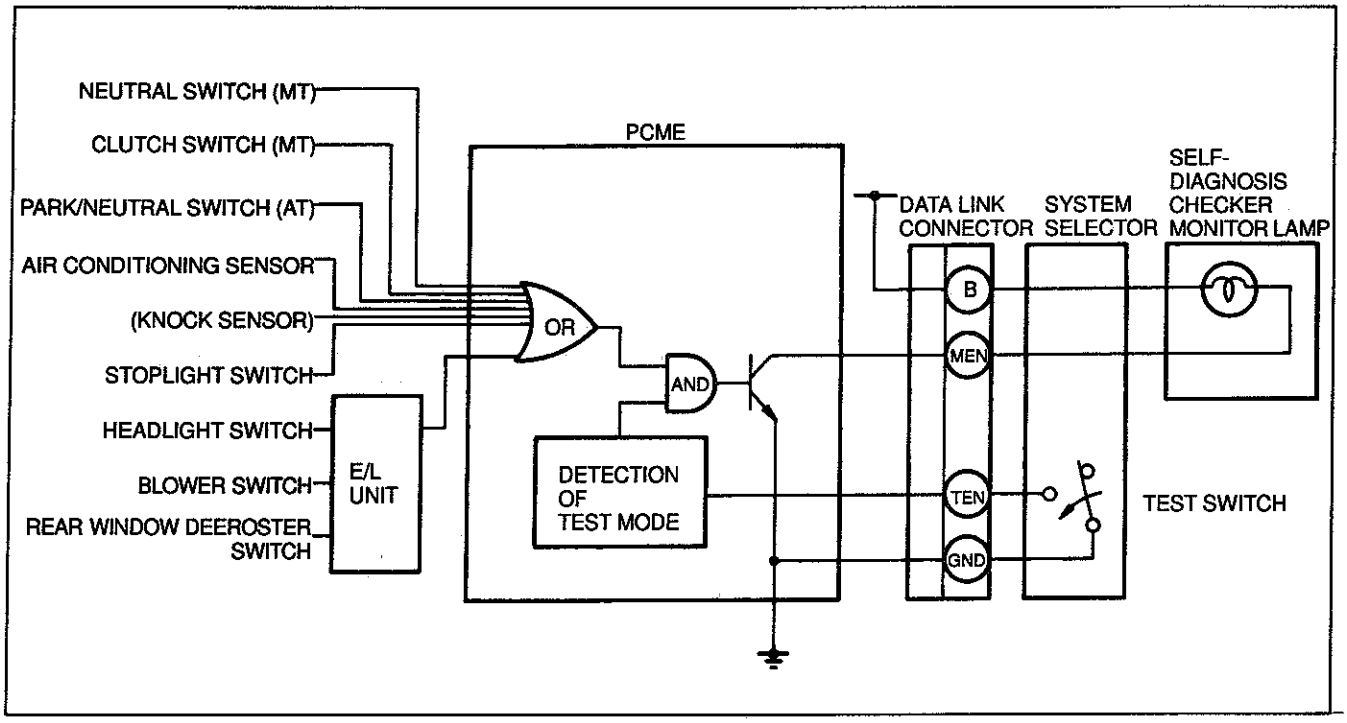
4. Connect the **SST** (Self-Diagnosis Checker) to the System Selector and a ground.
5. Set the select switch of the Self-Diagnosis Checker to position A.
6. Turn the ignition switch ON.
7. Verify that no trouble code numbers are displayed.

SWITCH MONITOR FUNCTION

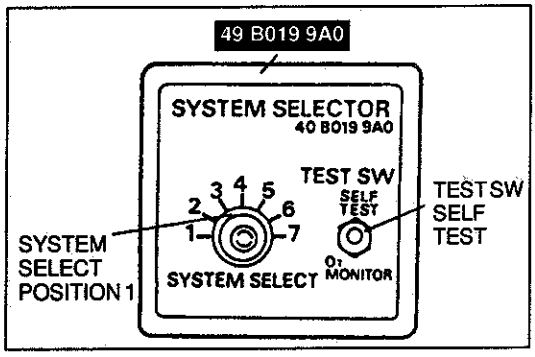
Individual switches can be inspected by the **SST** (Self-Diagnosis Checker)

Preparation

The TEN terminal of the data link connector must be grounded and the ignition switch turned to ON (engine off). If any switch remains activated, the monitor lamp will be illuminated.

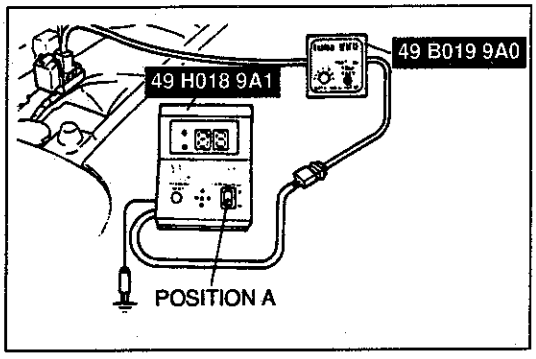


Switch	Self-Diagnosis Checker (Monitor lamp)		Remarks
	Lamp ON	Lamp OFF	
Clutch switch (MT)	Pedal depressed	Pedal released	In neutral
Neutral switch (MT)	In gear	Neutral	Clutch pedal released
Park/neutral switch (AT)	L, S, D or R range	N or P range	—
Headlight switch	ON	OFF	Headlight switch I or II position
Blower switch	ON	OFF	At 3rd or 4th position
Rear window defroster switch	ON	OFF	—
Air conditioning sensor	ON	OFF	Blower switch at 1st or 2nd position
Stoplight switch	Pedal depressed	Pedal released	—



Inspection Procedure
Self-Diagnosis Checker

1. Connect the **SST** (System Selector) to the data link connector.
2. Set system select to position 1.
3. Set TEST SW to SELF-TEST.



4. Connect the **SST** (Self-Diagnosis Checker) to the System Selector and a ground.
5. Set the select switch of the Self-Diagnosis Checker to position A.
6. Turn the ignition switch ON.
7. Check if the Monitor Lamp illuminates when each switch is made to function as described.

Caution

- **If either switch remains activated, the monitor lamp will be illuminated.**
- **Do not start the engine.**

Procedure

Set conditions to deactivate each switch
- All accessories OFF
- Transmission in neutral
- All pedals released

Is monitor lamp illuminated?

YES →
Check each switch and related wire harness
- Clutch switch ☞page F–173
- Neutral switch ☞page F–172
- Headlight switch ☞1994 RX-7 Body electrical troubleshooting manual
- Rear window defroster switch ☞1994 RX-7 Body electrical troubleshooting manual
- Blower switch ☞1994 RX-7 Body electrical troubleshooting manual
- Air conditioning sensor ☞1994 RX-7 Body electrical troubleshooting manual
- Position switch ☞1994 RX-7 Body electrical troubleshooting manual

NO ↓
Check each switch as described

Neutral switch (MT)

Shift transmission into in-gear. (Clutch pedal released.)
Is monitor lamp illuminated?

NO → PC:
- Neutral switch malfunction ☞page F–172
- Open circuit in related wire harness
- PCME terminal 1R voltage incorrect ☞page F–150
- PCME malfunction

YES ↓

Neutral switch OK
Return transmission to neutral

Clutch switch (MT)

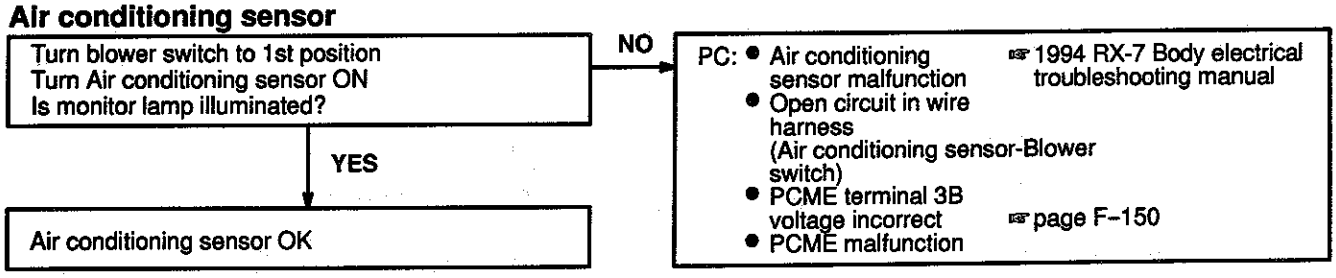
Clutch pedal depressed. (In neutral)
Is monitor lamp illuminated?

NO → PC:
- Clutch switch malfunction ☞page F–173
- Open circuit in related wire harness
- PCME terminal 1Q voltage incorrect ☞page F–150
- PCME malfunction

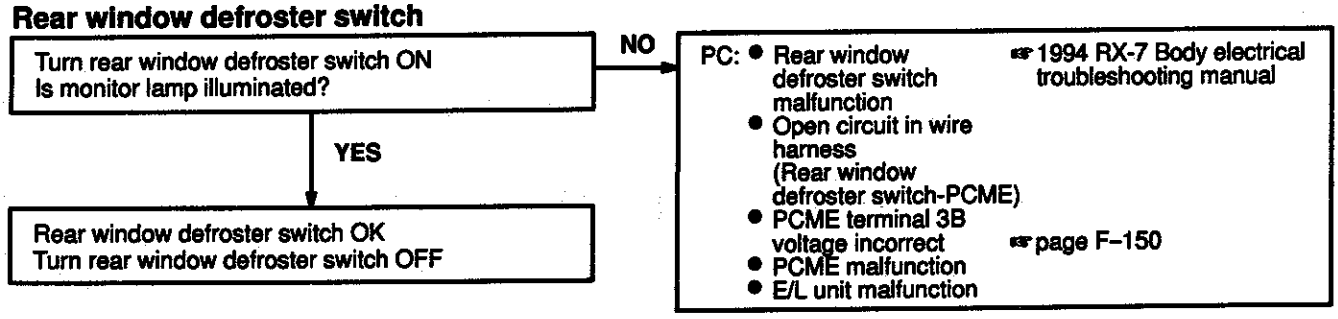
YES ↓

Clutch switch OK
Release clutch pedal

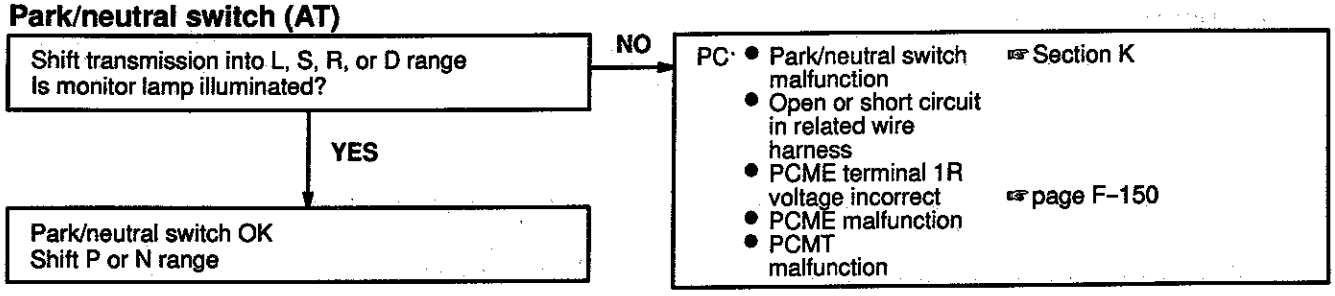
Air conditioning sensor



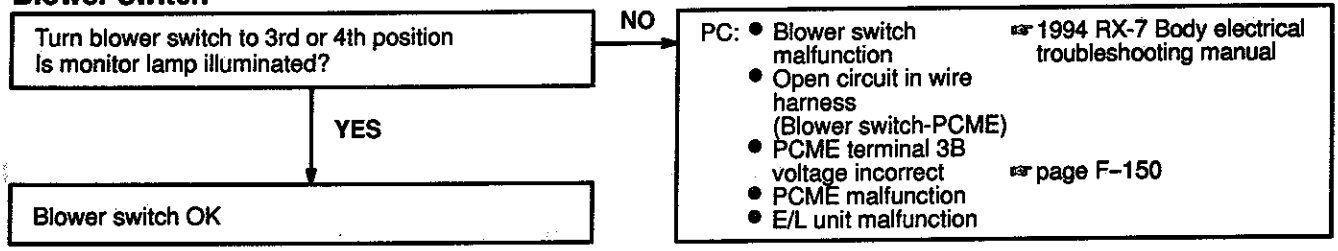
Rear window defroster switch



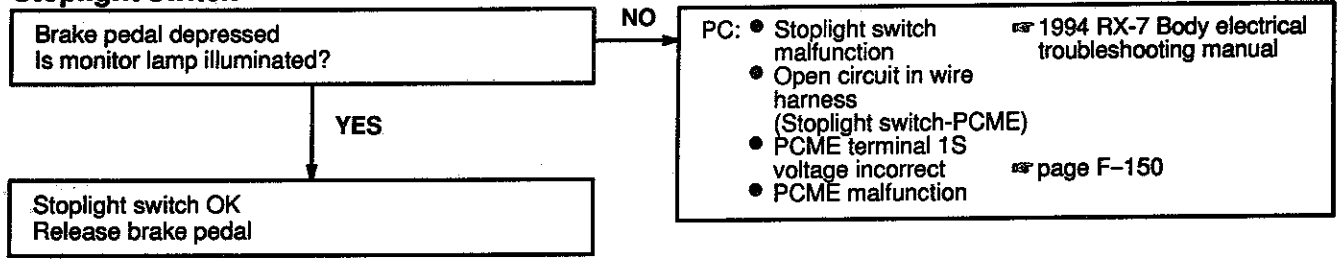
Park/neutral switch (AT)



Blower switch



Stoplight switch



OXYGEN SENSOR MONITOR FUNCTION

Engine Signal Monitor

With the SST see to O_2 Monitor, the oxygen sensor is monitored by the Self-Diagnosis Checker as described.

Condition		Item monitored	Function
Engine	System selector switch		
Vehicle running	O_2 monitor	Oxygen sensor output signal	Oxygen sensor output more than 0.45 V Monitor lamp: Flashes

KNOCK SENSOR MONITOR FUNCTION

With the System selector set to Engine Signal Monitor. SELF-TEST the knock sensor is monitored by the Self-Diagnosis Checker as described below.

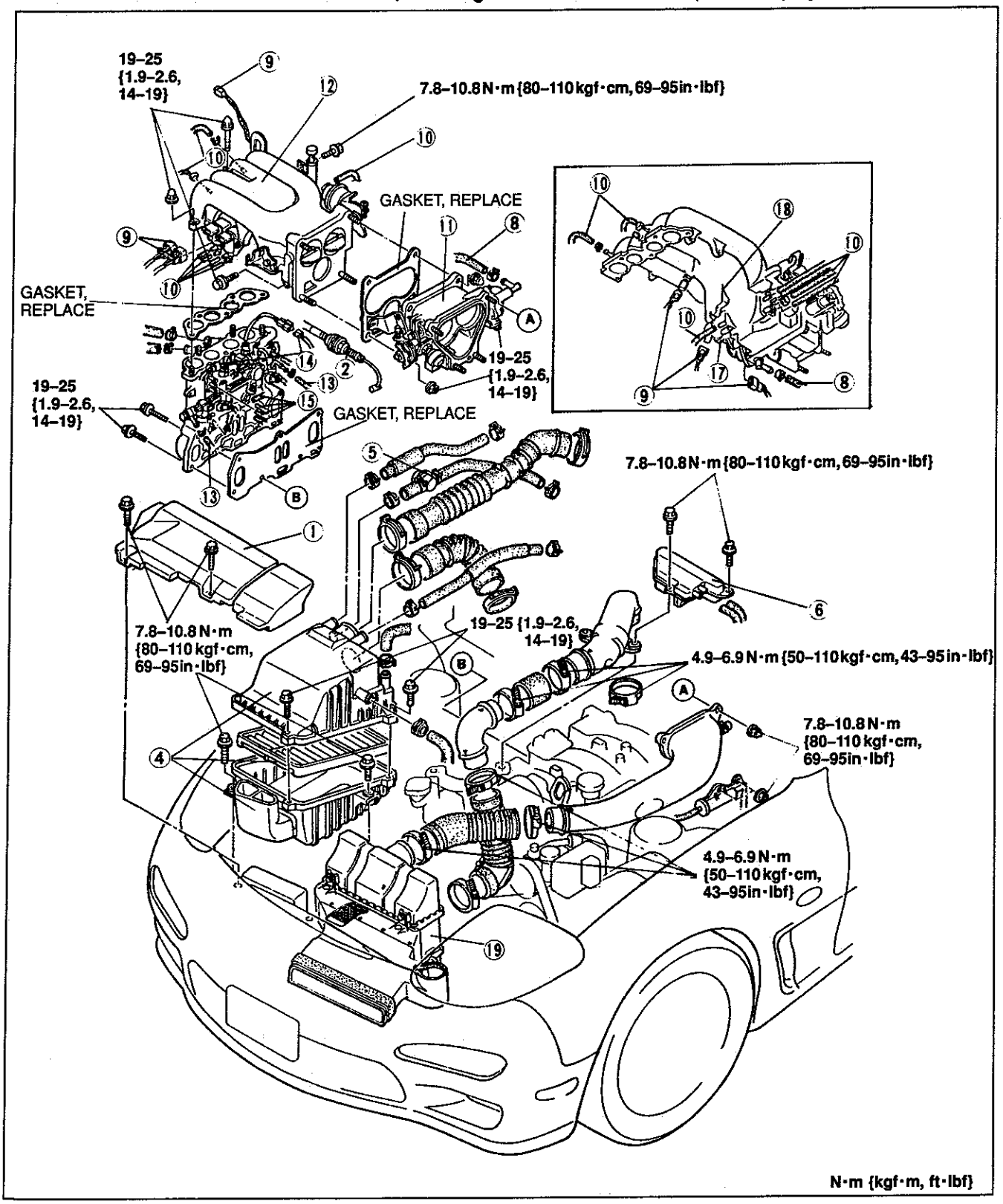
Item monitored	Condition			Function
	Test	Ignition switch	System selector switch	
Knock sensor output signal	Tap the engine hanger lightly with hammer	ON	SELF-TEST	Monitor lamp: Flashes

INTAKE AIR SYSTEM

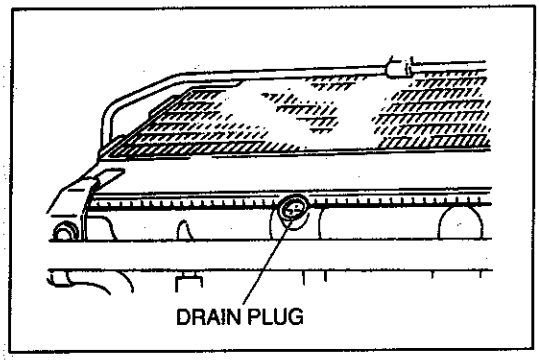
COMPONENT PARTS

Removal / Inspection / Installation

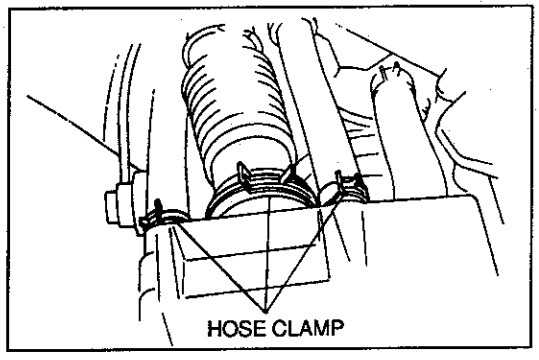
1. Remove in the order shown in the figure, reffering to **Removal Note**. (Refer to page F–77.)
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, reffering to **Installation Note**. (Refer to page F–77.)



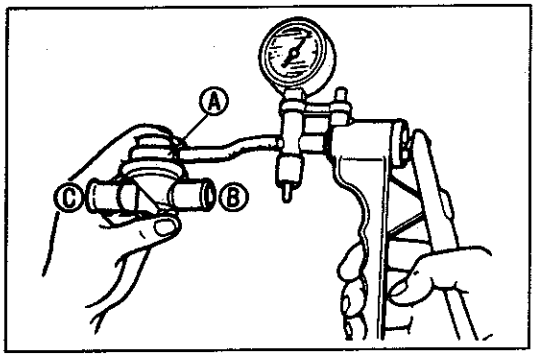
1. Fresh air duct
   Inspect for damage and cracks
2. Accelerator cable
3. Air intake hose
   Inspect for damage
4. Air cleaner housing
   Inspection ..... page F-16
5. Air bypass valve
   Inspection ..... page F-77
6. Pressure chamber
7. Air intake pipe
   Inspect for damage and cracks
8. Water hose
9. Connector
10. Vacuum hose
11. Throttle body
    Inspection ..... page F-79
12. Extension manifold
    Inspection ..... page F-79
13. Fuel hose
14. Connector
15. Vacuum hose
16. Intake manifold
    Inspection ..... page F-79
17. Idle air control valve
    Inspection ..... page F-83
18. Solenoid valve (AWS)
    Inspection ..... page F-83
19. Charge air cooler
    Removal / Inspection / Installation ..... page F-78



Removal Note
1. Loosen the drain plug and radiator cap and drain the coolant from radiator.
2. Remove the water hose from the throttle body.
3. After installation of the throttle body, refill the radiator. (Refer to section E.)



Installation Note
Install the air intake hose clamp and hose same place as shown in the figure.



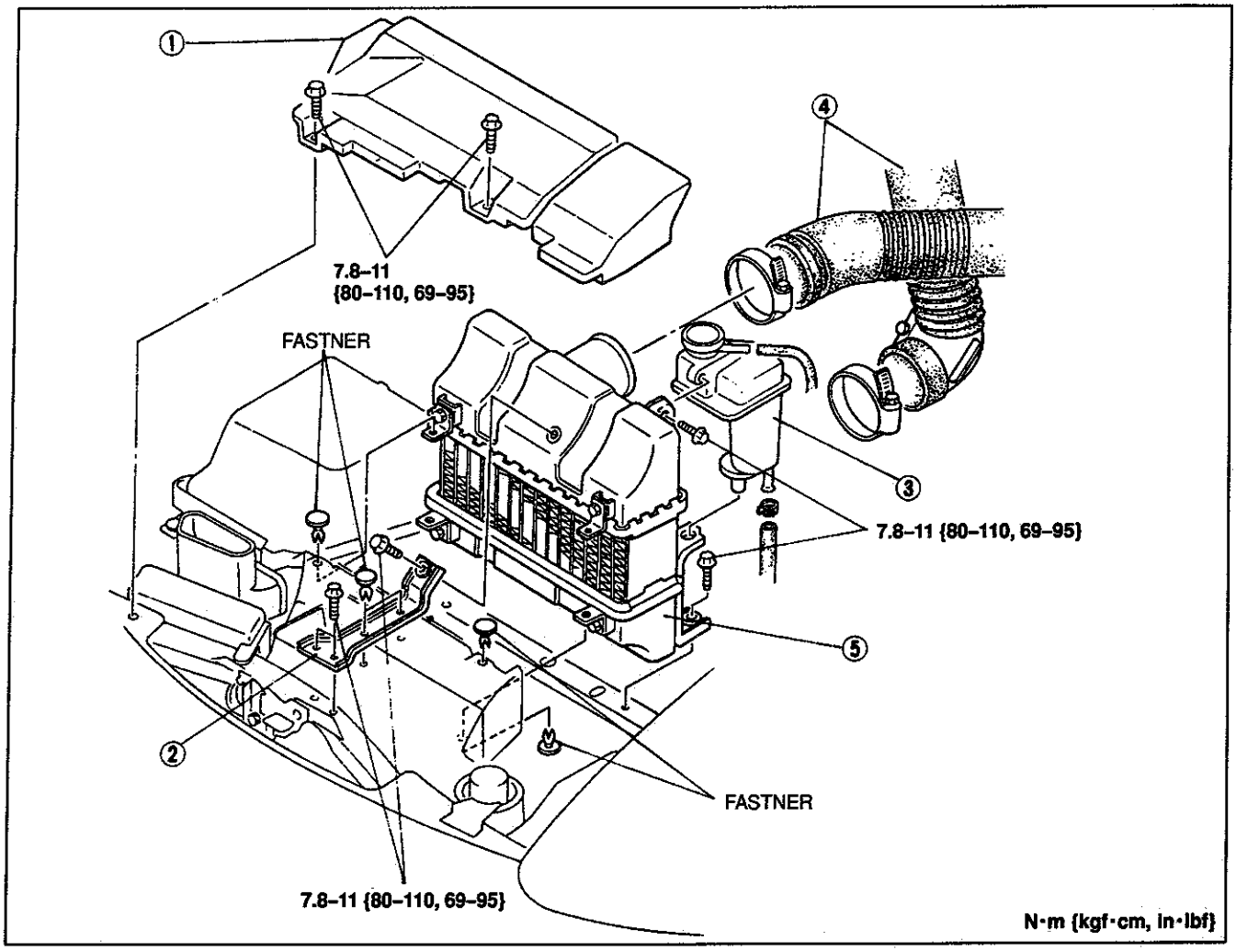
AIR BYPASS VALVE
Inspection
1. Remove the air bypass valve.
2. Connect a vaccum pump to the air bypass valve port A.
3. Check the operation of the air bypass valve.

Apply approx. 14–22 kPa {100–170 mmHg, 3.9–6.7 inHg}	Air flow
Apply approx. 31.3 kPa {235 mmHg, 9.2 inHg}	Fully open

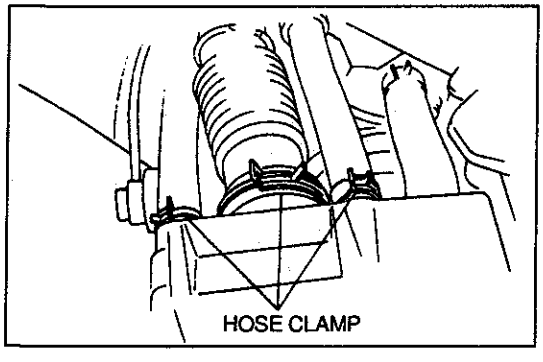
CHARGE AIR COOLER

Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Inspect the charge air cooler visually and repair or replace if necessary.
3. Install in the reverse order of removal, reffering to **Installation Note**.

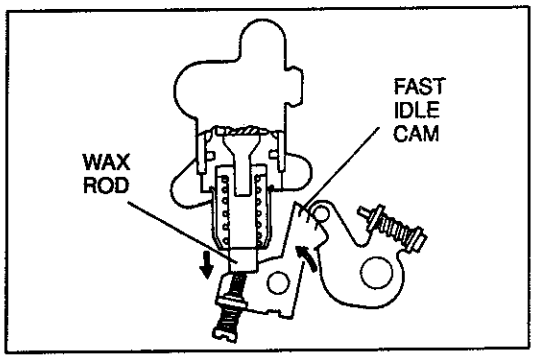


1. Fresh air duct
2. Charge air cooler braket
3. Air separation tank
4. Air hose
5. Charge air cooler



Installation Note

Install the air intake hose and hose clamp same place as shown in the figure.

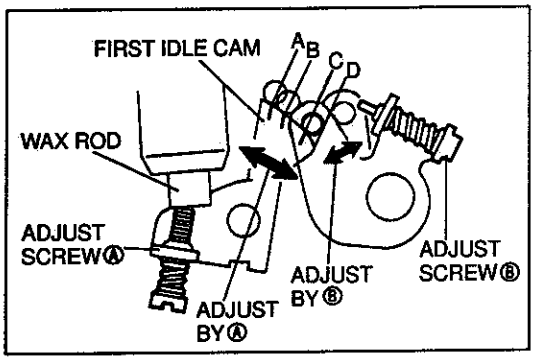


THROTTLE BODY

Inspection

Fast idle cam

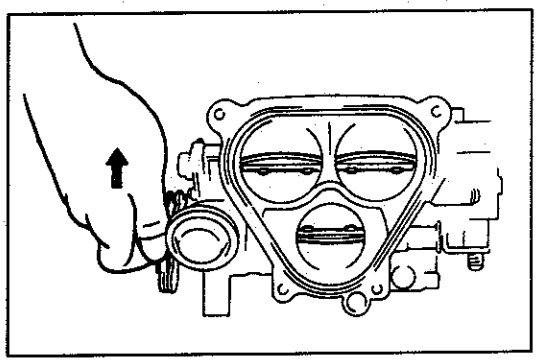
1. Verify that the indicated mark on the fast idle cam is aligned with the center of the cam.
2. Warm up the engine to operating temperature and verify that the waxrod extends outuard fully and the idle cam separates from the roller at 55–65°C {131–149°F}.
3. Adjust the adjust screws if necessary.



Adjustment

1. To adjust the first idle cam separates point D turn adjust screw B.
2. To adjust the first idle cam opening temperature turn adjust screw A.

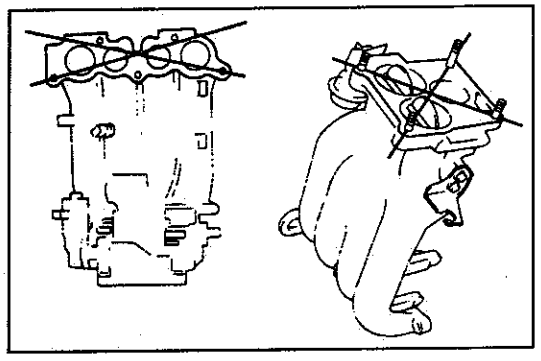
Temperature	Position
-20°C {-4°F}	A
0°C {32°F}	B
25°C {77°F}	C
60°C {140°F}	D



Double throttle valve

Inspection

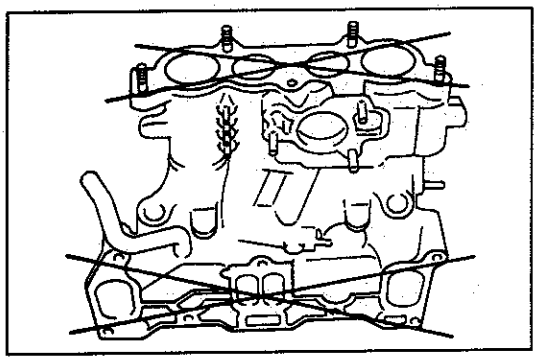
1. Verify that the No.2 secondary throttle valve and linkage move smoothly when primary throttle valve is fully opened.
2. Replace throttle body if necessary.



EXTENSION MANIFOLD

Inspection

1. Visually check for cracks or damage and replace it if necessary.
2. Check for distortion of extension manifold and replace if necessary.



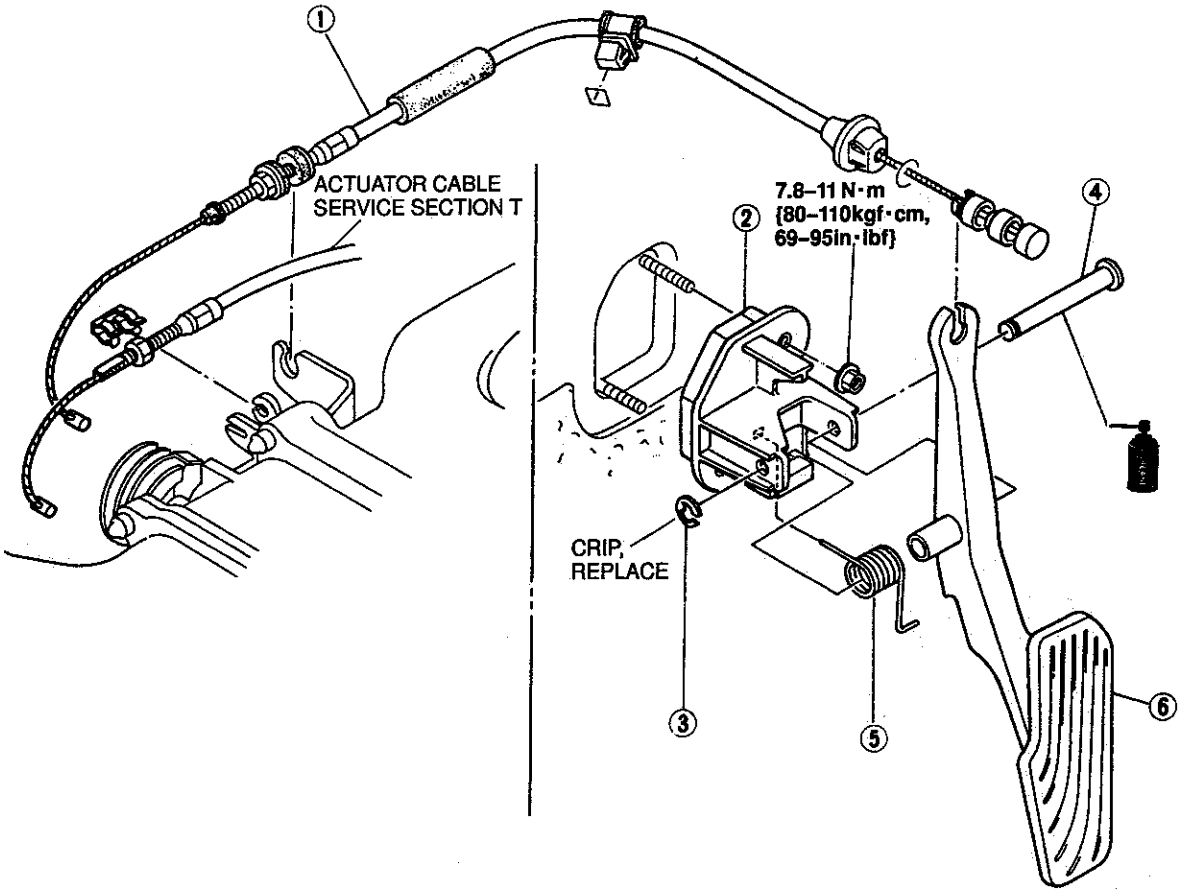
INTAKE MANIFOLD

1. Visually check for cracks or damage and replace if necessary.
2. Check for distortion of the intake manifold and replace it if necessary.

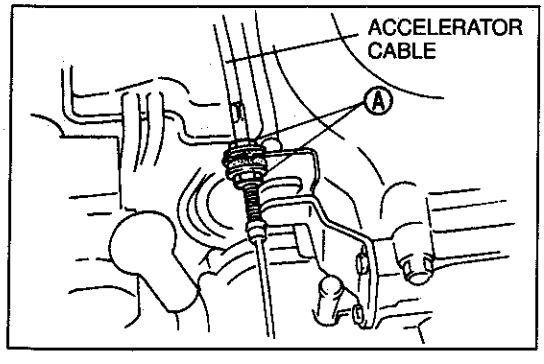
ACCELERATOR PEDAL

Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Visually check the accelerator pedal and retainer for cracks or damage.
3. Install in the reverse order of removal.



1. Accelerator cable
   Inspection / Adjustment ..... below
2. Retainer
3. Clip
4. Shaft
5. Return spring
6. Accelerator pedal



ACCELERATOR CABLE

Inspection / Adjustment

1. Warm up the engine at normal operating temperature.
2. Depress the accelerator pedal to the floor and check that the throttle valve is fully opened.
3. Inspect the play of the accelerator cable.

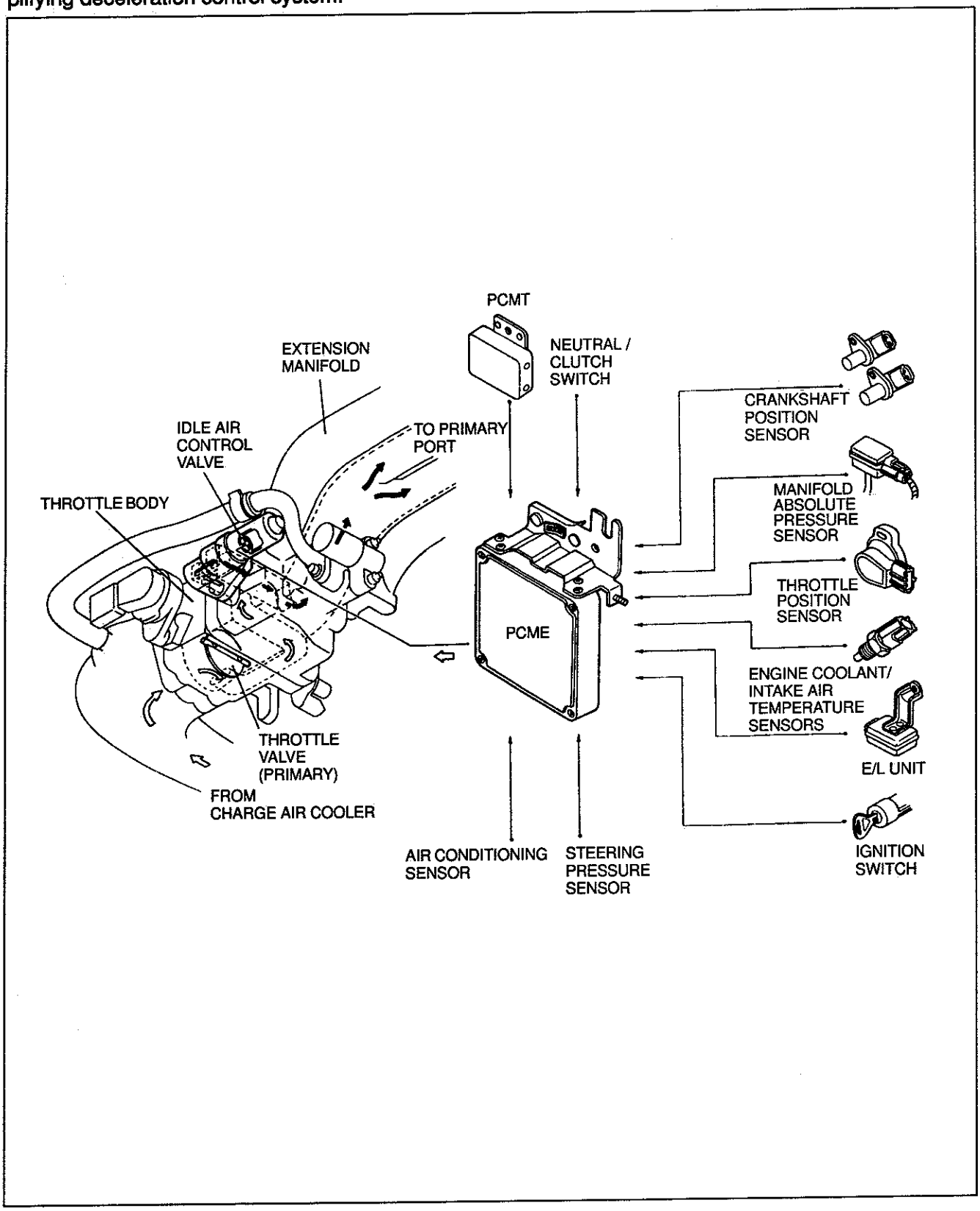
   Play: 1–3 mm {0.04–0.12 in}

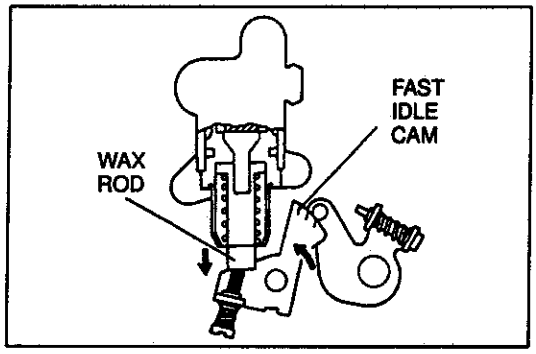
4. Loosen nuts A to adjust the play if necessary.

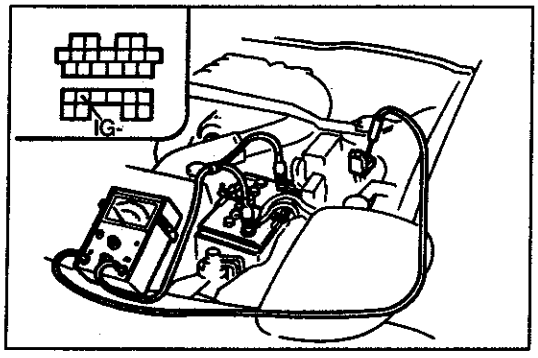
IDLE-SPEED CONTROL SYSTEM

DESCRIPTION

Idle-speed control system controls the bypass air amount that passes through the throttle valve, the idle-speed control system performs closed loop control so that engine idle smoothly and at the target speed. The system also performs the function of the AAV (anti-afterburns valve), there by eliminating the AAV and simplifying deceleration control system.







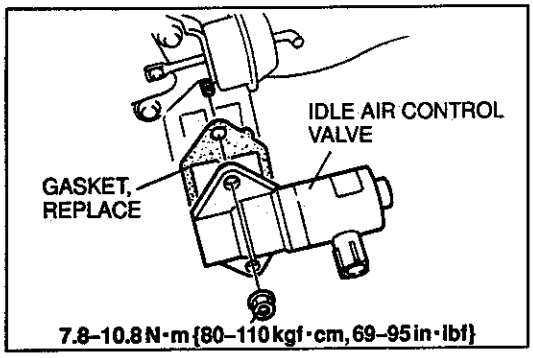
SYSTEM OPERATION

1. Warm up the engine and let it idle.
2. Verify that the fast idle cam separates.
3. Turn all electrical loads OFF.
4. Connect a tachometer to the data link connector terminal IG-.
5. With the coolant fan off, verify that the idle speed is within specification.

   Idle speed (Neutral or P range): 700–750 (720^{+30}_{-20}) rpm

6. Verify that the idle speed is within specification under the condition below.

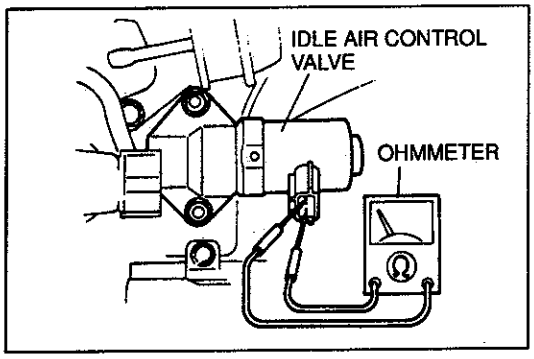
Condition	Idle speed (rpm)	
	MT	AT
No load	700–750 (720^{+30}_{-20})	
Electrical load ON	775–825	
Air conditioner ON	875–925	775–825



IDLE AIR CONTROL VALVE

Removal / Installation

1. Disconnect negative battery cable.
2. Remove the extension manifold. (Refer to page F–76.)
3. Disconnect the solenoid valve connector.
4. Remove the idle air control valve as shown in figure.
5. Install in the reverse order of removal.

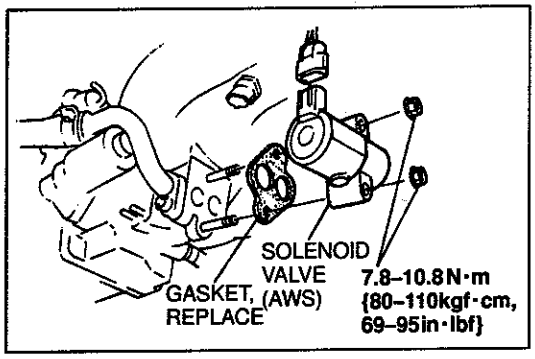


Inspection

1. Remove the solenoid valve. (Refer to above.)
2. Measure the solenoid valve resistance with an ohmmeter.

Resistance: 10.7–12.3 Ω (20°C {68°F})

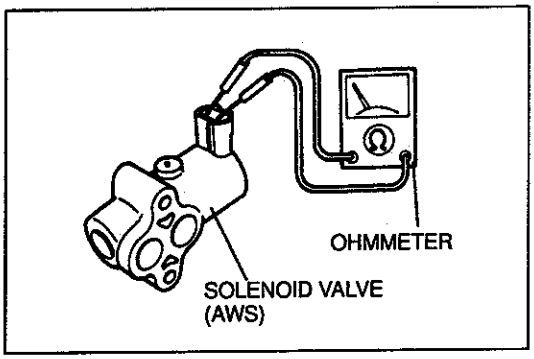
3. If not as specified, replace solenoid valve.



SOLENOID VALVE (ACCELERATED WARM-UP SYSTEM [AWS])

Removal / Installation

1. Disconnect negative battery cable.
2. Remove the extension manifold. (Refer to page F–76.)
3. Disconnect the solenoid valve connector.
4. Remove the solenoid valve (AWS) as shown in the figure.
5. Install in the reverse order of removal.



Inspection

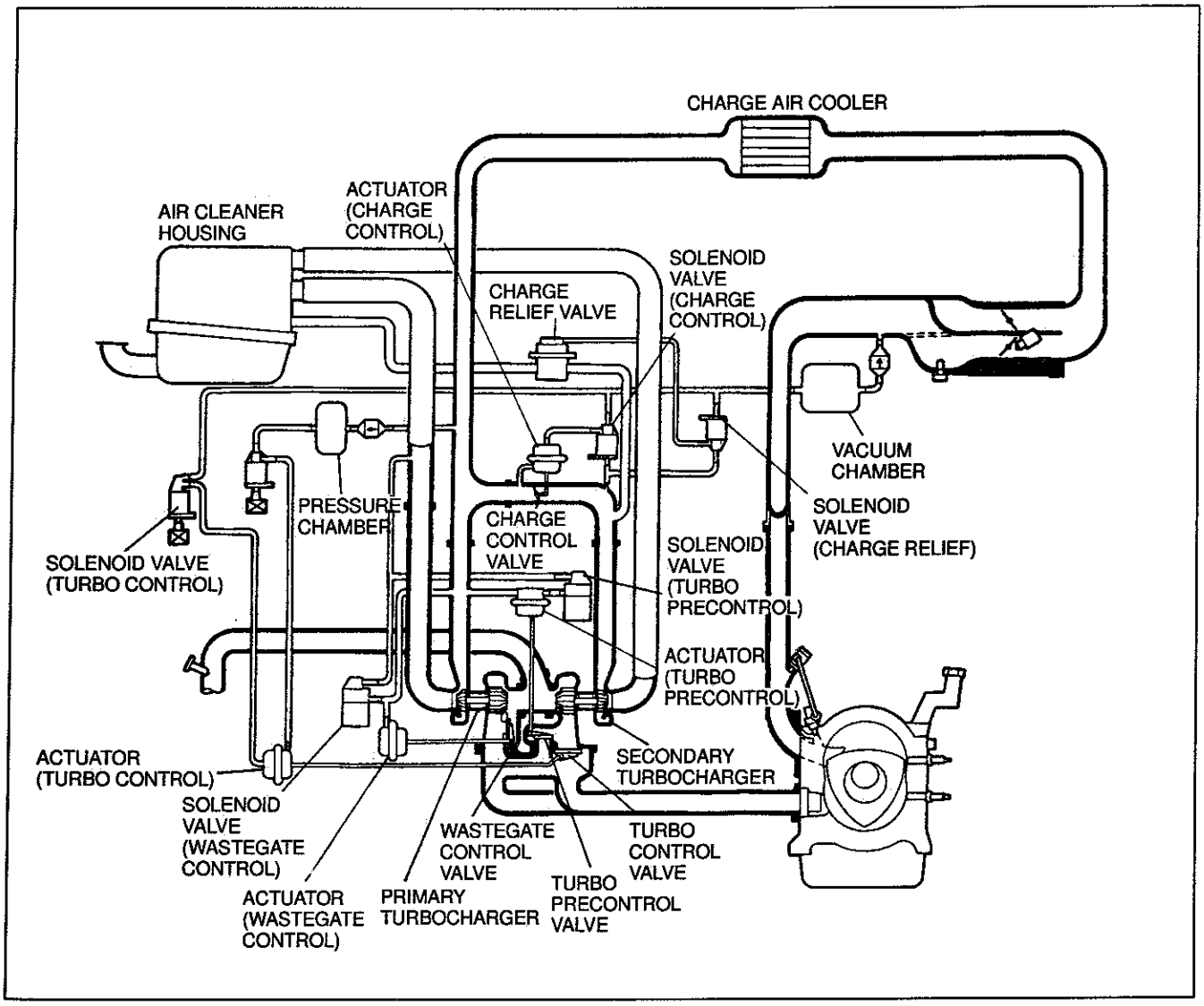
1. Remove the solenoid valve. (Refer to page F–76.)
2. Measure the solenoid valve resistance with an ohmmeter.

Resistance: 9.3–11.3 Ω (20°C {68°F})

3. If not as specified, replace solenoid valve.

SEQUENTIAL TWIN TURBOCHARGER SYSTEM

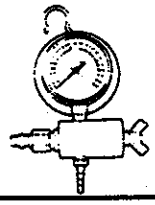
- The sequential twin turbocharger system consists of two turbochargers (primary and secondary) fitted in line with each other. In the low-speed, light-load range, turbocharging is done only by the primary turbocharger; in the high-speed, heavy-load range, turbocharging is done by the primary and secondary turbochargers in union.
- To prevent a drop of boost pressure when the secondary turbocharger begins to operate, the secondary turbocharger is made to spin prior to its operation.
- The sequential twin turbocharger system consists of the primary and secondary turbochargers and the actuators and solenoid valves (turbo precontrol, turbo control, wastegate control, charge control, charge relief).

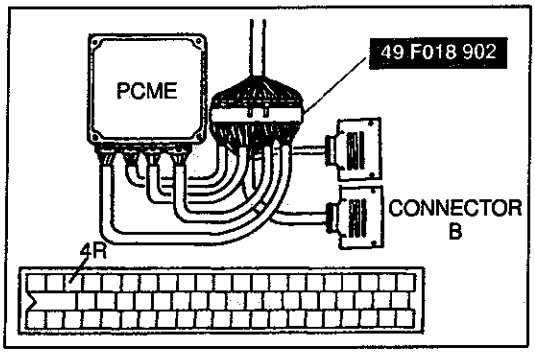


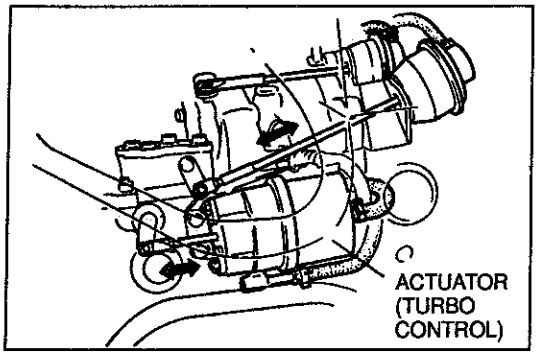
Operation

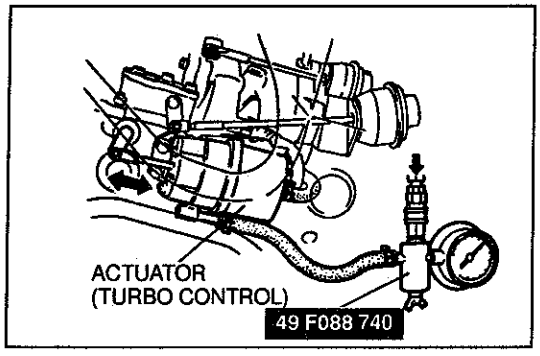
Devices \ Engine speed		Low-speed → High-speed light-load → Heavy-load		
Turbocharger	Primary	Boost pressure		
	Secondary	Stop	Preliminary rotation	Boost
Solenoid valve	Turbo precontrol	Duty control		Duty 5% (Fully open)
	Wastegate control	Duty 95% (Fully closed)		Duty control
	Charge relief	OFF		ON
	Charge control	ON		OFF
	Turbo control	OFF		ON

PREPARATION
SST

49 F088 740 Pressure tester		For inspection of turbocharger	49 F018 902 Adapter harness		For inspection of solenoid valve







ACTUATOR (TURBO CONTROL [TCNT])

System Operation

1. Connect the **SST** (Engine signal Monitor Adaptor Harness) to the PCME as shown.
2. Start the engine and verify that the actuator rod is moved once.
3. Run it idle.
4. Short the PCME terminal 4R and verify that the actuator rod is pulled into the actuator.
5. If the actuator rod is not moved, check the following condition below.

- Vaccum tube
  Inspect vaccum line fitting, connections and components for leaks. (Refer to page F–10.)
- Vaccum and pressure chamber
  Visually check for clogging damage or crack.
- Solenoid valve (Turbo control)
  Inspection (Refer to page F–176.)
- Actuator (Turbo control)
  Inspection (Refer to below.)

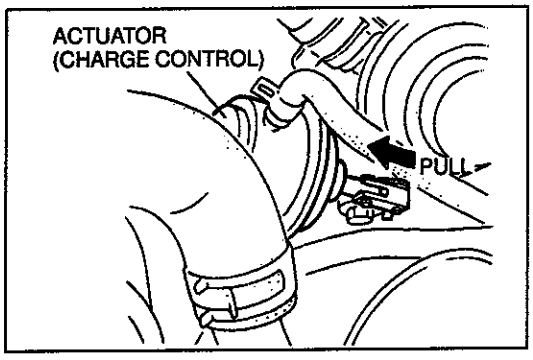
Inspection

1. Disconnect the air hose and attached it to the **SST** as shown.
2. Adjust the compressioned air pressure to **49 kPa. {0.5 kg·f/cm^2,7.1 psi}**
3. Verify that the actuator rod is move when appying and releasing air pressure.

Caution

- **Applying more than 79.4 kPa {0.81 kgf/cm^2, 11.5 psi} of compressed can damage the actuator.**

4. If not as specified, replace the actuator.
   (Refer to page F–91.)

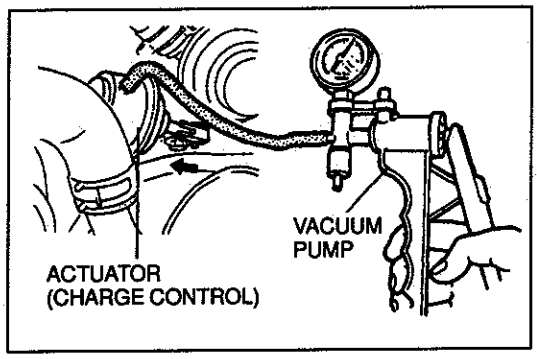


ACTUATOR (CHARGE CONTROL)

System Operation

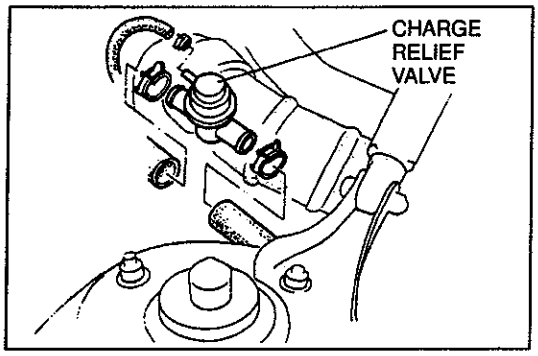
1. Start the engine and verify that the actuator rod is pulled into the actuator.
2. If the actuator rod is not pulled, check the following condition below.

- Vacuum tube
  Inspect vaccum line fitting, connections and components for leak. (Refer to page F-10.)
- Vacuum chamber
  Inspect the damage or crack.
- Solenoid valve (Charge control)
  Inspection (Refer to page F-176.)
- Actuator (Charge control)
  Inspection (Refer to below.)
- Shutter valve
  Inspection (Refer to below.)

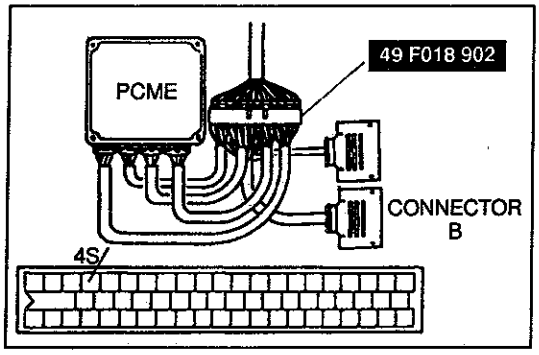


Inspection

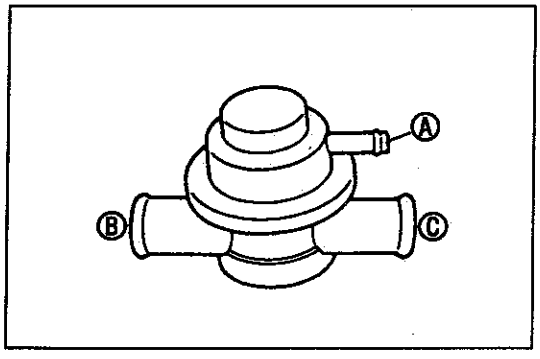
1. Disconnect the vacuum hose from the actuator.
2. Connect a vacuum pump.
3. Verify that the actuator rod is pulled when applying vacuum more than **6.7 kPa {50 mmHg, 1.9 inHg}**
4. If not as specified, replace the actuator. (Refer to page F-91.)



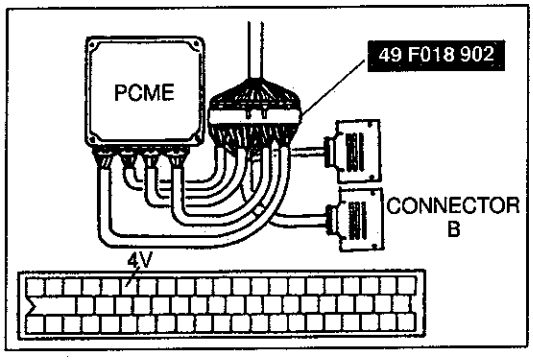
CHARGE RELIEF VALVE
Removal / Installation
1. Remove in the order shown in figure.
2. Install in the reverse order of removal.

