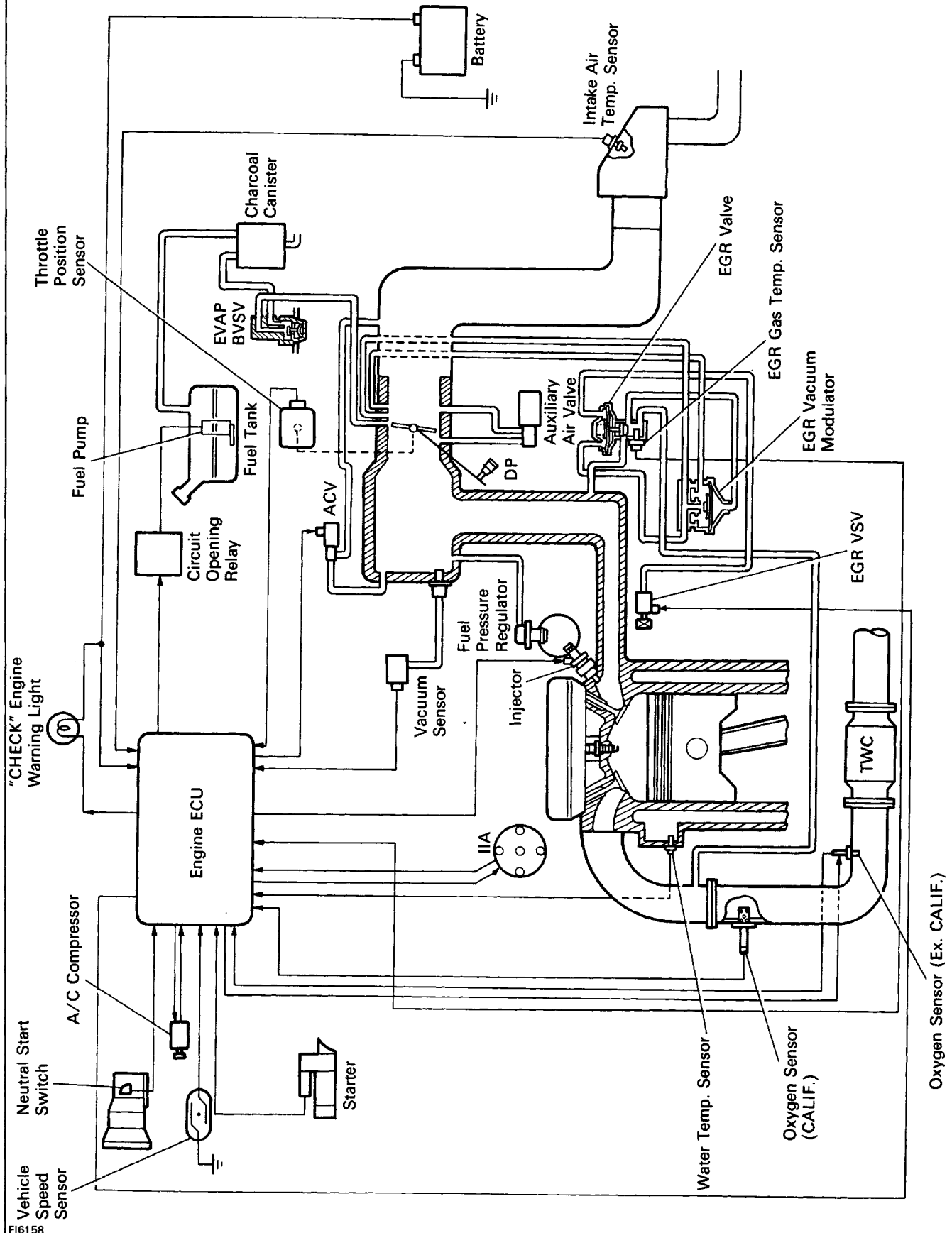
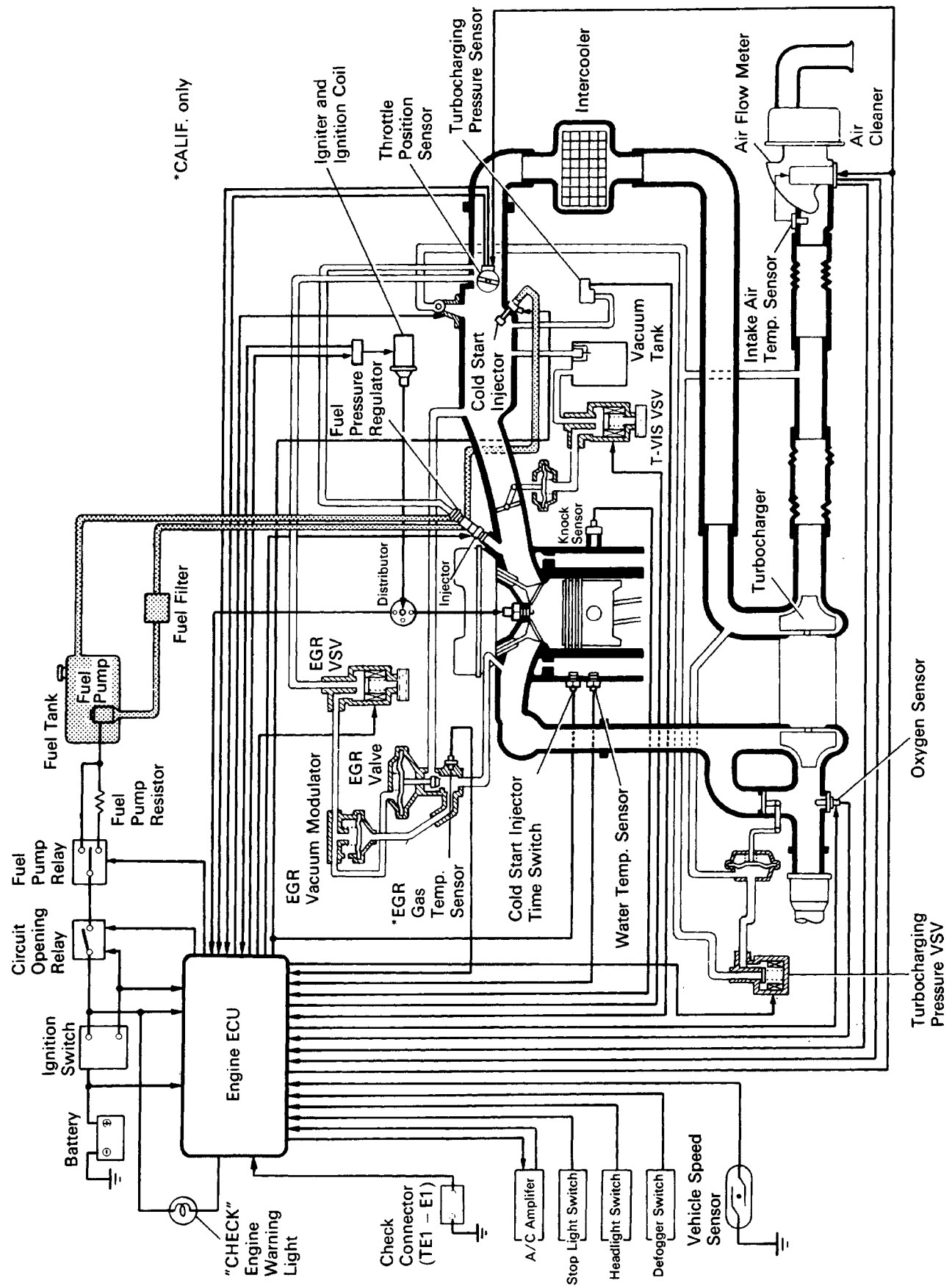

