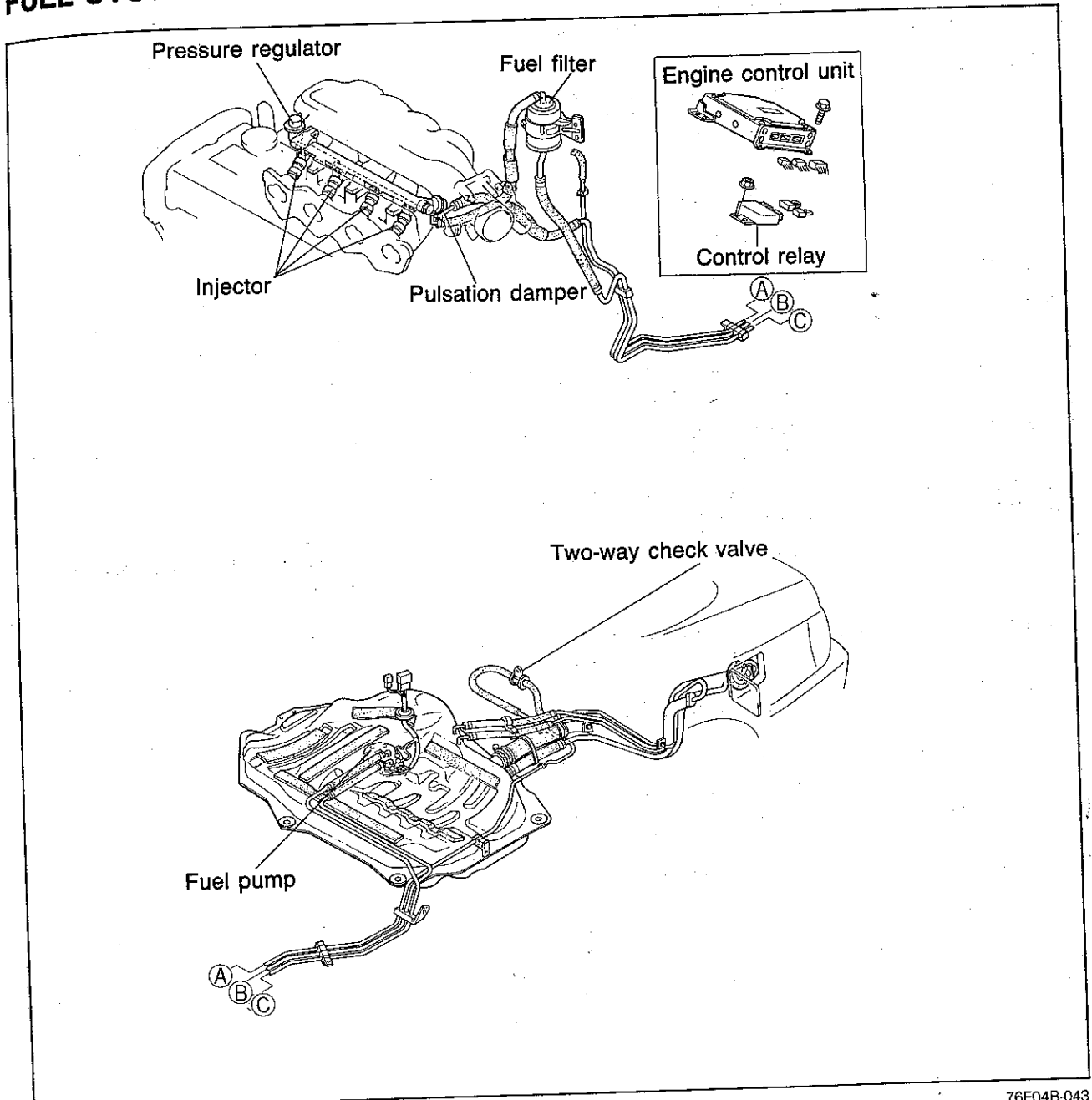


## FUEL SYSTEM



76F04B-043

This system supplies the necessary fuel for combustion at a constant pressure to the injectors. Fuel is metered and injected into the intake manifold according to the injection control signals from the engine control unit. It consists of the fuel pump, fuel filters, delivery pipe, pulsation damper, pressure regulator, injectors, and control relay. The fuel pump is mounted in the fuel tank to minimize the operating noise of the pump. The injectors receive battery voltage directly from the control relay. The connector on the injectors is white to distinguish the injectors for FE DOHC from those of other engines.

# 4B FUEL SYSTEM

## COMPONENT DESCRIPTION

Component	Function	Remark
<b>Air flow sensor</b>	Detects amount of intake air; sends signal to engine control unit	
<b>Clutch switch</b>	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
<b>Engine control unit</b>	Detects signals from input sensors and switches; controls injector and fuel pump operations	
<b>Fuel filter</b>	Filters fuel	
<b>Fuel pump</b>	Provides fuel to injectors	<ul style="list-style-type: none"><li>• Operates while engine running</li><li>• Installed in fuel tank</li></ul>
<b>G signal pick-up</b>	Detects No.1 cylinder TDC; sends signal to engine control unit	Installed in distributor
<b>Idle switch</b>	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
<b>Ignition switch (ST position)</b>	Sends engine cranking signal to engine control unit	
<b>Injector</b>	Injects fuel into intake port	<ul style="list-style-type: none"><li>• Controlled by signals from engine control unit</li><li>• High-ohmic injector</li></ul>
<b>Intake air thermo sensor</b>	Detects intake air temperature; sends signal to engine control unit	
<b>Control relay</b>	Supplies electric current to injectors, fuel pump, and engine control unit	
<b>Ne signal pick-up</b>	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
<b>Neutral switch</b>	Detects in-gear condition; sends signal to engine control unit	Switch ON when in gear
<b>Pressure regulator</b>	Adjusts fuel pressure supplied to injectors	
<b>Pulsation damper</b>	Absorbs fuel pulsations	
<b>Water thermo sensor</b>	Detects coolant temperature; sends signal to engine control unit	

76F04

# FUEL SYSTEM 4B

## TROUBLESHOOTING

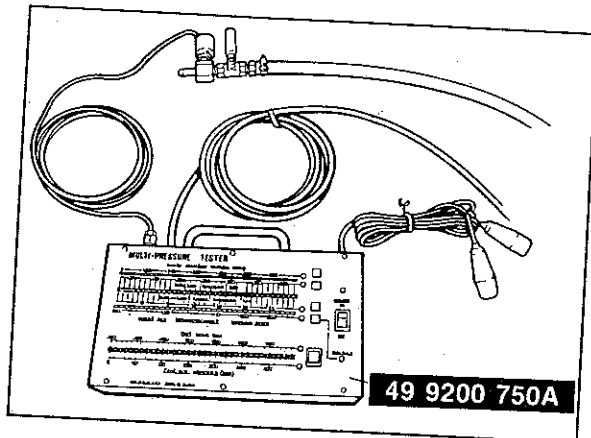
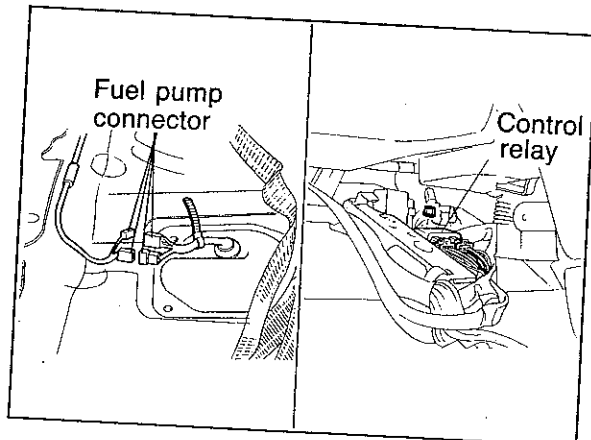
Check the condition of the wiring harness and connectors before checking the sensors or switches.

**Note**  
Make the system inspection first. If no problem is found, continue with inspection of the next system of Troubleshooting Guide. (Refer to page 4B-10 and 11)

Symptom	Possible cause	Air flow sensor 4B-85	Intake air thermo sensor 4B-88	Water thermo sensor 4B-86	Fuel pump 4B-52	Injector 4B-53	Fuel pressure 4B-50	Engine control unit terminal		
								1Q	3C,3E 3F,3H	3B
								4B-80		
Hard start or won't start (Crank OK)		—	—	6	1	4	—	2	5	3
Engine stalls	During warm up	4	—	3	—	2	1	—	5	—
	After warm up	1	—	—	—	3	2	—	4	—
Rough idle	During warm up	5	—	3	—	2	1	—	4	—
	After warm up	1	6	4	—	3	2	—	5	—
Poor acceleration, hesitation, or lack of power		1	—	4	—	3	2	—	5	—
Runs rough on deceleration		1	—	—	—	2	—	—	3	—
Afterburn on deceleration		1	—	—	—	2	—	—	3	—
Poor fuel economy		5	—	4	—	2	1	—	3	—
Engine stalls or runs rough after hot starting		1	5	—	—	3	2	—	4	—
Falls emissions test		—	—	—	—	1	—	—	2	—

76F04B-045

# 4B FUEL SYSTEM

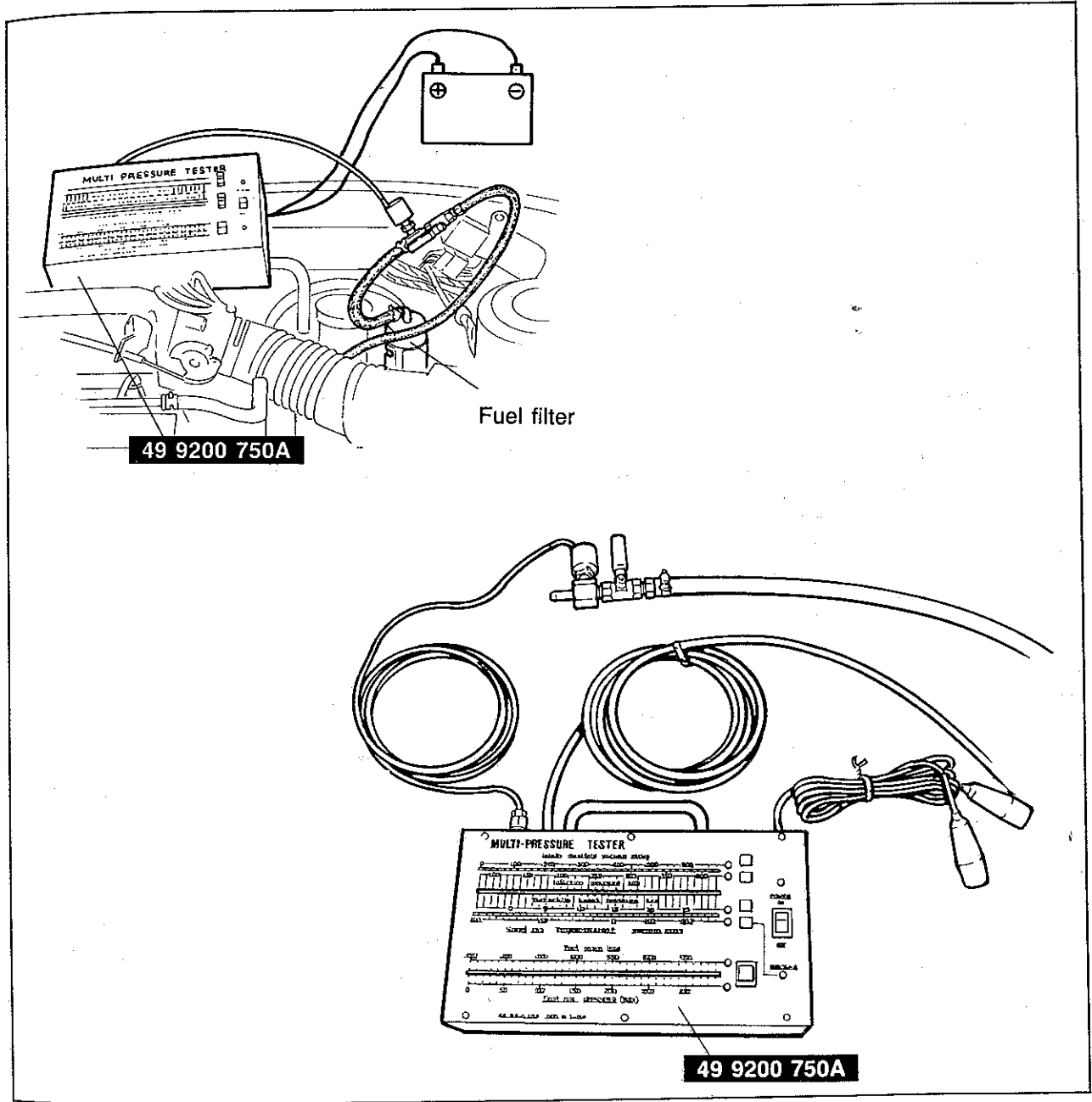


## FUEL PRESSURE RELEASE AND SERVICE FUEL SYSTEM

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

- a) Before disconnecting any fuel line, release the pressure from the fuel system to reduce the possibility of injury or fire.
1. Start the engine.
  2. Disconnect the 4-pin connector from the control relay or the fuel pump connector (5-pin).
  3. After the engine stalls, turn OFF the ignition switch.
  4. Reconnect the relay or fuel pump connector.
- b) Use a rag as protection from fuel spray when connecting the hoses.  
Plug the hoses after removal.
- c) When inspecting the fuel system, use the **S**

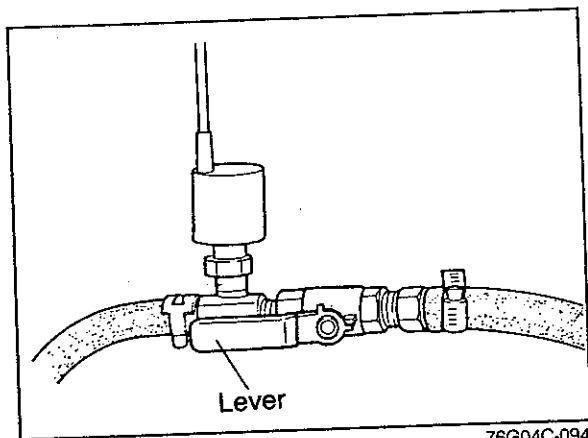
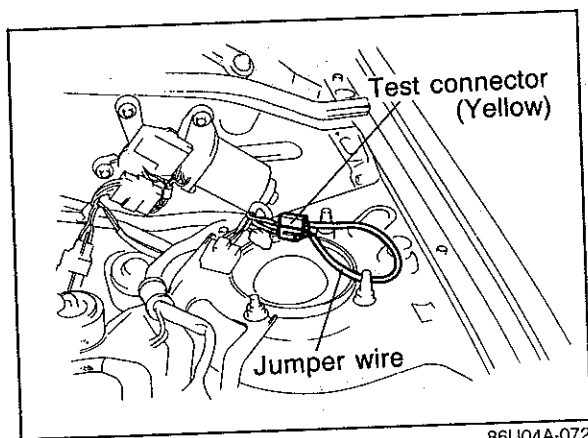
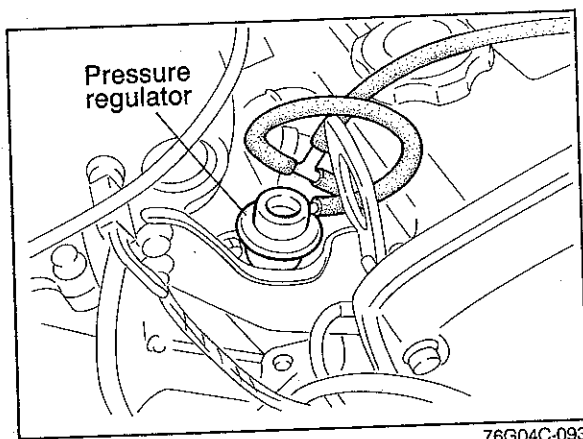
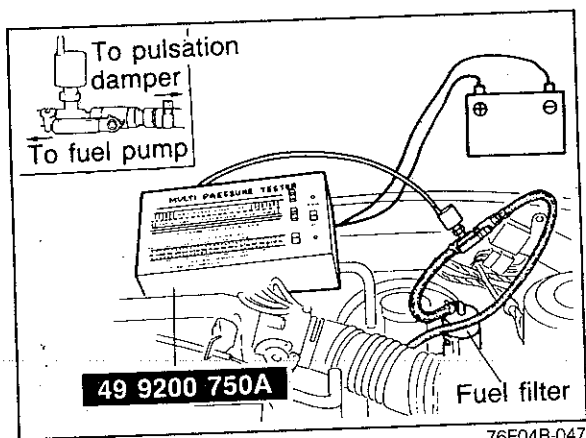
MULTI-PRESSURE TESTER (49 9200 750A)



76F04B-046

The **MULTI-PRESSURE TESTER** (49 9200 750A) is used to check the fuel pressure and the intake manifold vacuum.

## 4B FUEL SYSTEM



### How to Connect Multi-Pressure Tester

#### Warning

Before connecting the SST, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B-48.)

1. Disconnect the negative battery terminal.
2. Disconnect the fuel main hose from the fuel filter.
3. Connect the **SST** and adapter between the fuel main hose and the fuel pump.

#### Caution

Do not reverse the adapter connection.

4. Disconnect the vacuum hose from the pressure regulator. Connect the **SST** to the vacuum hose with a three-way joint.
5. Connect the negative battery terminal.
6. Connect the **SST** to the battery.

7. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON to operate the fuel pump.
8. Check for fuel leaks.

#### Caution

After checking for fuel leakage, turn the ignition switch OFF and disconnect the jumper wire from the test connector.

