



# SECTION EF

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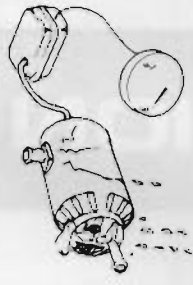
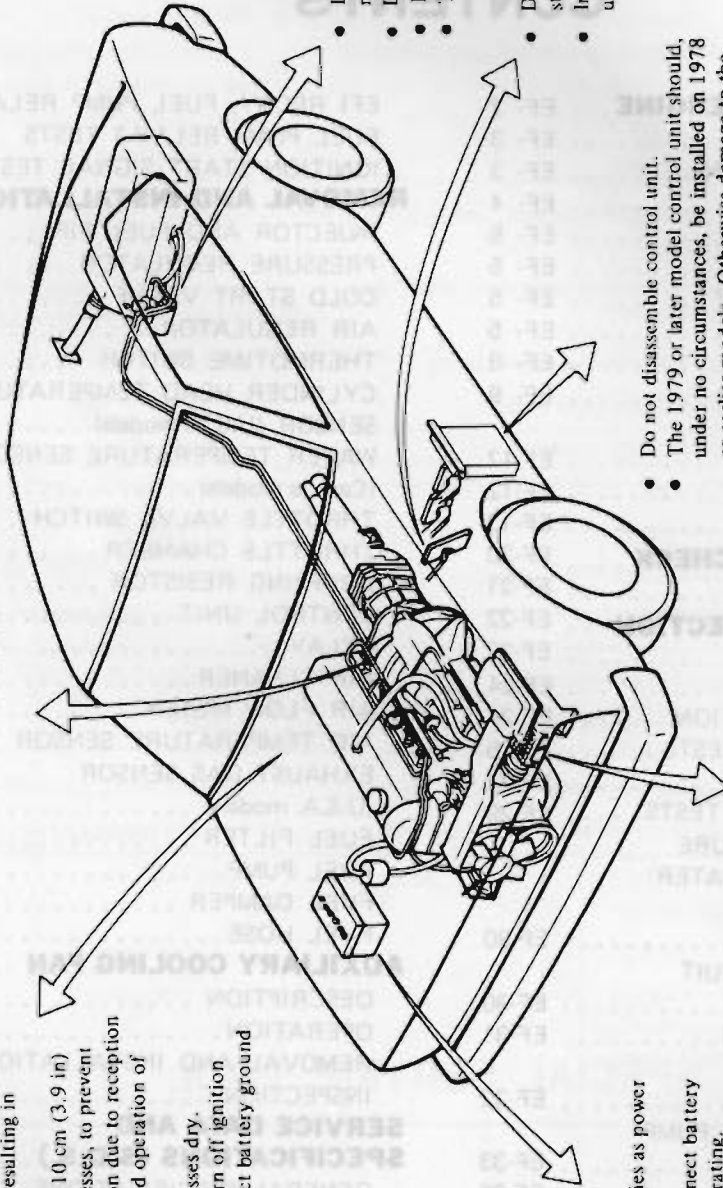
EF

# PRECAUTIONS FOR AN EFI ENGINE

Pay close attention to the following points when inspecting or servicing an EFI car.

- Securely connect EFI harness connector. A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to IC circuit.
- Keep EFI harness at least 10 cm (3.9 in) away from adjacent harnesses, to prevent an EFI system malfunction due to reception of external noise, degraded operation of IC circuit, etc.
- Keep EFI parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

- Do not apply battery power directly to injectors.

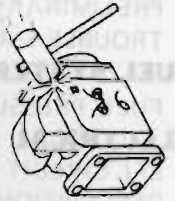


- Do not operate fuel pump when there is no fuel in lines.
- Do not use anti-freeze agents in fuel.
- Do not reuse fuel hose clamps.
- Tighten fuel hose clamps sufficiently.
- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.

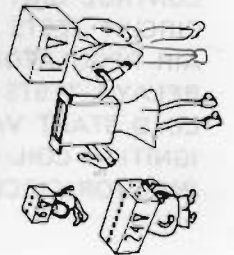
- Do not disassemble control unit.
- The 1979 or later model control unit should, under no circumstances, be installed on 1978 or earlier models. Otherwise damage to the control unit might result.



- Handle air flow meter carefully to avoid damage.
- There should not occur even a slight leak in air intake system.



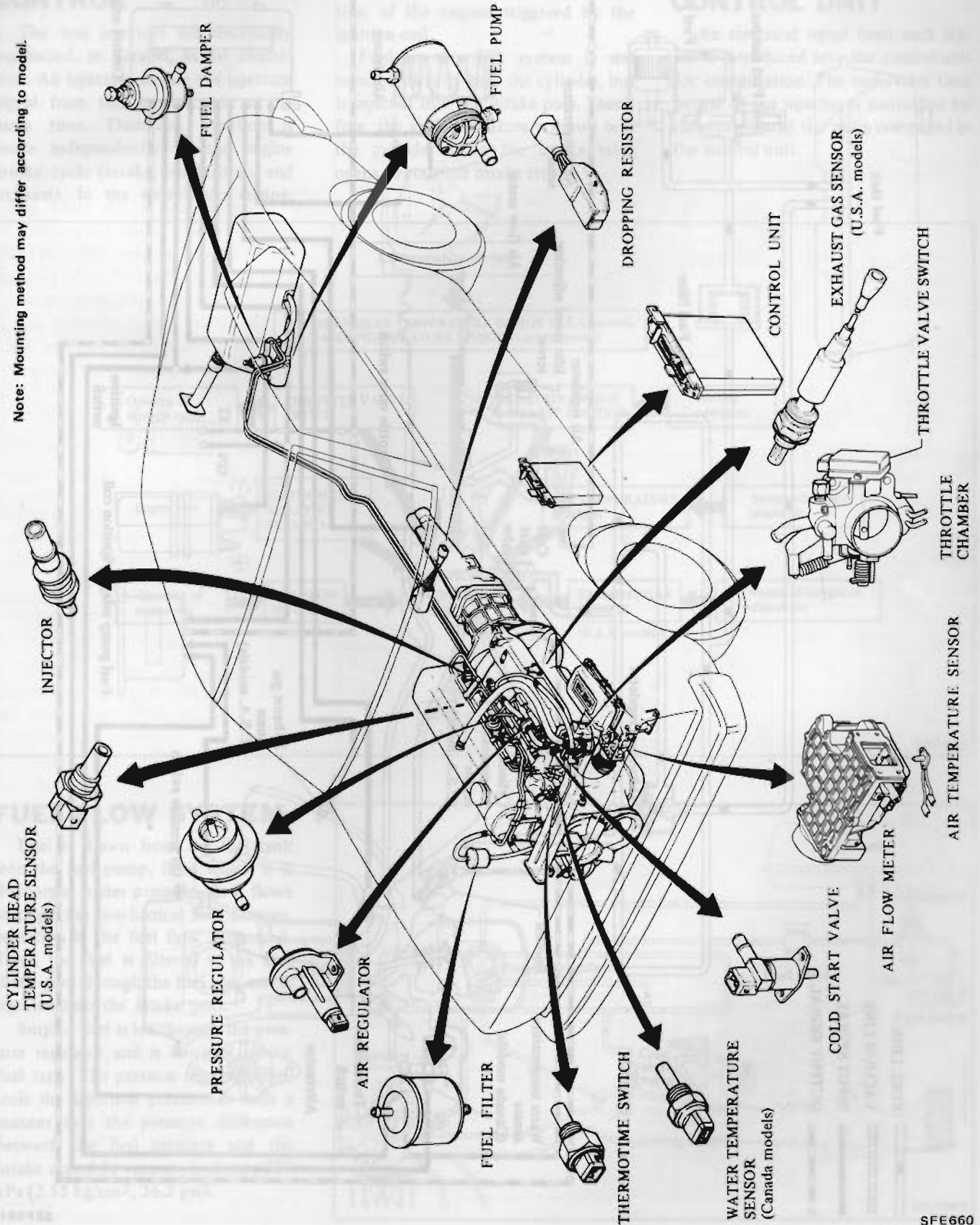
- Always use 12-volt batteries as power source.
- Do not attempt to disconnect battery cables while engine is operating.
- If a receiver-transmitter is installed, route antenna feeder cable along opposite side from EFI harness and control unit. Make sure that there is no interference while engine is idling.



DESCRIPTION

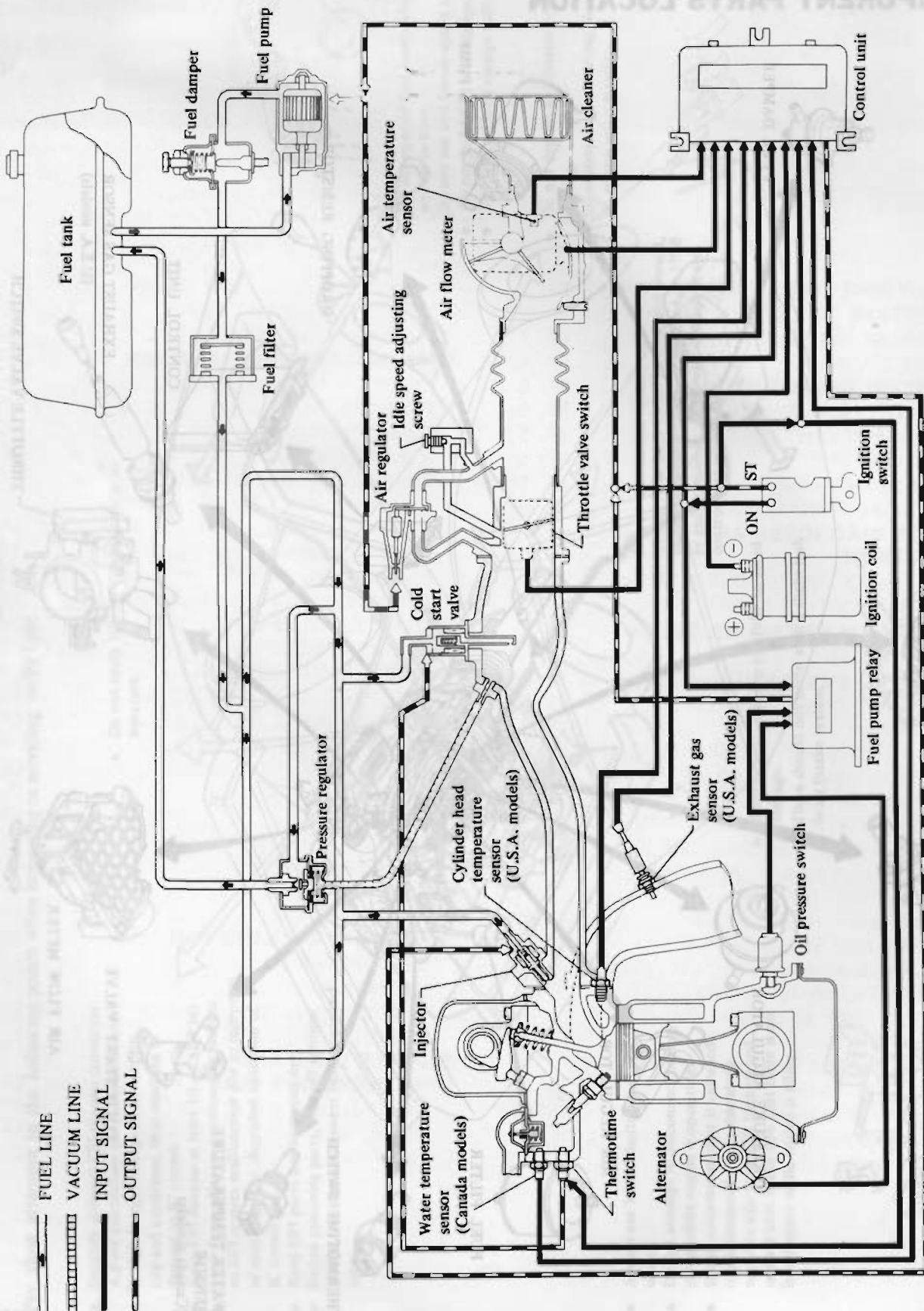
COMPONENT PARTS LOCATION

Note: Mounting method may differ according to model.





# SYSTEM DIAGRAM



## EFI SYSTEM OPERATION

### FUEL INJECTION CONTROL

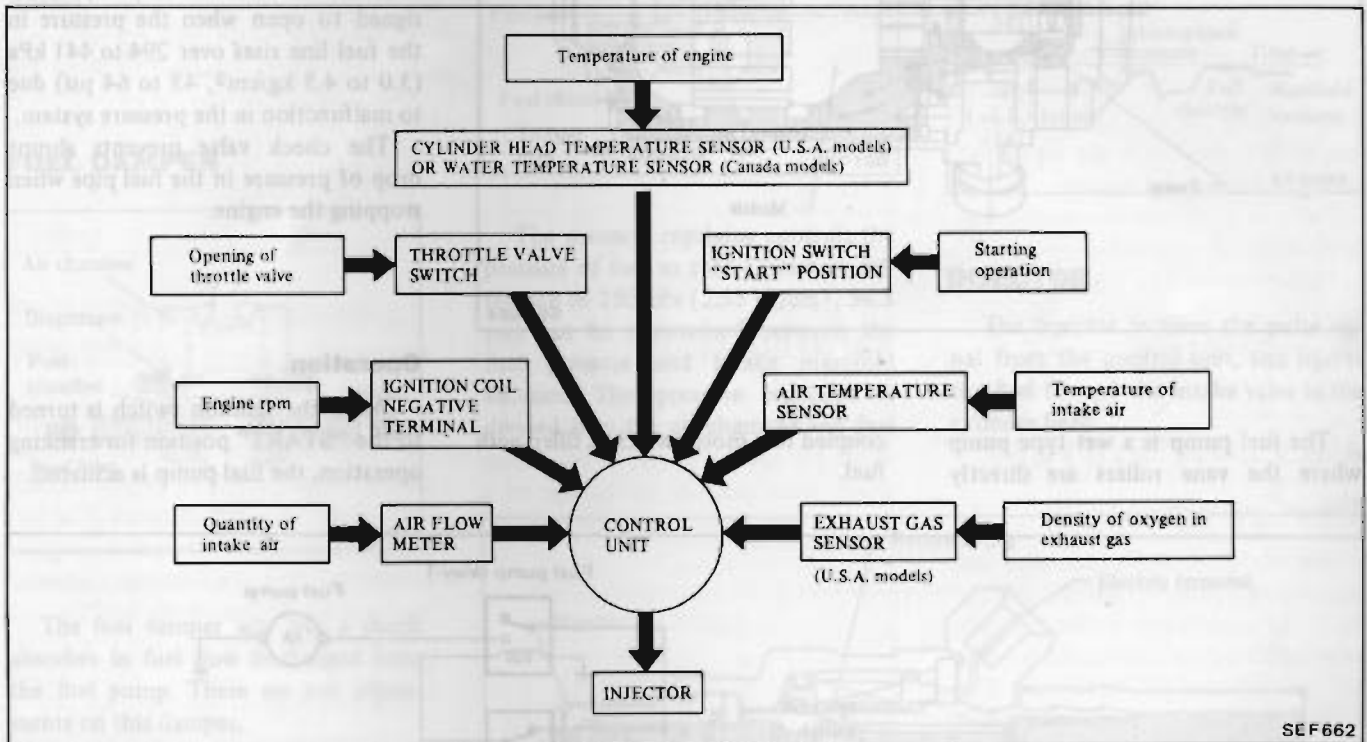
The fuel injectors are electrically connected, in parallel, in the control unit. All injectors receive the injection signal from the control unit at the same time. Therefore, injection is made independently of the engine stroke cycle (intake, combustion, and exhaust). In the six-cylinder engine,

injection is made once every revolution of the engine, triggered by the ignition coil.

Fuel in this EFI system is not injected directly into the cylinder, but is injected into the intake port. Therefore, the air-fuel mixture is drawn into the cylinder when the intake valve opens to start the intake stroke.

### SIGNALS FOR CONTROL UNIT

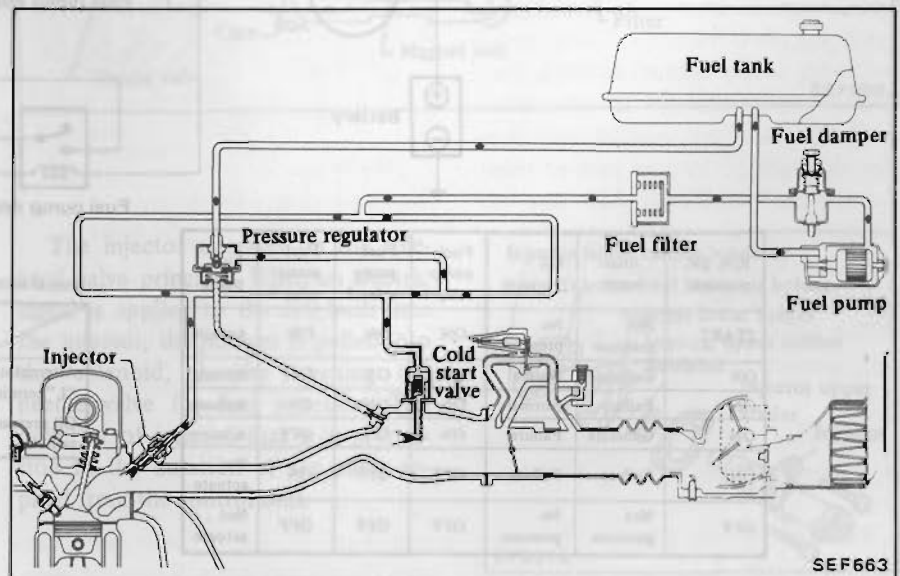
An electrical signal from each sensor is introduced into the control unit for computation. The open-valve time period of the injector is controlled by the duration of the pulse computed in the control unit.



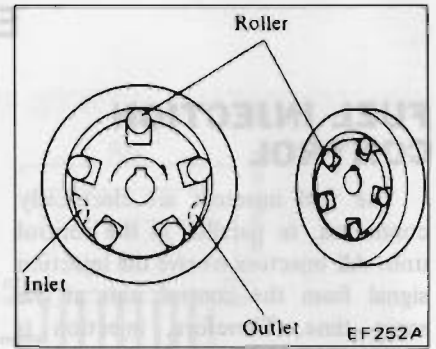
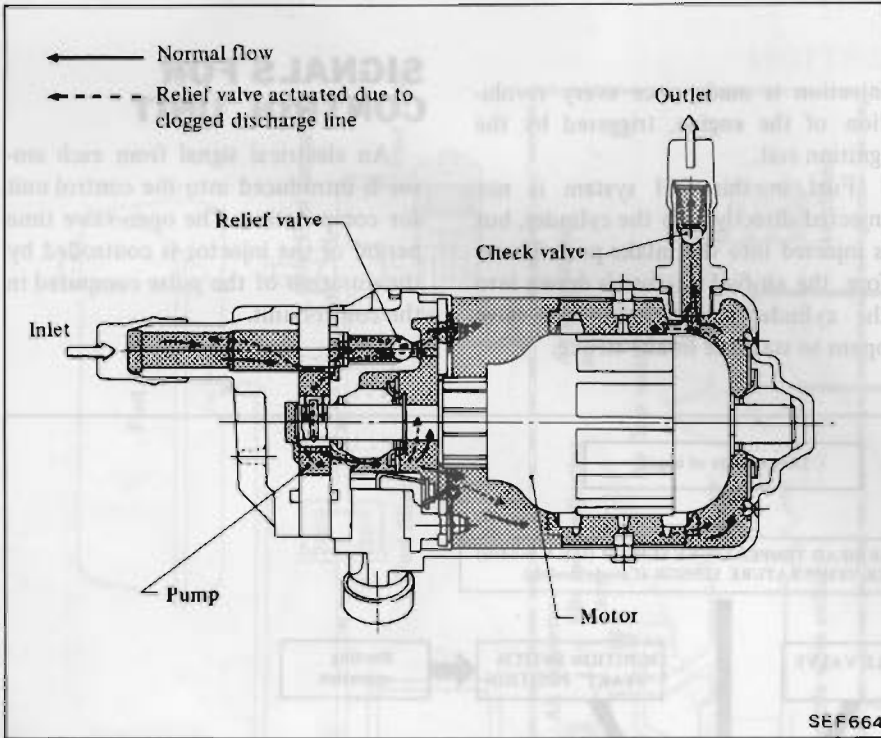
### FUEL FLOW SYSTEM

Fuel is drawn from the fuel tank into the fuel pump, from which it is discharged under pressure. As it flows through the mechanical fuel damper, pulsation in the fuel flow is damped. Then, the fuel is filtered in the fuel filter, goes through the fuel line, and is injected into the intake port.

Surplus fuel is led through the pressure regulator and is returned to the fuel tank. The pressure regulator controls the injection pressure in such a manner that the pressure difference between the fuel pressure and the intake manifold vacuum is always 250 kPa (2.55 kg/cm<sup>2</sup>, 36.3 psi).