EFI SYSTEM

DESCRIPTION

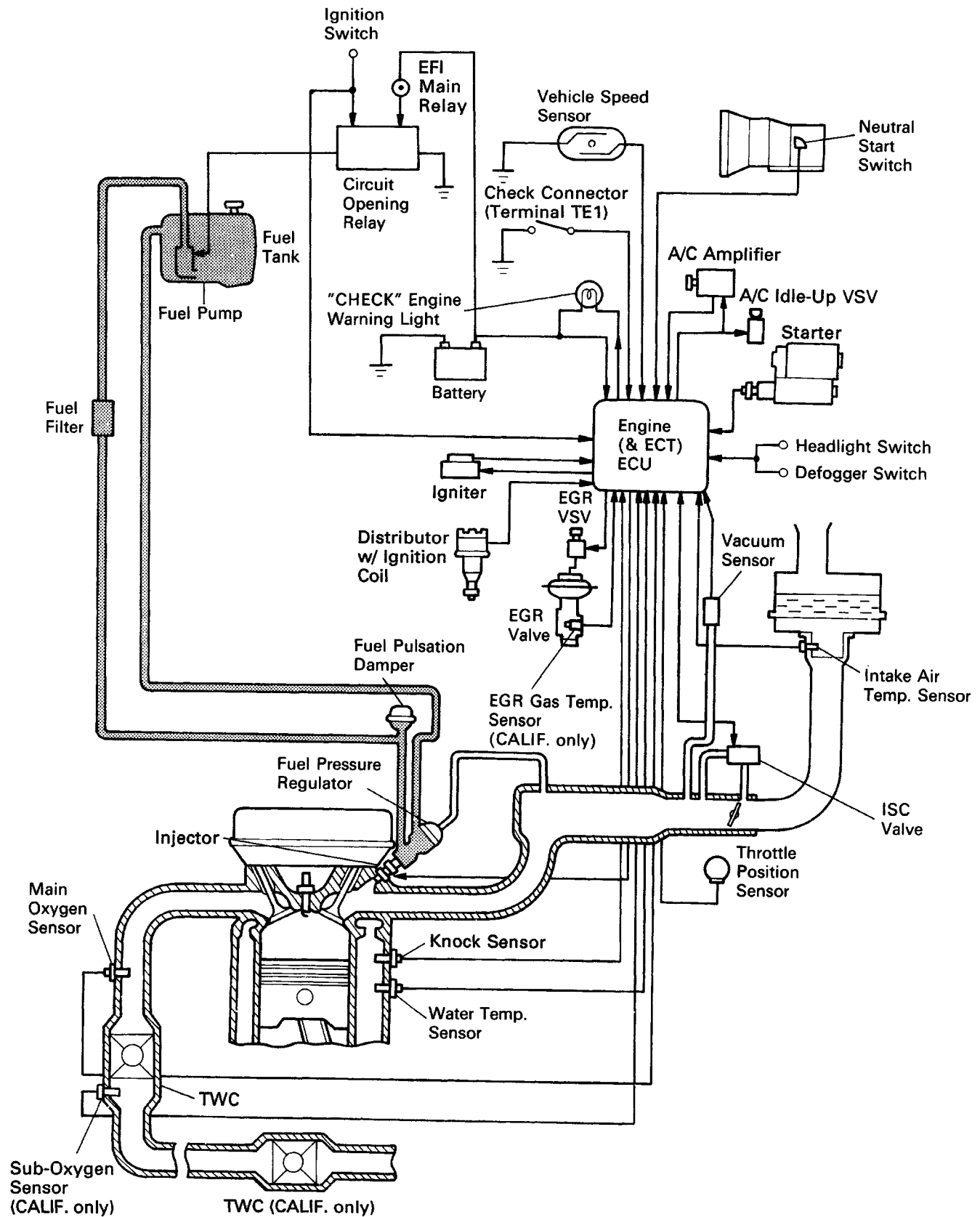
4A-FE



3S-GTE



5S-FE



The EFI system is composed of three basic sub-systems: Fuel, Air Induction and Electronic Control Systems.

FUEL SYSTEM

Fuel is supplied under constant pressure to the EFI injectors by an electric fuel pump. The injectors inject a metered quantity of fuel into the intake port in accordance with signals from the ECU (Electronic Control Unit).