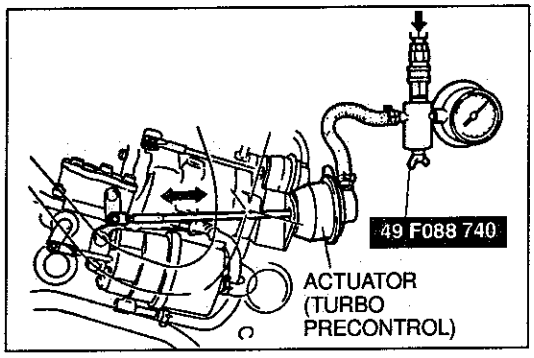


System operation
1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME as shown.
2. Turn ignition switch to ON.
3. Short the PCME terminal 4S and verify that the operating sound is heard when the solenoid valve ON.
4. If no sound is heard, check the solenoid valve. (Refer to page F-176.)



Inspection
1. Remove the charge relief valve.
2. Connect a vacuum pump to port A.
3. Apply approx. **26.7 kPa {200 mmHg, 7.87 inHg}** to port A and verify that air flows between B and C.
4. Replace if necessary.





TURBOCHARGER

Actuator (Turbo precontrol)

System operation

1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch to ON.
3. Short the PCME terminal 4V and verify that the operating sound is heard.
4. If no sound is heard, check the solenoid valve. (Refer to page F-93.)

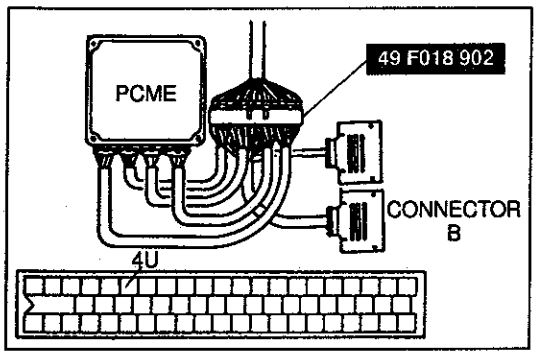
Inspection

1. Disconnect the air hoses and attached one to the **SST** and plug the other pipe as shown.
2. Verify that the actuator rod is moved when applying compressed air pressure to **69–98 kPa {0.7–1.0 kgf/cm^2, 10–14 psi}**

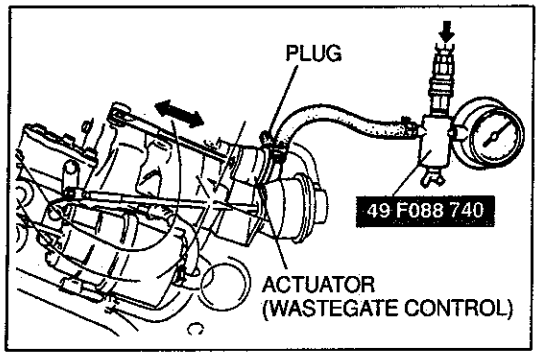
Caution

- **Applying more than 98 kPa {1.0 kgf/cm^2, 14 psi} of compressed can damage the actuator.**

3. Replace turbocharger, if necessary. (Refer to page F-91.)



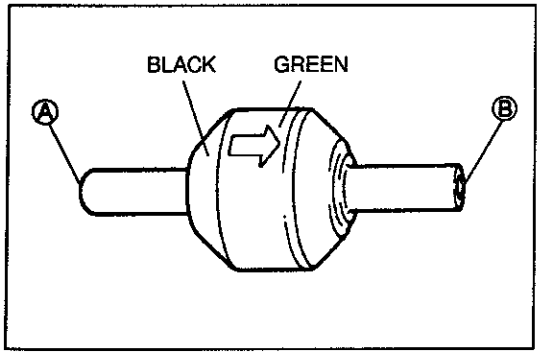
Actuator (wastegate control)
System Operation
1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch to ON.
3. Short the PCME terminal 4U and verify that the operating sound is heard.
4. If no sound is heard, check the solenoid valve (Refer to page F-93.)



Inspection
1. Disconnect the air hoses and attached one to the **SST** and plug the other pipe as shown.
2. Verify that the actuator rod is moved when applying pressed air pressure to **69–98 kPa {0.7–1.0 kgf/cm^2 10–14 psi}**

Caution
- **Applying more than 98 kPa {1.0 kgf/cm^2, 14 psi} of compressed can damage the actuator.**

3. Replace turbocharger, if necessary. (Refer to page F-91.)



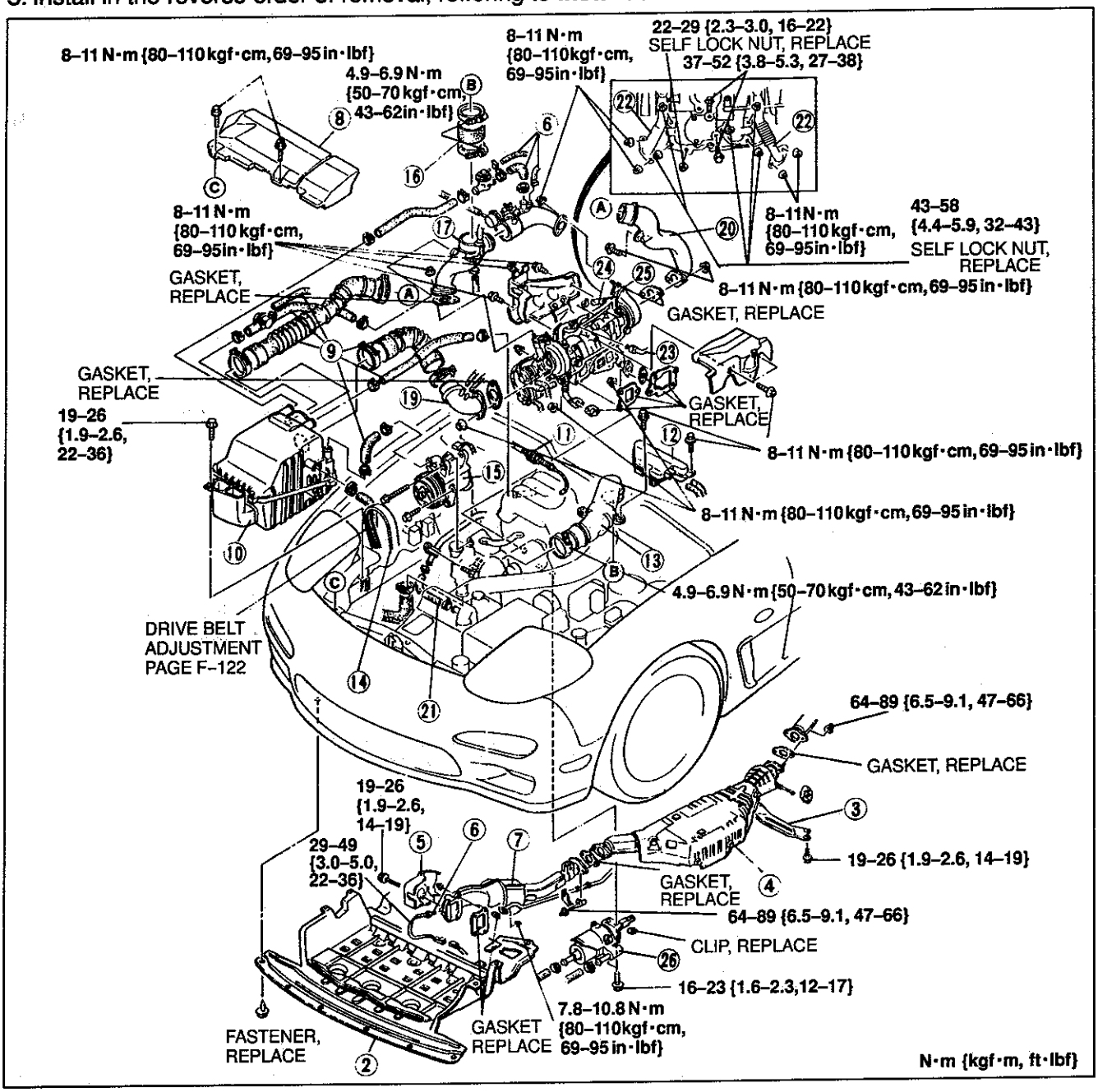
CHECK VALVE
Inspection
1. Remove the check velve.
2. Blow through A and verify that air flows from B.
3. Blow through B and verify that air does not flow from A.

Removal / Installation

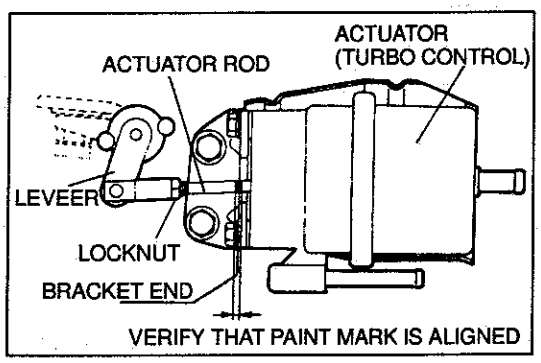
Turbocharger handling procedures.

- Holding the actuator, the rod, or the actuator hose when removing and carrying the turbocharger can cause damage.
- Set the turbine down with the shaft horizontal.
- Replace damaged studs and nuts. Use only the specified studs and nuts. Using damaged or unspecified studs and nuts can cause gas leakage because of insufficient clamping.
- Cover the turbocharger air port and exhaust port with tape to keep out foreign material. Foreign material may damage the turbocharger's internal components.

1. Disconnect the negative battery cable.
2. Lift up the vehicle.
3. Drain the engine coolant.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal, reffering to **Installation Note**.

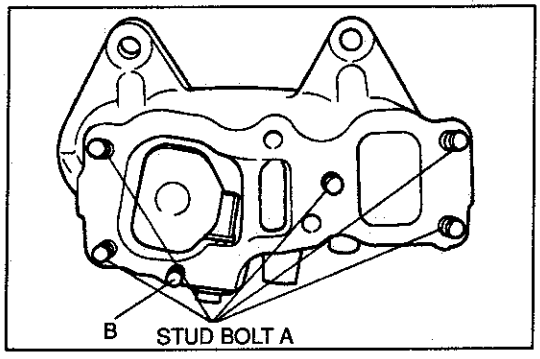


1. Negative battery cable
2. Under cover
3. Braket
4. Three-way catalyst assembly
5. Insulator
6. Oxygen sensor
7. Warm-up three-way catalyst
8. Fresh air duct
9. Air hoses
10. Air cleaner housing
11. Accelerater cable
    Removal / Installation ..... page F–80
    Inspection / Adjustment ..... page F–80
12. Pressure chamber
13. Air pipe
14. Drive belt
15. Air pump
16. Air hose
17. Air pipe
18. Charge control valve assembly
    Inspection ..... page F–87
19. Air intake pipe (Secondary)
20. Air intake pipe (Primary)
21. Water hose
22. Oil return pipes
23. Oil pipe
24. Water hose
25. Turbocharger
    Inspection ..... below
26. Actuator (Turbo control)
    Inspection ..... page F–86



Installation Note

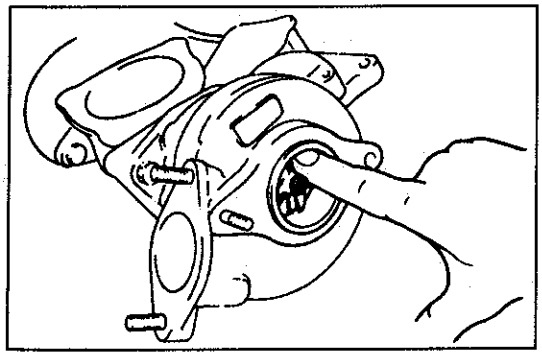
1. Verify that the paint mark on the actuator rod is aligned with actuator braket end.
2. If the mark is not aligned, adjust the actuator rod length



3. Check the stud bolt tighting torque before installing turbocharger.

Tighting torque

A: 16–24 N·m {1.6–2.4 kgf·m, 12–17 ft·lbf}
B: 8–12 N·m {0.8–1.2 kgf·m, 5.8–8.7 ft·lbf}



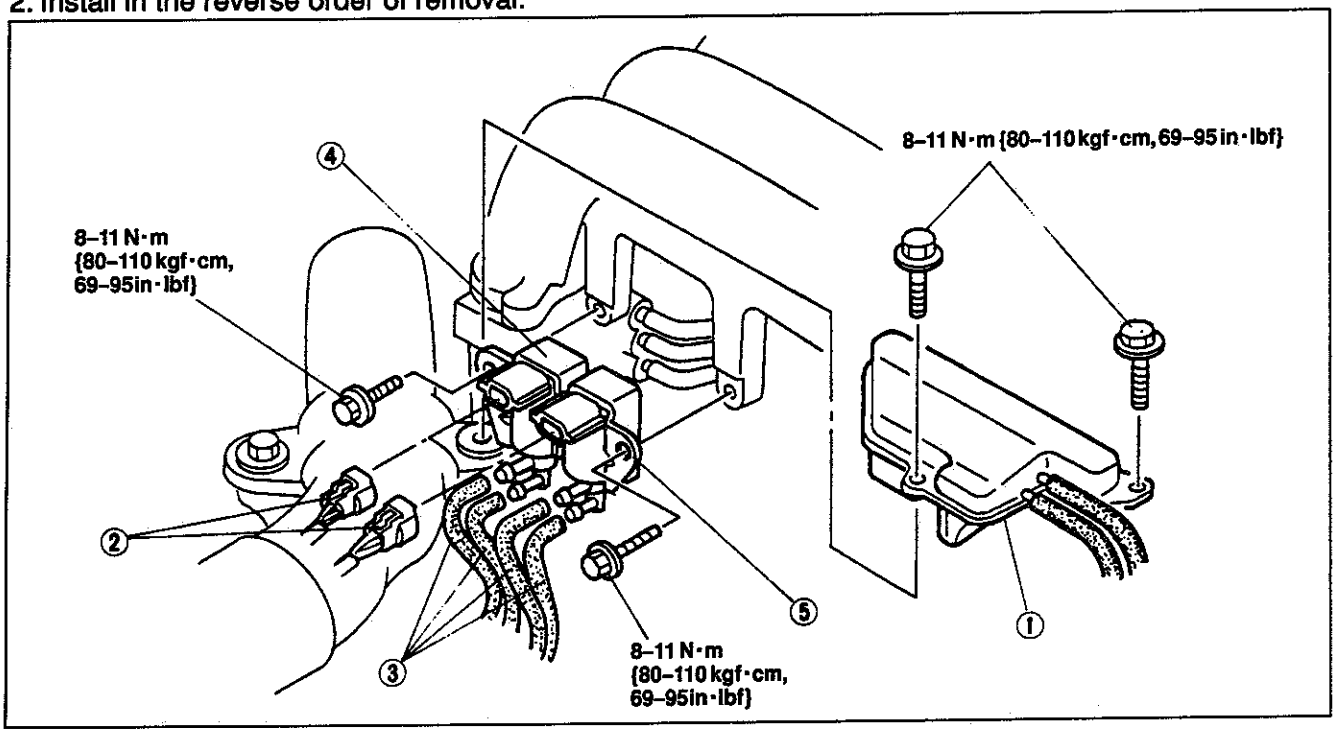
Inspection

1. Be sure the engine is cool.
2. Remove the turbocharger.
3. Check that the compressor wheel assembly turns smoothly.
4. If there is excessive drag or noise, replace the turbocharger.

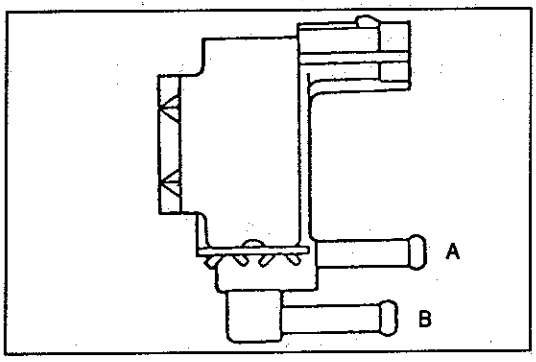
SOLENOID VALVE (TURBO PRECONTROL, WASTEGATE CONTROL)

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

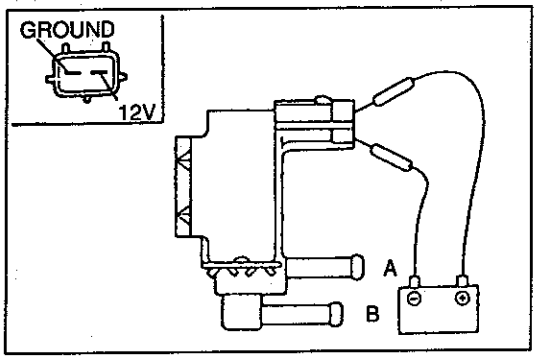


1. Pressure chamber
2. Connectors
3. Vaccum hoses
4. Solenoid valve. (Turbo precontrol)
   Inspection ..... below
5. Solenoid valve. (Wastegate control)
   Inspection ..... below



Inspection

1. Remove the solenoid valve.
2. Blow through the solenoid valve from hose A and check that air does not flow from B to A.



3. Apply battery positive voltage to solenoid valve and check that air does flow the solenoid valve from A to B.
4. If not as specified, measure the resistance.

Resistance: 29–33 Ω {20°C [68°F]}

FUEL SYSTEM

DESCRIPTION

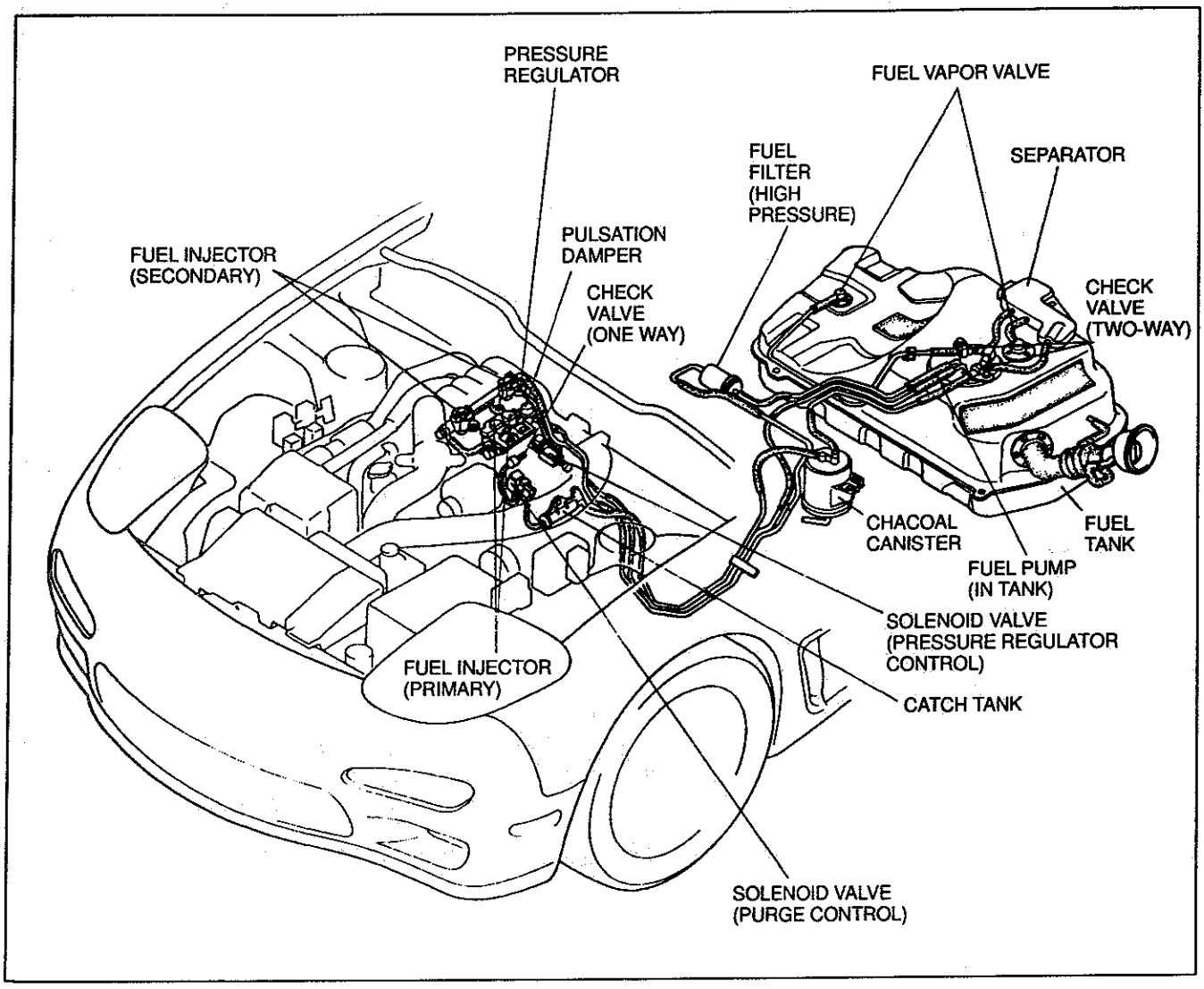
This system supplies the necessary fuel at constant pressure to the injectors.
Fuel is metered and injected into intake manifold and intake port according to the injection control signals from the PCME (Powertrain Control Module (Engine)).
This system consists of fuel pump, fuel filters, pressure regulator, pulsation dumper, solenoid valve (Pressure regulator control), and injectors.

SECONDARY INJECTOR - OPERATING RANGE

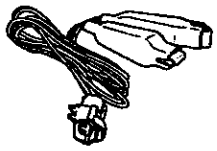
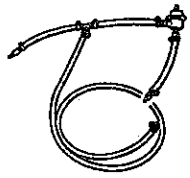
When the engine speed is above 2750 RPM and the total fuel injection amount is above the present amount (pre-programmed in the ECU), the secondary fuel injector operates.

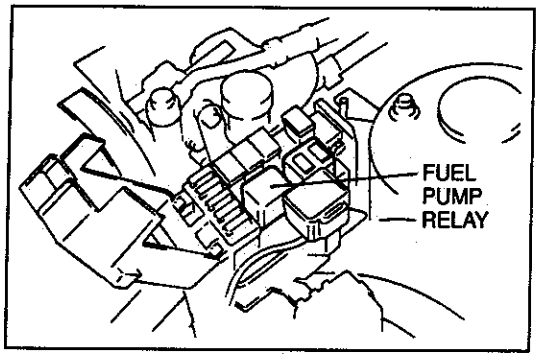
The total fuel injection amount is determined by engine speed, intake manifold pressure, intake air temperature and atmospheric pressure.

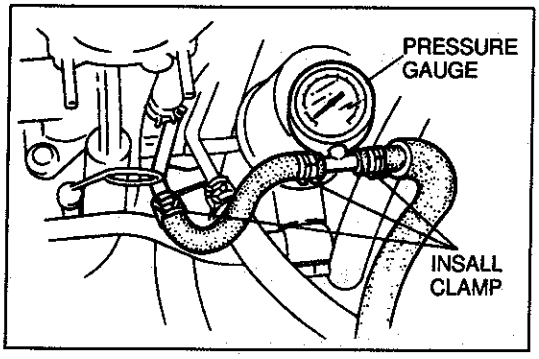
> For troubleshooting the secondary fuel injector, please refer to the self-diagnosis function-service code No. 71 and 73.



PREPARATION
SST

49 L018 901 Injector checker 	For inspection of injector	49 F013 102 Hose injector checker 	For inspection of injector





PRECAUTION

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

Fuel in the fuel system is under high pressure when the engine is not running.

Warning

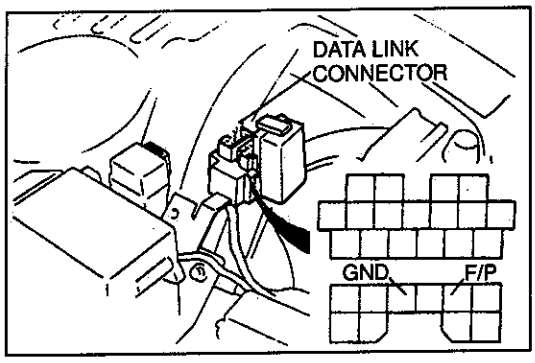
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the following "Fuel Line Safety Procedures".**

Fuel Line Safety Procedures

A. Release the fuel pressure before disconnecting a fuel line.
   1. Start the engine.
   2. Remove the fuel pump relay.
   3. After the engine stalls, turn the ignition switch to OFF.
   4. Install the fuel pump relay.

B. Avoid leakage.
   1. When disconnecting a fuel line hose, wrap a rag around it to protect against fuel leakage.
   2. Plug the hose after removal.

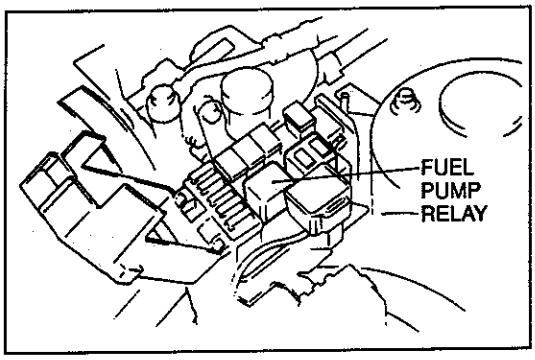
C. Install hose clamps to secure the fuel pressure gauge connections.



Priming Fuel System

After releasing the fuel pressure for repairs or inspection, the system must be primed to avoid excessive cranking when first starting the engine. Follow the steps below.

1. Connect the data link connector terminals **F/P** and **GND** with a jumper wire.
2. Turn the ignition switch ON for **Approximately 10 seconds** and check for fuel leaks.
3. Turn the ignition switch OFF and remove the jumper wire.

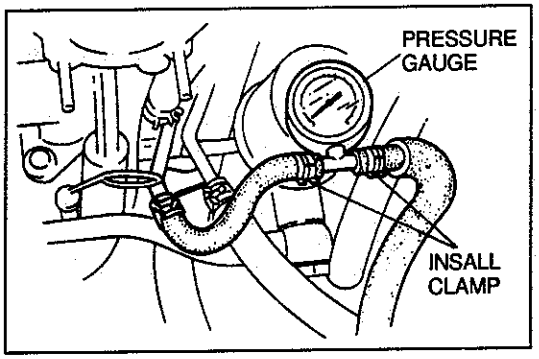


SYSTEM OPERATION

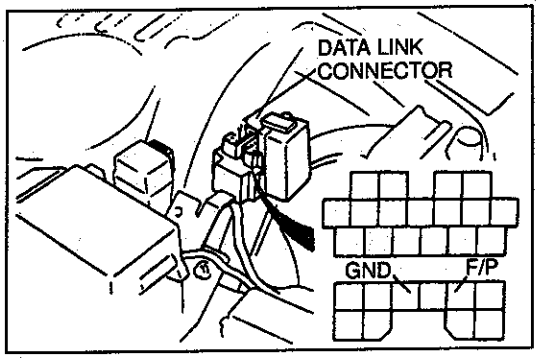
Fuel Pressure Hold Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F–95.**



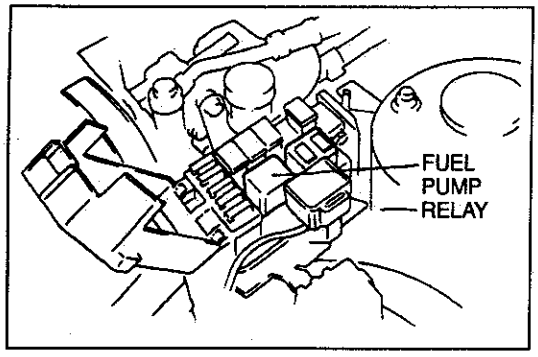
1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge as shown.
3. Connect the negative battery terminal.



4. Connect the data link connector terminals **F/P** and **GND** with a jumper wire.
5. Turn the ignition switch ON for **10 seconds** to operate the fuel pump.
6. Turn the ignition switch OFF and disconnect the jumper wire.
7. Observe the fuel pressure **5 minutes**.

Fuel pressure:
More than 150 kPa {1.5 kgf/cm^2, 21 psi}

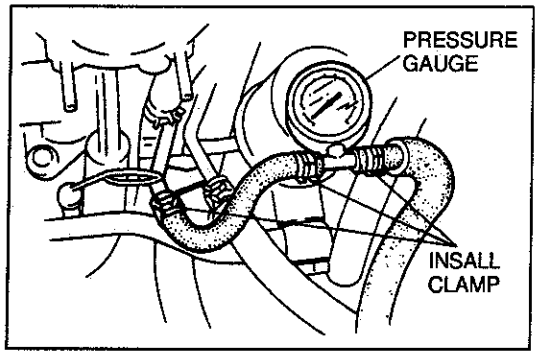
8. If not as specified, perform the following inspections.
   - Fuel pump hold pressure. (Refer to page F–100.)
   - Pressure regulator fuel line pressure. (Refer to page F–104.)
   - Injector fuel leakage. (Refer to page F–107.)



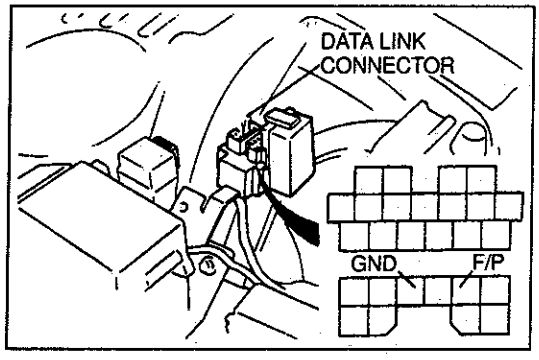
Fuel Line Pressure Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F-95.**



1. Disconnect the negative battery cable.
2. Install a fuel pressure gauge as shown in the figure.
3. Connect the negative battery cable.



4. Connect data link connector terminals **F/P** and **GND** with a jumper wire.
5. Turn the ignition switch ON.
6. Measure the fuel line pressure.

Fuel line pressure:
250–260 kPa {2.5–2.7 kg/cm^2, 36–38 psi}

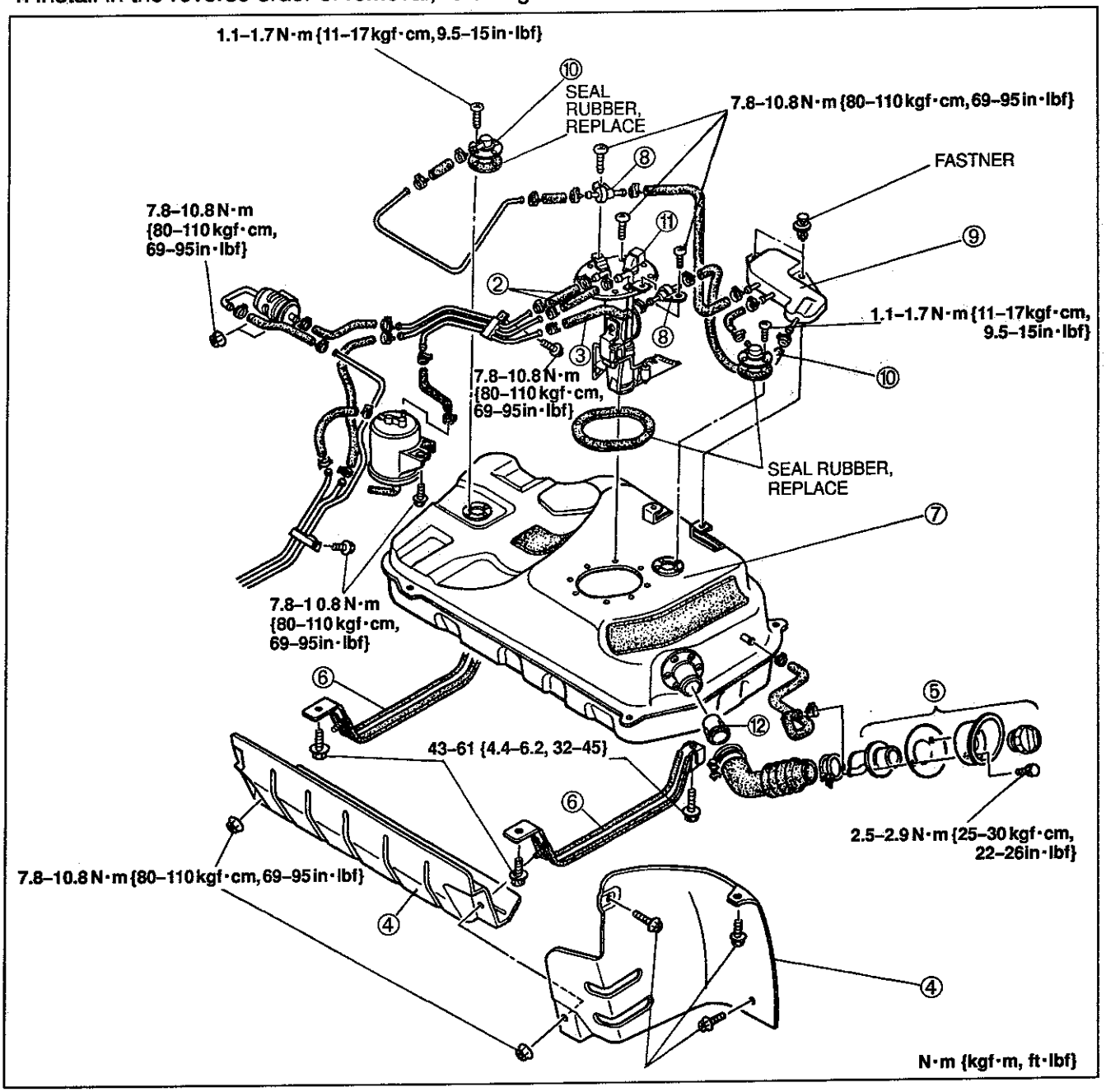
Pressure low – Measure fuel pump maximum pressure. (Refer to page F-101.) If as specified, the fuel line or fuel filter might be clogged or restricted.

Pressure high – Replace the pressure regulator. (Refer to page F-105.)

FUEL TANK
Removal / Inspection / Installation

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" on page F-95.**
- **Repairing a fuel tank that has not been properly steam cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**

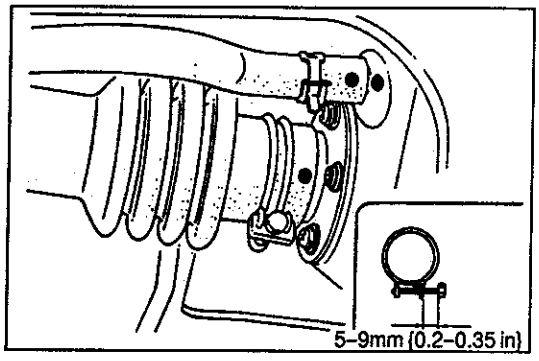
1. Drain the fuel from the fuel tank.
2. Remove in the order shown in the figure.
3. Inspect the fuel tank components visually and repair or replace if necessary.
4. Install in the reverse order of removal, referring to **Installation Note**.



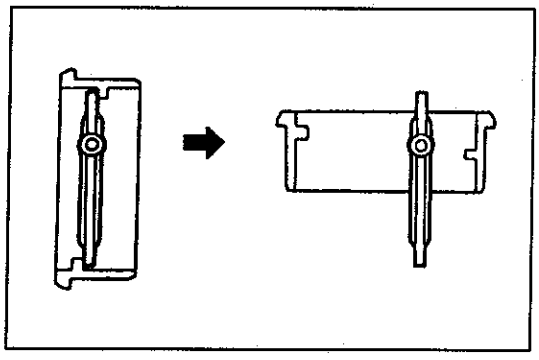
1. Battery cable
2. Fuel hoses
   Installation Note ..... page F-99
3. Evapolative hoses
   Installation Note ..... page F-99
4. Under cover
5. Fuel filler pipe
6. Fuel tank strap
7. Fuel tank
   Inspect for cracks and corrosion
8. Check valve
   Inspection ..... page F-132
9. Separator
   Inspect for cracks and corrosion
10. Fuel vapor valve
    Inspection ..... page F-132
11. Fuel pump
    Inspection ..... page F-101
    Removal / Installation ..... page F- 98
    Assembly / Disassembly ..... page F-102
12. Nonreturn valve

Installation Note

1. Push the ends of the main fuel hose, fuel return hose, and evaporative hoses onto the fuel tank fittings **at least 25 mm {1.0 in}**.
2. Push the fuel filter hose onto the fuel tank pipe and filter pipe **at least 35 mm {1.4 in}**.
3. Push the evaporative hoses onto the fuel vapor valve **at least 20 mm {0.8 in}**.
4. Push the evaporative hoses onto the check valve **at least 17 mm {0.7 in}**.

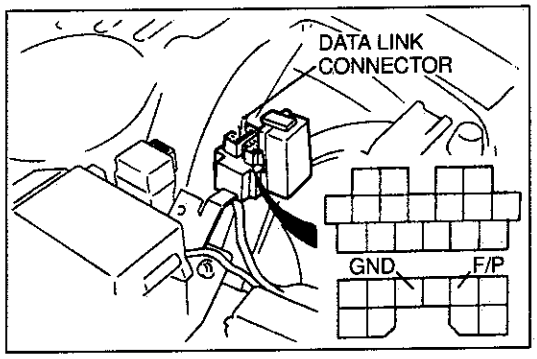


5. Connect the fuel filler hose and breather hose onto the fuel tank as shown in the figure.

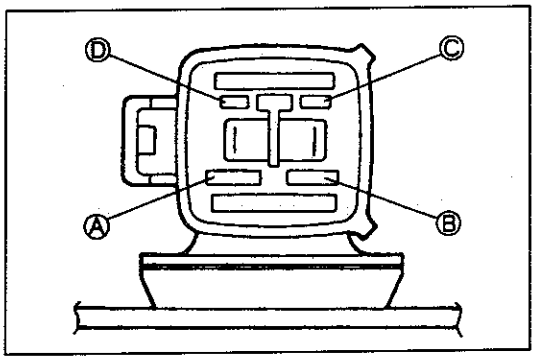


Nonreturn Valve

Verify that the nonreturn valve operates under its own weight as shown in the figure.



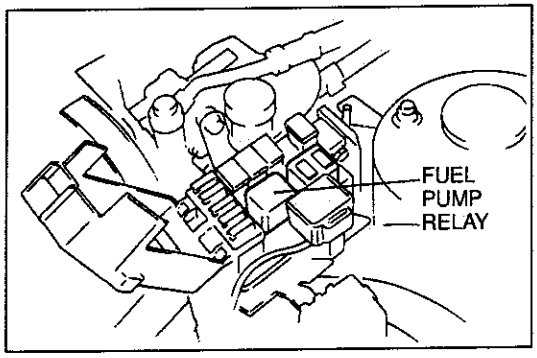
FUEL PUMP
Inspection
Fuel pump operation
1. Connect the data link connector terminals **F/P** and **GND** with a jumper wire.
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.
4. Listen for operational sound of the fuel pump at the filler inlet.
5. Install the fuel filler cap.



6. If no sound was heard, measure the voltage the fuel pump connector wire W/R.

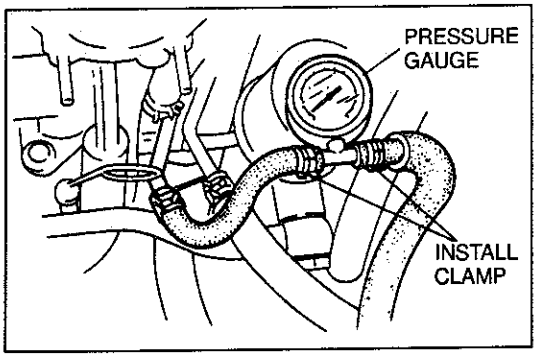
   Voltage: Battery positive voltage

7. If not correct, check the fuel pump relay and its circuits. (Refer to page F-110.)
8. If the voltage is normal, check for continuity between fuel pump connector A and B.
9. If there is no continuity, replace the fuel pump.

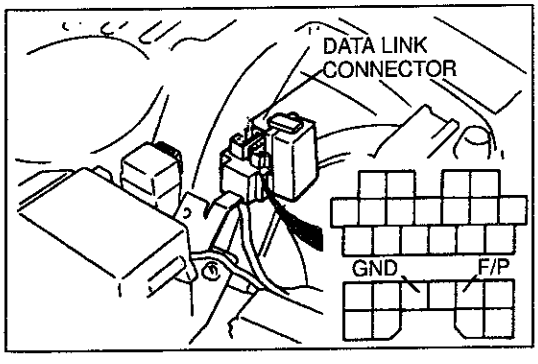


Hold pressure
Perform the inspection if the fuel pressure hold inspection is not as specified.

Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F-95.**



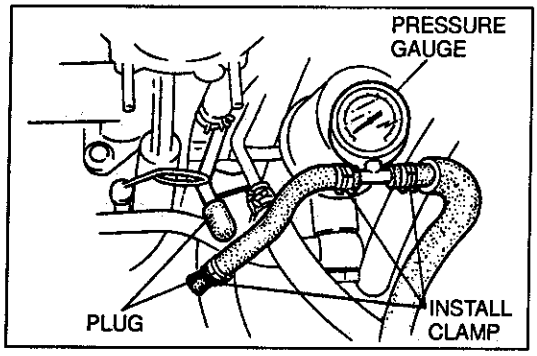
1. Disconnect the negative battery terminal.
2. Connect a fuel pressure gauge to the fuel main pipe and plug the outlet of the fuel pressure gauge as shown. (Install clamps as shown.)
3. Connect the negative battery terminal.

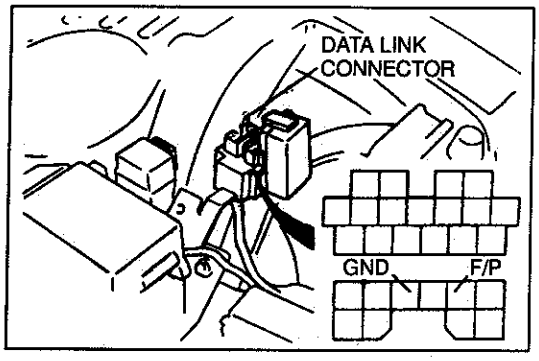


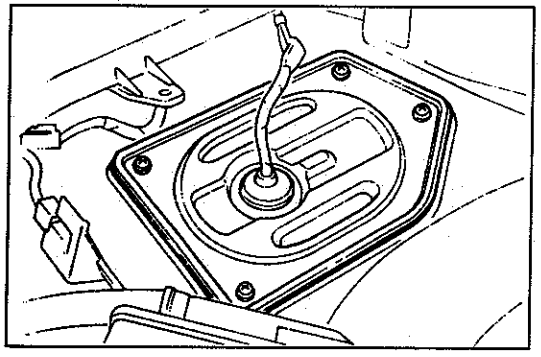
4. Connect data link connector terminals **F/P** and **GND** with a jumper wire.
5. Turn the ignition switch ON and measure the fuel pressure.

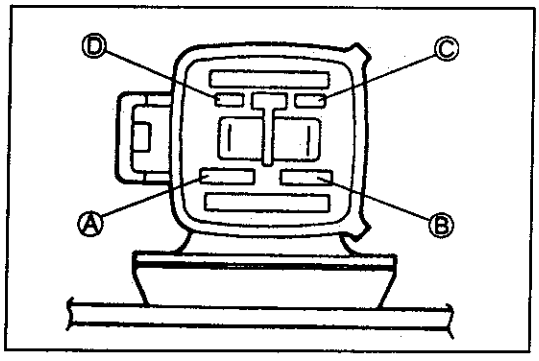
   Fuel pressure:
   490–740 kPa {5.0–7.5 kgf/cm^2, 71–106 psi}

6. Turn the ignition switch OFF and disconnect the jumper wire.
7. If not as specified, replace the fuel pump.









Fuel pump maximum pressure

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F–95.**

1. Disconnect the negative battery terminal.
2. Connect a fuel pressure gauge to the fuel main pipe and plug the outlet of the gauge as shown. (Install clamps as shown.)
3. Connect the negative battery terminal.
4. Connect data link connector terminals **F/P** and **GND** with a jumper wire.
5. Turn the ignition switch ON to operate the fuel pump.
6. Measure the pump maximum pressure.

Fuel pump maximum pressure:
490–740 kPa {5.0–7.5 kgf/cm^2, 71–107 psi}

7. Turn the ignition switch OFF and disconnect the jumper wire.
8. If not as specified, replace the fuel pump.

Continuity Inspection

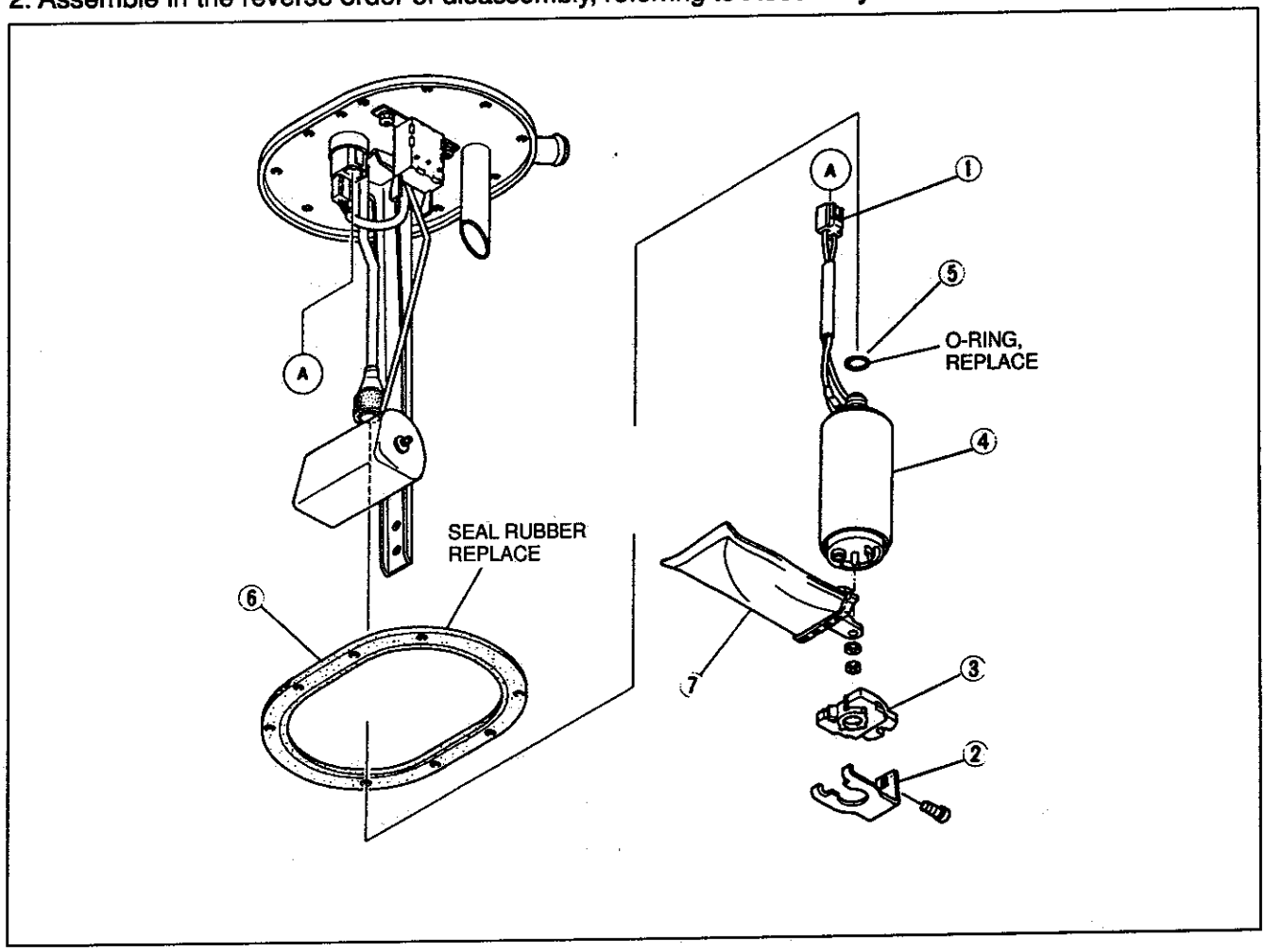
1. Remove the luggage room carpet.
2. Remove the acoustic wave guide assembly. (if equipped)
3. Disconnect the fuel pump connector.

4. Check for continuity between the fuel pump connector A and B.
5. If there is none, replace the fuel pump. (Refer to page F–98.)

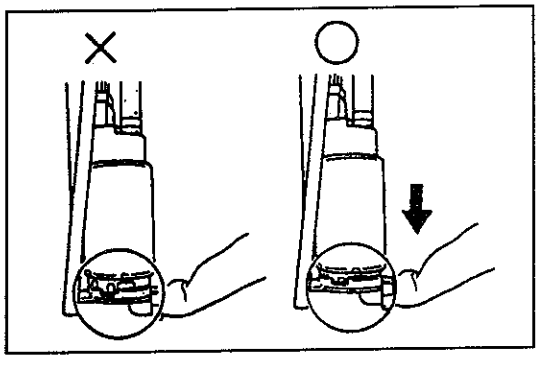
Disassembly / Assembly

Warning
- **When replacing the fuel system parts, keep sparks, cigarettes, and open flames away from the 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" on page F-95.**

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



1. Fuel pump connector
2. Bracket
3. Mounting rubber
4. Fuel pump
5. O-ring
6. Seal rubber
7. Fuel filter (Low pressure side)

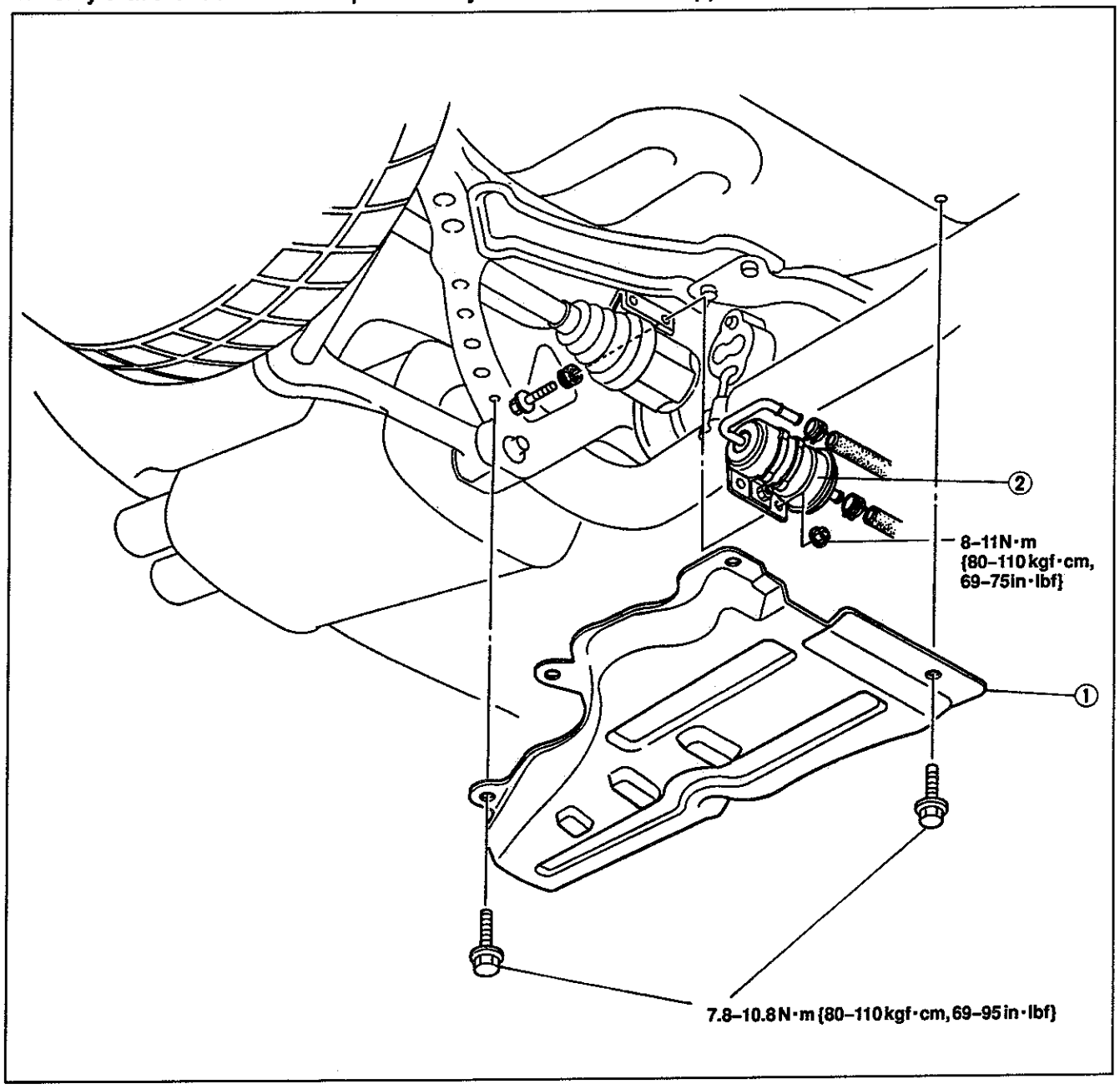


Assembly Note
After installing the fuel pump to the braket, pull the pump down so that it is tight against the braket.

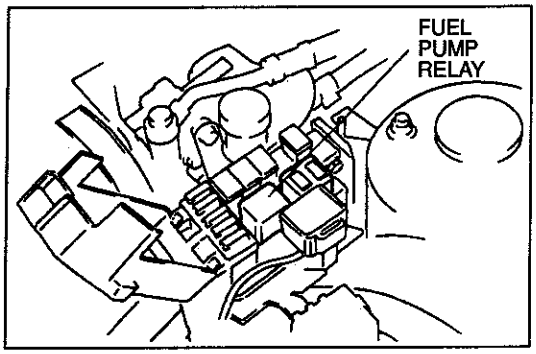
FUEL FILTER
Replacement

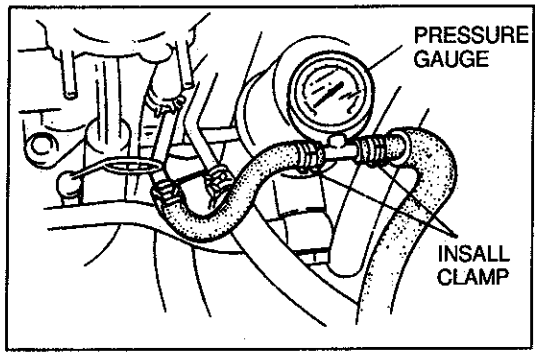
Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

High-pressure side
The fuel filter must be replaced at the intervals outlined in the maintenance schedule.
1. Before removing the fuel filter, release the fuel pressure from the fuel system.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.
4. Verify that the fuel hoses are pushed fully onto the fuel filter nipple.



1. Under cover
2. Fuel filter (High-pressure side)





PRESSURE REGULATOR

Inspection

Fuel line pressure

Warning

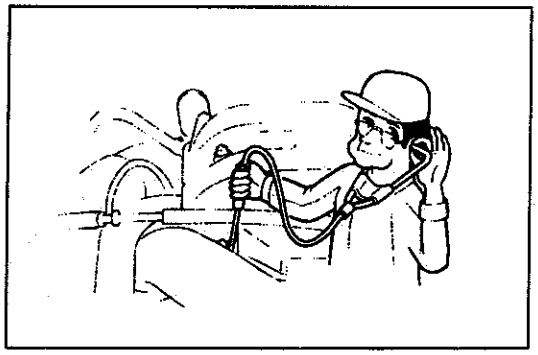
- **Fuel line spills and leaks can be dangerous. Fuel can ignite and cause serious injuries or death and can damage the vehicle. Fuel can also irritate skin and eyes. To prevent this from happening, release the fuel pressure according to "Fuel Line Safety Procedures" on page F-95.**

1. Disconnect the negative battery terminal.
2. Connect a fuel pressure gauge between the fuel filter and the fuel main hose. (Install clamps as shown.)
3. Connect the negative battery terminal.
4. Start the engine and run it at idle.
5. Measure the fuel line pressure.