**FUEL PUMP**



A relief valve in the pump is designed to open when the pressure in the fuel line rises over 294 to 441 kPa (3.0 to 4.5 kg/cm<sup>2</sup>, 43 to 64 psi) due to malfunction in the pressure system.

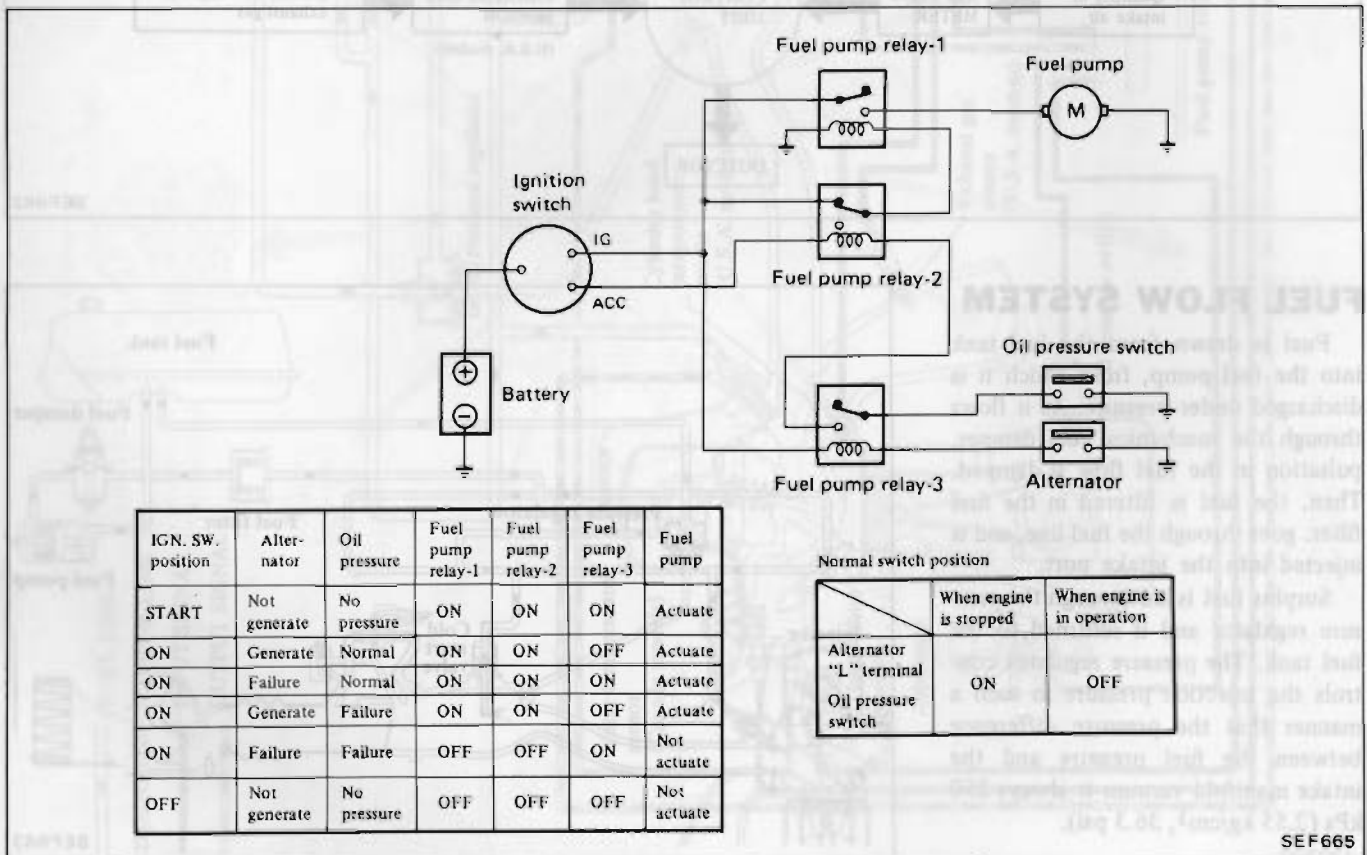
The check valve prevents abrupt drop of pressure in the fuel pipe when stopping the engine.

The fuel pump is a wet type pump where the vane rollers are directly

coupled to a motor which is filled with fuel.

**Operation**

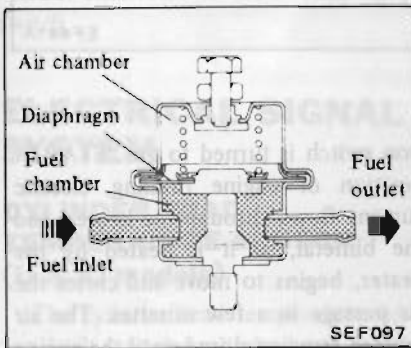
When the ignition switch is turned to the "START" position for cranking operation, the fuel pump is actuated.



After the engine is started (the ignition switch is "ON"), the alternator operates and the engine oil pressure switch is open, thereby actuating the fuel pump.

If the alternator stops and the engine oil pressure decreases for some reason, the fuel pump relay-3 is turned "ON", and the fuel pump relays-2 and -1 are turned "OFF". Then the fuel pump is stopped, though the ignition switch remains in the "ON" position. In this manner, fuel supply is cut off if the engine accidentally stops during driving.

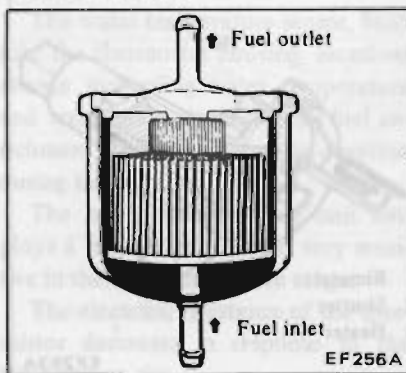
**FUEL DAMPER**



The fuel damper acts like a shock absorber in fuel flow discharged from the fuel pump. There are not adjustments on this damper.

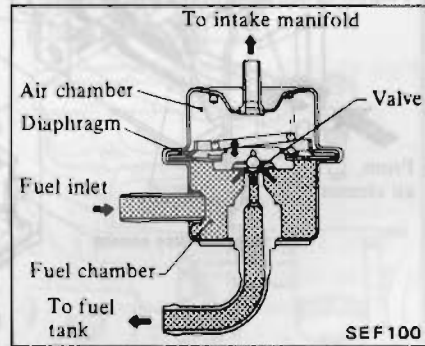
Change in the pump discharge pressure is monitored by the diaphragm and spring, which vary the volume of the fuel chamber.

**FUEL FILTER**



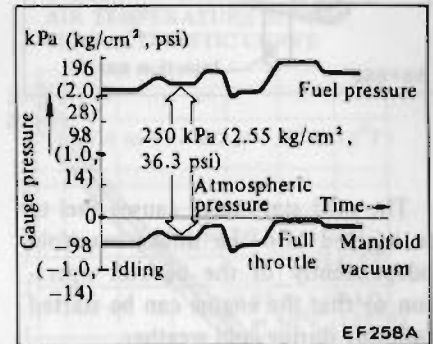
The fuel filter is placed between the fuel damper and the injector, and is used to remove foreign matter in the fuel. Water in the fuel is collected at the bottom of the filter casing.

**PRESSURE REGULATOR**



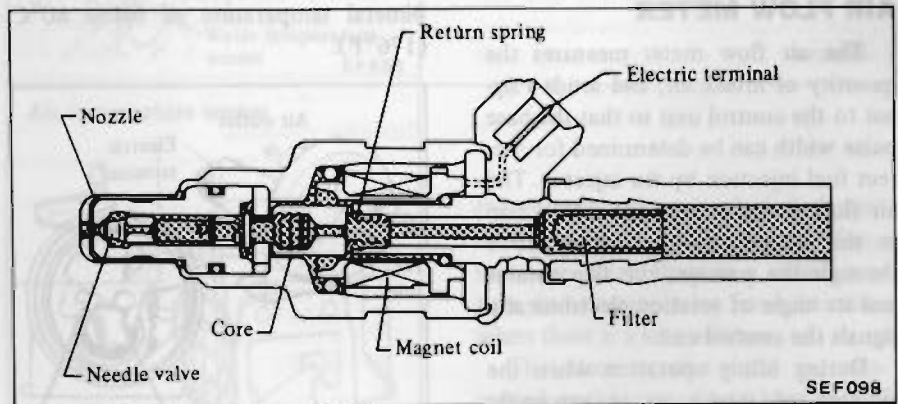
The pressure regulator controls the pressure of fuel so that a pressure difference of 250 kPa (2.55 kg/cm<sup>2</sup>, 36.3 psi) can be maintained between the fuel pressure and intake manifold vacuum. The pressure regulator is divided into the air chamber and fuel

chamber by the diaphragm. Intake manifold vacuum is introduced into the air chamber, thereby keeping differential pressure constant causing excessive fuel to return to the fuel tank through the return side port. This constant differential pressure provides optimum fuel injection in every mode of engine operation.

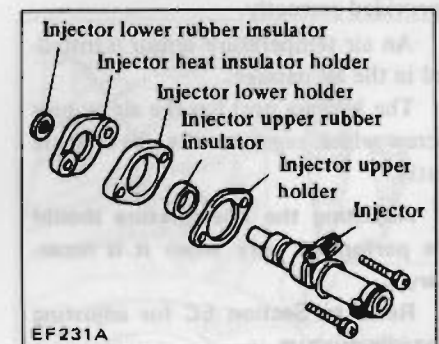


**INJECTOR**

The injector receives the pulse signal from the control unit, and injects the fuel toward the intake valve in the cylinder head.

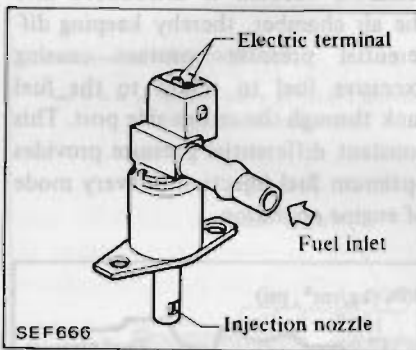


The injector operates on the solenoid valve principle. When an electric signal is applied to the coil built into the injector, the plunger is pulled into the solenoid, thereby opening the needle valve for fuel injection. The quantity of injected fuel is in proportion to the duration of the pulse applied from the control unit.





## COLD START VALVE



The cold start valve causes fuel to be injected into the intake manifold independently of the injector operation so that the engine can be started smoothly during cold weather.

The cold start valve operates on the electromagnetic principle.

To improve fuel-air mixing at lower temperatures, the cold start valve employs a swirl type nozzle.

## AIR FLOW SYSTEM

### AIR FLOW METER

The air flow meter measures the quantity of intake air, and sends a signal to the control unit so that the base pulse width can be determined for correct fuel injection by the injector. The air flow meter is provided with a flap in the air passage. As the air flows through the passage, the flap rotates and its angle of rotation electronically signals the control unit.

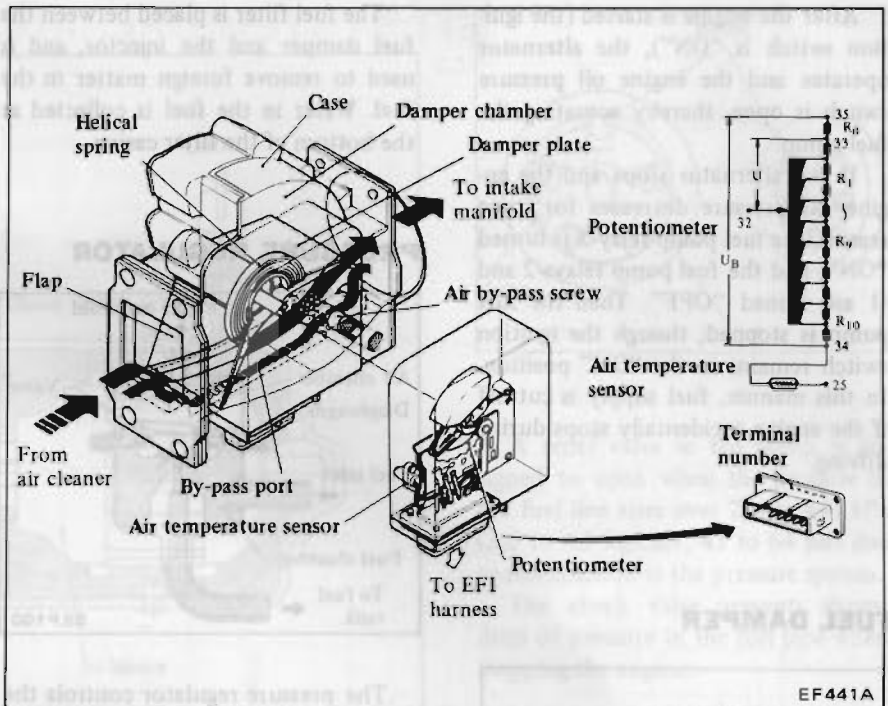
During idling operation when the amount of intake air is extremely small, the air flows parallel with the flap through the by-pass port so that the specified intake air flow can be provided correctly.

An air temperature sensor is installed in the air passage.

The by-pass port has the air by-pass screw which regulates the idle mixture ratio.

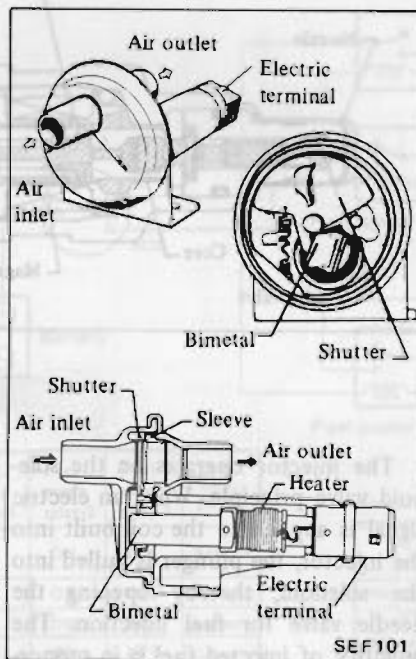
Adjusting the idle mixture should be performed only when it is necessary.

Refer to Section EC for adjusting the idle mixture.



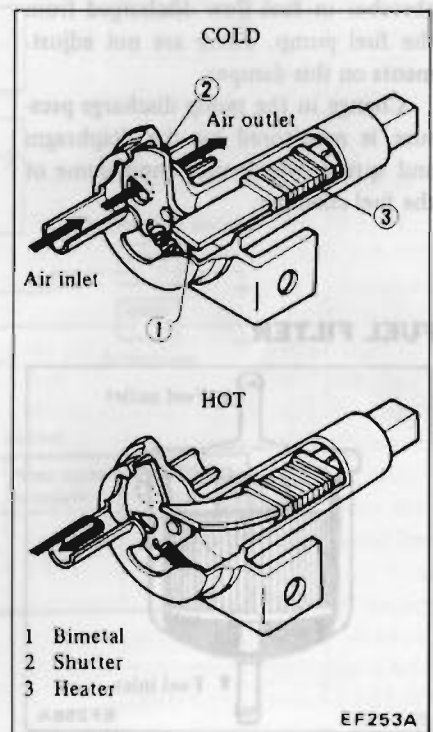
## AIR REGULATOR

The air regulator by-passes the throttle valve to control the quantity of air for increasing the engine idling speed when starting the engine at a bimetal temperature of below 80°C (176°F).



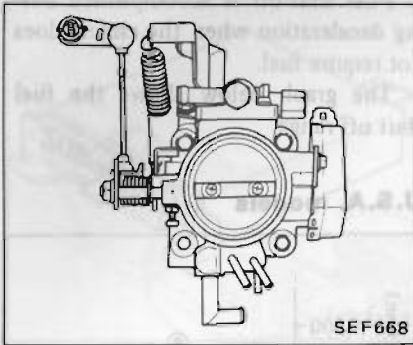
A bimetal and a heater are built into the air regulator. When the igni-

tion switch is turned to the "START" position or engine running, electric current flows through the heater, and the bimetal, as it is heated by the heater, begins to move and closes the air passage in a few minutes. The air passage remains closed until the engine is stopped and the bimetal temperature drops to below 80°C (176°F).





**THROTTLE CHAMBER**



SEF668

The throttle chamber, located between the air flow meter and the intake manifold, is equipped with a valve. This valve controls the intake air flow in response to accelerator pedal movement. The rotary shaft of this valve is connected to the throttle valve switch.

**ELECTRICAL SIGNAL SYSTEM**

**CYLINDER HEAD TEMPERATURE SENSOR (U.S.A. models)**

The cylinder head temperature sensor, built into the cylinder head, monitors change in cylinder head temperature and transmits a signal to increase the pulse duration during the warm-up period.

The temperature sensing unit employs a thermistor which is very sensitive in the low temperature range.

The electrical resistance of the thermistor decreases in response to the temperature rise.

**WATER TEMPERATURE SENSOR (Canada models)**

The water temperature sensor, built into the thermostat housing, monitors change in cooling water temperature and transmits a signal for the fuel enrichment to change the pulse duration during the warm-up period.

The temperature sensing unit employs a thermistor which is very sensitive in the low temperature range.

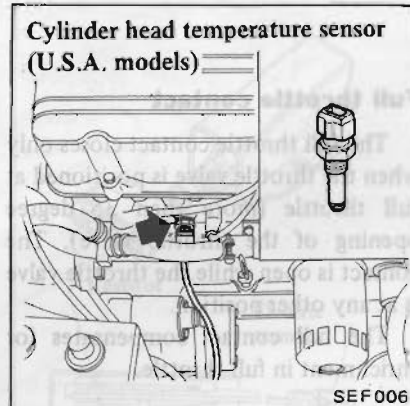
The electrical resistance of the thermistor decreases in response to the temperature rise.

**AIR TEMPERATURE SENSOR**

The air temperature sensor, built into the air flow meter, monitors change in the intake air temperature and transmits a signal for the fuel enrichment to change the pulse duration.

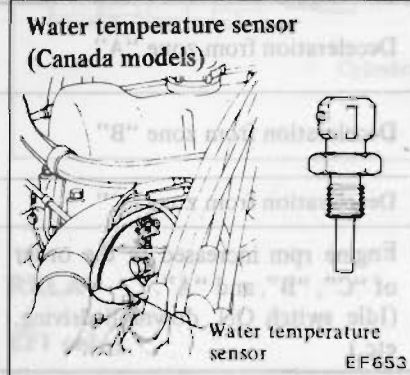
The temperature sensing unit employs a thermistor which is very sensitive in the low temperature range.

The electrical resistance of the thermistor decreases in response to air temperature rise.



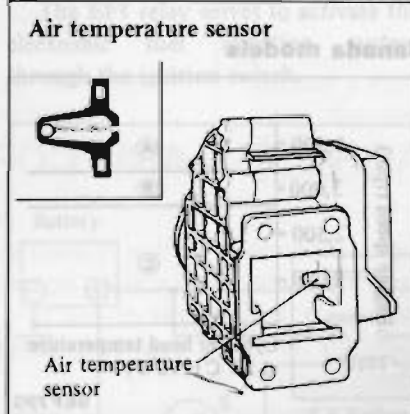
Cylinder head temperature sensor (U.S.A. models)

SEF006



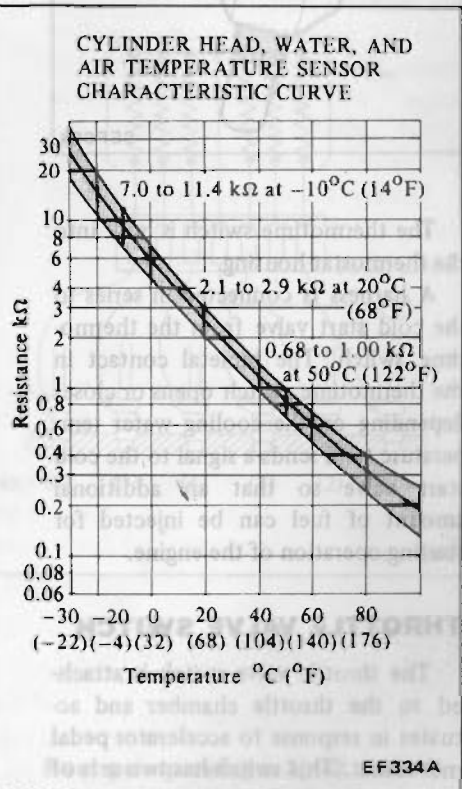
Water temperature sensor (Canada models)

EF653



Air temperature sensor

Air temperature sensor



EF334A

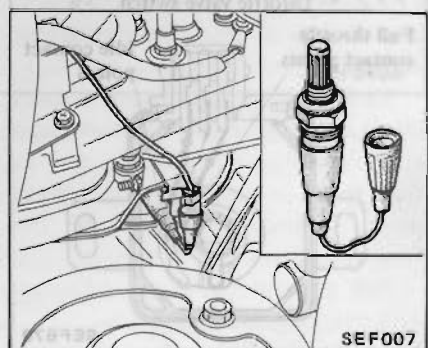
**EXHAUST GAS SENSOR (U.S.A. models)**

The exhaust gas sensor produces an electromotive force depending on air-fuel mixture ratio.