AIR INDUCTION SYSTEM

The air induction system provides sufficient air for engine operation.

ELECTRONIC CONTROL SYSTEM

The CELICA 4A-FE, 3S-GTE and 5S-FE engines are equipped with a TOYOTA Computer Controlled System (TCCS) which centrally controls the EFI, ESA, ISC, diagnosis systems etc. by means of an Electronic Control Unit (ECU—formerly EFI computer) employing a microcomputer.

The ECU controls the following functions:

1. Electronic Fuel Injection (EFI)

The ECU receives signals from various sensors indicating changing engine operation conditions such as:

Intake manifold pressure (4A-FE and 5S-FE)

Intake air volume (3S-GTE)

Intake air temperature

Coolant temperature

Engine rpm

Throttle valve opening angle

Exhaust oxygen content etc.

The signals are utilized by the ECU to determine the injection duration necessary for an optimum airfuel ratio.

2. Electronic Spark Advance (ESA)

The ECU is programmed with data for optimum ignition timing under any and all operating conditions. Using data provided by sensors which monitor various engine functions (rpm, coolant temperature, etc.), the microcomputer (ECU) triggers the spark at the precisely right instant. (See IG section)

3. Idle Speed Control (ISC)

The ECU is programmed with target idling speed values to respond to different engine conditions (coolant temperature, air conditioner ON/OFF (3S-GTE and 5S-FE), etc.). Sensors transmit signals to the ECU which controls the flow of air through the by-pass of the throttle valve and adjust idle speed to the target value.

4. Diagnosis

The ECU detects any malfunctions and abnormalities in the sensor network and lights a "CHECK" engine warning light on the combination meter. At the same time, the trouble is identified and a diagnostic code is recorded by the ECU. The diagnostic code can be read by the number of blinks of the "CHECK" engine warning light when terminals TE1 and E1 are connected. The diagnostic codes are referred to the later page. (See page [FI-31](#), 44 or 50)

5. Fail-Safe Function

In the event of the sensor malfunctioning, a back-up circuit will take over to provide minimal driveability, and the "CHECK" engine warning light will illuminate.

PRECAUTIONS

1. Before working on the fuel system, disconnect the cable from negative (–) terminal of the battery.

HINT: Any diagnostic code retained by the computer will be erased when the battery terminal is removed.

Therefore, if necessary, read the diagnosis before removing the battery terminal.

2. Do not smoke or work near an open flame when working on the fuel system.

3. Keep gasoline away from rubber or leather parts.

INSPECTION PRECAUTIONS

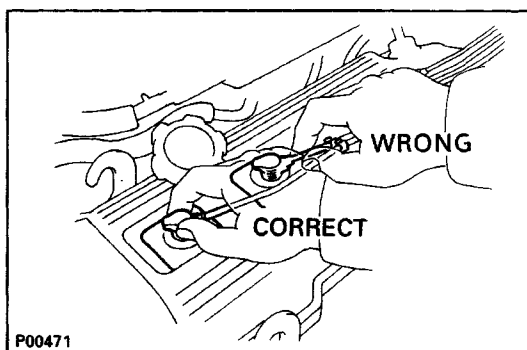
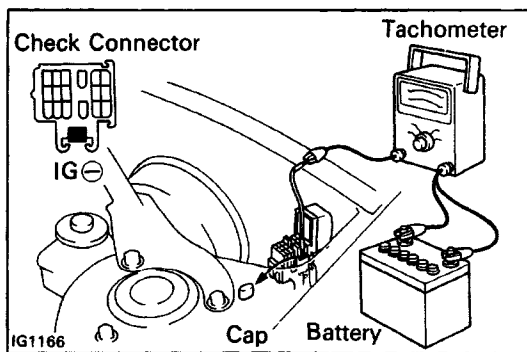
MAINTENANCE PRECAUTIONS

1. CHECK CORRECT ENGINE TUNE-UP

(See page EM-12)

2. PRECAUTIONS WHEN CONNECTING GAUGE

- (a) Use the battery as the power source for the timing light, tachometer, etc.
- (b) Connect the tester probe of a tachometer to the terminal IGO of the check connector.



3. IN EVENT OF ENGINE MISFIRE, FOLLOWING PRECAUTIONS SHOULD BE TAKEN

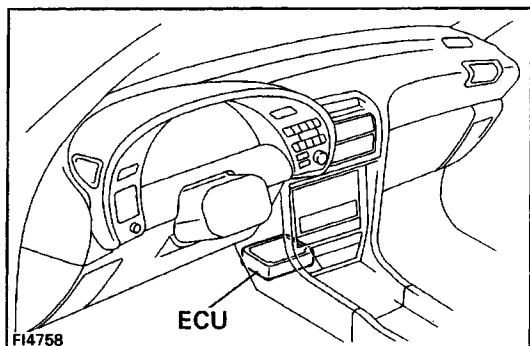
- (a) Check proper connection of battery terminals, etc.
- (b) Handle high-tension cords carefully.
- (c) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
- (d) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

4. PRECAUTIONS WHEN HANDLING OXYGEN SENSOR

- (a) Do not allow oxygen sensor to drop or hit against an object.
- (b) Do not allow the sensor to come into contact with water.

IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

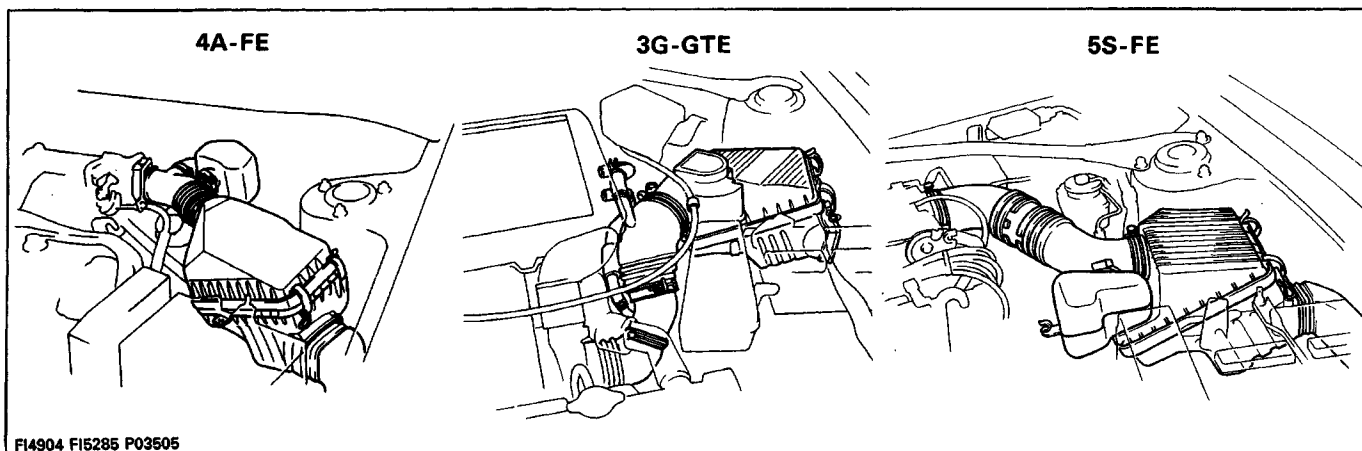
The ECU has been designed so that it will not be affected by outside interference. However, if your vehicle is equipped with a CB radio transceiver, etc. (even one with about 10 W output), it may, at times, have an effect upon ECU operation, especially if the antenna and feeder are installed nearby. Therefore, observe the following precautions:

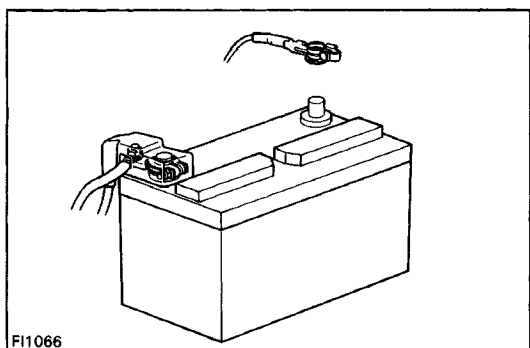


1. Install the antenna as far away as possible from the ECU.
The ECU is located under the radio so the antenna should be installed at the rear side of the vehicle.
2. Keep the antenna feeder as far away as possible from the ECU wires—at least 20 cm (7.87 in.)—and, especially, do not wind them together.
3. Check that the feeder and antenna are properly adjusted.
4. Do not equip your vehicle with a powerful mobile radio system.
5. Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

AIR INDUCTION SYSTEM

1. Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.
2. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause air suction and cause the engine to run out of tune.



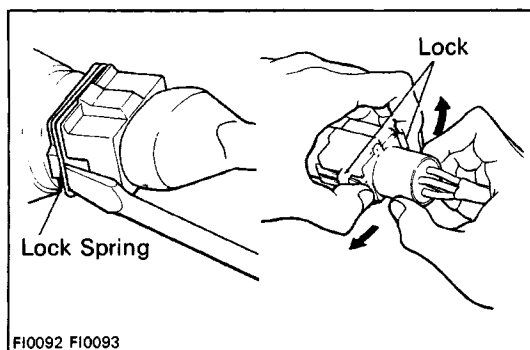


ELECTRONIC CONTROL SYSTEM

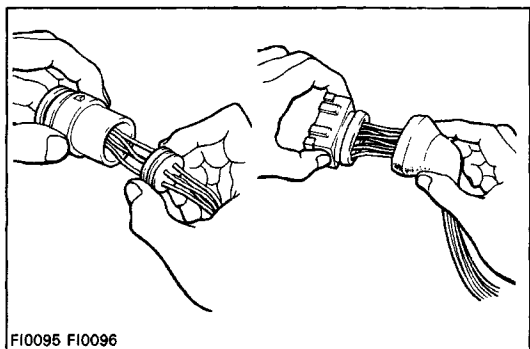
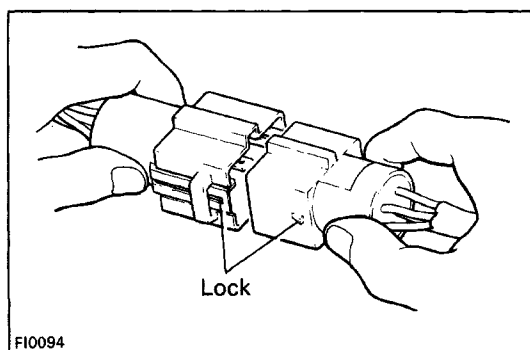
1. Before removing EFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the battery terminals.

HINT: Always check the diagnostic code before disconnecting the battery terminals.

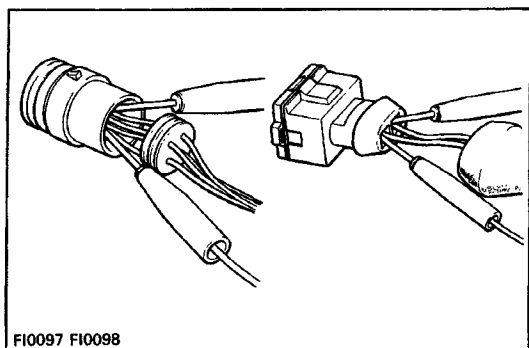
2. When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.
3. Do not permit parts to receive a severe impact during removal or installation. Handle all EFI parts carefully, especially the ECU.
4. Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can cause further troubles.
5. Do not open the ECU cover.
6. When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the EFI parts and wiring connectors.
7. Parts should be replaced as an assembly.
8. Care is required when pulling out and inserting wiring connectors.
 - (a) Release the lock and pull out the connector, pulling on the connectors.