Fuel line pressure:
190–220 kPa {1.9–2.3 kgf/cm^2, 28–32 psi}

Removal / Installation

(Refer to page F-105)



INJECTOR

Inspection (On-vehicle)

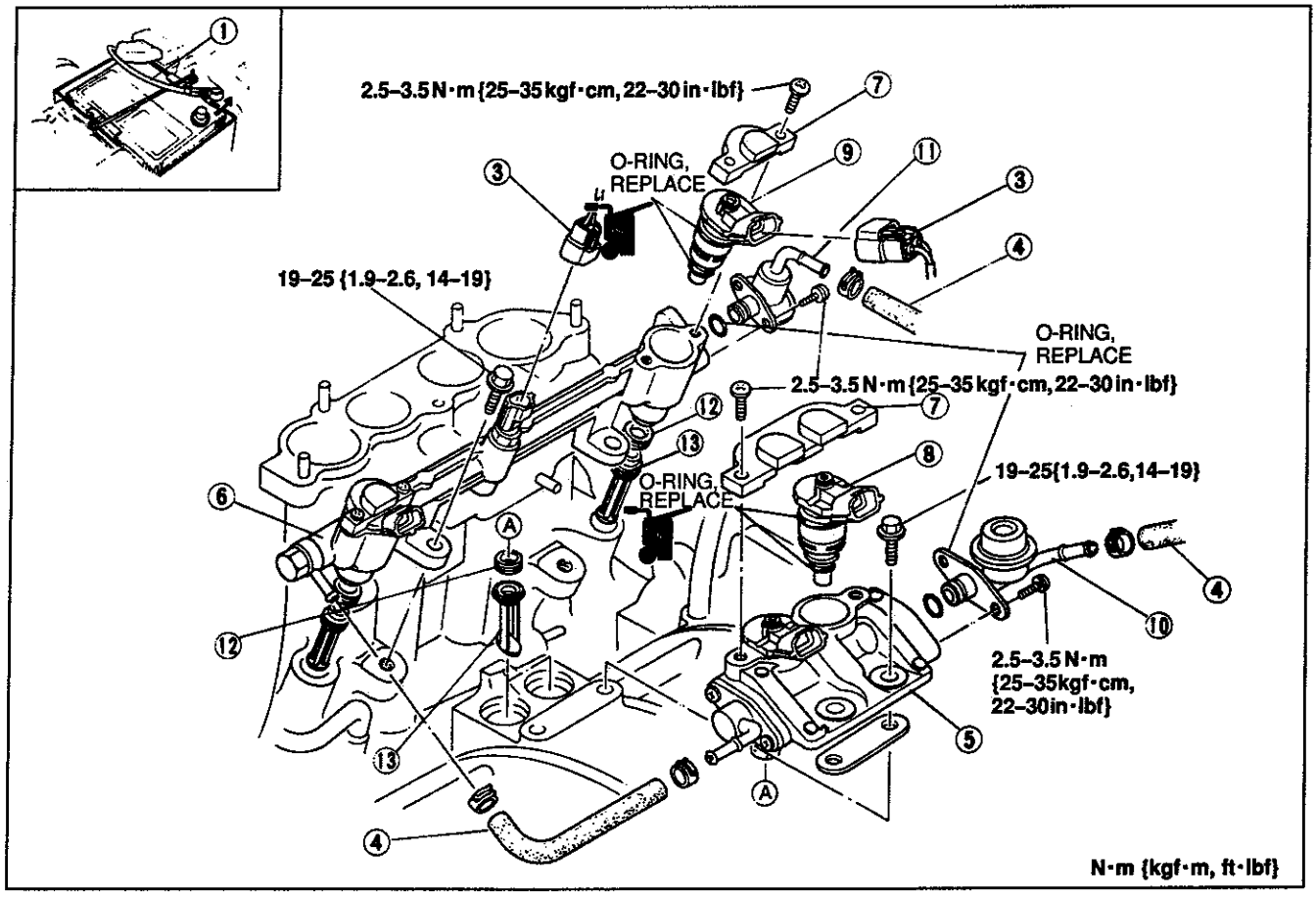
1. Warm up the engine and run it idle.
2. Listen for the operational sound of primary injector with a screwdriver or a sound scope.

Removal / Installation

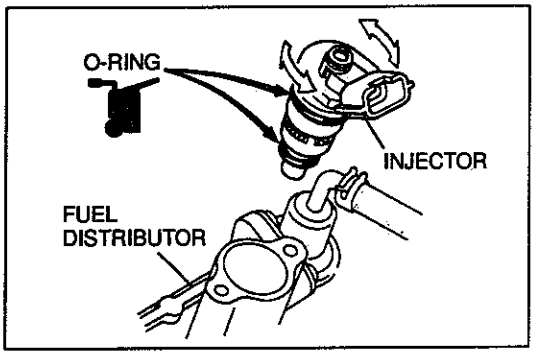
Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F–95.**

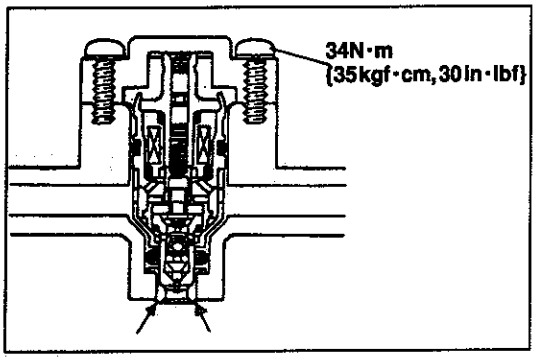
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation Note.**



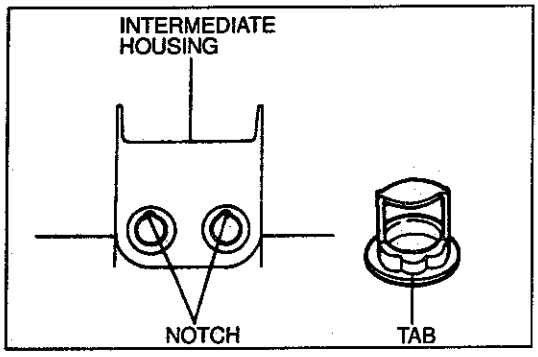
1. Negative battery cable
2. Extension manifold (Refer to page F–76)
3. Connector
4. Fuel hoses
5. Fuel distributor assembly (Primary)
6. Fuel distributor assembly (Secondary)
7. Cover
8. Injector (Primary) Inspection ..... page F–107
9. Injector (Secondary) Inspection ..... page F–107
10. Pulsation damper
11. Pressure regulator Inspection ..... page F–104
12. Insulator
13. Air bleed socket



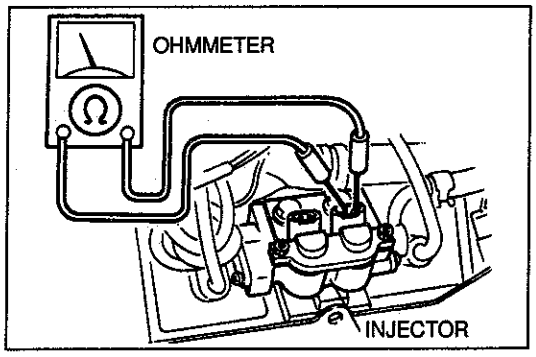
Installation Note
Injector installation
1. Use new O-rings.
2. Apply a small amount of clean engine oil to the O-rings before installing them.
3. Install the injector squarely into fuel distributor and gradually twist it.
4. Verify that the deposit is not to the holder inside of fuel distributor.
5. If there is, clean the holder inside by used to gasoline.



Fuel leakage test
1. Install the fuel hose.
2. Connect the data link connector terminals F/P and GND with a jumper wire.
3. Turn the ignition switch ON and check for fuel leaks from the fuel distributor.
4. If fuel leaks, check the injector O-ring and fuel distributor.



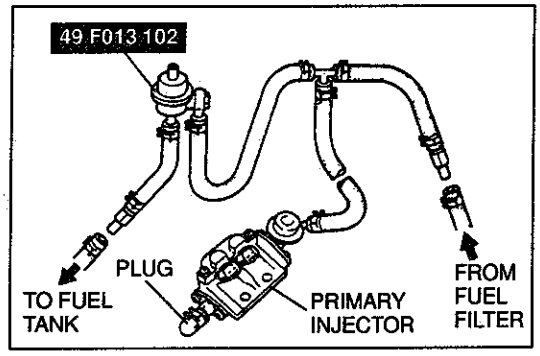
Air bleed socket installation
Align the tab of the air bleed socket with the notches in the intermediate housing.



Inspection
Injector resistance
1. Disconnect injector connector as shown in figure.
2. Measure the resistance of the injection with an ohmmeter.

Resistance: Approx. 13.8 Ω {20°C [68°F]}

3. If not as specified, replace the injector.

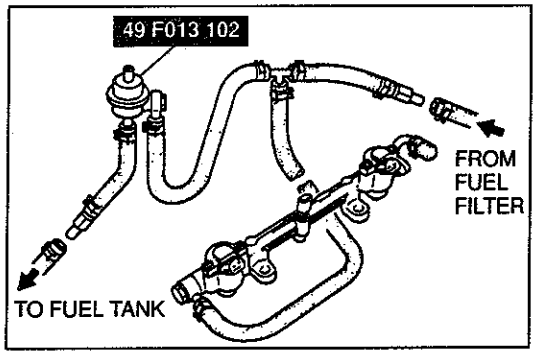


Fuel leakage test

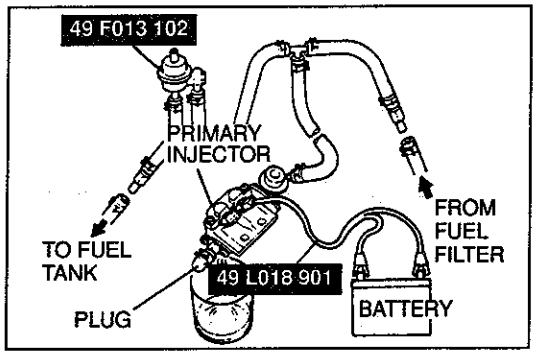
Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

1. Remove the injector together with fuel distributor.
2. Connect the **SST** as shown in figure.
3. Connect the data link connector terminals F/P and GND with a jumper wire.
4. Turn the ignition switch ON and check for fuel leaks from the injector.

Fuel leakage: Less than 1 drop / 5 min.



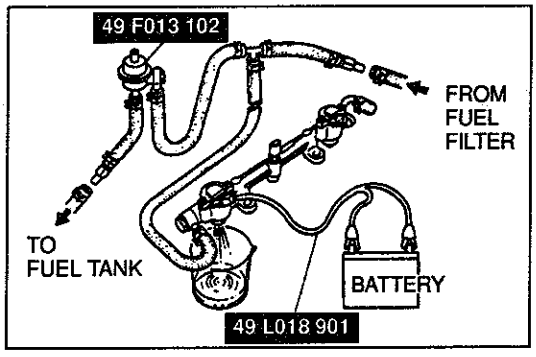
5. If not as specified, check the injector O-ring and fuel distributor contact face.
6. Install the injector.
7. Turn the ignition switch ON and check for fuel leaks from injector.
8. If not as specified, replace the injector.



Volume Test
1. Remove the injectors together with the fuel distributor.
2. Connect the **SST** as shown in figure.

Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

3. Check the injection volume with a graduated container.



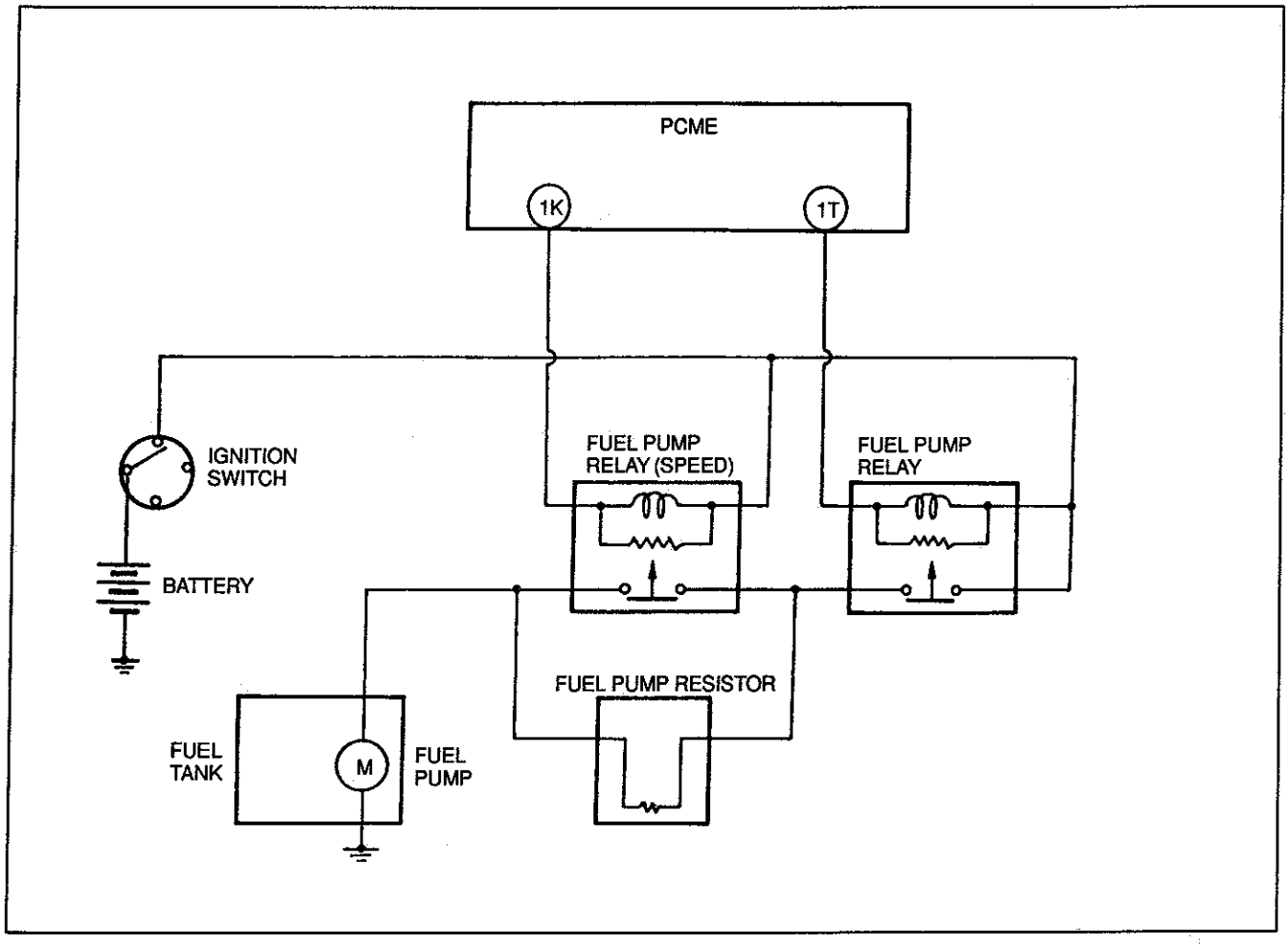
Injection volume
Primary injector:
128–147 ml {128–147 cc, 3.84–4.41 fl oz} / 15 sec.
Secondary injector:
198–227 ml {198–227 cc, 5.94–6.81 fl oz} / 15 sec.

4. If not as specified, replace the injector.

FUEL PUMP CONTROL SYSTEM

Description

- The PCME turns the fuel pump ON/OFF via the fuel pump relay. By controlling the fuel pump relay (speed), the PCME also controls fuel pump operation in two phases to improve fuel pump reliability and ensure the necessary fuel amount.



Fuel pump relay

- The fuel pump relay is controlled by the PCME and turns the fuel pump ON/OFF.

Fuel pump relay (speed)

- The fuel pump relay (speed) is controlled by the PCME and controls fuel pump operation voltage via the fuel pump resistor.

Fuel pump resister

- The fuel pump resister controls fuel pump operation voltage. During low-speed engine operation, fuel pump voltage is supplied via the fuel pump resistor.

Operation

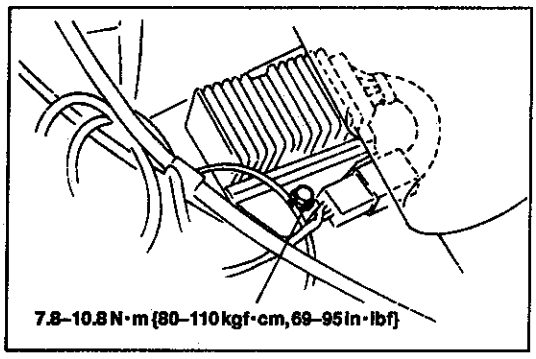
(1) In low-speed range (1K terminal of PCME is battery positive voltage)
  - The fuel pump is driven by voltage from the fuel pump resister.

(2) In high-speed range (1K terminal of is 0V)
  - The fuel pump is driven by battery positive voltage.

Operating conditions

The system operates when either of the following conditions is met.

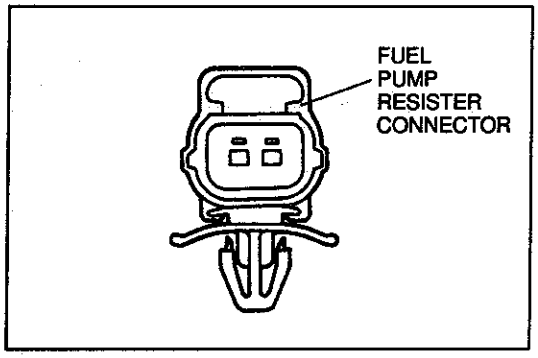
- During engine start-up
- Solenoid valve (pressure regulator control) operating
- High speed and heavy load



FUEL PUMP RESISTOR

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

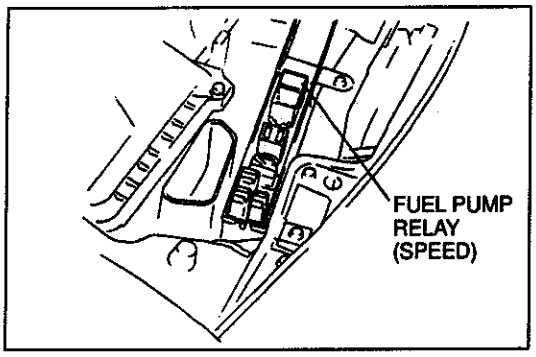


Inspection

1. Disconnect fuel pump resistor connector.
2. Measure resistance of the fuel pump resistor with an ohmmeter.

   Resistance 0.57–0.70 Ω {at 20°C [68°F]}

3. Replace the fuel pump resistor if necessary.

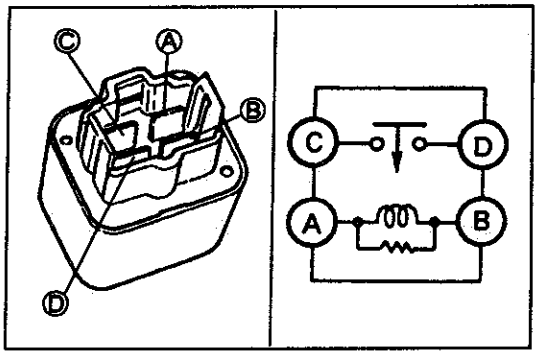


FUEL PUMP RELAY (SPEED)

Inspection

Operation check

Listen for operational sound of the fuel pump relay (speed) when ignition switch ON.



Continuity inspection

Check continuity between the terminals with ohmmeter.

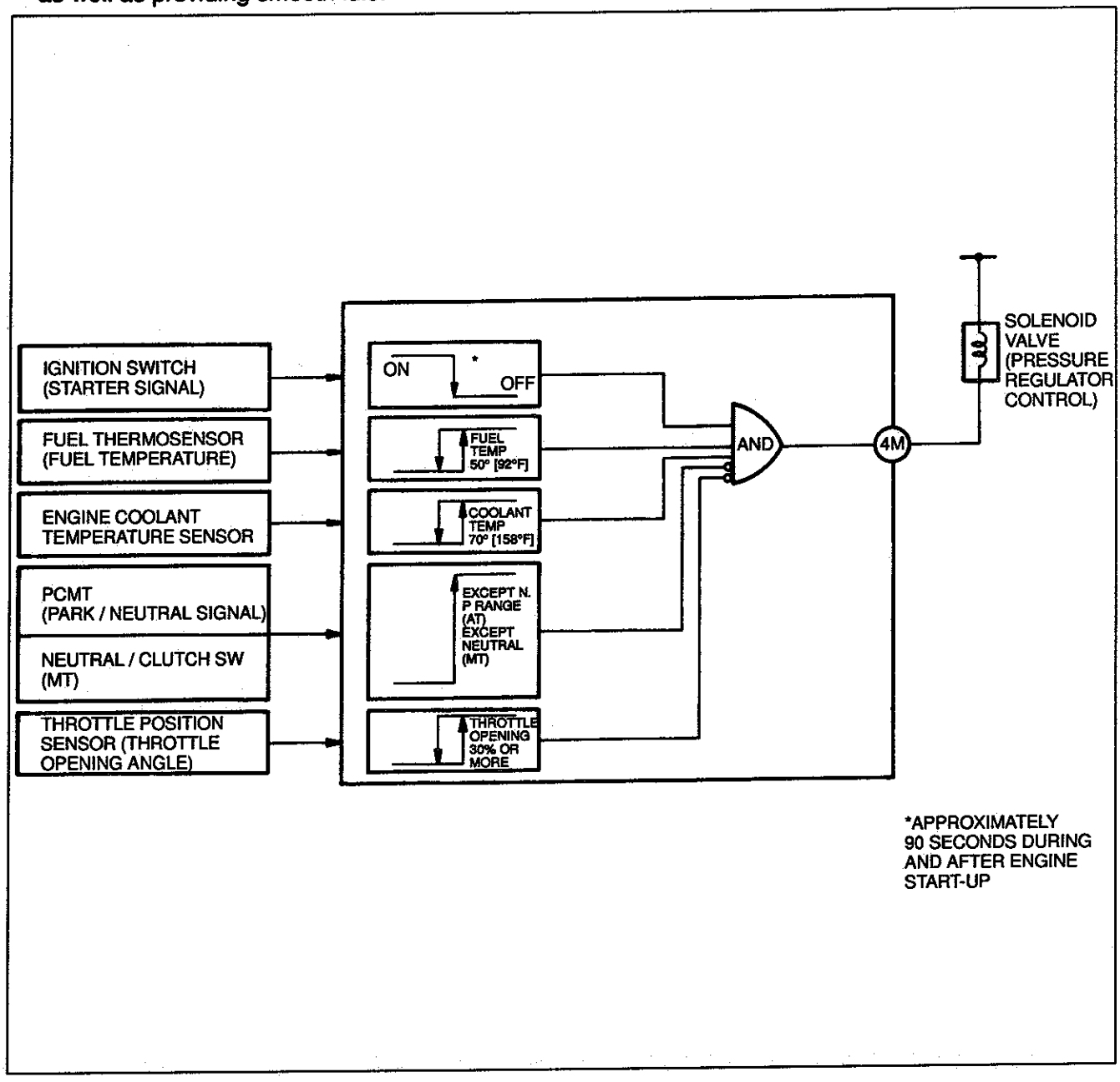
B+: Battery positive voltage

Terminal A–B	Terminal C–D
Apply B+	Yes
Not apply B+	No

PRESSURE REGULATOR CONTROL (PRC) SYSTEM

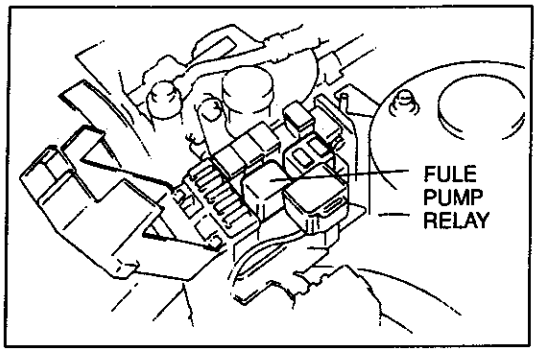
DESCRIPTION

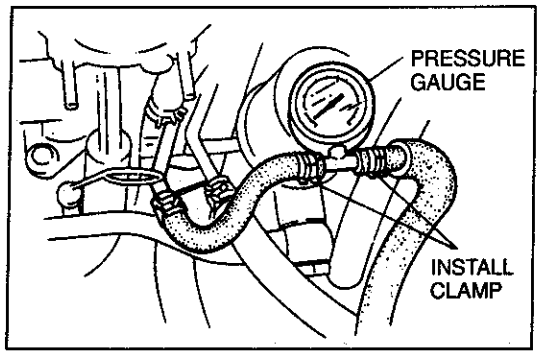
- This system cancels the vacuum applied to the pressure regulator and increases the fuel pressure during hot engine start-up and for a period immediately following engine start-up. This improves hot stanting as well as providing smooth idle.



Operation

To prevent vapor-lock during hot restart idle, vacuum to the pressure regulator is momentarily cut, and fuel injection pressure is increased.





SYSTEM OPERATION

Warning

- **Fuel line spills and leaks can be dangerous. Fuel can ignite and cause serious injuries or death and can damage the vehicle. Fuel can also irritate skin and eyes. To prevent this from happening, release the fuel pressure according to "Fuel Line Safety Procedures" on page F-95.**

1. Remove the fuel pump relay.
2. Connect a fuel pressure gauge to the main hose.
3. Connect the fuel pump relay.
4. Start the engine and run it idle.
5. Verify the fuel pressure.

Fuel line pressure
190–220 kPa {1.9–2.3 kgf/cm^2, 28–32 psi}

6. Short the PCME Terminal 4M and verify that fuel pressure.

Fuel line pressure
250–260 kPa {2.5–2.7 kgf/cm^2, 36–38 psi}

7. If not as specified, check the pressure regulator and solenoid valve.

EXHAUST SYSTEM

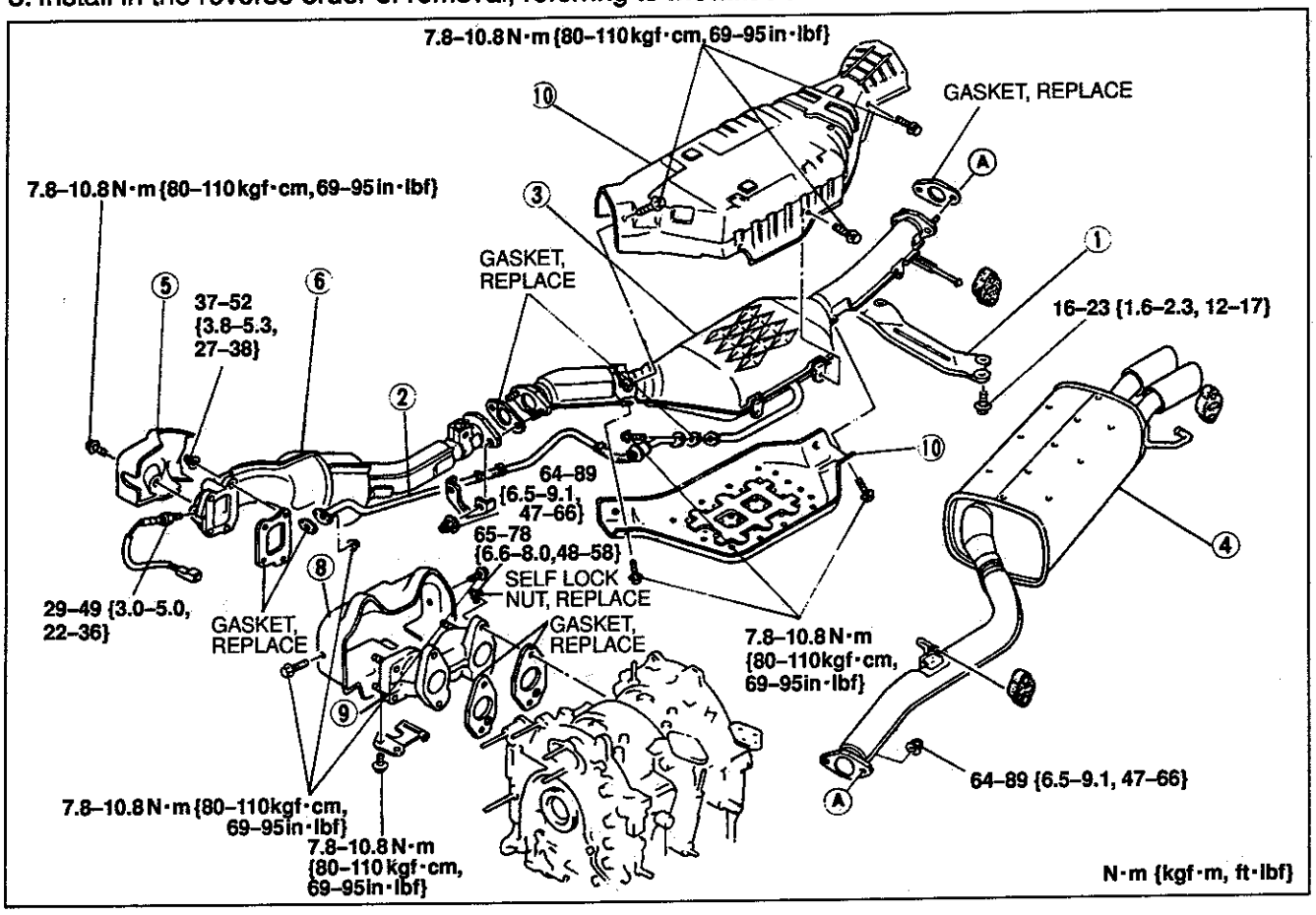
COMPONENT PARTS

Inspection (On-vehicle)

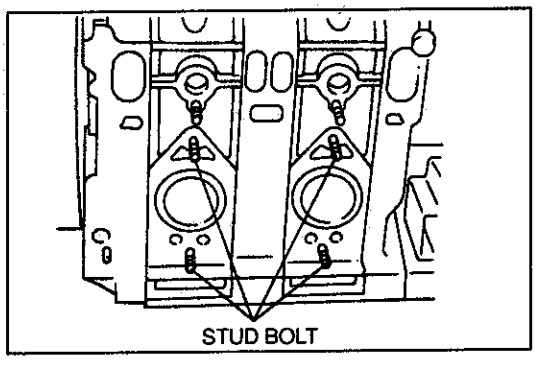
Start the engine and verify that there is no exhaust gas leakage from the exhaust system components.

Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Check all parts and repair or replace if necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



1. Braket
2. Secondary air pipe.
   Inspect for deterioration and restriction.
3. Three-way catalyst
   Inspect for deterioration and restriction.
4. Main silencer
   Inspect for deterioration and restriction.
5. Insulator
6. Warm-up three-way catalyst
   Inspect for deterioration and restriction.
7. Turbocharger
   Removal ..... Refer to page F–89
8. Insulator
9. Exhaust manifold
   Inspect for deterioration and restriction.
10. Insulatior



Installation Note

Check the stud bolt tighting torque before installing exhaust manifold.

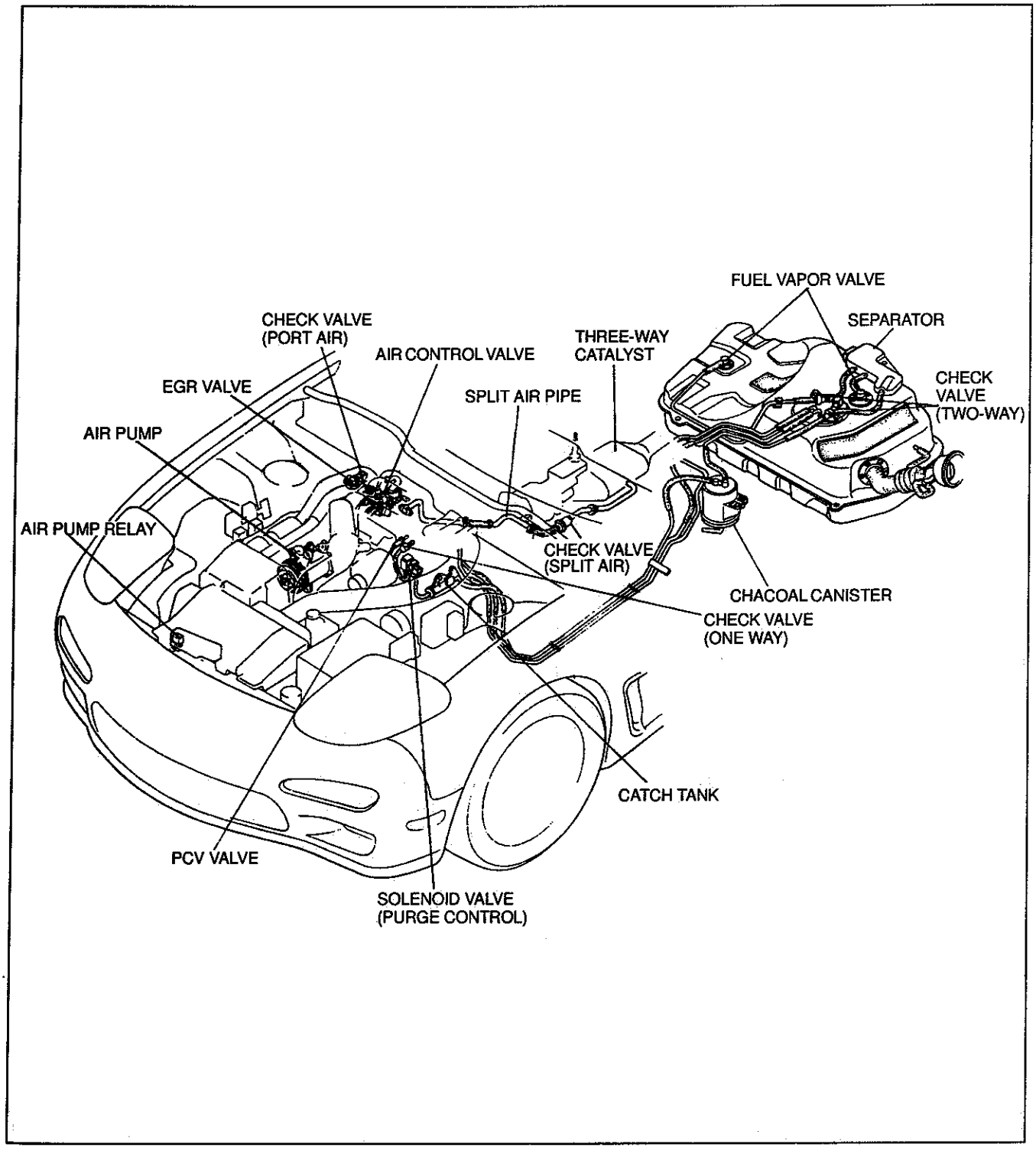
Tighting torque:
30–35 N·m {3.0–3.6 kgf·m, 22–26 ft·lbf}

OUTLINE OF EMISSION SYSTEM

STRUCTURAL VIEW

The following systems are employed to reduce CO, HC, and NOx emissions.

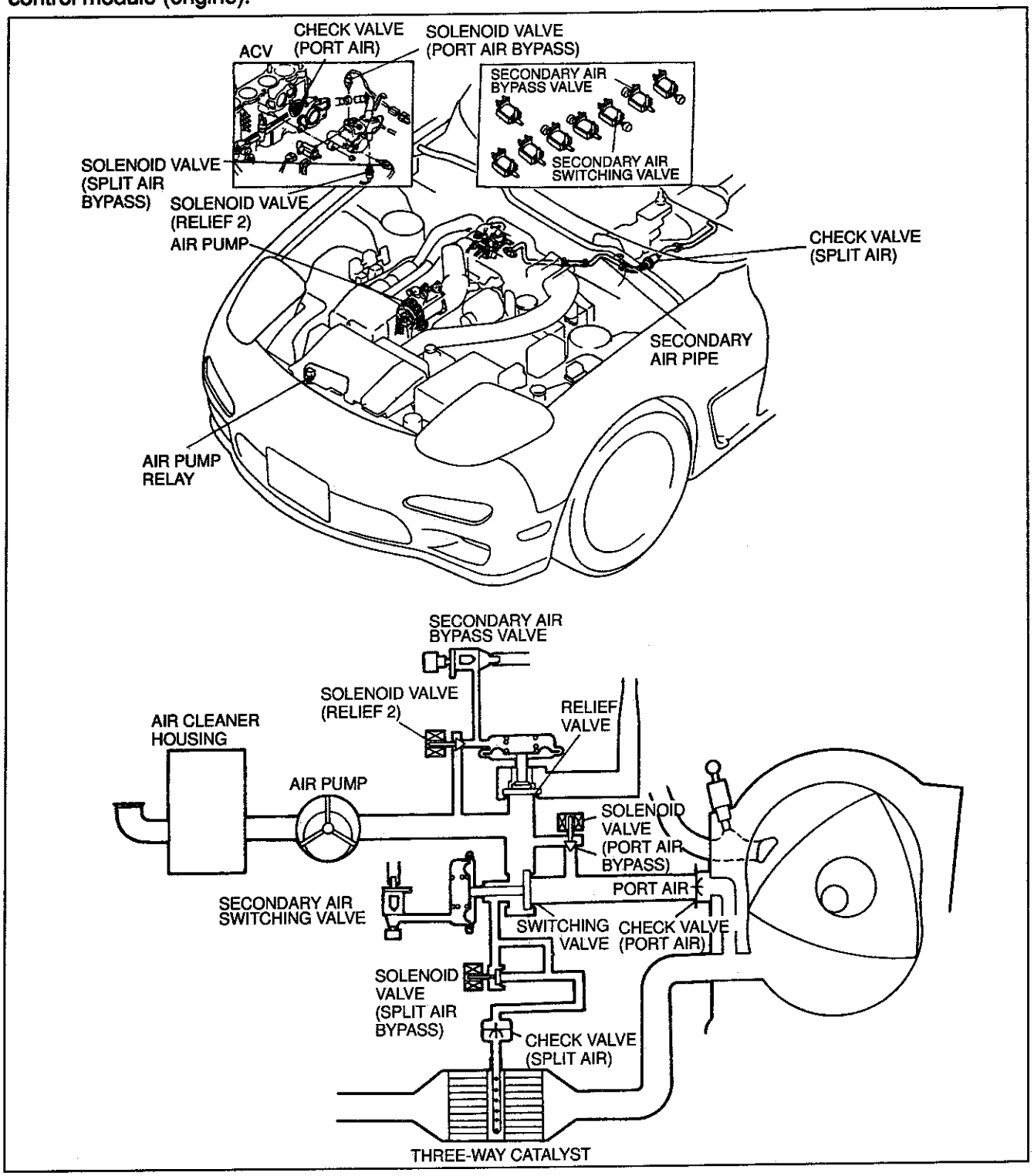
1. Secondary air injection
2. Positive crankcase ventilation system
3. Fuel evaporative system
4. Three-way catalyst
5. Deceleration control system
6. Exhaust gas recirculation



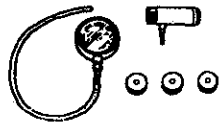
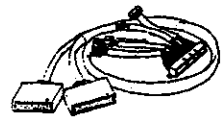
SECONDARY AIR INJECTION

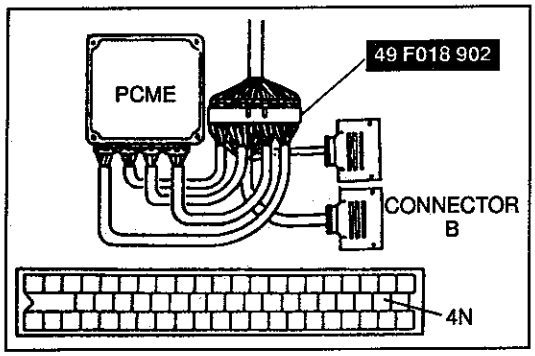
DESCRIPTION

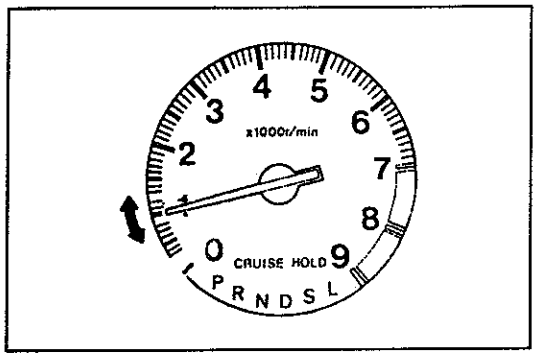
The secondary air injection helps to clean the exhaust gas by introducing fresh air into the exhaust port or three-way catalyst in relation to the during condition.
The PCME controls secondary air by actuating the solenoid valves (secondary air switching, secondary air bypass, relief 2, port air bypass, split air bypass) and the air pump relay.
This system consist of an air control valve (ACV), three way solenoid valves, air pump relay and powertrain control module (engine).

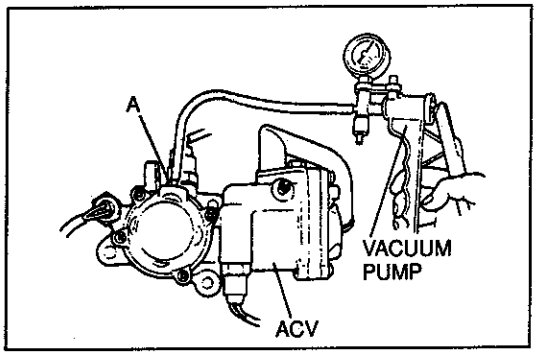


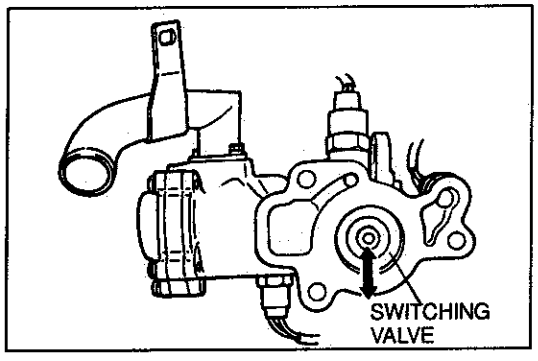
PREPARATION
SST

49 2113 011B Air pump gauge set		For inspection of air pump	49 F018 902 Adapter harness		For inspection of solenoid valve









AIR CONTROL VALVE (ACV)

Switching Valve

System operation

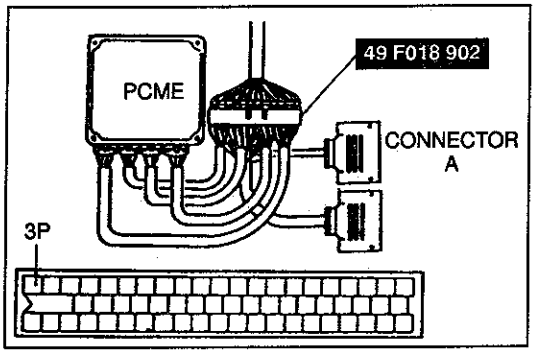
1. Connect the **SST** (Engine Signal Monitor Adapter Harness) to the PCME as shown.
2. Start the engine and run it idle.
3. Short the PCME terminal 4N and verify that the engine condition change (idle roughing).
4. If the engine condition does not change, check the following below.
   - Vacuum tube
     Inspect the vacuum line fitting, connections and components for leaks. (Refer to page F–10)
   - Secondary air switching valve
     Inspection (Refer to page F–176)
   - Air relief valve
     Inspection (Refer to page F–118)
   - Air pump
     Inspection (Refer to page F–121)
   - Air pump relay
     Inspection (Refer to page F–123)

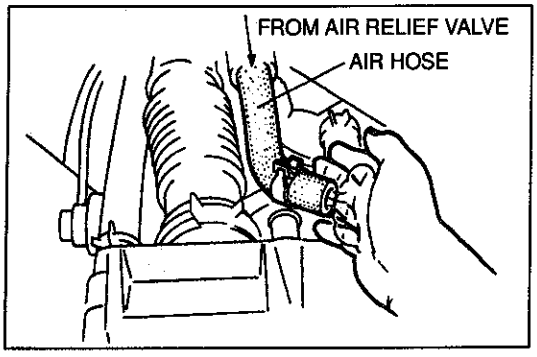
Inspection

1. Remove the air control valve. (Refer to page F–119.)
2. Connect a vacuum pump to port A.
3. Verify that the switching valve opens at a vacuum **14.7 kPa {110 mmHg, 4.3 inHg}.**

Caution
- **Applying vacuum greater than 66.7 kPa {500 mmHg, 19.7 inHg} can damage the air control valve.**

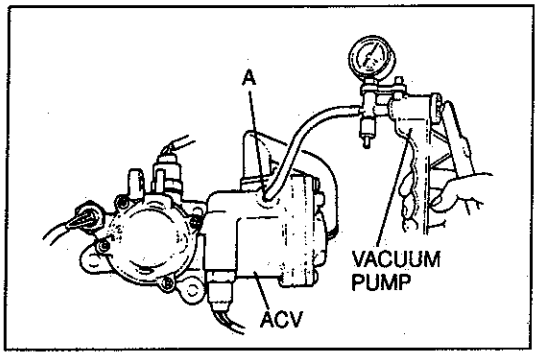
4. If not as specified, replace air control valve.
   (Refer to page F–119.)





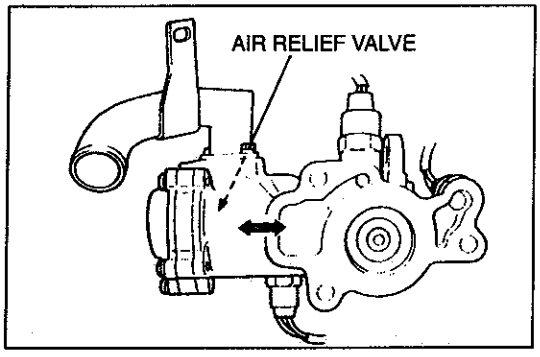
Air Relief Valve
System operation
Engine Signal Monitor

1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME as shown.
2. Start the engine and run it idle.
3. Verify that air does not flows from air relief Valve.
4. Short the PCME terminal 3P and verify that the air flows from air relief valve.
5. If the air does not flow, check the following condition below.
   - Vacuum tube
     Inspect the vacuum line fitting, connections and components for leaks. (Refer to page F–10)
   - Secondary air bypass valve
     Inspection (Refer to page F–176)
   - Air pump
     Inspection (Refer to page F–121)
   - Air pump relay.
     Inspection (Refer to page F–123)



Inspection

1. Remove the air control valve. (Refer to page F–119.)
2. Connect a vacuum pump to port A.



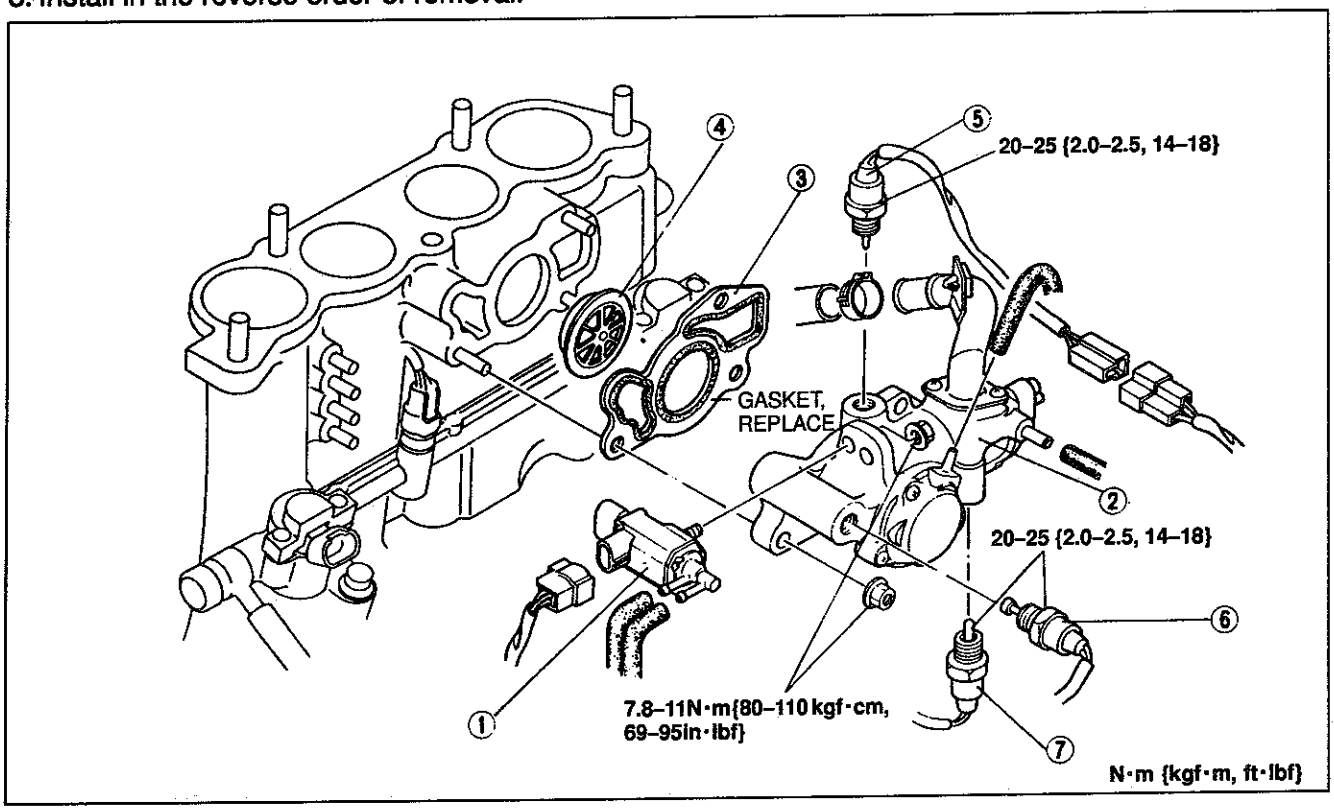
3. Verify that the air relief valve opens at a vacuum **19.3 kPa {145 mmHg, 5.7 inHg}**.

   Caution
   - **Applying vacuum greater than 66.7 kPa {500 mmHg, 19.7 inHg} can damage the air control valve.**

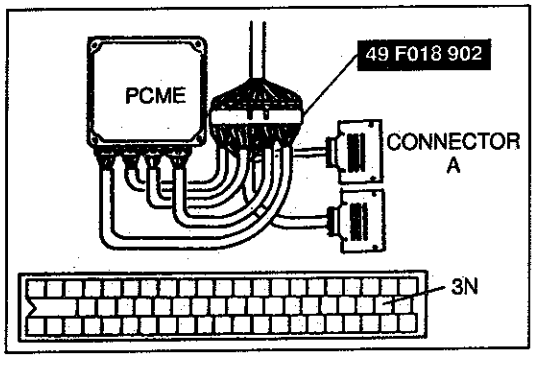
4. If not as specified, replace air control valve.

Removal / Installation

1. Remove the extension manifold. (Refer to page F–76.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Solenoid valve (Turbo control)
   Inspection ..... page F–176
2. Air control valve
3. Gasket
4. Check valve (Port air)
   Inspection ..... page F–120
5. Solenoid valve (Port air bypass)
   Inspection ..... below
6. Solenoid valve (Split air bypass)
   Inspection ..... page F–120
7. Solenoid valve (Relief2)
   Inspection ..... page F–123



SOLENOID VALVE (PORT AIR BYPASS)

System Operation

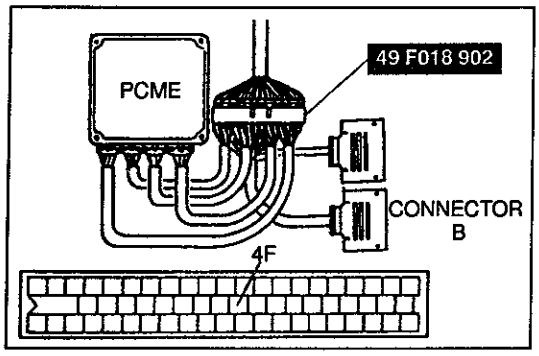
1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch ON.
3. Short the PCME terminal 3N and verify that the operational sound is heard.

Inspection

1. Disconnect the solenoid valve (Port air bypass) connector.
2. Measure the solenoid valve resistance with an ohmmeter.

   Resistance: 26.6–32.6 Ω (20°C [68°F])

3. If not as specified, replace solenoid valve. (Above)



SOLENOID VALVE (SPLIT AIR BYPASS)

System Operation

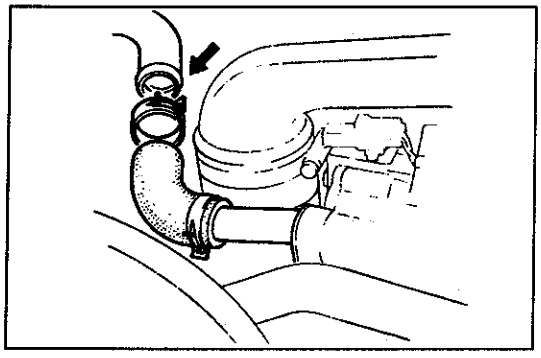
1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch ON.
3. Short the PCME terminal 4F and verify that the operational sound is heard.

Inspection

1. Disconnect the solenoid valve.
2. Measure the solenoid valve resistance with an ohmmeter.

Resistance: 27–32 Ω {20°C [68°F]}

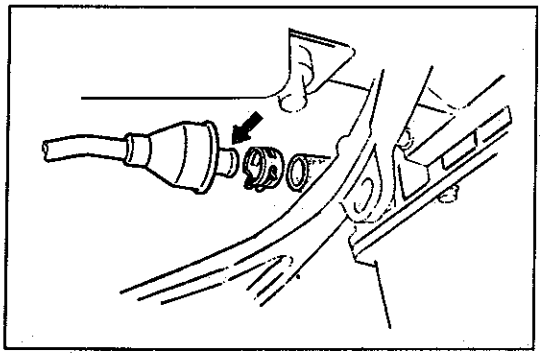
3. If not as specified, replace solenoid valve. (Refer to page F–119.)



CHECK VALVE (PORT AIR)

Inspection

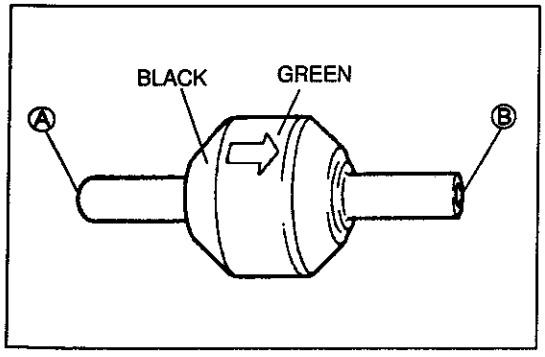
1. Disconnect the air hose (From air pump to air control valve) at the air control valve.
2. Start the engine and run it idle.
3. Verify that the exhaust gas does not flow from air control valve.
4. If the exhaust gas flows from air control valve, replace the check valve (port air). (Refer to page F–119.)



CHECK VALVE (SPLIT AIR)

Inspection

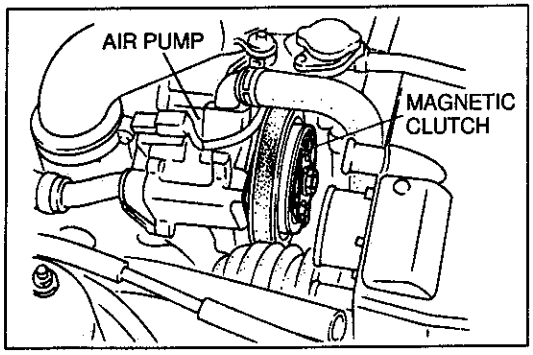
1. Disconnect the air hose (From air control valve to air pipe) at the air pipe.
2. Start the engine.
3. Increase the engine speed to 2,000 rpm and verify that the exhaust gas does not flow from split air pipe.
4. If not as specified, replace the check valve (Spilit air).



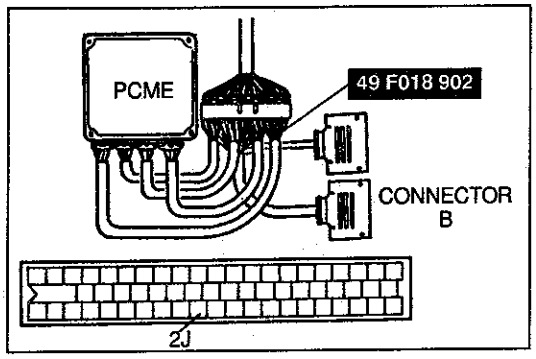
CHECK VALVE

Inspection

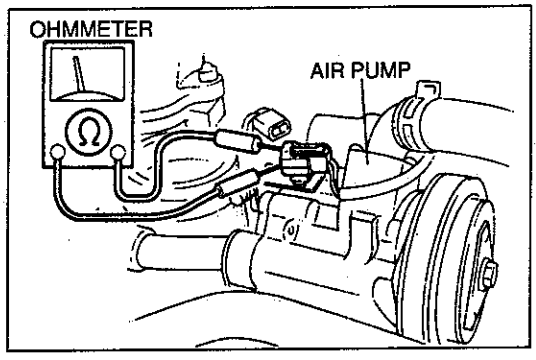
1. Remove the check valve.
2. Blow through A and verify that air flows from B.
3. Blow through B and verify that air does not flow from A.



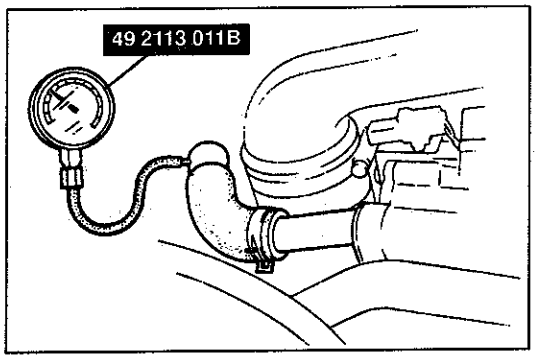
AIR PUMP
System Operation
1. Start the engine.
2. Increase the engine speed to above 3250 rpm and verify that the air pump magnetic clutch OFF.



Inspection
Magnetic clutch
1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch ON.
3. Short the PCME terminal 2J and verify that the magnetic clutch OFF.
4. If the magnetic clutch does not OFF, check the air pump relay. (Refer to page F–123.)
5. If the relay is OK, disconnect the air pump connector and check the continuity.
6. If not as specified, replace the air pump.



Continuity
1. Disconnect the air pump connector.
2. Check for continuity between terminals.
3. If no continuity, replace the air pump.