The electromotive force varies directly with the density of oxygen in exhaust gases which is burned at the

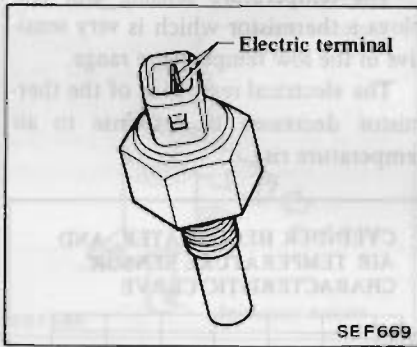
theoretically determined air-fuel ratio of the mixture; electromotive force increases when there is a richer mixture, and electromotive force decreases when there is a lean mixture.

The electromotive force is transmitted to the control unit by means of a signal which activates the control unit in order to provide the optimum amount of fuel injection.



SEF007

**THERMOTIME SWITCH**

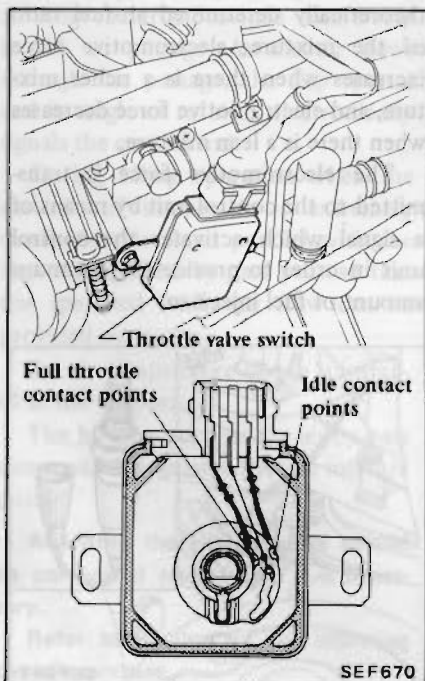


The thermotime switch is built into the thermostat housing.

A harness is connected in series to the cold start valve from the thermotime switch. The bimetal contact in the thermotime switch opens or closes depending on the cooling water temperature, and sends a signal to the cold start valve so that an additional amount of fuel can be injected for starting operation of the engine.

**THROTTLE VALVE SWITCH**

The throttle valve switch is attached to the throttle chamber and actuates in response to accelerator pedal movement. This switch has two sets of contact points. One set monitors the idle position and the other set monitors full throttle position.



**Idle contact**

The idle contact closes when the throttle valve is positioned at idle and opens when it is at any other position. The idle contact compensates for after idle enrichment, and sends the fuel shut-off signal.

**Full throttle contact**

The full throttle contact closes only when the throttle valve is positioned at full throttle (more than 35 degree opening of the throttle valve). The contact is open while the throttle valve is at any other position.

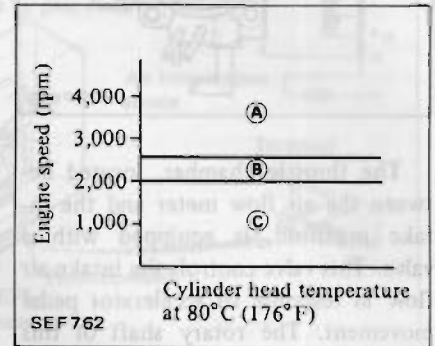
The full contact compensates for enrichment in full throttle.

**FUEL SHUT-OFF**

Fuel shut-off is accomplished during deceleration when the engine does not require fuel.

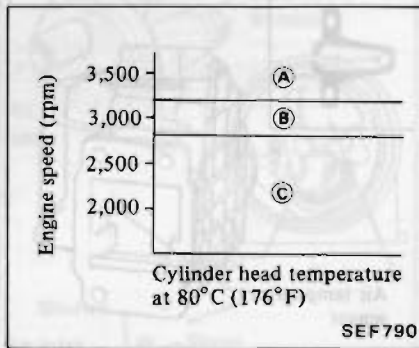
The graph below shows the fuel shut off range.

**U.S.A. models**



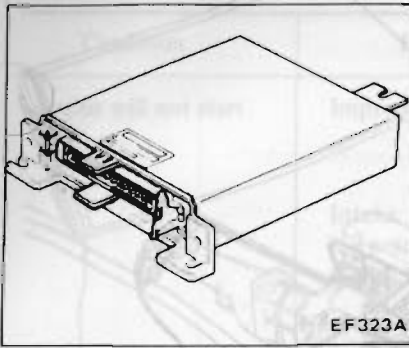
Deceleration from zone "A"	Fuel is shut off; and fuel is injected again in zone "C".
Deceleration from zone "B"	Fuel is shut off; and fuel is injected again in zone "C".
Deceleration from zone "C"	Fuel is not shut off.
Engine rpm increased in the order of "C", "B", and "A". (Idle switch ON, downhill driving, etc.)	Fuel is not shut off in zones "C" and "B"; in zone "A", fuel is shut off.

**Canada models**



Deceleration from zone "A"	Fuel is shut off; and fuel is injected again in zone "C".
Deceleration from zone "B"	Fuel is not shut off.
Deceleration from zone "C"	Fuel is not shut off.
Engine rpm increased in the order of "C", "B", and "A". (Idle switch ON, downhill driving etc.)	Fuel is not shut off in zones "C" and "B"; in zone "A", fuel is shut off.

**CONTROL UNIT**



The control unit is connected to the EFI harness by means of a multi-connector, and the EFI harness is connected to other sensors.

The essential role of the control unit is to generate a pulse. Upon receiving an electrical signal from each sensor, the control unit generates a pulse whose duration (injector open-valve time period) is controlled to provide an optimum quantity of fuel according to the engine characteristics.

The control unit consists mainly of three integrated circuits formed on the printed circuit board. This construction provides superior control unit reliability.

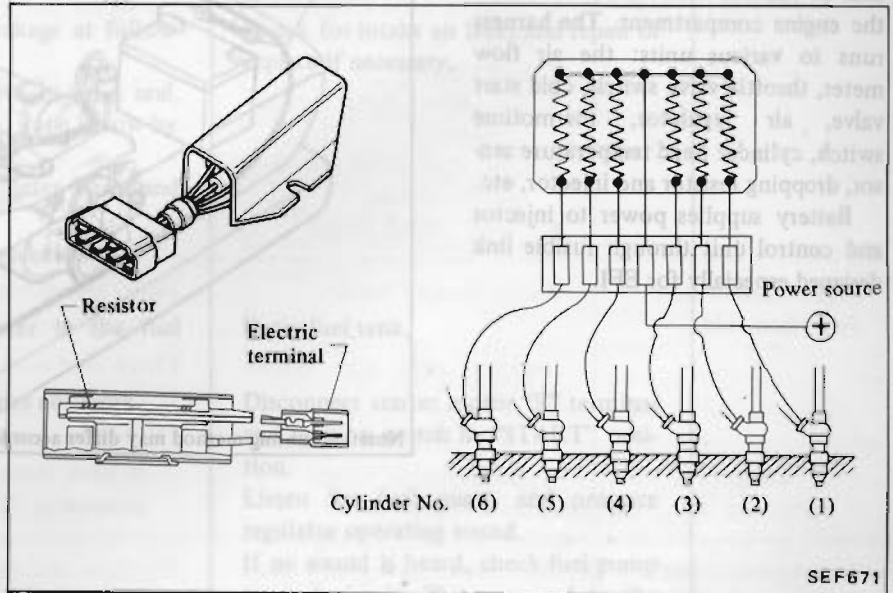
**DROPPING RESISTOR**

The dropping resistor is used to lower the source voltage to a level suitable for the injector.

The dropping resistor is connected in series with the injector. It reduces

the voltage to approximately 1/4 of the source voltage.

These resistors protect the injectors from alternator voltage surges and the effects of other components in the vehicle's electrical system.



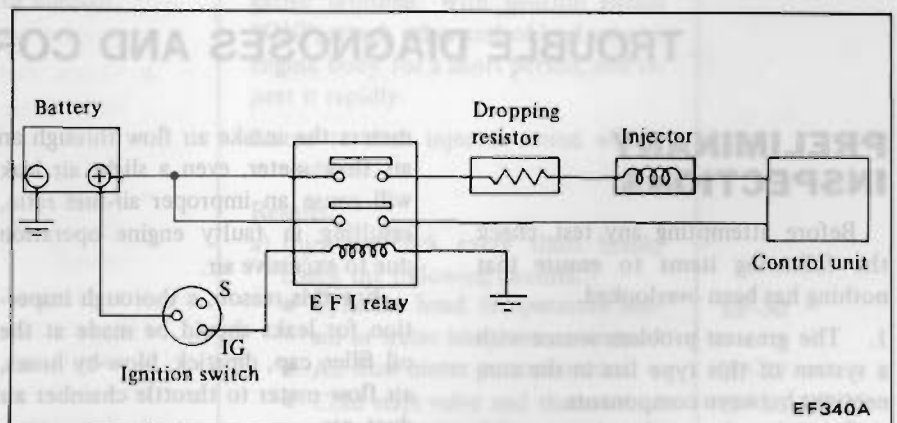
**RELAY**

**EFI relay**

The EFI relay serves to activate the electronic fuel injection system through the ignition switch.

**Fuel pump relays-1, -2 and -3**

The fuel pump relay serves to activate the fuel pump. For operation of the fuel pump, refer to Fuel Pump.



EF340A

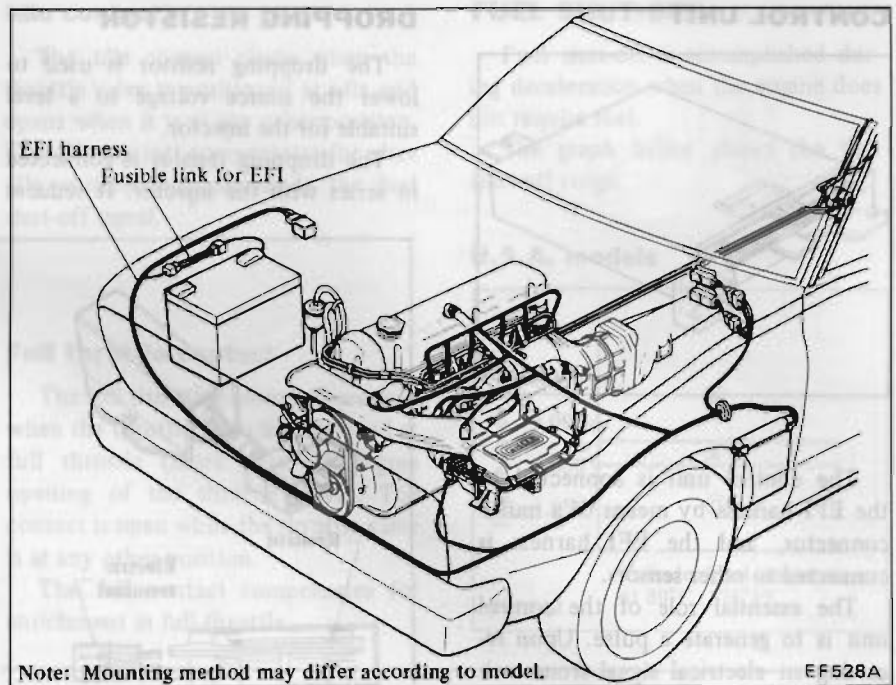


## EFI HARNESS

One wiring harness is used to connect lines between the control unit and the related major units.

The 35-pin connector of the EFI harness is connected to the control unit at the left dash side, and runs to the engine compartment. The harness runs to various units: the air flow meter, throttle valve switch, cold start valve, air regulator, thermotime switch, cylinder head temperature sensor, dropping resistor and injector, etc.

Battery supplies power to injector and control unit through fusible link designed especially for EFI.



Note: Mounting method may differ according to model.

EF528A

## TROUBLE DIAGNOSES AND CORRECTIONS

### PRELIMINARY INSPECTIONS

Before attempting any test, check the following items to ensure that nothing has been overlooked.

1. The greatest problem source with a system of this type lies in the connections between components.

Save time by performing a quick check if all harness connectors (especially the 35-pin connector and air flow meter connector) are securely in place. Connector terminals are free from corrosion and deformation.

Pull all connectors off and reconnect after inspecting terminals.

2. Since the EFI system accurately

measures the intake air flow through an air flow meter, even a slight air leak will cause an improper air-fuel ratio, resulting in faulty engine operation due to excessive air.

For this reason, a thorough inspection for leaks should be made at the oil filler cap, dipstick, blow-by hoses, air flow meter to throttle chamber air duct, etc.

3. Make sure that ignition and starting systems are satisfactory and the battery is in good condition.

### INSPECTION INSTRUCTIONS

While checking the EFI system, be sure to observe the cautions below. Failure to do so could result in damage

to the control unit or cause fuel line leakage.

#### CAUTION:

**When connecting or disconnecting EFI harness connector to or from any EFI unit, ensure that the ignition switch is in the "OFF" position and that the negative battery terminal is disconnected. Removing and installing these connectors with the ignition switch left in the "ON" position will damage control unit.**

Replace fuel hoses if they are deformed, scratched or chafed. Do not reuse fuel hose clamps after removal.

## TROUBLE-SHOOTING CHART

Condition	Probable cause	Check and corrective action	Reference page
<p><b>Engine will not start.</b></p>	<p>Improper ignition system.</p> <p>Intake air leakage at following points:</p> <ul style="list-style-type: none"> <li>● P.C.V. valve, dipstick seal, oil filler cap, blow-by hoses</li> <li>● Air flow meter hoses and clamps</li> <li>● Manifold gaskets</li> <li>● B.C.D.D.</li> </ul> <p>Excessive water in the fuel system.</p> <p>Fuel pump does not work.</p>	<p>Disconnect high tension cable from one spark plug and check for hot spark.</p> <p>Check for intake air leaks and repair or replace if necessary.</p> <p>Drain fuel tank.</p> <p>Disconnect starter motor "S" terminal and ignition switch in "START" position.</p> <p>Listen for fuel pump and pressure regulator operating sound.</p> <p>If no sound is heard, check fuel pump control circuit. Then proceed to the following checks:</p> <ul style="list-style-type: none"> <li>● Fuel pump</li> <li>● Alternator "L" terminal</li> <li>● Oil pressure switch</li> <li>● Fuel pump relays-1, -2 and -3.</li> </ul>	
	<p>Improper ignition signal input.</p> <p>Malfunctioning EFI relay or control unit or injector.</p>	<p>Check ignition signal input.</p> <p>Connect a lead wire to ignition coil negative terminal. With ignition switch "ON", attach other end of lead wire to engine body for a short period, and repeat it rapidly.</p> <p>Listen to each injector sound with a screwdriver.</p> <p>Results:</p> <p>a) Injectors click every third break, check the following circuits.</p> <ul style="list-style-type: none"> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Air flow meter potentiometer</li> <li>● Cold start valve and thermostime switch</li> <li>● "Start" signal circuit</li> <li>● Air regulator</li> </ul> <p>b) Injectors do not click, check the following circuits.</p> <ul style="list-style-type: none"> <li>● Control unit power input circuit</li> <li>● Ignition coil trigger input circuit</li> </ul>	<p>EF-35</p> <p>EF-30</p> <p>EF-27</p> <p>EF-31, EF-35</p> <p>EF-39</p> <p>EF-33</p> <p>EF-38</p> <p>EF-35</p>

Condition	Probable cause	Check and corrective action	Reference page
<p><b>Engine will not start.</b></p>	<p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Air flow meter potentiometer</li> <li>● Cold start valve and thermotime switch</li> <li>● "Start" signal circuit</li> </ul>	<ul style="list-style-type: none"> <li>● Control unit ground circuit</li> <li>● Injector circuit</li> </ul> <p>Check each circuit. Then proceed to "Component checks".</p>	<p>EF-32 EF-36 EF-24 - EF-39 EF-20</p>
<p><b>Engine hard to start only when cold.</b></p>	<p>Poorly charged battery.</p> <p>Improper cold start system circuit.</p>	<p>Check charge circuit. Recharge battery if necessary.</p> <p>Check cold start system circuit. If circuit is normal, check cold start valve.</p> <p><b>If both these tests are satisfactory, proceed to "Engine will not start".</b></p>	<p>EF-31, EF-35</p>
<p><b>Engine hard to start only when hot.</b></p>	<p>Malfunctioning cold start valve and thermotime switch.</p>	<p>To clean out excess fuel, proceed to the following steps:</p> <ul style="list-style-type: none"> <li>● Disconnect cold start valve.</li> <li>● Disconnect ignition coil trigger input lead wire and ground it.</li> <li>● Crank engine a few times to clean out excess fuel.</li> <li>● Reconnect ignition coil trigger input lead wire and try to start engine.</li> </ul> <p>Results:</p> <p>a) If engine is still hard to start, perform the following checks.</p> <ul style="list-style-type: none"> <li>● Check cylinder head temperature sensor or water temperature sensor, and air flow meter circuit.</li> <li>● Check fuel pressure and injector.</li> <li>● Check exhaust gas sensor and circuit.</li> </ul> <p>If no problem is found, proceed to "Engine will not start".</p> <p>b) If engine starts easily, proceed to the following steps.</p> <ul style="list-style-type: none"> <li>● Reconnect cold start valve.</li> <li>● Disconnect thermotime switch.</li> <li>● Try to start engine.</li> </ul> <p>Results:</p> <p>b-1) If engine is hard to start, check cold start valve and replace if necessary.</p>	<p>EF-30 EF-27 EF-20, EF-36 EF-30 EF-35</p>



Condition	Probable cause	Check and corrective action	Reference page
Engine hard to start only when cold.		b-2) If engine starts easily, check thermotime switch and replace if necessary.	EF-31
Engine starts, then stalls.	<p>Improper ignition signal input.</p> <p>Malfunctioning EFI relay or control unit or injector.</p> <p>Fuel pump does not work.</p> <p>Improper cylinder head temperature sensor or water temperature sensor circuit.</p> <p>Malfunctioning air regulator.</p> <p>Malfunctioning exhaust gas sensor.</p>	<p>Check ignition signal input.</p> <p>Connect a lead wire to ignition coil negative terminal. With ignition switch "ON", attach other end of lead wire to engine body for a short period, and repeat it rapidly.</p> <p>Listen to each injector sound with a screwdriver.</p> <p>Results:</p> <p>a) Injectors click every third break, check fuel pump circuit.</p> <p>b) Injectors do not click, check the following circuits.</p> <ul style="list-style-type: none"> <li>• "Start" signal circuit</li> <li>• Control unit power input circuit</li> <li>• Ignition coil trigger input circuit</li> <li>• Control unit ground circuit</li> <li>• Injector circuit</li> </ul> <p>With ignition switch in "ON" position, disconnect oil pressure switch harness connector or alternator "L" terminal. Listen for fuel pump and pressure regulator operating sound. If no sound is heard, check fuel pump control circuit. Then proceed to the following checks:</p> <ul style="list-style-type: none"> <li>• Fuel pump</li> <li>• Alternator "L" terminal</li> <li>• Oil pressure switch</li> <li>• Fuel pump relays-1, -2 and -3.</li> </ul> <p>Check circuit.</p> <p>Check air regulator and replace if necessary.</p> <p>Check sensor and circuit.</p> <p><b>If these tests are satisfactory, proceed to "Engine will not start".</b></p>	<p>EF-35</p> <p>EF-39</p> <p>EF-38</p> <p>EF-35</p> <p>EF-32</p> <p>EF-36</p> <p>EF-30</p> <p>EF-30</p>
Engine idles too fast – cannot be adjusted with idle speed adjusting screw or engine idle is unstable.	<p>Improper intake and exhaust valve clearance.</p> <p>Malfunctioning throttle valve.</p> <p>Malfunctioning air regulator.</p>	<p>Adjust valve clearance. See MA section.</p> <p>Check that plate is closing when throttle is released and replace if necessary.</p> <p>To check air regulator, proceed to the following steps:</p> <ul style="list-style-type: none"> <li>• Start engine.</li> <li>• Pinch off hose to air regulator.</li> </ul>	