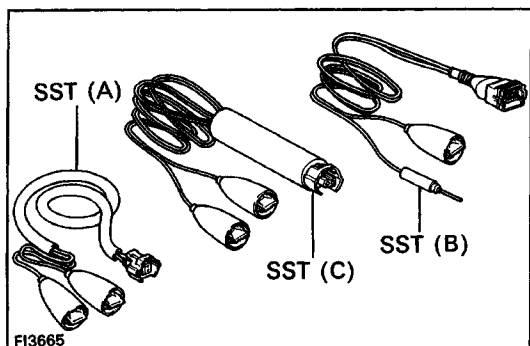
- (b) Fully insert the connector and check that it is locked.



9. When inspecting a connector with a volt/ohmmeter.
 - (a) Carefully take out the water-proofing rubber if it is a water-proof type connector.

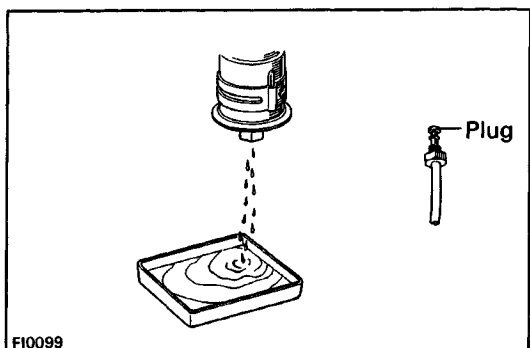


- (b) Insert the tester probe into the connector from wiring side when checking the continuity, amperage or voltage.
- (c) Do not apply unnecessary force to the terminal.
- (d) After checking, install the water-proofing rubber on the connector securely.



10. Use SST for inspection or test of the injector, cold start injector or its wiring connector.

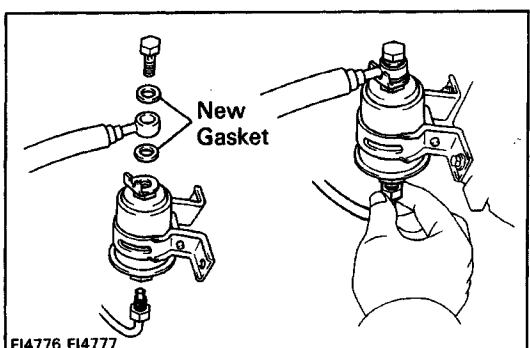
SST 09842-30070 (A) for 4A-FE and 5S-FE
 09842-30050 (B) and 09842-30060 (C)
 for 3S-GTE



FUEL SYSTEM

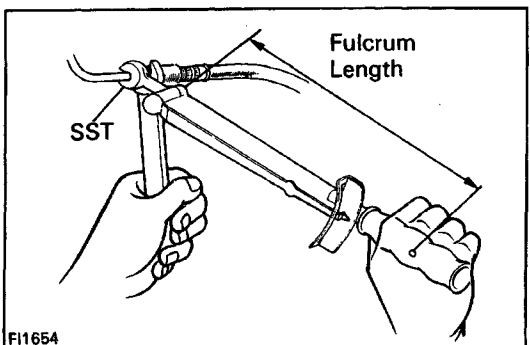
1. When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following procedures:

- (a) Put a container under the connection.
- (b) Slowly loosen the connection.
- (c) Disconnect the connection.
- (d) Plug the connection with a rubber plug.



2. When connecting the flare nut or union bolt on the high pressure pipe union, observe the following procedures:
 (Union Bolt Type)

- (a) Always use a new gasket.
- (b) Tighten the union bolt by hand.
- (c) Tighten the union bolt to the specified torque.
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)



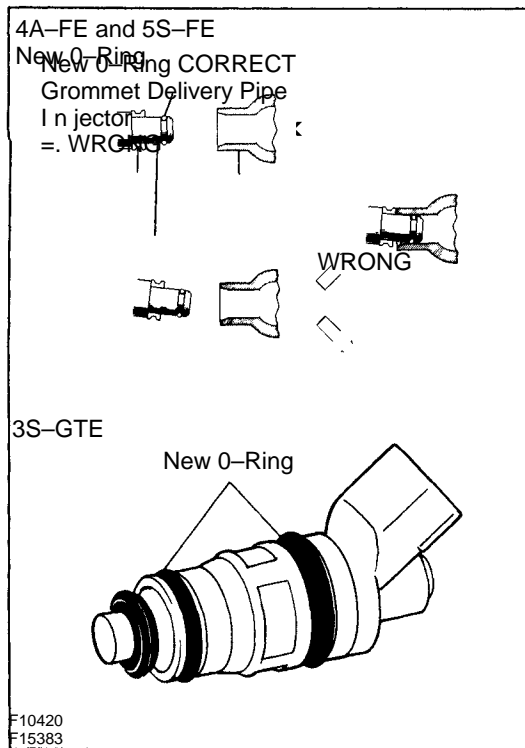
(Flare Nut Type)

- (a) Apply a light coat of engine oil to the flare nut and tighten the flare nut by hand.
- (b) Using SST, tighten the flare nut to the specified torque.