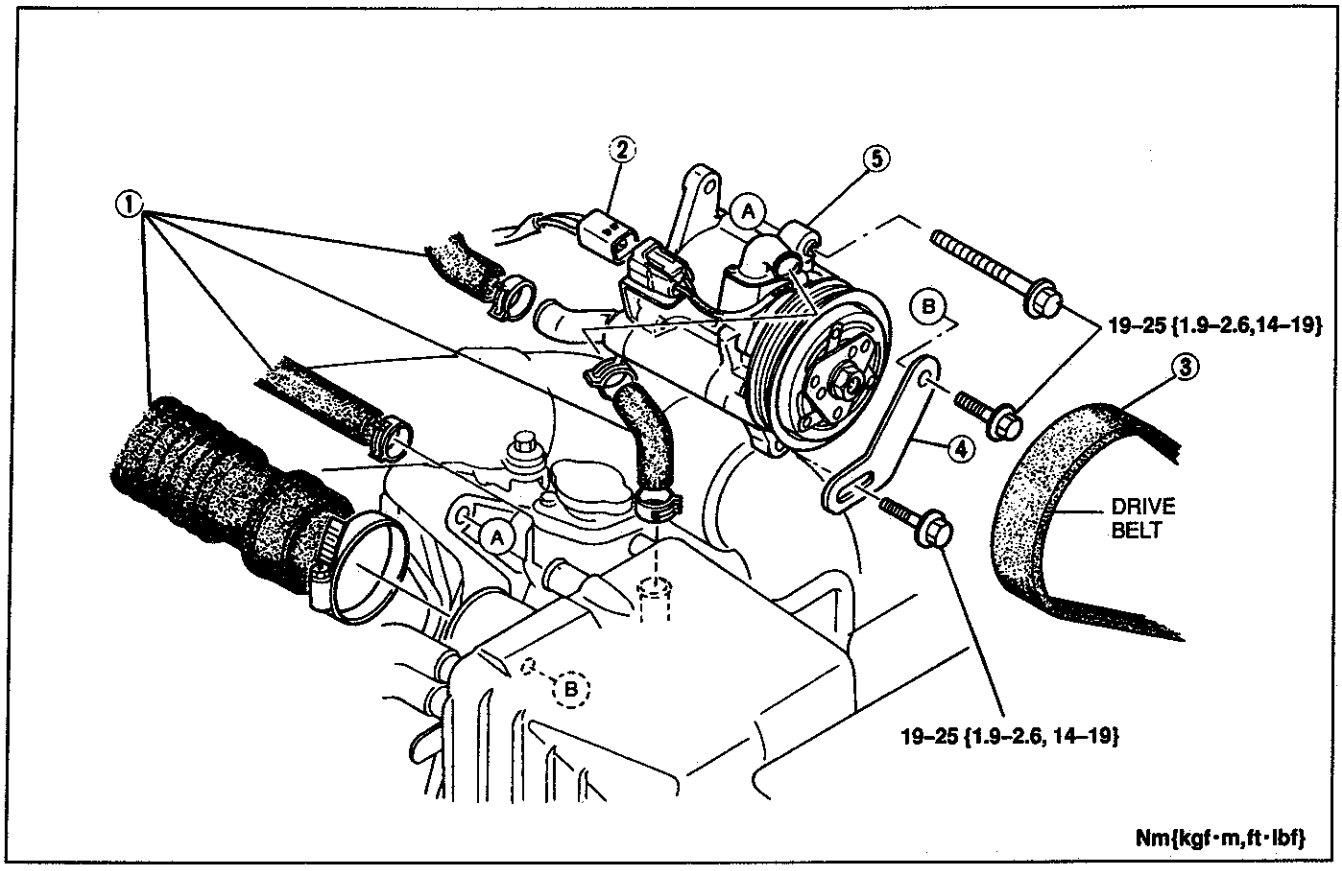


Pressure
1. Disconnect air hose (from air control valve to air pump) at the air control valve.
2. Connect the **SST** to the air hose.
3. Start the engine and run it idle.
4. Measure the pressure.

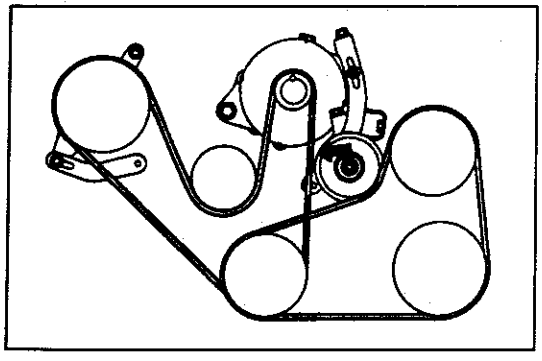
Pressure
More than 4.9 kPa {0.05 kgf/cm^2, 0.7 psi}

5. If not as specified, replace the air pump.

Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

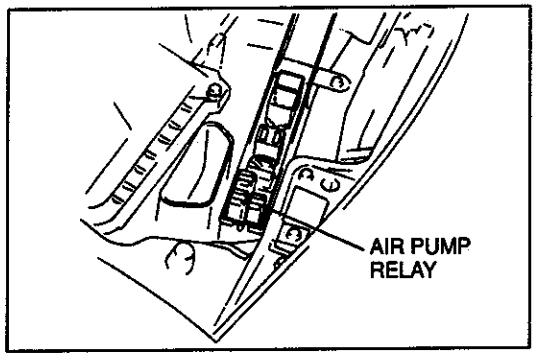


1. Air hoses
2. Connector
3. Drive belt
   Inspection ..... below
4. Braket
5. Air pump
   Inspection ..... page F–121



AIR PUMP DRIVE BELT
Inspection
1. Check the drive belt for cracks deterioration or oil contamination.
2. Replace if necessary.
3. If the belt is noisy, check for loose or misaligned pulleys.

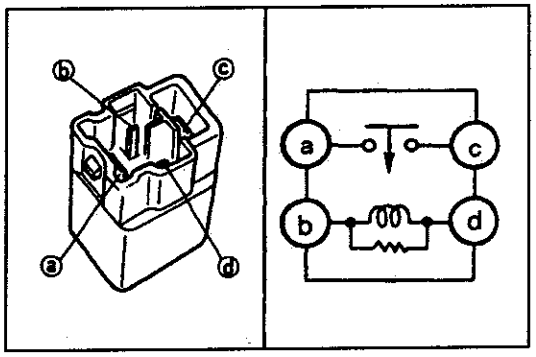
Adjustment
Refer to section C.



AIR PUMP RELAY

Inspection (On-vehicle)

Check that a "clicking" sound is heard at the Air pump relay when turning the ignition switch ON and OFF.

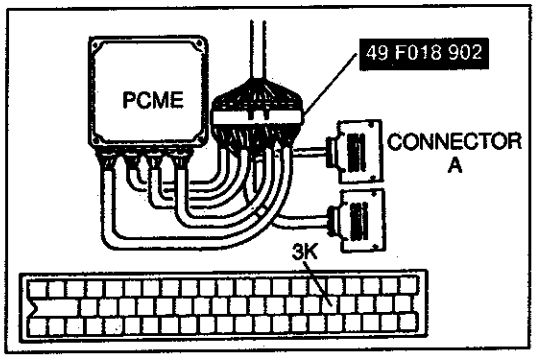


Inspection

1. Disconnect the air pump relay.
2. Apply Battery positive voltage and ground to terminals B and D of the relay.
3. Check continuity of the relay.

B+: Battery positive voltage

Operation	A–C terminals
B+ Applied	Continuity
B+ Not applied	No continuity



SOLENOID VALVE (RELIEF2)

System Operation

Engine Signal Monitor

1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch ON.
3. Short the PCME terminal 3K and verify that the operation sound is heard.

Inspection

1. Disconnect the solenoid valve. (Refer to page F–119.)
2. Measure the solenoid valve resistance with an ohmmeter.

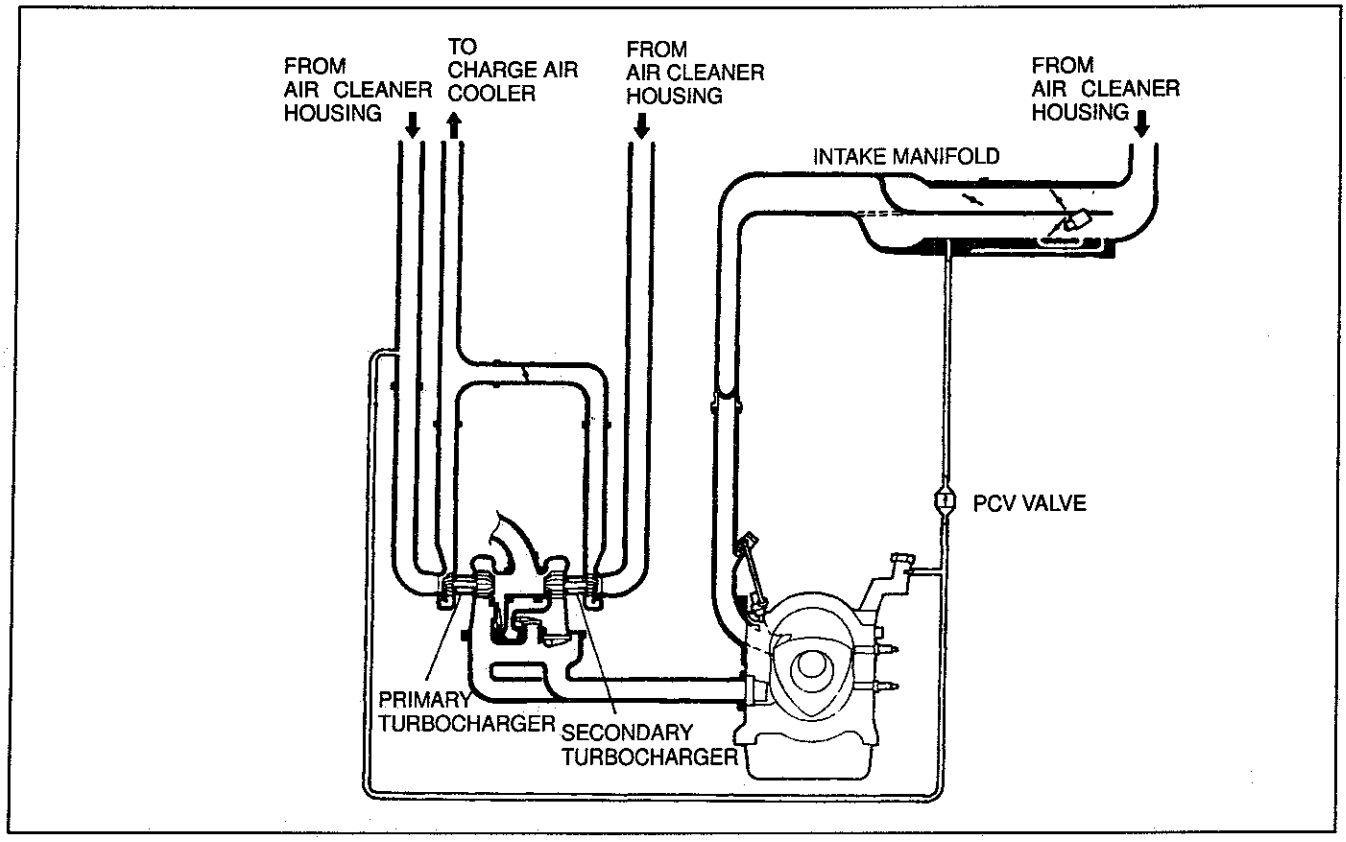
Resistance 27–32 Ω {20°C [68°F]}

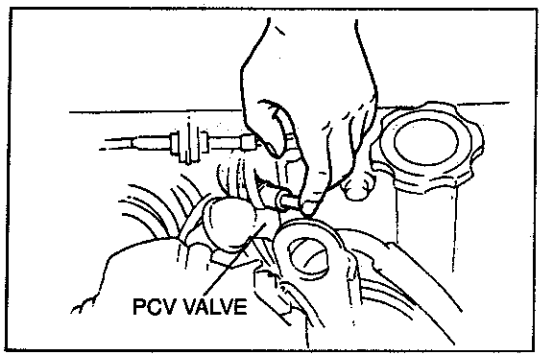
3. If not as specified, replace solenoid valve. (Refer to page F–119.)

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

DESCRIPTION

The PCV valve is operated by the intake manifold vacuum.
When the engine is running at idle, the PCV valve is opened slightly and a small amount of blow by gas is drawn into the dynamic chamber to be burned.
As the engine speed rises the PCV valve is opened further, allowing a larger amount of blow by gas to be drawn into the intake manifold.

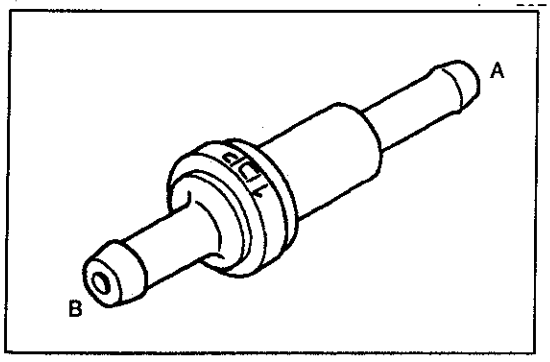




PCV VALVE

Inspection

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Disconnect the PCV valve with the ventilation hose.
3. Block the PCV valve opening.
4. Verify that vacuum is felt.

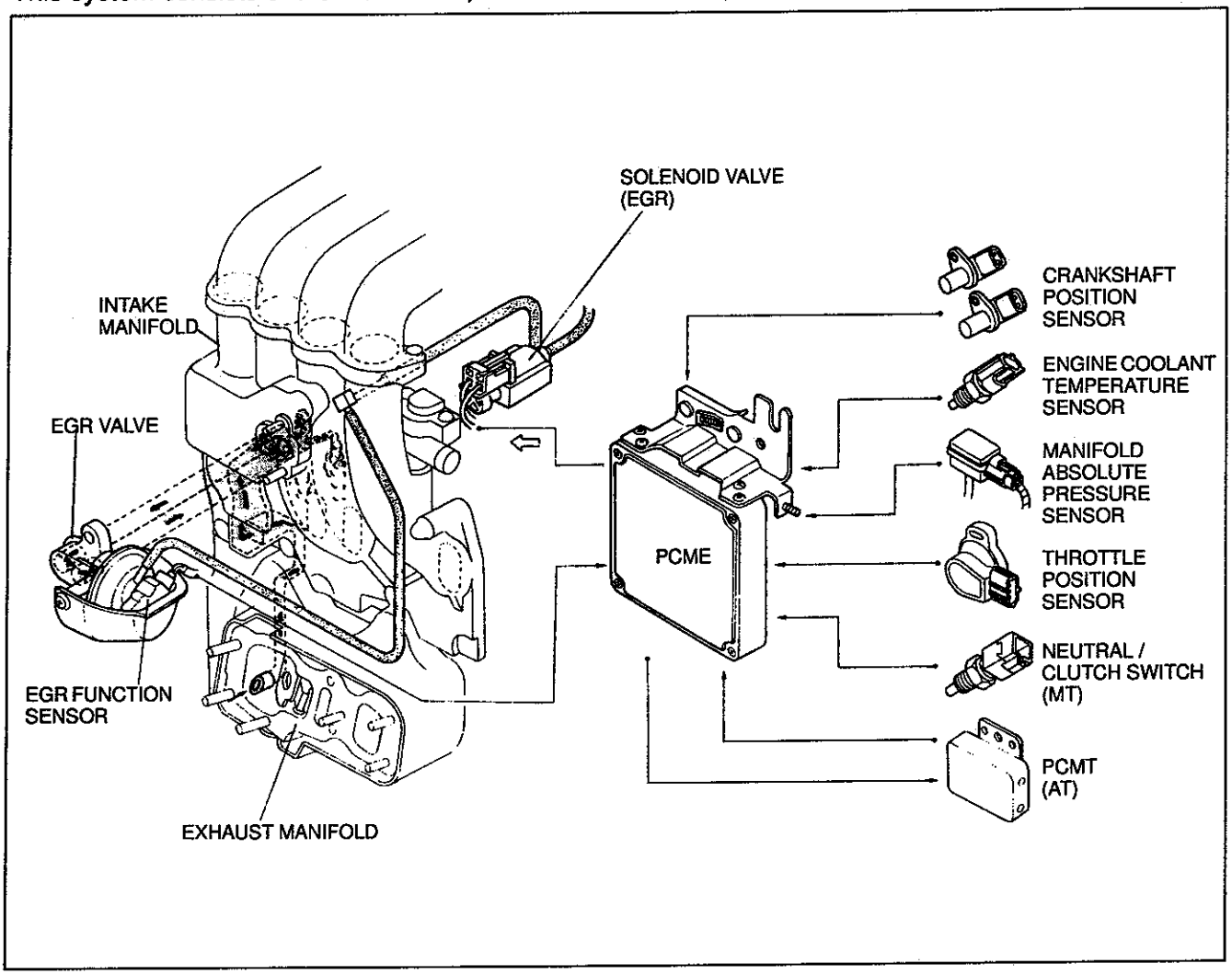


5. Remove the PCV valve.
6. Blow through the valve from port A and verify that air comes out of port B.
7. Blow through the valve from port B and verify that no air comes out of port A.
8. Replace the PCV valve if necessary.

EXHAUST GAS RECIRCULATION (EGR)

DESCRIPTION

This system recirculates a small amount of exhaust gas into the intake manifold to reduce the combustion temperature, and reduce NOx emissions.
This system consists of the EGR valve, EGR function sensor, solenoid valve, PCME and input devices.



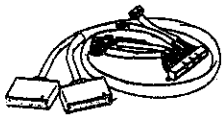
Operation

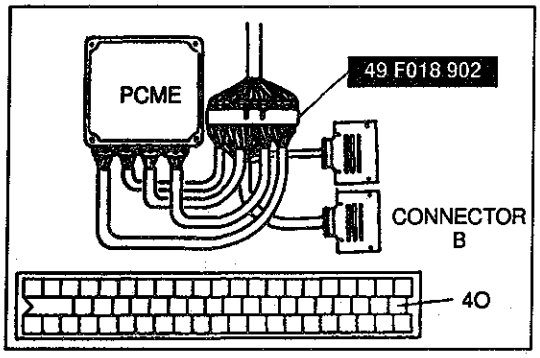
Cold engine (Engine coolant temperature: below 70°C [158°F])
EGR operation is stopped to improve drivabilty when the engine is cold.

Warm engine
The PCME controls the solenoid valve to supply EGR gases as described below.

Operating condition	EGR operation	Remark
Idle	Stopped	—
Deceleration		
High engine speed		Above 3850 rpm
Heavy load		—
Others	Supplied EGR gas	• MT 5th gear, AT OD position • Engine speed above 1700 rpm

PREPARATION
SST

49 F018 902 Adapter harness		For inspection of solenoid valve



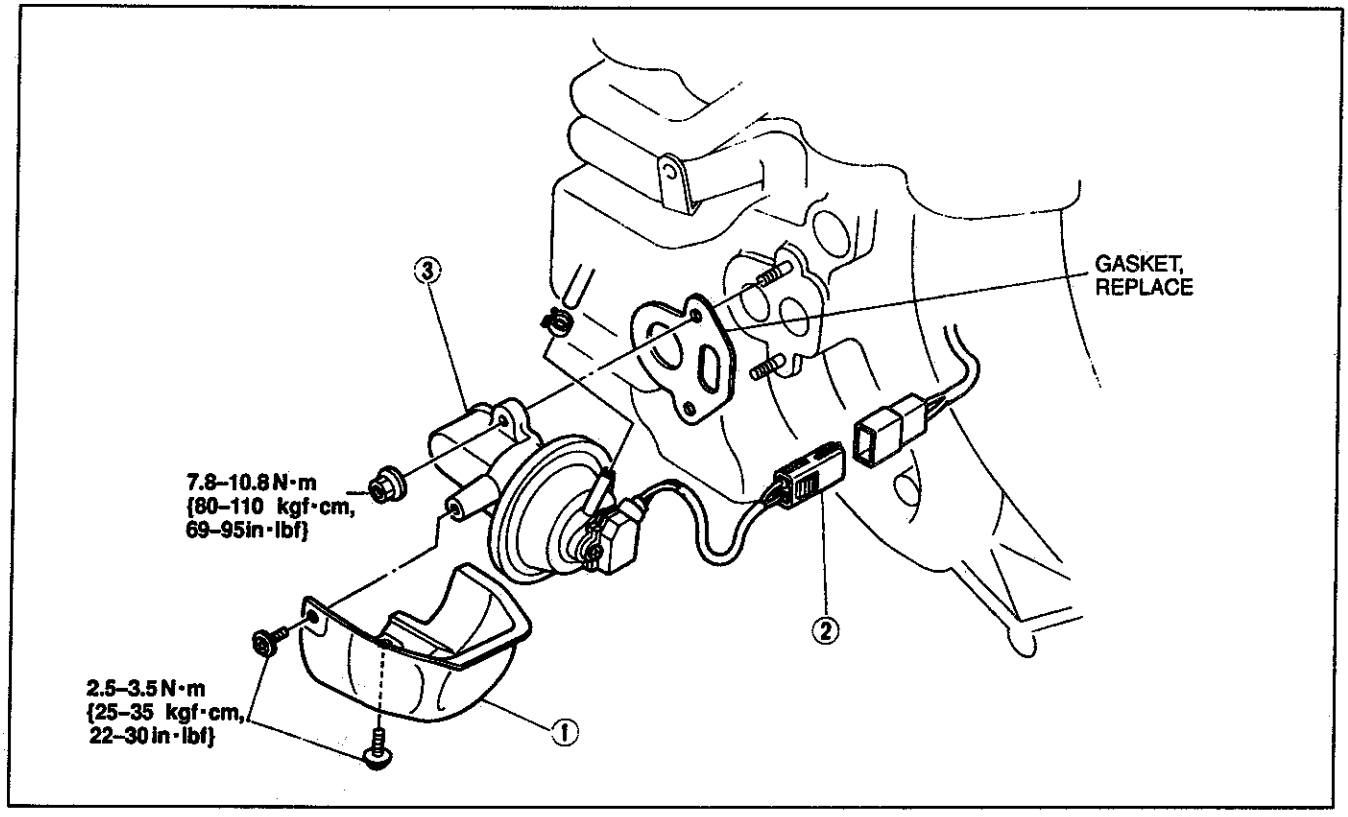
SYSTEM OPERATION

1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME as shown.
2. Start the engine.
3. Accelerates the engine and verify that PCME terminal 4O voltage B+ while the engine is still cold.
4. Warm up the engine to normal operating temperature and run it at idle.
5. Short the PCME terminal 4O and verify that the engine runs roughly or stalls at idle.

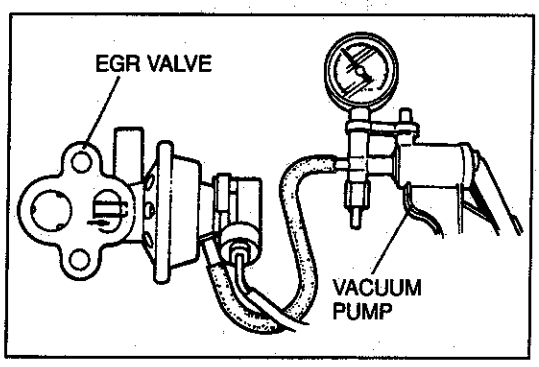
EGR VALVE

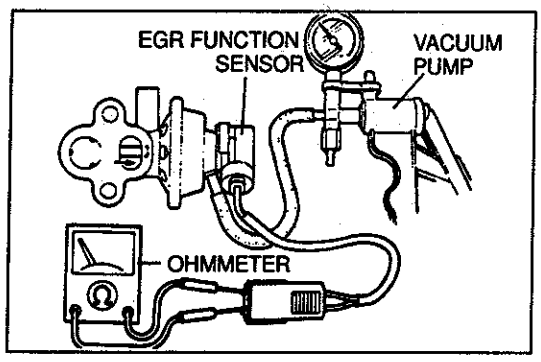
Removal / Installation

1. Remove the intake air system component parts. (Refer to page F-76.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Insulator
2. Connector
3. EGR valve
   Inspection ..... below





Inspection

1. Connect a vacuum pump as shown and apply vacuum.
2. Verify that the EGR valve moves at more than the specified vacuum.

   Specification:
   11–15.3 kPa {85–115 mmHg, 3.3–4.5 inHg}

3. If not as specified, replace EGR valve.

EGR FUNCTION SENSOR

Inspection

1. Remove the EGR valve. (Refer to above)
2. Connect a ohmmeter between the terminals.
3. Connect a vacuum pump as shown and apply vacuum.
4. Verify that the EGR function sensor ON (continue) at more than the specified vacuum.

   Specification:
   11–15.3 kPa {85–115 mmHg, 3.3–4.5 inHg}

5. If not as specified, replace EGR valve.

SOLENOID VALVE (EGR)

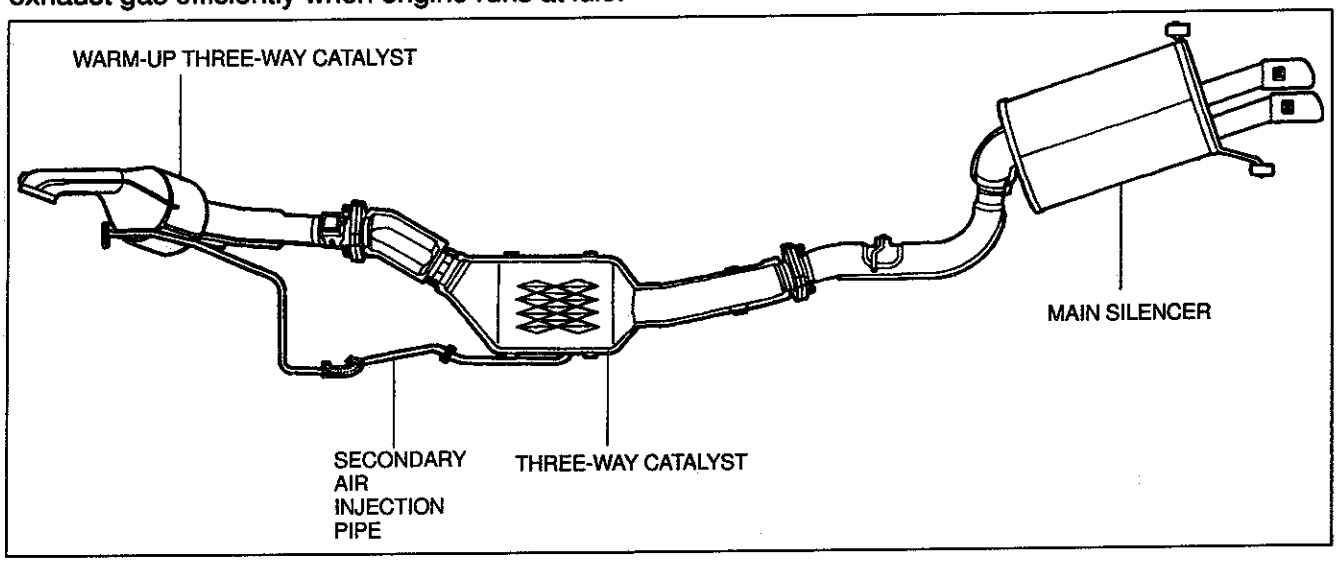
Inspection

(Refer to page F-176)

THREE-WAY CATALYST SYSTEM

DESCRIPTION

Two bets three-way catalysts are used to reduce CO, HC, and NOx emissions. For efficient operation, the warm-up three-way catalyst is placed close to the exhaust manifold so that it will heat up quickly and purify exhaust gas efficiently when engine runs at idle.



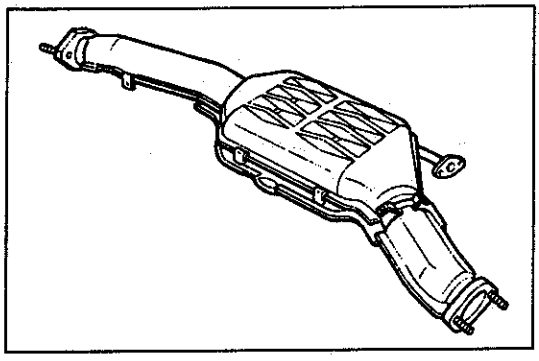
The three-way catalysts reduce CO and HC, emissions through oxidization and NOx emissions by chemical reaction.

Three-way catalyst	Type
Warm-up three-way catalyst	Metal
Three-way catalyst	Monotythic

Operation

(1) Before the engine is warmed up, when large amounts of CO and HC are ceated, the three-way catalyst is supplied port air and uses both the first and second stages as the oxidization catalyst.
(2) In the normal driving range, the three-way catalyst is supplied split air and uses the first stage as the ternary catalyst and second stage as the oxidization catalyst.
(3) During high-speed driving, an additional air to the three-way catalyst is cut off, and the first and second stages are used the ternary catalyst.

	First stage	Second stage	Remark
Port air	Oxidation	Oxidation	Low-speed range, Deceleration range
Split air	Ternary	Oxidation	Cruising range
Air cut	Ternary	Ternary	High-speed range



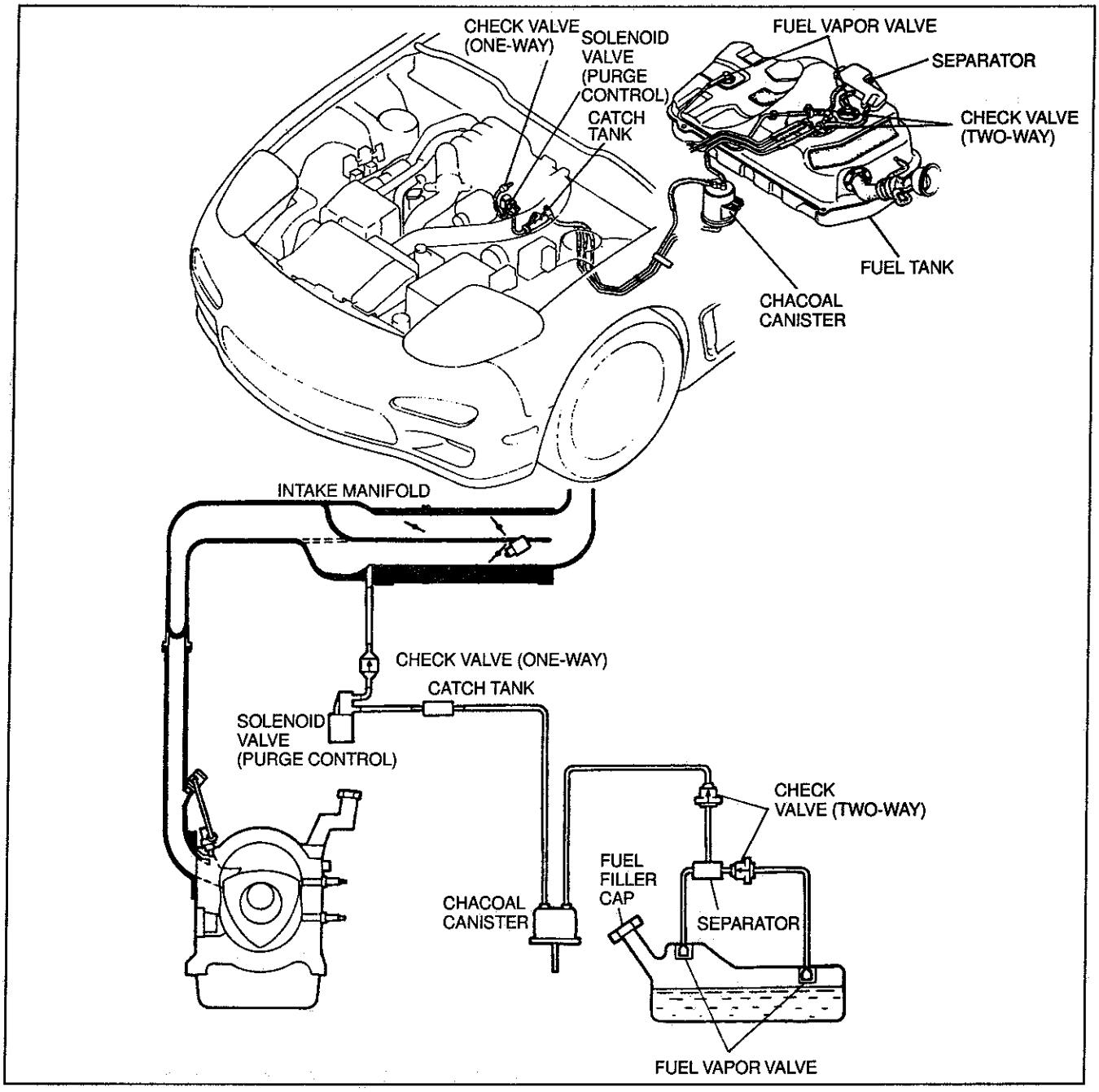
THREE-WAY CATALYST (WARM-UP THREE-WAY CATALYST AND THREE-WAY CATALYST)

Inspection

1. Check the three-way catalyst for deterioration or clogging.
2. Check the insulation covers welded onto the three-way catalyst for damage.
3. Excessive heat will occur at the floor if the insulation cover is touching the three-way catalyst.

FUEL EVAPORATIVE SYSTEM

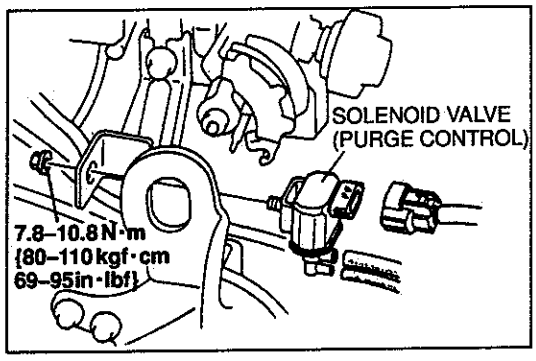
DESCRIPTION



The fuel evaporative system temporarily stores in the canister the evaporative fumes generated in the fuel tank. The stored gas is then passed into the air intake system for combustion when the engine is running. This operation prevents evaporative fumes from flowing out to the atmosphere.
Sending a large volume of evaporative fumes at one time into the air intake system deteriorates the air fuel ratio; thus, the PCME uses the solenoid valve (purge control) to regulate this volume.

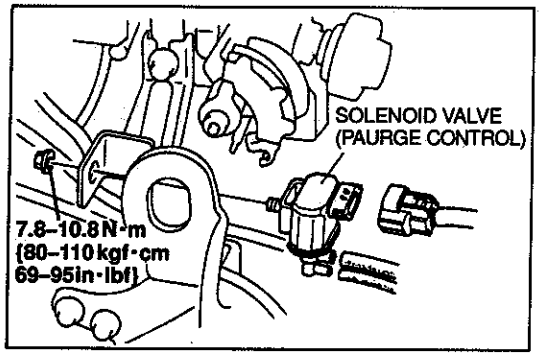
Operation

With engine stopped and no load applied
The evaporative fumes from the fuel tank are absorbed by the charcoal canister.
With engine running and load applied
The evaporative fumes absorbed by the charcoal canister are drawn into the engine via the solenoid valve (purge control). The volume of fumes drawn depends on engine conditions.



SYSTEM OPERATION

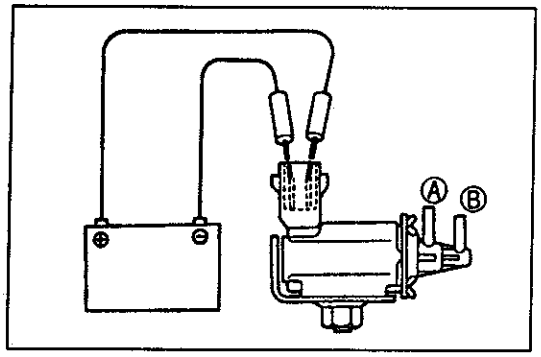
1. Warm up the engine to normal operating temperature and run it at idle.
2. Disconnect the vacuum hose from the solenoid valve (purge control) as shown in the figure, and verify that no vacuum is felt at the solenoid valve.
3. If not as specified, check the solenoid valve.



SOLENOID VALVE (PURGE CONTROL)

Removal / Installation

1. Disconnect the vacuum hoses and connector from solenoid valve.
2. Remove the mounting nuts and solenoid valve.
3. Install in the reverse order of removal.

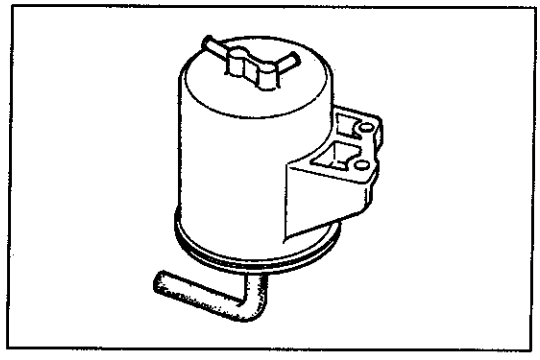


Inspection

1. Disconnect the vacuum hoses and connector from the solenoid valve.
2. Blow into the valve and verify that no air flows through it.
3. Apply battery positive voltage as shown in the figure.
4. Blow into the valve and verify that air flows through it.
5. If not as specified, measure the solenoid valve resistance with an ohmmeter.

   Resistance: 30–34 Ω (20°C [68°F])

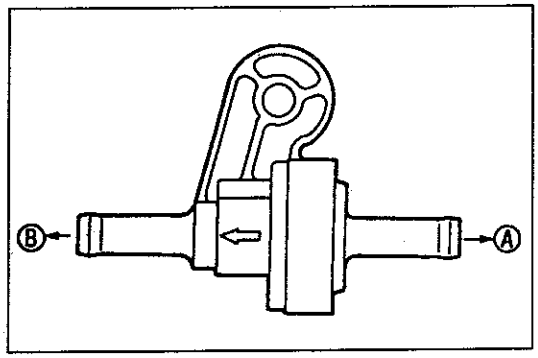
6. If not as specified, replace the solenoid valve.



CHARCOAL CANISTER

Inspection

Visually check for damage and replace the charcoal canister if necessary.

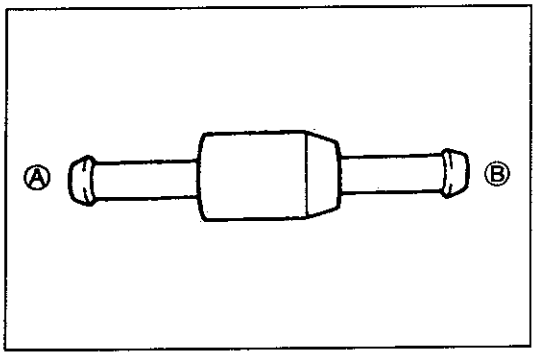


CHECK VALVE (TWO-WAY)

Inspection

1. Remove the check valve.
2. Check the operation of the check valve by using a vacuum pump.

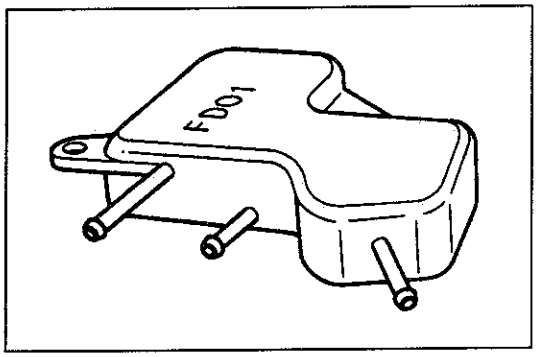
Apply approx. 5 kPa {37 mmHg, 1.46 inHg} vacuum at port A	Air flow
Apply approx. 6 kPa {44 mmHg, 1.73 inHg} vacuum at port B	Air flow



CHECK VALVE (ONE-WAY)

Inspection

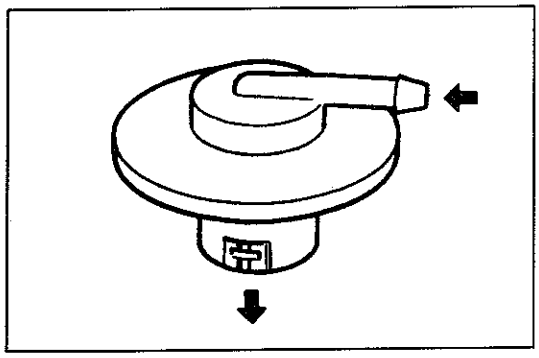
1. Remove the check valve.
2. Blow through the check valve from port A, and check that the air flows from port B.
3. Blow through the check valve from port B, and check there is no flow.



SEPARATOR

Inspection

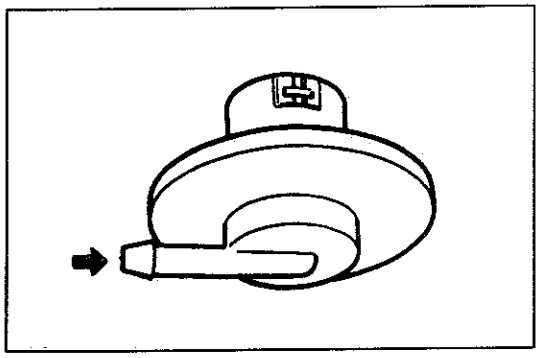
Visually check for damage and replace the separator if necessary.



FUEL VAPOR VALVE

Inspection

1. Remove the valve.
2. Blow through the valve and verify that air flows in the direction shown.

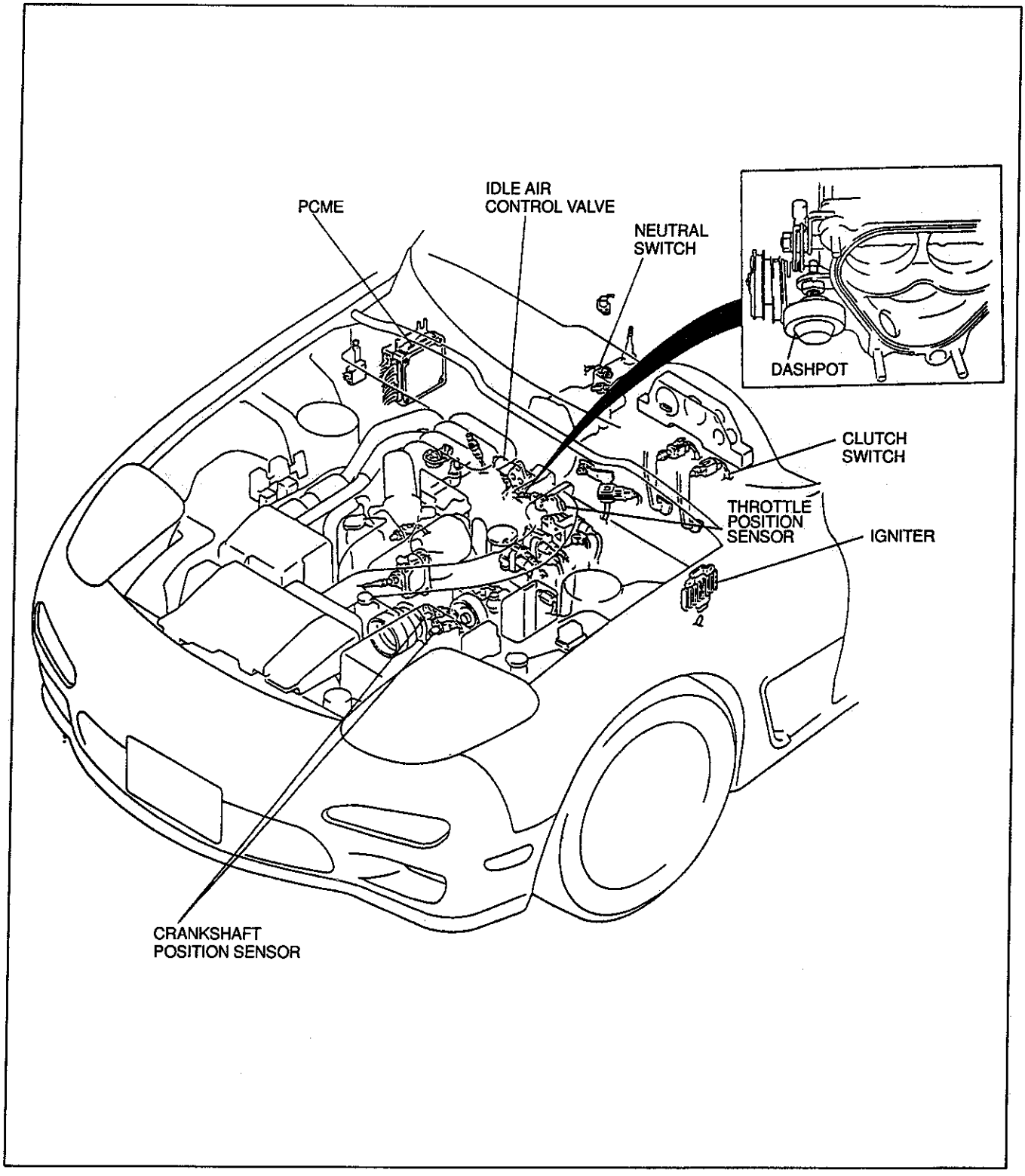


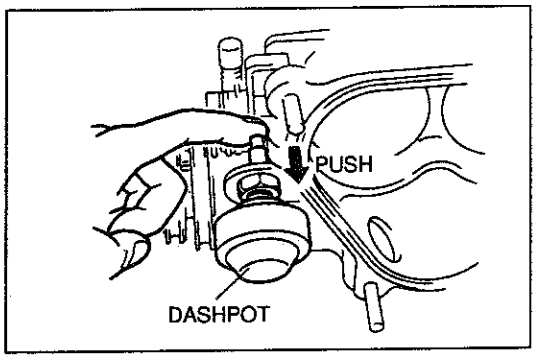
3. Turn the valve over and blow through the valve. Verify that no air flows.
4. Replace the valve if necessary.

DECELERATION CONTROL SYSTEM

DESCRIPTION

- Dashpot : To prevent the throttle valves from closing suddenly.
- Idle air control valve : To prevent afterburn, air is supplied to intake manifold during deceleration.
- Fuel cut control : To improve the fuel economy and to prevent engine bucking during deceleration.
- Air bypass valve : Bypasses compressed air from after the turbocharger to air cleaner housing during deceleration to prevent noise.

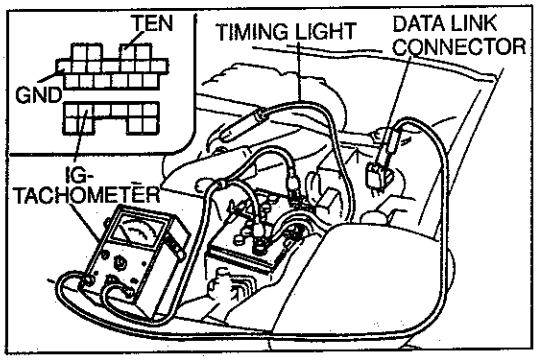




DASHPOT

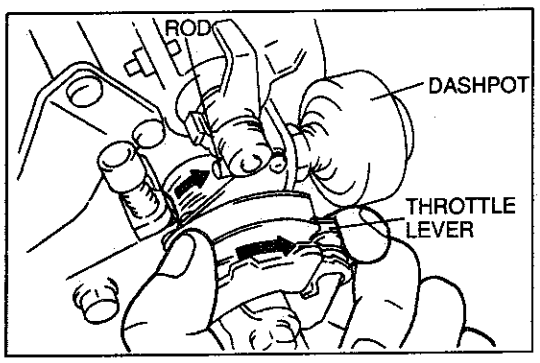
Inspection

1. Open the throttle valve fully, then push the dashpot rod with a finger and verify that the rod goes in slowly.
2. Release the rod and verify that it comes out quickly.
3. Replace it, if necessary.



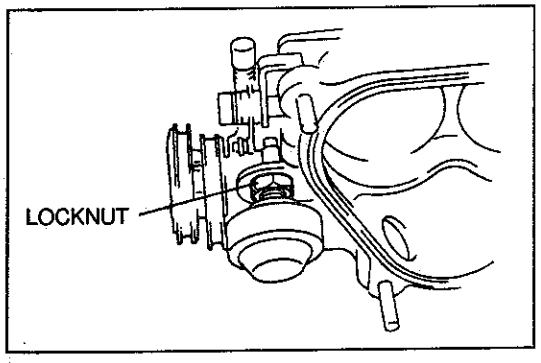
Adjustment

1. Warm up the engine to the normal operating temperature and run it idle.
2. Verify that the fast idle cam separates.
3. Turn all electrical loads OFF.
4. Connect a tachometer to the data link connector terminal **IG-**.

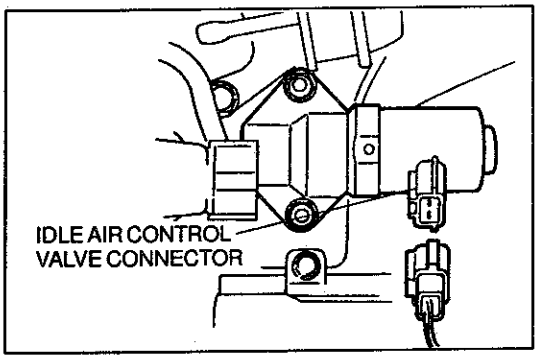


5. Open the throttle valve until the dashpot rod separates from the lever.
6. Check the engine speed when the dashpot rod touches to the lever.

Engine speed: 2600–3000 {2800 ± 200} rpm



7. Loosen the locknut and adjust by turning the dashpot, if necessary.



ANTI AFTERBURN CONTROL

System operation

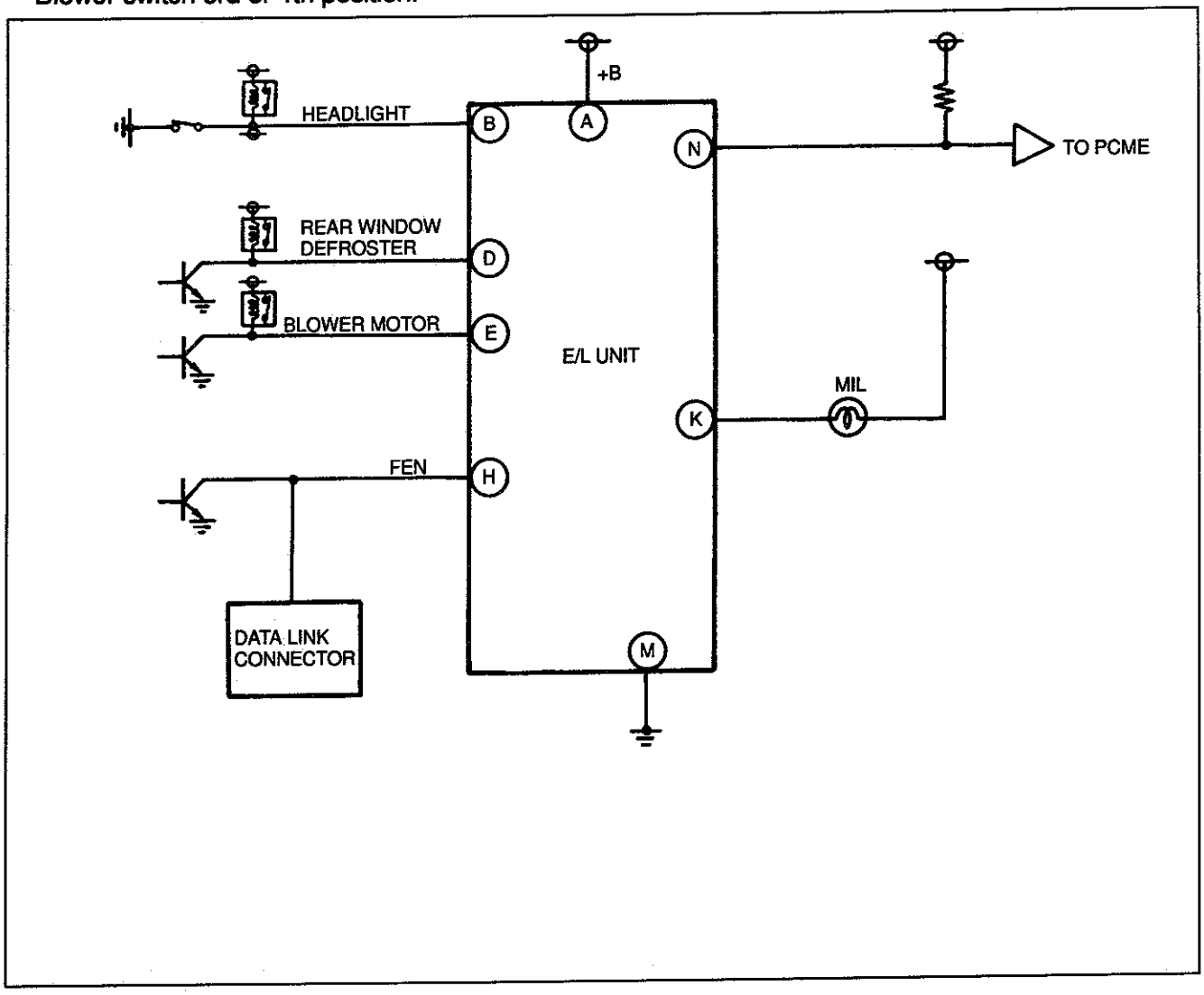
1. Start the engine and run it at idle.
2. Disconnect the idle air control valve connector.
3. Increase the engine speed to over 4,000 rpm then decrease the engine speed rapidly.
4. Verify that the engine speed decrease roughly at 1500–1000 rpm.

ELECTRICAL LOAD (E/L) CONTROL SYSTEM

DESCRIPTION

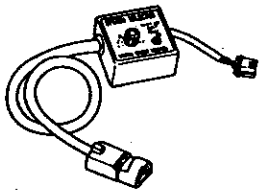
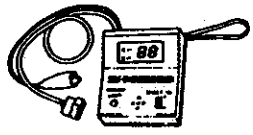
The engine speed increases when any of the following switches are ON.

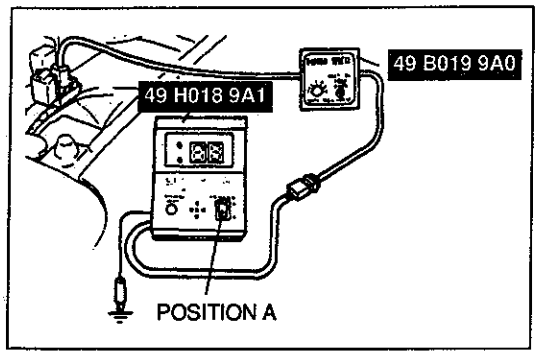
- Rear window defroster switch
- Headlight switch
- Blower switch 3rd or 4th position.



PREPARATION

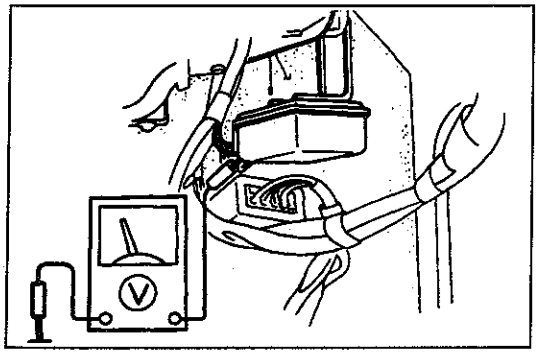
SST

49 B019 9A0 System Selector		For diagnosis	49 H018 9A1 Self-Diagnosis Checker		For diagnosis



SYSTEM OPERATION

1. Connect the **SST** (System selector) to the data link connector.
2. Set switch A to position 1 and TEST SW to SELF-TEST.
3. Connect the **SST** (Self-Diagnosis Checker) to the System Selector and a ground.
4. Set the select switch to position A.
5. Turn ignition switch ON.
6. Check if the monitor lamp illuminates when E/L unit relative switch is made to function. (Refer to page F–67.)



Inspection

1. Remove the E/L unit. (Refer to page F–150.)
2. Connect the E/L unit connector.
3. Measure the voltage at each terminal by using a voltmeter.
4. If any E/L unit terminal voltage is incorrect, check the input or output device and related wiring harness. If they are normal, replace the E/L unit.

