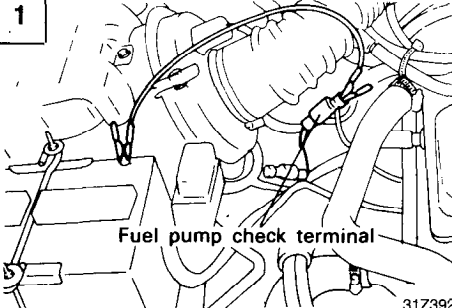
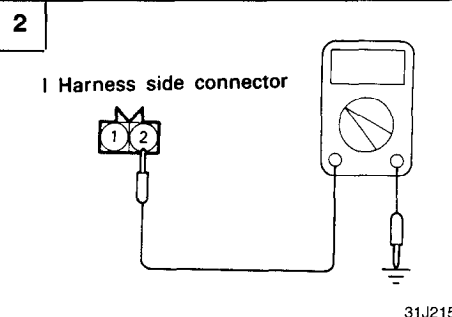
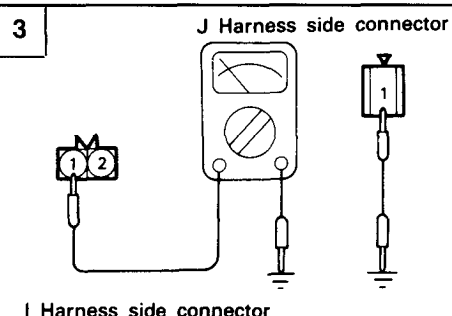
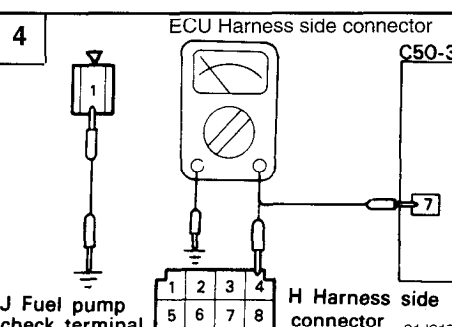
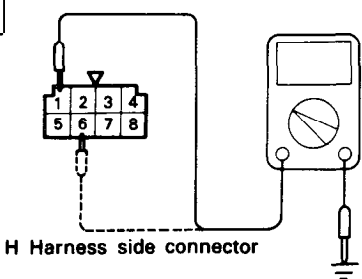
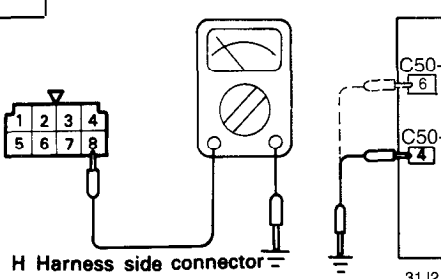
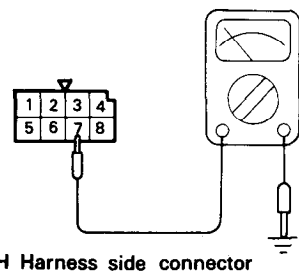
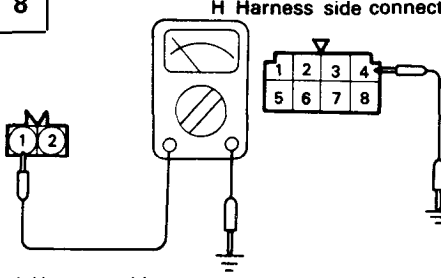


Harness Inspection

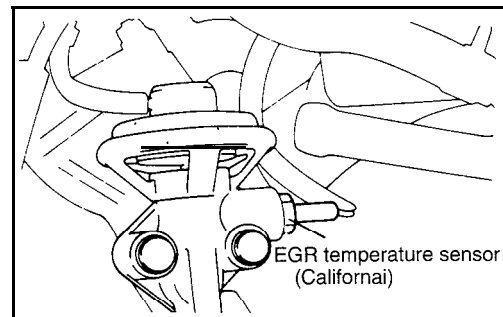
* California only

<p>1</p>  <p>Fuel pump check terminal</p> <p>31Z392</p>	<p>Check the fuel pump.</p> <ul style="list-style-type: none"> o Apply battery voltage to the checking terminal and operate the pump <p>OK → 4</p> <p>NG → 2</p>	
<p>2</p>  <p>I Harness side connector</p> <p>31J215</p>	<p>Check the ground circuit of the fuel pump.</p> <ul style="list-style-type: none"> o Connector: Disconnected <p>OK → 3</p> <p>NG → Repair the harness. (I 2-Ground)</p>	
<p>3</p>  <p>J Harness side connector</p> <p>I Harness side connector</p> <p>31J219</p>	<p>Check for continuity between the fuel pump and the checking terminal.</p> <ul style="list-style-type: none"> o Connector: Disconnected <p>OK → 4</p> <p>NG → Repair the harness. (I 1 - J 1)</p>	
<p>4</p>  <p>J Fuel pump check terminal</p> <p>ECU Harness side connector</p> <p>C50-3</p> <p>H Harness side connector</p> <p>31J217</p>	<p>Check for continuity between the checking terminal and the ECU, and between the control relay terminals.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected o ECU connector: Disconnected o Fuel pump connector: Disconnected <p>OK → 5</p> <p>NG → Repair the harness. (H 4- J 1) (J 1 - C50-3 7)</p>	

<div>5</div> <div></div> <div>H Harness side connector</div> <div>31J218</div>	<div>Measure the power supply voltage of the control relay.</div> <div><ul style="list-style-type: none">o Connector relay connector: Disconnectedo Ignition switch: START (when H 6 checked)</div> <div><table><tr><td>Voltage (V)</td></tr><tr><td>8 or more</td></tr></table></div>	Voltage (V)	8 or more	<div>OK → <div>6</div></div> <div>NG →</div> <div>Repair the harness. (H 1 -Battery) (H 6 -Ignition switch)</div>
Voltage (V)				
8 or more				
<div>6</div> <div></div> <div>H Harness side connector</div> <div>31J219</div>	<div>Check for an open-circuit, or a short-circuit to ground between the control relay and the ECU.</div> <div><ul style="list-style-type: none">o Control relay connector: Disconnectedo ECU connector: Disconnected</div>	<div>OK → <div>7</div></div> <div>NG →</div> <div>Repair the harness. (H 8-C50-2 4) * (H 8 - C50-4 6)</div>		
<div>7</div> <div></div> <div>H Harness side connector</div> <div>31J220</div>	<div>Check for continuity of the ground circuit.</div> <div><ul style="list-style-type: none">o Control relay connector: Disconnected</div>	<div>OK → <div>8</div></div> <div>NG →</div> <div>Repair the harness. (H 7 - Ground)</div>		
<div>8</div> <div></div> <div>H Harness side connector</div> <div>I Harness side connector</div> <div>31J221</div>	<div>Check for an open-circuit, or a short-circuit to ground between the control relay and the fuel pump.</div> <div><ul style="list-style-type: none">o Control relay connector: Disconnectedo Fuel pump connector: Disconnected</div>	<div>OK → <div>END !</div></div> <div>NG →</div> <div>Repair the harness. (H 4 - I 1)</div>		

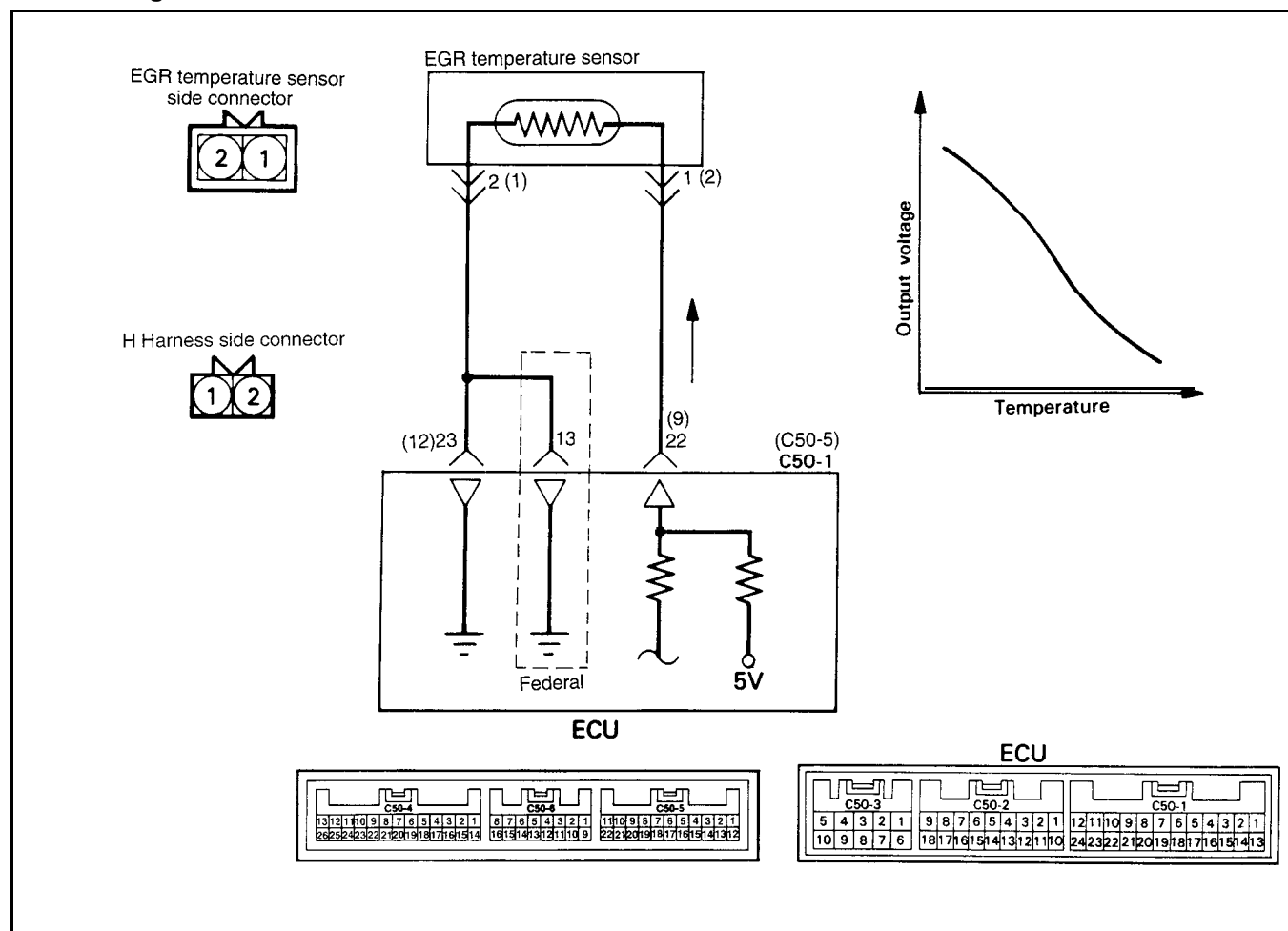
EGR TEMPERATURE SENSOR [California]

The EGR temperature sensor converts the temperature of EGR gas downstream from the EGR valve to voltage and inputs it to the ECU. The ECU judges the condition of the EGR by this signal. If there is abnormal condition, the engine warning light is turned on to notify the driver.



Circuit Diagram

() : California only

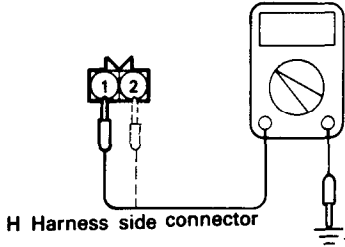
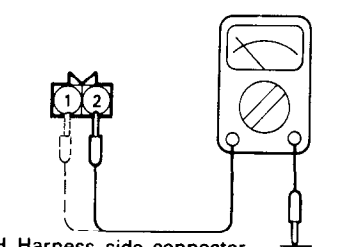


Using Multi-use Tester

Check Item	Data display	Check condition	Engine state	Test specification
EGR temperature sensor o Service data o Item No. 43	Sensor temperature	Engine: Warmed up Engine is maintained in a constant state for 2 minutes or more	750 rpm (Idle)	70°C (158°F) or less
			3,500 rpm	70°C (158°F) or more

Harness Inspection

* California only

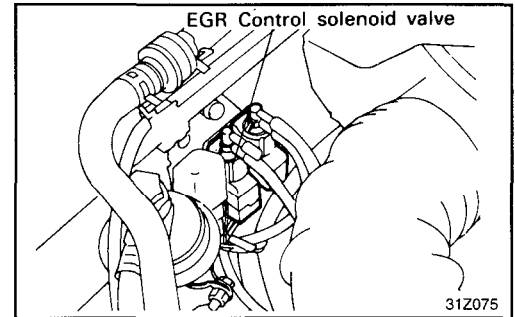
<div style="border: 1px solid black; padding: 5px; width: 30px; float: left; text-align: center;">1</div>  <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J126</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.3-4.7V 	<div style="text-align: right; font-size: 2em; font-weight: bold;">OK →</div> <div style="border: 1px solid black; padding: 5px; width: 30px; float: left; text-align: center;">2</div> <div style="clear: both;"></div> <p>Repair the harness. (H 1 - C50-1 22) * (H 2 - C50-5 9)</p>
<div style="border: 1px solid black; padding: 5px; width: 30px; float: left; text-align: center;">2</div>  <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J127</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<div style="text-align: right; font-size: 2em; font-weight: bold;">OK →</div> <p>END !</p> <div style="text-align: right; font-size: 2em; font-weight: bold;">NG →</div> <p>Repair the harness. (H 2 - C50-1 13, 23) * (H 1 - C50-5 12)</p>