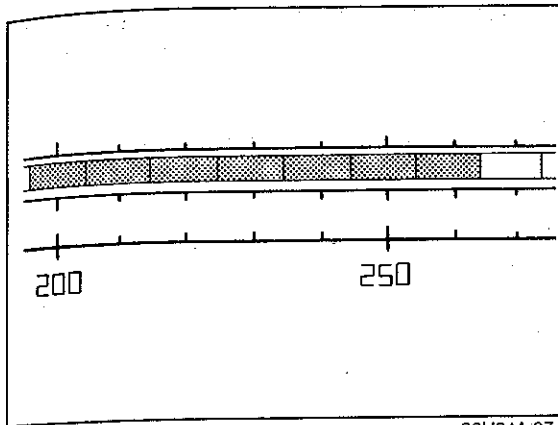
### FUEL PRESSURE

#### Note

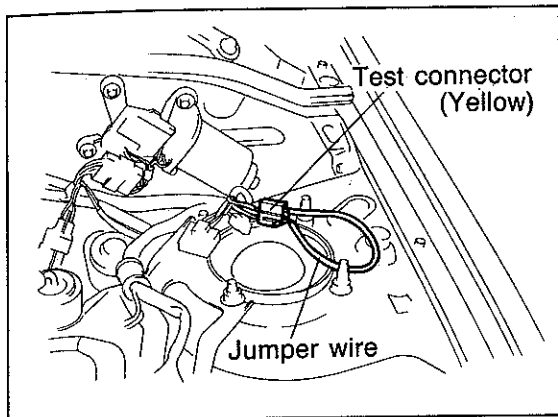
Warm up the engine to normal operating temperature.

#### Injection Pressure

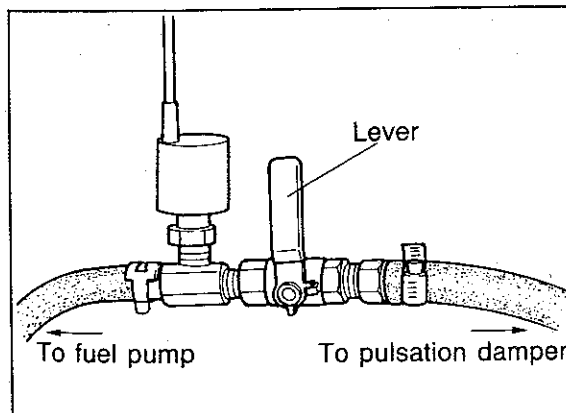
1. Set the lever on the adapter as shown in the figure.



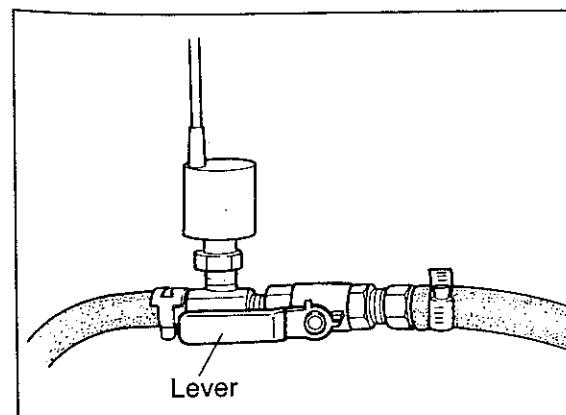
86U04A-074



86U04A-075



76F04B-048



76F04B-049

2. Run the engine and measure the injection pressure at various speeds.

**Injection pressure: Approx. 235—275 kPa (2.4—2.8 kg/cm<sup>2</sup>, 34—40 psi)**

3. If not within specification, check the fuel pump pressure and fuel line pressure.

### Fuel Pump Pressure

1. Connect the terminals of the test connector (Yellow) with a jumper wire.
2. Turn the ignition switch ON to operate the fuel pump.

3. Set the lever on the adapter as shown in the figure.
4. Check the fuel pump pressure.

**Fuel pump pressure: 441—588 kPa (4.5—6.0 kg/cm<sup>2</sup>, 64—85 psi)**

5. If the fuel pump pressure is not within specification, check the following;

#### No pressure

- Fuel pump operation. (Refer to page 4B—52.)

#### Low pressure

- Fuel pump feeding capacity. (Refer to page 4B—52.)

#### High pressure

- Replace the fuel pump.

6. After checking the fuel pump pressure, disconnect the jumper wire from the test connector.

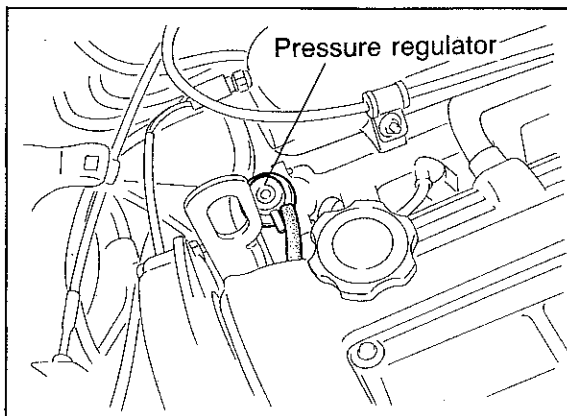
### Fuel Line Pressure

1. Start the engine and run it idle.
2. Set the lever on the adapter as shown in the figure.
3. Check the fuel line pressure.

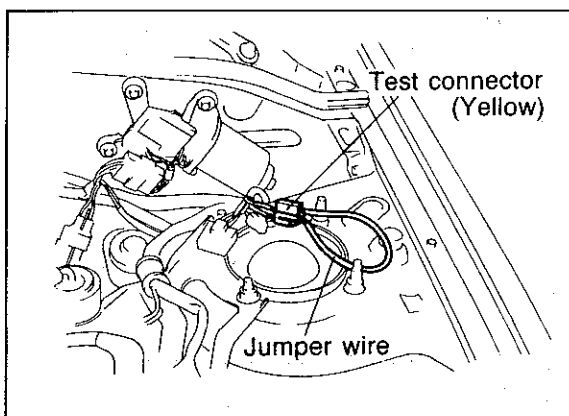
**Fuel line pressure: Approx. 186—226 kPa (1.9—2.3 kg/cm<sup>2</sup>, 27—33 psi)**

4. If not within specification, check the pressure regulator.

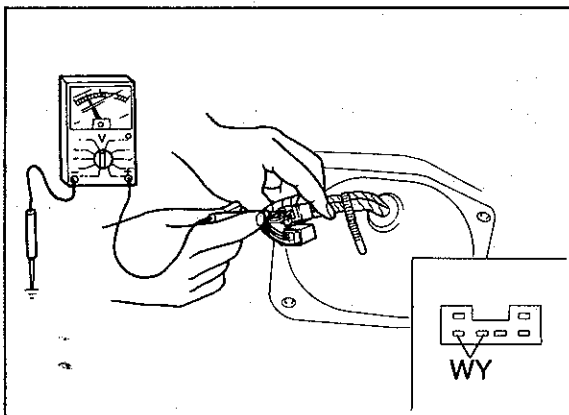
## 4B FUEL SYSTEM



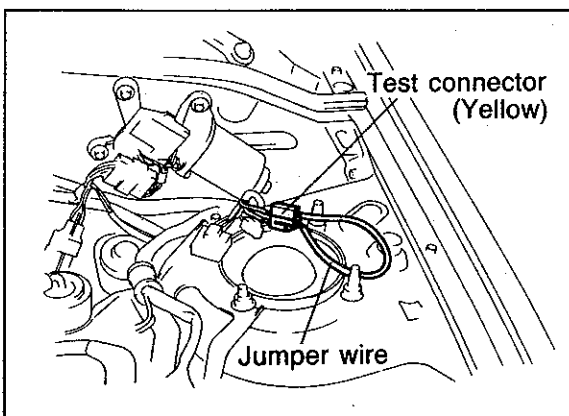
86U04A-078



76F04B-050



76F04B-051



76F04B-052

5. Disconnect the vacuum hose from pressure regulator, and place a finger over the end of the hose.
6. Check the fuel line pressure.

**Fuel line pressure: 235—275 kPa  
(2.4—2.8 kg/cm<sup>2</sup>, 34—40 psi)**

7. If not within specification, replace the pressure regulator.
8. Connect the vacuum hose to pressure regulator.

### FUEL PUMP

#### Operation Test

1. Connect a jumper wire to the test connector (Yellow).
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.
4. Listen for operation of the fuel pump at the filler inlet.
5. Install the fuel filler cap.

6. If no sound was heard, check the voltage at the fuel pump connector (WY wire and a ground).

**Voltage: 12V**

7. If the voltage is normal, replace the fuel pump.
8. If not correct, check the control relay and circuit. (Refer to page 4B—78.)
9. Disconnect the jumper wire.

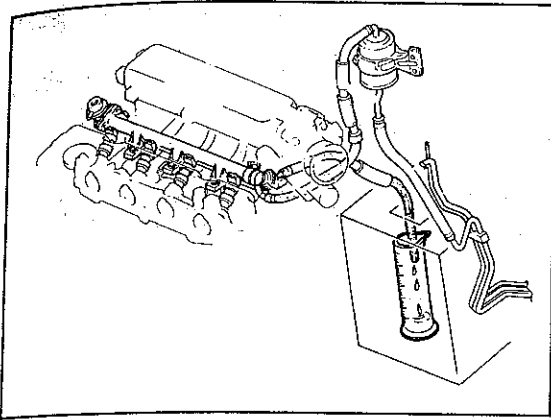
#### Volume Test

##### Warning

**Before performing the following procedures, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B—48.)**

1. Connect a jumper wire to test connector (Yellow).
2. Disconnect the fuel return hose from the fuel return pipe.





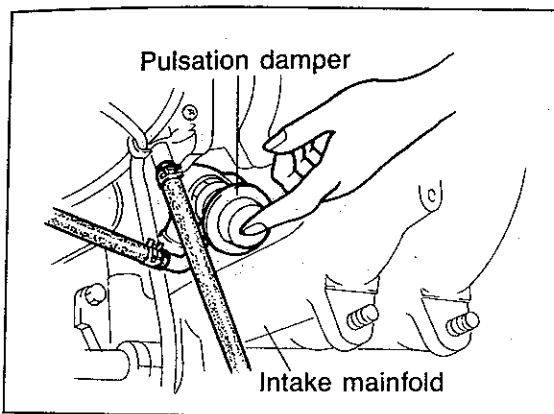
76F04B-053

3. Turn the ignition switch ON for 10 seconds, and check the feeding capacity with a graduated cylinder.

**Feeding capacity:**

**Minimum 220 cc (13.4 cu in)/10 sec.**

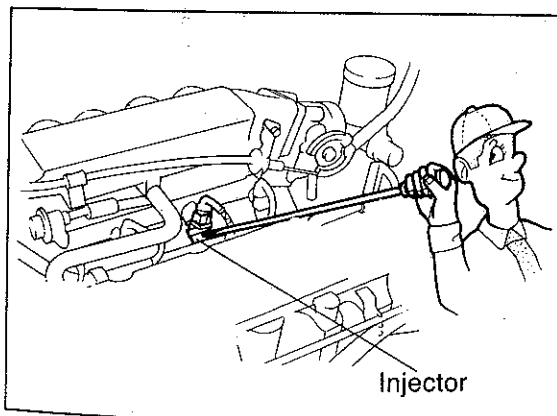
4. If not within specification, check the fuel filter, fuel lines, and fuel pump.
5. Turn the ignition switch OFF and disconnect the jumper wire.



86U04A-083

**PULSATION DAMPER**

1. Run the engine at idle.
2. Place a finger on the screw of the pulsation damper head.
3. Check that pulsation is felt.

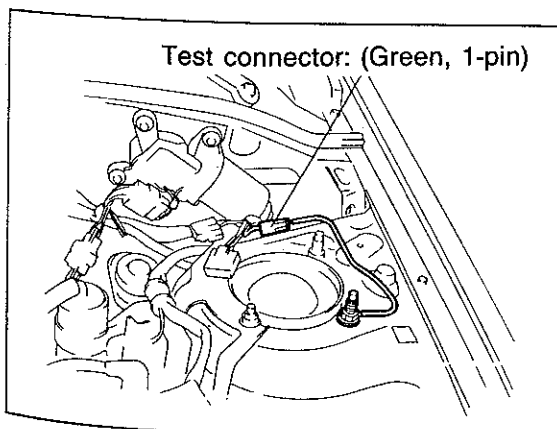


76F04B-054

**INJECTOR**

**On-vehicle Inspection**

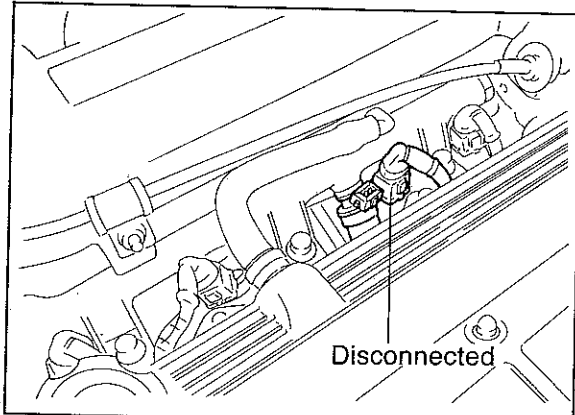
1. Warm up the engine and run it at idle.
2. Listen for operation of the injector with a screwdriver or a sound scope.



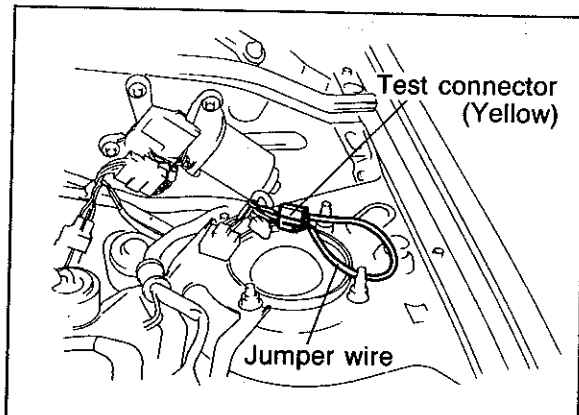
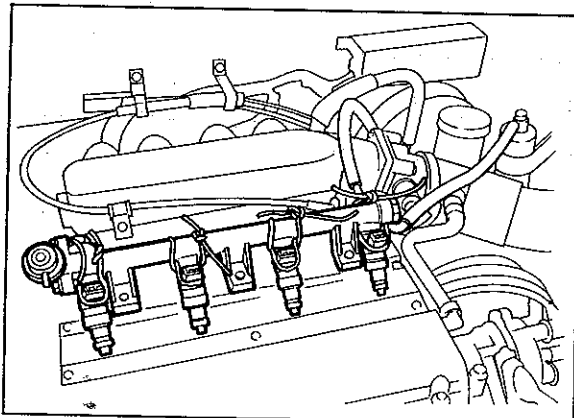
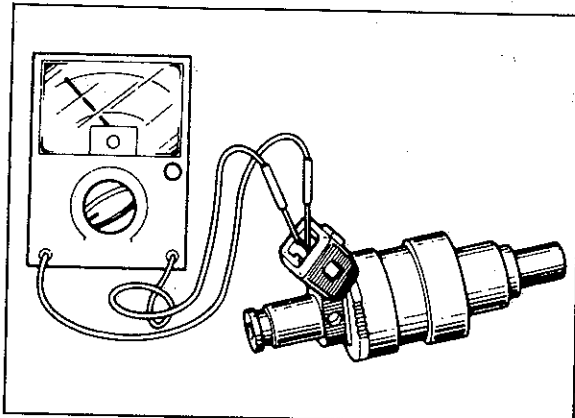
76G04C-102

3. Ground the test connector (Green, 1-pin).

## 4B FUEL SYSTEM



76G04C-103



76G04C-106

4. Disconnect the connector from each injector respectively.
5. Check that the engine speed decreases about **100—200 rpm** each time.
6. If not correct, check the following:

**No operating sound and no speed drop**  
Check injector wiring harness

**No speed drop only**  
Injector resistance  
Injection volume of injector

### Inspection

Perform the following inspections.

### Resistance

1. Remove the injectors from the engine. (Refer to page 4B—59.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

**Resistance: 12—16  $\Omega$**

### Fuel leakage test and volume test

1. Remove the injectors and delivery pipe. (Refer to pages 4B—56 and 58.)
2. Affix the injectors to the delivery pipe with wire.

### Caution

**Affix the injectors firmly so that no movement is possible.**

### Warning

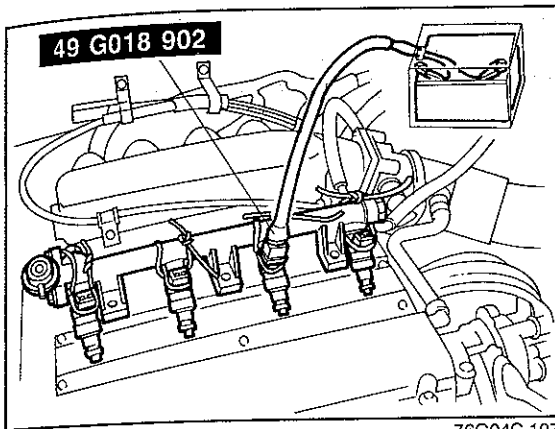
**Be extremely careful when working with fuel. Always work away from sparks or open flames.**

3. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON.
4. Check that no fuel leaks from the injector nozzles.

### Note

**After 1 minute, a drop of fuel from the injector is acceptable.**

# FUEL SYSTEM 4B



5. Connect the **SST** to the battery and injector.
6. Check the injection volume with a graduated container.

### Injection volume:

Approx. 66—91 cc (4.03—5.55 cu in) /15 sec.

### Caution

When using the **SST**, make sure of the **SST** number and use correct one.