Terminal voltage

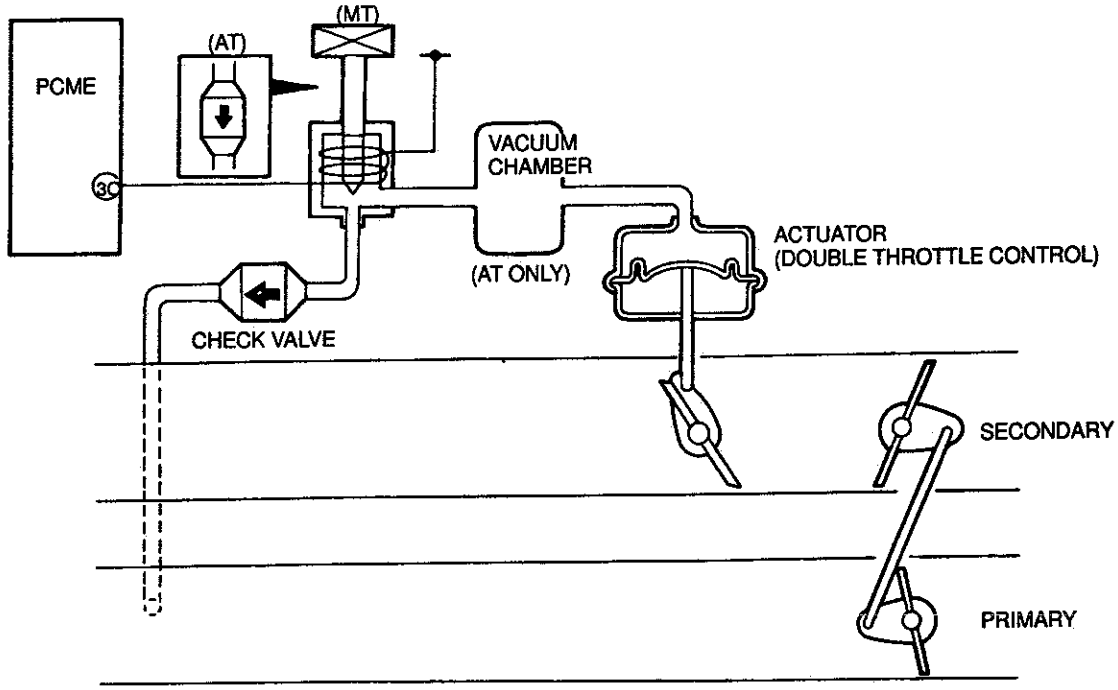
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
A	—	—	Main relay	Ignition switch ON	B+	—
B	O		TNS relay	Position light ON	Below 1.0V	—
				Position light OFF	B+	
C	—	—	—	—	—	—
D	O		Rear window defroster ready	Rear window defroster OFF	B+	Ignition switch ON
				Rear window defroster ON	Below 1.0V	
E	O		Blower motor relay	Blower switch 3rd or 4th position	Below 1.0V	Ignition switch ON
				Blower switch 1st or 2nd position	B+	
F	—	—	—	—	—	—
G	—	—	—	—	—	—
H		O	Self-Diagnosis checker Data link connector (FEN)	Buzzer sounded for 3 sec. after ignition switch OFF → ON	Below 2.5V	• With Self-Diagnosis Checker and System Selector • With System Selector test switch at SELF TEST
				Buzzer not sounded for after 3 sec.	B+	
				Buzzer sounded	Below 2.5V	
				Buzzer not sounded	B+	
I	—	—	—	—	—	—
J	—	—	—	—	—	—
K		O	Malfunction indicator lamp (MIL)	Lamp illuminated for 3 sec. after ignition switch ON	Below 2.5V	With system selector test switch at SELF TEST
				Lamp not illuminated after 3 sec.	B+	
				Lamp illuminated	Below 2.5V	
				Lamp not illuminated	B+	
L	—	—	—	—	—	—
M	—	—	Ground	Constant	0V	—
N		O	PCME	Electrical load ON	Below 4.0V	Ignition switch ON
				Electrical load OFF	4.5–5.5V	
O	—	—	—	—	—	—
P	—	—	—	—	—	—

DOUBLE THROTTLE CONTROL SYSTEM

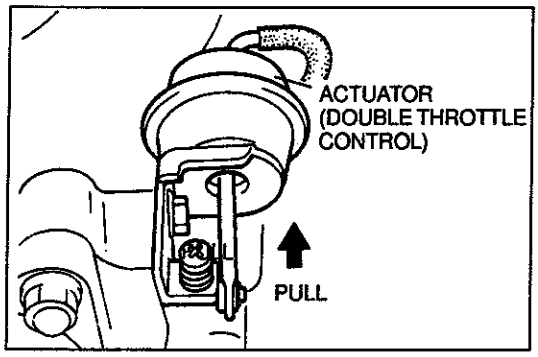
DESCRIPTION

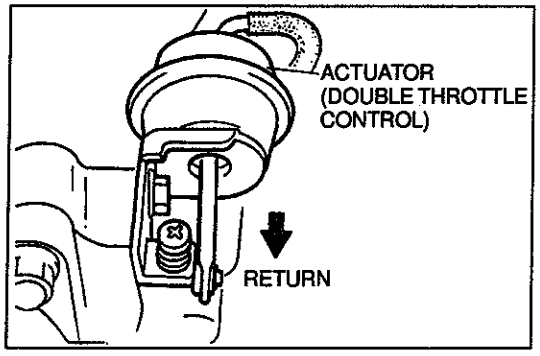
The response delay of the manifold absolute pressure sensor followed mounted by rapid acceleration temporarily causes a lean fuel mixture. The double throttle control system prevents hesitation caused by this lean fuel mixture by slightly delaying the opening of the double throttle valve after the secondary throttle valve.
The double throttle valve is controlled by the PCME through the solenoid valve.



OPERATION

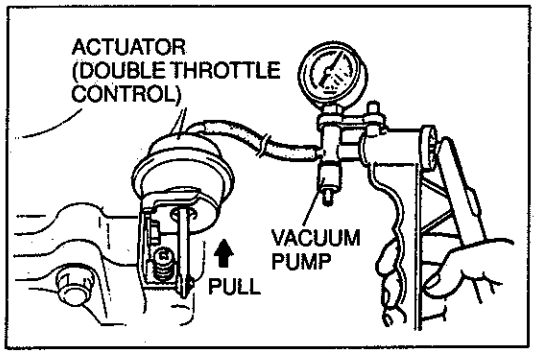
When the engine coolant temperature below 80°C {176°F} the PCME turns the solenoid valve ON, applies vacuum to the actuator (double throttle control), and closes the double throttle valve.





SYSTEM OPERATION

1. Start the engine and verify that the actuator (Double throttle control) rod is pulled into actuator while engine is cold.
2. If the actuator rod is not pulled, check the following condition below.
   - Vacuum tube
     Inspect vacuum line fitting, connections and components for leaks. (Refer to page F-10.)
   - Vacuum chamber
     Visually check for dogging damage or crack.
   - Actuator
     Inspection (Refer to below.)
   - Solenoid valve (Double throttle control)
     Inspection (Refer to page F-176.)
   - Engine coolant temperature sensor
     Inspection (Refer to page F-169.)
3. Verify that the actuator rod is returned, when warm up the engine to normal operating temperature.
4. If the actuator rod is not return, check the following condition below.
   - Solenoid valve (Double throttle control)
     Inspection (Refer to page F-176.)
   - Engine coolant temperature sensor
     Inspection (Refer to page F-169.)



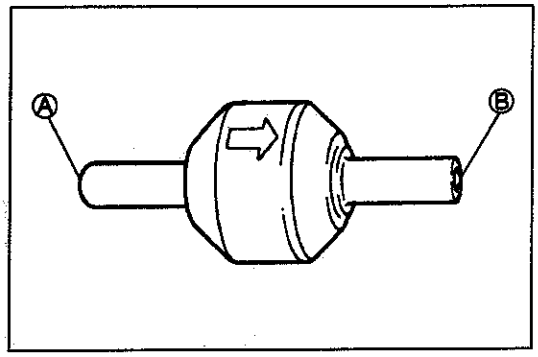
ACTUATOR (DOUBLE THROTTLE CONTROL)

Inspection

1. Disconnect vacuum hose.
2. Connect a vacuum pump and verify that actuator rod is pulled into actuator when apply the vacuum more than **22.0–28.7 kPa {165–215 mmHg, 6.5–8.5 inHg}**
3. If not as specified, replace the actuator.

Removal / Installation

(Refer to page F–76.)



CHECK VALVE

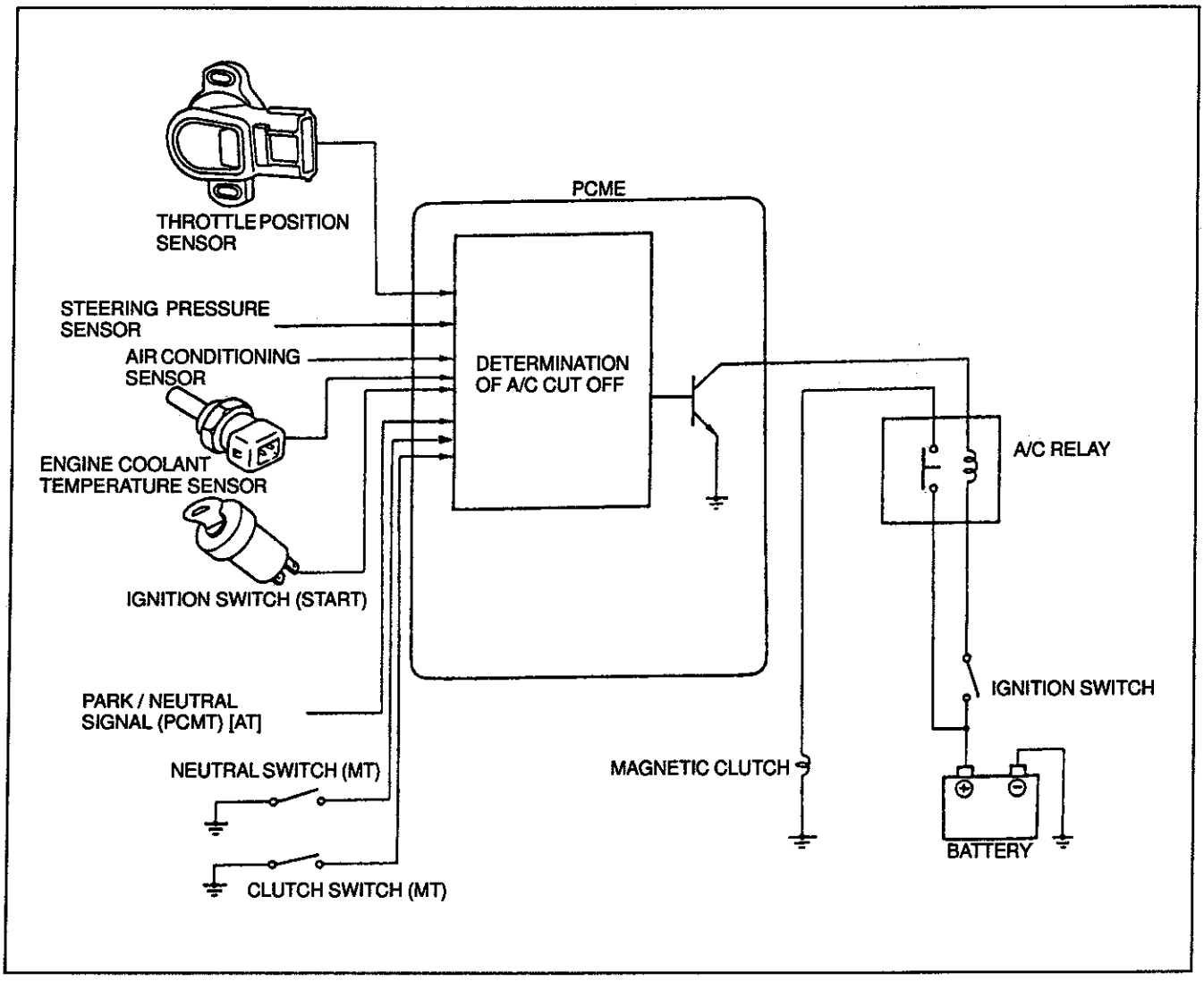
Inspection

1. Remove the check valve.
2. Blow through A and check that air flows from B.
3. Blow through B and check that air does not flow from A.

A/C CUT-OFF SYSTEM

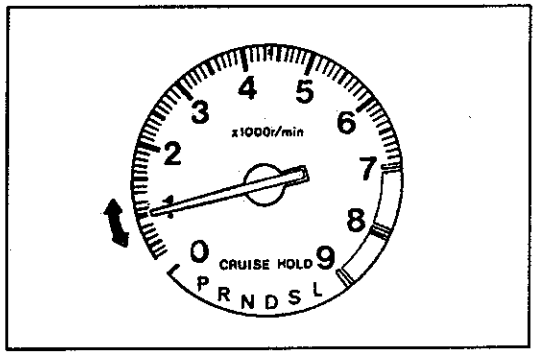
DESCRIPTION

An A/C cut-off system in used to improve idle smoothness immediately after starting the engine and to improve acceleration performance.



Operation

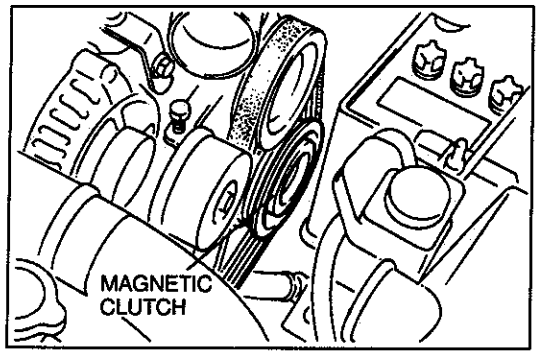
Engine condition	Purpose	Cut off period
After engine started	Improved idle	Approx. 8 sec.
Throttle valve wide open throttle	Improved drivability	Approx. 7 sec.
Engine coolant temperature over 117°C {243°F}	Prevent engine from over heating	Engine coolant temperature under 115°C {239°F}



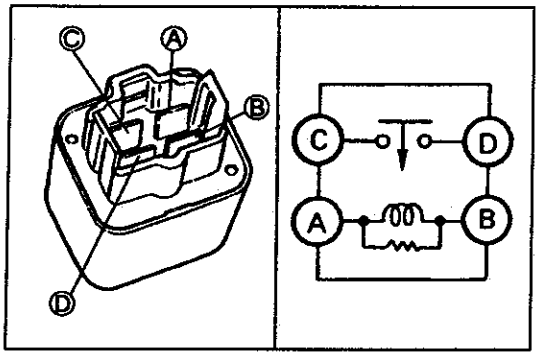
SYSTEM OPERATION

1. Start the engine and let it idle.
2. Turn the A/C sensor and blower switch ON, and verify that no engine speed decrease.
3. Turn the blower switch OFF and verify that no engine speed increase.
4. If not as specified, check for cause.

- Idle air control valve
  Inspection (Refer to page F–82.)
- A/C signal (PCME terminal 1E)
  Inspection (Refer to page F–152.)



Inspection
Acceleration cut-off
1. Turn ignition switch ON.
2. Shift transmission into gear (MT) on shift into D range (AT).
3. Turn the A/C sensor and blower switch ON.
4. Open the throttle valve fully and verify that the magnetic clutch disengage (click is heard) then renganges after **approx. 5 seconds**.



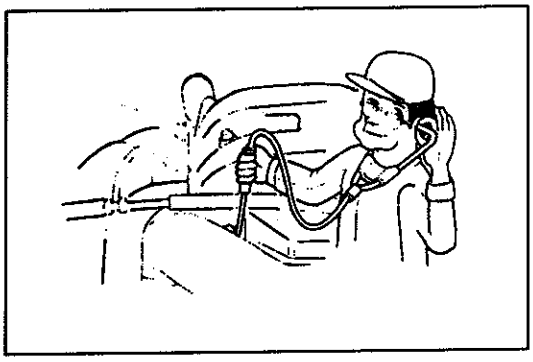
A/C RELAY
Continuity inspection
Check continuity between the terminals with ohmmeter.
B+: Battery positive voltage

Terminal A–B	Terminal C–D
Apply B+	Yes
Not Apply B+	No

DECHOKE CONTROL SYSTEM

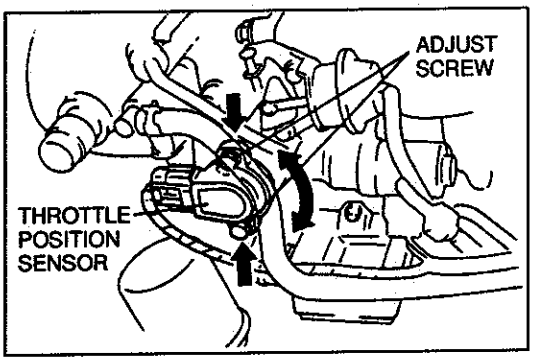
DESCRIPTION

To facilitate starting the engine if the spark plugs become fouled, such as when the engine is flooded, fuel injection is cut if the throttle valve is held wide open throttle while cranking the engine. This allows the spark plugs to dry and purges excess fuel from the cylinders.



SYSTEM OPERATION

1. Verify that the engine will not start and no operational sound of primary injector with a screwdriver or a soundscope when cranked at normal speed with the throttle wide open throttle.

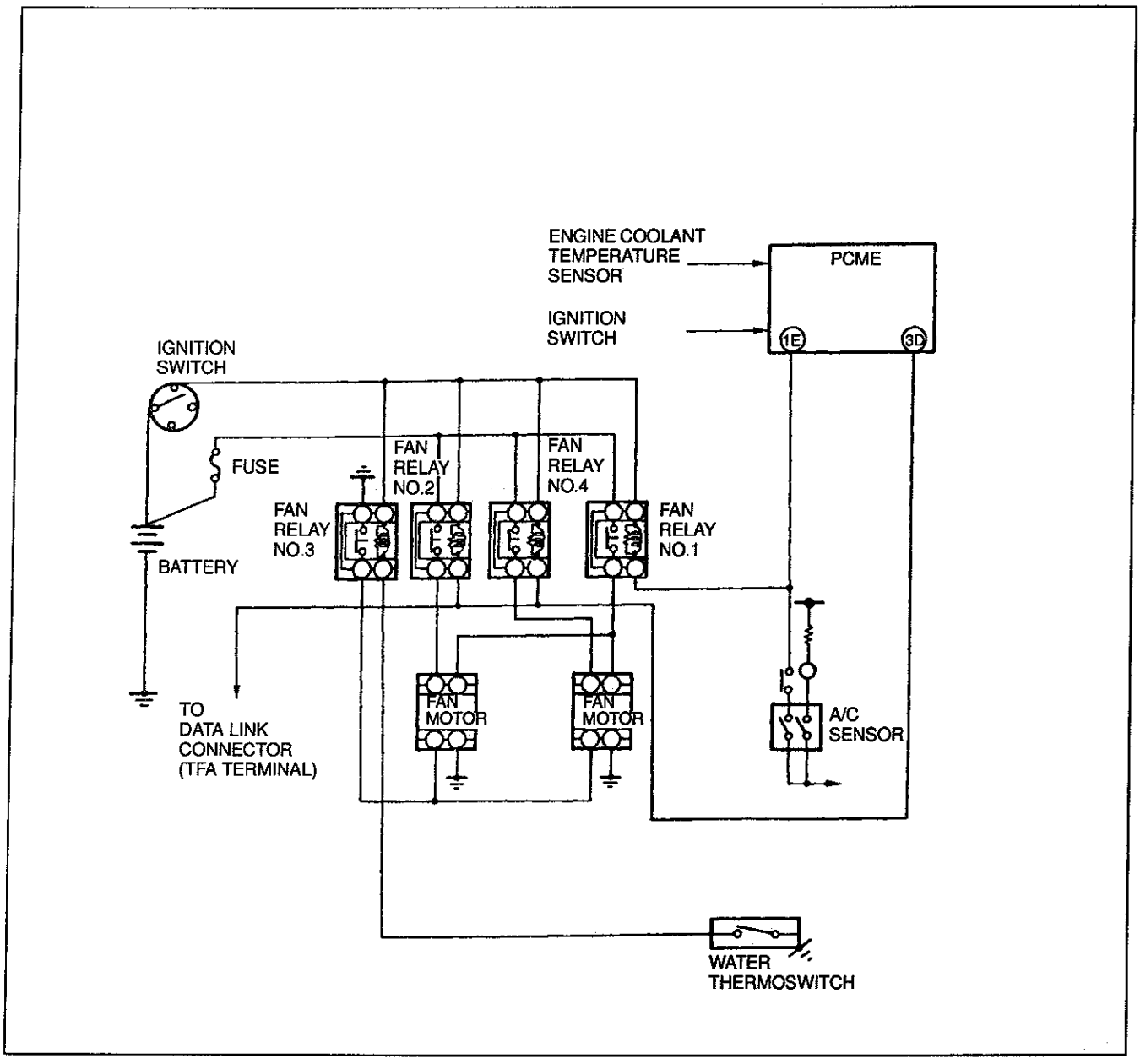


2. If the engine starts, and operational sound of primary injector is heard, inspect the throttle position sensor (Refer to page F-182) and the PCME terminal 1 C voltage. (Refer to page F-152.)

ELECTRICAL COOLANT FAN CONTROL SYSTEM

DESCRIPTION

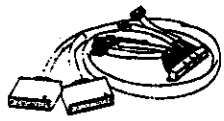
To improve idle smoothness and engine reliability, the electrical coolant fan control system controls the electrical fan speed by PCME. This system consist of the coolant fan, fan relays, PCME, and input devices.

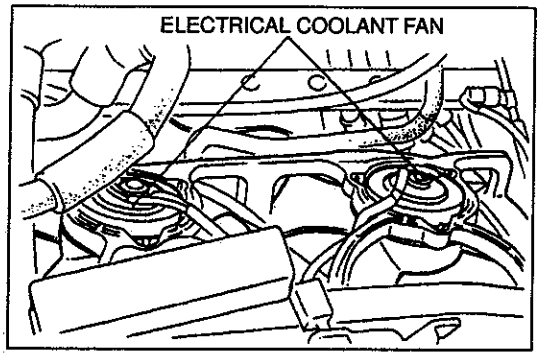


Operation

Engine condition (No electrical load)	A/C operation	Fan relay No.1	Fan relay No.2	Fan relay No.3	Fan relay No.4	Coolant fan operation
Coolant temperature below 105°C {221°F}	OFF	OFF	OFF	OFF	OFF	OFF
	ON	ON	OFF	OFF	OFF	LOW
Coolant temperature 105–108°C {221–226°F}	OFF	OFF	ON	OFF	ON	LOW
	ON	ON	ON	OFF	ON	MIDDLE
Coolant temperature above 108°C {226°F} (Water thermoswitch ON)	OFF	OFF	ON	ON	ON	MIDDLE
	ON	ON	ON	ON	ON	HIGH
Engine coolant temperature sensor malfunction	—	OFF	ON	OFF	ON	LOW
TFA terminal ground	—	OFF	ON	OFF	ON	LOW

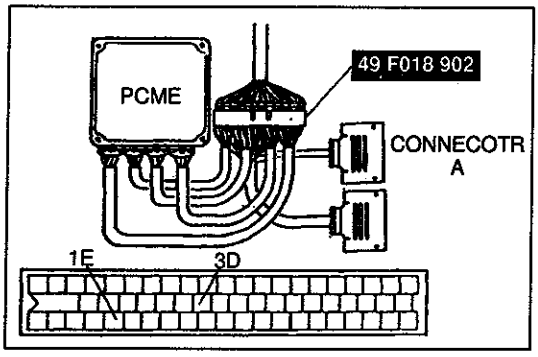
PREPARATION
SST

49 F018 902 Adaptor harness		For inspection of solenoid valve



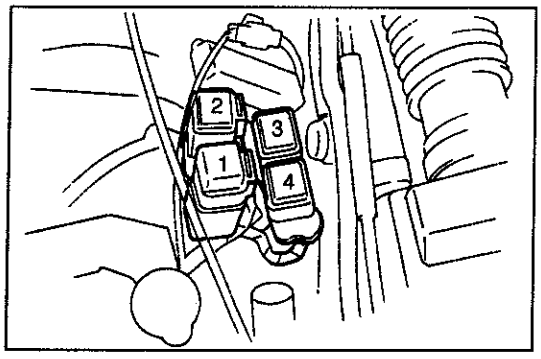
SYSTEM OPERATION

1. Connect the data link connector terminals TFA and GND with a jumper wire.
2. Turn ignition switch ON.
3. Verify that electrical coolant fans operate.



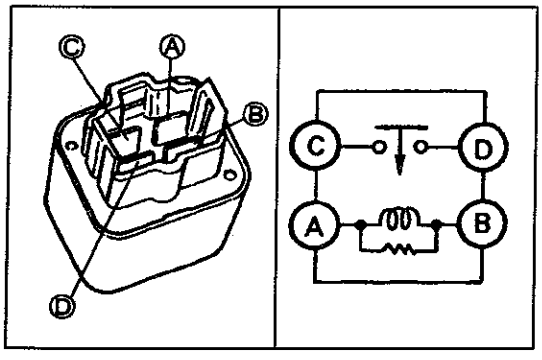
Inspection

1. Connect the **SST** (Engine Signal Monitor Adaptor Harness) to the PCME.
2. Turn ignition switch ON.
3. Short the PCME terminals and verify that the coolant fan operate as following condition below.



Terminal	Fan relay
3D	2,4
1E	1

4. If not as specified, check the harness and relays.



FAN RELAY

Inspection

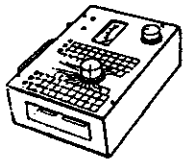
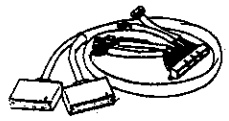
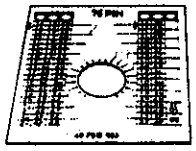
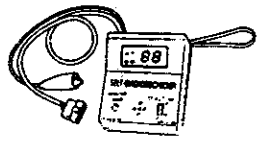
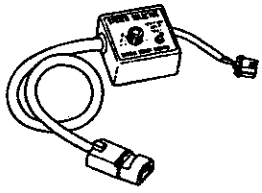
1. Disconnect coolant fan relay.
2. Apply battery positive voltage and ground to terminal A and B of fan relay.
3. Check continuity of the relay.

B+: Battery positive voltage

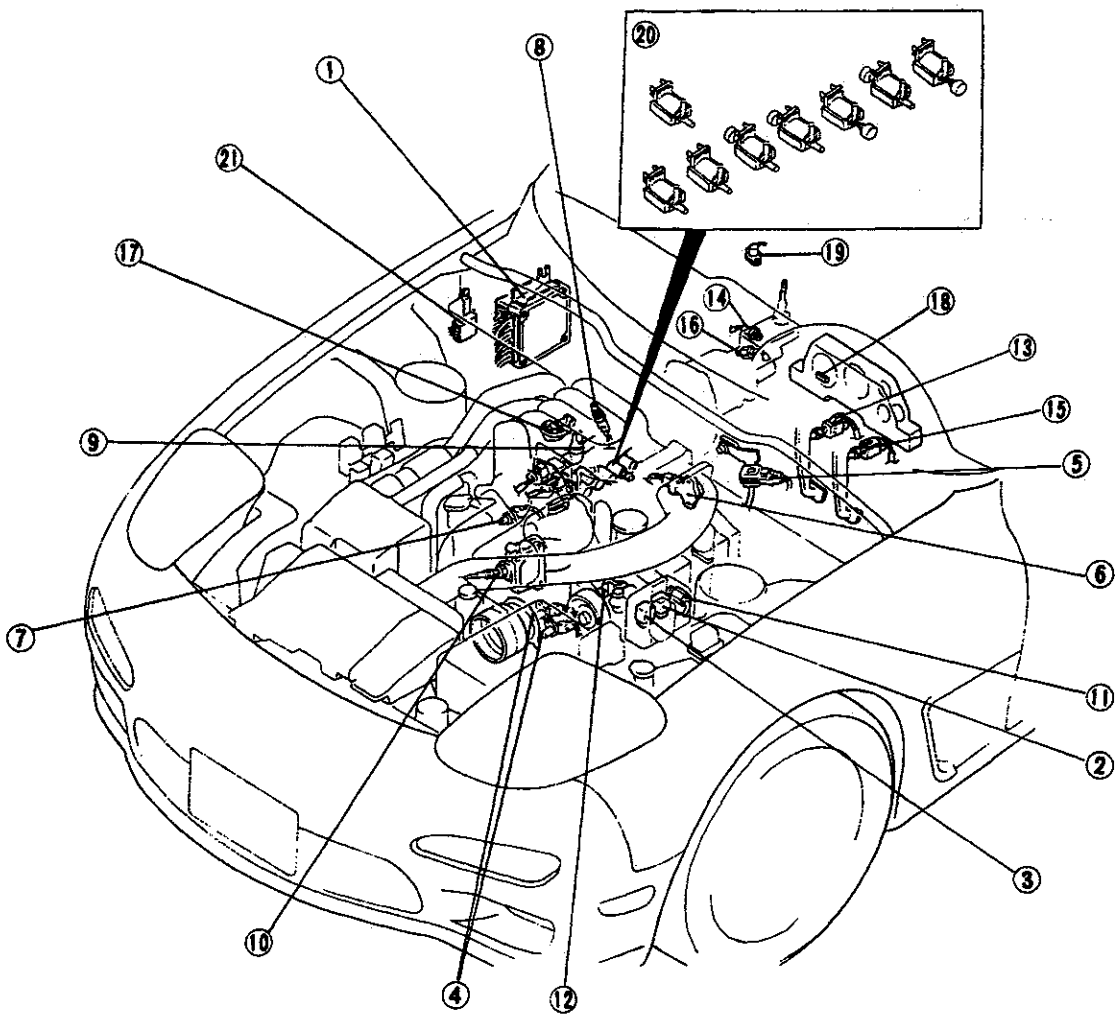
Operation	C–D terminal
B+ applied	Continuity
B+ Not applied	No continuity

CONTROL SYSTEM

PREPARATION
SST

49 9200 162 Engine Signal Monitor 	For inspection of PCME terminal voltage.	49 F018 902 Adaptor harness 	For inspection of PCME terminal voltage
49 F018 903 Sheet 	For inspection of PCME terminal voltage.	49 H018 9A1 Self-Diagnosis Checker 	For inspection of oxygen sensor and knock sensor
49 B019 9A0 System Selector 	For inspection of oxygen sensor and knock sensor.		

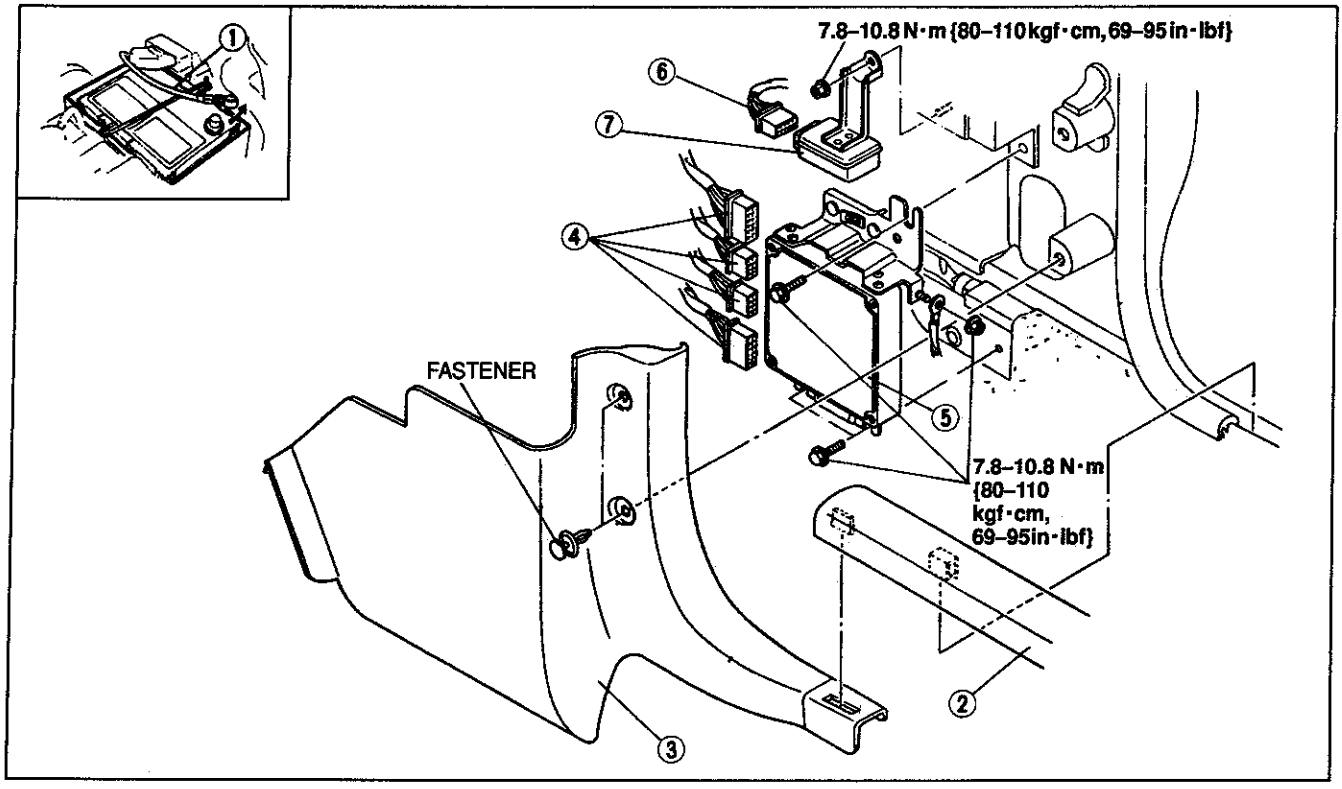
STRUCTUAL VIEW



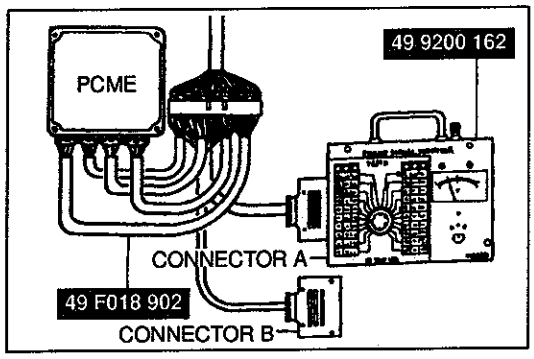
POWERTRAIN CONTROL MODULE (ENGINE) (PCME)

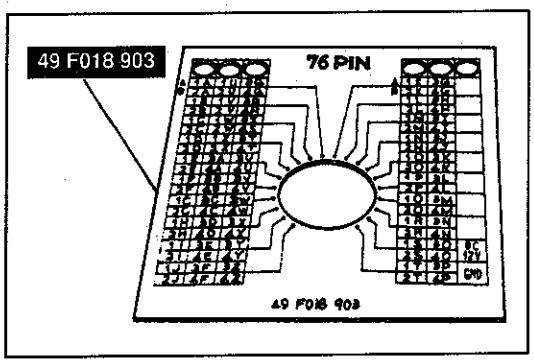
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Battery cable
2. Scuff plate
3. Front side trim
4. Connectors
5. PCME
   Inspection
   (Engine Signal Monitor) ..... page F–151
6. Connector
7. E/L unit
   Inspection ..... page F–136





Inspection
Engine signal Monitor
1. Connect the **SSTs** to the PCME as shown.

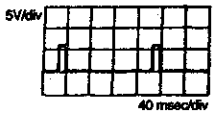
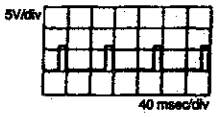
   Use connector A of the adapter to measure voltage at terminals 1A through 1V and 3A through 3P, and use connector B to measure voltage at the terminals 2A through 2L and 4A through 4Z.

2. Place the **SST** (Sheet: 76-pin type) on the **SST** (Engine Signal Monitor).
3. Measure the voltage at each terminal.
4. If any PCME terminal voltage is incorrect, check the input or output device and related wiring. If they are normal, replace the PCME.

Caution
- **Applying voltage to SST terminals A or B will damage the SST.**

Terminal voltage
1. Using the engine signal monitor

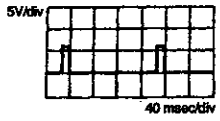
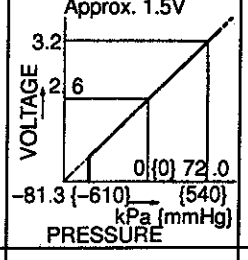
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
1A	—	—	Battery	Constant		B+	For backup
1B	○		Main relay (FUEL INJ relay)	Ignition switch	OFF	0V	—
					ON	B+	
1C	○		Ignition switch (START)	While cranking		B+	—
				Ignition switch ON		Below 1.0V	
1D		○	Self-Diagnosis checker (monitor lamp)	Test switch at SELF TEST Lamp illuminated for 3 sec. after ignition switch OFF → ON		4.5–5.5V	With Self-Diagnosis checker and System Selector
				Lamp not illuminated after 3 sec.		B+	
				Test switch at O_2 MONITOR Lamp illuminated		4.5–5.5V	
				Test switch at O_2 MONITOR Lamp not illuminated		B+	
1E	○		Air conditioning sensor	Air conditioning sensor ON		Below 3.0V	• With Blower SW ON • Ignition switch ON
				Air conditioning sensor OFF		B+	
1F		○	Self-Diagnosis checker (code number)	Buzzer sounded for 3 sec. after ignition switch OFF → ON		Below 2.5V	• With Self-Diagnosis checker and System Selector • With System Selector test switch at SELF TEST
				Buzzer not sounded for after 3 sec.		B+	
				Buzzer sounded		Below 2.5V	
				Buzzer not sounded		B+	
1G		○	Igniter (Trailing) Front rotor	Ignition switch ON		0V	—
				Idle Oscilloscope		0.2–0.5V (Reference) 	
				Engine speed: above 2,500 rpm		0.5–0.8V (Reference)	Initial acceleration
1H		○	Igniter (Leading)	Ignition switch ON		0V	—
				Idle Oscilloscope		0.2–0.5V (Reference) 	
				Engine speed: above 2,500 rpm		0.8–1.2V (Reference)	Initial acceleration

B+: Battery positive voltage

Incorrect voltage		Possible cause
Always 0V		• ROOM 10A fuse burnt • Open circuit in wiring from ROOM 10A fuse to PCME terminal 1A
Always 0V		• Main relay malfunction (Refer to page F–174) • Open or short circuit in wiring from main relay to PCME terminal 1B
Always 0V (starter turns)		• Open or short circuit in wiring from ignition switch to PCME terminal 1C • Ignition switch malfunction (Refer to section T)
Always 0V		• Main relay (FUEL INJ relay) malfunction (Refer to page F–174) • Open circuit in wiring from ignition switch to data link connector terminal +B • Open or short circuit in wiring from data link connector terminal MEN to PCME terminal 1D
Always B+		• Poor connection at PCME connector • PCME malfunction
Always approx. 5V		PCME malfunction
Always below 1.0V		• Short circuit in wiring from air conditioning sensor to PCME terminal 1E • Air conditioning sensor malfunction (Refer to section T)
Always B+		• Open circuit in wiring from air conditioning sensor to PCME terminal 1E • Air conditioning sensor malfunction (Refer to section T)
Always below 2.5V	No display on Self-Diagnosis Checker	• Main relay (FUEL INJ relay) malfunction (Refer to page F–174) • Open circuit in wiring from ignition switch to data link connector terminal + B
	"88" displayed and buzzer sounds continuously	Open or short circuit in wiring from data link connector terminal FEN to PCME terminal 1F
Always B+		• Poor connection at PCME connector • PCME malfunction
Always 0V		Refer to page F–16 (Ignition timing adjustment)
Always 0V		Refer to page F–16 (Ignition timing adjustment)

B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
1I	○		Data link connector (TEN terminal)	System Selector test switch at O_2 MONITOR		B+	• With System Selector • Ignition switch ON
				System Selector test switch at SELF TEST		0V	
1J		○	Igniter (Trailing) Rear rotor	Ignition switch ON		0V	—
				Idle Oscilloscope		0.2–0.5V (Reference) 	
				Engine speed: above 2500 rpm		0.5–0.8V (Reference)	Initial acceleration
1K		○	Fuel pump relay (Speed)	Ignition switch ON		Below 1.0V	—
				While cranking		Below 1.0V	
				Idle	Solenoid valve (PRC) does not operate	B+	
					Solenoid valve (PRC) operates	Below 1.0V	
1L		○	A/C relay	While cranking		B+	Air conditioning sensor, Blower switch ON
				Idle		Below 1.0V	
				During acceleration (Running)		B+	
1M	○		Vehicle speed sensor	Ignition switch ON		0V or 4.0–5.0V	—
				Driving		2.0–2.5V	
1N	○		Steering pressure sensor	P/S OFF at idle		B+	—
				P/S ON at idle		Below 1.0V	
			Mileage switch	Over 20,000 miles {34,000 km}		Below 1.5V	Ignition switch ON after 2 seconds
				Under 20,000 miles {34,000 km}		B+	
1O	○		Manifold absolute pressure sensor	Ignition switch ON		Approx. 2.6V	—
				Idle		Approx. 1.5V 	
1P	—	—	—	—		—	—

B+: Battery positive voltage

Incorrect condition	Possible cause
Always below 1.0V	Short circuit in wiring from data link connector terminal TEN to PCME terminal 1I
Always B+	• Open circuit in wiring from data link connector terminal TEN to PCME terminal 1I • Open circuit in wiring from data link connector terminal GND to ground
Always 0V	Refer to page F-16 (Ignition timing adjustment)
Always below 1.0V	Refer to Code No.51 Troubleshooting (Refer to page F-60)
Always B+	• Poor connection at PCME connector • Fuel pump relay (speed) malfunction (Refer to page F-110) • PCME malfunction
Always B+	• A/C relay malfunction (Refer to page F-142) • Open circuit in wiring from ignition switch to A/C relay • Open circuit in wiring from A/C relay to PCME terminal 1L
Always below 1.0V	• Short circuit in wiring from A/C relay to PCME terminal 1L • A/C relay malfunction (Refer to page F-142)
Always 0V	• Open or short circuit in wiring from vehicle speed sensor to PCME terminal 1M • Vehicle speed sensor malfunction (Refer to section T)
Always below 1.0V	• Steering pressure sensor malfunction (Refer to page F-172) • Short circuit in wiring from steering pressure sensor to PCME terminal 1N • PCME malfunction
Always B+	• Steering pressure sensor malfunction (Refer to page F-172) • Open circuit in wiring from steering pressure sensor to PCME terminal 1N • Open circuit in wiring from steering pressure sensor to ground
Always B+ under 20,000 miles	• Mileage switch malfunction (Refer to page F-175) • PCME malfunction
Always below 1.5V over 20,000 miles	• Mileage switch malfunction (Refer to page F-175) • PCME malfunction
Always 0V or 5V	Refer to Code No.13 Troubleshooting (Refer to page F-33)
—	—

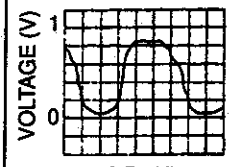
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
1Q	○		Clutch switch (MT)	Clutch pedal: released	B+	Ignition switch ON
				Clutch pedal: depressed	Below 1.0V	
			Powertrain control module (Transmission) (AT)	Idle	B+	Reduce torque signal
				When shifting from 1st to 2nd or from 2nd to 3rd with the throttle opening above 1.5/8	Below 1.0V	
				Idle	B+	Slip lock up signal
				When slip lockup with the throttle opening below 0.5/8	Below 1.0V	
1R	○		Neutral switch (MT)	Neutral	Below 1.0V	Ignition switch ON
				In gear	B+	
			Powertrain control module (Transmission) (AT)	Por N range	Below 1.0V	• Park/Neutral signal • Ignition switch ON
				Other	B+	
1S	○		Stoplight switch	Brake pedal released	Below 1.0V	Ignition switch ON
				Brake pedal depressed	B+	
1T		○	Fuel pump relay	Ignition switch ON	B+	—
				Idle	Below 1.0V	
1U	○		Fuel thermosensor	Idle (after warm up)	1.5–3.0V	—
1V	—	—	—	—	—	—
2A	—	—	—	—	—	—
2B		○	Data link connector (IG-terminal)	Ignition switch ON	0V	—
				Idle	0.3–0.8 (Reference)	
				Engine speed: 3,000 rpm	1.8–2.2V (Reference)	Initial acceleration
2C		○	Powertrain control module (Transmission) (AT)	Idle	B+	Slip lock up OFF signal
				Engine speed: hold 3,000 rpm (after 8 seconds)	Below 1.0V	Initial acceleration
2D		○	Powertrain control module (Transmission) (AT)	Ignition switch ON	2–4.5V	Barometric absolute pressure signal
2E		○	Powertrain control module (Transmission) (AT)	Idle	Below 1.0V	Idle signal
				Other	Approx 5V	
2F	—	—	—	—	—	—
2G		○	Powertrain control module (Transmission) (AT)	Idle	B+	Torque reduced signal
				Throttle opening above 1/8 (Engine coolant temp. below 40°C {104°F})	Below 1.0V	
2H	—	—	—	—	—	—
2I	○		Heat Hazard Sensor	Ignition switch ON	Below 2.0V	—
				Idle (Temp.: Below 100°C {212°F})	B+	
				Idle (Temp.: Above 100°C {212°F})	Below 1.0V	
2J		○	A/P relay	Engine speed Idle-Below 3,250 rpm	Below 1.0V	—
				Engine speed above 3,250 rpm	B+	

B+: Battery positive voltage

Incorrect voltage	Possible cause
Always B+	• Clutch switch malfunction (Refer to page F–173) • Open circuit in wiring from clutch switch to PCME terminal 1Q
Always below 1.0V	• Clutch switch malfunction (Refer to page F–173) • Short circuit in wiring from clutch switch to PCME terminal 1Q
Always B+	• Open circuit in wiring from PCME terminal 1Q to PCMT terminal 2P
Always below 1.0V	• Short circuit in wiring from PCME terminal 1Q to PCMT terminal 2P
Always below 1.0V	• Neutral switch malfunction (Refer to page F–172) • Short circuit in wiring from neutral switch to PCME terminal 1R
Always B+	• Neutral switch malfunction (Refer to page F–172) • Open circuit in wiring from neutral switch to PCME terminal 1R
Always below 1.0V	• Park/neutral switch malfunction (Refer to section K) • Short circuit in wiring from PCMT terminal 1C to PCME terminal 1R
Always B+	• Park/neutral switch malfunction (Refer to section K) • Open circuit in wiring from PCMT terminal 1C to PCME terminal 1R
Always below 1.0V (Stoplight OK)	Open circuit in wiring from stoplight switch to PCME terminal 1S
Always below 1.0V or B+	• Open or short circuit in wiring from fuel pump relay to PCME terminal 1T • Fuel pump relay malfunction (Refer to page F–174)
Always Approx. 0V or approx 5V	Refer to Code No.23 Troubleshooting (Refer to page F–40)
—	—
—	—
Always 0V	• Open circuit in wiring from data link connector IG-terminal to PCME terminal 2B • Crankshaft position sensor malfunction (Refer to page F–166) • PCME malfunction
Always B+	Open circuit in wiring from PCMT terminal 2G to PCME terminal 2C
Always below 1.0V	Short circuit in wiring from PCMT terminal 2G to PCME terminal 2C
Always 0V or 4V	• Refer to Code No.14 Troubleshooting (Refer to page F–34) • Open or short circuit in wiring from PCMT terminal 2C to PCME terminal 2D
Always below 1.0V	Short circuit in wiring from PCMT terminal 2M to PCME terminal 2E
Always B+	Open circuit in wiring from PCMT terminal 2M to PCME terminal 2E
—	—
Always below 1.0V	Short circuit in wiring from PCMT terminal 2P to PCME terminal 2G
Always B+	Open circuit in wiring from PCMT terminal 2P to PCME terminal 2G
—	—
Always below 1.0V	• Short circuit in wiring from heat hazard sensor to PCME terminal 2I • Heat hazard sensor malfunction (Refer to page F–175)
Always B+	• Open circuit in wiring from heat hazard sensor to PCME terminal 2I • Heat hazard sensor malfunction (Refer to page F–175)
Always below 1.0V or B+	Refer to Code No.54 Troubleshooting (Refer to page F–61)

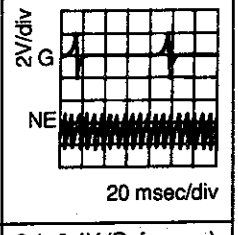
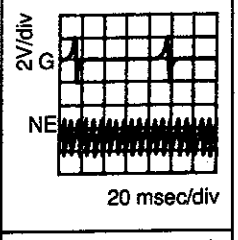
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
2K	O		1–2 switch (MT)	1st and 2nd position		B+	Ignition switch ON
				Other		Below 1.0V	
			PCMT	2nd or 3rd position		Below 1.0V	While running
				Other		B+	
2L	O		1–2 switch (MT)	2nd position		Below 1.0V	Ignition switch ON
				Other		B+	
			PCMT	3rd or O/D position		Below 1.0V	While running
				Other		B+	
3A	O		Metering oil pump position sensor	Ignition switch ON		1.0–4.2V	Voltage increase when accelerating
				Idle		Approx. 1.1V	
				Accelerator pedal depressed		1.1–4.2V	
3B	O		E/L unit	Headlight switch position I, II,		Below 4.0V	—
				Blower motor position III, IV,			
				Rear defroster switch ON			
				Headlight switch, Blower motor, rear defroster switch are OFF		4.5–5.5V	
3C	O		Oxygen sensor	Driving	Cold engine	Approx 0V	—
					After warm up	0.0–1.0V	
					Oscilloscope		
				Acceleration (after warm up)		0.5–1.0V	
				Deceleration (after warm up)		0.0–0.4V	
3D		O	Coolant fan relay	Idle	Electrical coolant fan does not operating	B+	—
					During electrical coolant fan operating	Below 1.0V	
				TFA terminal of data link connector is grounded		Below 1.0V	Ignition switch ON
3E	O		Engine coolant temperature sensor	Engine coolant temperature 20°C {68°F}		Approx. 2.5V	Ignition switch ON
				After warm up		Below 0.5V	
3F	O		Throttle position sensor (Narrow range)	Accelerator pedal released		0.75–1.25	• Ignition switch ON • After warm-up
				Accelerator pedal fully depressed		4.8–5.0	
3G	O		Throttle position sensor (Full range)	Accelerator pedal released		0.1–0.7	• Ignition switch ON • After warm-up
				Accelerator pedal fully depressed		4.2–4.6	
3H		O	Solenoid valve (purge control)	Ignition switch ON		B+	—
				Idle			
				Engine speed: 1,500–3,300 rpm		4–10V	While running

B+: Battery positive voltage

Incorrect voltage	Possible cause
Always below 1.0V	• Short circuit in wiring from 1–2 switch to PCME terminal 2K • 1–2 switch malfunction (Refer to page F–173)
Always B+	• Open circuit in wiring from 1–2 switch to PCME terminal 2K • 1–2 switch malfunction (Refer to page F–173)
Always below 1.0V	Short circuit in wiring from PCMT terminal 1D to PCME terminal 2K
Always B+	Open circuit in wiring from PCMT terminal 1D to PCME terminal 2K
Always below 1.0V	• Short circuit in wiring from 1–2 switch to PCME terminal 2L • 1–2 switch malfunction (Refer to page F–173)
Always B+	• Open circuit in wiring from 1–2 switch to PCME terminal 2L • 1–2 switch malfunction (Refer to page F–173)
Always below 1.0V	• Short circuit in wiring from PCMT terminal 1B to PCME terminal 2L
Always B+	• Open circuit in wiring from PCMT tarminal 1B to PCME terminal 2L
Always approx 0V or approx 5V	Refer to Code No.27 Troubleshooting (Refer to page F–43)
Always below 1.0V	• Short circuit in wiring from switches ~ E/L unit ~ PCME terminal 3B • Switches malfunction (Refer to section T)
Always B+	• Open circuit in wiring from switches ~ E/L unit ~ PCME terminal 3B • Switches malfunction (Refer to section T)
0V after warm-up	Refer to Code No.15 Troubleshooting (Refer to page F–34)
Always approx. 1V after warm-up	Refer to Code No.17 Troubleshooting (Refer to page F–36)
Always below 1.0V or Always B+	• Open or short circuit in wiring from coolant fan relay to PCME terminals 3D • Fan relay malfunction (Refer to page F–146) • PCME malfunction
Always approx. 0V or approx. 5V	Refer to Code No.09 Troubleshooting (Refer to page F–30)
Always approx. 0V	Refer to Code No.12 Troubleshooting (Refer to page F–32)
Always approx. 5V	
Always approx. 0V	Refer to Code No.18 Troubleshooting (Refer to page F–38)
Always approx. 5V	
Always 0V or B+	Refer to Code No.40 Troubleshooting (Refer to page F–53)

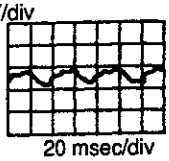
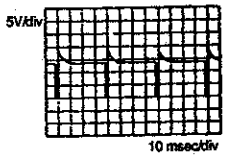
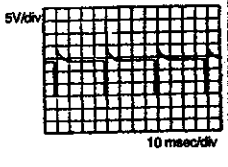
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
3I	O		Throttle position sensor	Constant		Approx. 5.0V	Ignition switch ON
3J	O		EGR function sensor	EGR valve operates		B+	—
				EGR valve does not operate		Below 1.0V	
3K		O	Solenoid valve (Relief2)	Ignition switch ON		B+	—
				Idle	Before warm up approx. 40°C {104°F}	Below 1.0V	
					After warm up	B+	
3L	O		Intake air temperature sensor	Ambient air temperature 20°C {68°F}		Approx. 2.5V	Ignition switch ON
				After warm up		Approx. 0.6V	
3M	O		Knock sensor	Ignition switch ON		Approx. 2.5V	—
				Knocking occur (Tap the engine hanger with hammer)		2.6–2.8V (Reference)	Ignition switch ON (Measure the terminal voltage by using the digital type voltmeter)
3N		O	Solenoid valve (Port air bypass)	Ignition switch ON		B+	—
				After warm up Engine speed: 1,500–3,000 rpm		Below 1.0V	While running
3O		O	Solenoid valve (Double throttle control)	Engine coolant temperature below 80°C {176°F}		Below 1.0V	Ignition switch ON
				After warm up		B+	
3P		O	Secondary air bypass valve	Idle		B+	• After warm up
				Engine speed: 3,250–3,750 rpm for 0.5 sec.		Below 1.0V	
4A	—	—	Ground (Output)	Constant		0V	—
4B	—	—	Ground (Output)	Constant		0V	—
4C	—	—	Ground (CPU)	Constant		0V	—
4D	—	—	Ground (Input)	Constant		0V	—
4E	O		Crankshaft position sensor [NE + signal]	Ignition switch ON		Below 1.0V	Engine signal monitor: Red lamp flash
				Idle	Oscilloscope		
					Voltmeter	0.1–0.4V (Reference)	
4F		O	Solenoid valve (Split air bypass)	Idle		B+	
				5th position (MT) / OD (AT)		Below 1.0V	• After warm up • While running
4G	O		Crankshaft position sensor [G signal]	Ignition switch ON		Below 1.0V	—
				Idle	Oscilloscope		
					Voltmeter	0.1–0.4V (Reference)	

B+: Battery positive voltage

Incorrect voltage	Possible cause
Always 0V	• Short circuit in wiring from main relay to PCME terminal 3I • Main relay malfunction (Refer to page F–174)
Always 0V or B+	• EGR function sensor malfunction (Refer to page F–127) • Open or short circuit in wiring from EGR function sensor to PCME terminal 3J
Always below 1.0V or B+	Refer to Code No.39 Troubleshooting (Refer to page F–52)
Always 0V or approx. 5V	Refer to Code No.11Troubeshooting (Refer to page F–31)
Always 0V	Refer to Code No.05 Troubleshooting (Refer to page F–28)
Always below 1.0V or B+	Refer to Code No.33 Troubleshooting (Refer to page F–48)
Always below 1.0V or B+	Refer to Code No.50 Troubleshooting (Refer to page F–59)
Always below 1.0V or B+	Refer to Code No.31 Troubleshooting (Refer to page F–46)
Above 0V	• Poor connection at ground terminal • Open circuit in wiring from PCME
Always approx. 0V or approx. 5V	Refer to Code No.03 Troubleshooting (Refer to page F–27)
Always below 1.0V or B+	Refer to Code No.30 Troubleshooting (Refer to page F–45)
Always approx 0V or approx. 5V	Refer to Code No.02 Troubleshooting (Refer to page F–26)

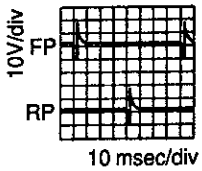
B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
4H	○		Crankshaft position sensor	Constant	Below 1.0V	—
4I		○	Stepping motor (Metering oil pump)	Ignition switch ON	B+	
4J				Idle	3 terminals / 4 terminals B+ Other terminal 5–9V	
4K						
4L						
4M		○	Solenoid valve (Pressure regulator control)	Idle	B+	
				Idle after hot start	Below 1.0V	approx. 90 seconds
4N		○	Secondary air switching valve	Ignition switch ON/Idle	B+	
				Engine speed: above 3,200 rpm (After warm up)	Below 1.0V	Initial acceleration
4O		○	Solenoid valve (EGR)	Idle	B+	
				5th position (MT)/OD (AT)	Below 1.0V	While running
4P		○	Solenoid valve (AWS)	Before warm up approx. 40°C {104°F}	Below 1.0V	Idle
				After warm up	B+	
4Q		○	Idle air control valve (ISC)	Ignition switch ON	8.0–11.0V	Reference value ● Cranking 99% ● Idle 32–65% ● Initial set 38%
				Idle Oscilloscope	5.0–11.0 (Reference) 5V/div  20 msec/div	
4R		○	Solenoid valve (Turbo control)	Idle	B+	
				Engine speed: above 5,500 rpm (MT)	Below 1.0V	Initial acceleration
				Engine speed: above 5,250 rpm (AT)		
4S		○	Solenoid valve (Charge relief)	Idle	B+	
				Engine speed: 4,000–5,500 rpm (MT) for 4–8 sec. 3,500–5,000 (AT) for 4–8 sec.	Below 1.0V	Initial acceleration
				Engine speed: above 5,500 rpm (MT) above 5,250 rpm (AT)		
4T		○	Solenoid valve (Charge control)	Idle	Below 1.0V	
				Engine speed: above 5,500 rpm (MT)	B+	Initial acceleration
				Engine speed: above 5,250 rpm (AT)		
4U		○	Solenoid valve (Wastegate control)	Ignition switch ON	B+	Reference value ● Idle 5% ● Solenoid valve (Turbo control) before operates 95%
				Idle Oscilloscope	B+  	
				Initial acceleration	5.0–11.0 V	
4V		○	Solenoid valve (Turbo precontrol)	Ignition switch ON	B+	Reference value ● Idle 5% ● Solenoid valve (Turbo control) after operates 5%
				Idle Oscilloscope	B+  	
				Engine speed: above 3,000 rpm	4.0–10.0V (Reference)	Initial acceleration

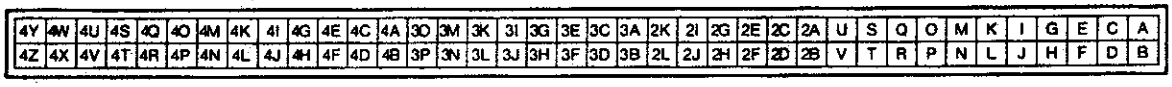
B+: Battery positive voltage

Incorrect voltage	Possible cause
Always above 1.0V	Refer to Code No.02 Troubleshooting (Refer to page F-26)
Always 0V or B+	Refer to Code No.26 Troubleshooting (Refer to page F-42)
Always below 1.0V or B+	Refer to Code No.25 Troubleshooting (Refer to page F-41)
Always below 1.0V or B+	Refer to Code No.32 Troubleshooting (Refer to page F-47)
Always below 1.0V or B+	Refer to Code No.28 Troubleshooting (Refer to page P-44)
Always below 1.0V or B+	Refer to Code No.38 Troubleshooting (Refer to page F-51)
Always below 1.0V or B+	Refer to Code No. 34 Troubleshooting (Refer to page F-49)
Always below 1.0V or B+	Refer to Code No.44 Troubleshooting (Refer to page F-56)
Always below 1.0V or B+	Refer to Code No.46 Troubleshooting (Refer to page F-58)
Always below 1.0V or B+	Refer to Code No.45 Troubleshooting (Refer to page F-57)
Always below 1.0V or B+	Refer to Code No.43 Troubleshooting (Refer to page F-55)
Always below 1.0V or B+	Refer to Code No.42 Troubleshooting (Refer to page F-54)

B+: Battery positive voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
4W		○	Injector (Front primary)	Ignition switch ON	B+	• Secondary injector not working at no load condition * Engine Signal Monitor: Green lamp flash
4X		○	Injector (Front secondary)	idle*	12–14V	
4Y		○	Injector (Rear primary)	Oscilloscope		
4Z		○	Injector (Rear secondary)			

PCME Connector (PCME Side)

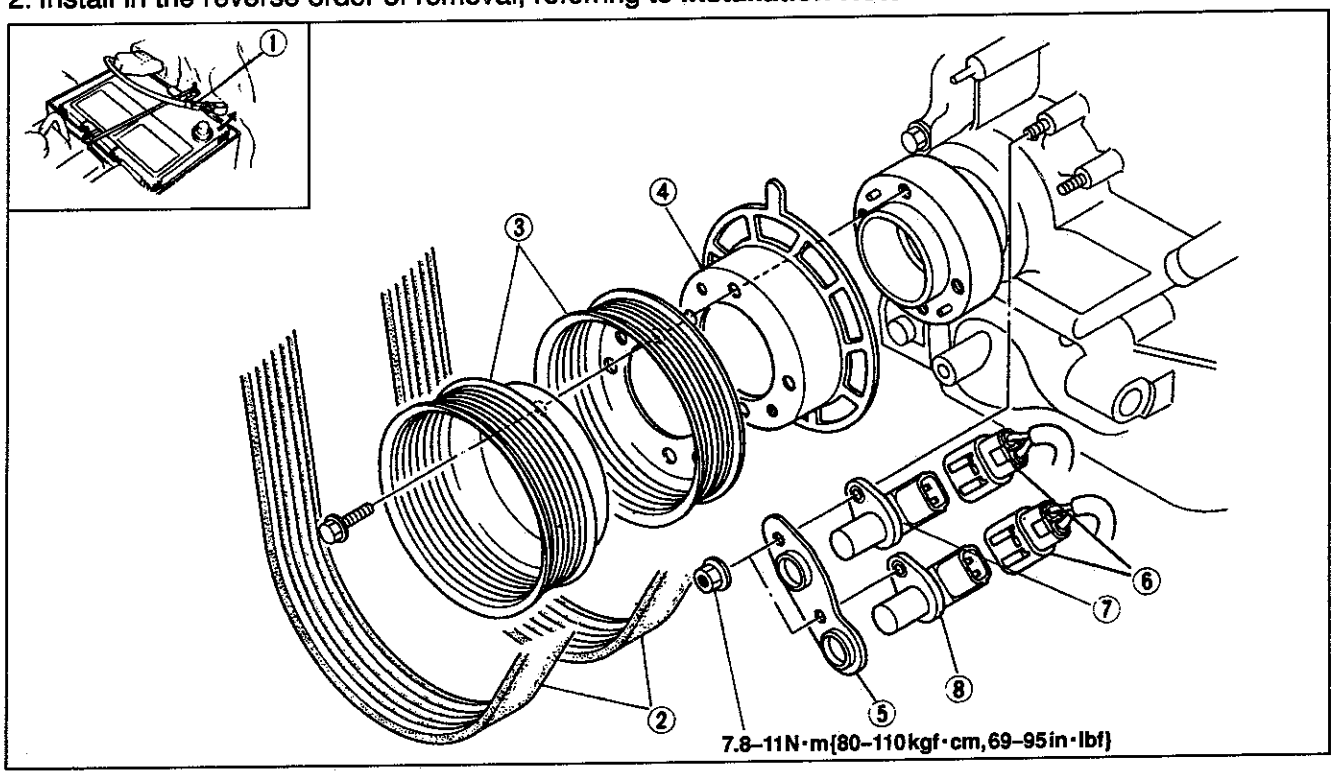


Incorrect voltage	Possible cause
Always 0V	• Open or short circuit in wiring from injector to PCME terminal 4W, 4X, 4Y, or 4Z • Main relay malfunction (Refer to page F–174) • Refer to Code No.71, 73 (Refer to page F–62, 63) troubleshooting

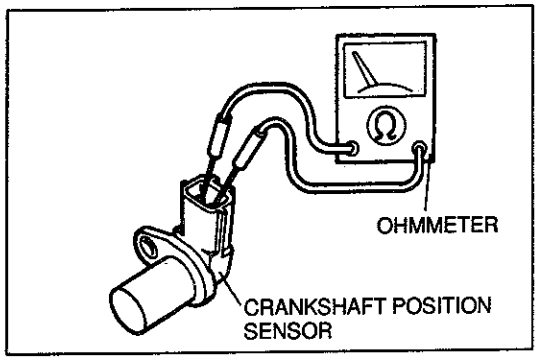
CRANKSHAFT POSITION SENSOR

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation Note**.