Condition	Probable cause	Check and corrective action	Reference page
<p><b>Engine idles too fast – cannot be adjusted with idle speed adjusting screw or engine idle is unstable.</b></p>		<p>Results:</p> <p>a) If idle speed drops, perform circuit test. If no fault is found, replace air regulator.</p> <p>b) If idle speed remains high or unstable, perform the following checks. Check for manifold vacuum leaks, including at P.C.V. valve, dipstick and oil filler cap seals. If no problem is found, perform the following circuit tests.</p> <ul style="list-style-type: none"> <li>● Throttle valve switch (idle contact and full throttle contact)</li> <li>● Air temperature sensor</li> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Control unit ground circuit</li> <li>● Air flow meter potentiometer</li> <li>● Air regulator and fuel pump circuit</li> <li>● Ignition coil trigger input circuit</li> <li>● Control unit power input circuit</li> <li>● Injector circuit</li> </ul> <p>Then proceed to “Component checks”.</p>	<p>EF-25 EF-29 EF-30 EF-32 EF-27 EF-33 EF-35 EF-38 EF-36 EF-20</p>
<p><b>Engine misfires.</b></p>	<p>Improper ignition circuit.</p> <p>Improper EFI harness connectors.</p> <p>Improper fuel line.</p> <p>Leaky E.G.R. valve.</p> <p>Malfunctioning control unit.</p> <p>Improper fuel pressure.</p> <p>Improper EFI circuit.</p> <p>Sulfated battery.</p>	<p>Check ignition circuit.</p> <p>Pull EFI harness connectors apart and including ground circuits). Include ground circuits and ignition input lead.</p> <p>Check fuel line for blockage.</p> <ul style="list-style-type: none"> <li>● Fuel tank fuel filter.</li> <li>● Fuel filter</li> <li>● Injectors</li> <li>● Fuel pipes</li> </ul> <p>Check E.G.R. system.</p> <p>Tap control unit while driving to see if this aggravates or alleviates the problem. If so, try another control unit.</p> <p>Perform fuel pressure test.</p> <p>Perform all circuit tests. Then perform “Component checks”.</p> <p>Check charge system.</p>	<p>EF-20 EF-24 - EF-39 EF-20</p>
<p><b>Engine will not revolve – lack of power.</b></p>	<p>Improper ignition system.</p> <p>Malfunctioning throttle valve.</p>	<p>Check IC ignition unit, pick-up coil and ignition coil.</p> <p>Make sure throttle plate is opening fully when accelerator is fully depressed.</p>	

Condition	Probable cause	Check and corrective action	Reference page
<p>Engine will not re- volve – lack of power.</p>	<p>Malfunctioning air flow meter.</p> <p>Clogged air cleaner filter.</p> <p>Improper fuel line.</p> <p>Improper fuel pressure.</p> <p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Ignition coil trigger input circuit</li> <li>● Control unit power input circuit</li> <li>● Injector circuit</li> <li>● Air flow meter potentiometer</li> <li>● Throttle valve switch, idle contact and full throttle contact</li> <li>● Air temperature sensor</li> <li>● Cylinder head temperature sensor or water temperature sensor.</li> <li>● Air regulator and fuel pump circuit</li> <li>● Exhaust gas sensor</li> </ul>	<p>Check air flow meter mechanical movement. Using a finger, push flap open, checking that it opens smoothly and fully.</p> <p>Check air cleaner filter and replace if necessary.</p> <p>Check fuel line for blockage.</p> <ul style="list-style-type: none"> <li>● Fuel tank fuel filter.</li> <li>● Fuel filter</li> <li>● Fuel pipes</li> </ul> <p>Perform fuel pressure test.</p> <p>Check each circuit. Then perform “Component checks”.</p>	<p>EF-20</p> <p>EF-24 - EF-39</p> <p>EF-20</p>
<p>Hesitation – stumble on acceleration.</p>	<p>Improper ignition system.</p> <p>Malfunctioning air flow meter.</p> <p>Intake air leakage at following points:</p> <ul style="list-style-type: none"> <li>● P.C.V. valve</li> <li>● Dipstick and oil filler cap seals</li> <li>● Manifold gaskets</li> <li>● Air flow meter hoses.</li> <li>● B.C.D.D.</li> </ul> <p>Improper engine condition.</p> <p>Improper EFI circuit.</p>	<p>Check ignition system.</p> <p>Check air flow meter mechanical movement. Using a finger, check for smooth flap movement.</p> <p>Check for intake air leaks.</p> <p>Check mixture ratio feedback system.</p> <p>Perform complete circuit test. Then perform “Component checks”.</p>	<p>EC-13</p> <p>EF-24 - EF-39</p> <p>EF-20</p>



Condition	Probable cause	Check and corrective action	Reference page
<p><b>Poor gas mileage, or CO reading too high.</b></p>	<p>Improper ignition timing or ignition system.</p> <p>Improper air cleaner filter.</p> <p>Improper fuel pressure.</p> <p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Cylinder head temperature sensor or water temperature sensor.</li> <li>● Air temperature sensor</li> <li>● Throttle valve switch, idle contact and full throttle contact</li> <li>● Air flow meter potentiometer</li> <li>● Air regulator circuit</li> <li>● Air regulator and fuel pump circuit</li> <li>● Injector circuits</li> <li>● Exhaust gas sensor</li> </ul>	<p>Check ignition timing.</p> <p>Check ignition system for hot spark.</p> <p>Check air cleaner filter and replace if necessary.</p> <p>Perform fuel pressure test.</p> <p>Check each circuit.</p> <p>Then proceed to "Component checks".</p>	<p>EF-20</p> <p>EF-24 - EF-39</p> <p>EF-20</p>
<p><b>Surge.</b></p>	<p>Malfunctioning air flow meter.</p> <p>Intake air leakage at the following points:</p> <ul style="list-style-type: none"> <li>● P.C.V. valve</li> <li>● Dipstick and oil filler cap seals</li> <li>● Manifold gaskets</li> <li>● Air flow meter hoses</li> <li>● B.C.D.D.</li> </ul> <p>Improper fuel pressure.</p> <p>Improper engine condition.</p> <p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Throttle valve switch, idle contact and full throttle contact</li> <li>● Air flow meter potentiometer</li> <li>● Control unit ground circuit</li> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Air temperature sensor</li> <li>● Air regulator and fuel pump circuit</li> <li>● Ignition coil trigger input circuit</li> </ul>	<p>Check air flow meter mechanical movement.</p> <p>Using a finger, check flap movement for smooth operation.</p> <p>Check for intake air leaks.</p> <p>Perform fuel pressure test.</p> <p>Check mixture ratio feedback system.</p> <p>Check each circuit.</p> <p>Then proceed to "Component Checks".</p>	<p>EF-26</p> <p>EF-20</p> <p>EF-20</p> <p>EC-13</p> <p>EF-24 - EF-39</p> <p>EF-20</p> <p>EF-20</p> <p>EF-24 - EF-39</p> <p>EF-20</p>

Condition	Probable cause	Check and corrective action	Reference page
<b>Surge.</b>	<ul style="list-style-type: none"> <li>● Control unit power input circuit</li> <li>● Injector circuit</li> </ul>		
<b>Backfiring.</b>	<p>Intake air leakage at the following points:</p> <ul style="list-style-type: none"> <li>● P.C.V. valve</li> <li>● Dipstick and oil filler cap seals</li> <li>● Manifold gaskets</li> <li>● Air flow meter hoses</li> <li>● B.C.D.D.</li> </ul> <p>Improper fuel pressure.</p> <p>Improper engine condition.</p> <p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Throttle valve switch, idle contact and full throttle contact</li> <li>● Air flow meter potentiometer</li> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Air temperature sensor</li> <li>● Ignition coil trigger input circuit</li> <li>● Control unit power input circuit</li> <li>● Injector circuit</li> <li>● Exhaust gas sensor</li> </ul>	<p>Check for intake air leaks.</p> <p>Perform fuel pressure test.</p> <p>Check mixture ratio feedback system.</p> <p>Check each circuit.</p> <p>Then proceed to the "Component checks".</p>	<p>EF-20</p> <p>EC-13</p> <p>EF-24 - EF-39</p> <p>EF-20</p>
<b>Afterfire or after-burning.</b>	<p>Problem in the following circuits:</p> <ul style="list-style-type: none"> <li>● Throttle valve switch, idle contact and full throttle contact.</li> <li>● Air flow meter potentiometer</li> <li>● Cylinder head temperature sensor or water temperature sensor</li> <li>● Air temperature sensor</li> <li>● Injector circuit</li> <li>● "START" signal input</li> </ul>	<p>Check each circuit.</p> <p>Then proceed to "Component checks".</p>	<p>EF-24 - EF-39</p> <p>EF-20</p>

1. If fuel pressure is not as specified, replace pressure regulator, and repeat fuel pressure check.

If below the specified value, check for clogged or deteriorated fuel lines, and if necessary, replace fuel pump or its assembly or check valve.

**COMPONENT CHECKS**

(To be performed only after circuit tests are completed)

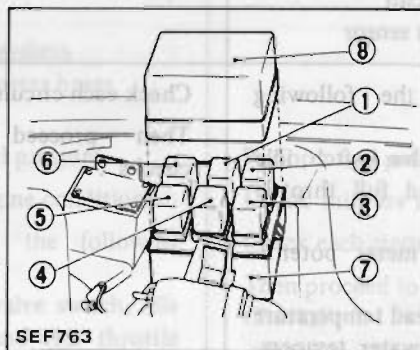
Problem	Injector sound	Cold start valve	Air regulator	Relay	Control unit replacement	Exhaust gas sensor	Air flow meter		Fuel system		
							Flap operation	Resistance meas.	Fuel pressure test	Injector leakage	Cold start valve leakage
Engine will not start	X	X	X	X	X		X	X	X	X	X
Idle too high or too rough	X		X						X	X	X
Engine misfires	X				X		X	X	X		
Lack of power – engine will not rev.	X					X	X	X	X	X	X
Hesitation – stumble							X	X	X	X	X
Poor gas mileage, or CO too high					X	X	X	X	X	X	X
Engine surges					X		X	X	X	X	X
Backfiring					X	X	X	X	X		
Afterburning					X		X	X	X	X	X

**FUEL SYSTEM PRESSURE CHECK**

Before disconnecting fuel hose, release fuel pressure from fuel line for safety reasons.

**RELEASING FUEL PRESSURE**

1. Start the engine.
2. Remove fuel pump relay-2 with engine running.



- |                         |                       |
|-------------------------|-----------------------|
| 1 Fuel pump relay-2     | 6 Inhibitor relay     |
| 2 Fuel pump relay-3     | 7 Relay bracket       |
| 3 Lighting relay        | 8 Relay bracket cover |
| 4 Bulb check relay      |                       |
| 5 Air conditioner relay |                       |

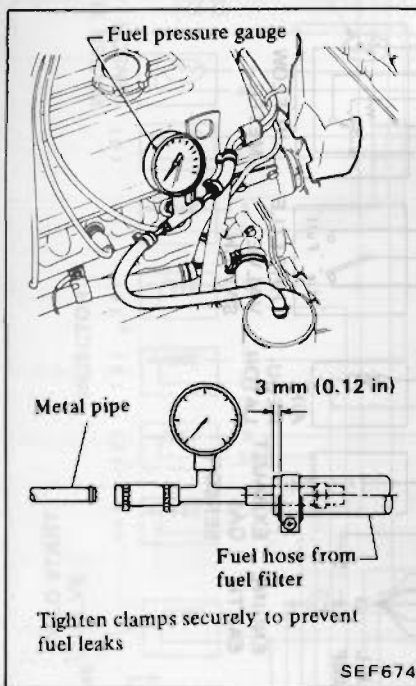
3. After the engine stalls, crank the engine two or three times.
4. Turn the ignition switch "OFF".
5. Install fuel pump relay-2.

## FUEL PRESSURE CHECK

When reconnecting the lines, always use new clamps and be sure to position them correctly.

Use a torque driver to tighten clamps.

1. Install Pressure Gauge (J 25400-34) between fuel filter hose and metal pipe at point shown. For convenience in later tests, position gauge so that it can be read from driver's seat.



2. Start engine and read fuel pressure gauge.

At idling:

Approximately 206 kPa  
(2.1 kg/cm<sup>2</sup>, 30 psi)

The moment accelerator pedal is fully depressed:

Approximately 255 kPa  
(2.6 kg/cm<sup>2</sup>, 37 psi)

3. If fuel pressure is not as specified, replace pressure regulator, and repeat fuel pressure check.

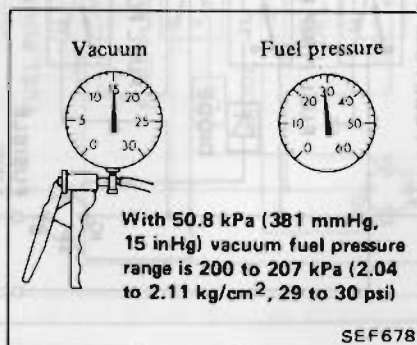
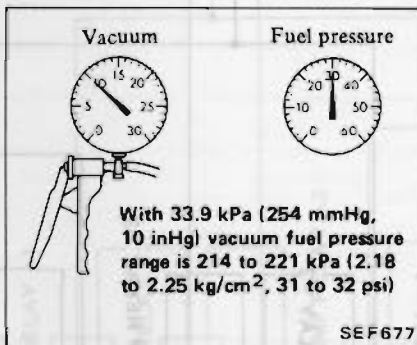
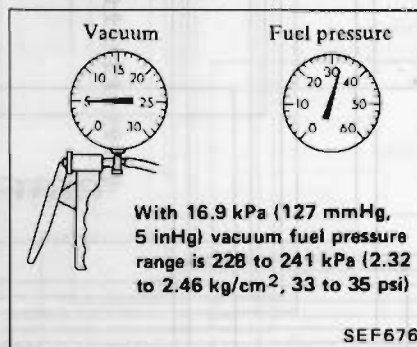
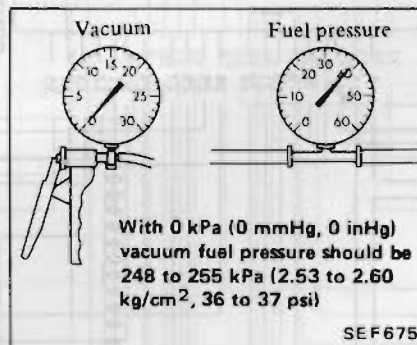
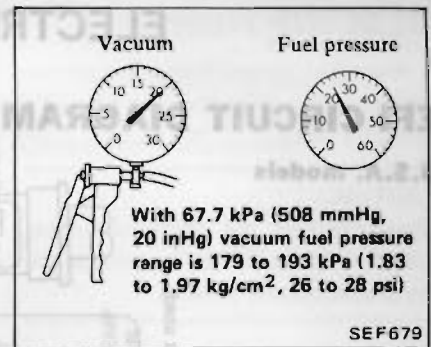
If below the specified value, check for clogged or deformed fuel lines, and if necessary, replace fuel pump as an assembly or check valve.

4. Connect variable vacuum source, J 23738 or equivalent to fuel regulator. Disconnect fuel pressure regulator vacuum hose from intake manifold and attach hose to variable vacuum source.

5. Disconnect alternator field plug and oil pressure sending unit lead wire.

6. Turn key to "ON".

7. Observe fuel pressure readings as vacuum is changed.



Fuel pressure must decrease as vacuum increases. If results are unsatisfactory, replace pressure regulator.

8. Turn key to "OFF".

9. Disconnect variable vacuum source and connect fuel pressure regulator vacuum hose to intake manifold.

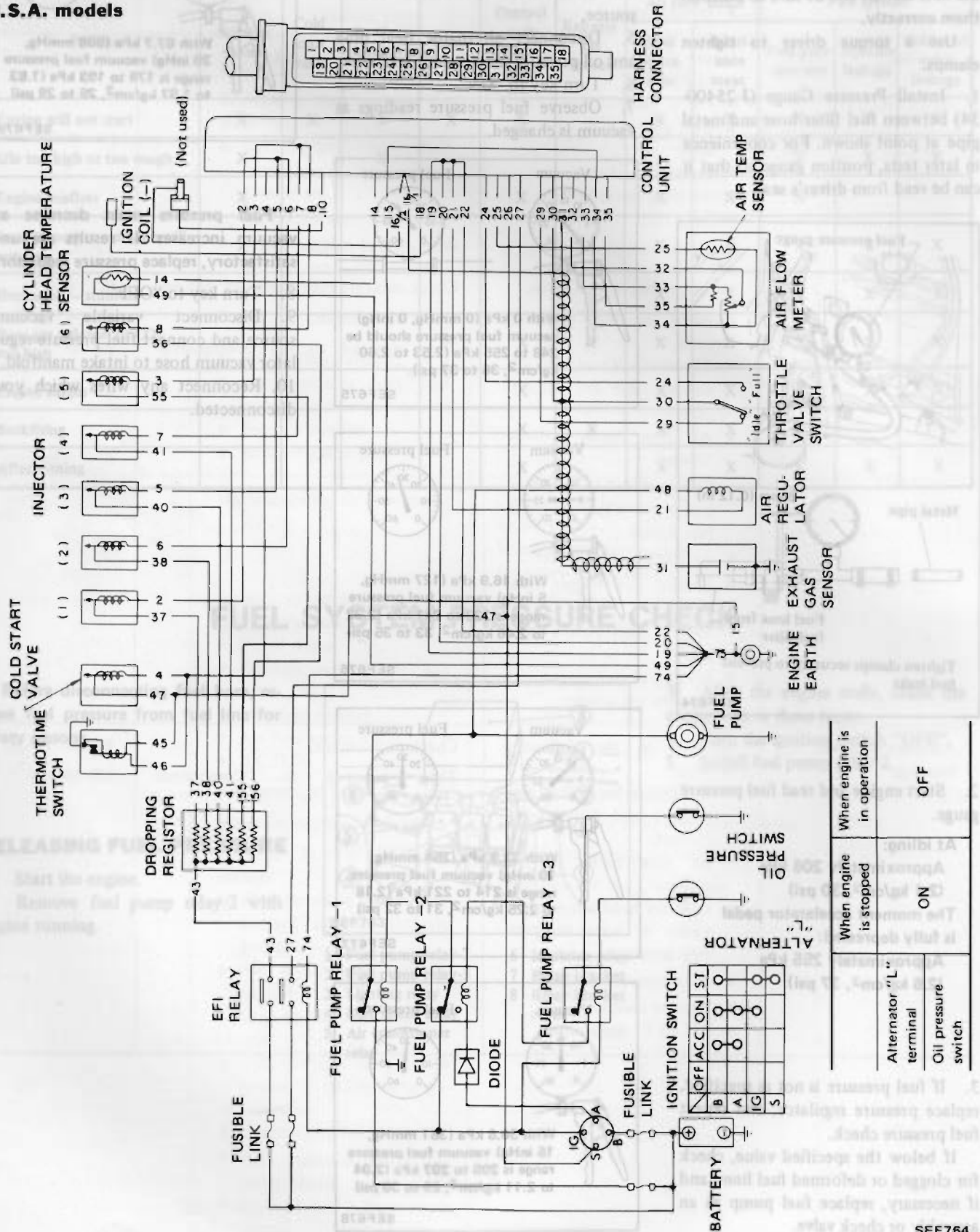
10. Reconnect any wires which you disconnected.



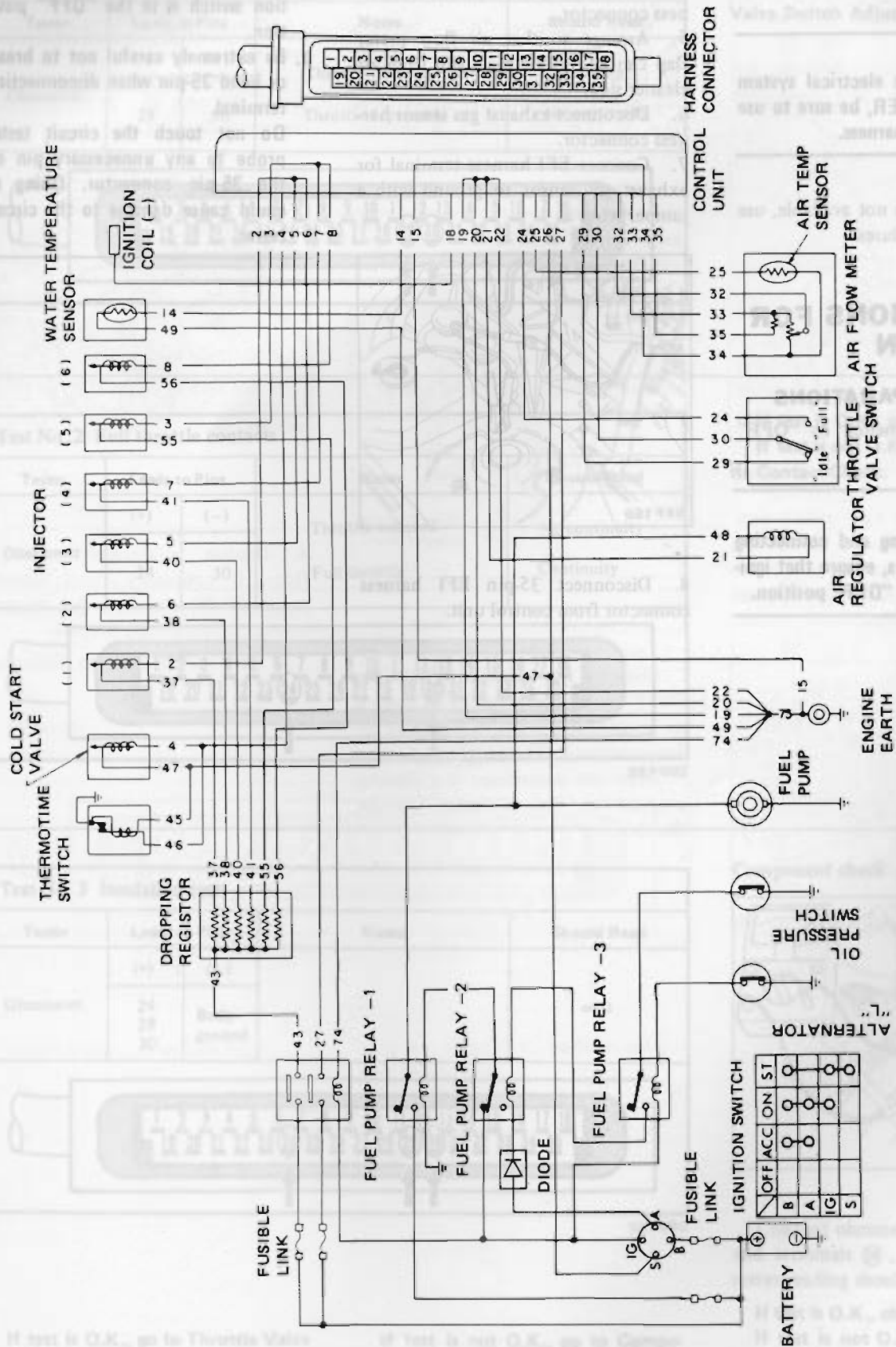
# ELECTRICAL SYSTEM INSPECTION

## EFI CIRCUIT DIAGRAM

U.S.A. models



Canada models



	When engine is stopped	When engine is in operation
Alternator "L" terminal	ON	OFF
Oil pressure switch	ON	OFF

## DESCRIPTION

Electrical system inspection can be performed by using the EFI ANALYZER (J-25400).