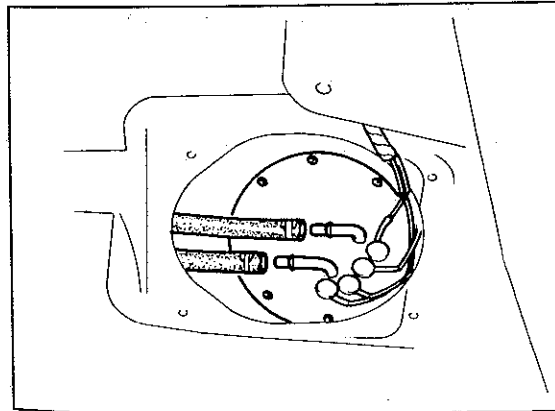
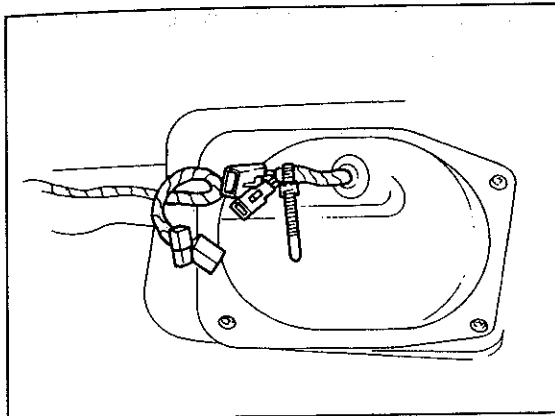
7. If not correct, replace the injector.

## REPLACEMENT

### Caution

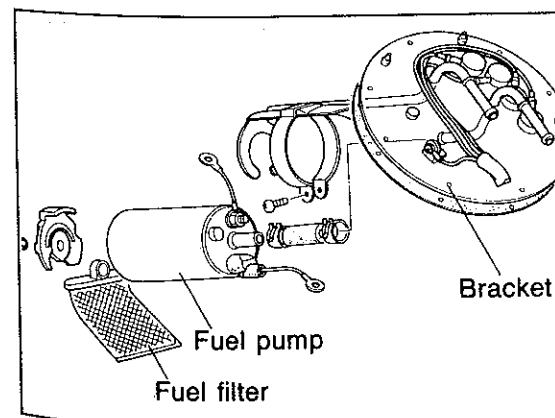
A) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B—48.)

b) When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.



### Fuel Pump

1. Remove the rear seat and disconnect the fuel pump connector.
2. Remove the service hole cover.
3. Disconnect the fuel hoses.
4. Remove the fuel pump and fuel tank gauge assembly.

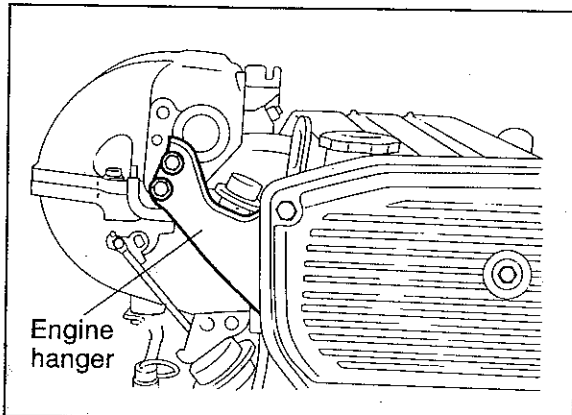


5. Install the fuel pump in the reverse order of removal.

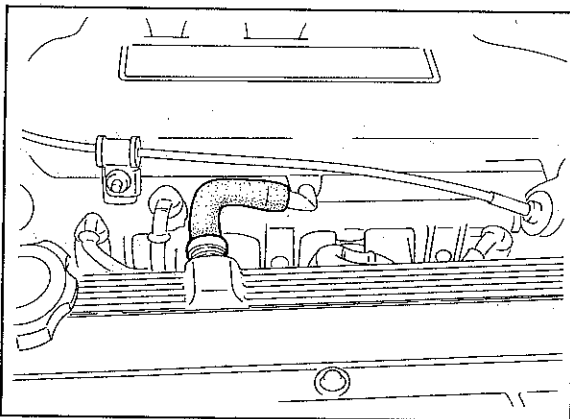
### Caution

Secure the fuel pump terminals and fuel hoses tightly.

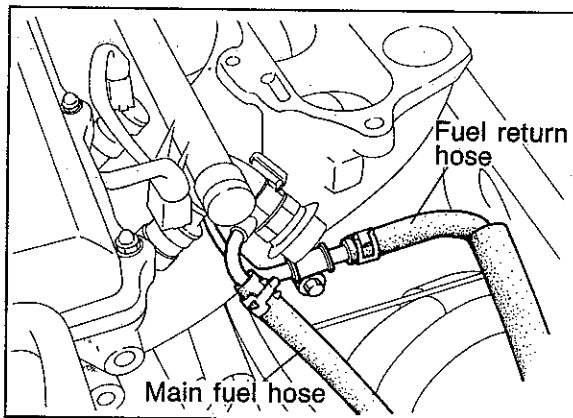
## 4B FUEL SYSTEM



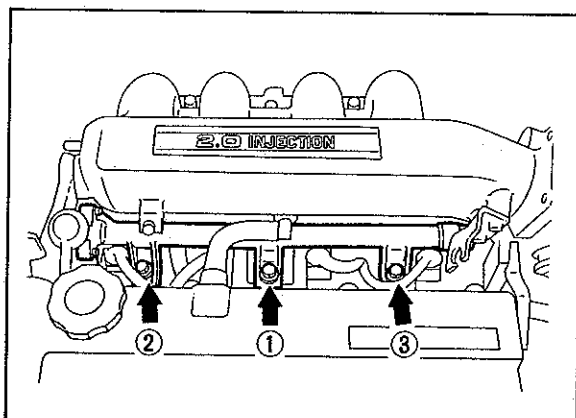
76G04C-113



76G04C-114



76G04C-115



76G04C-116

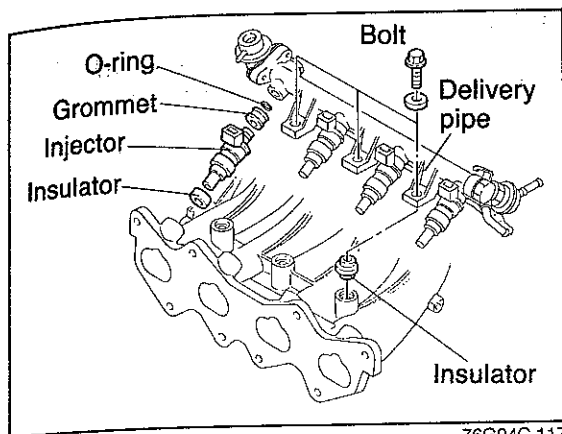
### Injector

1. Remove the engine hanger.
2. Remove the wiring harness bracket.

3. Disconnect the PCV valve and hose from the dynamic chamber.

4. Disconnect the main fuel hose from the delivery pipe assembly.
5. Disconnect the fuel return hose from the fuel return pipe.
6. Remove fuel return pipe mounting bolt.

7. Remove the delivery pipe assembly mounting bolts and insulators.

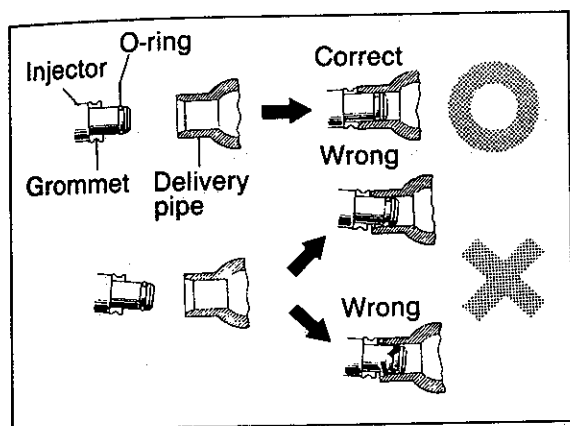


76G04C-117

8. Remove the grommets, injectors, and insulators.
9. Install in the reverse order of removal, referring to the installation note.

**Tightening torque:**

**Delivery pipe, dynamic chamber, and engine hanger**  
 19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

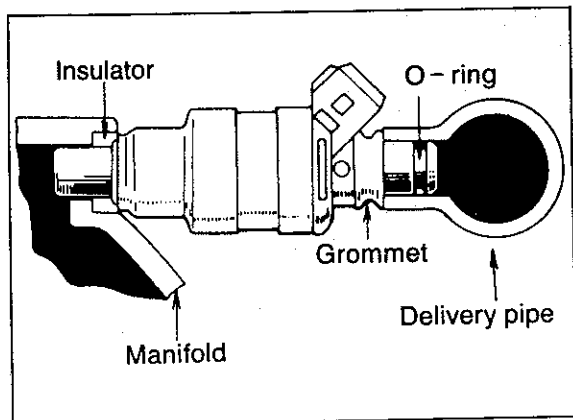


86U04A-108

**Installation note**

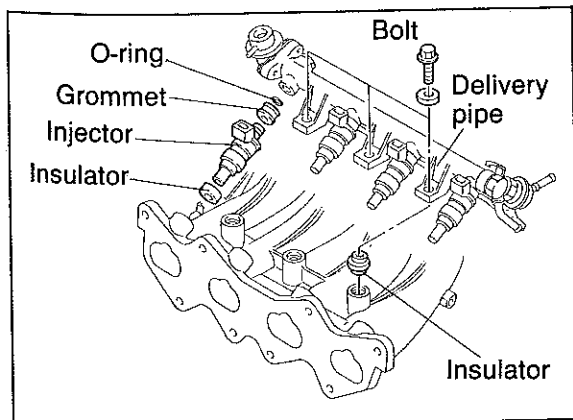
**Injector**

1. Use new O-rings.
2. Apply a small amount of engine oil to the O-rings when installing.



86U04A-109

3. Install the injectors and the injector insulators.

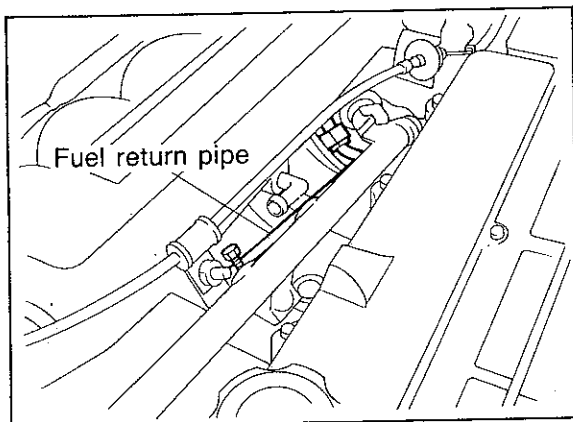


76G04C-118

**Insulator**

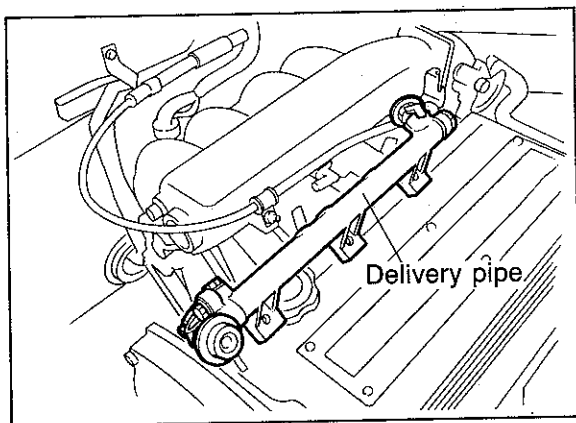
Install the insulators between the intake manifold and the delivery pipe.

## 4B FUEL SYSTEM



### Delivery Pipe

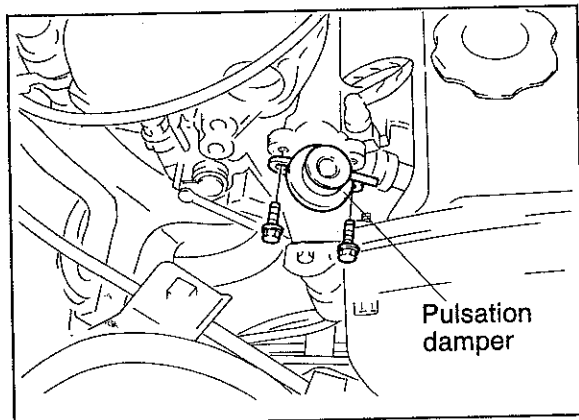
1. Remove the injectors. (Refer to page 4B-56.)
2. Separate the fuel return pipe from the delivery pipe assembly.



3. Replace the delivery pipe.
4. Install the reverse order of removal.

### Tightening torque:

Fuel return pipe 8-11 N·m  
(0.8-1.1 m·kg, 69-95 in·lb)

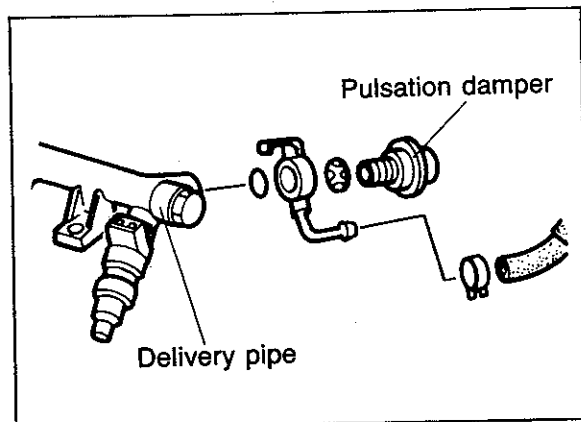


### Pressure Regulator

1. Remove the engine hanger.
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the pressure regulator.
4. Install in the reverse order of removal.

### Tightening torque:

8-11 N·m (0.8-1.1 m·kg, 69-95 in·lb)

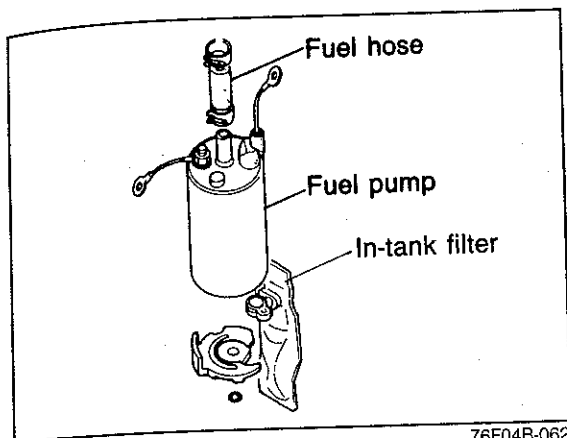


### Pulsation Damper

1. Remove the delivery pipe assembly.
2. Remove the pulsation damper.
3. Install in the reverse order of removal.

### Tightening torque:

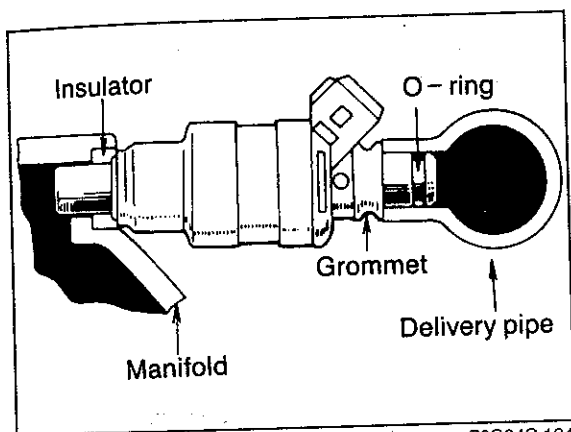
25-34 N·m (2.5-3.5 m·kg, 18-25 ft·lb)



## Fuel Filter

### Low-pressure side (In-tank filter)

Refer to page 4B-55.



### High-pressure side

The fuel filter must be replaced at the intervals outlined in the maintenance schedule.