Sensor Inspection

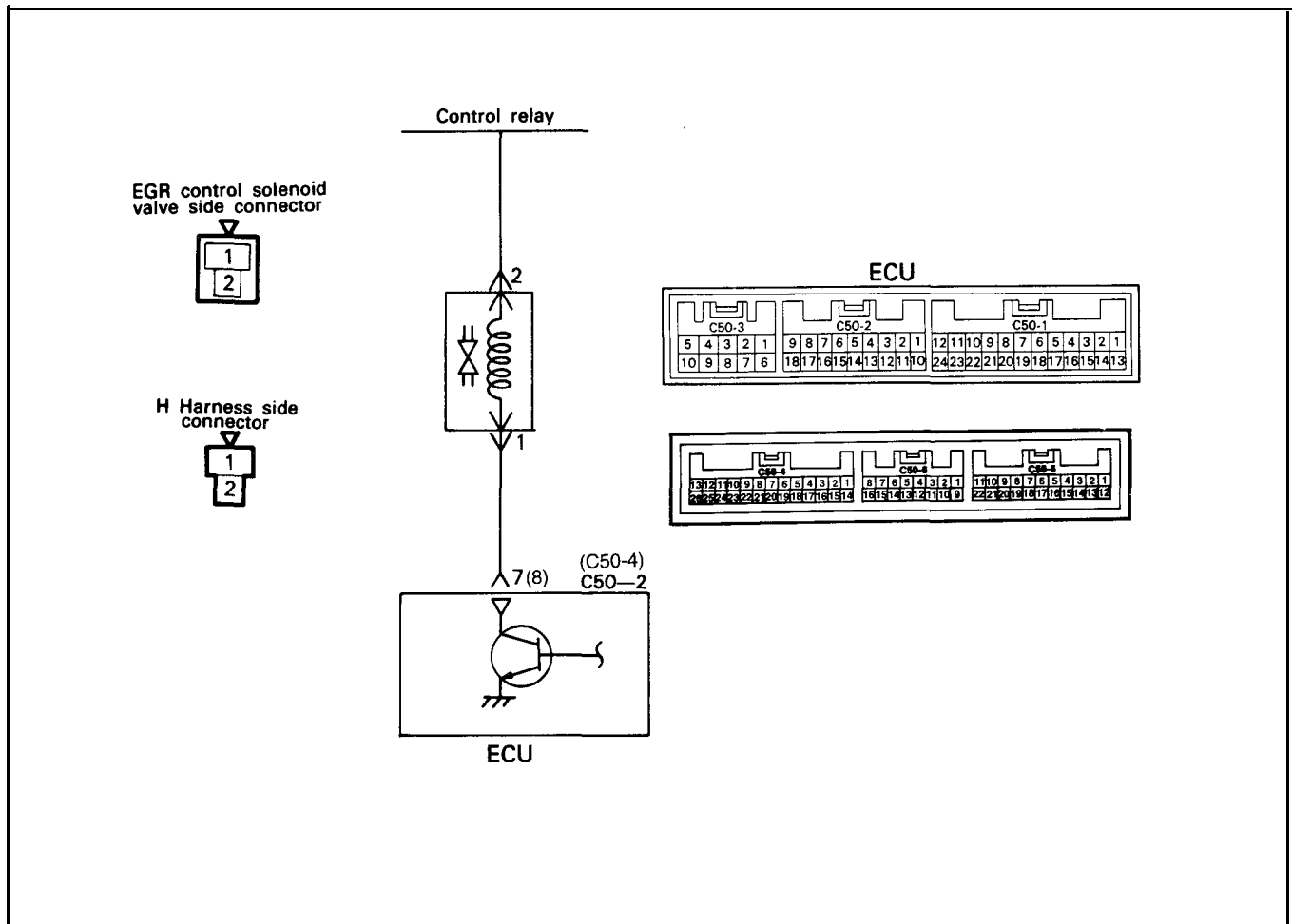
Refer to GROUP 29-Exhaust Gas Recirculation (EGR) System.

EGR CONTROL SOLENOID VALVE (California)

The EGR control solenoid valve is a duty control type solenoid valve, which makes control by leaking EGR valve operating negative pressure to the throttle body a port.

**Circuit Diagram**

() : California only

**Troubleshooting Hint**

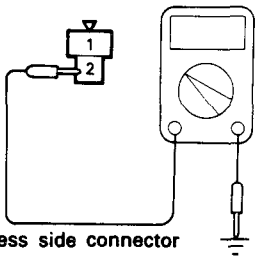
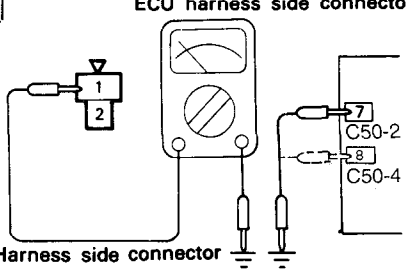
if the results of EGR control solenoid valve on-vehicle and off-vehicle inspections are normal but the self-diagnosis code for EGR system failure is displayed, check the EGR valve, vacuum hose and EGR passage for blocking.

Using Multi-use Tester

Check Item	Drive content	Check condition	Normal state
EGR control solenoid valve o Service data o Item No. 10	Change solenoid valve from OFF to ON state	Ignition switch: ON	Operating sound is heard when driven

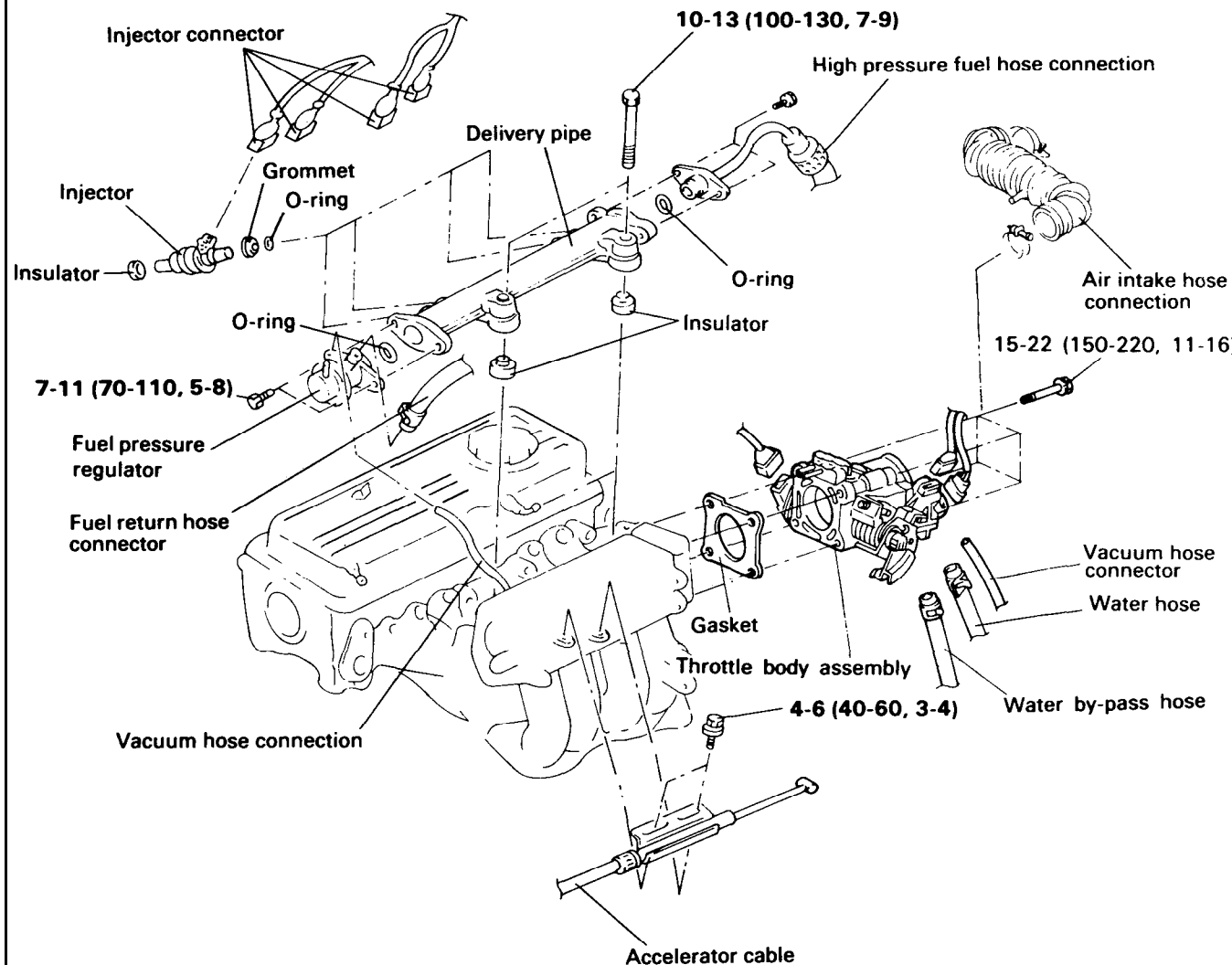
Harness Inspection

* California only

<div data-bbox="140 559 161 587" data-label="Text">1</div>  <p>H Harness side connector</p> <p>31J227</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: System Voltage <p>OK →</p> <p>NG →</p>	<div data-bbox="1278 580 1321 625" data-label="Text">2</div> <p>Repair the harness. (H2 - Control relay)</p>
<div data-bbox="140 902 161 929" data-label="Text">2</div>  <p>ECU harness side connector</p> <p>H Harness side connector</p> <p>31J228</p>	<p>Check for an open-circuit, or a short-circuit to ground between the EGR control solenoid valve and engine control unit.</p> <ul style="list-style-type: none"> o EGR control solenoid valve connector: Disconnected o ECU connector: Disconnected <p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness. (H 1 - C50-2 7) * (H 1 - C50-4 8)</p>

INJECTOR AND THROTTLE BODY

COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Release residual pressure from the fuel line to prevent fuel from spilling.

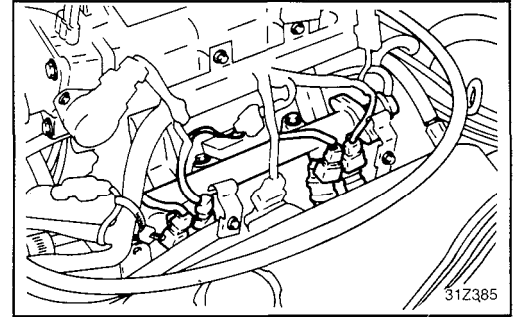
CAUTION

Cover the hose connection with rags to prevent splashing of fuel that could be caused by residual pressure in the fuel line.

2. Remove the delivery pipe with the fuel injector and pressure regulator.

CAUTION

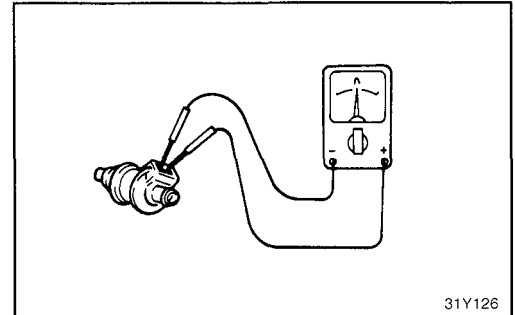
1. Be careful not to drop any injectors when removing the delivery pipe.
2. Be aware that fuel may flow out when removing the injector.

**INSPECTION**

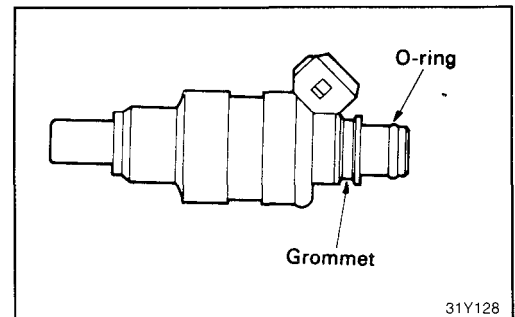
1. Measure the resistance of the injectors between the terminals using an ohmmeter.

Resistance **13-16Ω** [at 20°C (68°F)]

2. If the resistance is not within specifications, replace the injector.

**INSTALLATION**

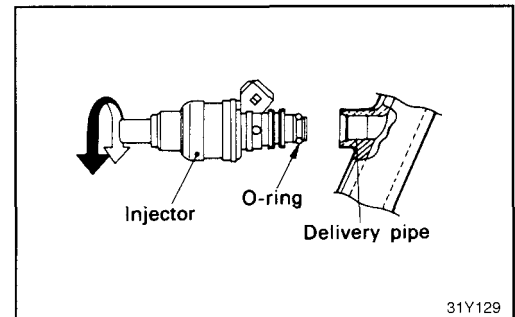
1. Install a new grommet and O-ring to the injector.
2. Apply a coating of solvent, spindle oil or gasoline to the O-ring of the injector.



3. While turning the injector to the left and right, install it on to the delivery pipe.
4. Be sure the injector turns smoothly.