### CAUTION:

When checking the electrical system with EFI ANALYZER, be sure to use the proper adapter harness.

If the analyzer is not available, use the following procedures.

## PREPARATIONS FOR INSPECTION

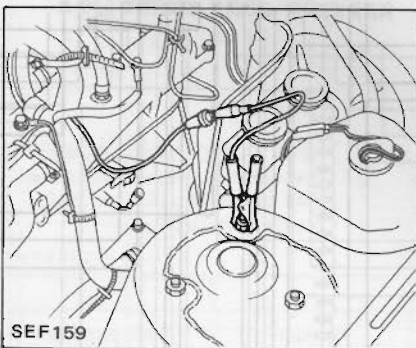
### VEHICLE PREPARATIONS

1. Turn ignition switch to "OFF" position.

### CAUTION:

Before disconnecting and connecting electrical connectors, ensure that ignition switch is in the "OFF" position.

2. Disconnect battery ground cable.
3. Disconnect lead wire from "S" terminal of starter motor.
4. Disconnect cold start valve harness connector.
5. Arrange so that air flow meter flap can be pushed manually from air cleaner side.
6. Disconnect exhaust gas sensor harness connector.
7. Connect EFI harness terminal for exhaust gas sensor to ground with a jumper wire.



8. Disconnect 35-pin EFI harness connector from control unit.

### CAUTION:

- a. Before disconnecting EFI harness at 35-pin connector, ensure that ignition switch is in the "OFF" position.
- b. Be extremely careful not to break or bend 35-pin when disconnecting terminal.  
Do not touch the circuit tester probe to any unnecessary pin on the 35-pin connector. Doing so could cause damage to the circuit tester.

## THROTTLE VALVE SWITCH TESTS

**Test No. 1 Idle contacts**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	29	30	Throttle released	Continuity
			Throttle depressed	No continuity

SEF681

If test is O.K., go to Test No. 2.  
 If test is not O.K., go to Throttle Valve Switch Adjustment.

**Test No. 2 Full throttle contacts**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	24	30	Throttle released	No continuity
			Full throttle	Continuity

SEF682

If test is O.K., go to Test No. 3.  
 If test is not O.K., go to Full Throttle Contact Check.

**Test No. 3 Insulation test**

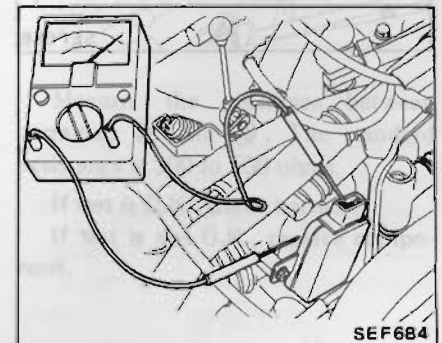
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	24	Body ground		$\infty \Omega$
	29			
	30			

SEF683

If test is O.K., go to Throttle Valve Switch Adjustment.

If test is not O.K., go to Component Check.

### Component check



SEF684

Connect ohmmeter between engine and terminals 24, 29 and 30. Ohmmeter reading should be infinite.

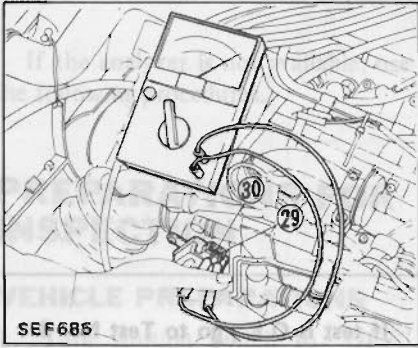
If test is O.K., check harness.  
 If test is not O.K., replace component and retest.



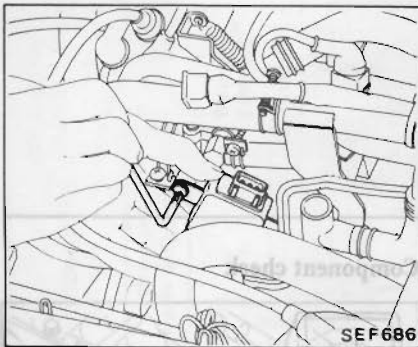
### THROTTLE VALVE SWITCH ADJUSTMENT

#### Ohmmeter method

1. Disconnect throttle valve switch connector.
2. Connect ohmmeter between terminals ②⑨ and ③①, and make sure continuity exists.



3. Adjust throttle valve switch position, with retaining screw, so that idle switch may be changed from "ON" to "OFF" when engine speed is about 900 rpm under no load.

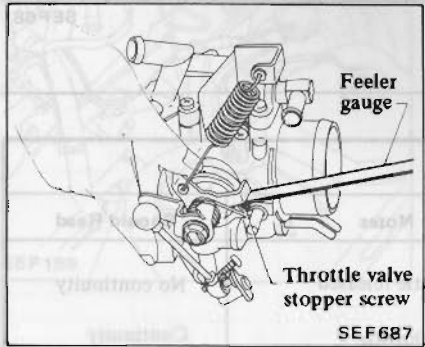


#### Feeler gauge method

To adjust position of throttle valve switch with engine off, proceed as follows:

When clearance "A" between throttle valve stopper screw and throttle valve shaft lever is 0.3 mm (0.012 in), adjust throttle valve switch position so that idle switch is changed from "ON" to "OFF".

If clearance between throttle valve stopper screw and throttle valve shaft lever is 0.3 mm (0.012 in), engine speed will become about 900 rpm.

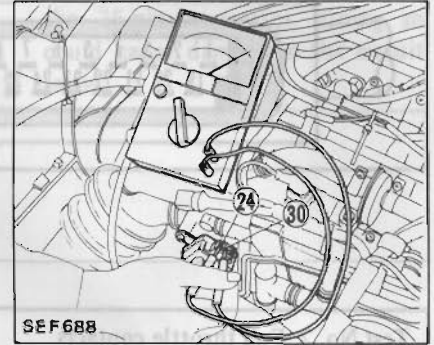


Changing idle switch from "ON" to "OFF" corresponds to change from 0 to ∞ (infinite) ohms in resistance between terminals ②⑨ and ③①.

After the adjustment is complete, proceed to Full Throttle Contact Check.

### FULL THROTTLE CONTACT CHECK

1. Disconnect ground cable from battery.
2. Remove throttle valve switch connector.
3. Connect ohmmeter between terminals ②④ and ③①, and make sure continuity does not exist.



4. Depress accelerator pedal to floor. If continuity exists between terminals ②④ and ③①, full throttle contact is functioning properly.

If test is O.K., go to Insulation Test.

Test No. 3 Insulation Test		Test	
Component	Resistance	Expected	Actual
Throttle Valve Switch	0 to ∞	∞	
Accelerator Pedal Switch	0 to ∞	∞	

## AIR FLOW METER TESTS

**Test No. 1 Air flow meter resistance**

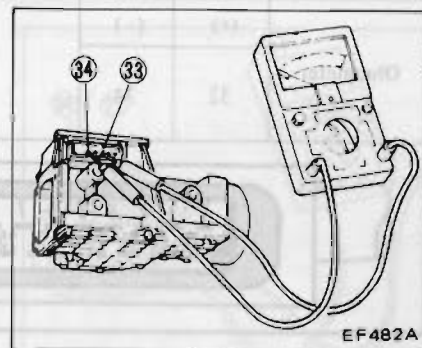
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	33	34		100 to 400Ω

SEF689

If test is O.K., go to Test No. 2.

If test is not O.K., perform component check.

### Component check



Measure the resistance between terminals 33 and 34. The standard resistance is 100 to 400 ohms.

If test is O.K., check harness.

If test is not O.K., replace component.

**Test No. 2 Air flow meter resistance**

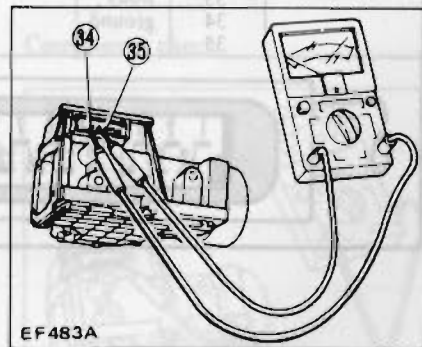
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	34	35		200 to 500Ω

SEF690

If test is O.K., go to Test No. 3.

If test is not O.K., perform component check.

### Component check



Measure the resistance between terminals 34 and 35. The standard resistance is 200 to 500 ohms.

If test is O.K., check harness.

If test is not O.K., replace component.

**Test No. 3 Air flow meter resistance**

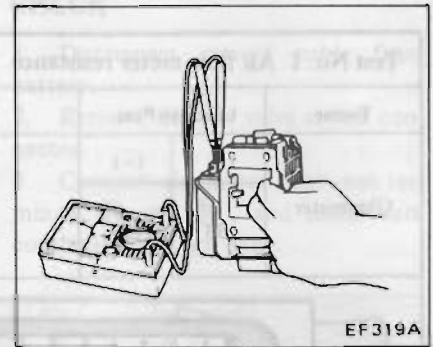
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	32	34		Except 0 and $\infty\Omega$

SEF691

If test is O.K., go to Test No. 4.

If test is not O.K., perform component check.

**Component check**



EF319A

While sliding flap, measure resistance between terminals 32 and 34. If resistance is at any value other than 0 and  $\infty$  ohm, air flow meter is normal.

If test is O.K., check harness.

If test is not O.K., replace component.

**Test No. 4 Insulation resistance**

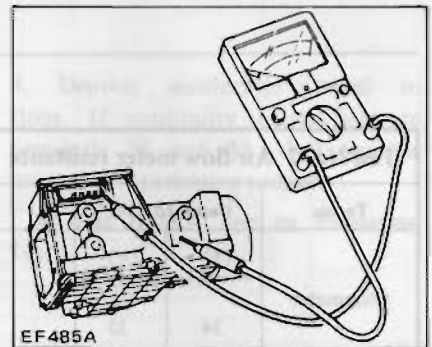
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	32	Body ground		$\infty\Omega$
	33			
	34			
	35			

SEF692

If test is O.K., go to Test No. 5.

If test is not O.K., perform component check.

**Component check**



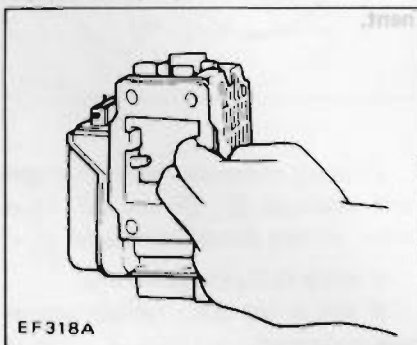
EF485A

Check insulation resistance between the air flow meter body and any one of the terminals 32, 33, 34 and 35. If continuity exists, the air flow meter is out of order.

If test is O.K., check harness.

If test is not O.K., replace component.

**Test No. 5 air flow meter flap.**



EF318A

Fully open the flap by hand to check that it opens smoothly without binding. If it doesn't, it is out of order.

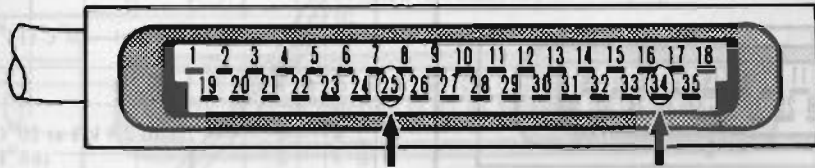
If test is O.K., air flow meter is O.K.

If test is not O.K., replace air flow meter.

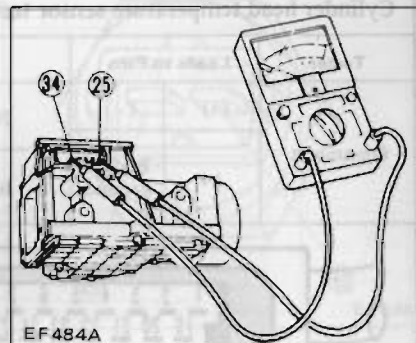
# AIR TEMPERATURE SENSOR TESTS

**Test No. 1 Air Temperature Sensor**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	25	34	Intake air temperature 20°C (68°F) or above	Below 2.9 kΩ
			Below 20°C (68°F)	2.1 kΩ or above



**Component check**



1. Measure the outside air temperature.
2. Measure resistance between terminals 25 and 34 of the air flow meter connector.

If test is O.K., check harness.  
If test is not O.K., replace component.


SEF772

If test is O.K., go to Test No. 2.

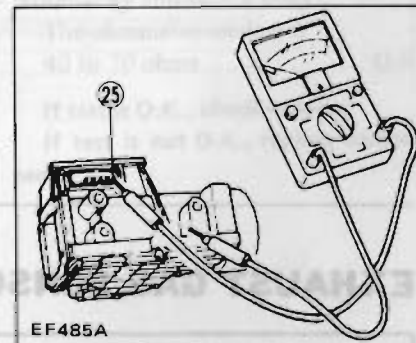
If test is not O.K., perform component check.

**Test No. 2 Insulation Resistance**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	25	Body ground		$\infty \Omega$



**Component check**



Check insulation resistance between terminal 25 and air flow meter body.

If test is O.K., check harness.  
If test is not O.K., replace component.

SEF773

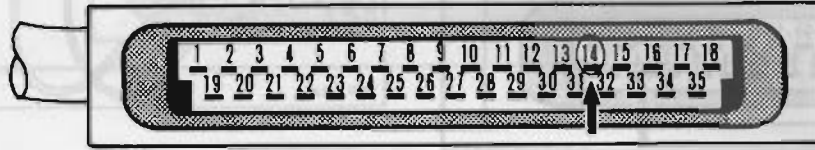
If test is O.K., air temperature sensor is O.K.

If test is not O.K., perform component check.



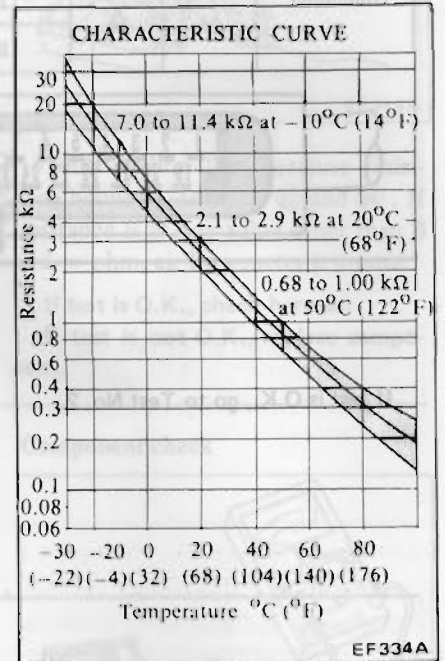
## CYLINDER HEAD TEMPERATURE SENSOR (U.S.A. models) OR WATER TEMPERATURE SENSOR (Canada models) TEST

Cylinder head temperature sensor test				
Tester	Leads to Pins		Notes	Should Read
Ohmmeter	(+)	(-)	20°C (68°F) or above	Below 2.9 kΩ
	14	Body ground	Below 20°C (68°F)	2.1 kΩ or above



SEF693

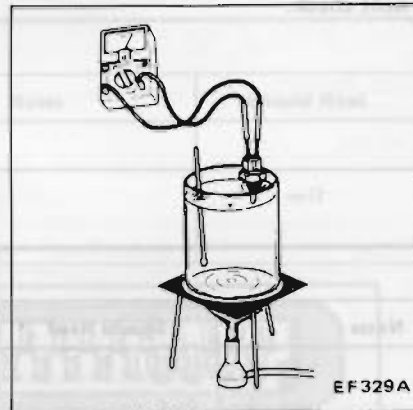
Dip the sensor into water maintained at a temperature of 20°C (68°F), 80°C (176°F), etc., and read its resistance.



EF334A

If test is O.K., test is complete.  
If test is not O.K., perform component check.

### Component check

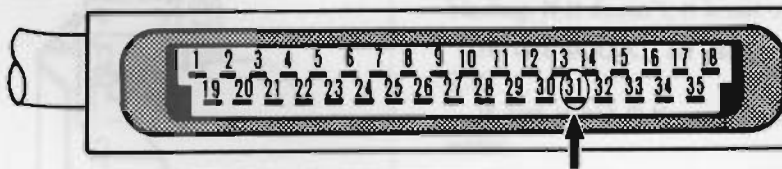


EF329A

If test matches curve, sensor is O.K. Check harness.  
If test does not match curve, replace sensor.

## EXHAUST GAS SENSOR CIRCUIT TEST (U.S.A. models)

Exhaust gas sensor circuit test				
Tester	Leads to Pins		Notes	Should Read
Ohmmeter	(+)	(-)	Disconnect exhaust gas sensor harness connector, and connect EFI harness terminal for exhaust gas sensor to ground with a jumper wire.	0Ω
	31	Body ground		



SEF694

If test is O.K., exhaust gas sensor circuit is O.K. For performing component check, refer to Section EC.

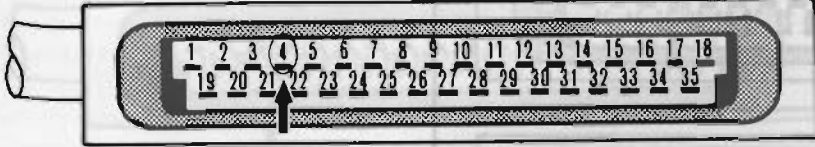
# THERMOTIME SWITCH TESTS

Disconnect cold start valve harness connector.

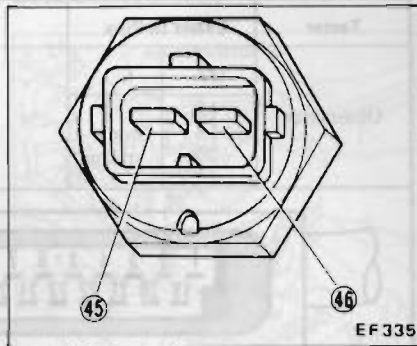
## Component check

**Test No. 1 Thermotime switch contact point**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	4	Body ground	Water temperature	$\infty\Omega$
			25°C (77°F) or above	
	4	Body ground	14 to 25°C (57 to 77°F)	0 or $\infty\Omega$
			Below 14°C (57°F)	0Ω



SEF 695



EF335

If test is O.K., go to Test No. 2.  
 If test is not O.K., perform component check.

Measure the resistance between terminal 46 and switch body.

- The resistance is zero when the cooling water temperature is less than 14°C (57°F). . . . O.K.
- The resistance is infinite when the cooling water temperature is more than 25°C (77°F). . . . O.K.

The resistance is zero or infinite when the cooling water temperature is between 14 to 25°C (57 to 77°F).


Measure the resistance between terminal 45 and switch body.

The ohmmeter reading is 40 to 70 ohms . . . . . O.K.

If test is O.K., check harness.  
 If test is not O.K., replace component.

**Test No. 2 Heater coil of thermotime switch bimetal**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	26	Body ground		40 to 70Ω



SEF 696

If test is O.K., thermotime switch is O.K.  
 If test is not O.K., perform component check.

## CONTROL UNIT GROUND CIRCUIT TESTS

Control unit ground circuit tests				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	15	Body ground		Continuity
	19			
	20			
	22			

If tests are O.K., ground circuits are O.K.

If tests are not O.K., check wiring diagram and harness.