### Warning

**Always work away from sparks or open flames.**

1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

### Note

**When installing the filter, push the fuel hoses fully onto the fuel filter and secure them with spring clamps.**

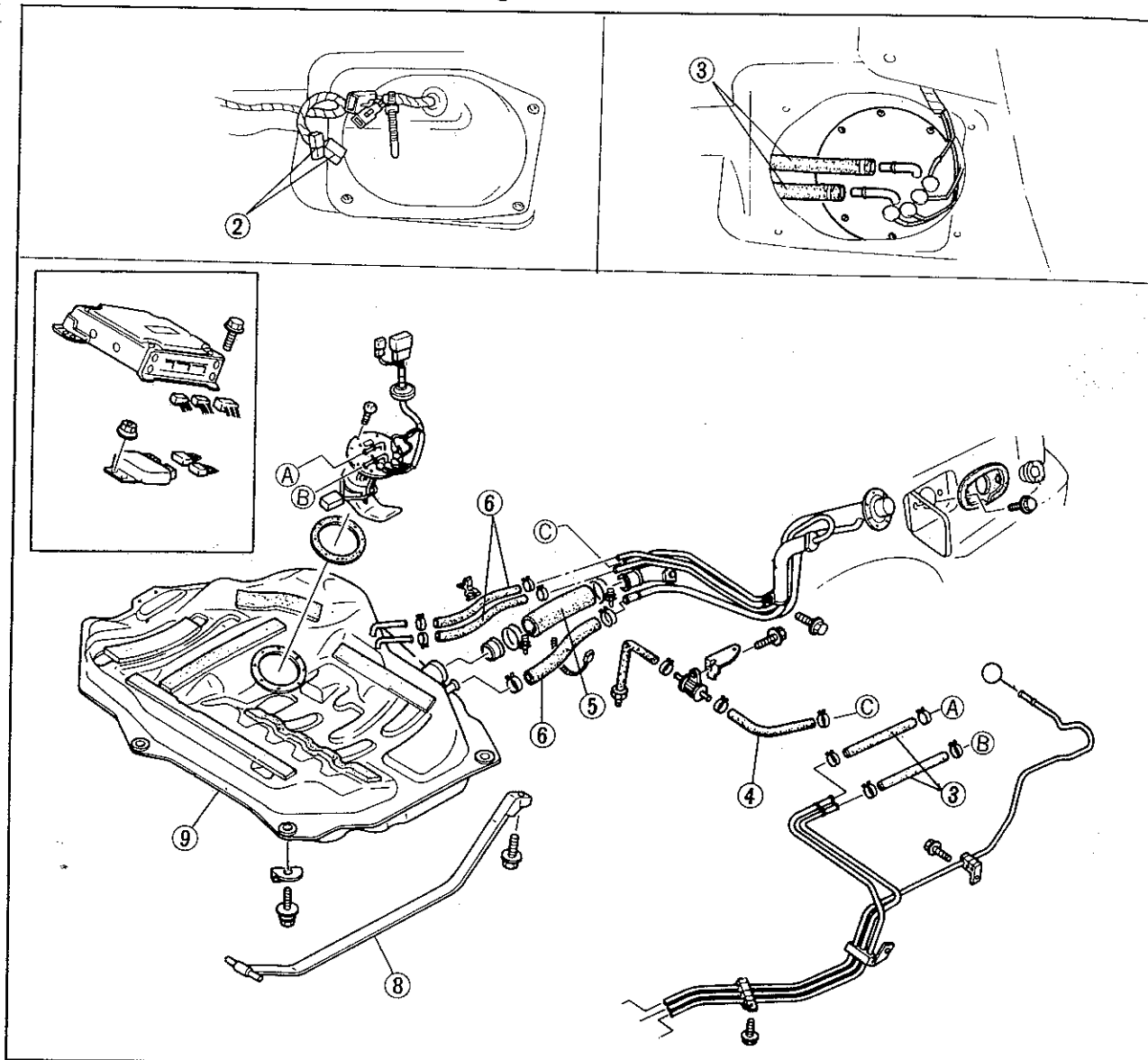
## 4B FUEL SYSTEM

### FUEL TANK Removal

#### Caution

- a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B—48.)
- b) When removing the fuel tank, keep sparks, cigarettes, and open flames away from the tank.

Remove in the sequence shown in the figure.



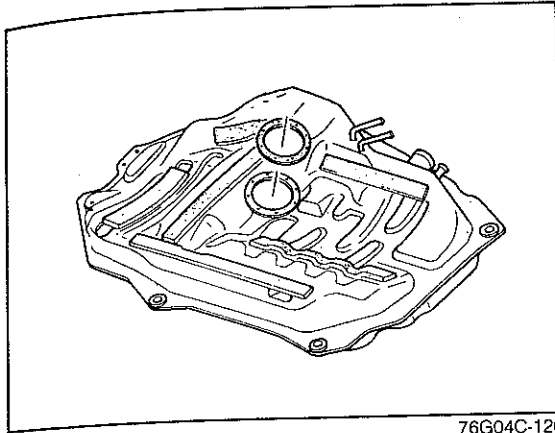
76F04B-063

#### Note

**Drain the fuel from the fuel tank before removing the tank.**

- |                         |                          |
|-------------------------|--------------------------|
| 1. Fuel filler cap      | 6. Breather hose         |
| 2. Fuel pump connectors | 7. Parking cable bracket |
| 3. Fuel hoses           | 8. Fuel tank strap       |
| 4. Evaporative hoses    | 9. Fuel tank             |
| 5. Fuel filler hose     |                          |





76G04C-126

### Inspection

1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

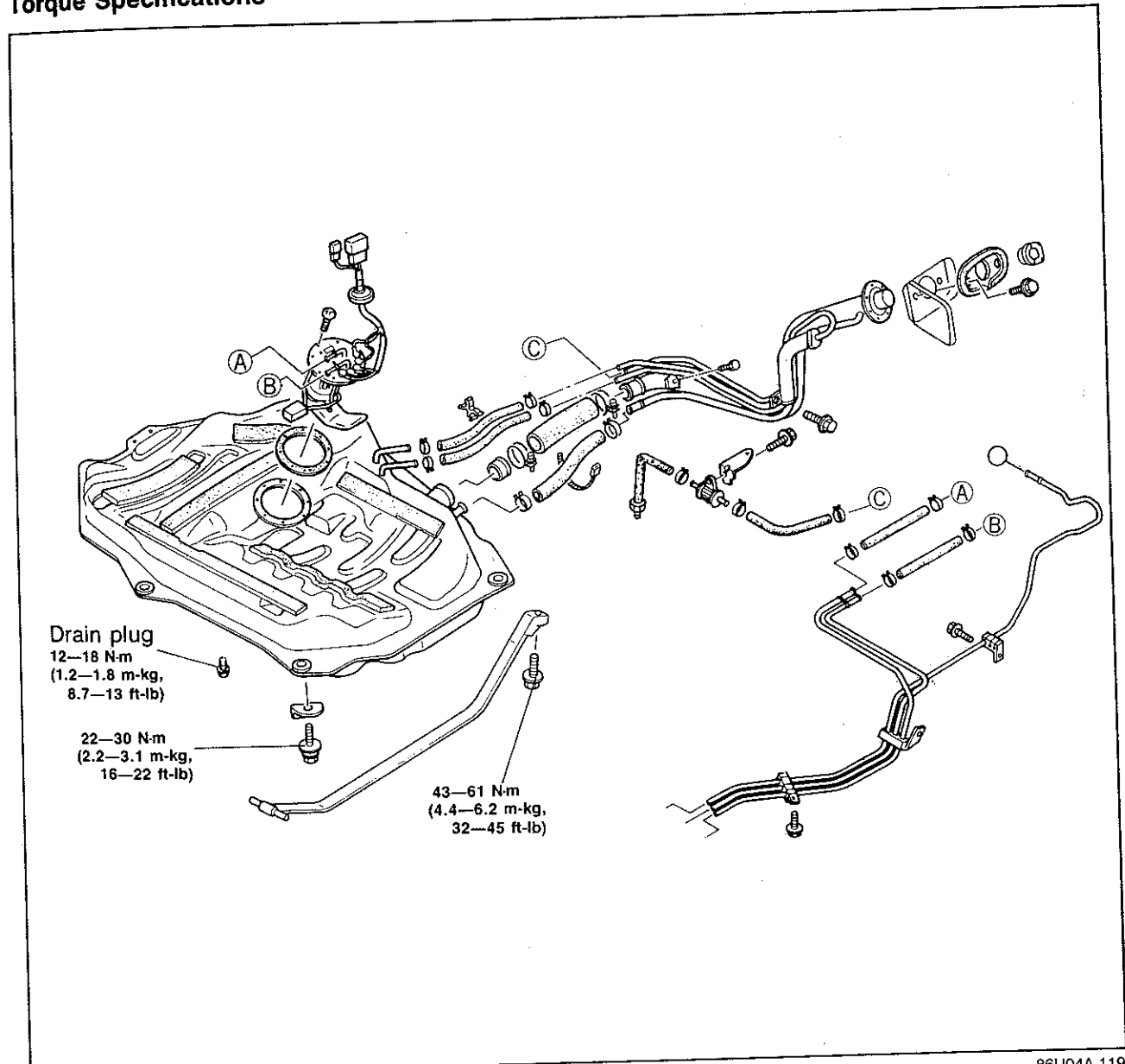
### Warning

**Before repairing, clean the fuel tank thoroughly with steam to remove all explosive fuel and fumes.**

### Installation

Install in the reverse order of removal, referring to the installation note.

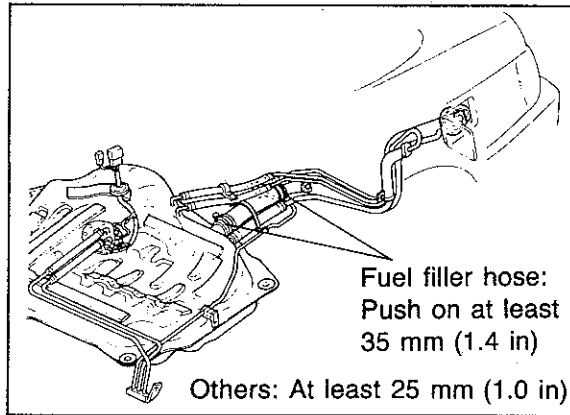
### Torque Specifications



fuel sys-  
from the

4B-063

## 4B FUEL SYSTEM



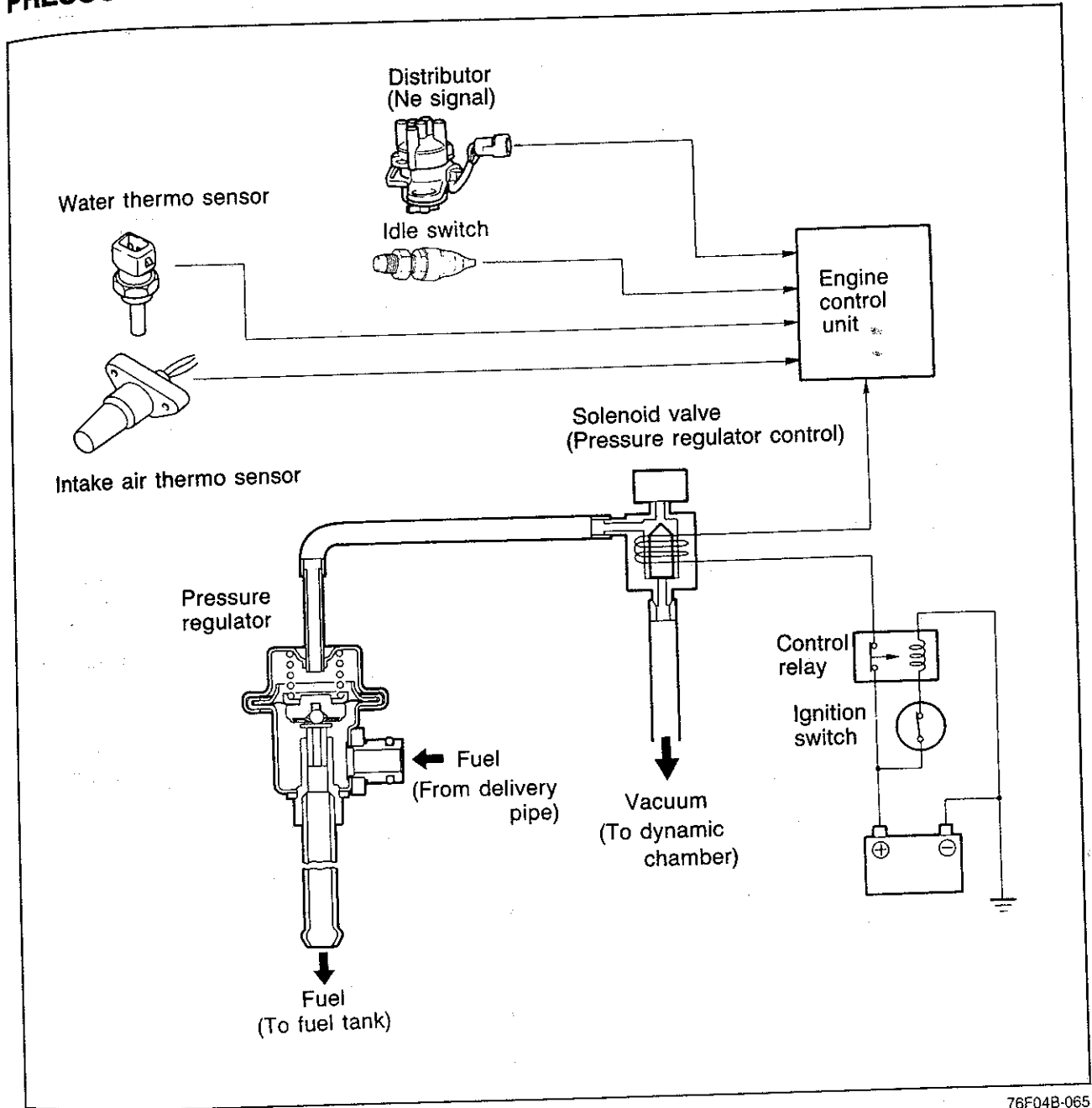
76F04B-064

### Installation note

#### Hoses

1. Push the ends of the main fuel hose, fuel retu hose, and evaporation hoses onto the fuel tank tings **at least 25 mm (1.0 in)**.
2. Push the fuel filler hose onto the fuel tank pipe a filler pipe **at least 35 mm (1.4 in)**.

**PRESSURE REGULATOR CONTROL (PRC) SYSTEM**



76F04B-065

To prevent percolation of the fuel during idle after the engine is restarted, vacuum is cut to the pressure regulator, increasing the fuel pressure.

**Specified time: Approx. 120 sec.**

**Operating condition: Coolant temperature — above 70°C (158°F)**  
**Intake air temperature — above 50°C (122°F)**

# 4B PRC SYSTEM

## COMPONENT DESCRIPTION

Component	Function	Remark
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Solenoid valve (Pressure regulator control)	Controls vacuum to pressure regulator	Cuts vacuum when hot
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Idle switch	Detects when throttle valve closed; sends signal to engine control unit	ON at idle

76G04C-129

## TROUBLESHOOTING

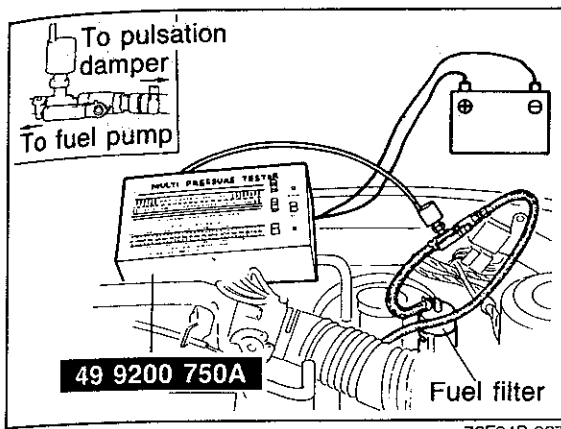
Check the condition of the wiring harness and connectors before checking the sensors or switches.

### Note

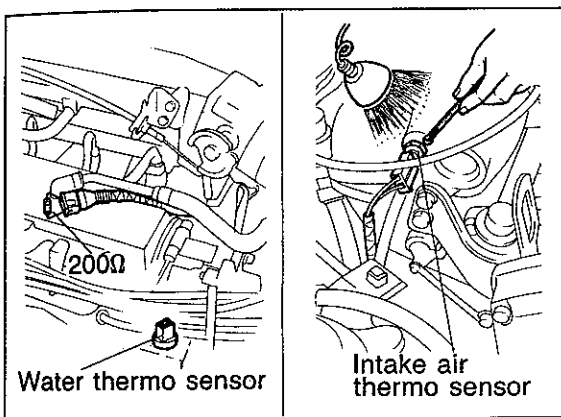
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4B—10 and 11.)

Possible cause Page	Solenoid valve (Pressure regulator control)	Water thermo sensor	Intake air thermo sensor	Engine control unit terminal	System inspection
				2K	
Symptom	4B—65	4B—86	4B—88	4B—80	4B—65
Engine stalls or runs rough after hot starting	2	3	4	5	1

76F04B-066



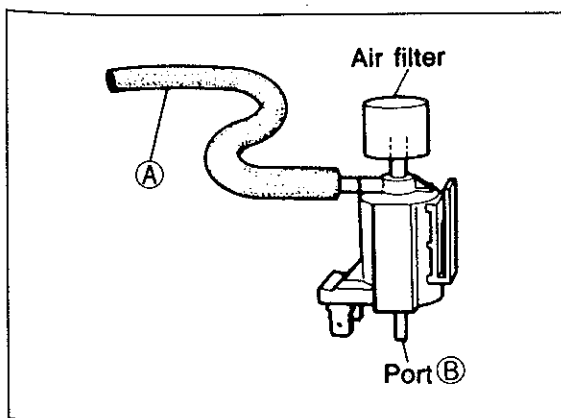
76F04B-067



76F04B-068

Operating time	Fuel line pressure kPa (kg/cm <sup>2</sup> , psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

76G04C-133



76G04C-134

### System Inspection

1. Connect the **SST** to the engine. (Refer to page 4B—49.)
2. Start the engine.

3. Warm up the engine to normal operating temperature and stop the engine.

### Warning

**Be careful when disconnecting the water thermo sensor connector because the surrounding area is very hot.**

4. Disconnect the water thermo sensor connector. Connect a resistor (**200 Ω**) to the sensor connector.
5. Heat the intake air thermo sensor as specified.