SST 09631-22020

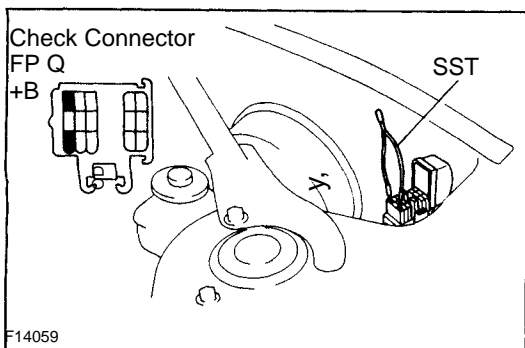
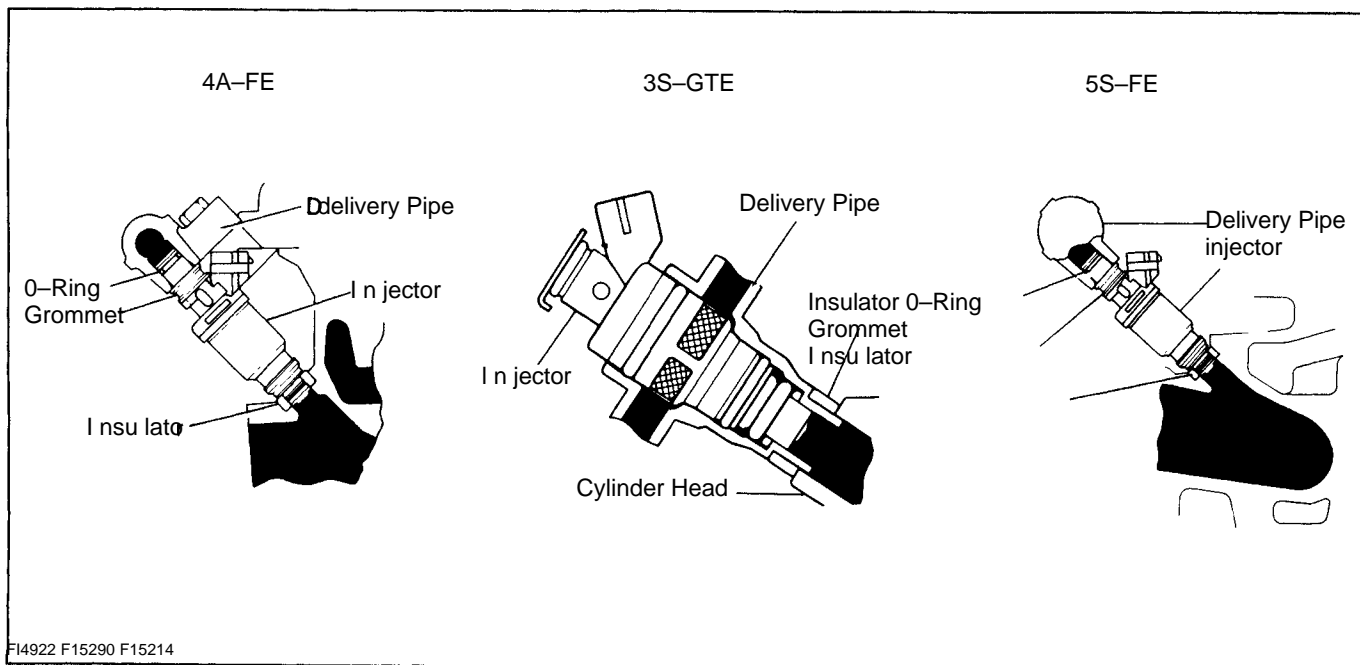
Torque: 30 N-m (310 kgf-cm, 22 ft-lbf)

HINT: Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

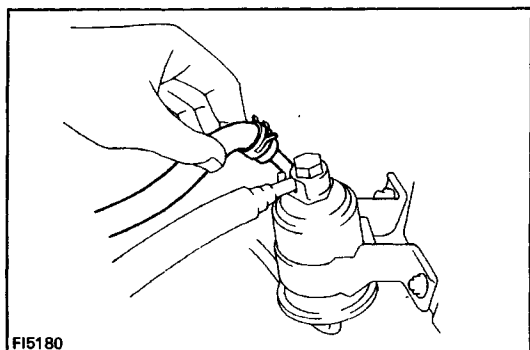


3. Observe the following precautions when removing and installing the injectors.
- Never reuse the O-ring.
 - When placing a new O-ring on the injector, take care not to damage it in any way.
 - Coat a new O-ring with spindle oil or gasoline before installing – never use engine, gear or brake oil.

4. Install the injector to delivery pipe and cylinder head as shown in the illustration.

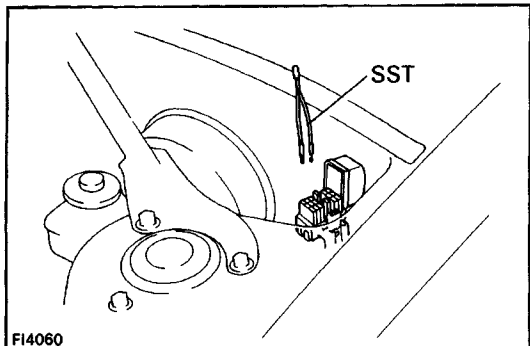


5. Check that there are no fuel leaks after performing any maintenance on the fuel system.
- Using SST, connect terminals +B and FP of the check connector.
SST 09843-18020
 - With engine stopped, turn the ignition switch ON.



- (c) When the fuel return hose is pinched, the pressure within high pressure line will rise to approx. 392 kPa (4 kg/cm², 57 psi). In this state, check to see that there are no leaks from any part of the fuel system.

NOTICE: Always pinch the hose. Avoid bending as it may cause the hose to crack.



- (d) Turn the ignition switch OFF.

- (e). Remove the SST.

SST 09843-18020

TROUBLESHOOTING

TROUBLESHOOTING HINTS

1. Engine troubles are usually not caused by the EFI system.
When troubleshooting, always first check the condition of the other systems.

(a) Electronic source

- Battery
- Fusible links
- Fuses

(b) Body ground

(c) Fuel supply

- Fuel leakage
- Fuel filter
- Fuel pump

(d) Ignition system

- Spark plugs
- High-tension cords
- Distributor
- Ignition coil
- Igniter

(e) Air induction system

- Vacuum leaks

(f) Emission control system

- PCV system
- EGR system

(g) Others

- Ignition timing (ESA system)
- Idle speed (ISC system)
- etc.

2. The most frequent cause of problems is simply a bad contact in wiring connectors. Always check that connections are secure.