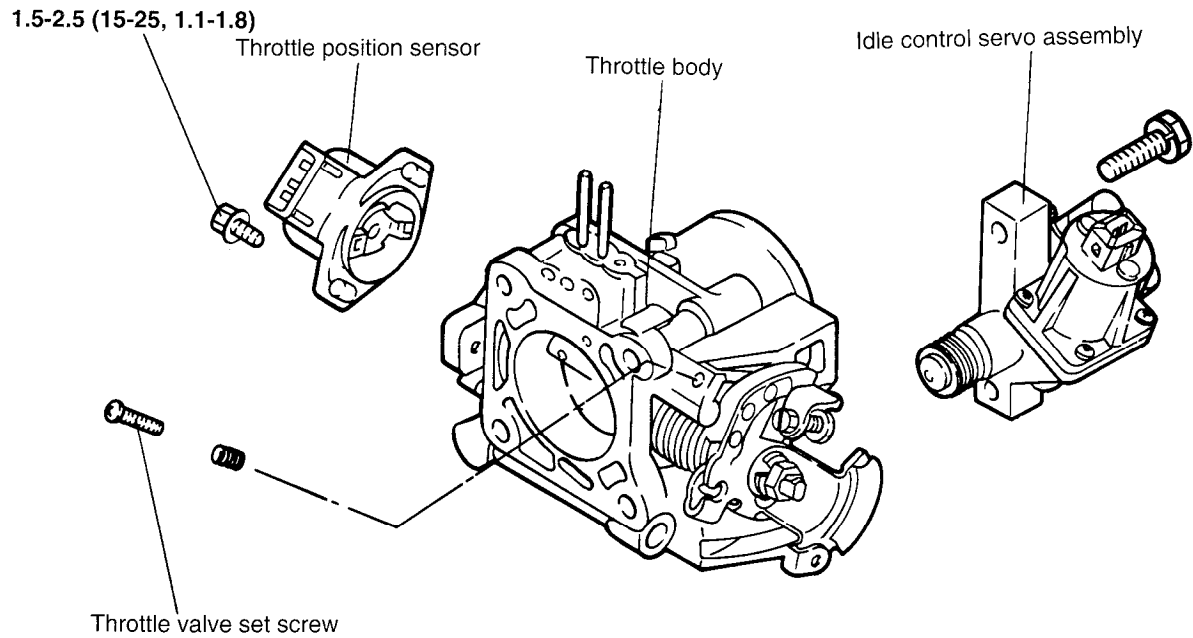
NOTE

If it does not turn smoothly, the O-ring may be jammed; remove the injector and re-insert it into the delivery pipe and re-check.



THROTTLE BODY

COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

CAUTION

The throttle valve must not be removed.

1. Remove the throttle position sensor by unscrewing the philips-head screws.

NOTE

Except when necessary for replacement, the throttle position sensor must not be removed.

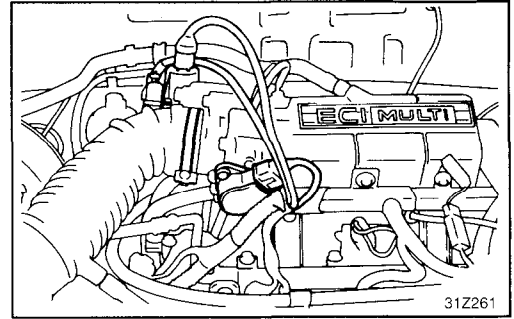
2. Remove the ISC servo assembly.

NOTE

1) Except when necessary for replacement, the ISC servo assembly should not be removed.

2) The ISC servo assembly should not be disassembled.

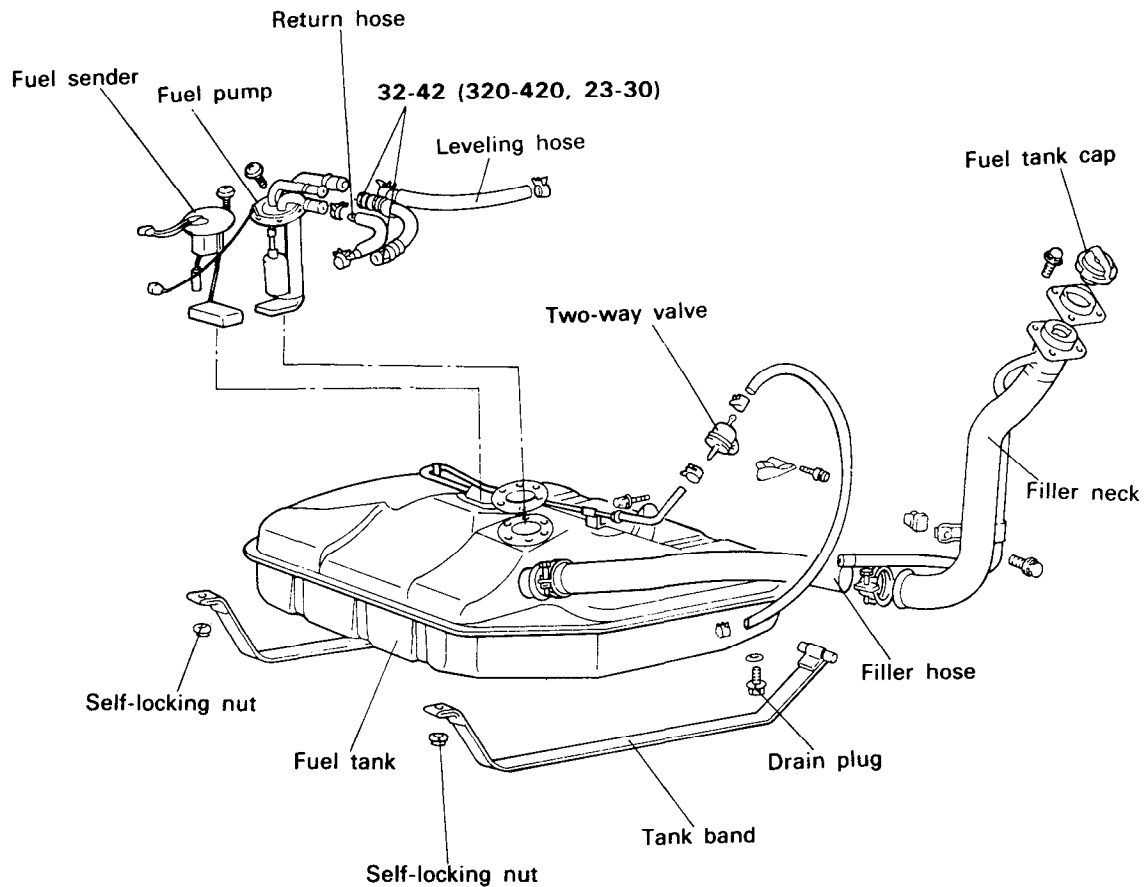
3. Use an open-end wrench or box wrench to remove the adjustment screw.

**INSPECTION****Cleaning Throttle Body Components**

1. Clean all components. The following components must not be cleaned by immersion in cleaning solvents.
 - o Throttle position sensor
 - o ISC servo assembly
 - o Idle position switchThe insulation of these components will be damaged if they are immersed in cleaning solvent. They should be cleaned by using a piece of cloth.
2. Check for restriction of the vacuum port or passage. Clean the vacuum passage by using compressed air.

FUEL TANK

COMPONENTS



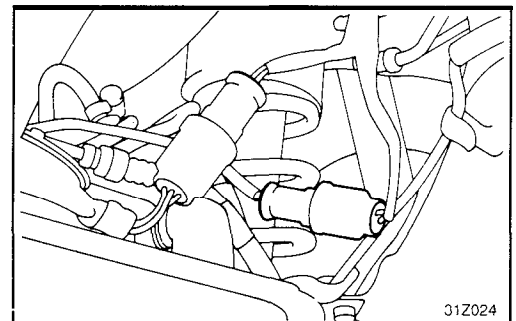
TORQUE ; Nm (kg.cm, lb.ft)

REMOVAL

1. To reduce the internal pressure of the fuel lines and hoses, first start the engine and then disconnect the electrical fuel pump connector.

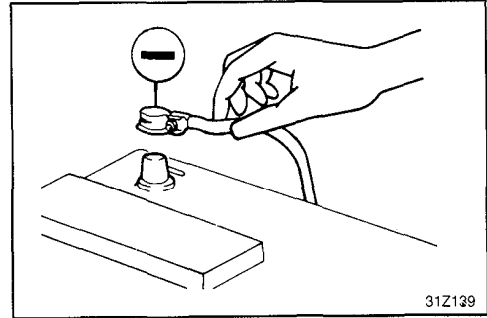
NOTE

Be sure to reduce the fuel pressure before disconnecting the fuel main pipe and hose otherwise fuel will spill out.

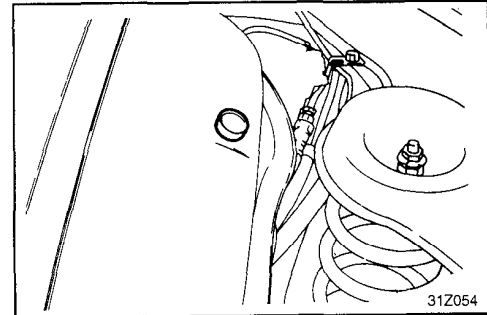


31Z024

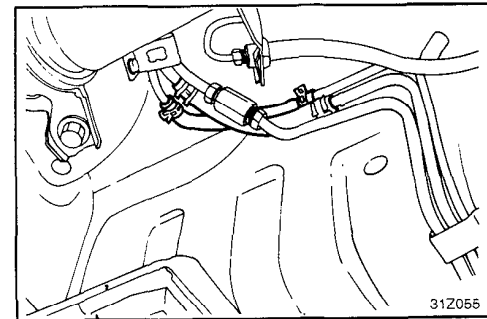
2. Disconnect the battery cable from the negative terminal of the battery.



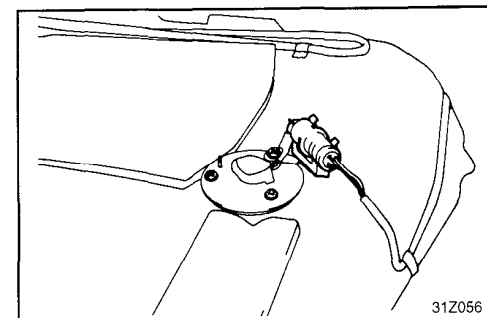
3. Remove the fuel tank cap.
4. Remove the drain plug and drain the fuel



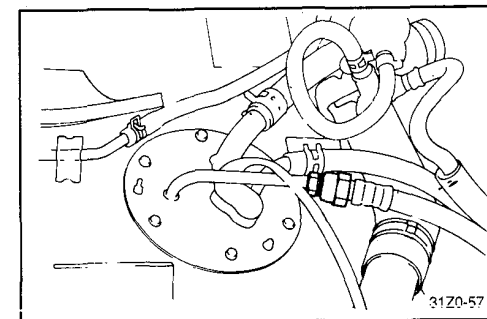
5. Disconnect the return hose and vapor hose



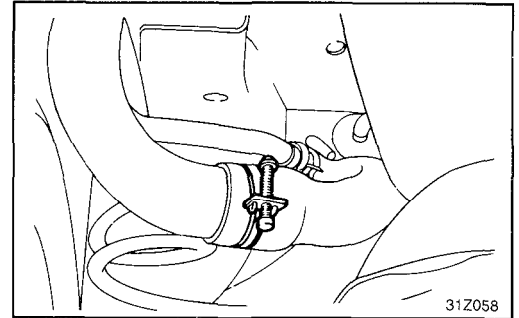
6. Disconnect the fuel gauge unit connector.



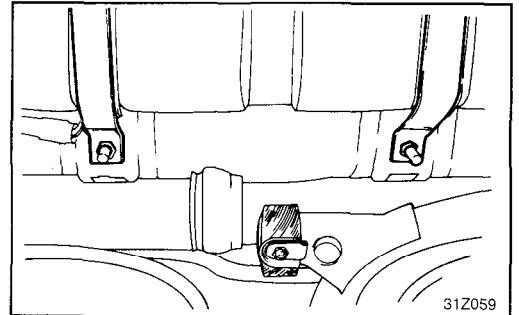
7. Disconnect the high pressure hose from the fuel tank.



8. Detach the fuel filler hose and leveling hose

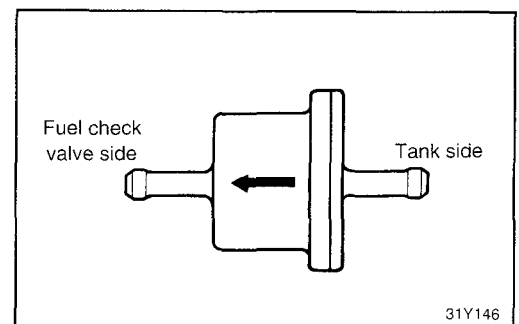


9. Loosen the two self-locking nuts, that hold the tank in position and remove the two tank bands.
10. Remove the fuel vapor hose and the fuel tank.