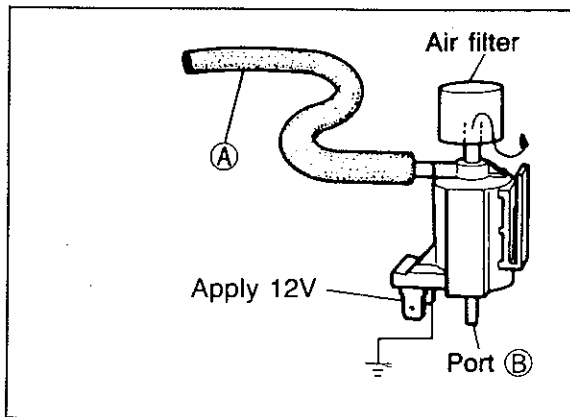
**Specification: 50°C (122°F) min.**

6. Restart the engine.
7. Check the fuel line pressure and operating times as shown in the chart.

### Solenoid Valve (Pressure Regulator Control) Inspection

1. Disconnect the vacuum hose from the vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.

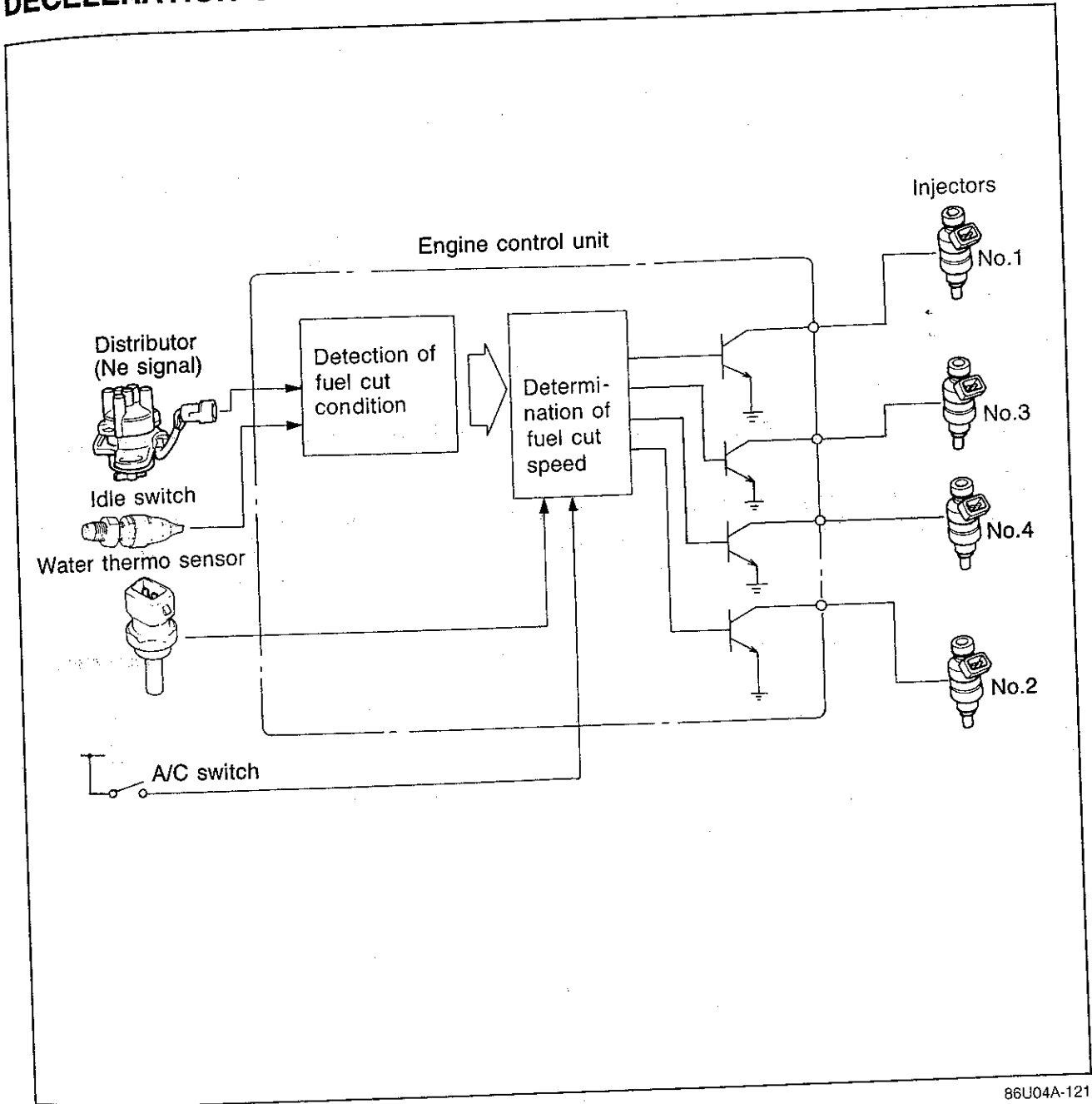
## 4B PRC SYSTEM



76F04B-069

4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the air filter.

## DECELERATION CONTROL SYSTEM



86U04A-121

The fuel cut system is provided as a deceleration control system.  
This system is to improve fuel economy.

# 4B DECELERATION CONTROL SYSTEM

## COMPONENT DESCRIPTION

Component	Function	Remarks
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	ON at idle
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

76G

## TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensors or swit

### Note

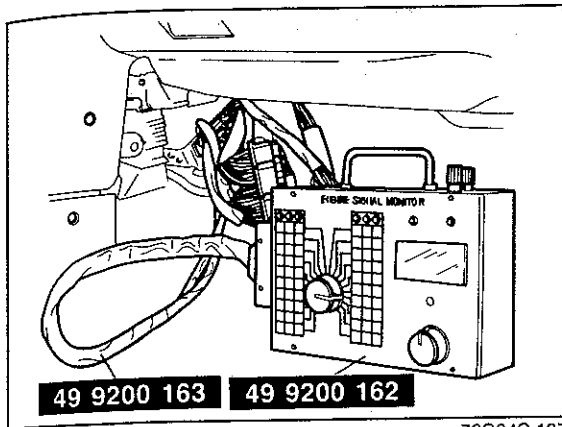
Make the system inspection first. If no problem is found, continue with inspection o next system of the Troubleshooting Guide. (Refer to pages 4B—10 and 11.)

Possible cause	Water thermo sensor	System inspectio
Page	4B—86	4B—69
Checking order	2	1

76F0



# DECELERATION CONTROL SYSTEM 4B



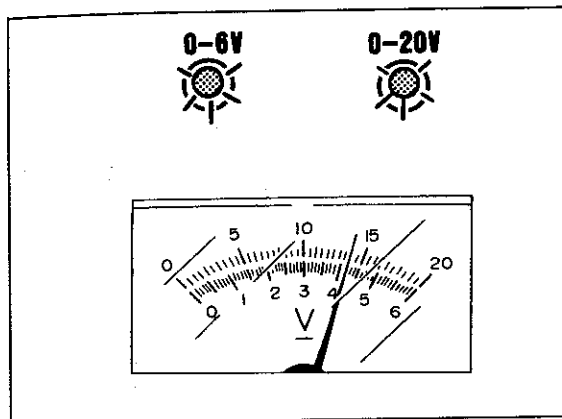
76G04C-137

## System Inspection (Electrical Signal)

1. Connect the **SST** between the wiring harness and control unit.
2. Set 3C, 3E 3F, or 3H position on the **SST**.

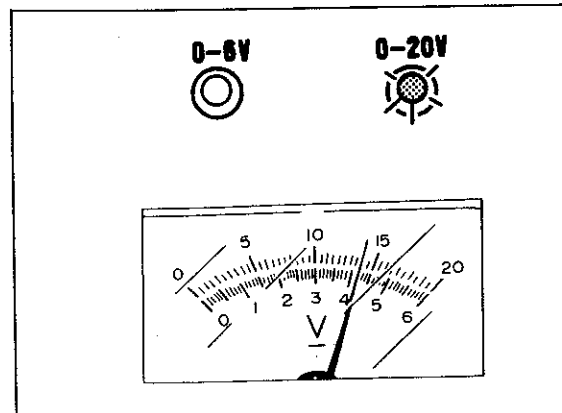
### Note

- 3C — For No. 2 injector
- 3E — For No. 1 injector
- 3F — For No. 4 injector
- 3H — For No. 3 injector



86U04A-125

3. Check that the indicator lamps alternately flash at idle.

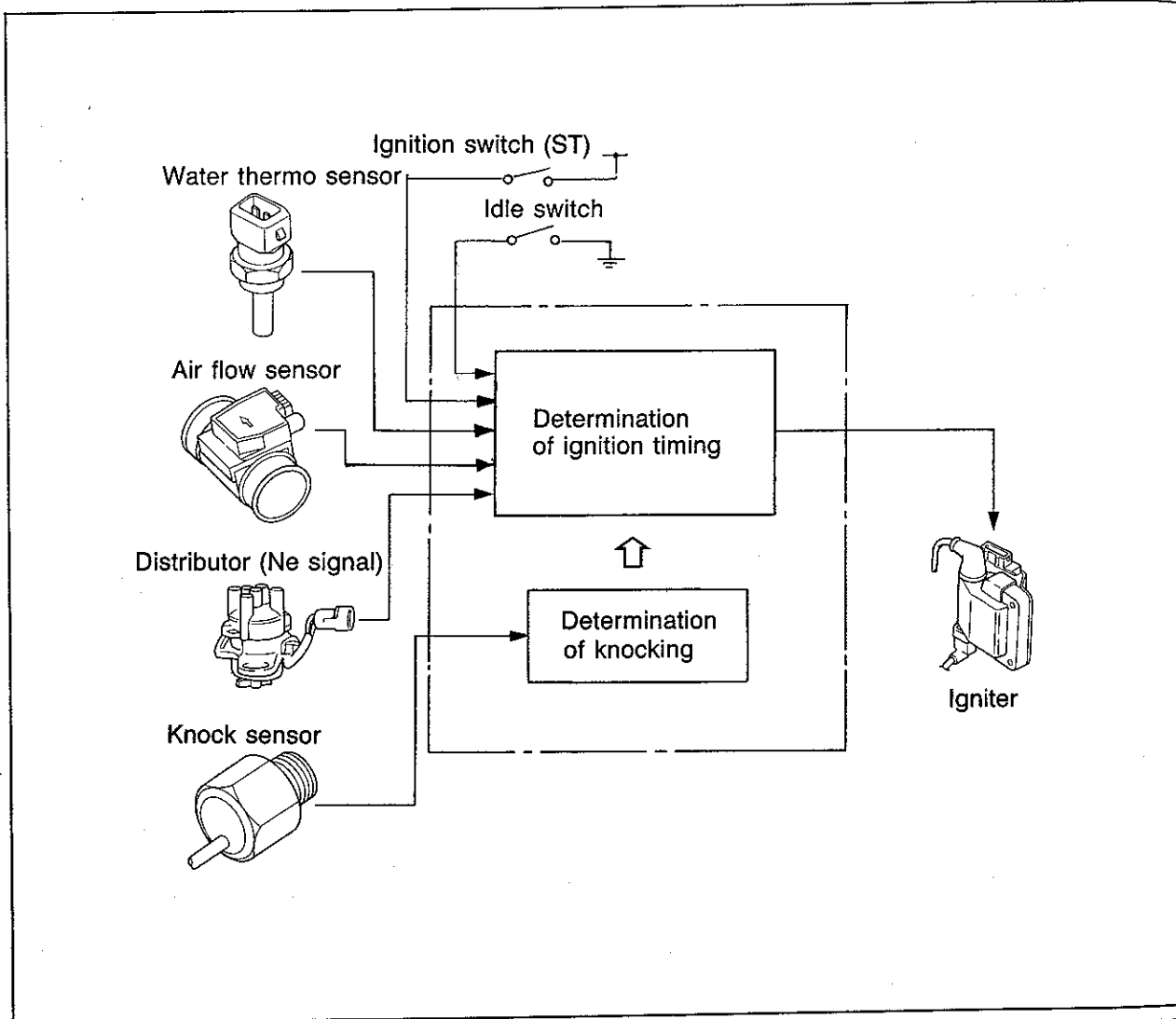


76F04B-071

4. Increase the engine speed to **4,000 rpm**, then suddenly decelerate.
5. Check that the green indicator lamp is OFF during deceleration.
6. Accelerate and check that the voltage decreases.

# 4B ESA CONTROL SYSTEM

## ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM



This system electronically controls the ignition timing to obtain the best engine performance. The optimum ignition timing is determined and set within the engine control unit based on signals from the various sensors and switches.

## COMPONENT DESCRIPTION

Component	Function	Remark
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	
Distributor	Has Ne and G signal pick-up and distributes secondary voltage to spark plugs	
Engine control unit	Detects signals from input sensors and switches; decides best ignition timing	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Igniter	Receives spark signal from engine control unit and generates high voltage in ignition coil	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Knock sensor	Detects engine knocking; sends signal to knock control unit	

76F04B-073

## TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensors or switches.

### Note

If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4B-10 and 11.)

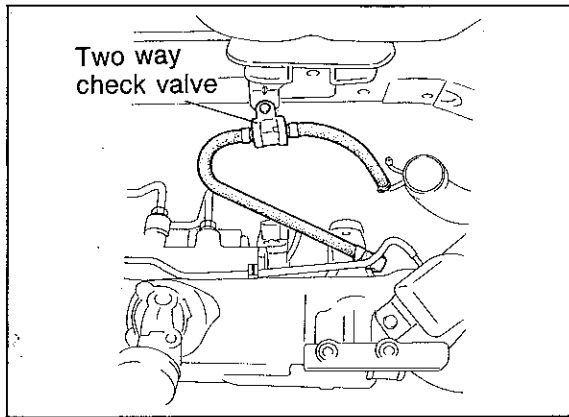
Symptom	Possible cause	Air flow sensor	Igniter	Engine control unit terminal	Knock sensor
		4B-85	Refer to section 5	4B-80	4B-88
Hard start or won't start (Crank OK)	Page	3	1	2	—
Knocking		—	—	—	1

76F04B-074

76F04B-072

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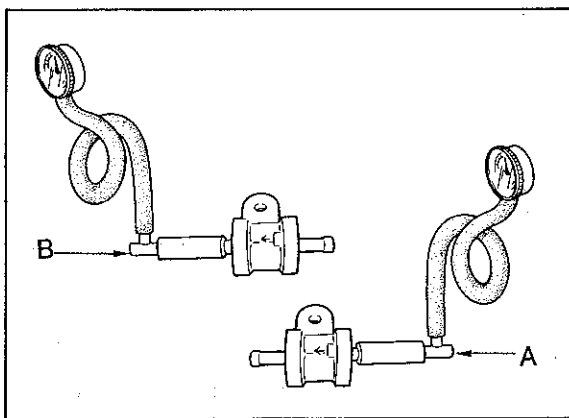
## 4B EEC SYSTEM



### EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM

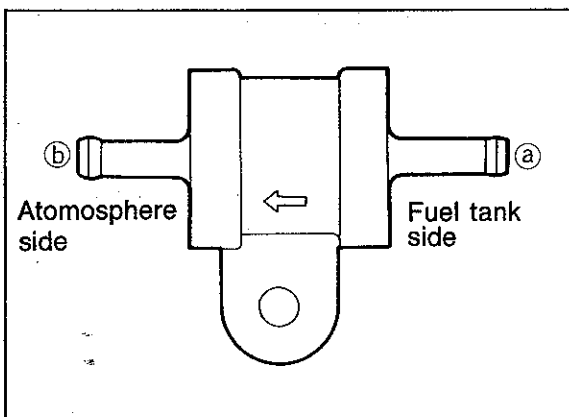
#### Two-way check valve Inspection

1. Remove the two-way check valve.
2. Connect a pressure gauge to the fuel tank side.
3. Blow through the valve from port A. Verify that the valve opens at **2.94 kPa (0.03 kg/cm<sup>2</sup>, 0.43 psi)**.
4. Remove the pressure gauge and connect it to the atmosphere side.
5. Blow through the valve from port B. Verify that the valve opens at **0.98 kPa (0.01 kg/cm<sup>2</sup>, 0.14 psi)**.



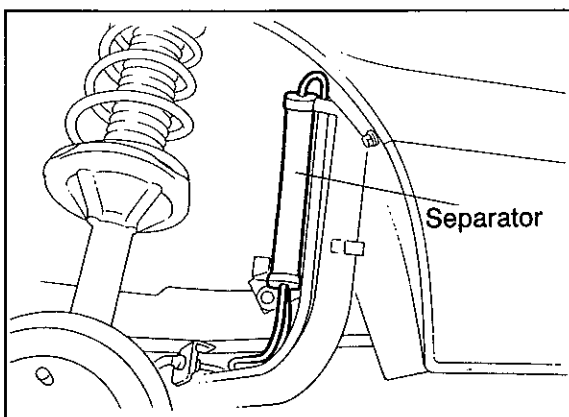
#### Replacement

1. Remove the two-way check valve.
2. Install the new valve with the arrow on the valve facing the atmosphere side.

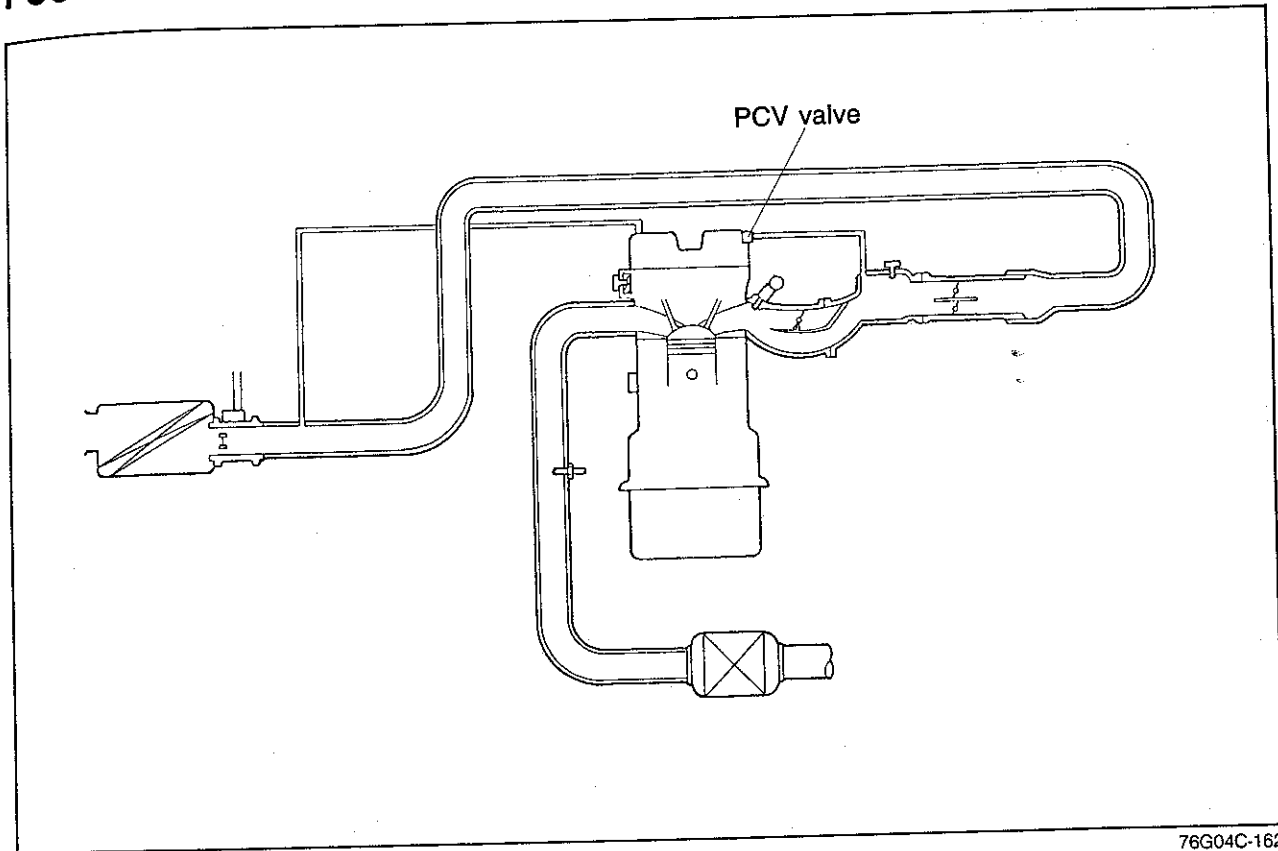


#### Separator

1. Remove the separator.
2. Visually check the separator for damage.
3. Replace, if necessary.



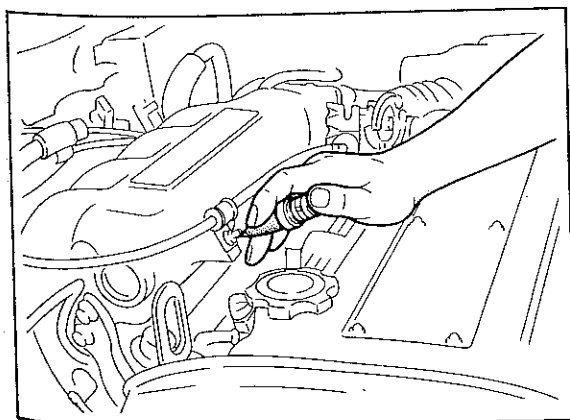
**POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM**