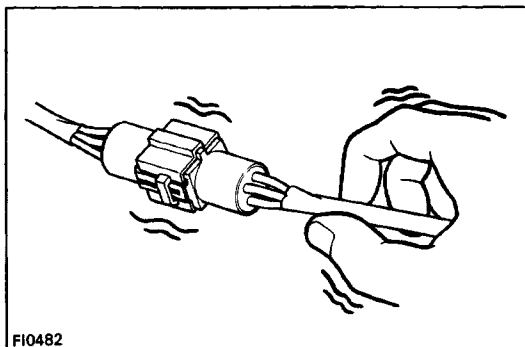
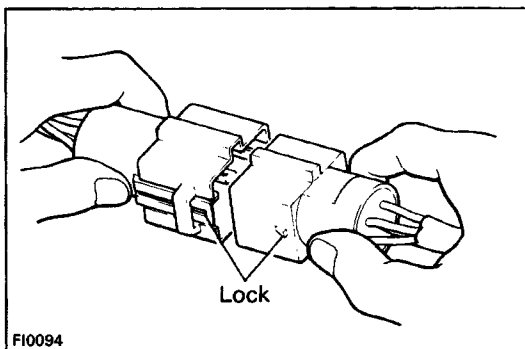
When inspecting the connector, pay particular attention to the following points:

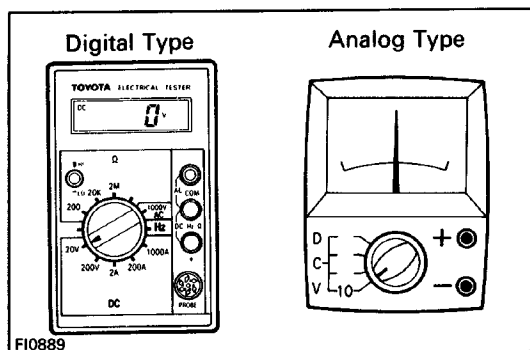
(a) Check to see that the terminals are not bent.

(b) Check to see that the connector is pushed in completely and locked.

(c) Check to see that there is no signal change when the connector is slightly tapped or wiggled.

3. Troubleshoot sufficiently for other causes before replacing the ECU, as the ECU is of high quality and it is expensive.

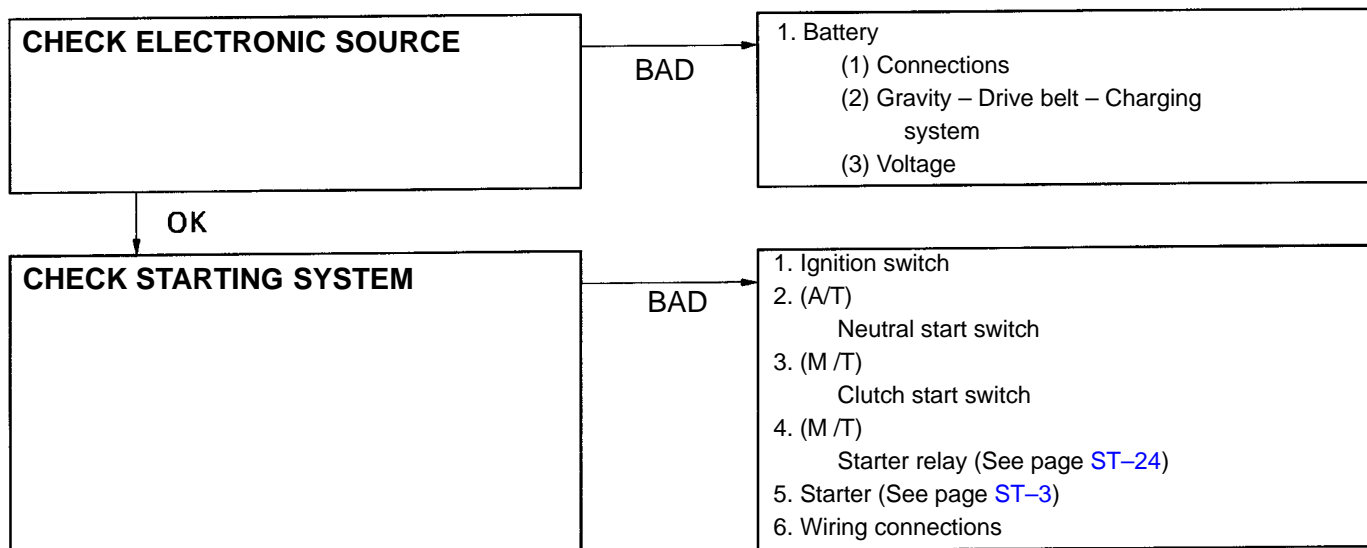




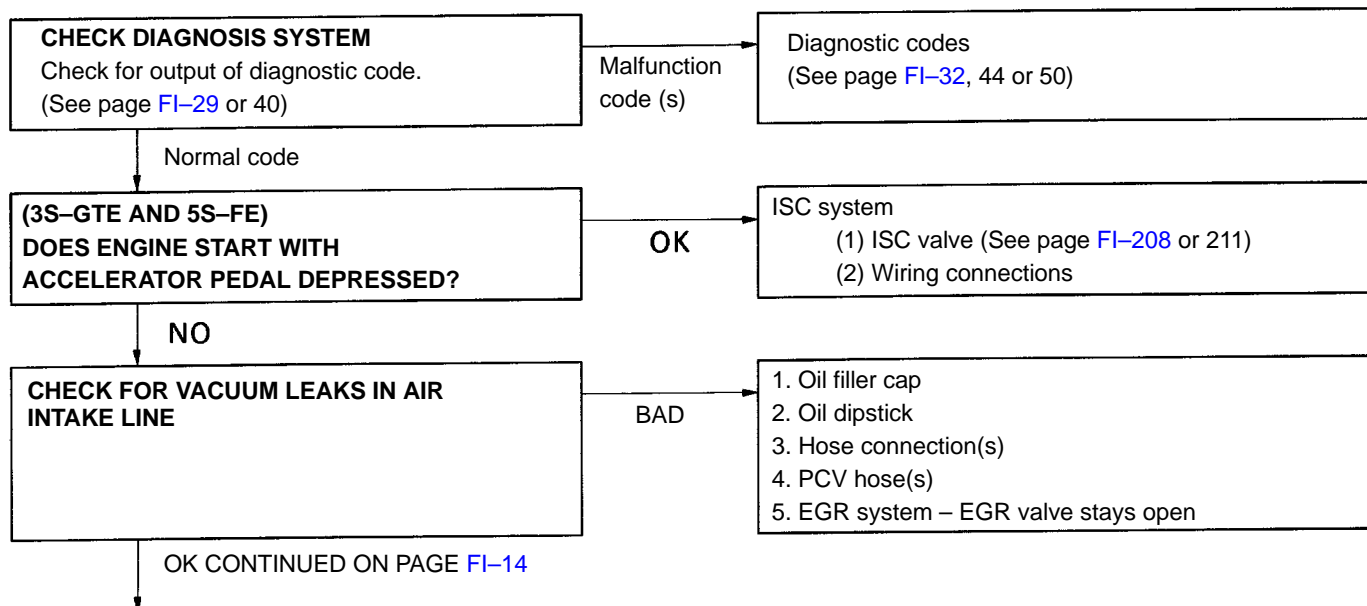
4. Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting of the electrical circuit. (See page [FI-58](#))