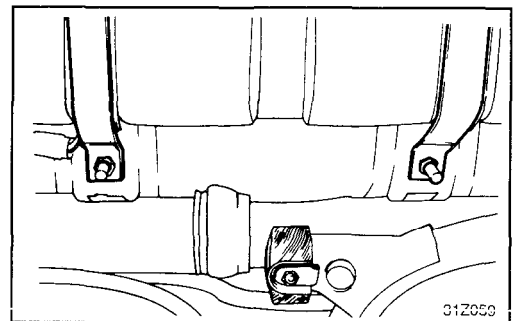
INSPECTION

1. Check the hoses and the pipes for cracks or damage.
 2. Check the fuel tank cap for proper operation.
 3. Check the fuel tank for deformation, corrosion or cracking.
 4. Check the inside fuel tank for dirt or foreign material.
 5. Check the in-tank fuel filter for damage or restriction.
-
6. Test the two-way valve for proper operation.
 7. To check the two-way valve, lightly breathe into the inlet and outlet. If air passes through after slight resistance, then the valve is good.

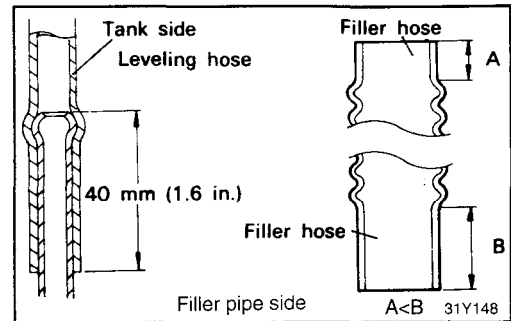


INSTALLATION

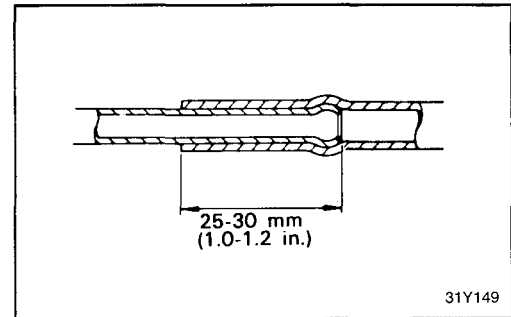
1. Confirm that the pad is fully bonded to the fuel tank, and install the fuel tank by tightening the self-locking nuts to the tank bands until the rear end of the tank band contacts the body.



2. Connect the leveling hose to the tank and approximately 40 mm (1.6 in.) at the filler neck.
3. When connecting the filler hose, the end with the shorter straight pipe should be connected to the tank side.



4. Connect the vapor hose and return hose. When attaching the fuel hose to the line, be sure that the hose is attached as shown in the illustration.



5. To connect the high pressure hose to the fuel pump, temporarily the flare nut by hand, and then tighten it to the specified torque. Be careful that the fuel hose does not twist.

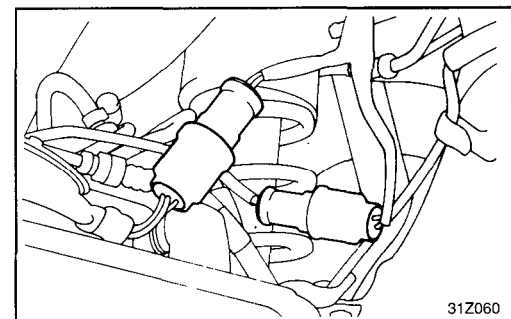
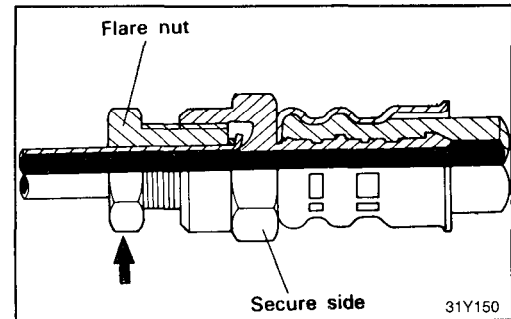
Tightening torque

High pressure hose flare nut 32-42 Nm (320-420 kg.cm, 23-30 lb.ft)

CAUTION

When tightening the flare nut, be careful not to bend or twist the line to prevent damage to the fuel pump connection.

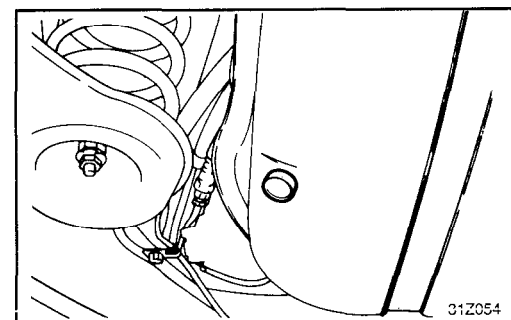
6. Connect the electrical fuel pump and fuel gauge unit connector.



7. Tighten the drain plug to the specified torque.

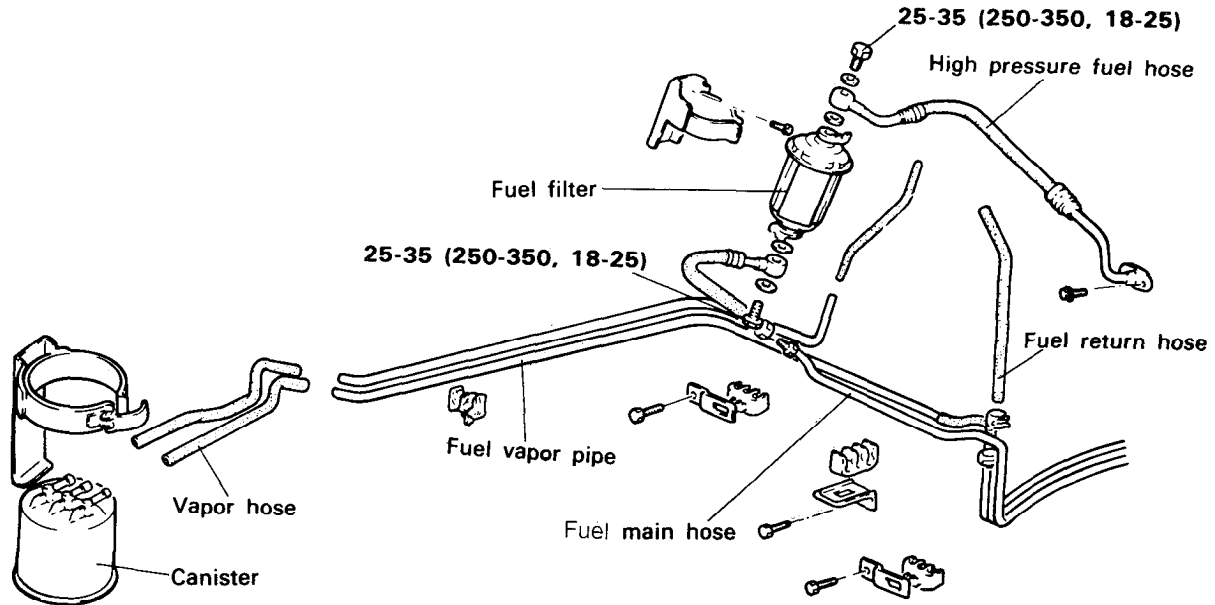
Tightening torque

Drain plug 15-25 Nm (150-250 kg.cm, 11-18 lb.ft)



FUEL LINE AND VAPOR LINE

COMPONENTS



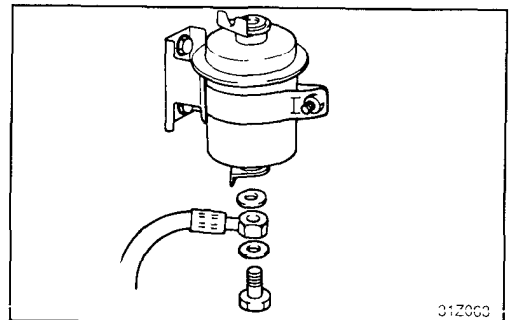
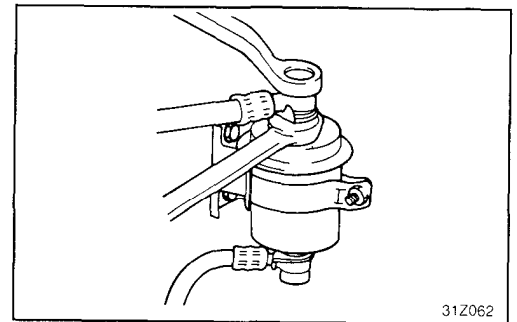
TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Remove the upper eye bolt while holding the fuel filter nut securely and remove the high pressure fuel hose.

CAUTION

- 1) Be sure to reduce the fuel pressure before disconnecting the fuel line and hose, otherwise fuel will spill out.
 - 2) Cover the hose connection with a shop towel to prevent splashing of fuel that could be caused by residual pressure in the fuel line.
2. Remove the lower eye bolt while holding the fuel filter nut assembly.
 3. Remove the fuel filter mounting bolts, then remove the fuel filter from the bracket.
 4. Remove the fuel return hose and line.
 5. Remove the fuel vapor hose and line.

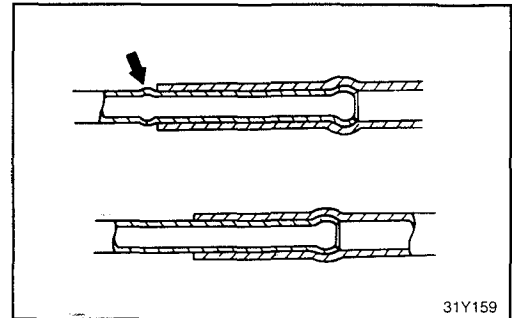


INSPECTION

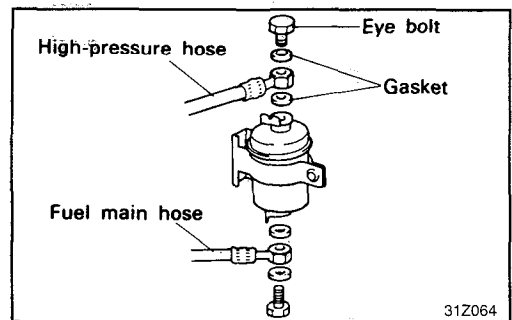
1. Check the hoses and pipes for cracking bending, deformation or restrictions.
2. Check the canister for restrictions.
3. Check the fuel filter for restrictions and damage.
If a problem is found, repair or replace parts as necessary.

INSTALLATION

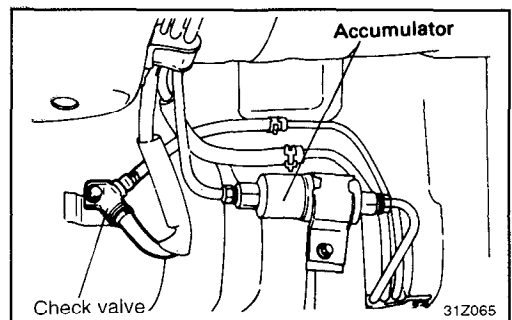
1. Install the fuel vapor hose and return hoses.
 - o If the fuel line has a stepped section, connect the fuel hose to the line securely, as shown in the illustration.
 - o If the fuel line does not have a stepped section, connect the fuel hose to the line securely.



2. Install the fuel filter, and tighten the fuel filter bracket.
3. Insert the main line on the filter and tighten the eye bolts while holding the fuel filter nuts.

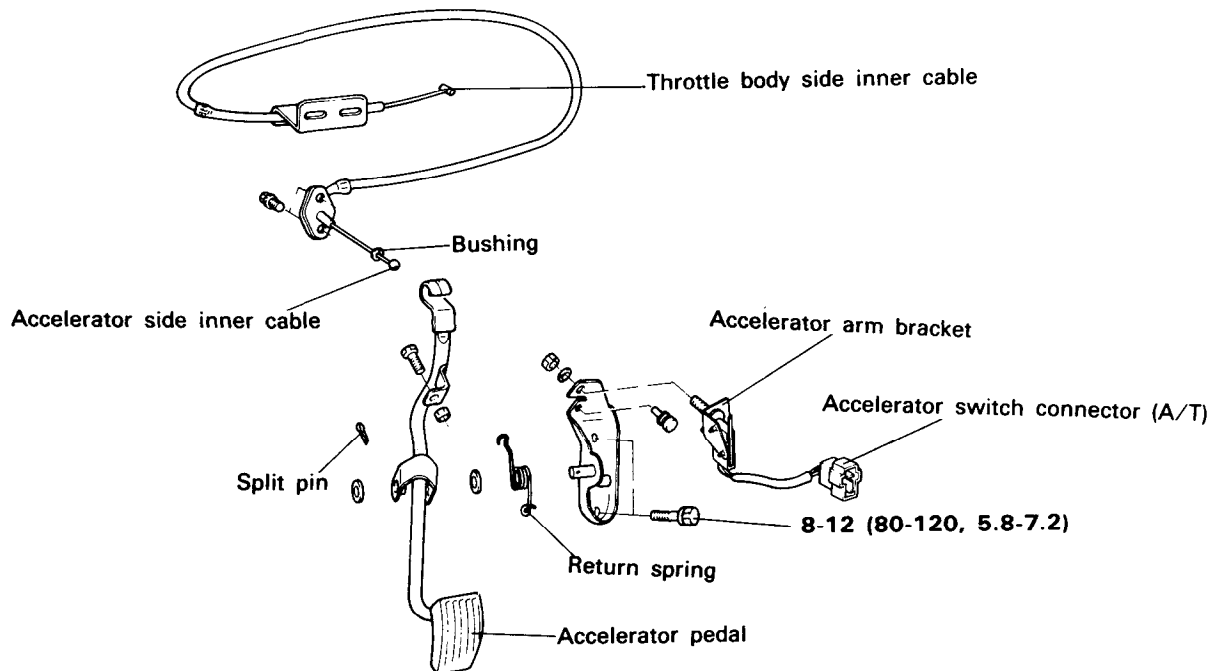


4. Install the clips and make sure that they do not interfere with other components.
5. When installing the check valve, install it so that the valve is facing in the direction as shown in the illustration.