SEF 697

## EXHAUST GAS SENSOR CIRCUIT TEST (U.S.A. models)

Exhaust gas sensor circuit test				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter	11	Body ground	Disconnect exhaust gas sensor harness connector, and connect EFI harness terminal for exhaust gas sensor to ground with a jumper wire.	∞
	12			

# AIR REGULATOR AND FUEL PUMP RELAY-1 TESTS

Test No. 1 Air regulator resistance				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Ohmmeter				25 to 90Ω
	21	Body ground		

SEF 698

If test is O.K., go to Test No. 2.

If test is not O.K., check air regulator.

Test No. 2 Air regulator power circuit				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter			1. Disconnect starter motor "S" terminal. 2. Connect battery ground cable. 3. Ignition "START"	Battery voltage
	21	Body ground		



SEF 699

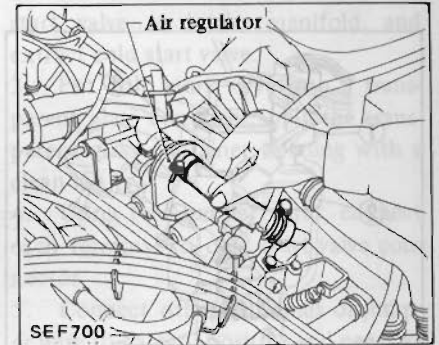
If test is O.K., air regulator is O.K.

If test is not O.K., listen for operating sound of fuel pump.

If no sound is heard with ignition "START", check fuel pump relay-1.

If fuel pump operates with ignition "START", check air regulator.

## CHECKING AIR REGULATOR



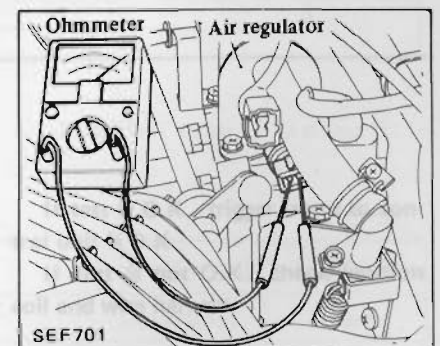
SEF 700

1. Starting engine, and pinch rubber hose between throttle chamber and air regulator.

- Engine speed decreases during warm-up. . . . . O.K.
- Engine speed remains unchanged after warm-up. . . . . O.K.

2. Disconnect hoses from both ends of air regulator, and visually check to see if air regulator shutter opens.

3. Disconnect electric connector of air regulator, and check continuity. Continuity should exist. If not, air regulator is faulty.



SEF 701

4. Pry air regulator shutter to open with a flat-blade screwdriver, then close. If shutter opens and closes smoothly, it is operating properly.

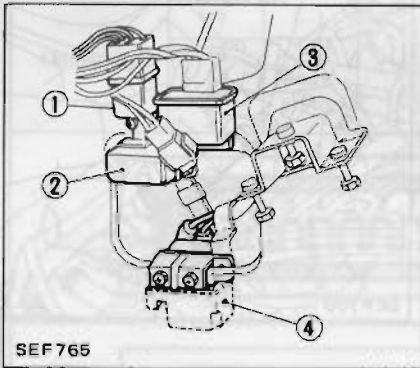
If test is O.K., check harness.

If test is not O.K., replace component and retest.

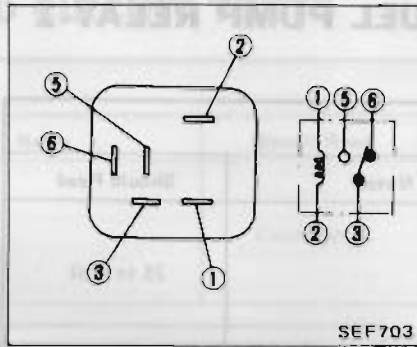


**CHECKING FUEL PUMP RELAY-1**

The fuel pump relay-1 is installed on the dash right side.



- 1 Fuel pump relay-1
- 2 Seat belt warning timer unit
- 3 Ignition accessory relay
- 4 Fan motor timer unit



SEF 703

Check terminals	Normal condition	12V direct current is applied between terminals ① and ②
① - ②	Continuity	—
③ - ⑤	No continuity	Continuity
③ - ⑥	Continuity	No continuity

If test is O.K., check harness.  
If test is not O.K., replace relay and retest.

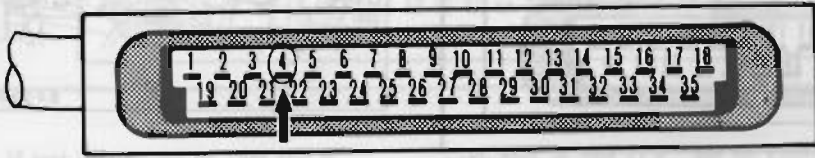


4. For air regulator shutter to open with a flat-blade screwdriver, then close. If shutter opens and closes smoothly, it is operating properly.  
If test is O.K., check harness.  
If test is not O.K., replace component and retest.

If test is O.K., air regulator is O.K.  
If test is not O.K., listen for quiet, jag sound of fuel pump.  
If no sound is heard with ignition "START", check fuel pump relay-1.  
If fuel pump operates with ignition "START", check air regulator.

## COLD START VALVE TESTS

Cold start valve circuit test				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	4	Body ground	1. Disconnect starter motor "S" terminal and thermotime switch harness connector. 2. Connect cold start valve harness connector and battery ground cable. 3. Ignition "START".	Battery voltage

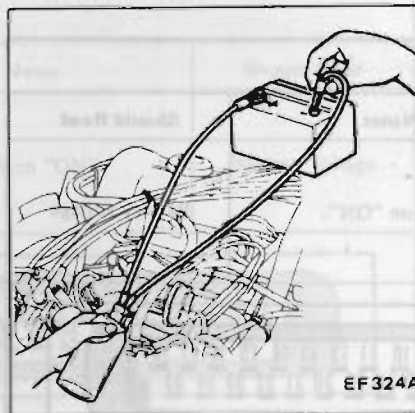


SEF704

If test is O.K., cold start valve is O.K.

If test is not O.K., perform component check.

### Component check



EF324A

1. Disconnect ground cable from battery.
2. Remove two screws securing cold start valve to intake manifold, and extract cold start valve.
3. Put cold start valve into a transparent glass container, plug the transparent glass container opening with a clean rag.
4. Using two jumper wires, connect each terminal to cold start valve connector.
5. Connect other terminals of jumper wire to battery positive and negative terminals.

- Fuel is injected. . . . . O.K.
- Fuel is not injected. . . . . N.G.

### CAUTION:

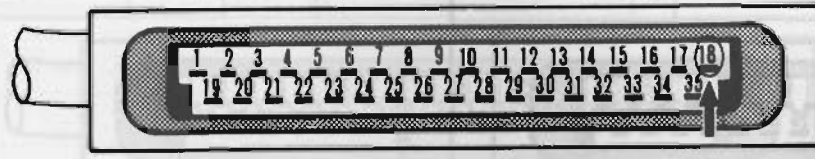
Be careful to keep both terminals separate in order to avoid short circuit.

If test is O.K., check harness.

If test is not O.K., replace component and retest.

## IGNITION COIL TRIGGER INPUT TEST

Ignition coil trigger input test				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	18	Body ground	1. Connect starter motor "S" terminal and battery ground cable. 2. Ignition "START".	Pointer deflects.



SEF705

If test is O.K., trigger input to control unit is O.K.

If test is not O.K., check ignition coil and wire harness.

# INJECTOR CIRCUIT TESTS

Test No. 1 Cylinder No. 1				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	(+)	(-)	1. Connect battery ground cable. 2. Ignition "ON".	Battery voltage
	2	Body ground		

SEF706

If test is O.K., go to Test No. 2.

If test is not O.K., go to Component Check.

Test No. 2 Cylinder No. 2				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	(+)	(-)	Ignition "ON".	Battery voltage
	6	Body ground		

SEF707

If test is O.K., go to Test No. 3.

If test is not O.K., perform component check.

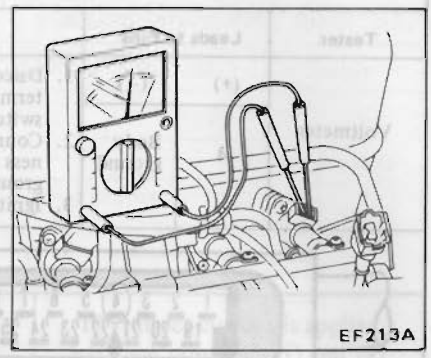
Test No. 3 Cylinder No. 3				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	(+)	(-)	Ignition "ON"	Battery voltage
	5	Body ground		

SEF708

If test is O.K., go to Test No. 4.

If test is not O.K., go to Component Check.

## Component check



EF213A

1. Disconnect ground cable from battery.
2. Disconnect electric connectors from injectors.
3. Check continuity between the two terminals. Continuity should exist. If not, injector(s) are faulty.

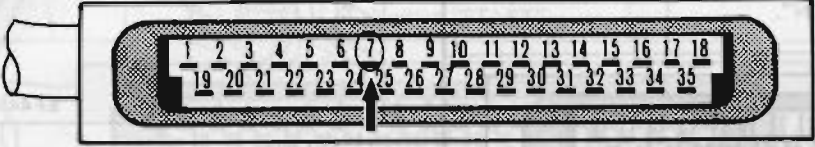
If test is O.K., go to Dropping Resistor Check.

If test is not O.K., replace injectors.

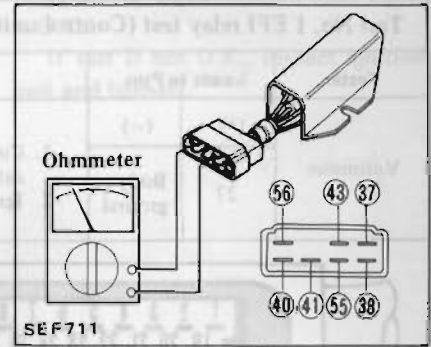
**DROPPING RESISTOR CHECK**

**Test No. 4 Cylinder No. 4**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	7	Body ground	Ignition "ON".	Battery voltage



SEF709



If test is O.K., go to Test No. 5.

If test is not O.K., go to Component Check.

Conduct resistance checks on dropping resistor between the following points.

- 43 and 37 (No. 1 cylinder)
- 43 and 38 (No. 2 cylinder)
- 43 and 40 (No. 3 cylinder)
- 43 and 41 (No. 4 cylinder)
- 43 and 55 (No. 5 cylinder)
- 43 and 56 (No. 6 cylinder)


The resistance should be approximately 6 ohms. . . . . O.K.

If test is O.K., check harness.

If test is not O.K., replace dropping resistors.

**Test No. 5 Cylinder No. 5**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	3	Body ground	Ignition "ON".	Battery voltage



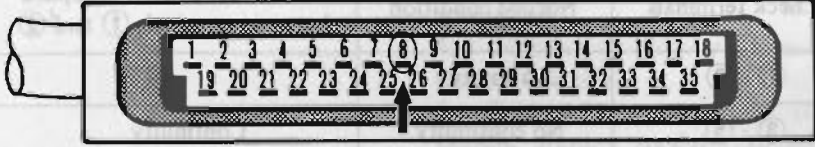
SEF710

If test is O.K., go to Test No. 6.

If test is not O.K., go to Component Check.

**Test No. 6 Cylinder No. 6**

Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	8	Body ground	Ignition "ON".	Battery voltage



SEF712

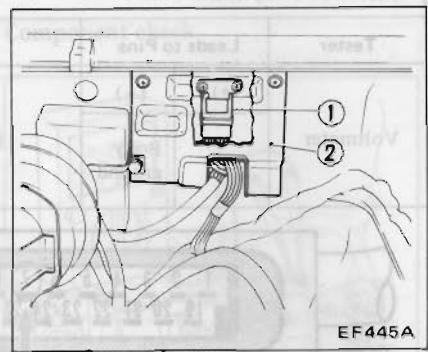
If test is O.K., all injectors are O.K.

If test is not O.K., perform component check.



# EFI RELAY, FUEL PUMP RELAY-2 AND FUEL PUMP RELAY-3 TESTS

## Component check



- 1 EFI relay
- 2 Relay cover

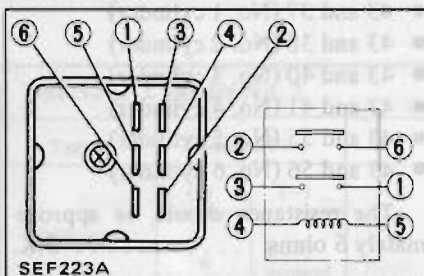
**Test No. 1 EFI relay test (Control unit power input circuit test)**

Tester	Leads to Pins		Notes	Should Read
Voltmeter	(+)	(-)	1. Connect battery ground cable. 2. Ignition "ON".	Battery voltage
	27	Body ground		

SEF713

If test is O.K., EFI relay is O.K. Go to Test No. 2.

If test is not O.K., perform component check.



SEF223A

Check terminals	Normal condition	12V direct current is applied between terminals ④ and ⑤
④ - ⑤	Continuity	—
① - ③	No continuity	Continuity
② - ⑥	No continuity	Continuity

If test is O.K., check harness. If test is not O.K., replace relay and retest.

**Test No. 2 Fuel pump relay-2 and -3 tests**

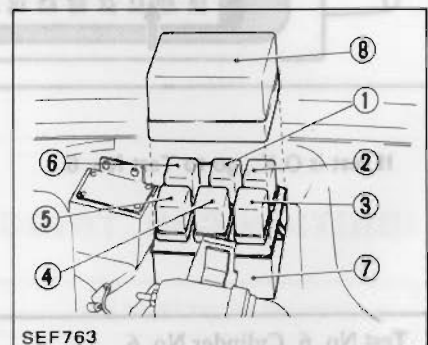
Tester	Leads to Pins		Notes	Should Read
Voltmeter	(+)	(-)	1. Disconnect alternator 2-pin connector. 2. Ignition "ON".	Battery voltage
	21	Body ground		

SEF714

If test is O.K., fuel pump relay-2 and -3 are O.K.

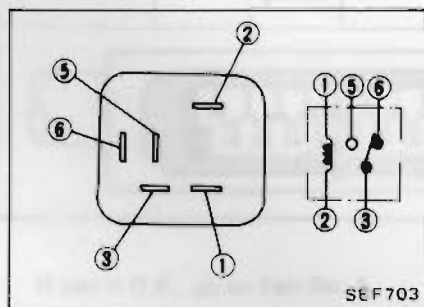
If test is not O.K., perform component check.

## Component check



SEF763

- 1 Fuel pump relay-2
- 2 Fuel pump relay-3
- 3 Lighting relay
- 4 Bulb check relay
- 5 Air conditioner relay
- 6 Inhibitor relay
- 7 Relay bracket
- 8 Relay bracket cover

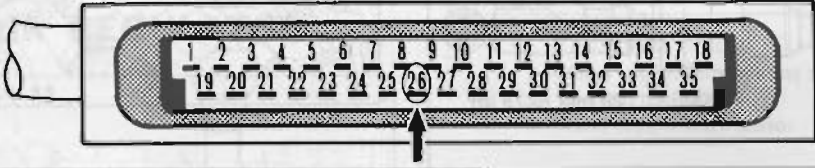


SEF703

Check terminals	Normal condition	12V direct current is applied between terminals ① and ②
① - ②	Continuity	—
③ - ⑤	No continuity	Continuity
③ - ⑥	Continuity	No continuity

If test is O.K., inspect oil pressure switch, alternator and harness. If test is not O.K., replace relay and retest.

## IGNITION START SIGNAL TEST

Ignition start signal test				
Tester	Leads to Pins		Notes	Should Read
	(+)	(-)		
Voltmeter	26	Body ground	1. Disconnect starter motor "S" terminal. 2. Connect battery ground cable. 3. Ignition "START".	Battery voltage
				

SEF715

If test is O.K., ignition start signal is O.K.

If test is not O.K., inspect ignition coil and harness.

## REMOVAL AND INSTALLATION

### INJECTOR AND FUEL PIPE

1. Follow the procedure below to reduce fuel pressure to zero.

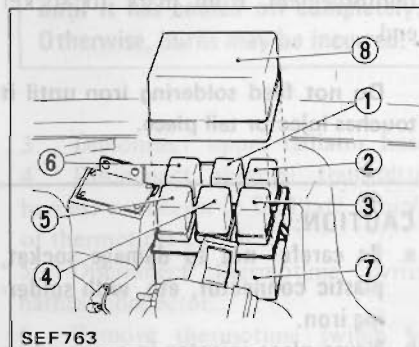
#### CAUTION:

Before disconnecting fuel hose, release fuel pressure from fuel line to eliminate danger.

- (1) Start the engine.
- (2) Remove fuel pump relay-2 with engine running.
- (3) After engine stall, crank the engine twice or three times.
- (4) Turn ignition switch off.

If the engine will not start, remove fuel pump relay-2 and crank the engine for about 5 seconds.

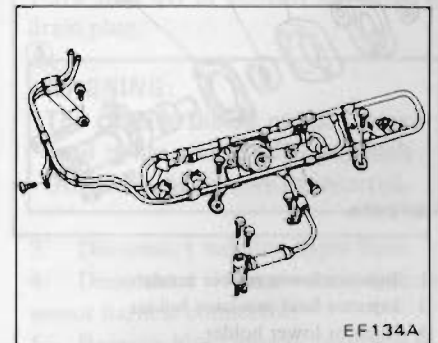
Then turn the ignition switch off.



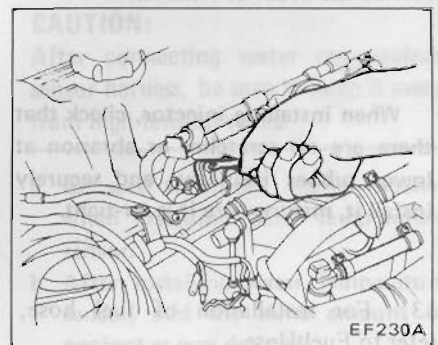
- |                         |                       |
|-------------------------|-----------------------|
| 1 Fuel pump relay-2     | 6 Inhibitor relay     |
| 2 Fuel pump relay-3     | 7 Relay bracket       |
| 3 Lighting relay        | 8 Relay bracket cover |
| 4 Bulb check relay      |                       |
| 5 Air conditioner relay |                       |

Place a rag under fuel pipe to prevent splashing of fuel.

8. Remove bolts securing fuel pipe and cold start valve.

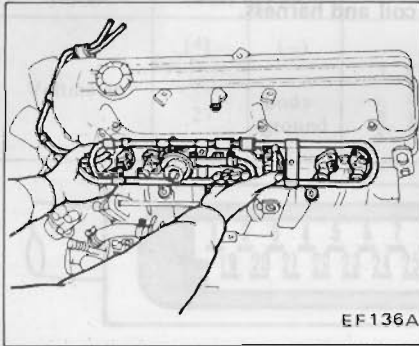


9. Remove screws securing fuel injectors.



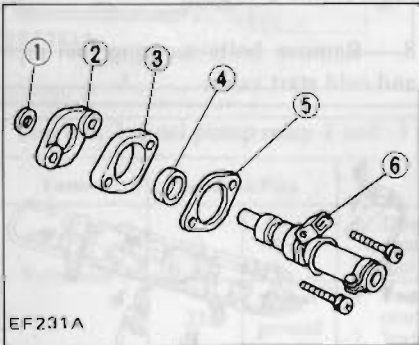
2. Disconnect electric connector from injector and cold start valve.
3. Disengage harness from fuel pipe wire clamp.
4. Disconnect blow-by hose at rocker cover side.
5. Disconnect vacuum tube (connecting pressure regulator to intake manifold) from pressure regulator.
6. Remove air regulator pipe.
7. Disconnect fuel feed hose and fuel return hose from fuel pipe.

10. Remove fuel pipe assembly by pulling out fuel pipe, injector, pressure regulator and cold start valve as an assembly.



11. Unfasten hose clamp on fuel injector and remove fuel injector from fuel pipe.

Place a rag under injector when disconnecting fuel pipe to prevent splashing of fuel.



- 1 Injector lower rubber insulator
- 2 Injector heat insulator holder
- 3 Injector lower holder
- 4 Injector upper rubber insulator
- 5 Injector upper holder
- 6 Injector

12. To install injector and fuel pipe, reverse the order of removal.

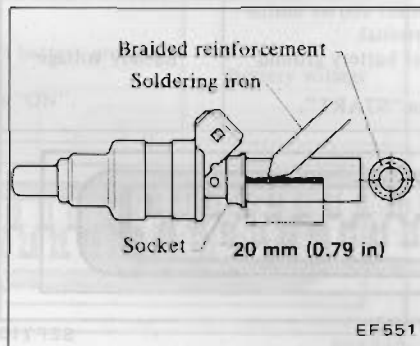
When installing injector, check that there are no scratches or abrasion at lower rubber insulator, and securely install it, making sure it is air-tight.

13. For installation of fuel hose, refer to Fuel Hose.

## INJECTOR RUBBER HOSE

If necessary, replace injector rubber hose, proceed as follows:

### Removal



1. On injector rubber hose, measure off a point approx. 20 mm (0.79 in) from socket end.
2. Heat soldering iron (150 watt) for 15 minutes. Cut hose into braided reinforcement from mark to socket end.