1. Battery cable
2. Drive belt
3. Eccentric shaft pulley
4. Crankshaft position sensor plate
5. Bracket
6. Connectors
7. Crankshaft position sensor (NE-signal)
   Inspection ..... below
8. Crankshaft position sensor (G-signal)
   Inspection ..... below

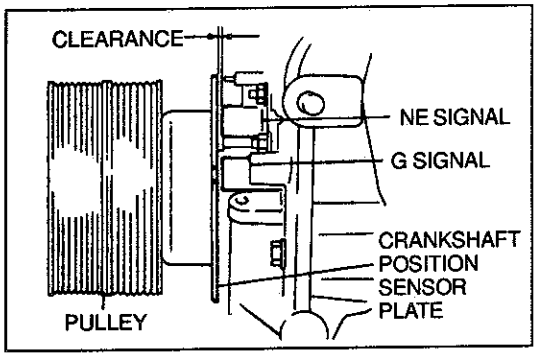


Inspection

1. Remove the crankshaft position sensor.
2. Measure the resistance of the sensor.

Resistance: 0.95–1.25 kΩ (20°C [68°F])

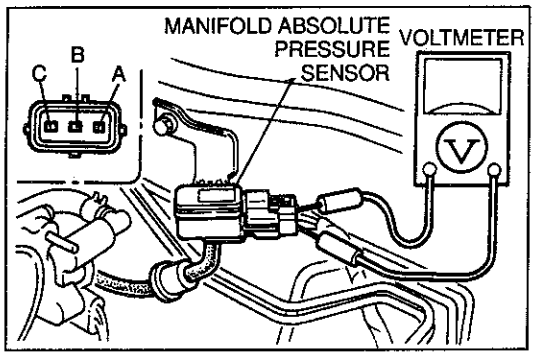
3. If not as specified, replace the crankshaft position sensor.

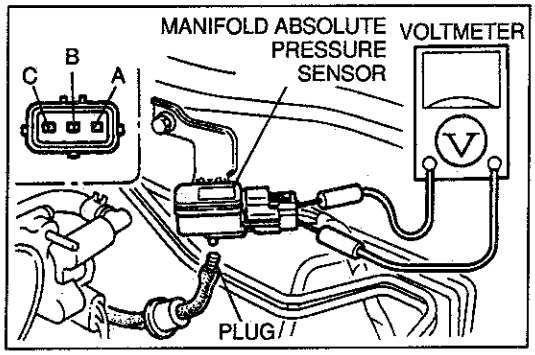


Installation Note

Measure the crankshaft position sensor to crankshaft position sensor plate clearance by using feeler gauge.

Clearance: 1.0–2.0 mm {0.039–0.078 in}





MANIFOLD ABSOLUTE PRESSURE SENSOR

Inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Turn all electrical load off.
3. Connect a voltmeter between the manifold absolute pressure sensor terminal A and B and verify that the voltage is within specification.

   Voltage: 1.3–1.6V

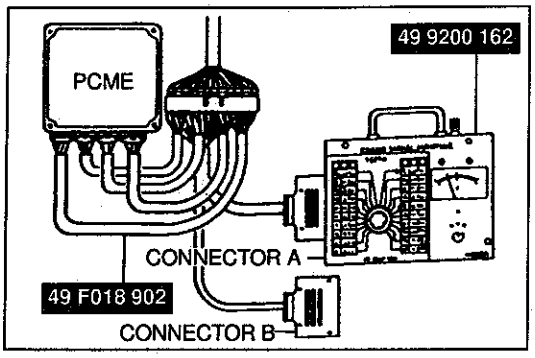
4. Disconnect vacuum tube and plug the vacuum tube and verify that the voltage is within specification.

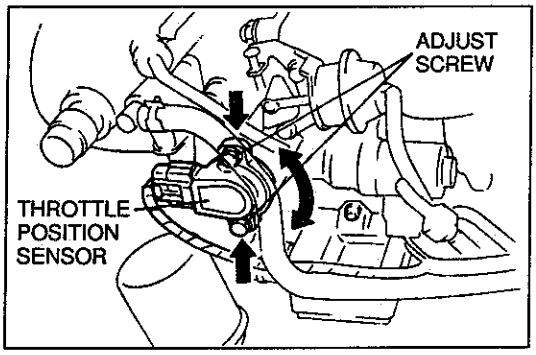
   Voltage: 2.38–2.78V

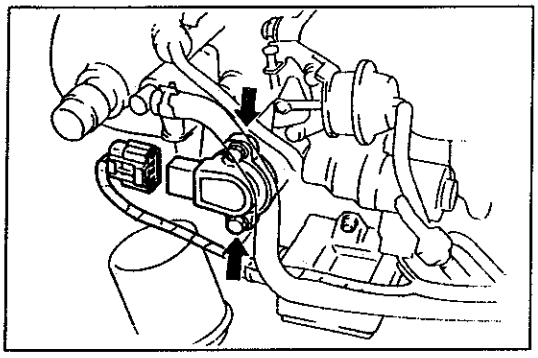
5. Connect a vacuum pump to the manifold absolute pressure sensor.
6. Apply vacuum and measure the voltage of the manifold absolute pressure sensor.

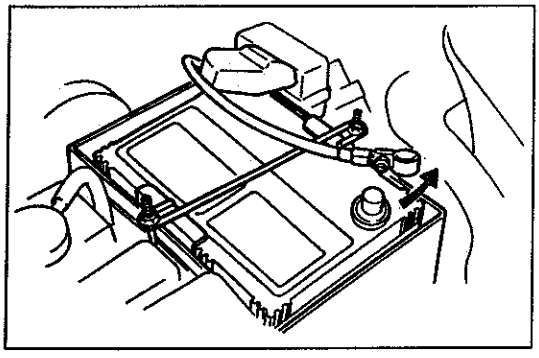
Vacuum	Voltage
-66 kPa {-500 mmHg-19.7 inHg} (Vacuum)	1.25–1.55V
0 kPa {0 mmHg, 0 inHg}	2.38–2.78V
98.7 kPa {740 mmHg, 29.1 inHg} (Pressure)	4.35–4.65V

7. If not as specified, replace the manifold absolute pressure sensor.
8. Cancel the memory of malfunctions by disconnecting the negative battery cable for at least 20 seconds and depress brake pedal.
9. Reconnect the negative battery cable.









THROTTLE POSITION SENSOR

Inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Verify the first idle cam separates.
3. Stop the engine.
4. Connect the **SSTs** (Engine Signal Monitor and Adaptor Harness) to PCME.
5. Turn the ignition switch to ON.
6. Rotate the throttle link by hand verify that the voltage is within specification.

Specification

PCME Terminal	Throttle valve condition		
	Closed throttle position	closed to open	Wide open throttle
3F (Narrow range)	0.75–1.25V	1.0–5.0V	4.8–5.0V
3G (Full range)	0.1–0.7V	0.4–4.3V	4.2–4.6V

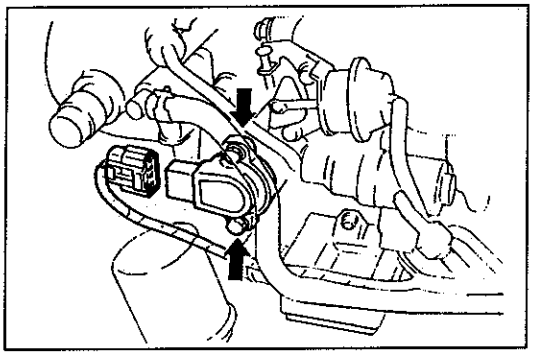
7. If not as specified, adjust or replace the throttle position sensor.

Adjustment

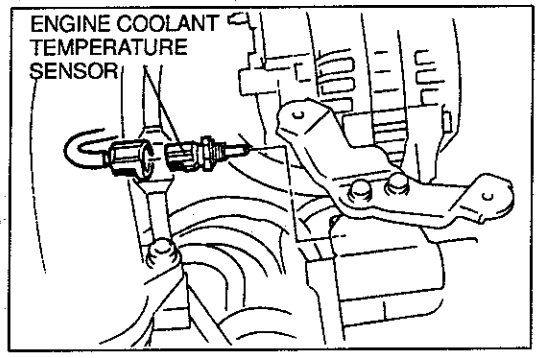
1. Warm up the engine to normal operating temperature and run it idle.
2. Verify that the first idle cam separates.
3. Stop the engine.
4. Connect the **SSTs** (Engine Signal Monitor and Adaptor Harness) to PCME.
5. Turn the ignition switch to ON.
6. Loosen the screws and rotate the throttle position sensor to set the correct closed position voltage.
   (Refer to "Specification" above)
7. Check the correct open position voltage and close to open voltage.
   (Refer to "Specification" above)
9. Tighten the screws.

Tightening Torque
1.6–2.4 N·m {16–24 kgf·cm, 140–210 in·lbf}

10. Cancel the memory of malfunctions by disconnecting the negative battery cable for at least 20 seconds and depress the brake pedal.
11. Reconnect the negative battery cable.



Removal / Installation
1. Turn ignition switch to OFF.
2. Disconnect the throttle position sensor connector.
3. Remove the throttle position sensor.
4. Install the throttle position sensor.
5. Adjust the throttle position sensor. (Refer to page F-168.)

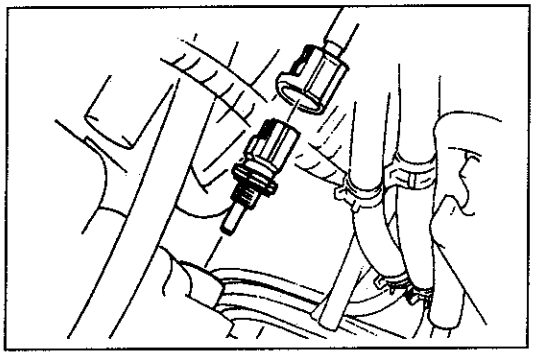


ENGINE COOLANT TEMPERATURE SENSOR
Removal / Installation

Warning
- **Removing the engine coolant temperature sensor while the engine hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. Turn off the engine and wait until it is cool. Even then, be very careful when removing the engine coolant temperature sensor.**

1. Remove the extension manifold. (Refer to page F-76.)
2. Disconnect engine coolant temperature sensor connector.
3. Remove the engine coolant temperature sensor.
4. Install a new gasket and install in the reverse order of removal.

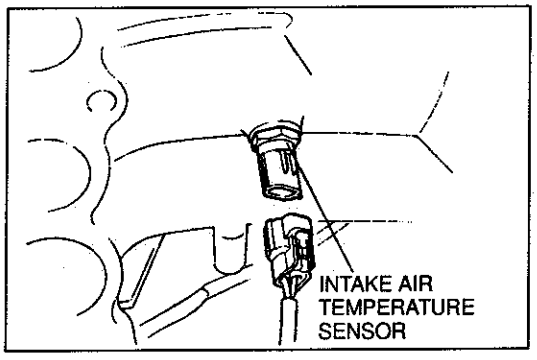
Tightening torque:
20–24 N·m {2.0–2.5 kgf·m, 15–18 ft·lbf}



Inspection
1. Place the engine coolant temperature sensor in water with a thermometer and heat the water gradually.
2. Measure the resistance of the sensor with an ohmmeter.

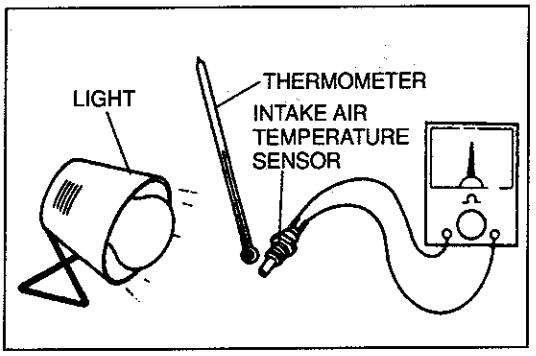
Water temperature	Resistance
20°C {68°F}	2.2–2.7 kΩ
80°C {176°F}	0.29–0.35 kΩ

3. Replace the sensor, if necessary.



INTAKE AIR TEMPERATURE SENSOR
Removal / Installation
1. Remove the extension manifold. (Refer to page F-76.)
2. Remove the intake air temperature sensor from extension manifold.
3. Install the intake air temperature sensor.

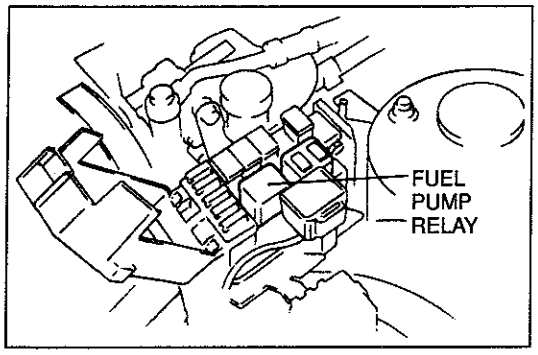
Tightening torque:
7.9–11.7 N·m {80–120 kgf·cm, 70–104 in·lbf}

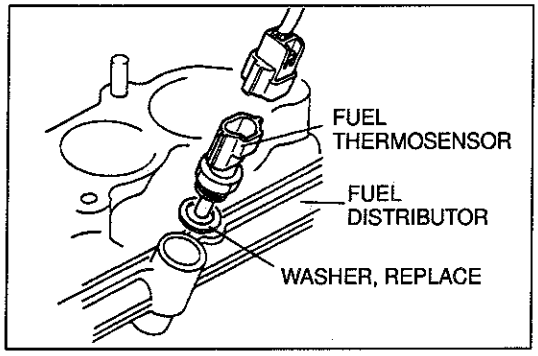


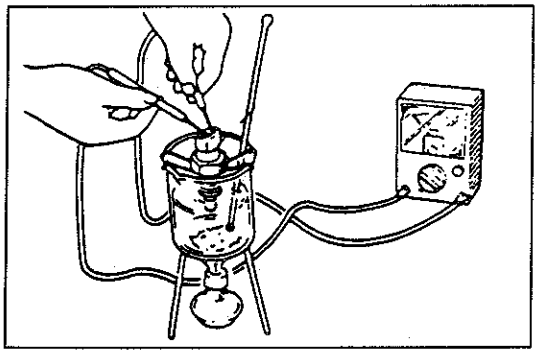
Inspection
1. Remove the intake air temperature sensor and heat the sensor as shown in the figure.
2. Measure the resistance of the sensor with an ohmmeter.

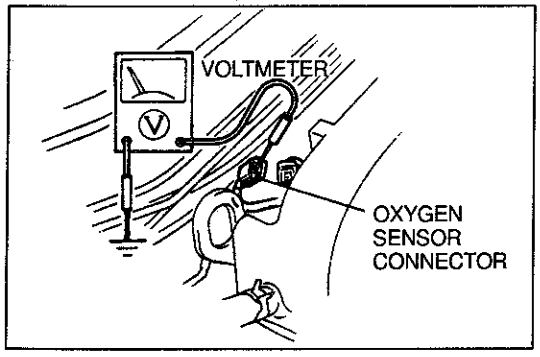
Temperature	Resistance
20°C {68°F}	2.2–2.7 kΩ
80°C {176°F}	0.29–0.35 kΩ

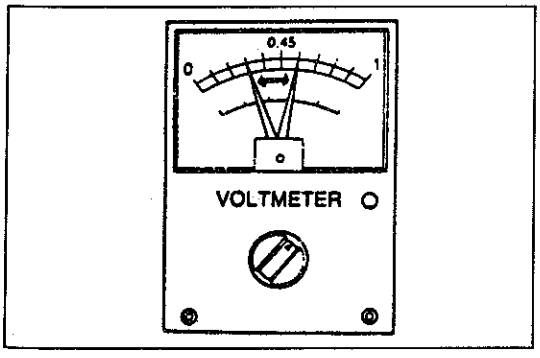
3. Replace the sensor, if necessary.











FUEL THERMOSENSOR
Removal / Installation

Warning

- **Fuel line spills and leaks can be dangerous. Fuel can ignite and cause serious injuries or death and can damage the vehicle. Fuel can also irritate skin and eyes. To prevent this from happening, release the fuel pressure according to "Fuel Line Safety Procedures" on page F–95.**

1. Remove the intake air system component parts. (Refer to page F–76.)
2. Disconnect the fuel thermosensor connector.
3. Remove the fuel thermosensor.
4. Install in the reverse order of removal.

Tightening torque:
20–24 N·m {2.0–2.5 kgf·m, 15–18 ft·lbf}

Inspection

1. Place the fuel thermosensor in water with a thermometer and heat the water gradually.
2. Measure the resistance of the sensor with an ohmmeter.

Water temperature	Resistance
20°C {68°F}	2.2–2.7 kΩ
80°C {176°F}	0.29–0.35 kΩ

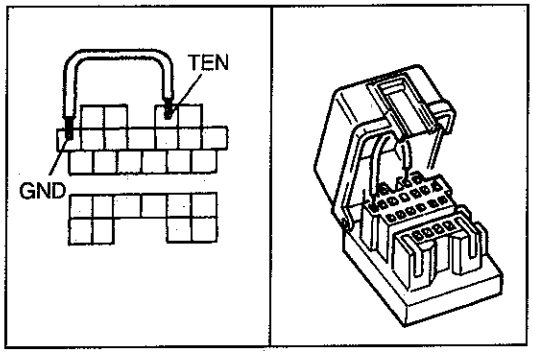
3. Replace the sensor, if necessary.

OXYGEN SENSOR
Inspection of Terminal Voltage.

1. Warm up the engine to normal operating temperature and run it at idle.
2. Disconnect the oxygen sensor connector.
3. Connect a high internal resistance voltmeter (more than 40 kΩ) between the oxygen sensor terminal and ground.
4. Measure the voltage while increasing and decreasing the engine speed suddenly several times.

Specification

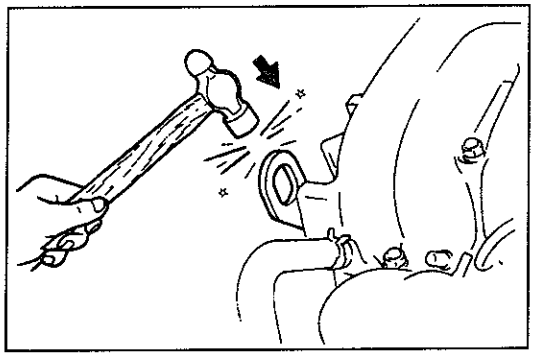
Engine condition	Voltage
While decelerating	0.0–0.4V
While accelerating	0.5–1.0V



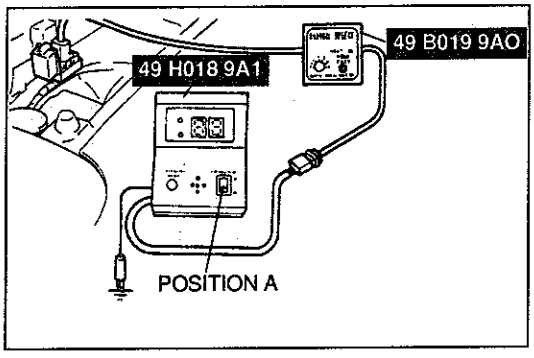
KNOCK SENSOR

Inspection (On vehicle)

1. Connect a voltmeter ⊖terminal to the MEN terminal of the data link connector
2. Connect the data link connector terminals TEN and GND by using a jumper wire.
3. Turn the ignition switch to ON.

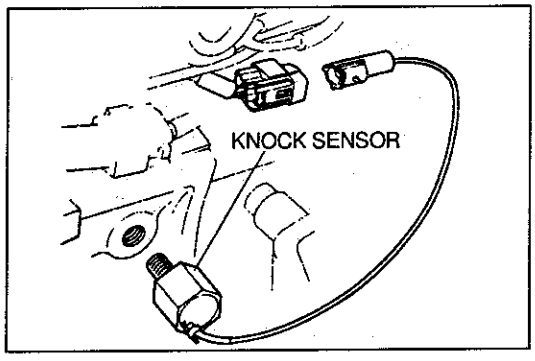


4. Lightly tap the engine hanger with a hammer.
5. Verify that the voltmeter indicator moves.
6. Turn the ignition switch to OFF.



Self-Diagnosis Checker

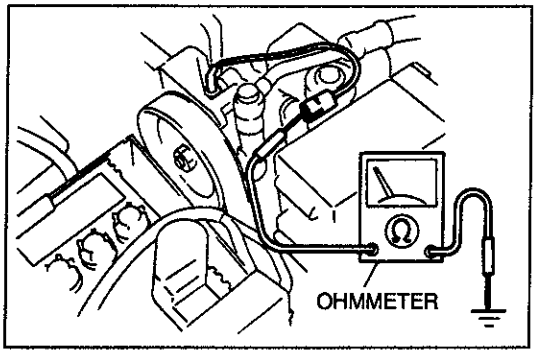
1. Connect the **SSTs** (System Selector and Self-Diagnosis Checker) to data link connector.
2. Set switch A to position of Self-Diagnosis Checker.
3. Set SYSTEM SELECT position 1and TEST SW to SELF-TEST of System Selector.
4. Turn the ignition switch to ON.
5. Lightly tap the engine hanger with a hammer.
6. Verify that the monitor lamp illuminates for approx. 0.5 seconds.
7. Turn the ignition switch to OFF.



Removal / Installation

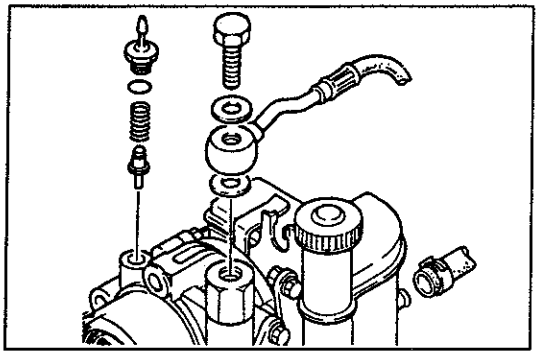
1. Disconnect knock sensor connector.
2. Remove the knock sensor.
3. Install in the reverse order of removal.

Tightning Torque:
20–34 N·m {2.0–3.5 kgf·m, 14–25 ft·lbf}



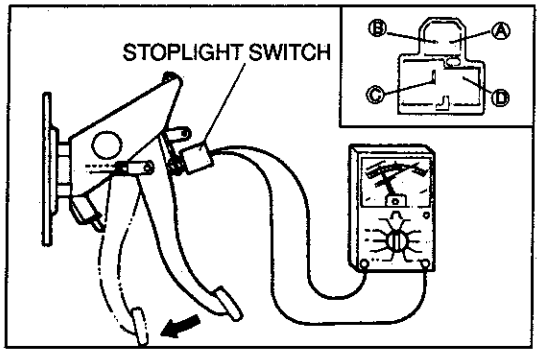
STEERING PRESSURE SENSOR
Inspection (On the vehicle)
1. Disconnect the steering pressure sensor connector.
2. Start the engine, and check continuity of the switch.

Steering wheel	Continuity
Turned	Yes
Straight ahead	No



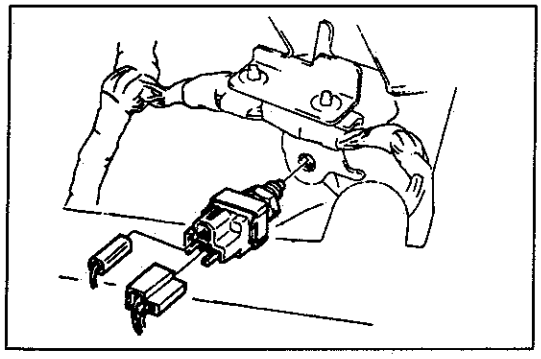
3. Replace the steering pressure sensor if not as specified.

Removal / Installation
Refer to section N.



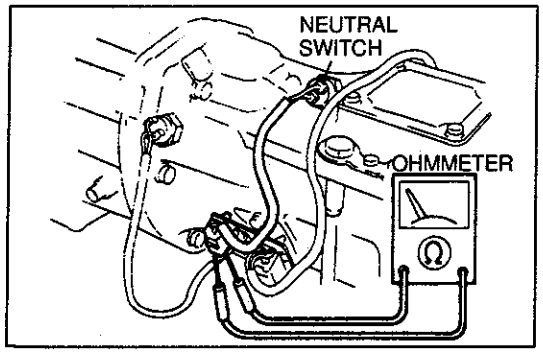
STOPLIGHT SWITCH
Inspection
1. Disconnect the stoplight switch connector.
2. Connect a circuit tester between the stoplight switch terminals C and D.
3. Check the continuity of the switch.

Pedal	Continuity
Depressed	Yes
Released	No



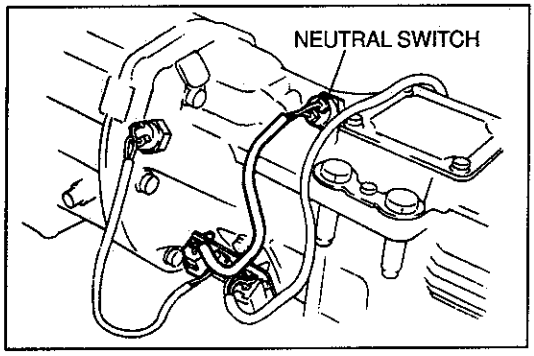
Removal / Installation
1. Disconnect the stoplight switch connector.
2. Remove the stoplight switch.
3. Install the stoplight switch.
4. Connect a circuit tester between the stoplight switch terminals C and D, and verify that the continuity when the brake pedal depressed and no continuity when the brake pedal released.
5. Tighten the adjust nut.

Tightening Torque:
14–18 N·m {1.4–1.8 kgf·m, 10–13 ft·lbf}



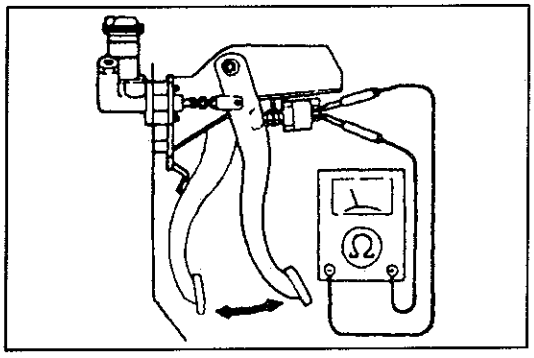
NEUTRAL SWITCH (MT)
Inspection
1. Disconnect the neutral switch connector.
2. Connect a circuit tester to the switch.
3. Check the continuity.

Transmission	Continuity
In neutral	Yes
In other ranges	No



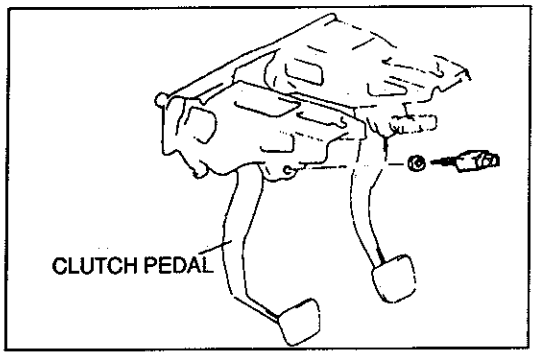
Removal / Installation
1. Remove the power plant frame (Refer to section J–MT Refer to section K–AT)
2. Disconnect the neutral switch connector.
3. Remove the neutral switch.
4. Install in the reverse order of removal.

Tightening Torque:
25–34 N·m {2.5–3.5 kgf·m, 18–25 ft·lbf}



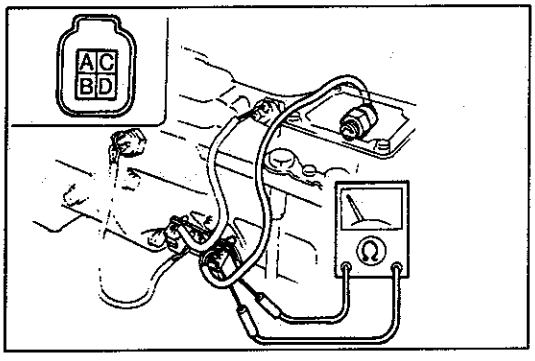
CLUTCH SWITCH (MT)
Inspection
1. Disconnect the clutch switch connector.
2. Connect a circuit tester to the switch.
3. Check the continuity.

Pedal	Continuity
Depressed	Yes
Released	No



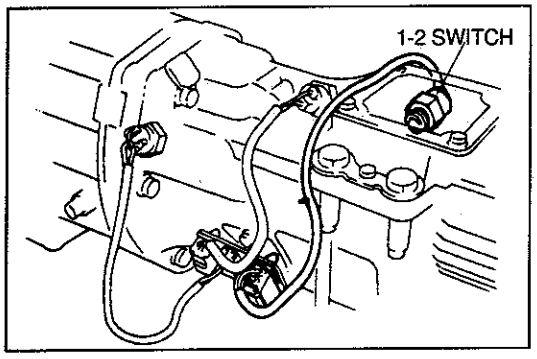
Removal / Installation
1. Remove the power plant frame (Refer to section J–MT Refer to section K–AT)
2. Remove the clutch switch.
3. Install the clutch switch.
4. Connect a circuit tester to the switch and verify that the continuity when the clutch pedal depressed and no continuity when the clutch pedal released.
5. Tighten the adjust nut.

Tightening torque:
14–18 N·m {1.4–1.8 kgf·m 10–13 ft·lbf}



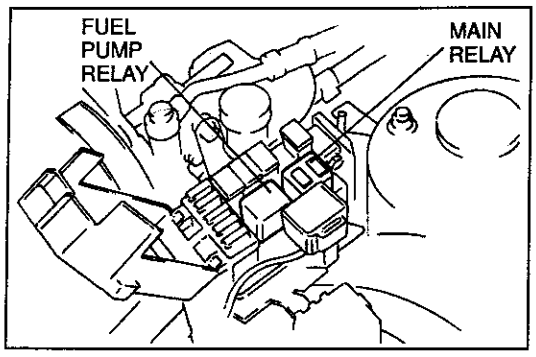
1-2 SWITCH (MT)
Inspection
1. Disconnect 1-2 switch.
2. Connect a circuit tester to the switch.
3. Check the continuity.

Terminal	Transmission	Continuity
A–B	In 1st and 2nd range	No
	In other range	Yes
C–D	In 2nd	Yes
	In other range	No



Removal / Installation
1. Remove the extension housing. (Refer to section J.)
2. Remove the 1-2 switch.
3. Install in the reverse order of removal.

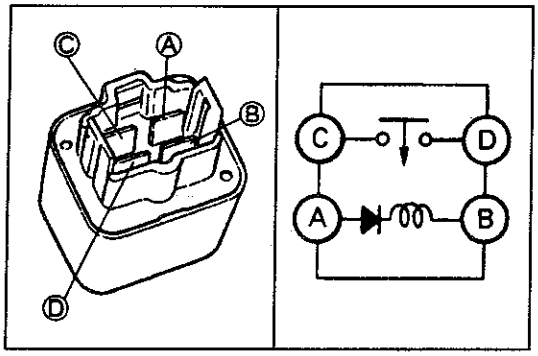
Tightening torque:
25–34 N·m {2.5–3.5 kgf·m, 18–25 ft·lbf}



MAIN RELAY (EGI RELAY)

Inspection (On vehicle)

Check that a "clicking" sound is heard at the main relay when turning the ignition switch OFF and ON.

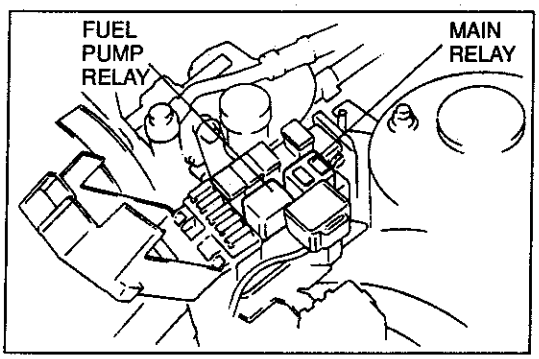


Inspection

1. Disconnect the main relay.
2. Apply battery positive voltage and ground to terminals A and B of the main relay.
3. Check continuity of the relay.

B+: Battery positive voltage

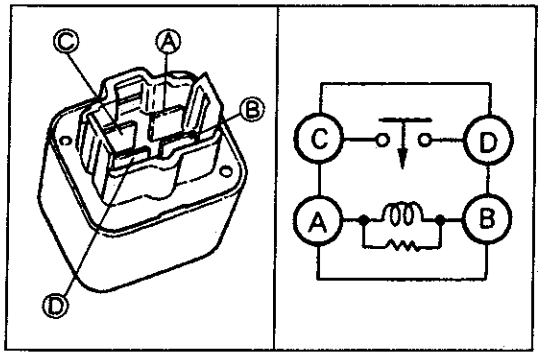
Operation	C-D terminals
B+ Applied	Continuity
B+ Not applied	No continuity



FUEL PUMP RELAY

Inspection (On vehicle)

Check that a "clicking" sound is heard at the fuel pump relay, when turning the ignition switch OFF and ON.

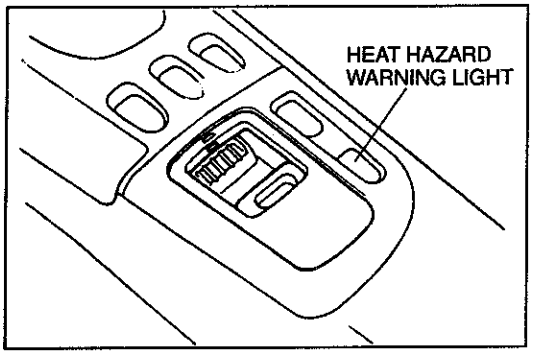


Inspection

1. Disconnect the fuel pump relay.
2. Apply battery positive voltage and ground to terminals A and B of the fuel pump relay.
3. Check continuity of the relay.

B+: Battery positive voltage

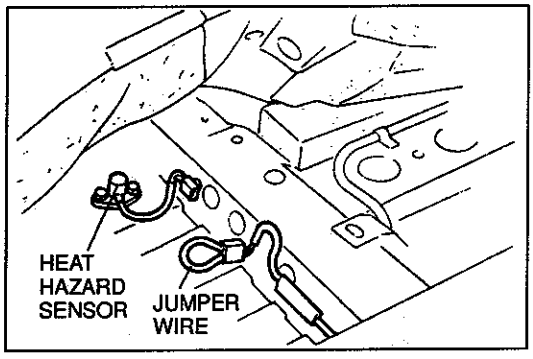
Operation	C-D terminals
B+ applied	Continuity
B+ Not applied	No continuity



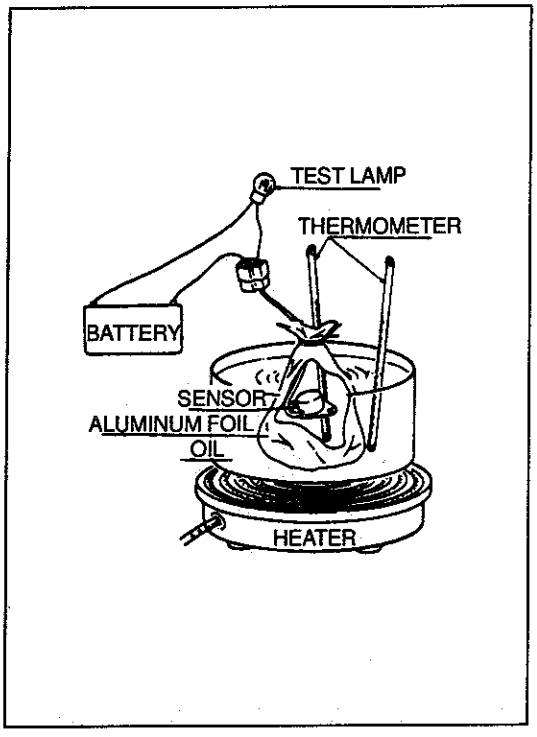
HEAT HAZARD SENSOR

Inspection (Warning system)

1. Turn the ignition switch to ON and verify that the heat hazard warning light illuminates.
2. Start the engine and verify that the warning lamp goes out.



3. Disconnect the heat hazard sensor connector.
4. Check that the heat hazard warning light illuminates on when a jumper wire is connected to the terminals of the sensor connector (harness side).



Removal

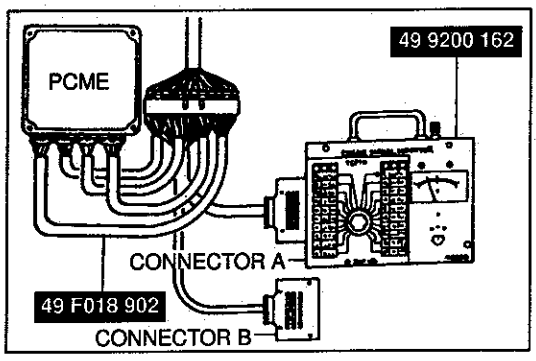
1. Remove the right front seat.
2. Lift up the floor mat.
3. Disconnect the heat hazard sensor connector and remove the sensor.

Installation

Install in the reverse order of removal.

Inspection

1. Wrap the sensor and a thermometer in aluminum foil and place them in a container of oil.
2. Connect a test lamp and battery positive voltage to the terminals of the sensor connector.
3. Gradually heat the oil.
4. Verify that the test lamp comes on when the temperature in the aluminum foil reaches 95–105°C {203–221°F}.
5. Replace the sensor if necessary.



MILEAGE SWITCH

Inspection

1. Connect the **SST** (Engine Signal Monitor) to the PCME.
2. Turn the ignition switch to ON.
3. Measure the voltage at PCME terminal 1N within the first two seconds after the ignition switch is turned to ON.

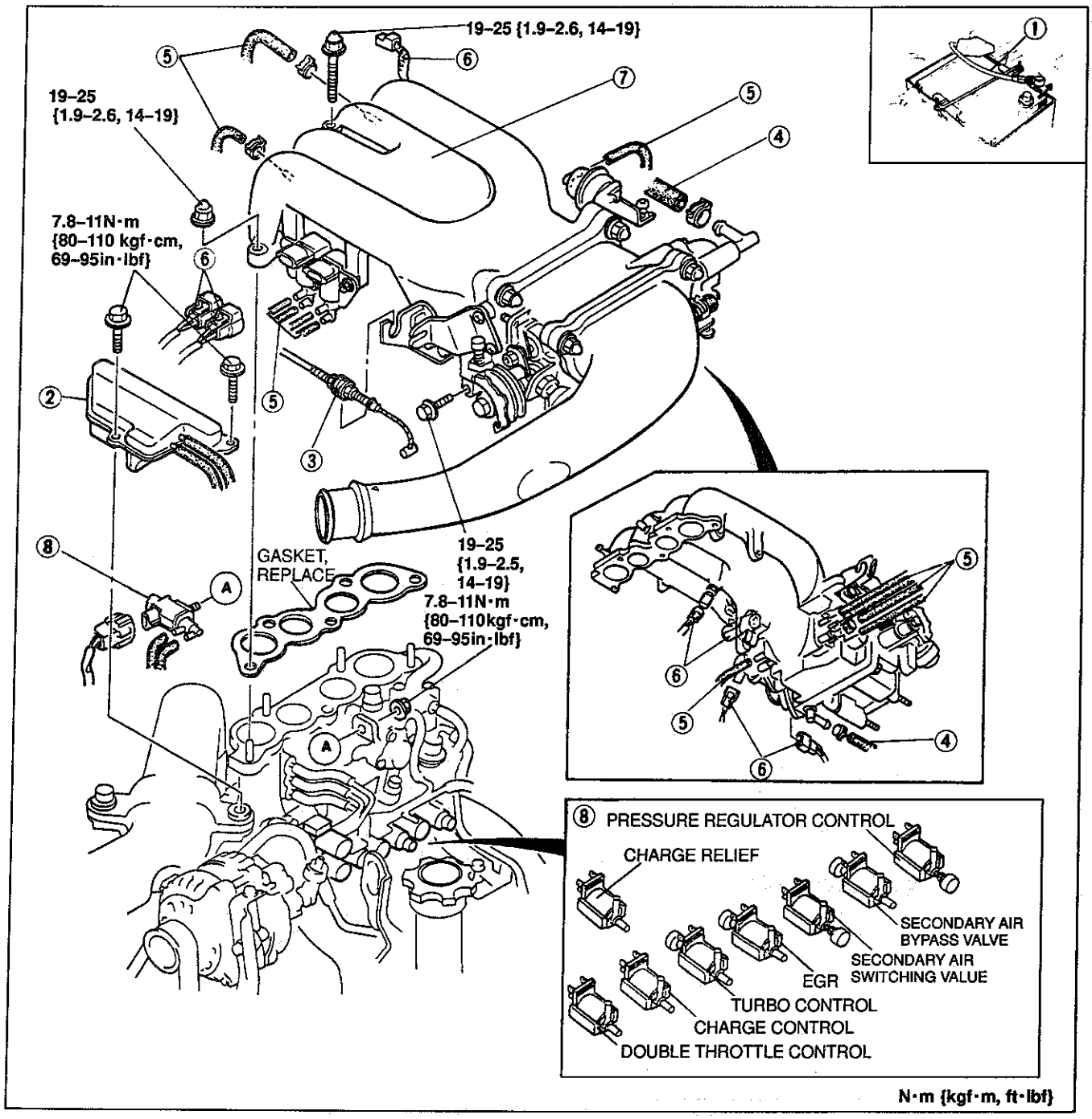
B+: Battery positive voltage

Under 20,000 miles	B+
Over 20,000 miles	Below 1.5V

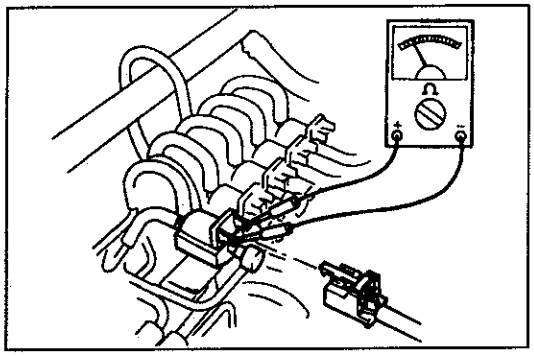
SOLENOID VALVES

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

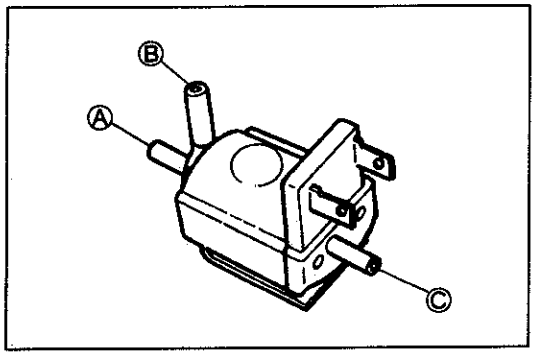


1. Battery cable
2. Pressure chamber
3. Accelerator cable
   removal / installation ..... page F–80
   Inspection / adjustment ..... page F–80
4. Water hose
5. Vacuum hoses
6. Connector
7. Extension manifold
8. Solenoid valves
   Inspection ..... page F–177



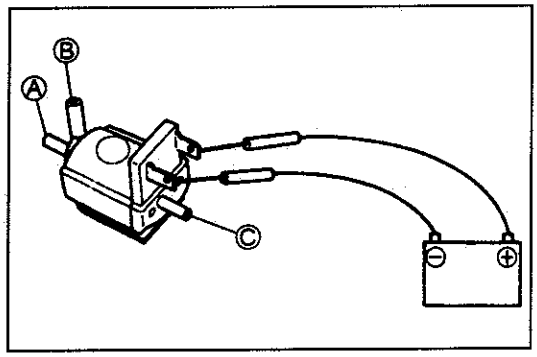
Inspection

1. Disconnect the connector.
2. Connect a circuit tester to the solenoid valve.
3. Check the continuity at the terminals.



4. Verify that air flows between each ports as below.

Port	Air flow
A–B	No
A–C	No
B–C	Yes



5. Connect battery positive voltage and a ground to the terminals of the solenoid valve.
6. Verify that air flows between each ports as below.

Port	Air flow
A–B	Yes
A–C	No
B–C	No

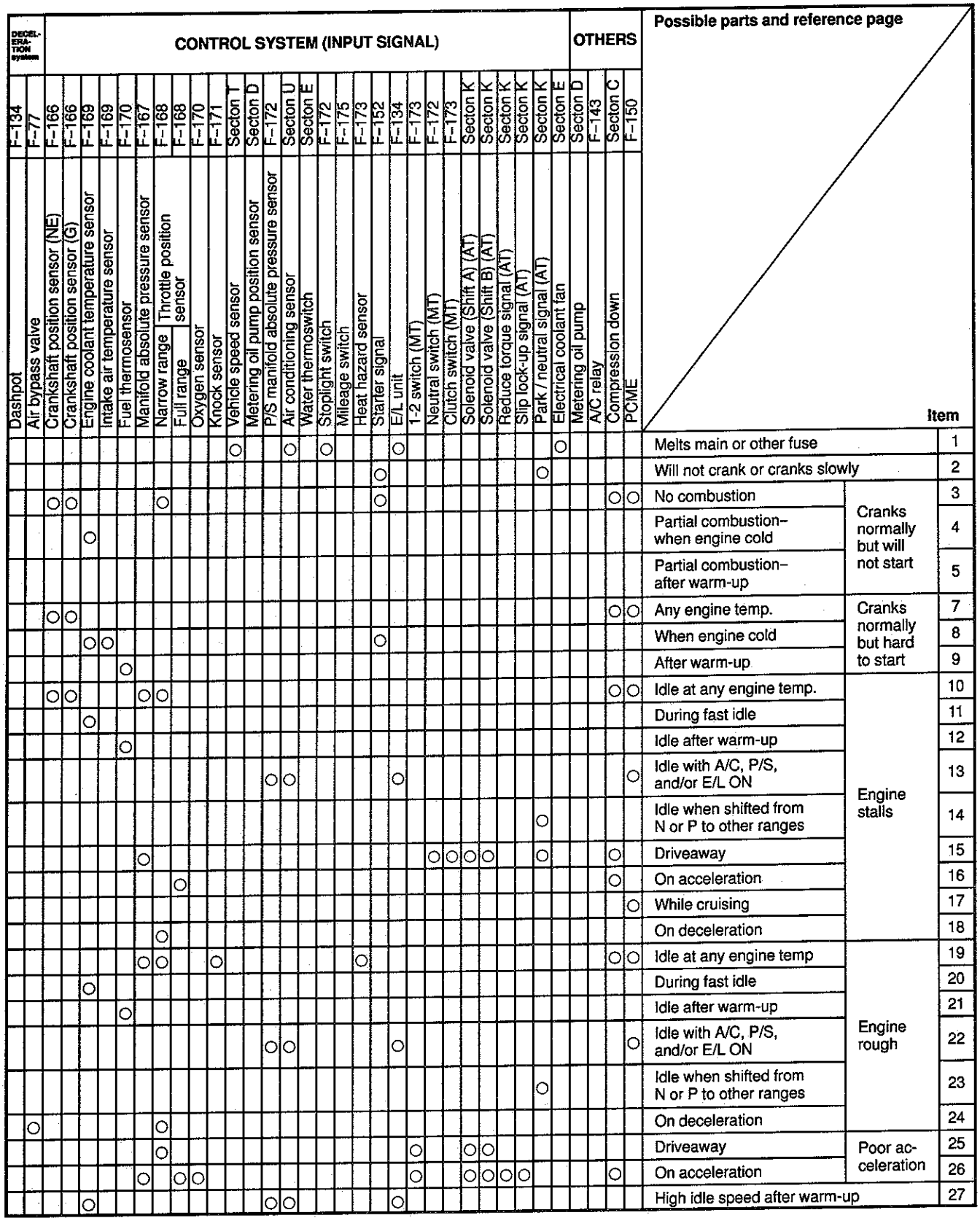
7. Replace the solenoid valve, if necessary.

TROUBLESHOOTING GUIDE

QUICK DIAGNOSIS CHART

This Quick Diagnosis Chart shows the relationship between troubleshooting items and inspection points.