ENGINE CONTROL

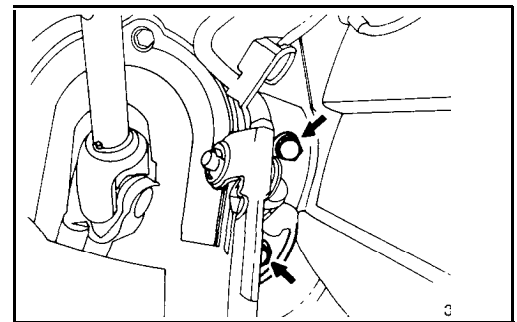
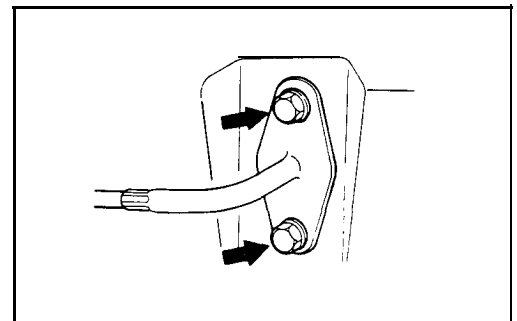
COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Remove the bushing and inner cable of the accelerator arm side.
2. After disconnecting the accelerator switch connector, loosen the bolts of the accelerator arm bracket and remove.



INSPECTION

1. Check the inner and outer cable for damage.
2. Check the cable for smooth movement.
3. Check the accelerator arm for deformation.
4. Check the return spring for deterioration.
5. Check the connection of the bushing to end metal fitting.
6. Check the accelerator switch proper operation.

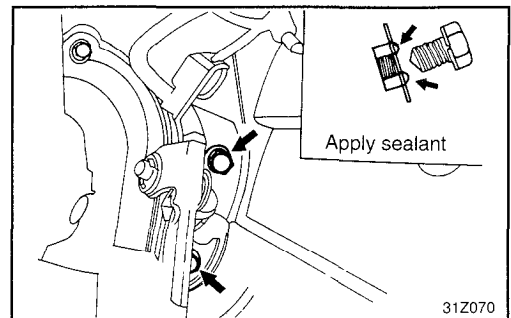
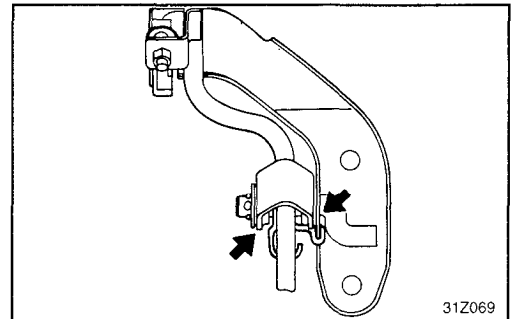
INSTALLATION

1. When installing the return spring and accelerator arm, apply multi-purpose grease around each moving point of the accelerator arm.

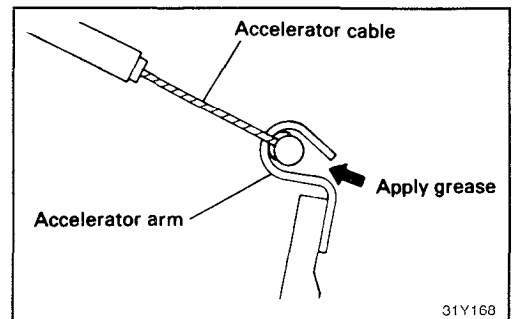
2. Apply sealant to the bolt mounting hole, and tighten the accelerator arm bracket.

Tightening torque

Accelerator arm bracket bolts
8-12 Nm (80-120 kg.cm, 5.8-7.2 lb.ft)



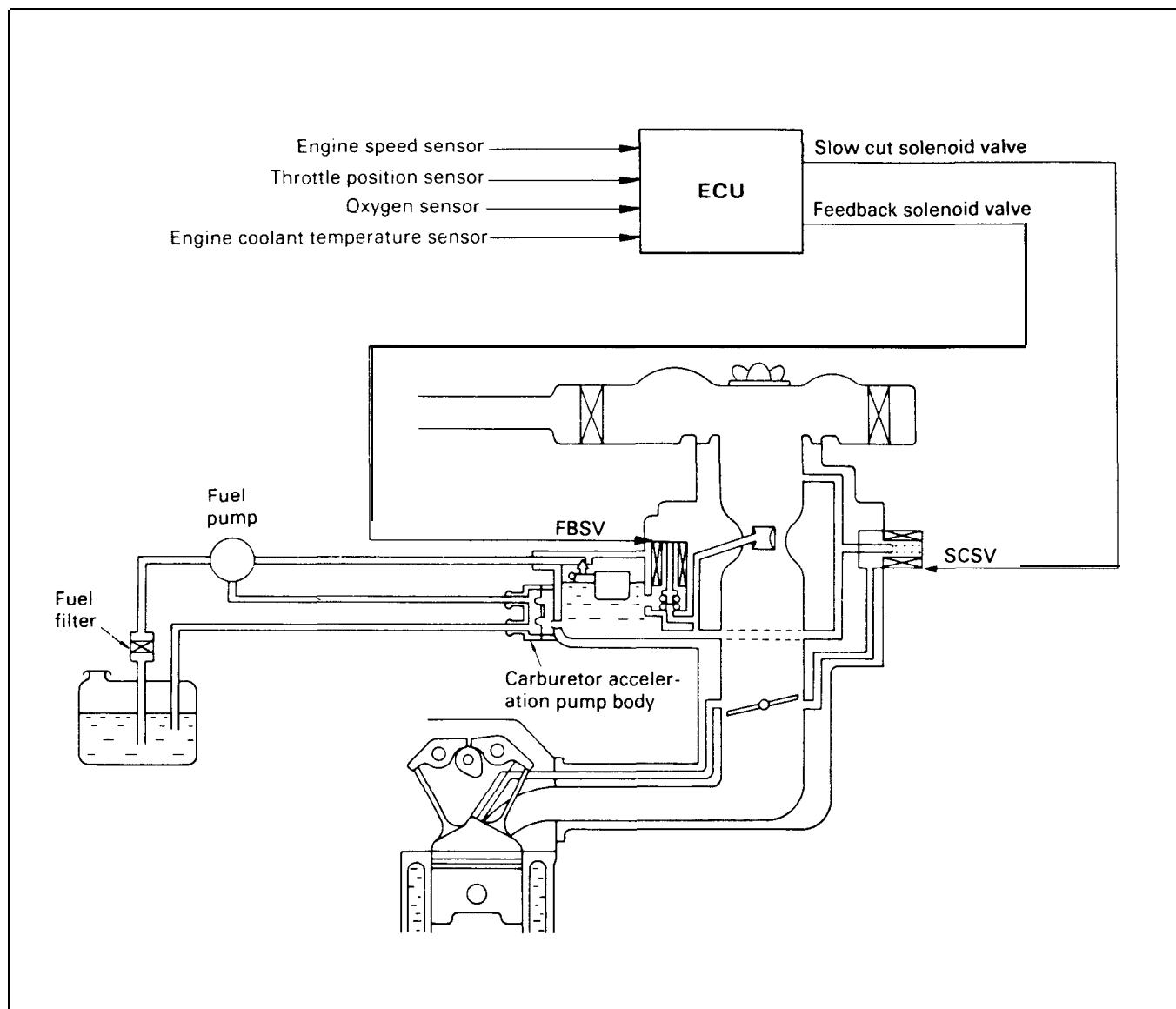
3. Securely install the resin bushing of the accelerator cable on the end of the accelerator arm.
4. Apply multipurpose grease around the cable end.



GENERAL INFORMATION (FBC SYSTEM)

The Feedback Carburetor (FBC) system provides a positive air-fuel ratio control for maximum reduction of emissions. The Electric Control Unit (ECU) receives signals from various sensors and then modulates two solenoid valves (FBSV, SCSV) installed on the carburetor to control the air-fuel ratio.

The ECU also controls the ignition timing, electric choke, throttle opener by switching on-off the solenoid valves.



FBSV : Feedback Solenoid Valve

SCSV : Slowcut Solenoid Valve

ECU : Electric Control Unit

GENERAL SPECIFICATIONS

Fuel tank	
Capacity	45 lit. (11.9 U.S. gal., 9.9 Imp.gal.)
Fuel filter	
Type [In-line filter]	Cartridge type
Type [In-tank filter]	Open type
Fuel pump	
Type	Mechanical diaphragm type
Driven by	Camshaft
Feed pressure	19-25 kPa (2.76-3.63 psi) at 2,500 rpm
Carburetor	
Type	Down-draft, 2-barrel, feed back type
Identification mark	
M/T	472 (For Canada), 474 (For Federal)
A/T	475 (For Federal)
Throttle bore	
Primary	30 mm (1.181 in.)
Secondary	32 mm (1.260 in.)
Feedback solenoid valve (FBSV)	
Type	Duty cycle solenoid
Coil resistance	54-66 Ω [At 20°C (68°F)]
Slow cut solenoid valve (SCSV)	
Type	duty cycle solenoid
Coil resistance	48-60 Ω [At 20°C (68°F)]
Throttle position sensor (TPS)	
Type	Variable resistor type (Rotary type)
Regulating voltage (When throttle valve fully closed)	0.25V
Coil resistance	3.5-6.5 K Ω
Bow vent valve (BVV)	
Type	Vacuum type
Vacuum orifice	0.3 mm (0.012 in.)
Mixture control valve (MCV)	
Type	Vacuum type
Dash pot	
Type	Conventional type
Operating rpm (When SAS 2 touches free lever)	Approx. 1,800 rpm
Outer venturi dia.	
Primary	20 mm (0.787 in.)
Secondary	25 mm (0.984 in.)
Inner venturi dia.	
Primary	9-14 mm (0.354-0.551 in.)
Secondary	9-12 mm (0.354-0.472 in.)

Main jet	
Primary	#83.8
Secondary	#145
Main air jet	
Primary - First	#80
Second	#60
Secondary	#70
Pilot jet	
Primary	#46.3
Secondary	#70
Pilot air jet	
Primary - First	#120
Second	#200
Secondary	#100
Main nozzle	
Primary	2.6 mm (0.102 in.)
Secondary	2.8 mm (0.110 in.)
Throttle valve plate	
Thickness	
Primary	1.0 mm (0.040 in.)
Secondary	1.5 mm (0.060 in.)
Fuel closing angle	
Primary	8°
Secondary	15°
Full opening angle	90°
Enrichment jet	#50
Slow air jet	#110
Accelerating pump	
Diaphragm dia.	24 mm (0.945 in.)
Pump jet dia.	0.35 mm (0.014 in.)
Choke	
Type	Automatic (Electric type)
Choke valve operating angle	25° (When fully closed) 90° (When fully opened)
Bimetal	
Temperature constant	1.0 deg/°C
Spring constant	60 gr.mm/deg.
Choke breaker opening	
First stage	1.4-1.6 mm (0.056-0.064 in.)
Second stage	2.9-3.1 mm (0.116-0.124 in.)
Input sensor	
Engine coolant temperature sensor	
Type	Thermistor type
Resistance	2.5 KΩ [at 20°C (68°)] 0.3 KΩ [at 80°C (176°F)]

Oxygen sensor	
Type	Zirconia sensor
Vacuum switch	
Type	Contact type switch
Operating condition - ON	More than 40 kPa (5.8 psi)
OFF	Less than 26 kPa (3.9 psi)
Vehicle speed sensor	Reed switch type
Top gear sensing switch	Contact type switch
Output actuator	
Cold mixture heater	
Type	Positive Temperature Coefficient (PTC) heater
Secondary air control solenoid valve	
Type	ON-OFF solenoid valve
Resistance	38-44 Ω [at 20°C (68°F)]
Advance control solenoid valve	
Type	ON-OFF solenoid valve
Resistance	38-44 Ω [at 20°C (68°F)]
Cold advance control solenoid valve	
Type	ON-OFF solenoid valve
Resistance	38-44 Ω [at 20°C (68°F)]
Throttle opener control solenoid valve	
Type	ON-OFF solenoid valve
Resistance	38-44 Ω [at 20°C (68°F)]

SERVICE STANDARD

Basic ignition timing	BTDC $5^{\circ} \pm 1^{\circ}$
Curb idle speed	700 ± 50 rpm
Throttle opener adjusting rpm for electrical load	800 ± 50 rpm
Throttle opener adjusting rpm for air conditioner load	900 ± 25 rpm

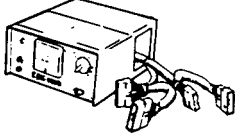
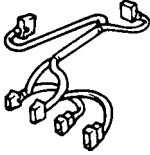
TIGHTENING TORQUE

	Nm	kg.cm	lb.ft
Accelerator arm bracket to body	8-12	80-120	5.8-8.7
Accelerator cable guide to body	3-5	30-50	2.2-3.6
Carburetor attaching bolt	15-20	150-200	11-14
Engine coolant temperature sensor	20-40	200-400	14-29
Oxygen sensor	40-50	400-500	29-36
Fuel tank drain plug	80-100	800-1,000	58-72

LUBRICANT

Grease for accelerator arm pin and return spring	Multipurpose grease SAE J310a, NLGI grade #3 or equivalent
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SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09341-21000 FBC checker		Diagnosis and inspection of FBC system (Use with 09391-21101)
09391-21101 Harness connector for FBC		Inspection for FBC system (Use with 09341-21000)

TROUBLESHOOTING

When checking and correcting engine troubles, it is important to start with inspection of the basic systems. If you experience one of the followings, (A) engine start failure, (B) unstable idling or (C) poor acceleration, you should first check the following basic systems.