Do not feed soldering iron until it touches injector tail piece.

### CAUTION:

- a. Be careful not to damage socket, plastic connector, etc. with soldering iron.
- b. Never place injector in a vise when disconnecting rubber hose.

3. Then pull rubber hose out with hand.

### Installation

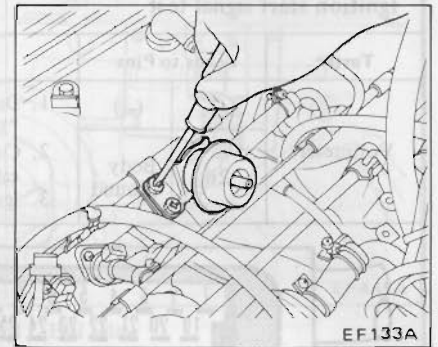
1. Clean exterior of injector tail piece.
2. Wet inside of new rubber hose with fuel.
3. Push end of rubber hose with hose socket onto injector tail piece by hand as far as they will go.

Clamp is not necessary at this connection.

### CAUTION:

After properly connecting fuel hose to injector, check connection for fuel leakage.

## PRESSURE REGULATOR

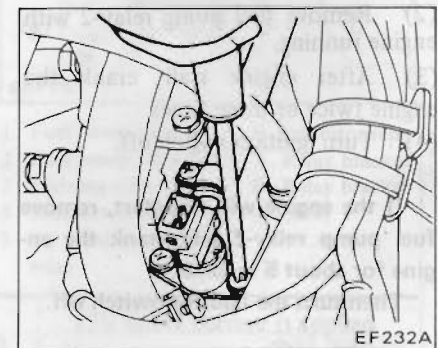


1. Reduce fuel line pressure to zero. Refer to item 1. under the heading Injector and Fuel pipe.
2. Disengage vacuum tube connecting regulator to intake manifold from pressure regulator.
3. Remove screws securing pressure regulator.
4. Unfasten hose clamps, and disconnect pressure regulator from fuel hose.

Place a rag under pressure regulator to prevent splashing of fuel.

5. To install pressure regulator, reverse the order of removal.
6. For installation of fuel hose, refer to Fuel Hose.

## COLD START VALVE



1. Reduce fuel line pressure to zero. Refer to item 1. under the heading Injector and Fuel pipe.
2. Remove screws securing cold start valve to intake manifold.

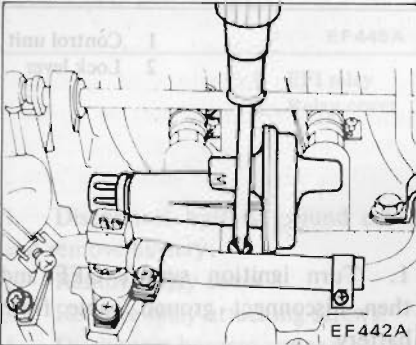


3. Unfasten clamp and disconnect cold start valve from fuel hose.

Place a rag under fuel hose to prevent splashing of fuel.

4. To install cold start valve, reverse the order of removal.
5. For installation of fuel hose, refer to Fuel Hose.

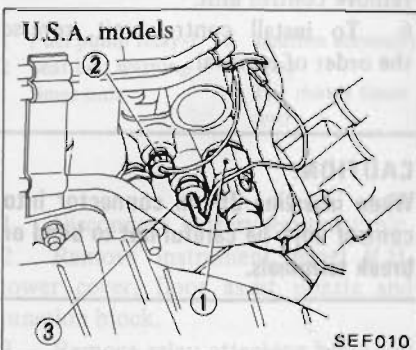
## AIR REGULATOR



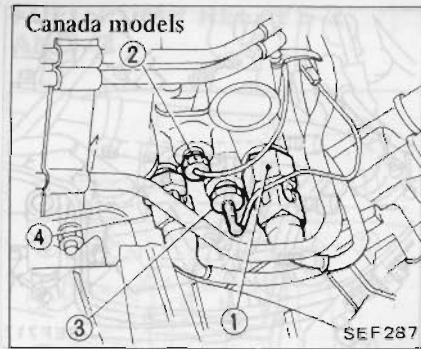
1. Disconnect ground cable from battery.
2. Disconnect electric connector from air regulator.
3. Unfasten clamp on each side of hose, and disconnect hose.
4. Remove setscrews, and remove air regulator.
5. To install air regulator, reverse the order of removal.

On Canada models, a rubber cover is provided on air regulator.

## THERMOTIME SWITCH



- 1 Thermotime switch
- 2 Water temperature sensing switch
- 3 Thermal transmitter



- 1 Thermotime switch
- 2 Water temperature sensing switch
- 3 Thermal transmitter
- 4 Water temperature sensor

1. Disconnect battery ground cable.
2. Remove radiator filler cap. Drain approximately 1.5 liters (1-5/8 US qt, 1-3/8 Imp qt) of coolant by opening drain plug.

### WARNING:

The coolant should not be drained until it has cooled off completely. Otherwise, burns may be incurred.

3. Disconnect upper radiator hose.
  4. Disconnect thermal transmitter harness connector to facilitate removal of thermotime switch.
  5. Disconnect thermotime switch harness connector.
  6. Remove thermotime switch by turning it counterclockwise.
  7. To install thermotime switch, reverse the order of removal.
- a. Be sure to install copper washer when installing thermotime switch.
  - b. After installing thermotime switch, add the same amount of coolant as was drained.

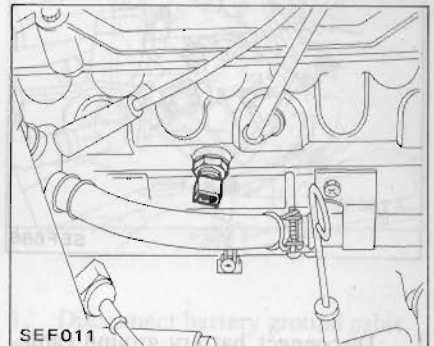
## CYLINDER HEAD TEMPERATURE SENSOR

### (U.S.A. models)

1. Disconnect battery ground cable.
2. Disconnect cylinder head temperature sensor harness connector.
3. Remove sensor by turning it counterclockwise.
4. To install sensor, reverse the order of removal.

### CAUTION:

After connecting cylinder head temperature sensor harness, be sure to keep it away from high tension wires.



## WATER TEMPERATURE SENSOR (Canada models)

1. Disconnect battery ground cable.
2. Remove radiator filler cap. Drain approximately 1.5 liters (1-5/8 US qt, 1-3/8 Imp qt) of coolant by opening drain plug.

### WARNING:

The coolant should not be drained until it has cooled off completely. Otherwise, burns may be incurred.

3. Disconnect radiator upper hose.
4. Disconnect water temperature sensor harness connector.
5. Remove blind plug to facilitate removal of water temperature sensor.
6. Remove water temperature sensor by turning it counterclockwise.
7. To install water temperature sensor reverse the order of removal.

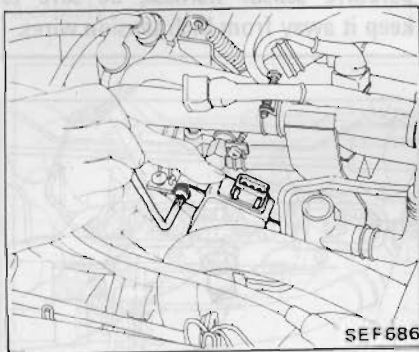
### CAUTION:

After connecting water temperature sensor harness, be sure to keep it away from high tension wires.

- a. Be sure to install copper washer when installing water temperature sensor.
- b. After installing water temperature sensor, add the same amount of coolant as was drained.

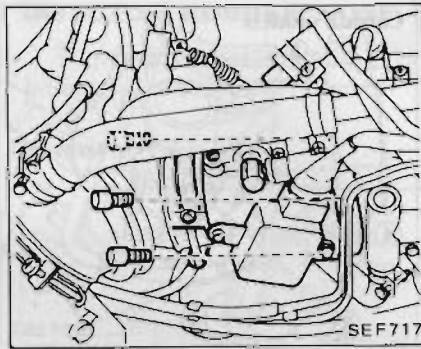


## THROTTLE VALVE SWITCH

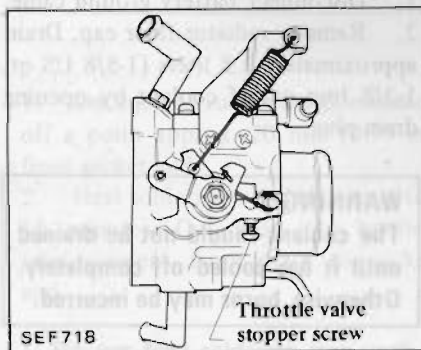


1. Disconnect battery ground cable.
2. Disconnect throttle valve switch harness connector.
3. Remove screws securing throttle valve switch to throttle chamber.
4. Slowly pull throttle valve switch toward you.
5. To install throttle valve switch, reverse the order of removal.
6. After installation, adjust position of throttle valve switch.

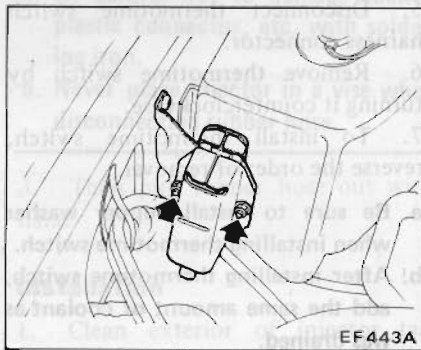
Refer to Throttle Valve Switch, under the heading Component Parts Inspection.



Do not adjust throttle valve stopper screw as it is properly adjusted at factory.

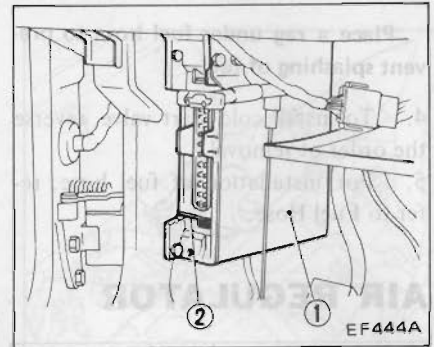


## DROPPING RESISTOR



1. Disconnect ground cable from battery.
2. Disconnect electric connector from dropping resistor.
3. Remove dropping resistor attaching screws.
4. To install dropping resistor, reverse the order of removal.

## CONTROL UNIT



- 1 Control unit
- 2 Lock lever

1. Turn ignition switch OFF and then disconnect ground cable from battery.

### CAUTION:

Before disconnecting EFI harness at 35-pin connector, be sure to turn ignition switch "OFF" and then disconnect ground cable from battery to prevent control unit from being damaged.

2. Remove instrument panel L.H. lower cover.
3. Remove L.H. dash side finisher.
4. Pull lock lever back, and disconnect 35-pin connector from control unit.
5. Remove bolt which secures control unit to L.H. dash side panel, and remove control unit.
6. To install control unit, reverse the order of removal.

### CAUTION:

When inserting 35-pin connector into control unit, be careful not to bend or break terminals.

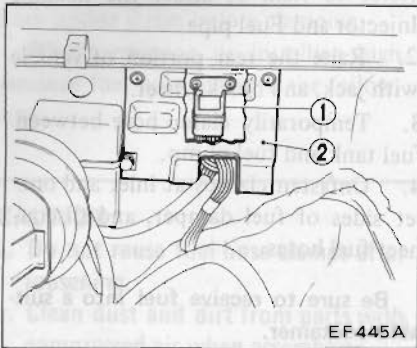
## THROTTLE CHAMBER

1. Disconnect battery ground cable.
2. Remove hoses, tube and air duct from throttle chamber.
3. Disconnect throttle valve switch harness connector.
4. Disconnect rod connector at auxiliary throttle shaft.
5. Remove bolts securing throttle chamber to intake manifold. The throttle chamber can be removed.
6. To install throttle chamber, reverse the order of removal.

**T**: Throttle chamber securing screw  
 15 - 20 N·m  
 (1.5 - 2.0 kg·m,  
 11 - 14 ft·lb)

## RELAY

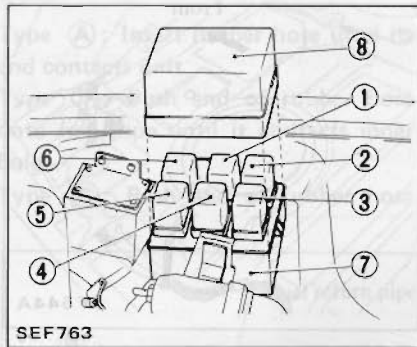
### EFI RELAY



- 1 EFI relay
- 2 Relay cover

1. Disconnect battery ground cable and remove battery.
2. Remove relay cover.
3. Remove relay attaching screws.
4. Disconnect harness connector.
5. To install relay, reverse the order of removal.

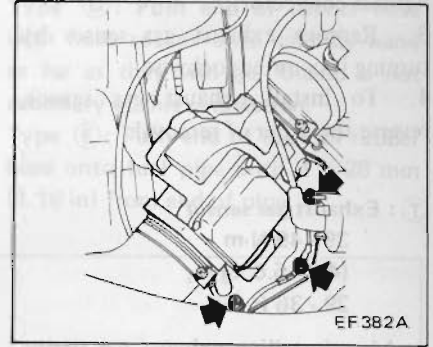
### FUEL PUMP RELAYS-2 AND -3



- 1 Fuel pump relay-2
- 2 Fuel pump relay-3
- 3 Lighting relay
- 4 Bulb check relay
- 5 Air conditioner relay
- 6 Inhibitor relay
- 7 Relay bracket
- 8 Relay bracket cover

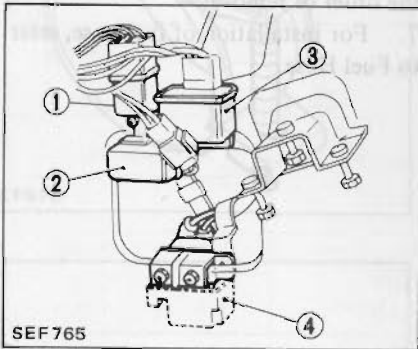
1. Disconnect battery ground cable.
2. Remove relay cover.
3. Remove relay from relay fixing board.
4. To install relay, reverse the order of removal.

### AIR FLOW METER



1. Disconnect battery ground cable.
2. Unfasten clamps securing air ducts at air flow meter and remove air ducts.
3. Remove bolts securing air flow meter bracket to body.
4. Remove air flow meter with bracket and disconnect harness connector.
5. To install air flow meter, reverse the order of removal.

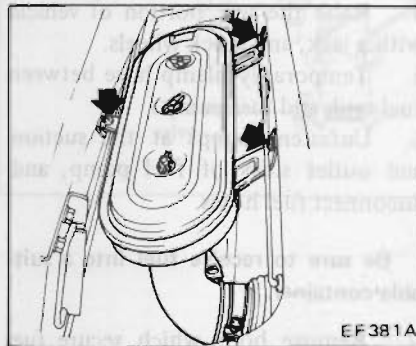
### FUEL PUMP RELAY-1



- 1 Fuel pump relay-1
- 2 Seat belt warning timer unit
- 3 Ignition accessory relay
- 4 Fan motor timer unit

1. Disconnect battery ground cable.
2. Remove instrument panel R.H. lower cover, floor assist nozzle and junction block.
3. Remove relay attaching bolts and disconnect harness connector.
4. To install relay, reverse the order of removal.

### AIR CLEANER

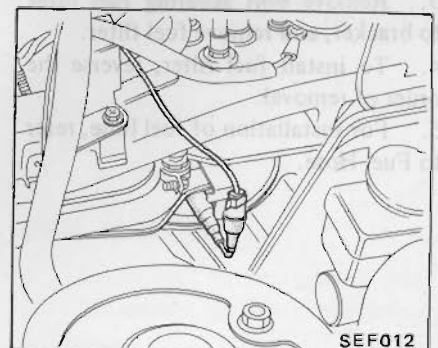


1. Unfasten clamp securing air duct between air cleaner and air flow meter.
2. Remove air cleaner securing screw.
3. Separate air cleaner from air ducts.
4. To install air cleaner, reverse the order of removal.

### AIR TEMPERATURE SENSOR

The air temperature sensor is built into the air flow meter and cannot be removed as a single unit. When replacement of air temperature sensor is necessary, the entire air flow meter assembly should be replaced.

### EXHAUST GAS SENSOR (U.S.A. models)

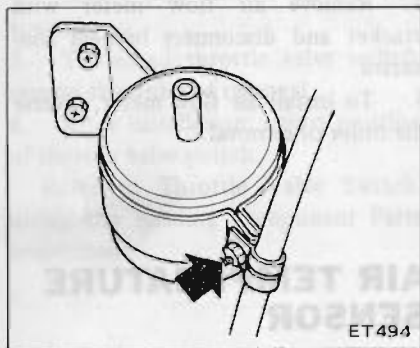


1. Disconnect battery ground cable.
2. Disconnect exhaust gas sensor harness connector.
3. Remove exhaust gas sensor by turning it counterclockwise.
4. To install exhaust gas sensor, reverse the order of removal.

**T** : Exhaust gas sensor  
 39 - 49 N·m  
 (4.0 - 5.0 kg·m,  
 29 - 36 ft·lb)

After installing exhaust gas sensor, make sure that there is no leakage of exhaust gas.

## FUEL FILTER

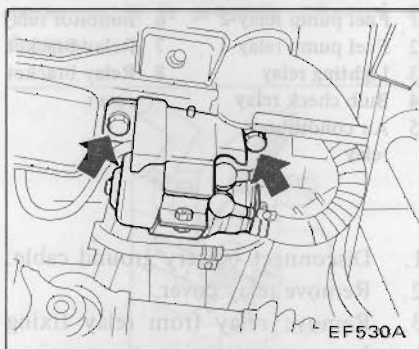
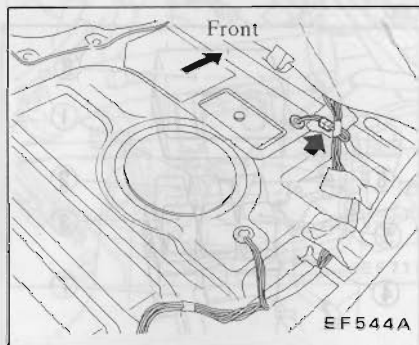


1. Reduce fuel line pressure to zero. Refer to item 1, under the heading Injector and Fuel pipe.
2. Unfasten clamps securing fuel hoses to the outlet and inlet sides of fuel filter, and disengage fuel hoses.

Be careful not to spill fuel over engine compartment. Place a rag to absorb fuel.

3. Remove bolt securing fuel filter to bracket, and remove fuel filter.
4. To install fuel filter, reverse the order of removal.
5. For installation of fuel hose, refer to Fuel Hose.

## FUEL PUMP



1. Disconnect ground cable from battery.
2. Reduce fuel line pressure to zero. Refer to item 1, under the heading Injector and Fuel pipe.
3. Disconnect harness connector of fuel pump at rear luggage compartment.
4. Raise the rear portion of vehicle with a jack, and block wheels.
5. Temporarily clamp hose between fuel tank and fuel pump.
6. Unfasten clamps at the suction and outlet sides of fuel pump, and disconnect fuel hoses.

Be sure to receive fuel into a suitable container.

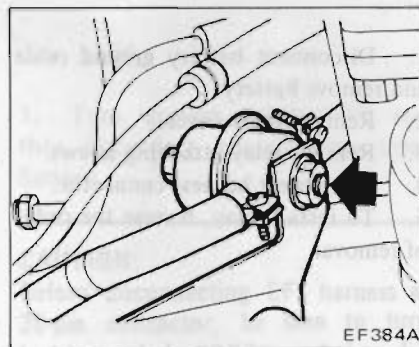
7. Remove bolts which secure fuel pump bracket to body, and remove screws which secure bracket to pump.
8. To install fuel pump, reverse the order of removal.
9. For installation of fuel hose, refer to Fuel Hose.

## FUEL DAMPER

1. Reduce fuel line pressure to zero. Refer to item 1, under the heading Injector and Fuel pipe.
2. Raise the rear portion of vehicle with jack, and block wheel.
3. Temporarily clamp hose between fuel tank and fuel pump.
4. Unfasten clamps at inlet and outlet sides of fuel damper, and disconnect fuel hoses.

Be sure to receive fuel into a suitable container.

5. Remove nut which secures fuel damper to bracket.



6. To install fuel damper, reverse the order of removal.
7. For installation of fuel hose, refer to Fuel Hose.

## FUEL HOSE

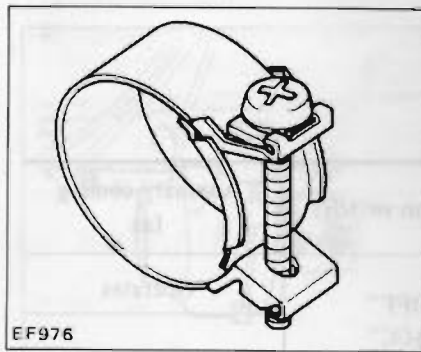
Make sure that all low pressure fuel hoses are fully inserted and are free from undue strain before clamping.