Item		Possible parts and reference pag	Intake air system						Fuel system								Ignition system				Turbo charger system					Secondary air Injection system						Emis-sion system			
			F-16	F-83	F-83	F-137	F-79	F-76	F-105	F-105	F-103	F-100	F-110	F-109	F-110	F-104	F-112	Secion G	Secion G	Secion G	F-16	F-93	F-93	F-93	F-93	F-123	F-119	F-119	F-119	F-123	F-121	F-123	F-128	F-131	F-131	F-127
			Air cleaner element	Idle air control valve	Solenoid valve (AWS)	Solenoid valve (Double throttle)	Fast idle cam	Intake air leakage	Injector (Primary)	Injector (Secondary)	Fuel filter	Fuel pump	Fuel pump relay (speed)	Fuel pump resistor	Fuel pump relay	Pressure regulator	Solenoid valve (PRC)	Igniter	Ignition coil	Spark plug	Ignition timing	Turbo precontrol	Wastegate control	Turbo precontrol	Charge control	Charge relief	Secondary air bypass valve	Secondary air switching valve	Split air bypass	Port air bypass	Relief 2	Air pump	Air pump relay	Three-way catalyst	Charcoal canister	Solenoid valve (Purge control)	Solenoid valve (EGR)
																						Solenoid valve						Solenoid valve							
1	Melts main or other fuse			○	○	○			○	○		○	○		○		○	○																	
2	Will not crank or cranks slowly																																		
3	Cranks normally but will not start	No combustion										○			○			○	○	○	○														
4		Partial combustion–when engine cold						○	○			○								○																
5		Partial combustion–after warm-up														○																		○	○	
7	Cranks normally but hard to start	Any engine temp.	○	○				○	○		○	○			○	○		○			○														
8		When engine cold					○													○																
9		After warm-up														○																		○	○	
10	Engine stalls	Idle at any engine temp.		○					○		○	○				○		○	○	○	○														
11		During fast idle		○			○																												
12		Idle after warm-up														○																		○	○	
13		Idle with A/C, P/S, and/or E/L ON		○																															
14		Idle when shifted from N or P to other ranges		○																															
15		Driveaway							○																										
16		On acceleration														○																				
17		While cruising							○			○			○			○	○																	
18		On deceleration																																	
19	Engine rough	Idle at any engine temp	○	○					○		○	○				○		○	○	○	○					○	○			○	○				○
20		During fast idle		○			○																												
21		Idle after warm-up														○																		○	○	
22		Idle with A/C, P/S, and/or E/L ON		○																															
23		Idle when shifted from N or P to other ranges		○																															
24		On deceleration																																	
25	Poor acceleration	Driveaway				○					○											○	○						○						
26		On acceleration	○			○				○	○		○					○	○			○	○	○	○	○						○				
27	High idle speed after warm-up			○	○		○	○	○							○	○																		


DECEL-ERA-TION system
CONTROL SYSTEM (INPUT SIGNAL)
OTHERS
Possible parts and reference page
Item
Dashpot F–134
Air bypass valve F–77
Crankshaft position sensor (NE) F–166
Crankshaft position sensor (G) F–166
Engine coolant temperature sensor F–169
Intake air temperature sensor F–169
Fuel thermosensor F–170
Manifold absolute pressure sensor F–167
Throttle position sensor: Narrow range F–168, Full range F–168
Oxygen sensor F–170
Knock sensor F–171
Vehicle speed sensor Secton T
Metering oil pump position sensor Secton D
P/S manifold absolute pressure sensor F–172
Air conditioning sensor Secton U
Water thermoswitch Secton E
Stoplight switch F–172
Mileage switch F–175
Heat hazard sensor F–173
Starter signal F–152
E/L unit F–134
1-2 switch (MT) F–173
Neutral switch (MT) F–172
Clutch switch (MT) F–173
Solenoid valve (Shift A) (AT) Secton K
Solenoid valve (Shift B) (AT) Secton K
Reduce torque signal (AT) Secton K
Slip lock-up signal (AT) Secton K
Park / neutral signal (AT) Secton K
Electrical coolant fan Secton E
Metering oil pump Secton D
A/C relay F–143
Compression down Secton C
PCME F–150
Melts main or other fuse 1
Will not crank or cranks slowly 2
Cranks normally but will not start: No combustion 3; Partial combustion–when engine cold 4; Partial combustion–after warm-up 5
Cranks normally but hard to start: Any engine temp. 7; When engine cold 8; After warm-up 9
Engine stalls: Idle at any engine temp. 10; During fast idle 11; Idle after warm-up 12; Idle with A/C, P/S, and/or E/L ON 13; Idle when shifted from N or P to other ranges 14; Driveaway 15; On acceleration 16; While cruising 17; On deceleration 18
Engine rough: Idle at any engine temp 19; During fast idle 20; Idle after warm-up 21; Idle with A/C, P/S, and/or E/L ON 22; Idle when shifted from N or P to other ranges 23; On deceleration 24
Poor acceleration: Driveaway 25; On acceleration 26
High idle speed after warm-up 27

Item	Possible parts and reference pag	Intake air system						Fuel system									Ignition system				Turbo charger system					Secondary air Injection system								Emis-sion system			
		F-16	F-83	F-83	F-137	F-79	F-76	F-105	F-105	F-103	F-100	F-110	F-109	F-110	F-104	F-112	Secion G	Secion G	Secion G	F-16	F-93	F-93	F-93	F-93	F-93	F-123	F-119	F-119	F-119	F-123	F-121	F-123	F-128	F-131	F-131	F-127
		Air cleaner element	Idle air control valve	Solenoid valve (AWS)	Solenoid valve (Double throttle)	Fast idle cam	Intake air leakage	Injector (Primary)	Injector (Secondary)	Fuel filter	Fuel pump	Fuel pump relay (speed)	Fuel pump resistor	Fuel pump relay	Pressure regulator	Solenoid valve (PRC)	Igniter	Ignition coil	Spark plug	Ignition timing	Turbo precontrol	Wastegate control	Turbo precontrol	Charge control	Charge relief	Secondary air bypass valve	Secondary air switching valve	Split air bypass	Port air bypass	Relief 2	Air pump	Air pump relay	Three-way catalyst	Charcoal canister	Solenoid valve (Purge control)	Solenoid valve (EGR)
																					Solenoid valve					Solenoid valve										
28	Idle fluctuates / idle hunts		○					○											○	○																	
29	Hesitates / Stumbles on acceleration	○			○			○	○			○							○	○	○		○	○													
30	Surges while cruising							○	○		○				○				○																		
31	Lack of power	○							○	○		○			○			○	○		○	○	○	○									○				
32	Poor fuel economy	○						○							○																		○				
33	A/C does not work																																				
34	Knocking / Pinging							○	○						○		○			○																	○
35	Fuel odor																																	○	○		
36	Exhaust sulfur smell									○																							○				
37	High oil consumption																																				
38	Self-Diagnosis Checker flashes 88																																				
39	Self-Diagnosis Checker will not work																																				

DECEL-ERATION system	CONTROL SYSTEM (INPUT SIGNAL)																															OTHERS			Possible parts and reference page / Item	
F-134	Dashpot																															Section D			Idle fluctuates / idle hunts	28
F-77	Air bypass valve																															F-143			Hesitates / Stumbles on acceleration	29
F-166	Crankshaft position sensor (NE)																															Section C			Surges while cruising	30
F-166	Crankshaft position sensor (G)																															F-150			Lack of power	31
F-169	Engine coolant temperature sensor																																		Poor fuel economy	32
F-169	Intake air temperature sensor																																		A/C does not work	33
F-170	Fuel thermosensor																																		Knocking / Pinging	34
F-167	Manifold absolute pressure sensor																																		Fuel odor	35
F-168	Throttle position sensor	Narrow range																																	Exhaust sulfur smell	36
F-168		Full range																																	High oil consumption	37
F-170	Oxygen sensor																																		Self-Diagnosis Checker flashes 88	38
F-171	Knock sensor																																		Self-Diagnosis Checker will not work	39
Secton T	Vehicle speed sensor																																			
Secton D	Metering oil pump position sensor																																			
F-172	P/S manifold absolute pressure sensor																																			
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Secton D	Metering oil pump																																			
F-143	A/C relay																																			
Secton C	Compression down																																			
F-150	PCME																																			

RELATIONSHIP CHART

INPUT DEVICE \ OUTPUT DEVICE		INJECTOR		FUEL PUMP RELAY	FUEL PUMP RELAY (SPEED)	IGNITER	SOLENOID VALVE															POWERTRAIN CONTROL MODULE (TRANSMISSION)	METERING OIL PUMP	A/C RELAY	AIR PUMP RELAY	TROUBLE CODE	MONITOR LAMP
		FUEL INJECTION AMOUNT	FUEL INJECTION TIMING				IDLE AIR CONTROL	ACCELEATED WARM-UP	DOUBLE THROTTLE CONTROL	PRESSURE REGULATOR CONTROL	TURBO PRECONTROL	WASTEGATE CONTROL	TURBO CONTROL	CHARGE CONTROL	CHARGE RELIEF	SECONDARY AIR BYPASS	SECONDARY AIR SWITCHING	SPLIT AIR BYPASS	PORT AIR BYPASS	RELIEF2	PURGE CONTROL	EGR						
CRANKSHAFT POSITION SENSOR	NE SIGNAL	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	G SIGNAL		○			○																				○	
THROTTLE POSITION SENSOR	NARROW RANGE	○				○	○		○	○						○	○	○	○	○	○	○	○		○	○	
	FULL RANGE	○	○			○	○				○	○	○	○	○							○		○	○	○	○
ENGINE COOLANT TEMPERATURE SENSOR		○				○	○	○	○		○	○				○	○	○	○	○	○	○			○	○	
INTAKE AIR TEMPERATURE SENSOR		○				○	○																			○	
FUEL THERMOSENSOR		○			○	○	○			○											○					○	
MANIFOLD ABSOLUTE PRESSURE SENSOR		○			○	○	○				○	○	○	○	○	○	○	○	○	○	○	○		○		○	○	
OXYGEN SENSOR		○														○		○	○		○					○	○
KNOCK SENSOR						○																				○	○
VEHICLE SPEED SENSOR							○																			○	
MOP POSITION SENSOR							○																○			○	
E/L UNIT						○	○																				○
AIR CONDITIONING SENSOR		○				○	○																				○
STEERING PRESSURE SENSOR		○				○	○																				○
IGNITION SWITCH (ST SIGNAL)		○		○	○	○	○	○		○			○			○								○	○		○
STOPLIGHT SWITCH							○																				○
NEUTRAL SWITCH (MT)		○				○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○			○	○		○
CLUTCH SWITCH (MT)		○				○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○			○	○		○
1-2 SWITCH (MT)											○	○	○	○	○											○	
EGR FUNCTION SENSOR																						○				○	
MILEAGE SWITCH																○		○	○	○							
HEAT HAZARD SENSOR																									○		
SOLENOID VALVE SIGNAL (AT)	SHIFT A					○			○		○	○	○	○	○		○	○					○			○	
	SHIFT B					○			○		○	○	○	○	○		○	○					○			○	
REDUCE TORQUE SIGNAL (AT)						○																	○				
SLIP LOCK-UP SIGNAL (AT)						○																	○				
PARK / NEUTRAL SIGNAL (AT)		○				○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○		○
DATA LINK CONNECTOR (TEN-TERMINAL)		○					○																			○	○
BAROMETRIC ABSOLUTE PRESSURE SENSOR (IN PCME)		○				○	○			○		○	○	○	○	○		○			○		○				○	

Output devices and Engine condition

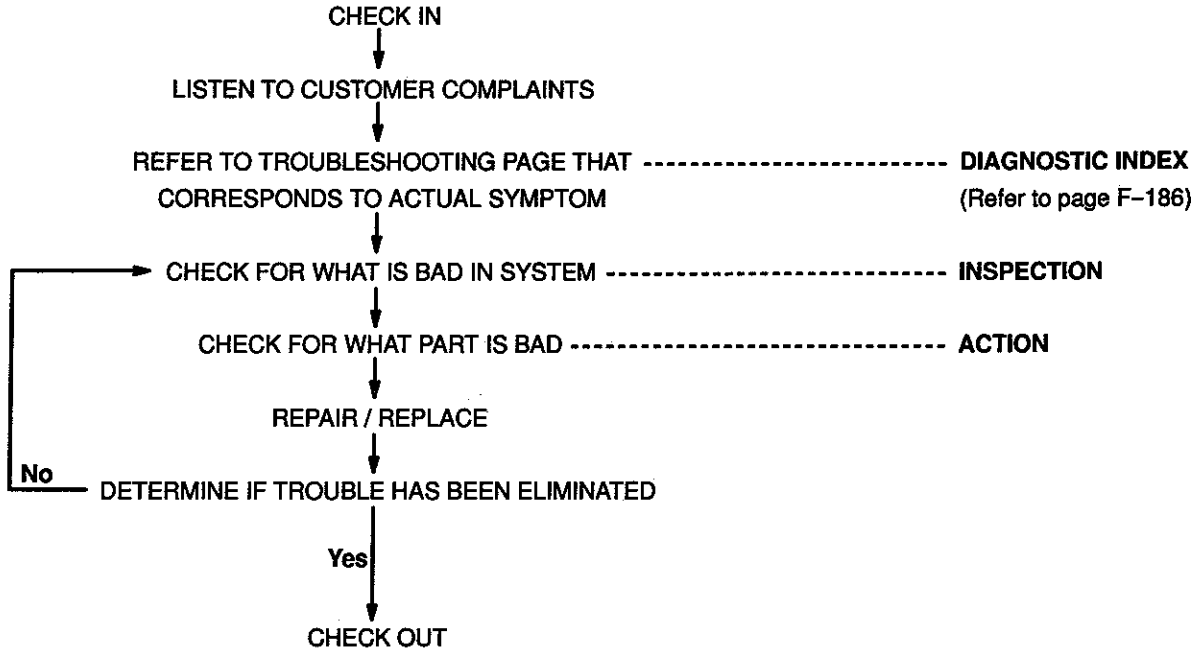
ENGINE CONDITION / OUTPUT DEVICE		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCELERATION	HEVY LOAD	DECELERATION	IDLE	IG: ON (ENGINE NOT RUNNING)	REMARK
				COLD	WARM						
INJECTOR	FUEL INJECTION AMOUNT	Rich			Normal	Rich		FUEL CUT	Rich	No Injection	
	Primary	Operate						Not operate	Operate		
	Secondary	Not operate				Operate		Not operate			
FUEL PUMP RELAY		ON								OFF	
FUEL PUMP REAY (SPEED)		OFF (Low speed)				ON (High speed)		OFF (Low speed)			
IGNITER		Fixed at BTDC 5°	Advanced· depends on engine condition						Fixed at ATDC 5° (L) ATDC 20° (T)	—	
SOLENOID VALVE	ACELERATED WARM-UP (AWS)	ON	OFF								
	IDLE AIR CONTROL (IAC)	ON (Feedback duty)	ON (Fixed duty)						ON (Feedback duty)		
	DOUBLE THROTTLE CONTROL	ON (Closed)		OFF (Open)		ON (AT onry)	OFF (Open)				
	TURBO PRE-CONTROL	OFF (Closed)	Depends on engine condition					OFF (Closed)			
	WASTEGATE CONTROL	OFF (Closed)				Depends on engine condition		OFF (Closed)			
	TURBO CONTOROL	OFF (Closed)				ON (Open)		OFF (Closed)			
	CHARGE CONTROL	ON (Closed)				OFF (Open)		ON (Closed)			
	CHARGE RELIEF CONTROL	OFF (Open)				ON (Closed)		OFF (Closed)			
	SECONDARY AIR BYPASS	OFF (Closed)		ON (Open)		OFF (Closed)					
	SECONDARY AIR SWITCHING	OFF (Port)		ON (Split)				OFF (Port)			
	SPLIT AIR BYPASS	OFF (Closed)		ON (Open)				OFF (Closed)			
	PORT AIR BYPASS	OFF (Closed)	ON (Open)			OFF (Closed)					
	RELIEF 2	ON (Open)	OFF (Closed)								
	PRESSURE REGULATOR CONTROL (PRC)	OFF (Vacuum to pressure regulator)							ON*	OFF	* During hot start only
	PURGE CONTROL (PURGE)	OFF		ON (Purge)		OFF					
	EXHAUST GAS RECIRCULATION (EGR)	OFF (EGR Cut)		ON* (EGR)		OFF (EGR Cut)					* Engine speed: 1,700–3,850 rpm
A/C RELAY		OFF (A/C cut)	ON			OFF (A/C cut)	ON				
COOLANT FAN RELAY		OFF		Depends on engine coolant temperature							
METERING OIL PUMP (MOP)		OFF	ON							OFF	

USING THIS SECTION

Introduction

Most of the fuel and emission control systems are electronically controlled, often making it difficult to diagnose problems, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivabilitiy complaint. The customer is often a good source of information on such problems, especially the intermittent ones. Through a talk with the customer, you will usually find out what the symptoms are and under what conditions they occur.

Work flow



Diagnostic index

DESCRIPTION:
Describes each troubleshooting item.

No.:
Each troubleshooting item is assigned a number.

PAGE:
Shows the reference page or section

TROUBLESHOOTING ITEM:
There are 58 troubleshooting items. Choose the item that most closely corresponds to the actual symptom.

F TROUBLESHOOTING GUIDE

DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM TROUBLE		DESCRIPTION	PAGE
1	Melts main or other fuse		–	F-204
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	Section G
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	F-205
4		Partial combustion – when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	F-205
5		Partial combustion – when warm-up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm Engine will not continue running when warm when IGN switch is returned from STA to IG position	F-207
6	Will start in other than P and N ranges		Engine starts in P, N and other ranges	Section K
7	Cranks normally but hard to start	Any engine temp.	Starter cranks engine at normal speed but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	F-208
		When engine cold	Starter cranks engine at normal speed but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	
		After	...cranks engine at normal speed but engine requires ...cking time before starting after warm-up	
10	Engine stalls		...rectly at any engine temp.	
11			...ow operation	F

Troubleshooting chart

7, 8, 9	CRANKS NORMALLY BUT HARD TO START	• ANY ENGINE TEMPERATURE • WHEN ENGINE COLD • AFTER WARM-UP
DESCRIP-TION	• Starter cranks engine at normal speed but engine requires excessive cranking time before starting • Engine starts after stalling a few times • Battery in normal condition • Engine runs normally at idle (if idle condition not OK, refer to "Engine rough" [Nos. 19, 20, 21, 22, or 23])	

[TROUBLESHOOTING HINTS]
① Injector
- Fuel leakage from injector(s)

② Fuel pump
- Poor connection of pump connector
- Poor connection of fuel pump relay connector

③ Pressure regulator
- Malfunction of pressure regulator

④ Fast idle cam
- Malfunction of fast idle cam (when engine cold)

⑤ Spark plug
- Dirty or worn spark plug(s)

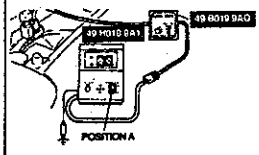
⑥ Intake air system
- Air leakage

⑦ Engine coolant temperature sensor
- Poor connection of engine coolant temperature sensor
- Malfunction of engine coolant temperature sensor

⑧ Solenoid valve (Purge control)
- Air leakage

⑨ Metering oil pump
- Malfunction of pump

⑩ Crankshaft position sensor
- Ground circuit open

STEP	INSPECTION		ACTION
1	Is "00" displayed on SST with ignition switch ON? ☞page F-20 	Yes	"00" displayed Go to next step
		No	Trouble Code No. displayed Check for cause (Refer to specified check sequence)
2	Is air leakage felt or heard at intake air system components at idle?	Yes	Repair or replace
3			

DESCRIPTION:
Further describes the system. Confirm that the chart addresses the actual symptom before beginning troubleshooting.

TROUBLESHOOTING HINTS:
This describes the possible point of malfunction.

STEP:
This shows the order of troubleshooting. Proceed with troubleshooting as indicated.

INSPECTION:
This describes an inspection to quickly determine the malfunction of parts. If a detailed procedure is necessary to perform the INSPECTION, refer to the page specified by the "☞" mark.

ACTION:
This recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the actions is described on the reference page specified by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM No.	TROUBLE		DESCRIPTION	PAGE
1	Melts main or other fuse		—	F-190
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	Section G
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	F-191
4		Partial combustion – when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	F-191
5		Partial combustion – when warm-up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm Engine will not continue running when warm when IGN switch is returned from STA to IG position	F-193
6	Will start in other than P and N ranges		Engine starts in P, N and other ranges	Section K
7	Cranks normally but hard to start	Any engine temperature	Starter cranks engine at normal speed but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	F-194
8		when engine cold	Starter cranks engine at normal speed but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	
9		After warm-up	Starter cranks engine at normal speed but engine requires excessive cranking time before starting after warm-up	
10	Engine stalls	Idle at any engine temperature	Engine stops unexpectedly at any engine temperature	F-196
11		During fast idle	Engine stops unexpectedly during fast-idle operation	
12		Idle after warm-up	Engine stops unexpectedly at idle after warm-up	
13		Idle with A/C, P/S, and/or E/L ON	Engine stops unexpectedly when A/C, P/S, and/or E/L is turned ON at idle	F-198 Section K
*14		Idle when shifted from N or P to other ranges	Engine stops unexpectedly when shifted from N or P to other ranges at idle	
15		Driveaway	Engine stops unexpectedly upon driveaway	F-199
16		On acceleration	Engine stops unexpectedly at beginning of acceleration or during acceleration	F-201
17		While cruising	Engine stops unexpectedly while cruising	
*18		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration Exhaust afterburn	F-202 Section K
19	Engine rough	Idle at any engine temperature	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temperature Idle speed too slow and excessive engine shake at any engine temperature	F-203
20		During fast idle	Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up	
21		Idle after warm-up	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up	

* Refer to section F before referring to section K.

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
22	Engine rough	Idle with A/C, P/S, and/or E/L ON	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S, and/or E/L ON	F-205
23		Idle when shifted from N or P to other range	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range	
24*		On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn	F-206 Section K
25*	Poor acceleration	Driveaway	Engine speed increases normally but vehicle speed slowly increases during driveaway	F-207 Section K
26*		On acceleration	Engine speed increases normally but vehicle speed slowly increases during acceleration	
27	High idle speed after warm-up		Idle speed continues at fast idle after warm-up Engine returns slowly to idle after accelerator is released	F-209
28	Idle fluctuates / Idle hunts		Engine speed hunts between specified idle speed and higher speed	F-211
29	Hesitates / Stumbles on acceleration		Momentary pause at beginning of acceleration or during acceleration	F-212
30*	Surges while cruising		Momentary minor irregularity in engine power at steady vehicle speed	F-214 Section K
31*	Lack of power		Performance poor under load (i.e., power down when climbing hills)	F-215 Section K
32*	Poor fuel economy		Fuel economy unsatisfactory	F-215 Section K
33	A/C does not work		A/C compressor magnetic clutch does not engage when Air conditioning sensor ON	F-215
34	Knocking / Pinging		Sound produced as air/fuel mixture is ignited by some-thing other than spark plug (i.e., hot spot in combustion chamber)	F-216
35	Fuel odor		Gasoline fuel smell or visible leaks	F-216
36	Exhaust sulfur smell		Rotten egg (sulfur) smell from exhaust	F-216
37	High oil consumption		Oil consumption excessive	F-216
38	Self-Diagnosis Checker flashes 88		Checker flashes 88 with test connector grounded	F-217
39	MIL never ON		Self-Diagnosis Checker indicates Trouble Code No. of input device but MIL never ON	F-217
40	Vehicle does not move in D, S, L and/or R ranges		No creep at all Vehicle does not move when accelerator pedal is depressed after shifted to D, S, L and/or R ranges	Section K
41	Vehicle moves in N range		Vehicle creeps in N ranges Vehicle moves with accelerator pedal not depressed	Section K
42	Vehicle moves in P range		Vehicle rolls in P range	Section K
43	Excessive creep		Vehicle moves quickly in D, S, L and R range (with accelerator pedal not depressed) Excessive N to R range and N to D range shift shock felt.	Section K

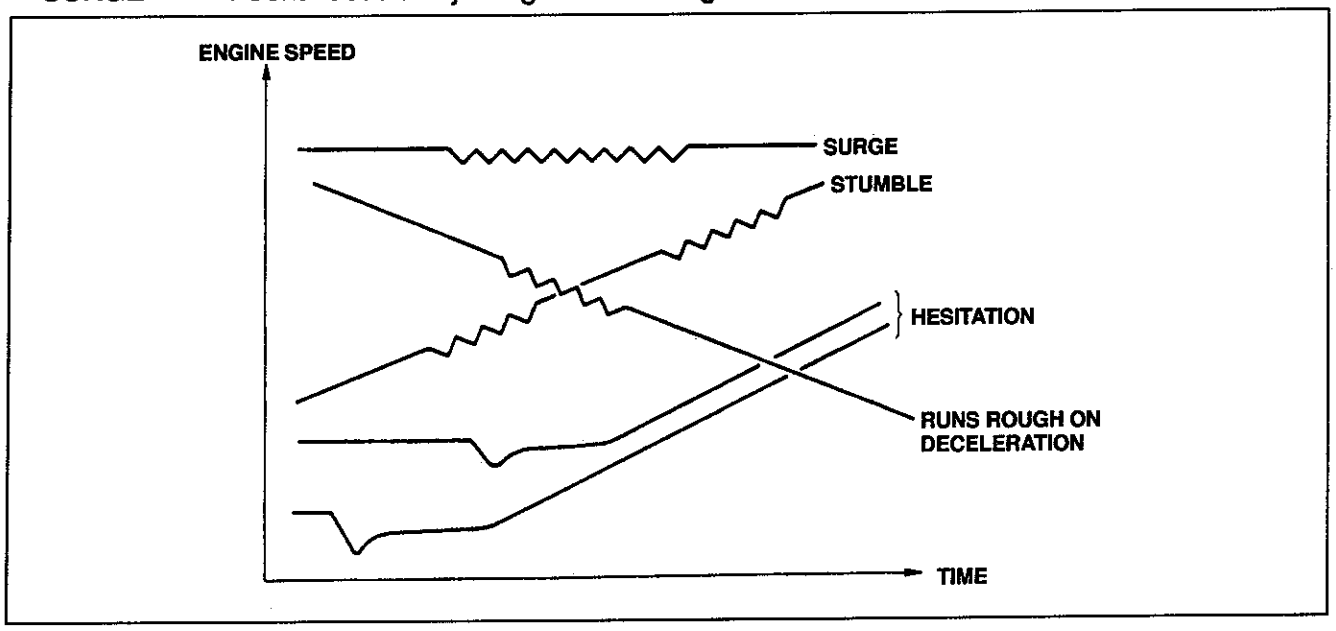
* Refer to section F before referring to section K.

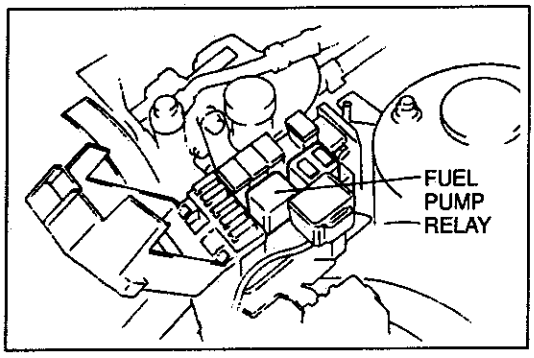
TROUBLESHOOTING GUIDE

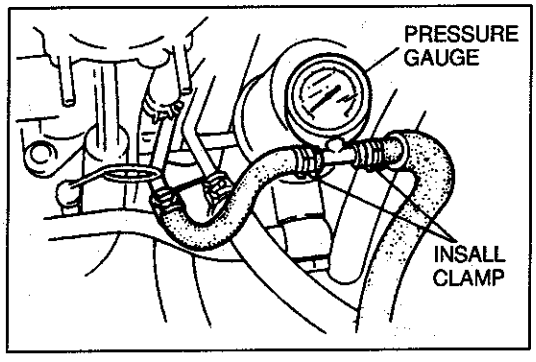
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
44	No shift		Single range shift (1st → 2nd, 2nd → 3rd or 3rd → O/D) only Sometimes shifts correctly Gear position held in hold mode	Section K
45	Abnormal shift		Shifts incorrectly (incorrect shift pattern) (ex) Vehicle shifts 1st → O/D directly when accelerating with accelerator pedal depressed slightly	Section K
46	Frequent shifting		Downshift occurs when accelerated slightly in D, S and L ranges (except hold mode)	Section K
47	Shift point high or low		Shift points do not match shift diagram Shift delayed when accelerating Shift occur too fast when accelerating and engine speed does not increase	Section K
48	No lockup		No lockup when vehicle speed reaches lockup range	Section K
49	No kickdown		Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range	Section K
50	Engine speed flares up	When accelerating	Engine speed flares up on acceleration	Section K
51		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed before upshifting Engine flares up suddenly when accelerator pedal depressed before downshifting	Section K
52	Excessive shift shock	P, N to R and/or N to D	Strong shift shock felt at id e when shifting from N to D or R range	Section K
53		When upshitting and/or downshifting	Excessive shift shock felt when accelerating at upshitting Excessive shift shock felt when accelerator pedal depressed at downshifting during cruising	Section K
54	No engine braking		Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed	Section K
55	No mode change		Mode does not change to/from normal mode in D range Hold mode not engaged or not cancelled	Section K
56	Transmission noise	All ranges	Transmission noisy in all ranges when vehicle is idling	Section K
57		D, S, L, R ranges	Abnormal noise from transmission in D, S, L, R	Section K
58	Transmission overheats		ATF smells burnt and/or is discolored	Section K

Description of Drivability Problems

STUMBLE : Mild jerking during acceleration.
HESITATION : Flat spot occurring just after the accelerator pedal is depressed.
SURGE : Continuous soft jerking while cruising.







PRECAUTION

Fuel Pressure Release and Servicing Fuel System

a) Fuel in the fuel system remains under high pressure when the engine is not running.
Before disconnecting any fuel line, release the fuel pressure from the fuel system as described to reduce the possibility of injury or fire.
1. Start the engine.
2. Remove the fuel pump relay.
3. After the engine stalls, turn OFF the Ignition switch.
4. Install the fuel pump relay.

b) Use a rag as protection from fuel spray when disconnecting the hoses.
Plug the hoses after removal.

c) When inspecting the fuel system, use a suitable fuel pressure gauge.

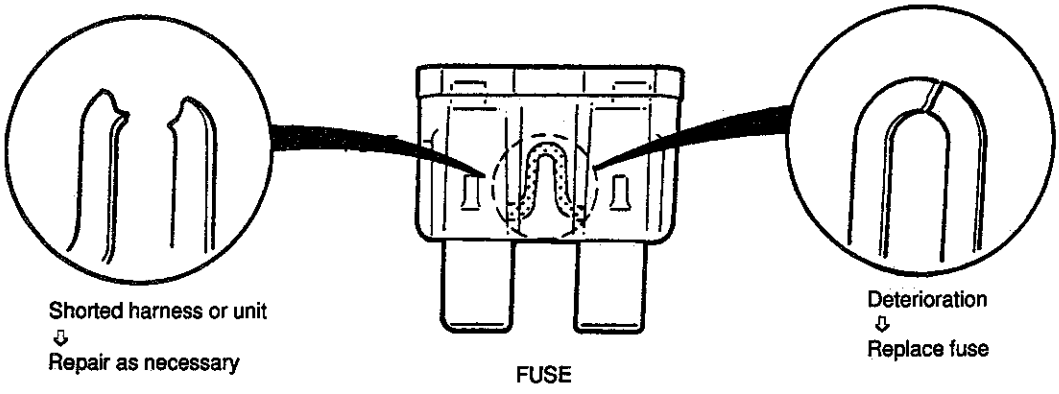
Caution

- **Install hose clamps to secure the fuel pressure gauge to prevent fuel leakage.**

SYMPTOM TROUBLESHOOTING

1	MELTS MAIN OR OTHER FUSE	

[TROUBLESHOOTING HINTS]
Check the condition of the fuse



Damaged Fuse	Related Wiring Harness	
MAIN (120A)	Main fuse	Alternator
BTN (60A)	BTN fuse	ROOM fuse
ROOM (10A)	ROOM fuse	PCME terminal 1A
EGI INJ (30A)	Main relay	Injectors PCME terminal 1B Oxygen sensor Solenoid valves E/L unit Air pump relay
ENGINE (15A)	ENGINE fuse	Main relay
METER (15A)	METER fuse	Data link connector terminal + B
FUEL PUMP (20A)	FUEL PUMP fuse Fuel pump relay	Fuel pump relay Fuel pump

3	CRANK NORMALLY BUT WILL NOT START	• NO COMBUSTION
DESCRIP-TION	• Starter cranks engine at normal speed but engine shows no indication of firing	

[TROUBLESHOOTING HINTS]
① Crankshaft position sensor
- Poor connection of connector

② Main relay
- Poor connection of connector
- Malfunction of relay

③ Fuel pump
- No fuel in tank
- Poor connection of fuel pump connector

④ PCME
- Poor connection of connector (Especially 1H, 1O, 1T, 3I, 4D, 4E, 4G, 4H)

⑤ Igniter
- Poor connection of connector

⑥ Injector
- Poor connection of connector

4	CRANKS NORMALLY BUT WILL NOT START	• PARTIAL COMBUSTION – WHEN ENGINE COLD
DESCRIP-TION	• Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold at initial starting • Engine will not continue running when cold when ignition switch is returned from STA to IG position • Refer to "ENGINE STALLS" if this symptom initially appears after engine stalls • Fuel in tank • Battery in normal condition	

[TROUBLESHOOTING HINTS]
① Igniter
- Poor connection of connector

② Ignition coil
- Poor connection of connector

③ Spark plug
- Dirty or worn spark plug(s)

④ Injector (primary)
- Poor connection of connector
- Fuel leakage from injector(s)

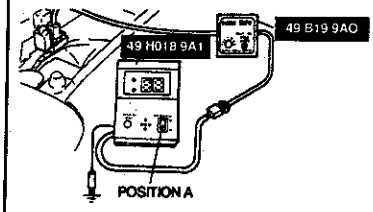
⑤ Intake air system
- Air leakage

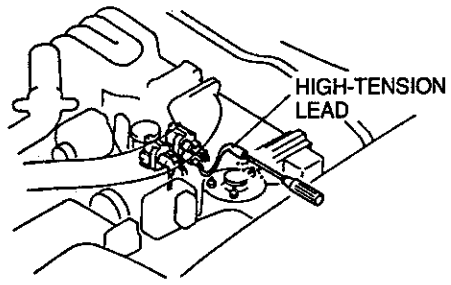
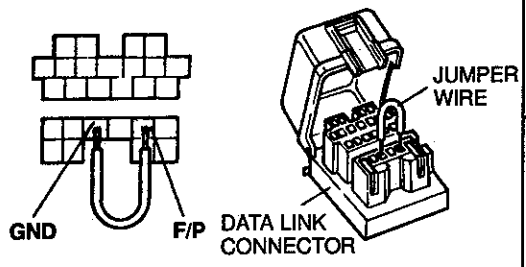
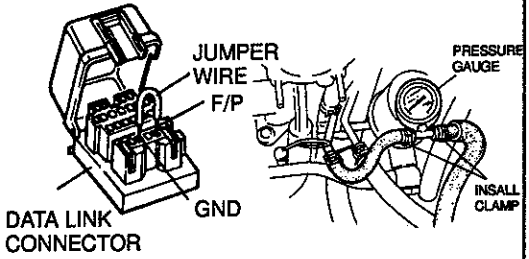
⑦ Engine coolant temperature sensor
- Poor connection of connector

⑧ Engine compression

⑨ PCME
- Poor connection of connector (Especially 1B, 1G, 1H, 1J, 1N, 1O, 1T, 3E, 4E, 4G, 4H)

⑩ Solenoid valve (Purge control)
- Short circuit (Solenoid valve fully opened)

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞ **page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence)

STEP	INSPECTION		ACTION
2	Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Go to next step
		No	Check ignition system ☞Section G
3	Are spark plugs OK? ☞Page G	Yes	Go to next step
		No	Clean or replace
4	Connect jumper wire between F/P and GND terminals of data link connector; will engine start? 	Yes	Check as follows: ● 1T terminal voltage at PCME ☞page F-156 ● Continuity between 1T terminal and fuel pump relay connector terminal ● Condition of PCME and fuel pump relay connector female terminals
		No	Check if fuel pump operating sound is heard ● If yes, go to next step ● If no, check fuel pump and wiring harness ☞Page F-100
5	Are PCME terminal voltages OK? ☞page F-152 Terminal: 1B, 1G, 1H, 1J, 1N, 1O, 1T, 3E, 4E, 4G, 4H	Yes	Go to next step
		No	Check for cause ☞page F-153
6	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞page F-98 **Fuel line pressure:** **250–260 kPa {2.5–2.7 kgf/cm², 36–38 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ● If pressure **quickly** increases, check pressure regulator ☞page F-104 ● If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞page F-101

STEP	INSPECTION		ACTION
7	Are injectors OK? ☞Page F–107 ● Fuel leakage ● Primary injector(s) clogged	Yes	Go to next step
		No	Replace injector(s) ☞Page F–105
8	Is engine compression OK? ☞Section C **Compression** **690 kPa {7.0 kgf/cm², 100 psi} – 250 rpm** **Differential limit of chambers** **150 kPa {1.5 kgf/cm², 21psi} – 250 rpm**	Yes	Go to next step
		No	Check for cause ☞Section C
9	Try known good PCME; does condition improve? ☞page F–150		

5	CRANKS NORMALLY BUT WILL NOT START	● PARTIAL COMBUSTION – AFTER WARM UP
DESCRIP-TION	● Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm ● Engine will not continue running when ignition switch is returned from STA to IG position	

[TROUBLESHOOTING HINTS]

① Solenoid valve (PRC)
- Poor connection of solenoid valve connector or PCME 4M terminal

② Fuel
- High RVP (winter) fuel used in warm weather

③ Engine coolant temperature sensor
- Malfunction of engine coolant temperature sensor

④ Evaporative emission control
- Malfunction of check valve (two-way)

⑤ Fuel pump
- Malfunction of fuel pump relay

7, 8, 9	CRANKS NORMALLY BUT HARD TO START	• ANY ENGINE TEMPERATURE • WHEN ENGINE COLD • AFTER WARM-UP
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before starting • Engine starts after stalling a few times • Battery in normal condition • Engine runs normally at idle (if idle condition not OK, refer to "Engine rough" [Nos. 19, 20, 21, 22, or 23])	

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)

② Fuel pump
- Poor connection of pump connector
- Poor connection of fuel pump relay connector

③ Pressure regulator
- Malfunction of pressure regulator

④ Fast idle cam
- Malfunction of fast idle cam (when engine cold)

⑤ Spark plug
- Dirty or worn spark plug(s)

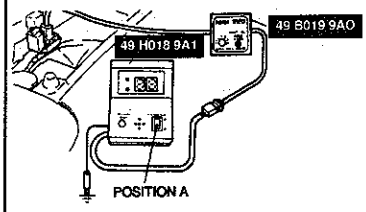
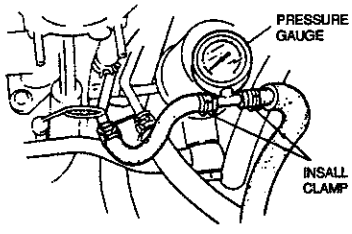
⑥ Intake air system
- Air leakage

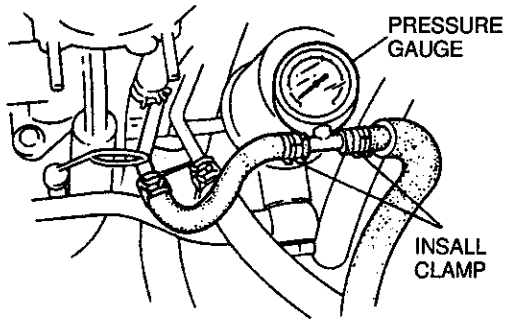
⑦ Engine coolant temperature sensor
- Poor connection of engine coolant temperature sensor
- Malfunction of engine coolant temperature sensor

⑧ Solenoid valve (Purge control)
- Air leakage

⑨ Metering oil pump
- Malfunction of pump

⑩ Crankshaft position sensor
- Ground circuit open

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? **☞page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence)
2	Is air leakage felt or heard at intake air system components at idle?	Yes	Repair or replace
		No	Go to next step
3	Is fast idle cam OK? **☞page F–79**	Yes	Go to next step
		No	Adjust **☞page F–79**
4	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? **☞page F–98** **Fuel line pressure:** **250–260 kPa {2.5–2.7 kgf/cm², 36–38 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator **☞page F–104** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure **☞page F–101**

STEP	INSPECTION		ACTION
5	Is fuel line pressure held after ignition switch is turned OFF? ☞page F-97 **Fuel pressure:** **More than 150 kPa {1.5 kgf/cm², 21 psi}**  	Yes	Go to next step
		No	Plug outlet of pressure regulator, Is fuel line pressure held after ignition switch is turned OFF? ☞page F-100 ● If yes, replace pressure regulator ☞page F-104 ● If no, check fuel pump hold pressure ☞page F-101 If fuel pump OK, check injectors for fuel leakage ☞page F-106
6	Are spark plugs OK? ☞Section G	Yes	Go to next step
		No	Repair or replace
7	Is EGR control system OK? ☞page F-126	Yes	Go to next step
		No	Check as follows: ● Solenoid valve (EGR) for sticking ● Condition of solenoid valve connector female terminal(s)
8	Try known good PCME; does condition improve? ☞page F-150		

10,11,12	ENGINE STALLS	• IDLE AT ANY ENGINE TEMP • DURING FAST IDLE • IDLE AFTER WARM-UP
DESCRIPTION	• Engine stops unexpectedly at idle and/or during fast idle operation	

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)
- Injector(s) clogged

② Fuel pump
- Poor connection of connector

③ Fuel pump relay
- Poor connection of connector

④ Spark plug
- Dirty or worn spark plug(s)

⑤ Manifold absolute pressure sensor
- Poor connection of manifold absolute pressure sensor connector

⑥ EGR control valve
- EGR control valve stuck

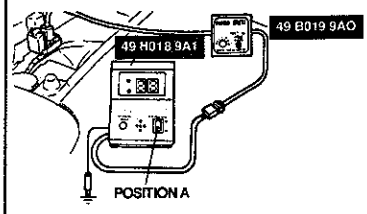
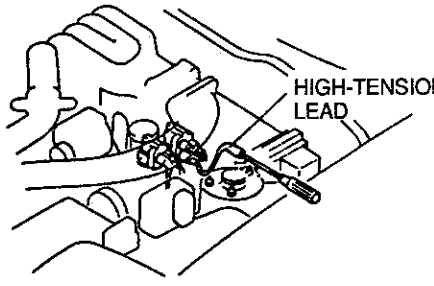
⑦ Idle air control valve
- Poor connection of connector

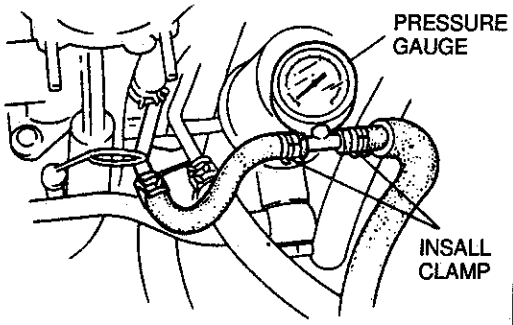
⑧ Crankshaft position sensor
- Poor connection of connector

⑨ PCME
- Poor connection of connector

⑩ Igniter
- Poor connection of connector

⑪ Metering oil pump
- Malfunction of oil pump

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20** 	Yes	**"00" displayed** • If symptom occurs at idle at any engine temp., go to next step • If symptom occurs during fast idle operation, go to next step • If symptom occurs at idle after warm-up, go to Step 6
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence)
2	Is tast idle cam OK? ☞**page F–79**	Yes	Go to next step
		No	Adjust ☞**page F–79**
3	Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Go to next step
		No	Check ignition system ☞**Section G**

STEP	INSPECTION		ACTION
4	Are following PCME terminal voltages OK? ☞page F–152 ● 1B (PCME power) ● 1G, 1H, 1J (Igniter) ● 1O (Manifold absolute pressure sensor) ● 1T (Fuel pump relay) ● 3E (Engine coolant temperature sensor) ● 3F (Throttle position sensor narrow range) ● 4E, 4G, 4H (Crankshaft position sensor) ● 4O (Solenoid valve (EGR)) ● 4P (Solenoid valve (AWS)) ● 4Q (Idle air control valve) ● 4W, 4Y (Primary fuel injector)	Yes	Go to next step
		No	Check for cause ☞page F–153
5	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞page F–98 **Fuel line pressure:** **250–260 kPa {2.5–2.7 kgf/cm², 36–38 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ● If pressure **quickly** increases, check pressure regulator ☞page F–104 ● If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞page F–101
6	Is engine compression correct? ☞Section C **Compression** **690 kPa {7.0 kgf/cm², 100 psi} – 250 rpm** **Differential limit of chambers** **150 kPa {1.5 kgf/cm², 21 psi} – 250 rpm**	Yes	Go to next step
		No	Check for cause
7	Are spark plugs OK? ☞Section G	Yes	Go to next step
		No	Check for cause
8	Try known good PCME; does condition improved? ☞page F–150		

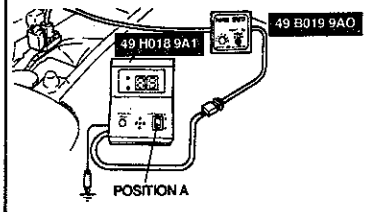
13, 14	ENGINE STALLS	• IDLE WITH A/C, P/S, and/or E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES
DESCRIPTION	• Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle • Engine stops unexpectedly when shifted from N or P to other ranges at idle • Idle condition is normal when A/C, P/S, and E/L are OFF and in N and P	

[TROUBLESHOOTING HINTS]

① Monitor switch functions (SST)
- Air conditioning sensor
- Headlight switch
- Rear window defroster switch
- Blower switch

② Idle air control valve
- Solenoid valve stuck

③ Air control valve
- Malfunction of air control valve

STEP	INSPECTION		ACTION
1	Are switches correct when checked by using **SST** monitor switch function while ignition switch ON? ☞**page F–44** • Blower switch • Headlight switch • Rear window defroster switch • Electric coolant fan • Electrical load unit • Air conditioning sensor	Yes	Go to next step
		No	Lamp not ON/OFF with specified switch Check for cause (Refer to specified check sequence) ☞**page F–45**
2	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20**  	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F–22**
3	Is terminal voltage at PCME correct at idle? ☞**page F–150** **4Q terminal: Approx. 5-11V (at idle)**	Yes	Check idle air control valve and replace it if necessary ☞**page F–83** If OK, go to "ENGINE STALLS–IDLE WHEN SHIFTED FROM N or P TO OTHER RANGES" in Section K of this manual
		No	Try known good PCME and check if condition improves ☞**page F–150**

15	ENGINE STALLS	• DRIVEAWAY
DESCRIPTION	• Engine stops unexpectedly upon driveaway • Idle condition normal	

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)
- Injector(s) clogged

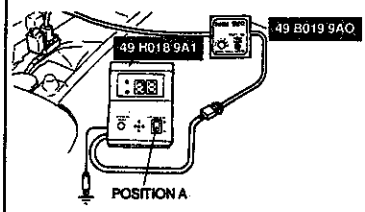
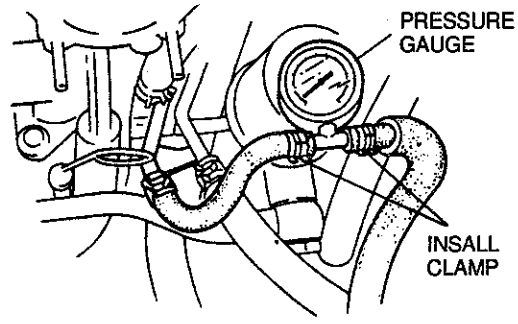
② Pressure regulator
- diaphragm damaged

③ Fuel filter
- Fuel filter clogged

④ Metering oil pump
- Poor connection of connector

⑤ Engine coolant temperature sensor
- Poor connection of connector

⑥ Crankshaft position sensor
- Malfunction of sensor

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? **☞page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) **☞page F–22**
2	Using Engine Signal Monitor, do voltage reading and lamp operation change as follows upon driveaway? Terminal: 1O — Condition: Voltage gradually increase Terminal: 4E, 4G — Condition: Voltage not suddenly change Terminal: 4W, 4Y — Condition: Flashing of green and red lamps becomes quicker	Yes	Go to next step
		No	Check as follows: • Condition of female terminals in related connector • Continuity between injector connector and PCME 4W or 4Y terminal
3	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? **☞page F–98** **Fuel line pressure:** **250–260 kPa {2.5–2.7 kgf/cm², 36–38 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator **☞page F–104** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure **☞page F–101**
4	Are injectors OK? • No fuel leakage **☞page F–106** • Injectors not clogged (Perform volume test) **☞page F–67**	Yes	Go to next step
		No	Replace injector **☞page F–105**

STEP	INSPECTION		ACTION
5	Is engine compression OK? ☞Section G **Compression** **690 kPa {7.0 kgf/cm², 100 psi} – 250 rpm** **Differential limit of chambers** **150 kPa {1.5 kgf/cm², 21 psi} – 250 rpm**	Yes	Go to next step
		No	Check for cause
6	Are spark plugs OK? ☞Section G	Yes	Go to next step
		No	Clean or replace
7	Try known good PCME; does condition improved? ☞page F–150		

16, 17	ENGINE STALLS	• ON ACCELERATION / WHILE CRUISING
DESCRIP-TION	• Engine stops unexpectedly at beginning of acceleration or during acceleration • Engine stops unexpectedly while cruising	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection

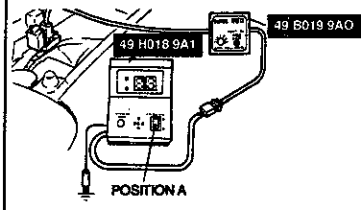
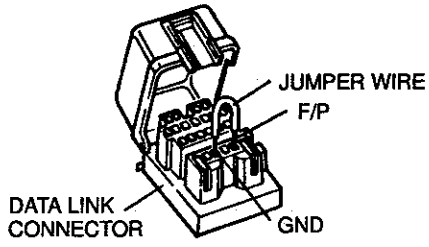
② Pressure regulator
- Diaphragm damaged

③ Crankshaft position sensor
- Poor connection of connector

④ Manifold absolute pressure sensor
- Poor connection of connector

⑤ Spark plug
- Misfire

⑥ Main relay
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence)
2	Ground terminal F/P of data link connector within ignition switch ON; does condition improve? 	Yes	Check as follows; • Poor connection of fuel pump relay • Poor connection of PCME 1T terminal
		No	Go to next step
3	Is pressure regulator OK? ☞**page F–104**	Yes	Go to next step
		No	Replace
4	Try known good PCME; does condition improved? ☞**page F–150**		

18	ENGINE STALLS	• ON DECELERATION
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration • Exhaust afterburn	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection of connector

② Idle speed
- Idle speed too low

③ Crankshaft position sensor
- Poor connection of connector

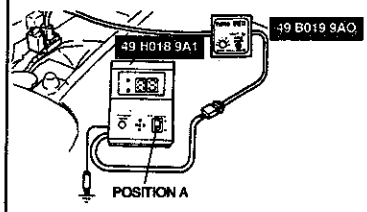
④ Manifold absolute pressure sensor
- Malfunction of manifold absolute pressure sensor

⑤ Idle air control valve
- Solenoid valve stuck

⑥ EGR control valve
- Solenoid valve stuck open

⑦ PCME
- Poor connection of connector

⑧ Fuel cut control

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON ☞**page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence)
2	Are following PCME terminal voltage correct? When checking voltages, tap, move, and wiggle the harness and the connector • 1B (Main relay) • 1G, 1H, 1J (Igniter) • 1T (Fuel pump relay) • 4D (Ground) • 4W, 4Y (Primary injector)	Yes	**MT** Check neutral switch and clutch switch ☞**page F–173** **AT** Go to "ENGINE STALLS ON DECELERATION" in Section K of this manual
		No	Check for cause

19, 20, 21	ENGINE ROUGH	• IDLE AT ANY ENGINE TEMP / DURING FAST IDLE / IDLE AFTER WARM-UP
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temperature • Idle speed too low and excessive engine shake at any engine temperature • Fast idle speed too low and excessive engine shake during fast idle, but returns to normal after warm-up • Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up	

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)
- Injector(s) clogged

② Air pump
- Malfunction of air pump

③ Fuel pump relay
- Poor connection of connector

④ Spark plug
- Misfire

⑤ Engine
- Compression low

⑥ Fast idle cam
- Malfunction of fast idle cam

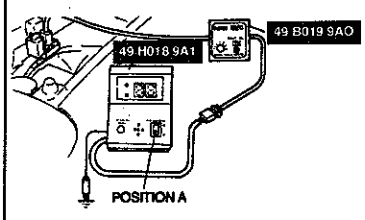
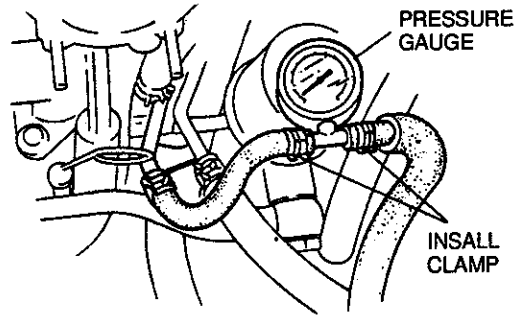
⑦ Manifold absolute pressure sensor
- Malfunction of manifold absolute pressure sensor

⑧ Engine coolant temperature sensor
- Poor connection of connector

⑨ EGR control valve
- EGR control valve stuck

⑩ Idle air control valve
- Poor connection of connector

⑪ Fuel thermosensor

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F–22**
2	Are spark plugs OK?	Yes	Go to next step
		No	Clean or replace
3	Is strong blue spark visible at each disconnected high-tension lead at idle?	Yes	Go to next step
		No	Check ignition system ☞**Section G**
4	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞**page F–98** 	Yes	• If symptom occurs at idle at any engine temperature, go to next step • If symptom occurs during fast idle operation, go to Step 6 • If symptom occurs at idle after warm-up, go to Step 10
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞**page F–104** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞**page F–101**
5	Is air pump OK? ☞**page F–121**	Yes	Go to next step
		No	Repair or replace

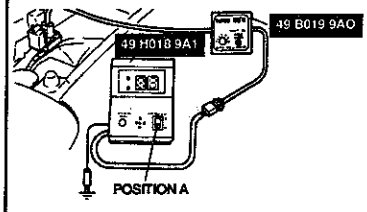
STEP	INSPECTION		ACTION
6	Is idle air control valve OK? ☞page F–83	Yes	Go to next step
		No	Repair or replace
7	Is fast idle cam OK? ☞page F–79	Yes	Go to next step
		No	Adjust
8	Is accelerated warm-up system OK? ☞page F–83	Yes	Go to next step
		No	Repair or replace
9	Is engine compression correct? ☞Section C **Compression** **690 kPa {7.0 kgf/cm², 100 psi} – 250 rpm** **Differential limit of chambers** **150 kPa {1.5 kgf/cm², 21psi} – 250 rpm**	Yes	Go to next step
		No	Check for cause ☞Section G
10	Are following PCME terminal voltages correct? ☞page F–152 • 1O (Manifold absolute pressure sensor) • 3E (Engine coolant temperature sensor) • 3L (Intake air temperature sensor) • 4I, 4J, 4K, 4L (Metering oil pump) • 4Y (Rear primary injector) • 4W (Front primary injector)	Yes	Go to next step
		No	Check for cause
11	Is EGR control system OK? ☞page F–126	Yes	Try known good PCME; does condition improve? ☞page F–150
		No	Repair or replace

22, 23	ENGINE ROUGH	• IDLE WITH A/C, P/S AND/OR E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S and/or E/L ON • Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range	

[TROUBLESHOOTING HINTS]
① Idle speed
- Idle speed too low

② Monitor switch function (SST)
- Air conditioning sensor
- Headlight switch
- Rear window defroster switch
- Blower switch

③ Idle air control valve
- Solenoid valve stuck

STEP	INSPECTION		ACTION
1	Is idle speed correct? ☞page F-16	Yes	Go to next step
		No	Adjust ☞page F-16
2	Is "00" displayed on SST with ignition switch ON? ☞page F-20  	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞page F-22
3	Are following terminal voltage at PCME correct? ☞page F-1 • 1E (Air conditioning sensor) • 1N (Steering pressure sensor) • 1R (PCMT) [AT] • 3B (Electrical load unit) • 3D (Electrical coolant fan)	Yes	Go to next step
		No	Check for cause
5	Warm-up engine Does idle speed decrease when idle air control valve connector disconnected?	Yes	• If symptom occurs at idle with A/C ON, check A/C system in section U of this manual • If symptom occurs at idle with E/L ON, check E/L unit ☞page F-135 • If symptom occurs at idle with P/S ON, check P/S pump in section N of this manual • If symptom occurs at idle when shifted from N or P to other range, go to "ENGINE ROUGH-IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGE" in Section K of this manual (AT)
		No	Check fast idle cam ☞page F-79

24	ENGINE ROUGH	• ON DECELERATION
DESCRIPTION	• Engine shakes at beginning of deceleration, or recovery from deceleration • Exhaust afterburn.	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection of connector

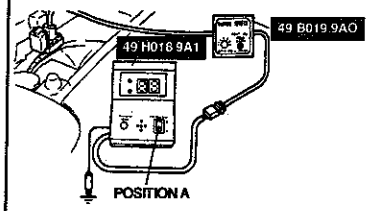
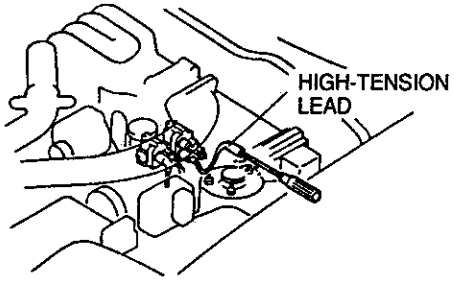
② Injector
- Fuel leakage from injector(s)

③ Dashpot
- Dashpot misadjusted

④ Throttle position sensor
- Poor connection of connector

⑤ Secondary air injection

⑥ Idle air control valve
- Solenoid valve stuck

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F-20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F-22**
2	Is strong blue spark visible at each disconnected high-tension lead.? 	Yes	Check spark plugs If OK, go to next step If not OK, clean or replace spark plug
		No	Check ignition system ☞**Section G**
3	Is dashpot OK? ☞**page F-134**	Yes	Go to next step
		No	Adjust
4	Is intake manifold vacuum correct at idle? **Vacuum:** **More then 60.0 kPa {450 mmHg, 17.7 inHg}**	Yes	Go to next step
		No	Check as follows: • Intake air system components for proper installation • Vacuum hoses for disconnection and damage • Engine compression ☞**Section C**
5	Are injectors OK? ☞**page F-106**	Yes	Go to next step
		No	Replace
6	Is engine compression OK? ☞**Section C** **Compression** **690 kPa {7.0 kgf/cm^3, 100 psi} – 250 rpm** **Differential limit of chambers** **150 kPa {1.5 kgf/cm^2, 21 psi} – 250 rpm**	Yes	Go to next step
		No	Check for cause ☞**Section C**
7	Try known good PCME; does condition improved? ☞**page F-150**		

25, 26	POOR ACCELERATION	• DRIVEAWAY • ON ACCELERATION
DESCRIPTION	• Engine speed increases normally but vehicle speed slowly increases during driveaway or acceleration	

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)
- Injector nozzle clogged

② Pressure regulator
- Pressure regulator malfunction

③ Fuel filter
- Filter clogged

④ Spark plug
- Misfire

⑤ Igniter
- Poor connection of connector

⑥ Air leakage in intake air system

⑦ Manifold absolute pressure sensor
- Manifold absolute pressure sensor filter or hose clogged
- Poor connection of connector

⑧ Crankshaft position sensor
- Poor connection of connector

⑨ Metering oil pump
- Malfunction of oil pump
  (Fuel injection amount and ignition timing fixed)

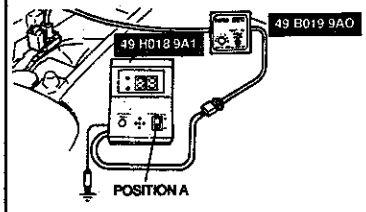
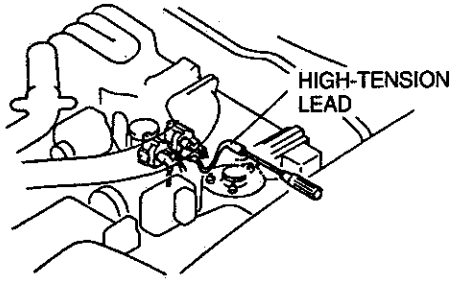
⑩ Solenoid valve (Turbo control, Charge control)
- Malfunction of solenoid valve
  (Fuel injection amount and ignition timing fixed)

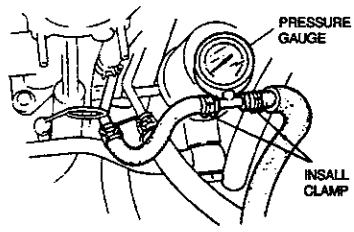
⑪ EGR control system
- FOR control valve stuck (open)

⑫ Engine coolant temperature sensor
- Malfunction of thermosensor

⑬ Double throttle control system

⑭ Check valve (Turbo control, Charge control, Charge relief)

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? **☞page F-20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) **☞page F-22**
2	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plugs If OK, go to next step If not OK, clean or replace spark plug
		No	Check ignition system **☞Section G**
3	Is intake manifold vacuum correct at idle? **Vacuum:** **More than 60.0 kPa {450 mmHg, 17.7 inHg}**	Yes	Go to next step
		No	Check as follows • Intake air system components and installation • Vacuum hoses for disconnection and damage • Engine compression **☞Section C**
4	Is air leakage felt or heard at intake air system components?	Yes	Repair or replace
		No	Go to next step