1. Power supply
 - 1) Battery
 - 2) Fusible link
 - 3) Fuse
2. Body ground
3. Fuel supply
 - 1) Fuel line
 - 2) Fuel filter
 - 3) Fuel pump
4. Ignition system
 - 1) Spark plug
 - 2) High-tension cable
 - 3) Distributor
 - 4) Ignition coil
5. Emission control system
 - 1) PCV system
 - 2) EGR system
 - 3) Vacuum leak
6. Others
 - 1) Ignition timing
 - 2) Idle speed

Troubles with the FBC system are often caused by poor contact of harness connector. It is, therefore, important to check harness connector contact.

Fuel Tank and Fuel Line

Symptom	Probable cause	Remedy
Engine malfunctions due to insufficient fuel supply	Bent or kinked fuel pipe or hose Clogged fuel pipe or hose Clogged fuel filter or in-tank fuel filter Water in fuel filter Dirty or rusted fuel tank interior Malfunctioning fuel pump (Clogged filter in the pump)	Repair or replace Clean or replace Replace Replace the fuel filter or clean the fuel tank and fuel line Clean or replace Replace
Evaporative emission control malfunctions (Pressure released when fuel tank cap is removed)	Misrouted vapor lines Disconnected vapor line piping joint Folded, bent, cracked or clogged vapor line Faulty fuel tank cap Malfunctioning overfill limiter (two-way valve)	Correct Correct Replace Replace Replace

Carburetor and FBC System

Symptom		Probable cause	Remedy
Engine will not start or start to hard	Carburetor	Choke valve remains open-cold engine Improper choke breaker operation Electric choke malfunction Needle valve sticking or clogged	Clean choke bore and linkage Check and adjust choke breaker Check electric choke body and choke valve operation Repair or replace
	FBC system	Engine coolant temperature sensor malfunction Vacuum hose disconnected or damaged Slow-cut solenoid valve malfunction Feedback solenoid valve malfunction Vacuum switch malfunction-cold engine Faulty ECU Harness broken/short-circuited or loose connection	Check by using checker (Check component and replace if faulty) Repair or replace Check component Check component Check component Replace Repair or replace
Rough idle or engine stalls	Carburetor	Choke valve malfunction Improper fast idle-cold engine Improper idle adjustment Electric choke malfunction Primary pilot jet clogged Dash pot malfunction	Clean choke bore and link Adjust fast idle speed Adjust idle speed Check choke body and choke valve operation Clean up or replace Adjust
	FBC system	Slow-cut solenoid valve malfunction Engine coolant temperature sensor malfunction Vacuum hose disconnected or damaged Throttle position sensor malfunction Engine speed sensor malfunction Timing control system malfunction Throttle opener control system malfunction Harness broken/short-circuited or connector not connected securely	Check drive signal by using checker Check component Check by using checker (Check component and replace if faulty) Repair or replace Check component and adjust Check by using checker Check harness for continuity Check system. If faulty, check components Check system. If faulty, check components Repair or replace

Symptom		Probable cause	Remedy
Engine hesitates or poor acceleration	Carburetor	Acceleration pump malfunction Choke valve remains open-cold engine Choke valve remains closed-hot engine Main jet clogged Enrichment jet clogged Secondary valve operation abnormal	Clean pump discharge rate Clean choke bore and link Check choke valve operation Clean choke bore and link Check choke valve operation Clean up Clean up Check valve operation
	FBC system	Feedback solenoid valve malfunction Vacuum switch malfunction Timing control system malfunction Engine coolant temperature sensor malfunction Throttle position sensor malfunction Engine speed sensor malfunction Cold mixture heater relay control system malfunction-cold engine Harness broken/short-circuited or connector not connected properly Air conditioner power relay control system malfunction	Check drive signal by using checker Check component Check with checker (Replace if faulty) Check system. If faulty, check components Check by using checker (Check components and replace if faulty) Check component and adjust Check by using checker Check harnesses for continuity Check system. If faulty, check components Repair or replace Check system
Engine dieseling	Carburetor	Engine idle speed too high	Adjust idle speed
(runs after ignition FBC system switch is turned off)	FBC system	Slow-cut solenoid valve malfunction	Check component
Poor fuel mileage	Carburetor	Choke valve operation abnormal Engine idle speed too high Electric choke malfunction Enrichment valve kept open	Check valve operation Adjust idle speed Check choke body and valve operation Repair or replace

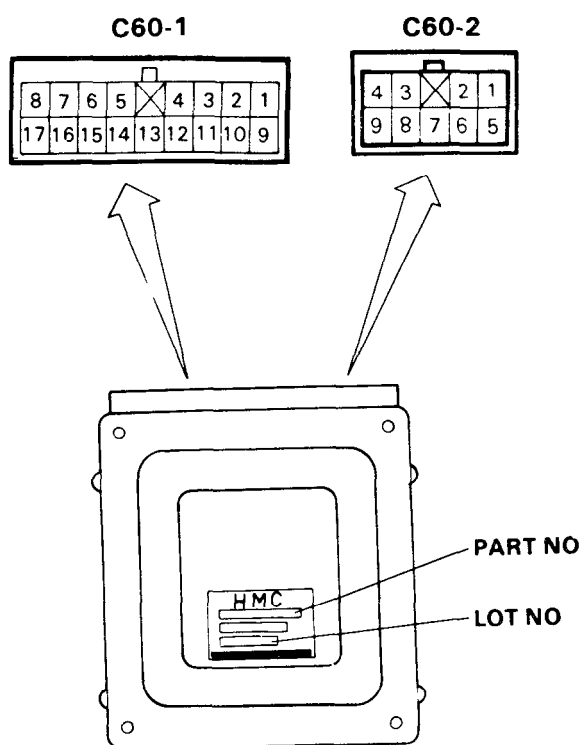
Symptom		Probable cause	Remedy
Poor fuel mileage	FBC system	Engine coolant temperature sensor malfunction	Check by using checker (Check component and replace if faulty)
		Oxygen sensor malfunction	Check by using checker (Check component and replace if faulty)
		Timing control system malfunction	Check system. If faulty, check components
		Feedback solenoid valve malfunction	Check drive signal by using checker
		Slow-cut solenoid valve malfunction	Check component Check drive signal by using checker
		Throttle position sensor malfunction	Check components
		Engine speed sensor malfunction	Check component and adjust
			Check by using checker
		Harness broken/short-circuited or connector not connected securely	Check harness for continuity Repair or replace

FBC System Component

1. Electric Control Unit (ECU)

Based on the information from various sensors, the ECU determines (computes) ideal setting for varying operating conditions and drives the output actuators to control the air-fuel ratio.

The ECU consists of an 8-bit microprocessor, random access memory (RAM), read only memory (ROM) and input/output (I/O) interface.



C60-1

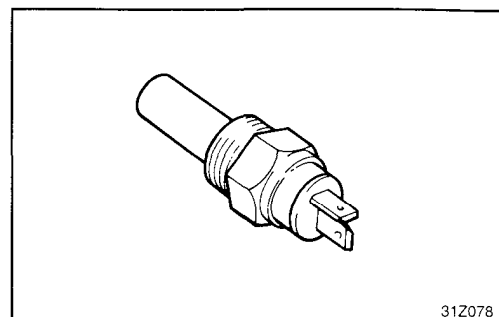
1. Feedback solenoid valve
2. Idle up control solenoid valve
3. Distributor advance vacuum exchange solenoid valve
4. Electric choke relay
5. Ignition coil negative terminal;
6. Ground
- 7.
8. Battery back up
9. Slow cut solenoid valve
10. Secondary air control solenoid valve
11. Air conditioner cut relay
12. -
13. Vacuum switch
14. Cold spark advance control solenoid valve
15. O₂ sensor checker
16. Ignition 1
17. Ignition 2
18. -

C60-2

1. Cold mixture heater relay (-)
2. -
3. Throttle position sensor (output)
4. Throttle position sensor (source)
5. -
6. O₂ sensor (output)
7. -
8. Coolant temperature sensor (output)
9. Coolant temperature sensor (ground)

2. Engine Coolant Temperature Sensor

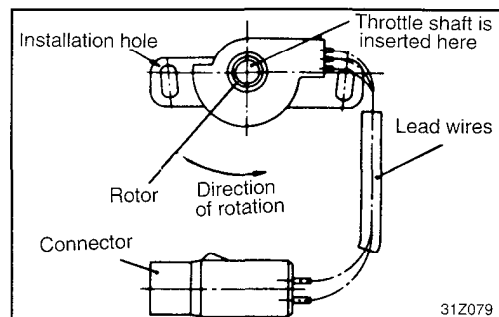
The engine coolant temperature sensor is installed in the engine coolant passage of the intake manifold. This coolant sensor is a thermistor. The ECU determines engine temperature by the sensor output voltage and utilize it to provide optimum fuel enrichment when the engine is cold.



3. Throttle Position Sensor (TPS)

The TPS is a rotary type variable resistor that rotates together with the carburetor throttle shaft to sense the throttle valve angle. As the throttle shaft rotates, the TPS output voltage changes and the ECU detects the throttle valve opening based on the change of the voltage.

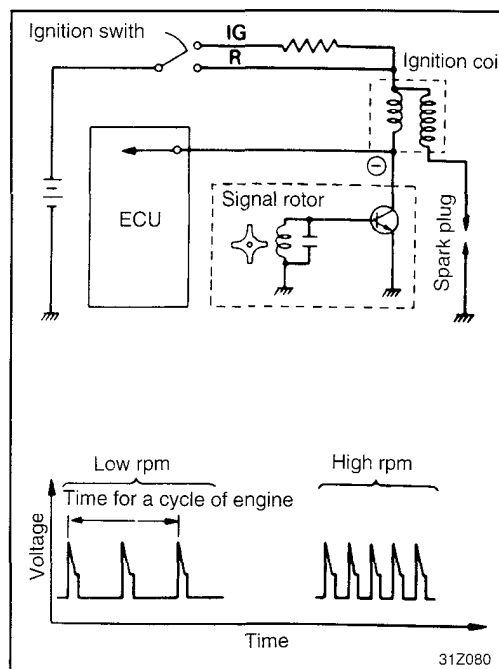
Using the TPS output signal, engine speed signal and other signals, the ECU maintains the optimum air-fuel ratio.



4. Engine Speed Sensor

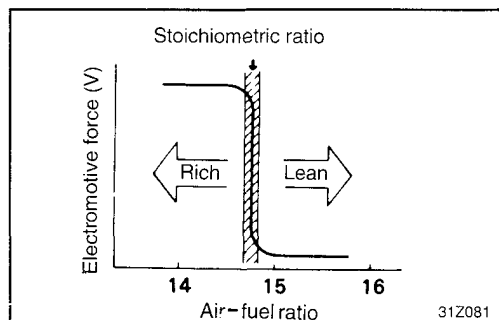
The ignition coil negative terminal voltage makes sudden increase twice per crankshaft revolution synchronously with ignition timing.

By sensing this ignition coil negative terminal voltage change and measuring the time between peak voltages, the ECU computes the engine speed, judges the engine operating mode and controls the air-fuel ratio and ignition timing.

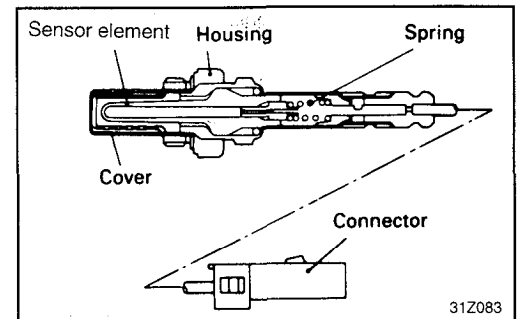
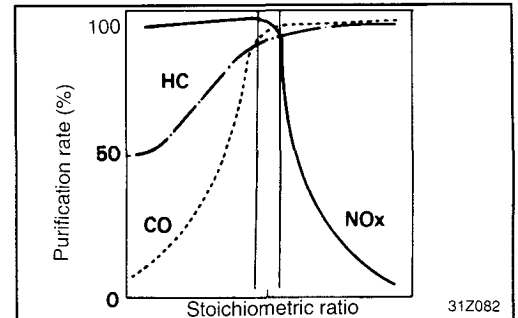


5. Oxygen Sensor

- 1) The oxygen sensor installed on the exhaust manifold makes use of the principles of solid electrolyte oxygen concentration cell. The oxygen concentration cell is characterized by sharp change of the output voltage in the vicinity of the stoichiometric air-fuel ratio.