When removing or installing high pressure fuel hose, observe the following.

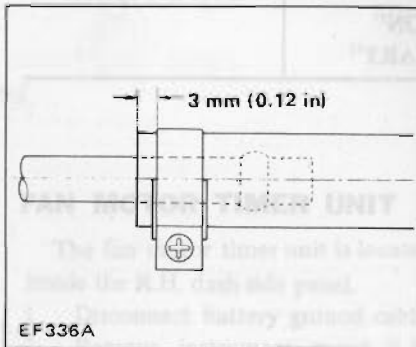
### CAUTION:

- Do not reuse fuel hose clamps after loosening.
- Clean dust and dirt from parts with compressed air when assembling.
- Tighten high pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end or screw position (wider than other portions of clamp) is flush with hose end. Tightening torque specifications are the same for all rubber hose clamps.

ⓐ : Fuel hose clamps  
 1.0 - 1.5 N·m  
 (0.10 - 0.15 kg·m,  
 0.7 - 1.1 ft·lb)



EF976



EF336A

- When tightening hose clamp, ensure that screw does not come into contact with adjacent parts.

Insert high pressure fuel hoses into their proper positions as instructed below.

Type ⓐ: Insert rubber hose until its end contacts unit.

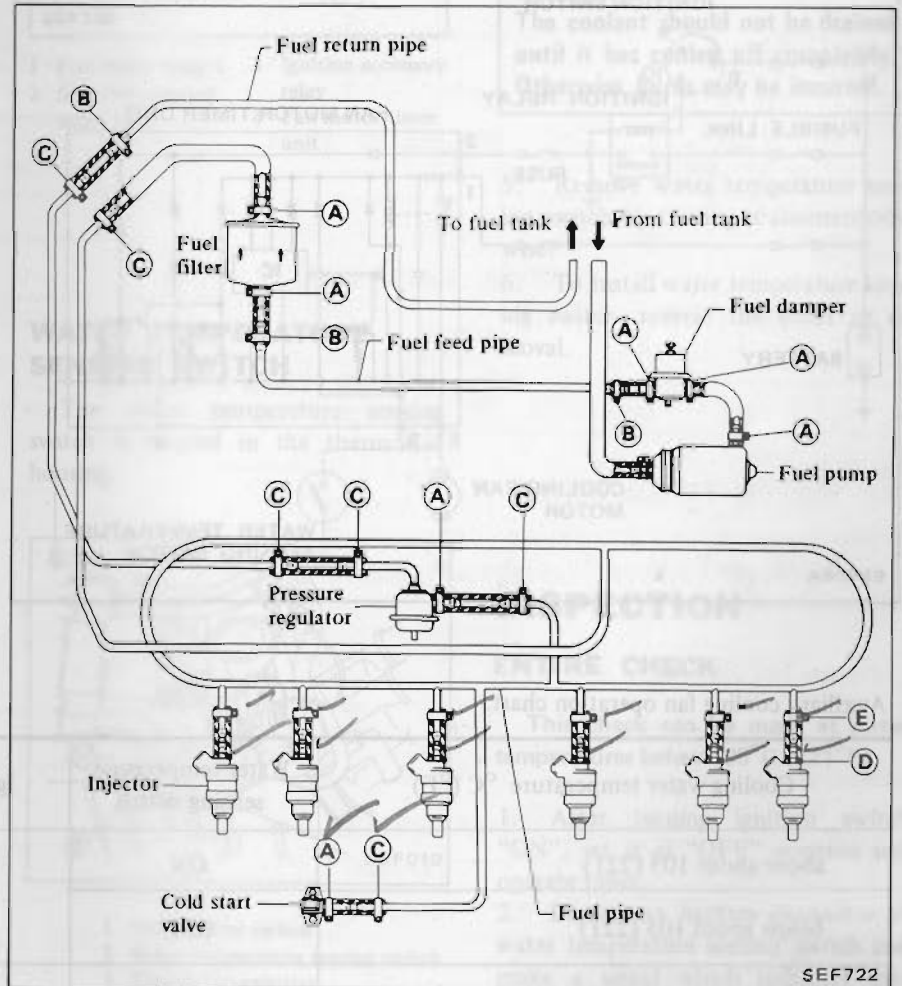
Type ⓑ: Push end of rubber hose onto fuel pipe until it contacts inner bulge.

Type ⓒ: Push end of rubber hose

onto fuel pipe until it is 33 mm (1.30 in) from end of pipe.

Type ⓓ: Push end of rubber hose with hose socket onto unit by hand as far as they will go. Clamp is not necessary at this connection.

Type ⓔ: Push end of injector rubber hose onto fuel pipe until it is 28 mm (1.10 in) from end of pipe.



SEF722

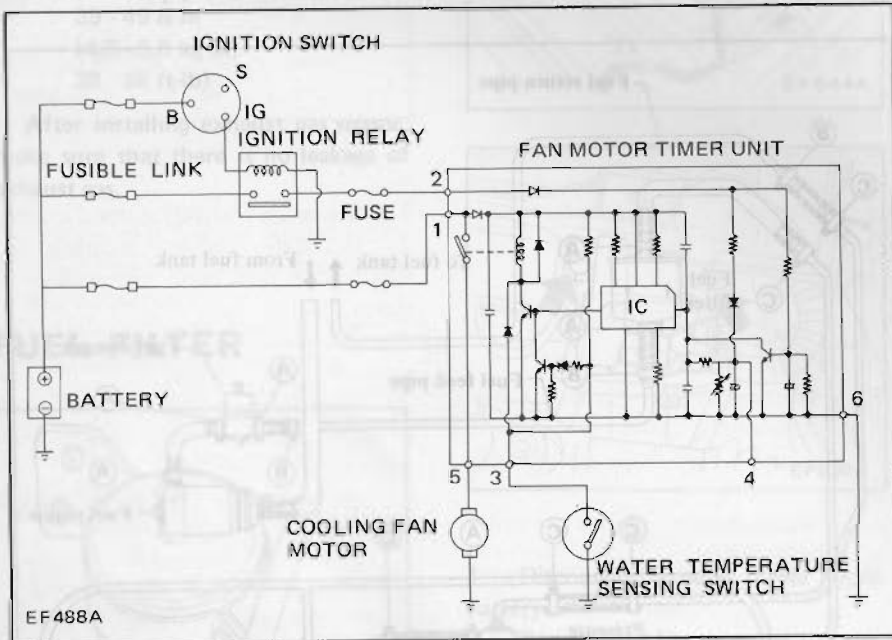


# AUXILIARY COOLING FAN

## DESCRIPTION

The auxiliary cooling fan is located in the engine compartment. The cooling fan operates after ignition switch is turned off, and thereby cooling down the temperature of fuel inside the injector and fuel hoses in the engine compartment.

tion switch is turned off, and thereby cooling down the temperature of fuel inside the injector and fuel hoses in the engine compartment.



## OPERATION

- As soon as the ignition switch is turned off at an engine coolant temperature of above about 105°C (221°F), the cooling fan operates.
  - When the ignition switch is turned off at an engine coolant temperature of below about 105°C (221°F), the cooling fan operates when the engine coolant temperature rises above about 105°C (221°F).
- a. The cooling fan operates for about 17 minutes after the ignition switch is turned off.
  - b. When the ignition switch is turned to the "ON" or "START" position, the cooling fan will stop even though it is in operation.

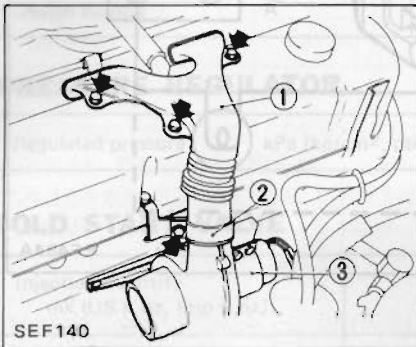
Auxiliary cooling fan operation chart.

Cooling water temperature °C (°F)	Water temperature sensing switch	Ignition switch	Auxiliary cooling fan
above about 105 (221)	ON	"OFF" "ACC"	Operates
below about 105 (221)	OFF		Does not operate
		"ON" "START"	Does not operate

## REMOVAL AND INSTALLATION

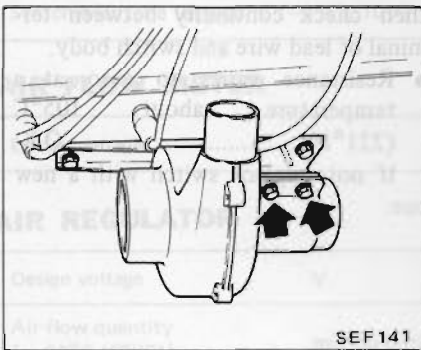
### COOLING FAN

1. Disconnect battery ground cable.
2. Disconnect harness connector of fan motor.
3. Remove bolts securing air duct and disconnect air duct from cooling fan.



- 1 Air duct
- 2 Clamp
- 3 Cooling fan

4. Loosen bolts securing bracket to cooling fan and remove cooling fan.

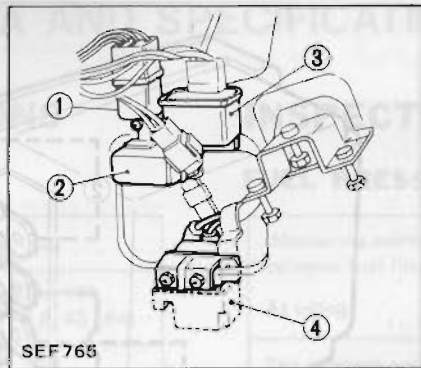


SEF141

### FAN MOTOR TIMER UNIT

The fan motor timer unit is located inside the R.H. dash side panel.

1. Disconnect battery ground cable.
2. Remove instrument panel R.H. lower cover and junction block.
3. Remove timer unit attaching screws.
4. Disconnect harness connector.
5. To install timer unit, reverse the order of removal.



SEF765

- 1 Fuel pump relay-1
- 2 Seat belt warning timer unit
- 3 Ignition accessory relay
- 4 Fan motor timer unit

1. Disconnect battery ground cable.
2. Remove radiator filler cap. Drain approximately 1.5 liters (1-5/8 US qt, 1-3/8 Imp qt) of coolant by opening drain plug.
3. Disconnect upper radiator hose.
4. Disconnect water temperature sensing switch harness connector.

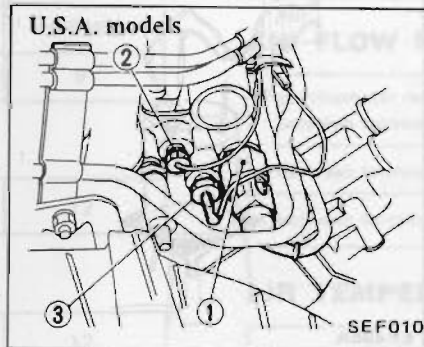
### WARNING:

The coolant should not be drained until it has cooled off completely. Otherwise, burns may be incurred.

5. Remove water temperature sensing switch by turning it counterclockwise.
6. To install water temperature sensing switch, reverse the order of removal.

### WATER TEMPERATURE SENSING SWITCH

The water temperature sensing switch is located in the thermostat housing.



U.S.A. models

SEF010

- 1 Thermotime switch
- 2 Water temperature sensing switch
- 3 Thermal transmitter

## INSPECTION

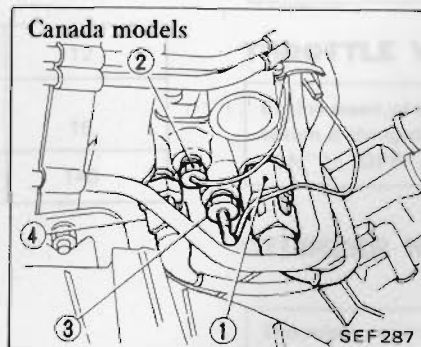
### ENTIRE CHECK

This check can be made at water temperatures below 105°C (221°F).

1. After turning ignition switch "ON", set it at "OFF" position and operate timer.
2. Disconnect harness connector of water temperature sensing switch and make a signal which indicates that water temperature has exceeded 105°C (221°F), by grounding connector terminal at harness side.

- Cooling fan operates ..... O.K.
- Cooling fan does not operate ..... N.G.

3. If cooling fan does not operate, check fan motor timer unit and fan motor as a part.



Canada models

SEF287

- 1 Thermotime switch
- 2 Water temperature sensing switch
- 3 Thermal transmitter
- 4 Water temperature sensor

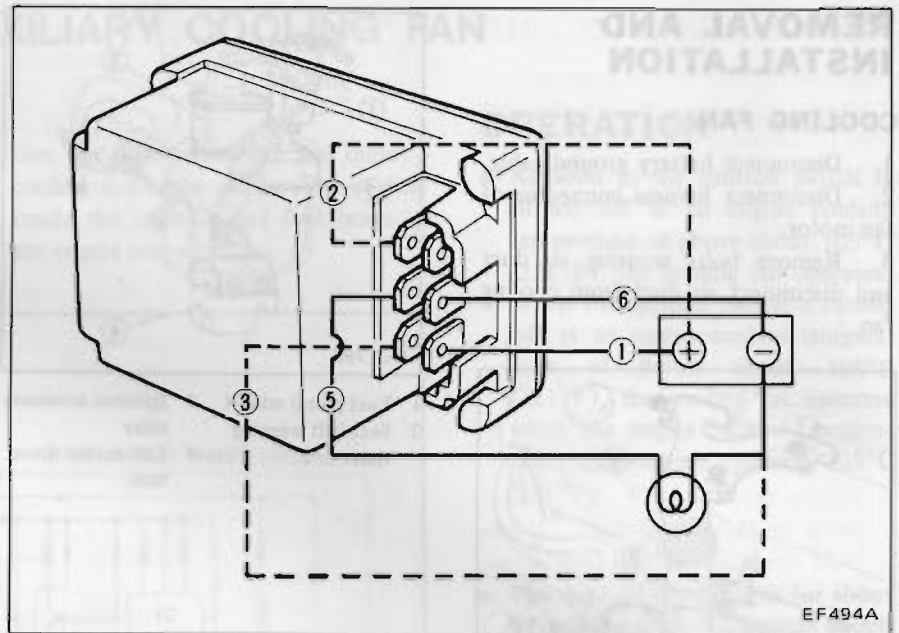
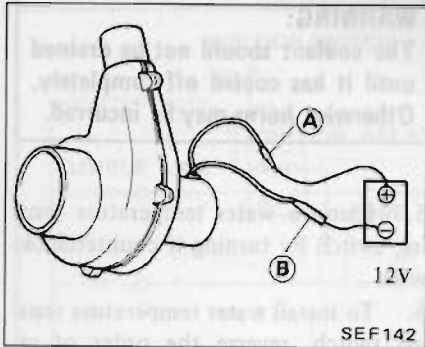
### FAN MOTOR

1. Disconnect battery ground cable.
2. Disconnect harness connectors of fan motor.

3. Make sure continuity exists between connector terminals (A) and (B).

4. Then securely connect positive terminal of a 12-volt d.c. power supply to terminal (A), and ground terminal (B).

Fan motor should run. If not running, the motor is out of order.



**FAN MOTOR TIMER UNIT**

Test timer unit with a power source of 12-volt DC and test lamp following the procedure below.

**Prepare 12V-3W lamp.**

1. Connect terminal (6) to negative terminal of power source, terminal (5) to test lamp terminal and the other test lamp terminal to negative terminal of the power source.

2. Connect terminal (1) to positive terminal of power source.

- Test lamp does not glow ..... O.K.
- Test lamp glows ..... N.G.

3. Connect terminal (2) to positive terminal of power source and disconnect it. (Operate timer)

4. Connect terminal (3) to negative terminal of power source.

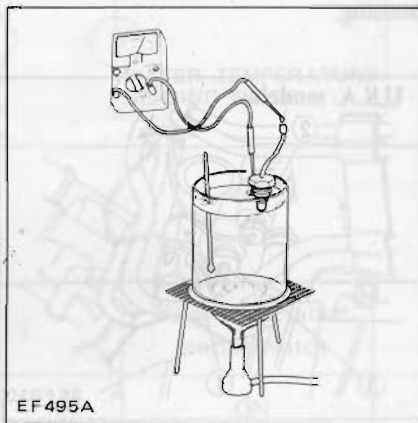
- Test lamp glows ..... O.K.
- Test lamp does not glow ..... N.G.

5. Make sure that test lamp should remain on for about 17 minutes after step 3 is performed, and then go out.

6. While test lamp is on, connect terminal (2) to positive terminal of power source.

- Test lamp goes out ..... O.K.
- Test lamp does not go out ..... N.G.

**WATER TEMPERATURE SENSING SWITCH**



1. Dip sensing portion of water temperature sensing switch into proper solution maintained at 80°C (176°F).

2. Measure resistance between terminal of lead wire and switch body.

- Resistance is infinite ..... O.K.

3. Increase solution temperature, then check continuity between terminal of lead wire and switch body.

- Resistance varies to zero at a temperature about 105°C (221°F) ..... O.K.

If not, replace switch with a new one.

## SERVICE DATA AND SPECIFICATIONS (S.D.S.)

## GENERAL SPECIFICATIONS

## FUEL PUMP

Design voltage	V	12
Cut-off discharge pressure	kPa (kg/cm <sup>2</sup> , psi)	294 - 441 (3.0 - 4.5, 43 - 64)
Design current	A	5.1

## PRESSURE REGULATOR

Regulated pressure	kPa (kg/cm <sup>2</sup> , psi)	250 (2.55, 36.3)
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## COLD START VALVE

Injection quantity mℓ (US fl oz, Imp fl oz)	135 (4.6, 4.8)	
Design voltage	V	12

## THERMOTIME SWITCH

Design voltage	V	12
Switch-over temperature	°C (°F)	19.5 (67)
Switch-over time [at -20°C (-4°F), 10V] sec.		9

## AIR FLOW METER

Design voltage	V	12
----------------	---	----

## AIR REGULATOR

Design voltage	V	12
Air flow quantity [at 20°C (68°F)]	m <sup>3</sup> (cu ft)/hr	27.5 (971)

## CONTROL UNIT

Design voltage	V	12
Consumption wattage at idling	W	15
at full throttle	W	140

## INSPECTION AND ADJUSTMENT

## FUEL PRESSURE

Unit: kPa (kg/cm<sup>2</sup>, psi)

(Measuring point: between fuel filter and fuel pipe)	
At idling	Approximately 206 (2.1, 30)
The moment accelerator pedal is fully depressed	Approximately 255 (2.6, 37)

## FUEL INJECTOR

Coil resistance	Ω	2.35
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## THERMOTIME SWITCH

Cooling water temperature below 14°C (57°F)	ON	
14 - 25°C (57 - 77°F)	ON or OFF	
above 25°C (77°F)	OFF	
Coil resistance	Ω	40 - 70

## AIR FLOW METER

Unit: Ω

Potentiometer resistance between terminals ③③ and ③④	100 - 400
between terminals ③④ and ③⑤	200 - 500
between terminals ③② and ③④	Except 0 and ∞

## AIR TEMPERATURE SENSOR

Unit: kΩ

Thermistor resistance at -10°C (14°F)	7.0 - 11.4
at 20°C (68°F)	2.1 - 2.9
at 50°C (122°F)	0.68 - 1.00

## THROTTLE VALVE SWITCH

Engine speed when idle switch is changed from "ON" to "OFF"	rpm	Approximately 900
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## CYLINDER HEAD TEMPERATURE SENSOR

Unit: kΩ

Thermistor resistance at -10°C (14°F)	7.0 - 11.4
at 20°C (68°F)	2.1 - 2.9
at 50°C (122°F)	0.68 - 1.0



**WATER TEMPERATURE SENSOR**

Unit: kΩ

Thermistor resistance at -10°C (14°F)	7.0 - 11.4
at 20°C (68°F)	2.1 - 2.9
at 50°C (122°F)	0.68 - 1.0

**DROPPING RESISTOR**

Resistance (per resistor) Ω	Approximately 6
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**WATER TEMPERATURE SENSING SWITCH (For Auxiliary Cooling Fan)**

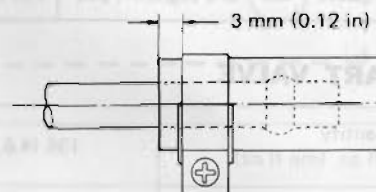
Cooling water temperature below about 105°C(221°F)	OFF
above about 105°C (221°F)	ON

**FAN MOTOR TIMER UNIT (For Auxiliary Cooling Fan)**

Operating period minutes	about 17
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**TIGHTENING TORQUE**

Unit	N·m	kg·m	ft·lb
Throttle chamber securing screw	15 - 20	1.5 - 2.0	11 - 14
Exhaust gas sensor	39 - 49	4.0 - 5.0	29 - 36
Fuel hose clamp	1.0 - 1.5	0.10 - 0.15	0.7 - 1.1



Fuel hose clamping position

EF336A