STEP	INSPECTION		ACTION
5	Is fuel line pressure correct at idle? ☞page F–98 **Fuel line pressure:** **190–220 kPa {1.9–2.3 kgf/cm², 28–32 psi}**  	Yes	Go to next step
		No	**Low pressure** Check as follows: ● Fuel filter for clogging ● Operation of pressure regulator
6	Are injectors OK? ☞page F–106	Yes	**MT** Go to next step **AT** Go to "POOR ACCELERATION – DRIVEAWAY / ON ACCELERATION" in section K of this manual
		No	Replace
7	Try known good PCME; does condition improved? ☞page F–150		

27	HIGH IDLE SPEED AFTER WARM-UP
DESCRIPTION	• Idle sped continues at fast idle after warm-up • Engine returns slowly to idle after accelerator is released

[TROUBLESHOOTING HINTS]

① Fast idle cam
- Malfunction of fast idle cam

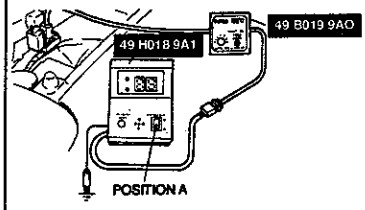
② Accelerated warm-up system
- Solenoid valve (AWS) open

③ Engine coolant temperature sensor
- Malfunction of engine coolant temperature sensor

④ Idle air control valve
- Idle air control valve stuck (open)
- A/C, P/S, or E/L signal always ON

⑤ Throttle valve
- Valve not closed throttle position

⑥ Dashpot

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20**  	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F–22**
2	Connect data link connector terminals TEN and GND with a jumper wire; does idle speed decrease?	Yes	Check following terminal voltage at PCME ☞**page F–152** • 1E (Air conditioning sensor) • 1N (Steering pressure sensor) • 3B (Electrical load unit)
		No	Go to next step
3	Are following terminal voltage at PCME correct? ☞**page F–152** • 1E (Air conditioning sensor) • 1O (Manifold absolute pressure sensor) • 3B (Electric load unit) • 3E (Engine coolant temperature sensor) • 3F (Throttle position sensor-Narrow range) • 3L (Intake air temperature sensor) • 4P (Solenoid valve (AWS)) • 4Q (Idle air control valve)	Yes	Go to next step
		No	Check for cause ☞**page F–153**
4	Is throttle valve closed throttle position?	Yes	Go to next step
		No	Check following devices • Accelerator cable linkage • Throttle lever • Accelerator pedal • Fast idle cam

STEP	INSPECTION		ACTION
5	Is solenoid valve (AWS) OK? ☞page F-83	Yes	Go to next step
		No	Repair
6	Is engine coolant temperature sensor OK? ☞page F-183	Yes	Go to next step
		No	Replace
7	Try known good PCME; does condition improved? ☞page F-150		

28	• IDLE FLUCTUATES • IDLE HUNTS
DESCRIPTION	• Engine speed changes back and forth between specified idle speed and higher speed

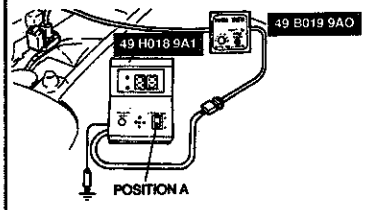
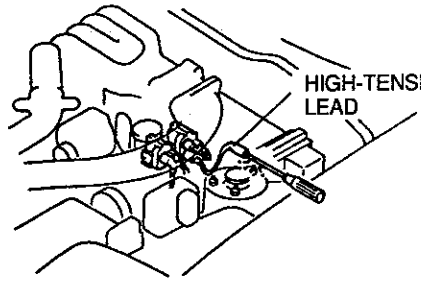
[TROUBLESHOOTING HINTS]
① PCV valve
- PCV valve stuck

② Spark plug
- Dirty or worn spark plug(s)

③ Throttle position sensor
- Incorrect adjustment

④ Idle air control valve
- Solenoid valve stuck

⑤ Intake air system
- Air leakage

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞ page F–20  	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞page F–22
2	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine?  	Yes	Check spark plug(s) If OK, go to next step If not OK clean or, replace spark plug(s)
		No	Check as follows: • Ignition coils • Igniter • High-tension leads • PCME 1G, 1H, 1J terminal voltage ☞Section G
3	Is air leakage felt or heard at intake air system components?	Yes	Repair or replace
		No	Go to next step
4	Is PCV valve stuck? ☞page F–124	Yes	Replace PCV valve
		No	Go to next step
5	Is idle air control valve OK? ☞page F–83	Yes	Go to next step
		No	Replace
6	Is fuel line pressure correct at idle? ☞page F–98 **Fuel line pressure:** **190–220 kPa {1.9–2.3 kgf/cm ^{2}, 28–32 psi}**	Yes	Go to next step
		No	**Low pressure** Check as follows: • Fuel filter for clogging • Operation of pressure regulator
7	Try known good PCME; does condition improved? ☞page F–150		

29	• **HESITATES** • **STUMBLES ON ACCELERATION**
DESCRIP-TION	• Momentary pause at beginning of acceleration or during acceleration

[TROUBLESHOOTING HINTS]

① Injector
- Fuel leakage from injector(s)

② Pressure regulator
- Pressure regulator stuck

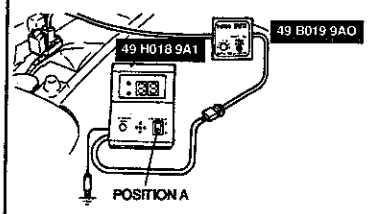
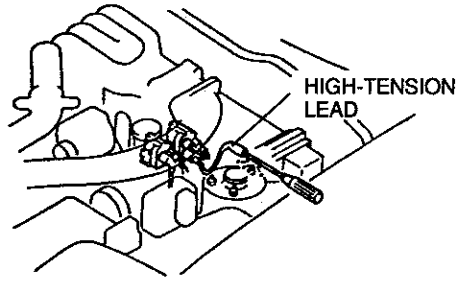
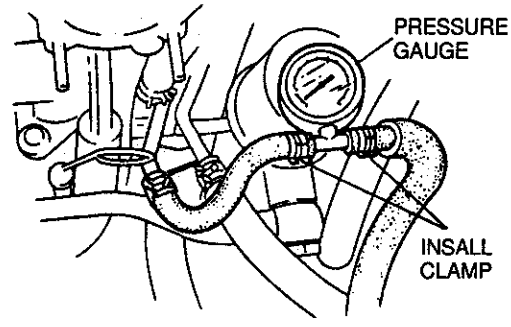
③ High-tension lead
- Lead damaged

④ Spark plug
- Dirty or worn spark plug(s)

⑤ Manifold absolute pressure sensor
- Malfunction of manifold absolute pressure sensor

⑥ EGR control valve
- EGR control valve stuck

⑦ Double throttle control
- Double throttle valve stuck

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F–22**
2	Is strong blue spark visible at each disconnected high-tension lead at idle? 	Yes	Check spark plug(s) If OK, go to next step If not OK, clean or replace spark plug(s)
		No	Check ignition system ☞**Section G**
3	Is fuel line pressure correct at idle? ☞**page F–104** **Fuel line pressure** **190–220 kPa {1.9–2.3 kgf/cm², 28–32 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞**page F–104** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞**page F–101**

STEP	INSPECTION		ACTION
4	Does fuel pressure increase when throttle valve opened? (engine running)	Yes	Go to next step
		No	Check pressure regulator ☞page F–104
5	Are following terminal voltage at PCME correct? ☞page F–154 1O (Manifold absolute pressure sensor) 3F (Throttle position sensor-Full range) 3G (Throttle position sensor-Narrow range) 3K (Solenoid valve (Relief 2)) 3O (Solenoid valve (Double throttle)) 3P (Secondary air bypass valve) 4E (Crankshaft position sensor (NE)) 4I, 4J, 4K, 4L (Metering oil pump) 4O (Solenoid valve (EGR)) 4R (Solenoid valve (Turbo control)) 4S (Solenoid valve (Charge relief)) 4T (Solenoid valve (Charge control)) 4V (Solenoid valve (Turbo precontrol)) 4W, 4X, 4Y, 4Z (Fuel injector)	Yes	Go to next step
		No	Check for cause ☞page F–155
6	Are injectors OK? ☞page F–106	Yes	Go to next step
		No	Repair or replace
7	Is EGR control system OK? ☞page F–126		
8	Try known good PCME; does condition improved? ☞page F–150		

30	SURGES WHILE CRUISING
DESCRIPTION	• Momentary minor irregularity in engine power at steady vehicle speed.

[TROUBLESHOOTING HINTS]

① Injector
- Poor connection of connector

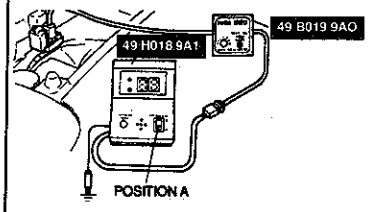
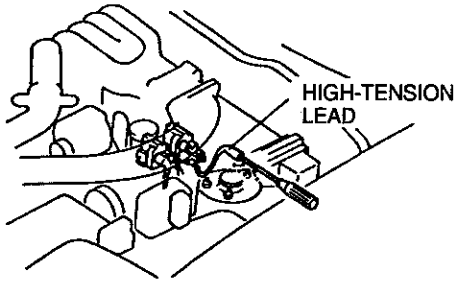
② Spark plug
- Dirty or worn spark plug(s)

③ Manifold absolute pressure sensor
- Poor connection of connector

④ Igniter
- Poor connection of connector

⑤ Ignition coil
- Malfunction of ignition coil

⑥ Throttle position sensor

STEP	INSPECTION		ACTION
1	Is "00" displayed on **SST** with ignition switch ON? ☞**page F–20** 	Yes	**"00" displayed** Go to next step
		No	**Trouble Code No. displayed** Check for cause (Refer to specified check sequence) ☞**page F–22**
2	Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plug(s) for damage If OK, go to next step If not OK, replace spark plug(s)
		No	Check ignition system ☞**Section G**
3	Does idle become rough when shaking connector of following devices? • Injector • Igniter • Ignition coil • Crankshaft position sensor	Yes	Check condition of connector
		No	Go to next step
4	Are following terminal voltage at PCME correct? ☞**page F–158** • 1G, 1H, 1J (Igniter) • 3G (Throttle position sensor-Full range) • 4O (Solenoid valve (EGR)) • 4R (Solenoid valve (Turbo control)) • 4S (Solenoid valve (Charge relief)) • 4V (Solenoid valve (Turbo precontrol)) • 4W, 4X, 4Y, 4Z (Injector)	Yes	Go to next step
		No	Check for cause ☞**page F–159**
5	Try known good PCME; does condition improved? ☞**page F–150**		

31	LACK OF POWER
DESCRIP-TION	• Performance poor under load (i.e., power down when climbing hills)

[TROUBLESHOOTING HINTS]

① Manifold absolute pressure sensor
- Malfunction of manifold absolute pressure sensor

② Secondary injector
- Poor connection of connector
- Nozzle clogged

③ Air leakage
- Turbo boost leakage

④ Spark plug
- Dirty or worn spark plug(s)

⑤ Throttle position sensor (Full range)
- Malfunction of throttle position sensor

⑥ Fuel filter
- Filter clogged

⑦ Pressure regulator
- Malfunction of pressure regulator

⑧ Double throttle control system
- Double throttle valve not open

⑨ Sequential twin turbo control system
- Secondary port not open
- Malfunction of check valve(s)

⑩ EGR control system
- EGR control valve stuck (open)

⑪ Air cleaner housing
- Clogged element

⑫ Three-way catalyst
- Clogged three-way catalyst

⑬ Fuel
- Low octane fuel used

⑭ Metering oil pump
- Poor connection of connector

32	POOR FUEL ECONOMY
DESCRIP-TION	• Fuel economy unsatisfactory

[TROUBLESHOOTING HINTS]

① Engine compression
- Compression low

② Spark plug(s)
- Dirty or worn spark plug(s)

③ Ignition coil
- Malfunction of ignition coil

④ Pressure regulator
- Malfunction of pressure regulator

⑤ Intake air leakage
- Air hose damaged or disconnected

33	A/C DOES NOT WORK
DESCRIP-TION	• A/C compressor magnetic clutch does not engage when Air conditioning sensor ON

[TROUBLESHOOTING HINTS]

① A/C relay
- Poor connection of connector
- Relay malfunction

☞**Section U**

② Air conditioning sensor
- Does not send signal to PCME terminal 1E

☞**page F–152**

③ PCME
- PCME 1L terminal circuit open

☞**page F–154**

34	• KNOCKING • PINGING
DESCRIP-TION	• Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e , hot spot in combustion chamber)
[TROUBLESHOOTING HINTS] Knock sensor • Open or short in harness (Code No.05 output) ☞page F–171	

35	FUEL ODOR
DESCRIP-TION	• Gasoline smell or visible leaks
[TROUBLESHOOTING HINTS] ① Solenoid valve (purge control) • Open harness (Code No.26 output) ☞page F–131 ② Charcoal canister • Canister full of fuel and leaking	

36	EXHAUST SULFUR SMELL
DESCRIP-TION	• Rotten egg smell (sulfur) from exhaust
[TROUBLESHOOTING HINTS] High sulfer content fuel used	

37	HIGH OIL CONSUMPTION
DESCRIP-TION	• Oil consumption excessive
[TROUBLESHOOTING HINTS] ① Metering oil pump ☞ Section D • Malfunction of metering oil pump • Open or short in wiring harness ② PCV valve • PCV valve stuck open ☞page F–124	

38	SELF-DIAGNOSIS CHECKER FLASHES 88
DESCRIP-TION	• Checker flashes 88 with test connector (TEN) grounded
[TROUBLESHOOTING HINTS] ① Short circuit in wiring between data link connector terminal FEN and PCME terminal 1F ② PCME malfunction	

39	MIL NEVER ON
DESCRIP-TION	• Self-Diagnosis Checker indicates Trouble Code No. of input device but MIL never ON
[TROUBLESHOOTING HINTS] ① Bulb burnt ② Electrical load unit 1K terminal circuit open ☞page F-135	

SERVICE POINTS

OUTLINE
[Power and Ground]
Main relay (Battery power)
- If the circuit is shorted, the EGI INJ fuse (30A) will burn out.

PCME ground (Injector)
- An open circuit will not produce any symptom.
- If the PCME ground (Output devices) circuit also has an open, the engine will not start.

PCME ground (Output devices)
- An open circuit will not produce any symptom.
- If PCME ground (Injector) circuit also has an open, the engine will not start.

PCME ground (System)
- An open circuit will not produce any symptom.

PCME ground (Analogue)
- If the circuit has an open, engine hard starting and rough idle will be caused and Trouble Code Nos. 09,11,12,13, 20 and 23 will be output.

Room fuse (PCME memory power)
- If the circuit is open, the PCME memory function will not operate, and trouble codes for intermittent malfunctions will not be indicated. Also, the learning control will be canceled, but will not produce any particular symptom.
- If the circuit is shorted, the ROOM fuse (15A) will burn out.

[Input Device]
1–2 switch (MT)
- If the circuit has an open or short, no symptom will be noticed.

Air conditioning sensor
- The switch monitor function can confirm the presence of an open or short circuit.
- If the circuit is open, the air conditioner (the magnetic clutch) will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when the blower is ON.

Barometric absolute pressure sensor
- The sensor is contained in the PCME.
- If the sensor has an open or short circuit, Trouble Code No. 14 is output, and the PCME will use a preprogrammed pressure of sea level.
- A malfunction in the sensor causes engine roughness at high elevation.

Clutch switch (MT)
☞Refer to "Neutral / clutch switches" on page F–173.

Crankshaft position sensor (NE, G signal)
- If the NE signal circuit has an open or short, Trouble Code No. 02 is output.
- If the G signal circuit has an open or short, Trouble Code No. 03 is output.
- If the NE or G signal circuit has an open or short, the engine will not start (No fuel injection and no ignition).

E/L unit
- If the circuit has an open, the switch monitor function can confirm that the blower fan, headlight, rear window defroster, signals are not input to the PCME.
- If the circuit is short, the Idle speed will be increased slightly.

EGR function sensor
- If the EGR function sensor or circuit has an open or short, Trouble Code No. 16 is output.

Engine coolant temperature sensor
- If the thermosensor or circuit has an open or short, Trouble Code No. 09 is output, and PCME uses a preprogrammed temperature value of 82°C {180°F}.
- A malfunction in the engine coolant temperature sensor or its circuit will cause hard starting or engine stall when engine is cold.
- In the above condition, the electric coolant fan will constantly operate when the ignition switch is ON.

Fuel thermosensor
- If the thermosensor circuit has an open or short, Trouble Code No. 23 is output.
- In the above conditions, the PCME will use a preprogrammed temperature value of 50°C {122°F} and no symptom will be noticed.

Heat hazard sensor
- If the circuit has open, no sympotm will be noticed.
- If the sensor or circuit has a short, the heat hazard warning light will illuminate and the air pump will not operate, causing rough idle.

Intake air temperature sensor
- If the thermosensor or circuit has an open or short, Trouble Code No. 11 is output.
- In the above conditions, no symptom will be noticed.

Knock sensor
- If the knock sensor or circuit has an open or short, Trouble Code No. 05 is output.
- In the above conditions, ignition timing is retarded.

Manifold absolute pressure sensor
- If the sensor or circuit has an open or short, Trouble Code No. 13 is output.
- In the above condition, the PCME uses a preprogrammed fuel injection amount, causing rough idle and poor acceleration with afterburn.

Metering oil pump position sensor
- If the sensor or circuit has an open or short, Trouble Code 20 is output.
- In the above conditions, the fuel injection amount is fixed, causing poor acceleration and hesitation.

Mileage switch / Steering pressure sensor
- If the sensor circuit has an open circuit, no particular symptom will be noticed.
- If the sensor circuit has a short circuit, idle speed will be increased.

Neutral switches (MT)
- The switch monitor function of the Self-Diagnosis Checker can confirm the presence of an open or short circuit.
- If the circuit is open, the idle speed drops when the A/C, P/S, or electrical load is ON.

Oxygen sensor
- If the sensor output voltage continues below 0.55V for 100 sec. after the engine exceeds 1,500 rpm because of an open or short circuit, Trouble Code No. 15 is output.
- If the sensor output voltage continues unchanged 50 Sec, after the engine exceeds 1,500 rpm, Trouble Code No. 17 is output.
- In the above conditions, no fuel injection closed loop control will be present and no symptom will be noticed.

Park / Neutral signal (AT; Refer to section K)
- If the circuit is open or shorted, the idle speed will be slightly low in R, D, S, and L ranges.

Reduce torque signal (AT; Refer to section K)
- If a malfunction occurs in the reduce torque signal, the torque reduction control system is inhibited and line pressure will be high at shifting. Shift shock may be slightly increased.

Slip lock-up signal (AT; Refer to section K)
- If a malfunction occurs in the slip lock-up signal, line pressure will be high at shifting and shift shock may be slightly increased.

Solenoid valve (Shift A) (AT)
- Refer to section K.

Solenoid valve (Shift B) (AT)
- Refer to section K.

Start signal
- A lack of engine cranking signal will cause hard starting when engine is cold.

Steering pressure sensor
- Refer to "Mileage switch".

Stoplight switch
- The switch monitor function can confirm the presence of an open or short circuit.
- An open or short circuit will produce no symptom.
- A short circuit will cause the STOP fuse (20A) burn out.

TEN terminal (Data link connector)
- If the circuit is open, the Self-Diagnosis Checker can not perform trouble code checks.
- If the circuit is shorted, the opening amount of the idle air control valve will not change, causing hard starting and rough idle. The Self-Diagnosis Checker cannot perform sensor monitoring checks.

Throttle position sensor (Narrow range)
- If the sensor or circuit has an open or short, Trouble Code No. 18 is output.
- In the above condition, rough idle, and engine stall on deceleration will be caused.

Throttle position sensor (Full range)
- If the sensor or circuit has an open or short, Trouble Code No. 12 is output.
- In the above condition, poor acceleration will be caused.

Vehicle speed sensor
- If the vehicle speed signal circuit has an open or short, Trouble Code No. 06 is output.
- If the circuit has open or short, hold mode will not operate.

[Output Device]
A/C relay
- If the circuit is open, the air conditioner (Magnetic clutch) will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when blower is ON, causing rough idle.

Air pump relay
- If the relay or circuit has an open or short, Trouble Code No. 54 is output.
- If the circuit is short, air pump will always operate, causing three-way catalyst melted.
- If the circuit is open, the air pump will never operate, causing rough idle.

Fan relay
- If the. circuit is shorted, the coolant fan will always operate while the ignition switch ON.
- If the circuit is open, the coolant fan will not operate until the engine temperature exceeds 108°C {226°F}.

FEN terminal (Data link connector)
- If the circuit between the data link connector and E/L unit is open, the Self-Diagnosis Checker buzzer will not sound during the trouble code check.
- If the circuit between PCME 1F terminal and E/L unit is open, the Self-Diagnosis Checker buzzer will constantly sound during the trouble code check.
- If the circuit is shorted, code "88" will keep flashing and the buzzer will continue sounding (Self-Diagnosis Checker), preventing a trouble code check.

Fuel injector
- If a secondary injector or circuit has an open or short, Trouble Code No. 71 (Front) or 73 (Rear) is output, causing poor acceleration and lack of engine power.
- If a primary injector or circuit has an open, engine will stall and will not start.

Fuel pump relay
- If the circuit is open, the engine will not start.
- If the circuit is shorted, the fuel pump will operate whenever the ignition switch is ON.

Fuel pump relay (speed)
- If the relay or circuit has an open or short, Trouble Code No. 51 is output.
- If the circuit is open, engine will hesitate or engine power will lack.

Idle air control valve
- If the solenoid valve or circuit has an open or short, Trouble Code No. 34 is output.
- If the circuit is open, the valve will always closed throttle position, causing rough idle and hard starting.
- If the circuit is shorted, the valve will always wide open throttle, causing high idle speed. (After warm-up, engine hunts at approx. 1500 rpm.)

Igniter
- If a trailing igniter or circuit has an open or short, idle speed will be slightly decreased and poor acceleration will be cased
- If the leading igniter or circuit has an open or short, hard starting and rough idle will be caused.

MEN Terminal (Data Link Connector)
- If the circuit is open, the monitor lamp will not illuminate.
- If the circuit is shorted, the monitor lamp will stay on.

Metering oil pump
- If the pump or circuit has an open or short, Trouble Code No. 26 and 27 are output.
- In the above conditions, PCME fixes ignition timing and fuel injection amount, causing engine poor acceleration.

PCMT (AT)
- Refer to section K.

Secondary air bypass valve
- If the solenoid valve or circuit has an open or short, Trouble Code No. 31 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, solenoid / valve will be always open and CO and HC will be increased.

Secondary air switching valve
- If the solenoid valve or circuit has an open or short, Trouble Code No. 32 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, rough idle will result.

Solenoid valve (Accelerated warm-up system)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 38 is output.
- If the circuit is open, the fast idle speed just after engine starting will not exceed 2,000 rpm.
- If the circuit is shorted, the idle speed will be increased and then hunted at the specified speed (approx. 1500 rpm after warm-up).

Solenoid valve (Charge control)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 45 is output.
- In the above conditions, the PCME fixes the ignition timing and fuel injection amount, causing poor acceleration and lack of power.

Solenoid valve (Charge relief)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 46 is output.
- If the circuit is open, the charge relief valve will always open, causing poor acceleration.
- If the circuit is shorted, the charge relief valve will always closed, causing momentarily intake air noise on acceleration.

Solenoid valve (Double throttle control)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 50 is output.
- If the circuit is open, the double throttle valve will always closed, causing poor acceleration and lack of power.
- If the circuit is shorted, the double throttle valve will always open, causing hesitation when the engine is cold.

Solenoid valve (EGR)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 28 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the EGR valve will always open, causing engine stalling and hard starting.

Solenoid valve (Port air bypass)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 33 is output.
- In the above conditions, no symptom will be noticed.

Solenoid valve (Pressure regulator control)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 25 is output.
- If the circuit is open, hard starting may result when the engine is hot.
- If the circuit is shorted, fuel pressure will always be approx. 280 kPa {2.9 kgf/cm^2, 41 psi} and no symptom will be noticed.

Solenoid valve (Purge control)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 40 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the engine stalls at low speed.

Solenoid valve (Relief 2)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 39 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, secondary air noise will be heard while the air pump operates.

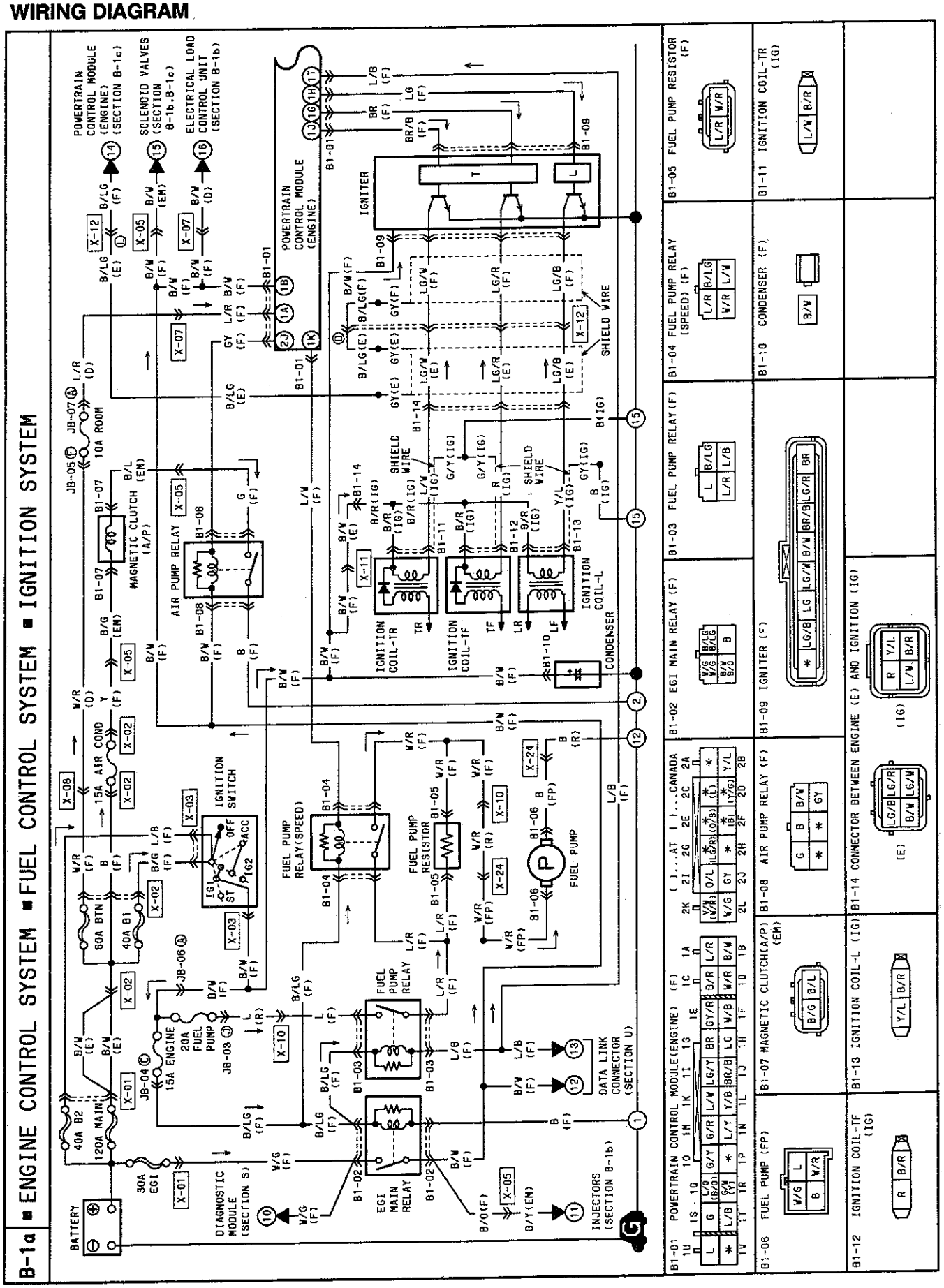
Solenoid valve (Split air bypass)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 30 is output.
- In the above conditions, no symptom will be produced.

Solenoid valve (Turbo control 1, Turbo control 2)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 44 is output.
- If the circuit is open, the turbo control valve will not open, causing poor acceleration and lack of power.
- If the circuit is shorted, turbo control valve will open earlier on acceleration, causing poor acceleration.

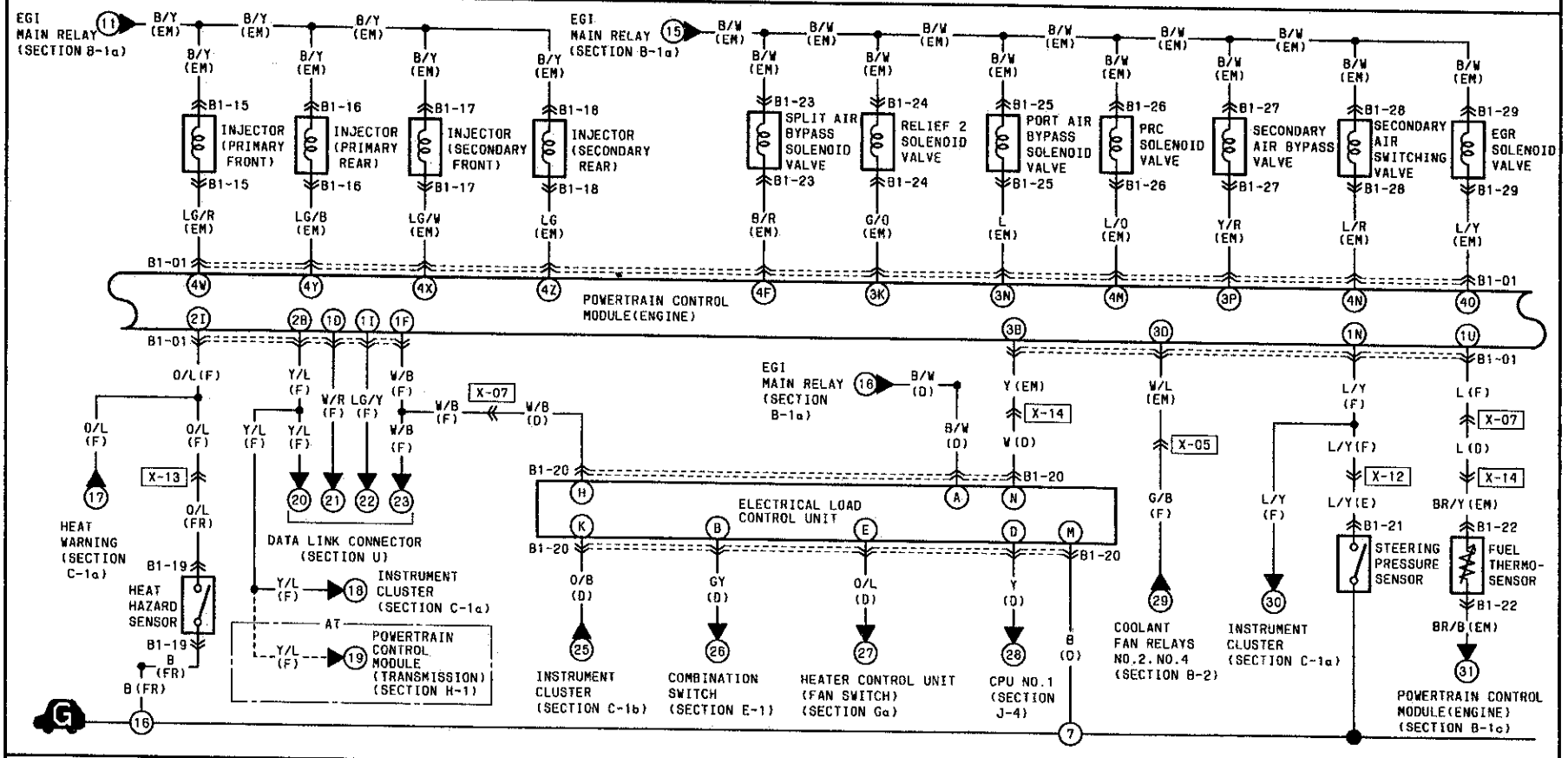
Solenoid valve (Turbo precontrol)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 42 is output.
- If the circuit is open, the precontrol valve will open earlier, causing slightly hesitation and poor acceleration.
- If the circuit is short, precontrol valve will never open, causing hesitation and poor acceleration.

Solenoid valve (Wastegate control)
- If the solenoid valve or circuit has an open or short, Trouble Code No. 43 is output.
- If the circuit is open, wastegate valve will open earlier, causing poor acceleration and lack of power.
- If the circuit is shorted, wastegate valve will not open easily and no symptom will be noticed. (To prevent engine damage, the overboost fuel cut will be operated.)

WIRING DIAGRAM



B-1b ■ ENGINE CONTROL SYSTEM ■ FUEL CONTROL SYSTEM



B1-01 POWERTRAIN CONTROL MODULE(ENGINE)

	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
	L	G	L/O (B/O)	G/Y	G/R	L/W	LG/Y	BR	GY/R	B/R	L/R
(F)	*	L/B	G/W (Y)	*	L/Y	Y/B	BR/B	LG	W/B	W/R	B/W
	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

	2K	2I	2G	2E	2C	2A
	Y/W (W/R)	O/L	* (LG/R)	* (O/B)	* (L)	*
(F)	W/G	GY	*	* (B)	* (Y/G)	Y/L
	2L	2J	2H	2F	2D	2B

	3O	3M	3K	3I	3G	3E	3C	3A
	B/R	W	G/O	BR/W	B/G	G/W	B	G/B
(EM)	Y/R	L	G	L/G	G/Y	G/R	W/L	Y
	3P	3N	3L	3J	3H	3F	3D	3B

	4Y	4W	4U	4S	4Q	4O	4M	4K	4I	4G	4E	4C	4A
	LG/B	LG/R	L/W	P	L/G	L/Y	L/O	B/LG	B/O	W	B	B	B/W
(EM)	LG	LG/W	L/Y	L/B	Y/L	BR/Y	L/R	B/Y	B/L	R	B/R	BR/B	B/W
	4Z	4X	4V	4T	4R	4P	4N	4L	4J	4H	4F	4D	4B

( )...AT [ ]...CANADA

B1-15 INJECTOR (PRIMARY FRONT) (EM) — LG/R B/Y

B1-16 INJECTOR (PRIMARY REAR) (EM) — LG/B B/Y

B1-17 INJECTOR (SECONDARY FRONT) (EM) — LG/W B/Y

B1-18 INJECTOR (SECONDARY REAR) (EM) — LG B/Y

B1-19 HEAT HAZARD SENSOR (FR) — O/L, B

B1-20 ELECTRICAL LOAD CONTROL UNIT (D)

O	M	K	I	G	E	C	A
*	B	O/B	*	*	O/L	*	B/W
*	W	*	*	W/B	*	Y	GY
P	N	L	J	H	F	D	B

B1-21 STEERING PRESSURE SENSOR (E) — L/Y

B1-22 FUEL THERMOSENSOR (EM) — BR/B BR/Y

B1-23 SPLIT AIR BYPASS SOLENOID VALVE (EM) — B/W, B/R

B1-24 RELIEF 2 SOLENOID VALVE (EM) — B/W, G/O

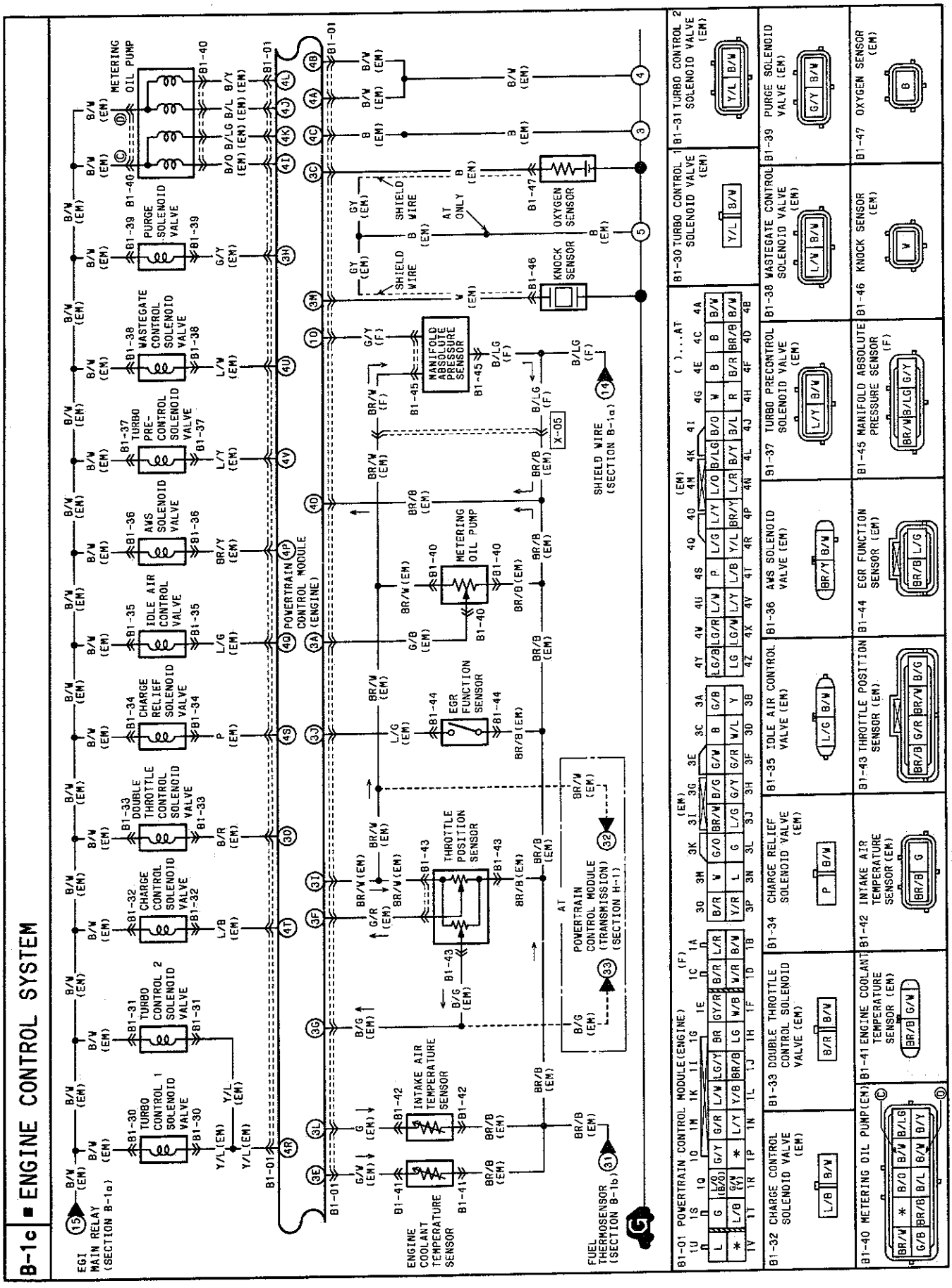
B1-25 PORT AIR BYPASS SOLENOID VALVE (EM) — B/W, L

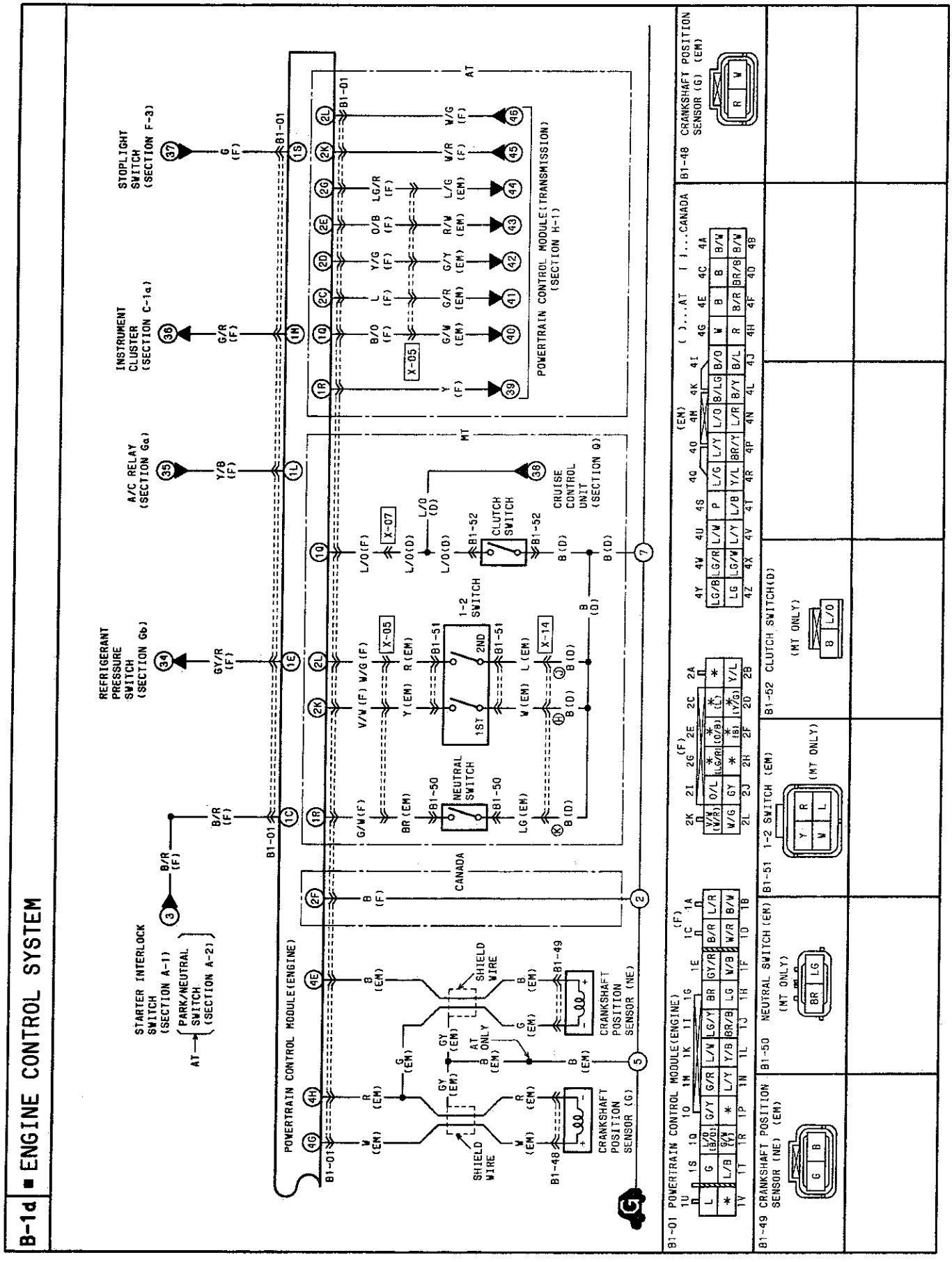
B1-26 PRC SOLENOID VALVE (EM) — L/O B/W

B1-27 SECONDARY AIR BYPASS VALVE (EM) — Y/R B/W

B1-28 SECONDARY AIR SWITCHING VALVE (EM) — L/R B/W

B1-29 EGR SOLENOID VALVE (EM) — L/Y B/W


B-1c ■ ENGINE CONTROL SYSTEM
EGI MAIN RELAY (SECTION B-1a)
B1-30 TURBO CONTROL 1 SOLENOID VALVE
B1-31 TURBO CONTROL 2 SOLENOID VALVE
B1-32 CHARGE CONTROL SOLENOID VALVE
B1-33 DOUBLE THROTTLE CONTROL SOLENOID VALVE
B1-34 CHARGE RELIEF SOLENOID VALVE
B1-35 IDLE AIR CONTROL VALVE
B1-36 AWS SOLENOID VALVE
B1-37 TURBO PRE-CONTROL SOLENOID VALVE
B1-38 WASTEGATE CONTROL SOLENOID VALVE
B1-39 PURGE SOLENOID VALVE
B1-40 METERING OIL PUMP
POWERTRAIN CONTROL MODULE (ENGINE)
ENGINE COOLANT TEMPERATURE SENSOR
B1-41
B1-42 INTAKE AIR TEMPERATURE SENSOR
B1-43 THROTTLE POSITION SENSOR
B1-44 EGR FUNCTION SENSOR
B1-45 MANIFOLD ABSOLUTE PRESSURE SENSOR
B1-46 KNOCK SENSOR
B1-47 OXYGEN SENSOR
FUEL THERMOSENSOR (SECTION B-1b)
POWERTRAIN CONTROL MODULE (TRANSMISSION) (SECTION H-1)
SHIELD WIRE (SECTION B-1a)
X-05
B1-01 POWERTRAIN CONTROL MODULE (ENGINE)
B1-30 TURBO CONTROL 1 SOLENOID VALVE (EM)
B1-31 TURBO CONTROL 2 SOLENOID VALVE (EM)
B1-32 CHARGE CONTROL SOLENOID VALVE (EM)
B1-33 DOUBLE THROTTLE CONTROL SOLENOID VALVE (EM)
B1-34 CHARGE RELIEF SOLENOID VALVE (EM)
B1-35 IDLE AIR CONTROL VALVE (EM)
B1-36 AWS SOLENOID VALVE (EM)
B1-37 TURBO PRECONTROL SOLENOID VALVE (EM)
B1-38 WASTEGATE CONTROL SOLENOID VALVE (EM)
B1-39 PURGE SOLENOID VALVE (EM)
B1-40 METERING OIL PUMP (EM)
B1-41 ENGINE COOLANT TEMPERATURE SENSOR (EM)
B1-42 INTAKE AIR TEMPERATURE SENSOR (EM)
B1-43 THROTTLE POSITION SENSOR (EM)
B1-44 EGR FUNCTION SENSOR (EM)
B1-45 MANIFOLD ABSOLUTE PRESSURE SENSOR (F)
B1-46 KNOCK SENSOR (EM)
B1-47 OXYGEN SENSOR (EM)


B-1d ■ ENGINE CONTROL SYSTEM
STARTER INTERLOCK SWITCH (SECTION A-1)
PARK/NEUTRAL SWITCH (SECTION A-2)
AT
REFRIGERANT PRESSURE SWITCH (SECTION G6)
A/C RELAY (SECTION G6)
INSTRUMENT CLUSTER (SECTION C-1a)
STOPLIGHT SWITCH (SECTION F-3)
POWERTRAIN CONTROL MODULE(ENGINE)
POWERTRAIN CONTROL MODULE(TRANSMISSION) (SECTION H-1)
MT
AT
CANADA
NEUTRAL SWITCH
1-2 SWITCH
CLUTCH SWITCH
CRUISE CONTROL UNIT (SECTION G)
SHIELD WIRE
AT ONLY
CRANKSHAFT POSITION SENSOR (NE)
B1-01 POWERTRAIN CONTROL MODULE(ENGINE)
B1-49 CRANKSHAFT POSITION SENSOR (NE) (EM)
B1-50 NEUTRAL SWITCH (EM) (MT ONLY)
B1-51 1-2 SWITCH (EM)
B1-52 CLUTCH SWITCH(D) (MT ONLY)
B1-48 CRANKSHAFT POSITION SENSOR (G) (EM)
( )...AT
...CANADA

ELECTRICAL DIAGNOSIS SUPPORT
[Power and Ground]
Main relay (Battery power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1B)–Main relay	Engine hard starting	EGI INJ fuse (30A) burns out when ignition switch ON	NA

Room fuse (Memory power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1A)–Room fuse	No symptom	ROOM fuse (15A) burns out	NA

PCME ground (Output device, Injector, System, Analogue)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4A)–Ground (Output device)	(One side open circuit) No symptom (Both sides open circuit) Engine will not start	NA	(One side poor ground) No symptom (Both sides poor ground) Engine will not start
PCME (4B)–Ground (Injector)			
PCME (4C)–Ground (System)	No symptom		No symptom
PCME (4D)–Ground (Analogue)	Code Nos. 09, 11, 12, 13, 20, and 23 Engine hard starting Rough idle		Code Nos. 09, 11, 12, 13, 20, and 23 Engine hard starting Rough idle

[Input Device]
Air conditioning sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME(1E)–A/C amplifier	Air conditioner (magnetic clutch) will not operate	Air conditioner will constantly operate with blower ON	NA

Clutch switch (MT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1Q)–Clutch switch	No symptom	No symptom	NA

Crankshaft position sensor (NE, G signal)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4E)–Crankshaft position sensor (NE)	Code No. 02 output Engine will not start	Code No. 02 output Engine will not start	NA
PCME (4G)–Crankshaft position sensor (G)	Code No. 03 output Engine will not start	Code No. 03 output Engine will not start	
PCME (4H)–Crankshaft position sensor (Ground)	Code Nos. 02 and 03 output Engine will not start	NA	Engine will not start Engine suddenly stalls

NA: Not applicable

E/L unit

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1F)–E/L unit (H)	MIL will never ON	MIL will always ON Self-Diagnosis Checker buzzer sounds constantly	NA
PCME (3B)–E/L unit (N)	Idle speed will be low when E/L ON*1	Idle speed will be high	
Main relay–E/L unit (A)	Idle speed will be low when E/L ON*1	EGI INJ fuse (30A) burns out when ignition switch ON	
Headlight switch–E/L unit (B)	Idle speed may be low when headlight switch ON	Parking lights will always ON	
Rear window defroster switch–E/L unit (D)	Idle speed may be low when defroster switch ON	Rear window defroster always ON when ignition switch ON	
Heater control unit–E/L unit (E)	Idle speed may be low when blower fan operate high speed	High idle speed when blower fan not operate	
MIL–E/L unit (K)	MIL will never ON	MIL will always ON	
Ground–E/L unit (M)	Idle speed drops when E/L ON*1 MIL will never ON	NA	Idle speed hunts or drops when E/L ON*1 MIL will never ON

*1 E/L ON: Headlight switch ON, rear window defroster switch ON, or blower switch at 3rd or 4th position.

EGR function sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3J)–EGR function sensor	Code No. 16 output No symptom	Code No. 16 output No symptom	NA
PCME (4D)–EGR function sensor		No symptom	

Fuel thermosensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1U)–Fuel thermosensor	Code No. 23 output No symptom	Code No. 23 output No symptom	NA
PCME (4D)–Fuel thermosensor		No symptom	

Heat hazard sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (2I)–Heat hazard sensor	No symptom	Heat hazard warning light illuminates Rough idle	NA
Ground–Heat hazard sensor		No symptom	No symptom

NA: Not applicable

Park / Neutral signal (AT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1R)–PCMT (1C)	Idle speed drops when shifted to L, S, D or R range		NA

Intake air temperature sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3L)–Thermosensor	Code No. 11 output No symptom	Code No. 11 output No symptom	NA
PCME (4D)–Thermosensor		No symptom	

Knock sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3M)–Knock sensor	Code No. 05 output Lack of power Knocking	Code No. 05 output Lack of power Knocking	NA

Metering oil pump position sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3A)–Metering oil pump (J)	Code No. 20 output Poor acceleration Hesitation	Code No. 20 output Poor acceleration Hesitation	NA
PCME (4D)–Metering oil pump (H)		No symptom	
PCME (3I)–Metering oil pump (I)		Code No. 20 output Poor acceleration Hesitation	

Mileage switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1N)–Mileage switch	No symptom	Idle speed slightly high	NA

Neutral switch (MT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1R)–Neutral switch	Idle speed slightly high	Idle speed drops when A/C, P/S, or E/L ON	NA

1-2 switch (MT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (2K)–1-2 switch	No symptom	No symptom	NA
PCME (2L)–1-2 switch			
Ground–1-2 switch			No symptom

NA: Not applicable

Oxygen sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3C)–Oxygen sensor	Code No. 15 output No symptom	Code No. 15 output No symptom	NA

Manifold absolute pressure sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1O)–Manifold absolute pressure sensor	Code No. 13 output Poor acceleration Rough idle	Code No. 13 output Poor acceleration Rough idle	NA
PCME (3I)–Manifold absolute pressure sensor			
PCME (4D)–Manifold absolute pressure sensor		No symptom	

Steering pressure sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1N)–Steering pressure sensor	No symptom	Idle speed slightly high	NA

Reduced torque signal, slip lock-up signal (AT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1Q)–PCMT (2P)	Shift shock slightly increased		NA

Solenoid valve (Shift A) (AT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (2K)–PCMT (1D)	Shift shock slightly increased		NA

Solenoid valve (Shift B) (AT)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (2L)–PCMT (1B)	Shift shock slightly increased		NA

Stoplight signal (Stoplight switch)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1S)–Stoplight switch	No symptom	STOP fuse (20A) burns out	NA

Throttle position sensor (Narrow range, Full range)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3F)–Throttle position sensor (Narrow range)	Code No. 18 output Rough idle Strong shift shock (AT)	Code No. 18 output Rough idle Strong shift shock (AT)	NA
PCME (3G)–Throttle position sensor (Full range)	Code No. 12 output Poor acceleration Strong shift shock (AT)	Code No. 12 output Poor acceleration Strong shift shock (AT)	
PCME (3I)–Throttle position sensor	Code Nos. 12,18 output Rough idle Code No. 12 output Rough idle	Code Nos. 12 and 18 output Rough idle	
PCME (4D)–Throttle position sensor		No sympton	

NA: Not applicable

TEN terminal (Data link connector)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1I)–Data link connector	Cannot perform trouble code checks and switch monitor checks	Hard starting Rough idle	NA

Engine coolant temperature sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3E)–Engine coolant temperature sensor	Code No. 09 output Rough idle and hard starting when engine cold	Code No. 09 output Rough idle and hard starting when engine cold	NA
PCME (4D)–Engine coolant temperature sensor		No symptom	

Vehicle speed sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1M)–Vehicle speed sensor	Code No. 06 output Hold mode will not operate (AT)		NA

[Output Device]
A/C relay

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1L)–A/C relay	A/C will not operate	A/C constantly operate when blower ON Rough idle	NA

Air pump relay

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (2J)–Air pump relay	Code No. 54 output Rough idle	Code No. 54 output Three-way catalyst melted	NA

Fan relay

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3D)–fan relay	Coolant fan will not operate until coolant temperature exceeds 108°C {226°F}	Coolant fan always operate when ignition switch ON	NA

Fuel injector

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4X, 4Z)–Secondary injector	Code No. 71 or 73 output Lack of power	Code No. 71 or 73 output Engine will not start	NA
PCME (4W, 4X)–Primary injector	Engine stall Engine will not start	Engine stalls Engine will not start	

NA: Not applicable

Fuel pump relay (speed)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1K)–Fuel pump relay (speed)	Code No. 51 output Hesitation Lack of power	Code No. 51 output No symptom	NA

FEN terminal (Data link connector)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1F)–Data link connector	Self-Diagnosis Checker buzzer will not sound during trouble code check	Code "88" will keep flashing and buzzer will continue sounding during trouble code check	NA

Idle air control valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4Q)–Solenoid valve	Code No. 34 output Rough idle Hard start	Code No. 34 output Idle speed stays or fluctuates at approx. 1,500 rpm after warm-up	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Igniter

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1G)–Igniter (Trailing Front) PCME (1J)–Igniter (Trailing Rear)	Poor acceleration Hard starting when engine cold		NA
PCME (1H)–Igniter (Leading)	Rough idle Poor acceleration Hard starting when engine cold		

Metering oil pump

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4I, 4J, 4K, 4L)–Metering oil pump	Code No. 26 and 27 output Poor acceleration		NA

MEN terminal (Data link connector)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (1D)–MEN terminal	Monitor lamp will not illuminate	Monitor lamp stays on	NA

Secondary air bypass valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3P)–Solenoid valve	Code No. 31 output No symptom	Code No. 31 output CO and HC increased	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

NA: Not applicable

Secondary air switchig valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4N)–Solenoid valve	Code No. 32 output No symptom	Code No. 32 output Rough idle	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Accelerated warm-up system)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4P)–Solenoid valve	Code No. 38 output Fast idle speed just after engine starting will not exceed 2,000 rpm	Code No. 38 output Idle speed stays stays or fluctuates at approx. 1,500 rpm after warm-up	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Charge control)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4T)–Solenoid valve	Code No. 45 output Lack of power Poor acceleration	Code No. 45 output Lack of power Poor acceleration	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Charge relief)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4S)–Solenoid valve	Code No. 46 output Poor acceleration	Code No. 46 output Momentarily Intake air noise on acceleration	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Double throttle control)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3O)–Solenoid valve	Code No. 50 output Poor acceleration Lack of power	Code No. 50 output Hesitation when engine cold	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (EGR)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4O)–Solenoid valve	Code No. 28 output No symptom	Code No. 28 output Engine stall Hard starting	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

NA: Not applicable

Solenoid valve (Port air bypass)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3N)–Solenoid valve	Code No. 33 output No symptom	Code No. 33 output No symptom	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Pressure regulator control)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4M)–Solenoid valve	Code No. 25 output Hard starting when engine warm-up	Code No. 25 output No symptom	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Purge control)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3H)–Solenoid valve	Code No. 40 output No symptom	Code No. 40 output Hard starting Engine stalls at low speed	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Relief 2)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (3K)–Solenoid valve	Code No. 39 output No symptom	Code No. 39 output Secondary air noise heard while air pump operates	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Split air bypass)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4F)–Solenoid valve	Code No. 30 output No symptom	Code No. 30 output No symptom	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Turbo control 1, Turbo control 2)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4R)–Solenoid valve (s)	Code No. 44 output Poor acceleration	Code No. 44 output Poor acceleration	NA
Solenoid valve (s)–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

NA: Not applicable

Solenoid valve (Turbo precontrol)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4V)–Solenoid valve	Code No. 42 output Hesitation Poor acceleration	Code No. 42 output Hesitation Poor acceleration	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

Solenoid valve (Wastegate control)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCME (4U)–Solenoid valve	Code No. 43 output Lack of power Poor acceleration	Code No. 43 output No symptom	NA
Solenoid valve–Main relay		EGI INJ fuse (30A) burns out when ignition switch ON	

NA: Not applicable