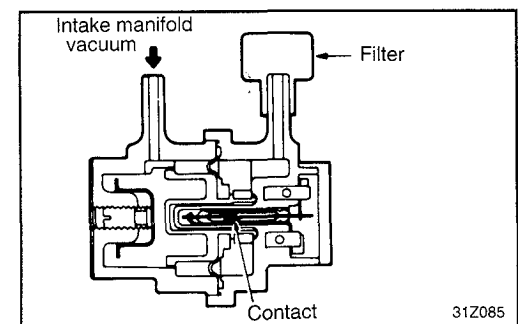
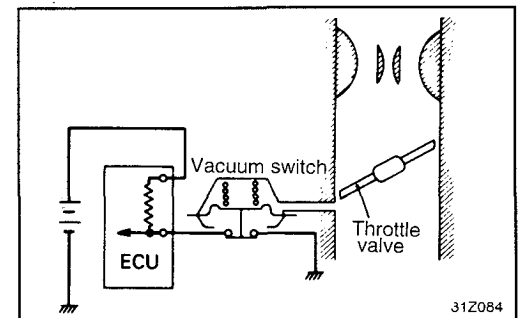
- 2) Using such characteristics, the oxygen sensor senses the oxygen concentration in the exhaust gas and feeds it to the ECU. The ECU then judges if the air-fuel ratio is richer or leaner as compared to the stoichiometric ratio and provides feedback control to adjust the air-fuel ratio to the stoichiometric ratio where the emission purification rate of the three way catalytic converter is the optimum.



6. Vacuum Switch

The vacuum switch is a contact type switch that is operated by intake manifold vacuum. When the throttle valve closes, the intake manifold vacuum acts on the vacuum switch to close its contact.

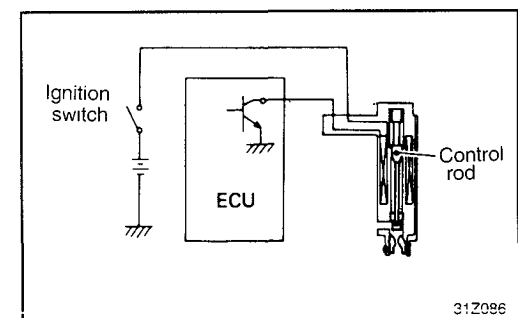
By this action, the voltage on the ECU side is grounded and the ECU senses that the throttle valve opening is near idle.



7. Feedback Solenoid Valve (FBSV)

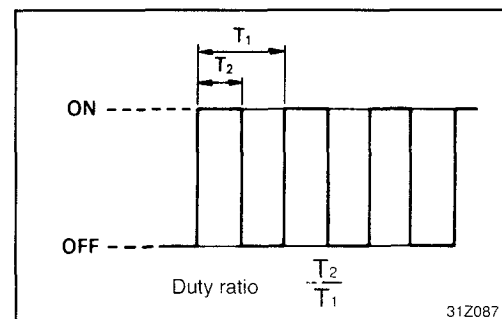
The FBSV is installed in the carburetor float chamber cover. The ECU controls the air-fuel ratio by controlling the duty cycle of the FBSV.

The higher is the duty ratio, the leaner becomes the air-fuel ratio.



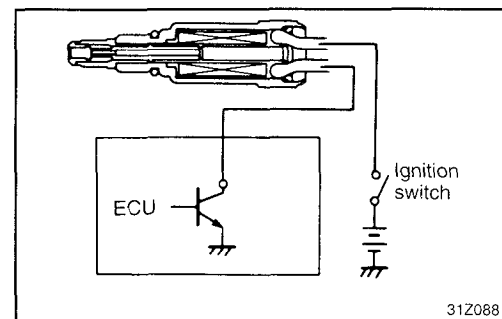
NOTE

The duty cycle control means control of the solenoid valve energization rate by changing the ON time ratio T_2/T_1 (called duty ratio) of 10 Hz pulse.



8. Slow Cut Solenoid Valve (SCSV)

The SCSV is located in the carburetor float chamber cover. The ECU controls the carburetor slow system fuel flow by controlling the duty cycle of the SCSV.



FBC System Operation

1. The air-fuel ratio control is maintained by the ECU in one of two operating modes.

- 1) Closed loop control (Feedback control)

After engine warm-up, the air-fuel ratio control is made by the feedback control based on the oxygen sensor signal. The oxygen sensor output voltage changes sharply at the stoichiometric ratio. The control unit senses this oxygen sensor signal and provides feedback control to the FBSV maintaining the stoichiometric ratio that will give the best purification rate of the 3-catalyst converter may be accurately kept. In this state, the SCSV is kept wide open (100% duty)

- 2) Open loop control (No feedback control)

During engine start, warm-up operation, high load operation and deceleration, the air-fuel ratio is in open-loop. The ECU controlled based on map values* established previously for engine speed, throttle valve opening angle and engine coolant temperature, to improve startability and driveability.

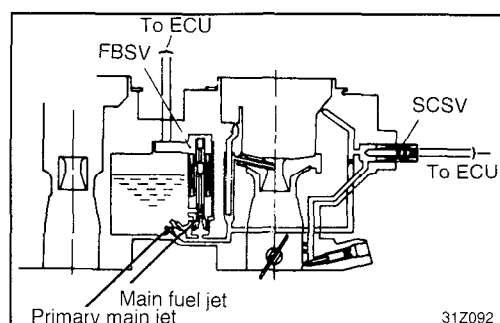
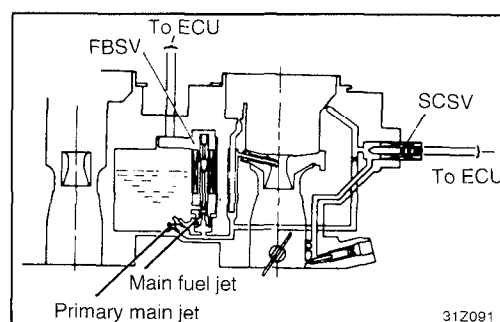
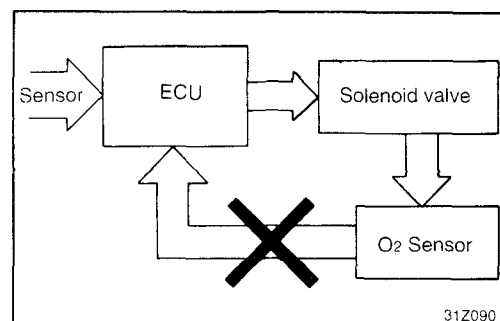
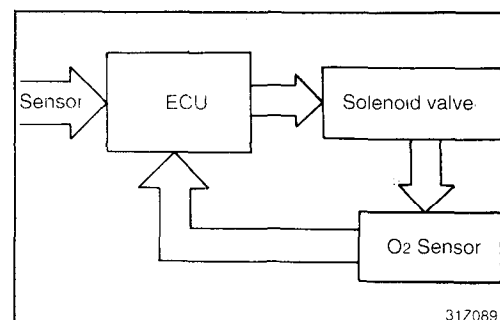
During deceleration, the SCSV limits fuel flow for better fuel economy and for prevention of overheating of the catalysts, *Map value is a value previously established and stored in ROM in ECU.

2. When the FBSV is energized, the main fuel jet is closed to leaving the primary main jet passage as the only fuel passage. This reduces the amount of fuel, resulting in leaner air-fuel mixture.

3. When the FBSV is de-energized, the main fuel jet is opened to provide two fuel passages including the primary main jet passage. Since this will increase the amount of fuel, richer air-fuel mixture is obtained.

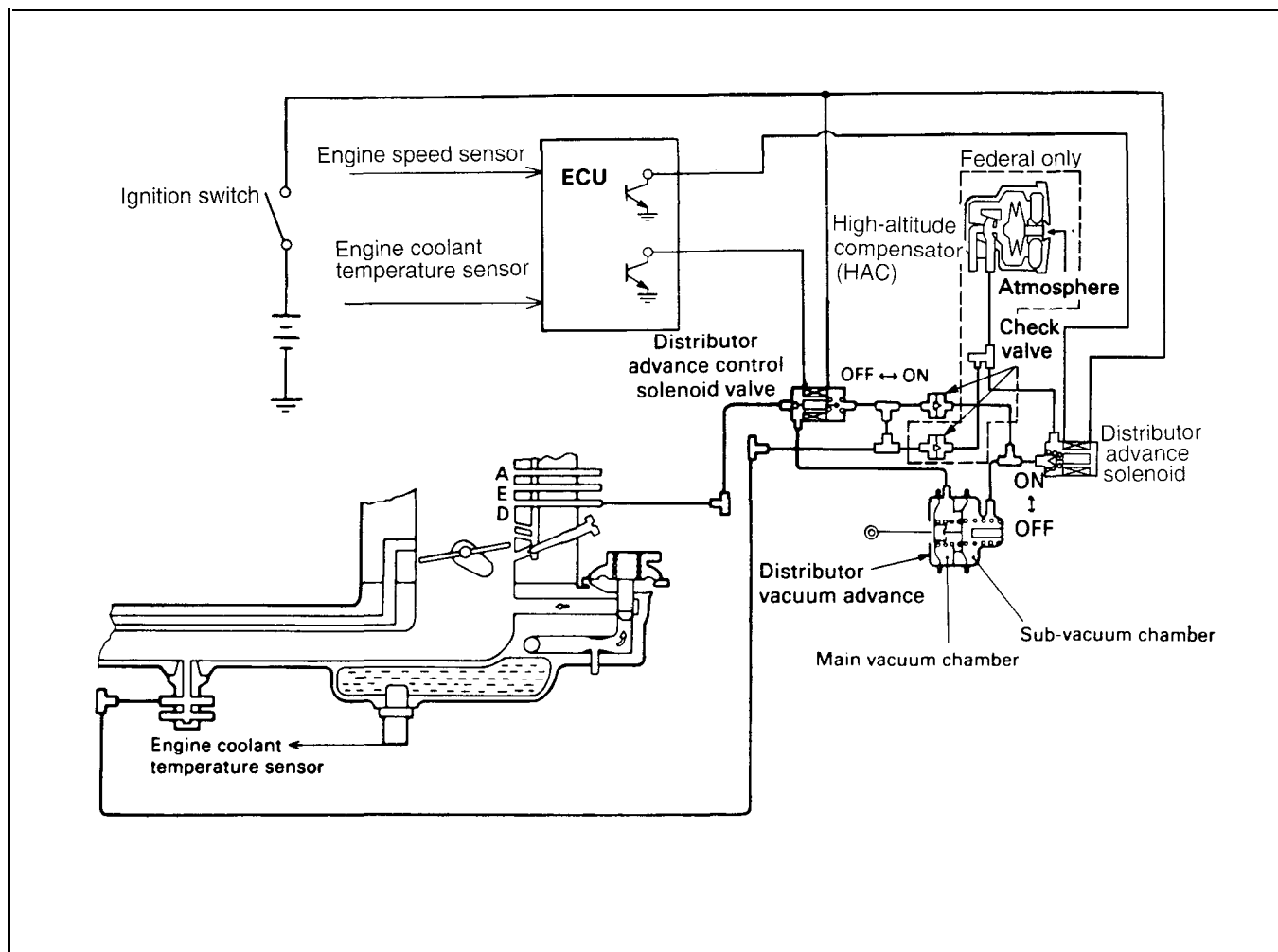
With the ON-OFF operation of SCSV, the slow fuel passage is opened and closed.

The air-fuel ratio at deceleration is controlled in this manner.



Distributor Advance Control System (Ignition Timing Control System)

The distributor vacuum advance is a dual diaphragm type having main vacuum chamber and sub-vacuum chamber. To control the ignition timing, the ECU energizes the solenoid valves in the respective vacuum circuits of main vacuum chamber and subvacuum chamber.



1. Main Vacuum Timing Control

- 1) When the engine speed is near the-idle speed (1,200 rpm or less), the ECU energizes the distributor advance control solenoid valve. By this action the carburetor D port vacuum is introduced to the main vacuum chamber which resets the ignition timing.

NOTE

The D port vacuum is zero when the throttle valve is at idle position, and increases with the valve opening angle.

- 2) When the engine speed increases to 1,200 rpm the ECU turns off the distributor advance control solenoid valve. Intake manifold vacuum is routed to the main vacuum chamber increasing ignition advance. When the engine starts to warm up] engine coolant temperatures: below 80°C (176°F), the solenoids are energized, allowing D port vacuum to reach main vacuum chamber.