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. At high engine speeds, the PCV valve is further opened and a larger amount of blow by gas is drawn into the dynamic chamber.

**COMPONENT DESCRIPTION**

Component	Function	Remark
PCV valve	Controls blowby gas amount pulled into engine	



**PCV VALVE**

1. Warm up the engine to operating temperature and run it at idle.
2. Disconnect the PCV valve and the ventilation hose from the cylinder head cover.
3. Close the PCV valve opening.
4. Check that vacuum is felt.

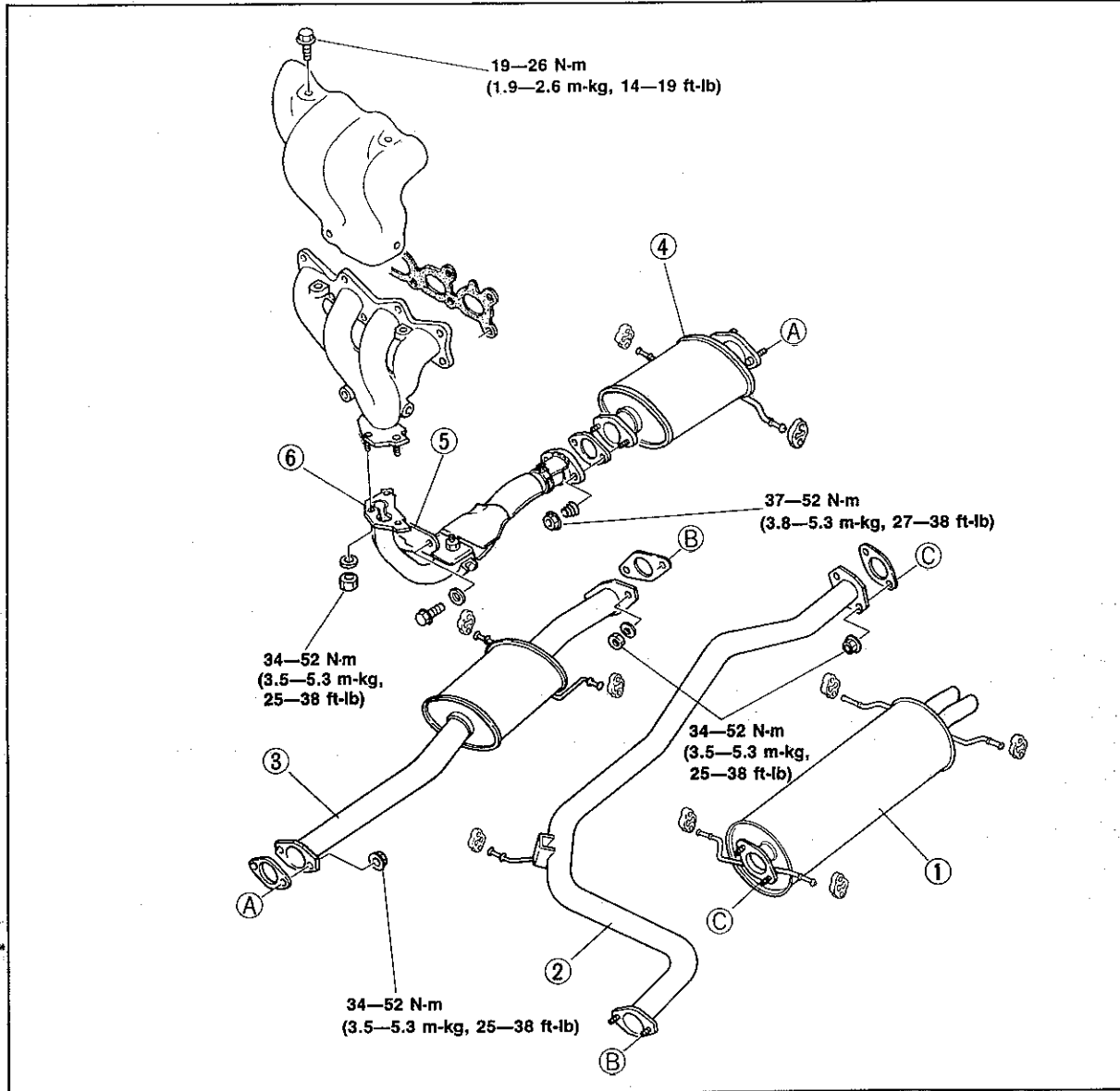
# 4B EXHAUST SYSTEM

## EXHAUST SYSTEM

### REMOVAL AND INSTALLATION

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

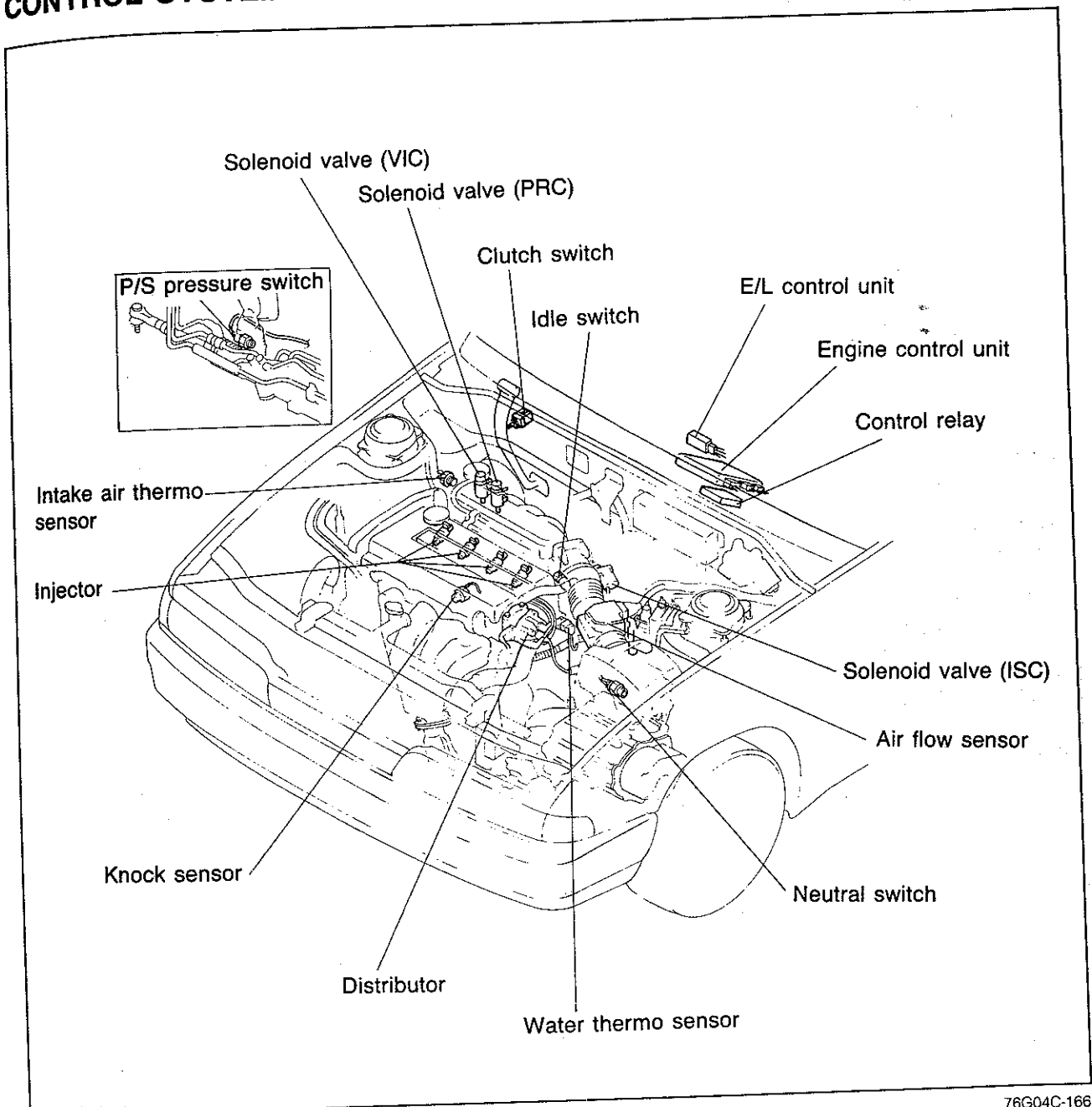
### Torque Specifications



1. Main silencer
2. Middle pipe
3. No. 2 presilencer

4. No. 1 presilencer
5. Bracket
6. Front pipe

## CONTROL SYSTEM



76G04C-166

The control system consists of the input devices and the engine control unit. The control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, ignition timing, switch monitor function, and fail-safe function.

# 4B CONTROL SYSTEM

**RELATIONSHIP CHART**  
Output Devices and Input Devices

INPUT DEVICE	OUTPUT DEVICE											
	INJECTOR	FUEL INJECTION AMOUNT	FUEL INJECTION TIMING	AIR VALVE	ISC VALVE	FUEL PUMP CONTROL	MAIN POWER CONTROL	SOLENOID VALVE (PRESSURE REGULATOR CONTROL)	SOLENOID VALVE (VARIABLE INERTIA CONTROL)	A/C RELAY	IGNITER	AIR FLOW SENSOR (BURN-OFF)
IGNITION SWITCH (ON POSITION)	X	X	X	X	X	X	O	X	X	X	X	O
TEST CONNECTOR	X	X	X	O	X	X	X	X	X	X	O	X
KNOCK SENSOR	X	X	X	X	X	X	X	X	X	X	O	X
ELECTRICAL LOAD CONTROL UNIT	X	X	X	O	X	X	X	X	X	X	X	X
P/S PRESSURE SWITCH	X	X	X	O	X	X	X	X	X	X	X	X
A/C SWITCH	X	X	X	O	X	X	X	X	X	O	X	X
IGNITION SWITCH (STA POSITION)	O	O	X	O	O	X	X	O	X	X	O	X
NEUTRAL AND CLUTCH SWITCHES	O	X	X	O	X	X	X	X	X	X	X	X
INTAKE AIR THERMO SENSOR	X	X	X	X	X	X	X	O	X	X	X	X
WATER THERMO SENSOR	O	X	X	O	X	X	X	O	X	X	O	O
IDLE SWITCH	O	X	X	O	X	X	X	O	X	X	O	X
VARIABLE RESISTOR (IN AIR FLOW SENSOR)	O	X	X	X	X	X	X	X	X	X	X	X
AIR FLOW SENSOR	O	X	X	X	X	X	X	X	X	X	O	O
Ne SIGNAL	O	O	X	O	O	O	X	O	O	X	O	O
G SIGNAL	X	O	X	X	X	X	X	X	X	X	X	X

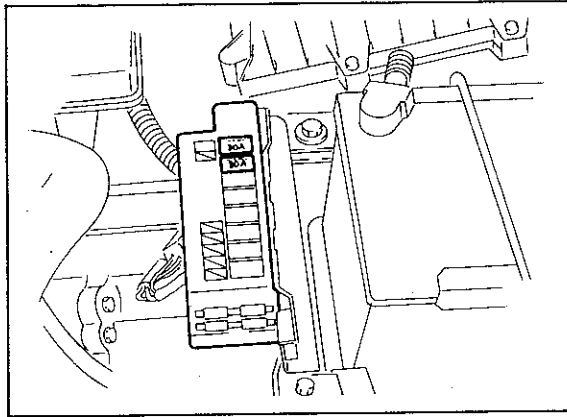


## Output Devices and Engine Conditions

ENGINE CONDITION		CRANKING WARMING UP (COLD ENGINE)	MEDIUM LOAD		ACCELERATION	HEAVY LOAD	DECELERATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
<b>INJECTOR</b>	FUEL INJECTION AMOUNT	Rich	Normal	Rich	Rich	Fuel cut*	Rich	No injection	Above 7,000 rpm: fuel cut	
	FUEL INJECTION TIMING	1-group (twice per revolution)	Sequential (Once per two revolutions)		Closed		Sequential (Once per two revolutions)		*Coolant temp.: below 50° (122°F)	
<b>BAC VALVE</b>	AIR VALVE	Open*			Closed					
	ISC VALVE	Large amount of bypass air	Small amount of bypass air		No bypass					
<b>CONTROL RELAY</b>	FUEL PUMP CONTROL	ON (Main fuel pump operates)		OFF (Main fuel pump not operated)						
	MAIN POWER CONTROL	ON		ON						
<b>SOLENOID VALVE (PRESSURE REGULATOR CONTROL)</b>	SOLENOID VALVE (PRESSURE REGULATOR CONTROL)	OFF (Vacuum to pressure regulator)		OFF			*After starting: ON (Vacuum cut)	OFF	* During hot starting only	
	SOLENOID VALVE (VARIABLE INERTIA CONTROL)	OFF	ON* (Vacuum to shutter valve actuator)		OFF			OFF	* Engine speed: above 5,400 rpm	
<b>A/C RELAY</b>	OFF	ON*		ON*				OFF	*Delays 0.5 seconds	
<b>IGNITER</b>	Fixed at BTDC 6°	Fixed at BTDC 12°	Advanced (Depends on engine conditions)		—					
<b>AIR FLOW SENSOR (BURN-OFF)</b>	OFF* (Burn-off does not function)		OFF*		OFF*				* Operates momentarily after engine stopped	

X	O	O	X	X	O	X	X	X	X	X	X	O
---	---	---	---	---	---	---	---	---	---	---	---	---

# 4B CONTROL SYSTEM

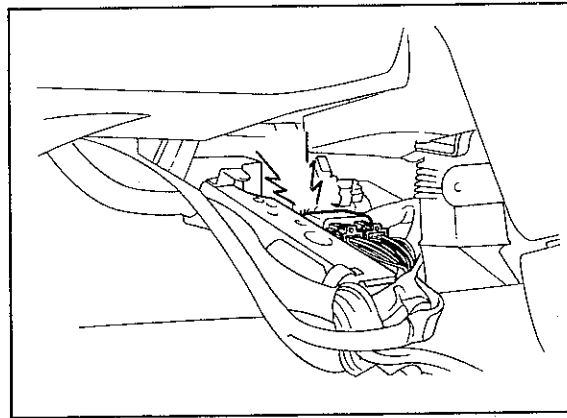


76F04B-082

## EGI MAIN FUSE

### Inspection

Check continuity of the EGI main fuse.



76G04C-171

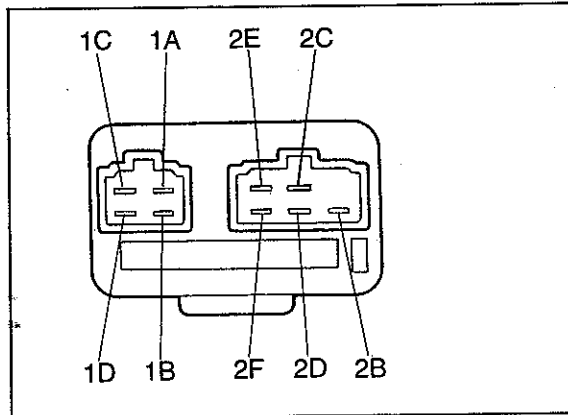
## CONTROL RELAY

### Power Supply Circuit

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

### Note

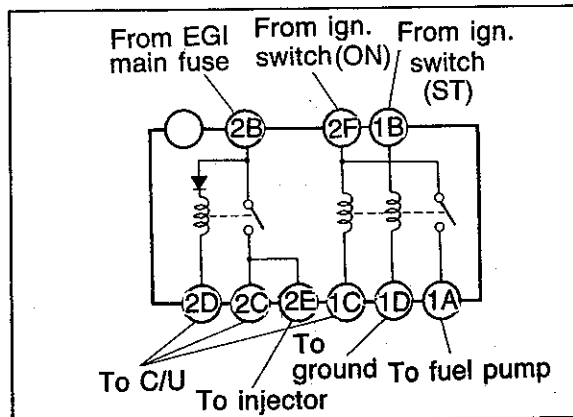
The control relay is located under the ce console.