2. Sub-vacuum Timing Control

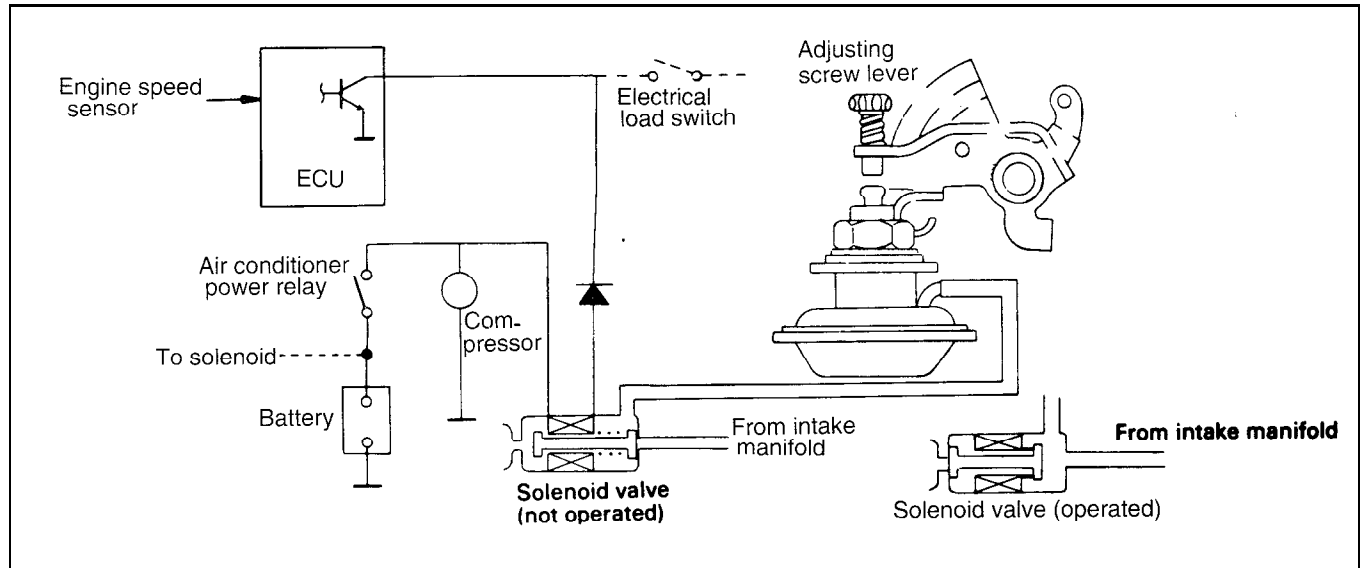
- o Control at low altitude [approx. 1,200 m (3,900ft.) or lower]
 - 1) When the engine coolant temperature is low [50°C (122°F) or lower], the ECU energizes the distributor cold advance control solenoid valve. By this action, the intake manifold vacuum no longer leaks to atmosphere and instead is introduced to the sub-vacuum chamber. As a result, the timing advanced by the main vacuum advance is additionally advanced by a fixed angle (5° in crank angle).
 - 2) During warm-up operation or when the engine coolant temperature is high [over 50°C (122°F)], the ECU de-energizes the distributor cold advance control solenoid valve circuit. As a result, the intake manifold vacuum leaks to atmosphere, which prevents timing advance.
- o Control at high altitude [approx, 1,200 m (3,900 ft.) to over)

At high altitude, the HAC is closed and hence the intake manifold vacuum does not leak to atmosphere from the HAC.

Independently of the distributor cold advance control solenoid valve, the intake manifold vacuum acts on the sub-vacuum chamber, causing the timing to advance by a fixed angle (5° in crank angle). [For Federal]

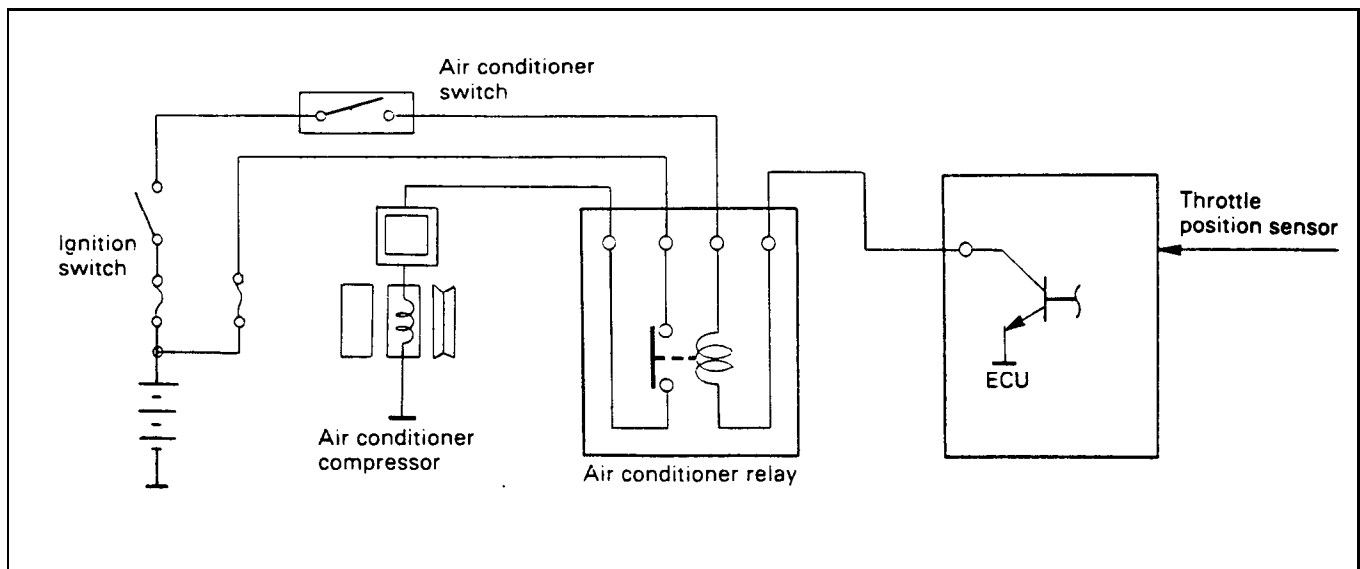
Throttle Opener System (For A/C)

When the engine speed is below the set speed (1,200 rpm), the ECU keeps the power transistor on. When the air conditioner relay is turned on the throttle opener control solenoid valve is energized to introduce intake manifold vacuum to the throttle opener. The throttle valve opens slightly preventing engine speed drop caused by air conditioner load.



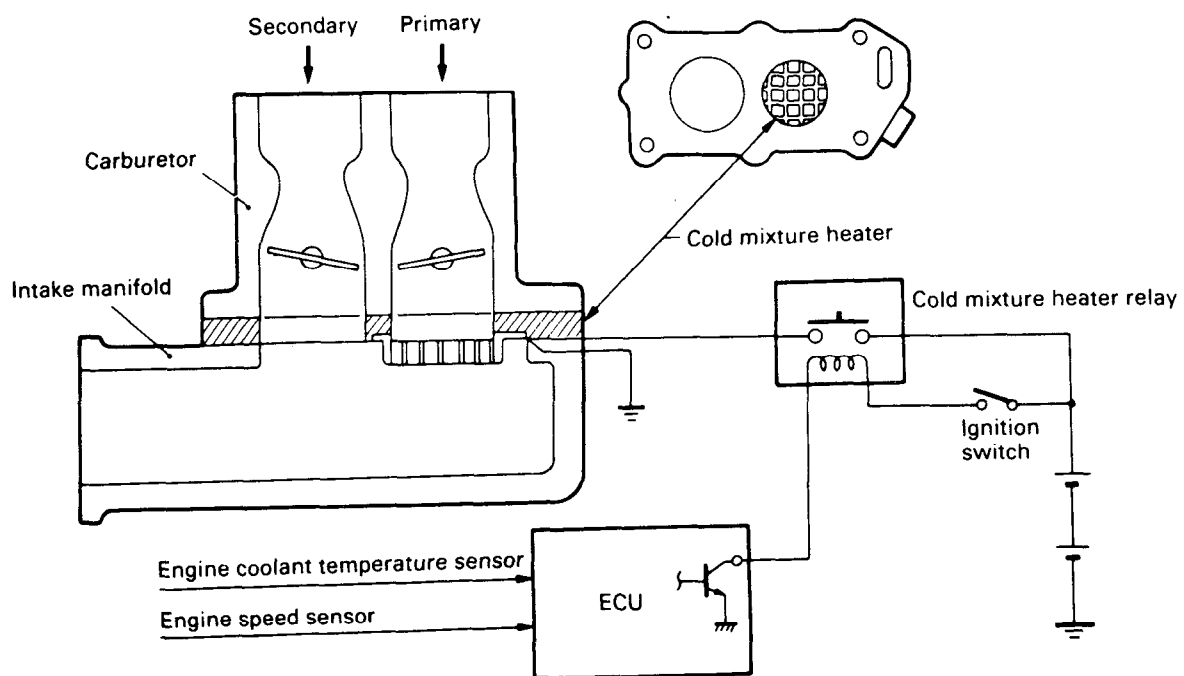
Air Conditioner Power Relay Control System (For A/T)

When the throttle valve opening increases (over 74°) during acceleration etc., the ECU turns off the air conditioning power relay for about 5 seconds. As a result, even if the air conditioner switch is on, the air compressor is not driven and hence the engine load is reduced, improving acceleration performance.



Cold Mixture Heater (CMH) Relay Control System

The cold mixture heater is a Positive Temperature Coefficient (PTC) heater installed between the carburetor and intake manifold. When the engine coolant temperature is below 60°C (140°F) the ECU energizes the cold mixture heater relay. The closed relay supplies voltage to the cold mixture heater. The cool air-fuel mixture is heated and atomized by the heater before it reaches the combustion chamber for improved combustion.

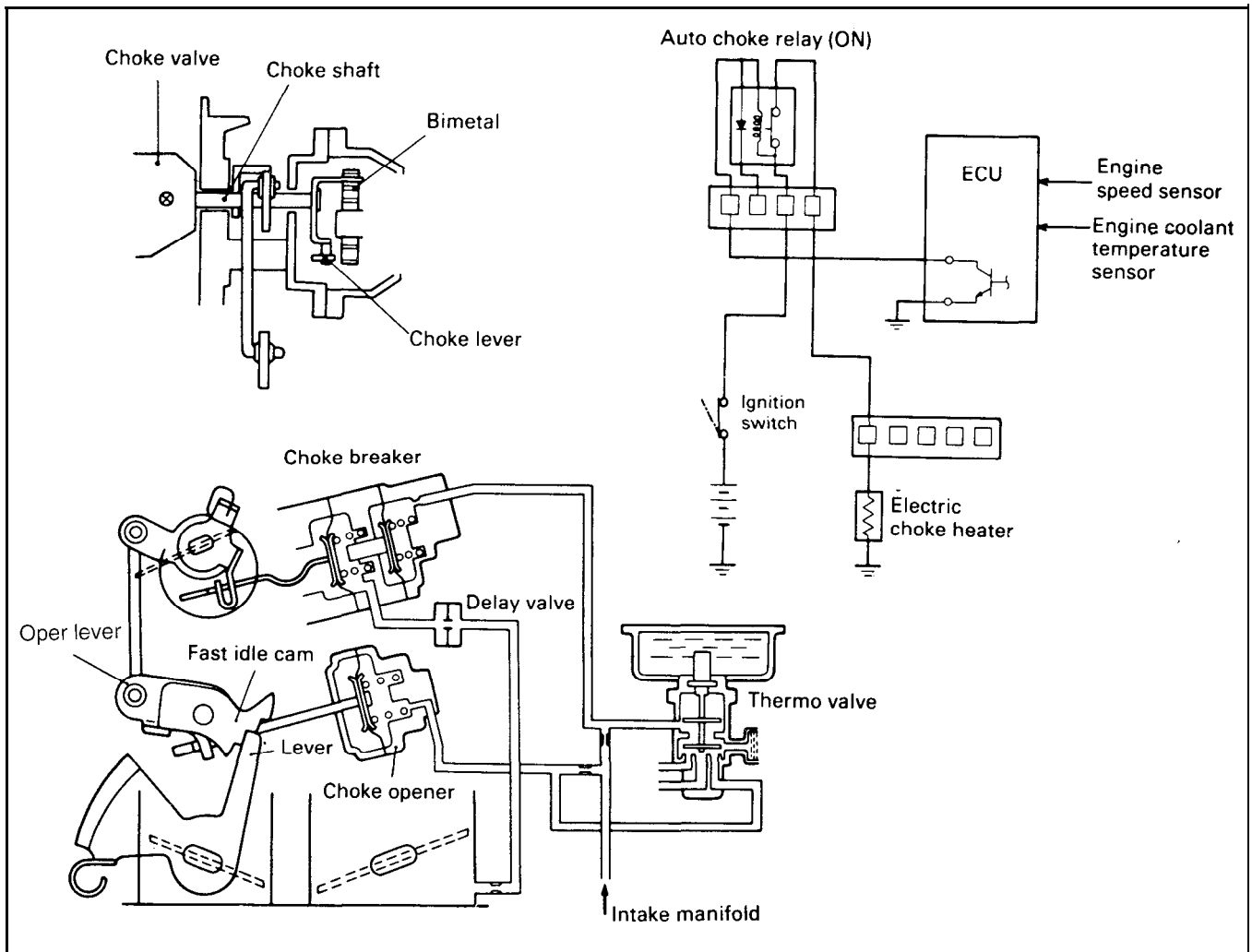


Electric Auto Choke System

In the carburetor electric choke system, a bimetal choke spring is heated by an electric heater (PTC heater*).

As the bimetal spring is heated by the heater after start-up, the bimetal opens the choke valve gradually by thermal expansion and pushes down the stopper lever.

The lower the temperature when the engine is started, the tighter the bimetal closes the choke valve, thus improving at cold weather starting.



*PTC heater : Positive Temperature Coefficient heater