76G04C-172

2. Apply 12V to the 2B terminal and ground the terminal of the control relay.
3. Check voltage at the terminals with an voltm

	2D terminal	Grounded	Not grou
Terminals			
2C		12V	0V
2E		12V	0V

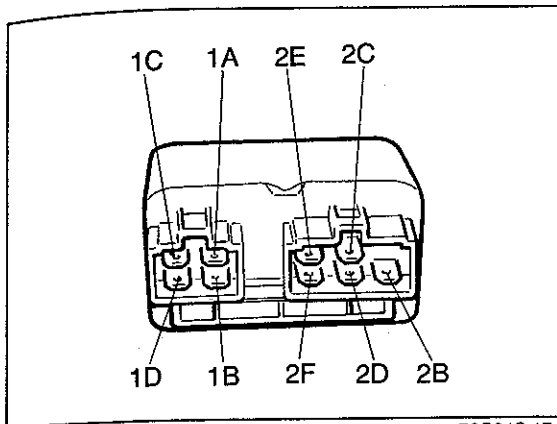


76G04C-173

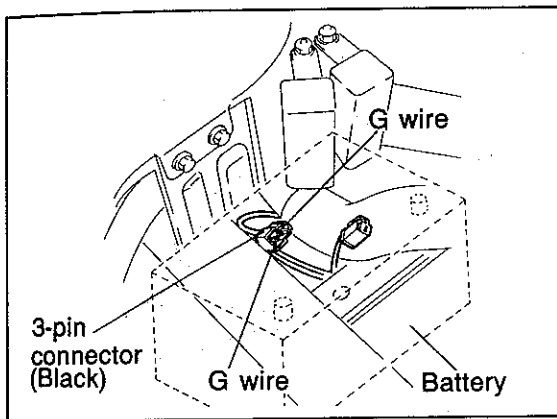
## Fuel Pump Circuit

1. Apply 12V and a ground to the terminals desc below and check the terminals with an ohmr or voltmeter.

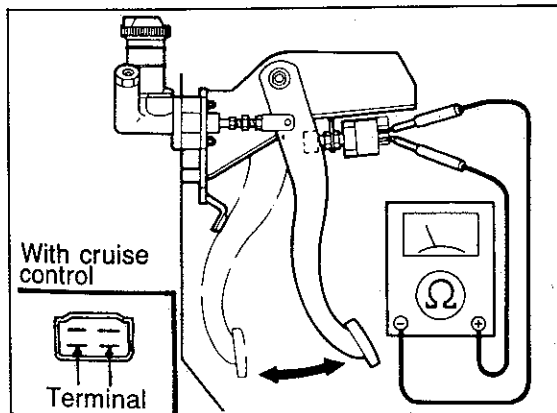
Terminal applied 12V	Terminal grounded	Terminal checked	Corre conditi
1B	1D	2F-1A	Continu
2F	1C	1A	Approx.



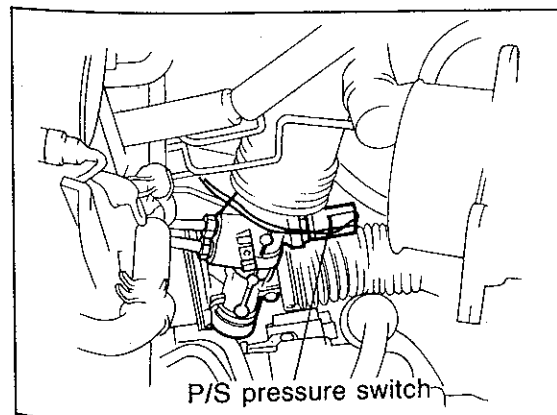
76G04C-174



76G04C-175



76G04C-176



76G04C-177

### Resistance

Check resistance between the terminals with an ohmmeter.

Between terminals	Resistance ( $\Omega$ )
1B ↔ 1D	More than approx. 20
2F ↔ 1C	More than approx. 60
2F ↔ 1A	$\infty$
2B ↔ 2D	More than approx. 60
2B ↔ 2C	$\infty$

### NEUTRAL SWITCH Inspection

1. Disconnect the neutral switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Transmission	Continuity
In neutral	No
In other ranges	Yes

4. Reconnect the switch connector.

### Note

Refer to Section 7A for replacement of the neutral switch.

### CLUTCH SWITCH Inspection

1. Disconnect the clutch switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Pedal	Continuity
Depressed	No
Released	Yes

4. Reconnect the switch connector.

### Note

Refer to Section 6 for replacement of the clutch switch.

### P/S PRESSURE SWITCH Inspection

1. Disconnect the P/S pressure switch connector.
2. Connect an ohmmeter to the switch.
3. Start the engine. Check continuity of the switch while turning the steering wheel at idle.

P/S	Continuity
Turning	Yes
Not turning	No

4. Reconnect the switch connector.

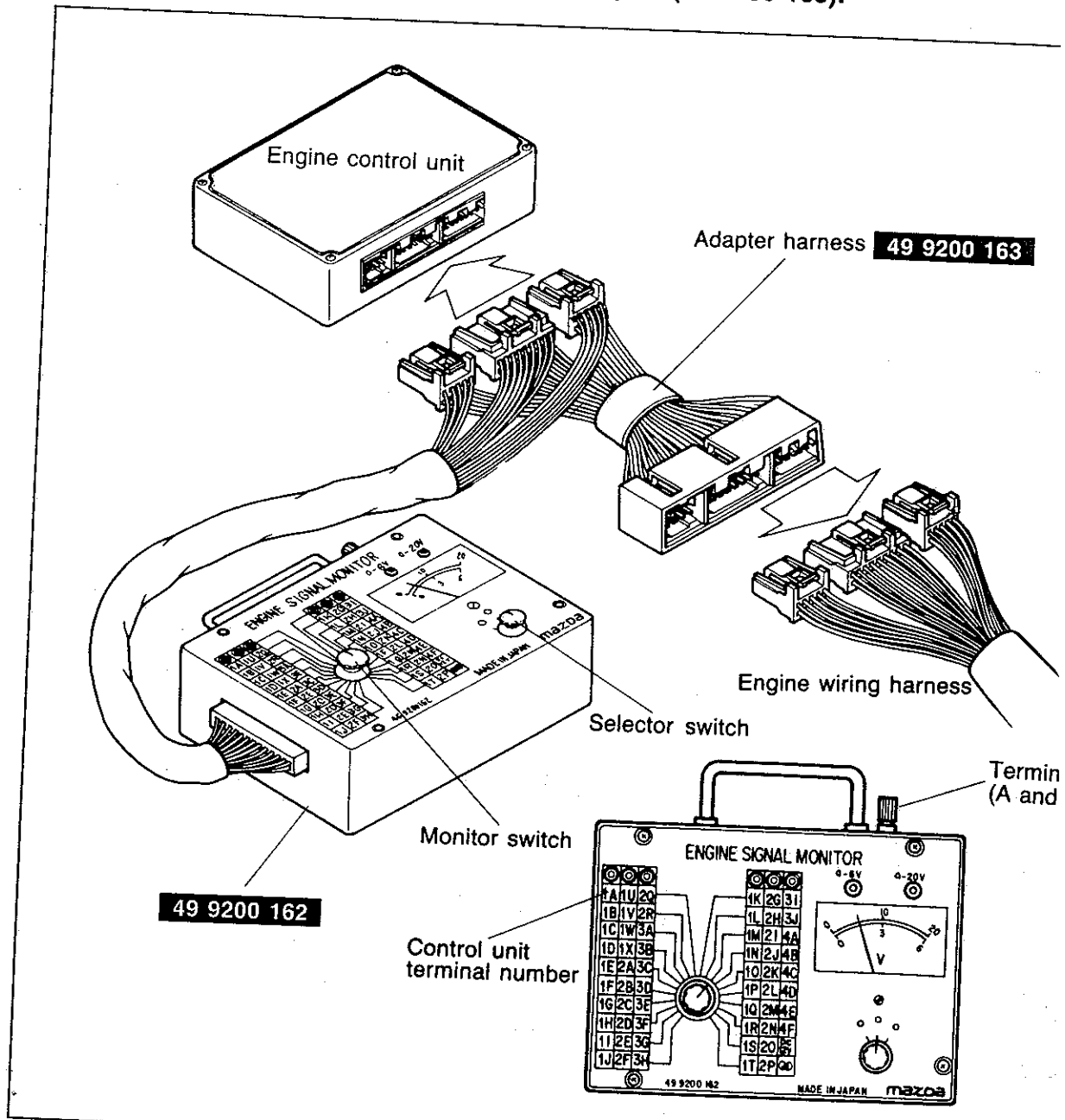
### Note

Refer to Section 10 for replacement of the P/S pressure switch.

# 4B CONTROL SYSTEM

## ENGINE CONTROL UNIT

Engine Signal Monitor (49 9200 162) and Adapter (49 9200 163).



The **Engine Signal Monitor** (49 9200 162) is used to check the control unit terminal voltage 76FC

### How to Use the Engine Signal Monitor

1. Connect the **Engine Signal Monitor** (49 9200 162) between the engine control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

### Caution

Never apply voltage to terminal A or B.

## Terminal Voltage

If the input and output devices wiring are normal, but the engine control unit terminal voltage is incorrect, replace the engine control unit.

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
1A	—	—	—	—	—	—
1B		○	Self-Diagnosis Checker (Code No.)	For 3sec. after ignition switch OFF → ON: below 2.5V (Buzzer sounds) After 3sec.: approx. 12V (Buzzer does not sound)		<ul style="list-style-type: none"> <li>Using Self-Diagnosis Checker and test connector grounded</li> <li>Buzzer sounds: below 2.5V</li> <li>Buzzer does not sound: approx. 12V</li> </ul>
1C		○	Solenoid valve (Variable inertia control)	Approx. 12V		Above 5200 rpm (Unleaded fuel) or 5400 rpm (Leaded fuel): Below 2.5V
1D		○	Self-Diagnosis Checker (Monitor lamp)	For 3sec. after ignition switch OFF → ON: approx. 5V (light illuminates) After 3sec.: approx. 12V (light does not illuminate)	(Test connector grounded) approx. 5V (Test connector not grounded) Monitor lamp ON: approx. 5V Monitor lamp OFF: approx. 12V	Using Self-Diagnosis Checker
1E	○		Idle switch	Accelerator pedal released: 0V Accelerator pedal depressed: approx. 12V		
1F		○	A/C relay	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor ON
1G	○		Neutral or clutch switch	In-gear condition Clutch pedal depressed: approx. 12V Clutch pedal released: 0V		MTX (Neutral: constant approx. 12V)
1H	—	—	—	—	—	—
1I	○		Electrical load control unit	E/L switch ON: below 2.5V E/L switch OFF: approx. 10—12V		Electrical load: Rear defroster switch Headlight switch Blower motor switch (3rd & 4th position) Electrical fan switch
1J	—	—	—	—	—	—
1K	○		P/S pressure switch	Constant approx. 12V	P/S ON: below 2.5V P/S OFF: approx. 12V	
1L	○		A/C switch	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor: ON
1M	○		Distributor (Ne signal)	0V or 5V	Approx. 2.0V	
1N	○		Distributor (G signal)	0V or 5V	Approx. 1.2V	

# 4B CONTROL SYSTEM

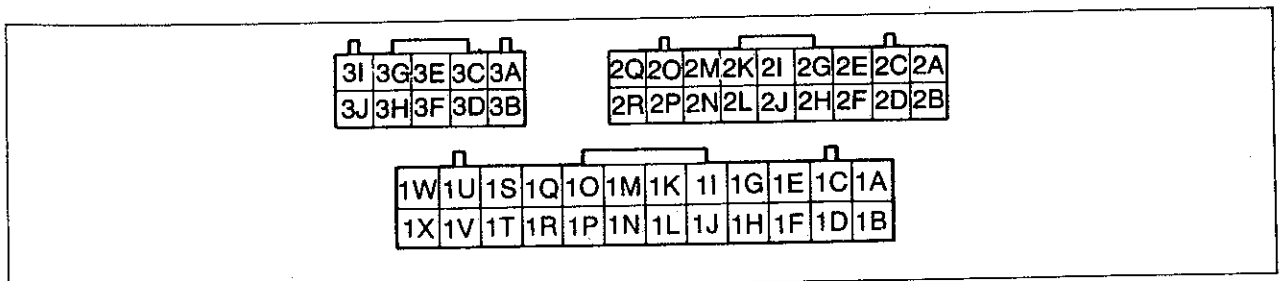
Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
1O		○	Air flow sensor (Burn-off control)	Below 2.5V		While burning c Approx. 8—12V
1P		○	Control relay (Power supply circuit)	Below 2.5V		Ignition switch (C Approx. 12V
1Q		○	Control relay (Fuel pump circuit)	Approx. 12V	Below 2.5V	
1R	○		Knock sensor	0V or 2—7V		While knocking: Approx. 0.001
1S	—	—	—	—		—
1T	○		Ignition switch (ON position)	Approx. 12V		
1U	—	—	—	—		—
1V	—	—	—	—		—
1W	○		Test connector	Test connector grounded: 0V Test connector not grounded: approx. 12V		Green, 1-pin connector
1X		○	Igniter	Approx. 12V	Approx. 1V*	*Engine Signal Monitor: green red lights flash
2A	—	—	—	—		—
2B	○		Air flow sensor (Ground)	0V		
2C	—	—	Ground (E2)	0V		
2D	—	—	—	—		—
2E	○		Air flow sensor (Intake air mass)	1.0—1.6V	1.7—2.3V	Increase engine speed: voltage increases
2F	—	—	—	—		—
2G	—	—	—	—		—
2H	○		Air flow sensor (Variable resistor)	0—5V		Depends on adjustment
2I	○		Water thermo sensor	Approx. 0.4V		Engine coolant temp. 20°C (68°F) approx. 2.5
2J	○		Intake air thermo sensor (Dynamic chamber)	Approx. 2.5V at 20°C (68°F)		
2K		○	Solenoid valve (Pressure regulator control)	For 120 sec. after ignition switch OFF → ON: below 2.5V	For 120. sec after starting: below 2.5V	Hot engine: Coolant temp. above 70°C (15: Intake air temp. above 50°C (12: Other conditions
				Approx. 12V		
2L	—	—	—	—		—

# CONTROL SYSTEM 4B

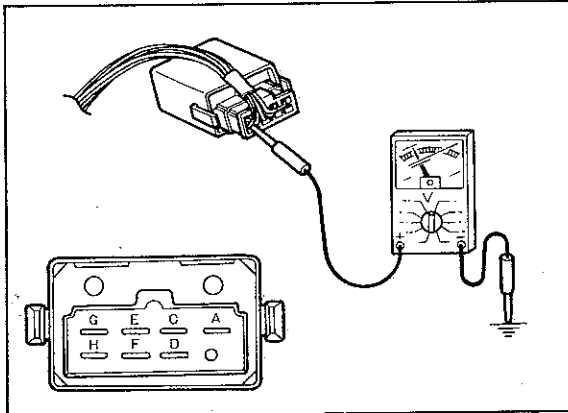
Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
2M	—	—	—	—	—	—
2N	—	—	—	—	—	—
2O	—	—	—	—	—	—
2P	—	—	—	—	—	—
2Q		○	Solenoid valve (Idle speed control)	Approx. 9—11V		
2R	—	—	Ground (E02)	0V		
3A	—	—	Ground (E01)	0V		
3B	○		Ignition switch (Start position)	Below 2.5V		While cranking: approx. 10V
3C		○	Injector (No.2)	Approx. 12V	Approx. 12V*	* Engine Signal Monitor green and red lights flash
3D	—	—	—	—		—
3E		○	Injector (No.1)	Approx. 12V	Approx. 12V*	* Engine Signal Monitor green and red lights flash
3F		○	Injector (No.4)	Approx. 12V	Approx. 12V*	* Engine Signal Monitor green and red lights flash
3G	—	—	Ground (E1)	0V		
3H		○	Injector (No.3)	Approx. 12V	Approx. 12V*	*1 Engine Signal Monitor green and red lights flash
3I	○	—	Control relay	Approx. 12V		
3J	—	—	Battery	Approx. 12V		For back-up

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## Terminal Location



# 4B CONTROL SYSTEM



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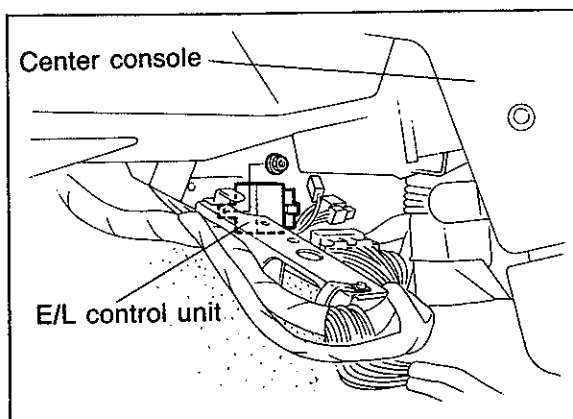
## E/L CONTROL UNIT

### Inspection

1. Connect a voltmeter between the E/L control unit and a ground.
2. Start the engine and check the terminal voltages as described below.

Terminal	Input	Output	Connection to	Voltage (after warm-up)		Remark
				Ignition switch: ON	Idle	
A (BW)	—	—	Ignition switch	Approx. 12V		
B	—	—	—	—	—	—
C (B)	—	—	Ground	0V		
D (LY)	○		Electrical fan relay	Approx. 12V		Coolant temp.: below 97°C (207°F)
				Below 1.5V		Coolant temp.: above 97°C (207°F)
E (GY)		○	Control unit (1l)	0V		E/L: ON
				Approx. 12V		E/L: OFF
F (W)	○		Headlight switch	Approx. 12V		Headlight switch: ON
				Below 1.5V		Headlight switch: OFF
G (LB)	○		Blower motor switch	Below 1.5V		Blower motor switch: ON (3rd or 4th position)
				Approx. 5V		Others
H (BL)	○		Rear defroster switch	Below 1.5V		Rear defroster switch: ON
				Approx. 12V		Rear defroster switch: OFF

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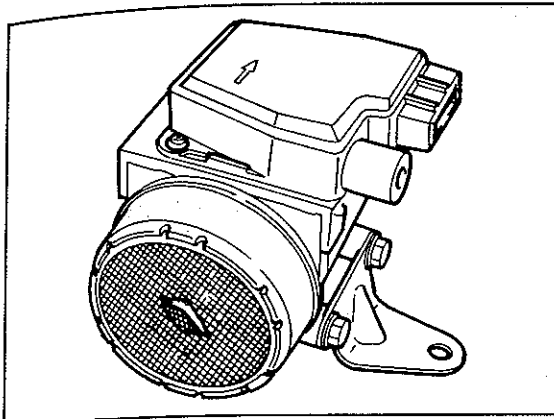


76G04C-182

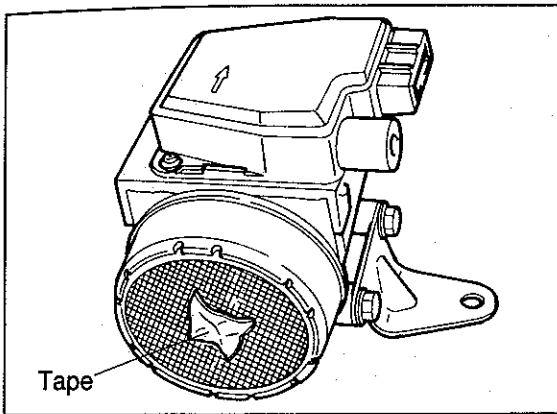
### Replacement

1. Replace the E/L control unit.
2. Install in the reverse order of removal.





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## AIR FLOW SENSOR

### Visual Inspection

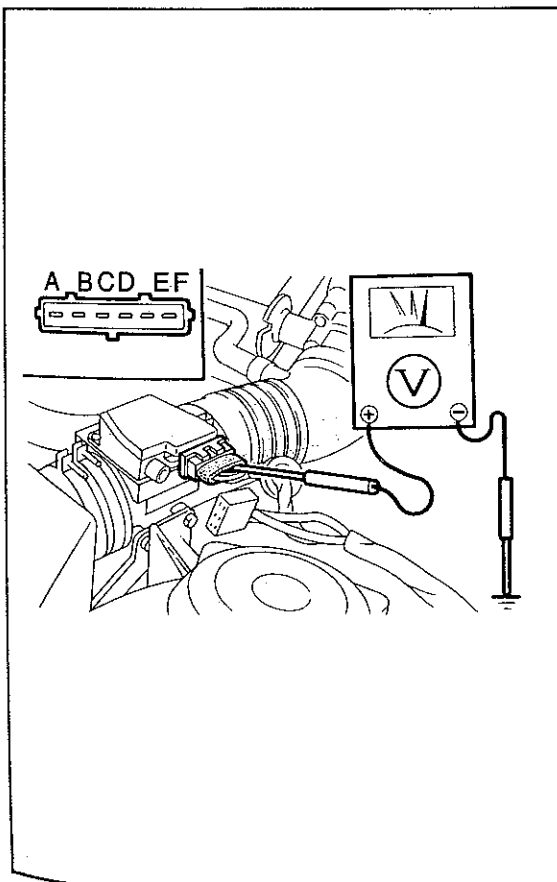
1. Remove the air hose.
2. Check the air flow sensor visually for the following:
  - a) Torn protection net (air cleaner side)

- b) Restricted protection net

### Output Voltage Inspection

1. Remove the rubber boot from the air flow sensor connector.
2. Check terminal voltage with a voltmeter.

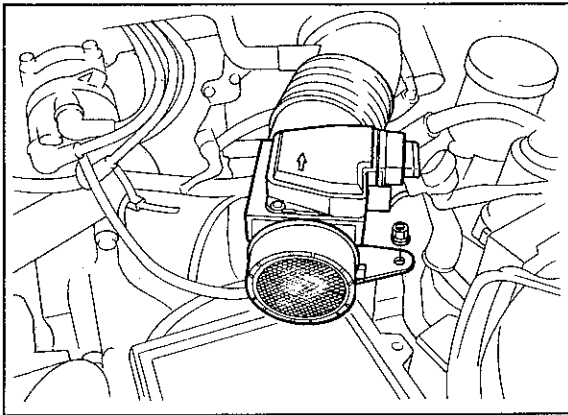
Terminal	Condition	Ign. switch:ON	Engine running
A (Idle mixture)		0—5V	
B (Power supply)		Approx. 12V	
C (Burn-off)		0V	
D (Air flow mass)		1.0—1.6V	1.7V—5V
E (Ground)		0V	
F (Ground)		0V	



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6. If not correct, check the wiring harness for an open or short circuit.
7. If the wiring harness is OK, replace the air flow sensor.

### 3 CONTROL SYSTEM



76F04B-087

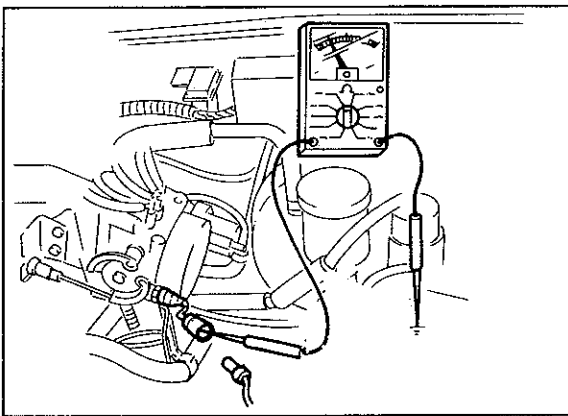
#### Replacement

1. Disconnect the connector.
2. Loosen the air hose clamps.
3. Replace the air flow sensor.

#### Caution

**Install the air flow sensor so that the arrow on the sensor corresponds to air flow direction.**

4. Tighten the hose clamps.
5. Reconnect the connector to the sensor.



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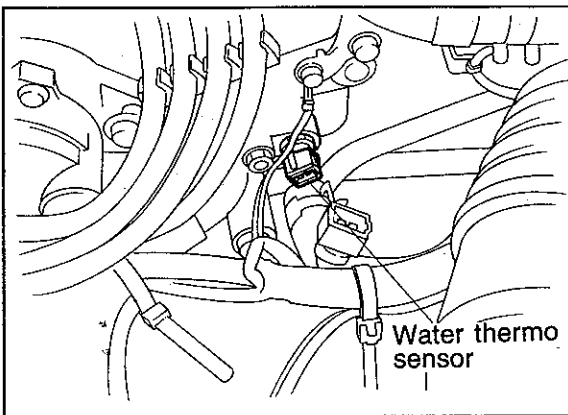
#### IDLE SWITCH

##### Inspection

1. Disconnect the idle switch connector.
2. Check continuity between the switch and a ground.

Throttle valve condition	Continuity
Fully closed	Yes
Open	No

3. If not correct, check condition of the wiring harness of the idle switch. Replace the idle switch and throttle body as an assembly, if necessary.

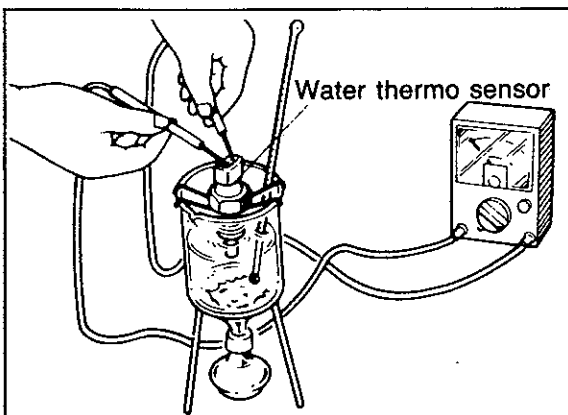


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#### WATER THERMO SENSOR

##### Inspection

1. Remove the water thermo sensor.

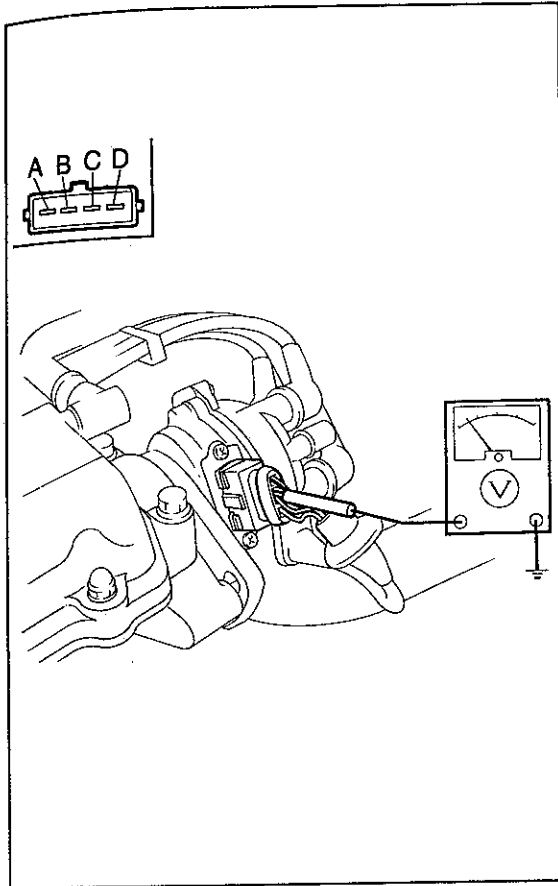


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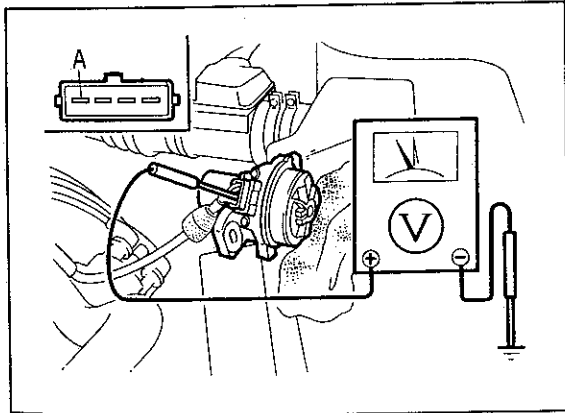
2. Place the sensor in water with a thermometer and heat the water gradually.
3. Check resistance of the sensor with an ohmmeter.

Coolant	Resistance
-20°C (-4°F)	14.5–17.8 kΩ
20°C (68°F)	2.2–2.7 kΩ
40°C (104°F)	1.0–1.3 kΩ
60°C (140°F)	500–640 Ω
80°C (176°F)	280–350 Ω

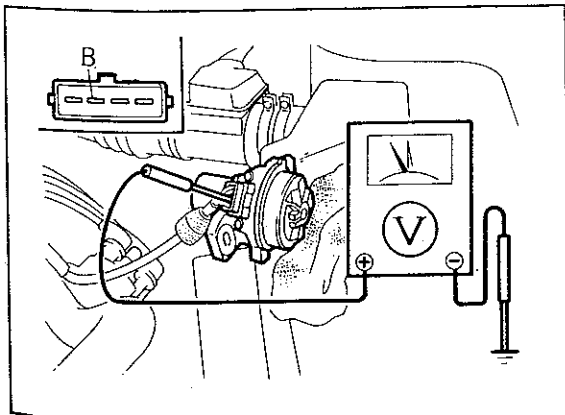
4. If not correct, replace the water thermo sensor.



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76F04B-089

## DISTRIBUTOR

### On-vehicle Inspection

1. Remove the rubber boot from the distributor connector.
2. Run the engine at idle.
3. Check terminal voltage with a voltmeter.

Terminal	Voltage
A (G signal)	1.0—2.4
B (Ne signal)	1.8—2.2
C (Power supply)	Approx. 12V
D (Ground)	0V

4. If not correct, check the wiring harness for an open or short circuit, then check the distributor for G signal or Ne signal.

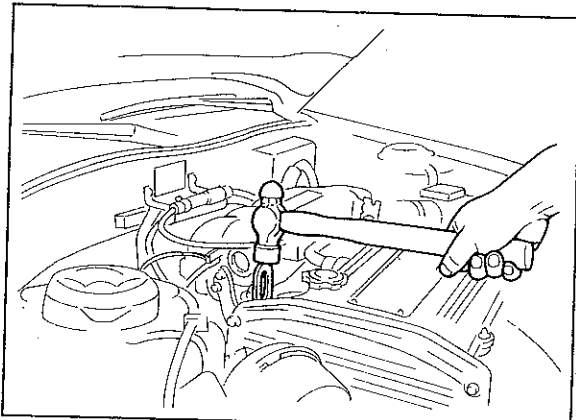
### G Signal Inspection

1. Remove the distributor. (Refer to section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a volt meter between the A terminal and a ground.
5. Turn the shaft and check that the distributor generates one pulse signal per rotation.

### Ne signal Inspection

1. Remove the distributor. (Refer to Section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a voltmeter between the B terminal and a ground.
5. Turn the shaft and check that the distributor generates four pulse signals per rotation.

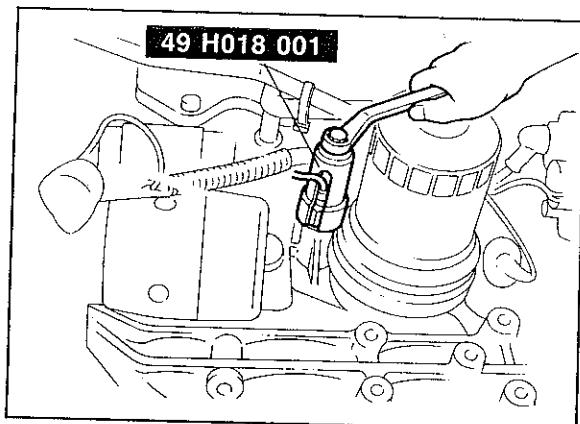
## B CONTROL SYSTEM



76F04B-090

### KNOCK SENSOR Inspection

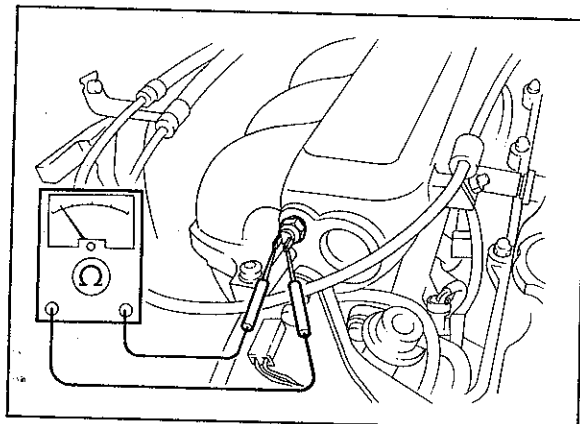
1. Warm up the engine and run it at idle.
2. Connect a timing light to the engine.
3. Ground the test connector (Green, 1-pin) jumper wire.
4. Tap the engine hanger with a hammer and that the ignition timing retards.
5. If not correct, replace the knock sensor.



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### Replacement

1. Disconnect the knock sensor connector.
2. Lift the vehicle and remove the intake manifold bracket.
3. Remove the knock sensor with the **SST**.
4. Install the knock sensor in the reverse order of removal.



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### INTAKE AIR THERMO SENSOR (DYNACHAMBER)

#### Inspection

1. Disconnect the intake air thermo sensor connector.
2. Connect an ohmmeter to the sensor terminals.
3. Check the resistance of the sensor.

Temperature	Resistance (kΩ)
20°C (68°F)	29.7—36.3
50°C (122°F)	8.4—10.2
85°C (185°F)	2.5—3.1

4. Reconnect the sensor connector.

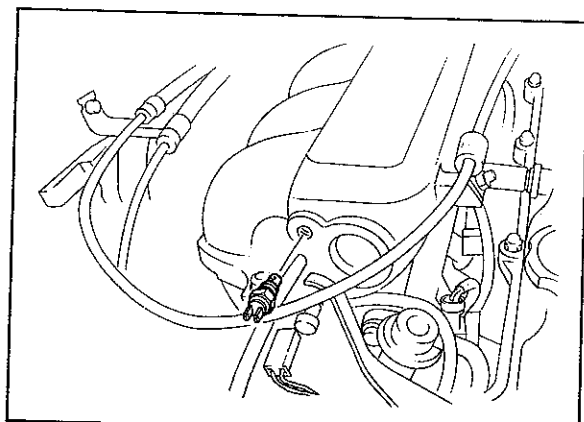
#### Replacement

1. Disconnect the intake air thermo sensor connector.
2. Remove the sensor.
3. Install the sensor.

#### Note

When installing the sensor, tighten to specified torque.

Specified torque: 6.9—8.8 N·m  
(0.7—0.9 m·kg, 5.1—6.5 ft·lb)



76F04B-091