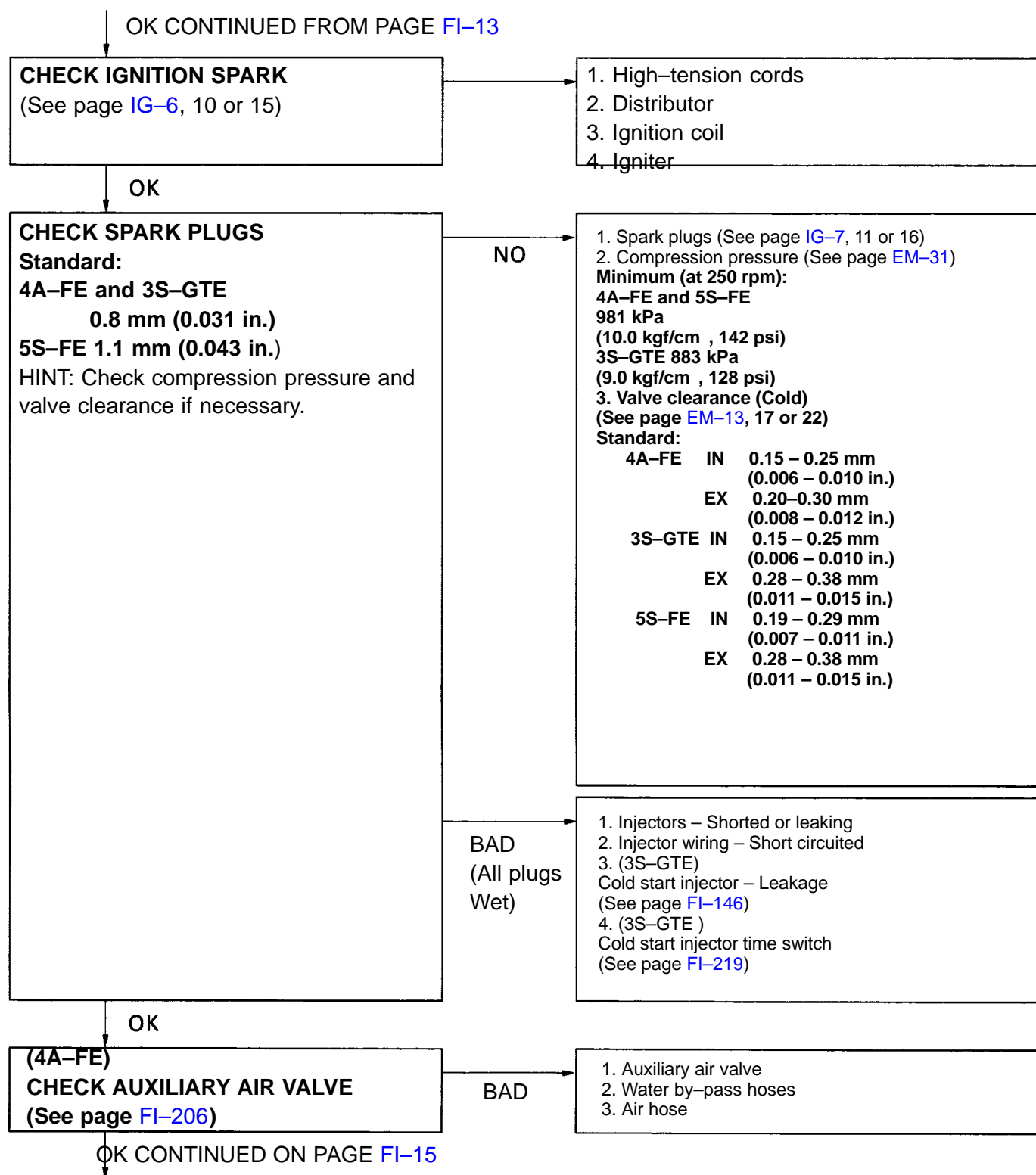
TROUBLESHOOTING PROCEDURES

SYMPTOM – DIFFICULT TO START OR NO START (ENGINE WILL NOT CRANK OR CRANKS SLOWLY)



SYMPTOM – DIFFICULT TO START OR NO START (CRANKS OK)





OK CONTINUED FROM PAGE FI-14

CHECK FUEL SUPPLY TO INJECTOR

1. Fuel in tank
2. Fuel pressure in fuel line
 - (1) Connect terminals + B and FP of check connector.
 - (2) Fuel pressure at fuel hose of fuel filter can be felt. (See page FI-125 or 136)

BAD

1. Fuel line – Leakage – Deformation
2. Fuses
3. Circuit opening relay
(See page FI-217 or 218)
4. Fuel pump (See page FI-124 or 135)
5. Fuel filter
6. Fuel pressure regulator
(See page FI-149, 151 or 153)

OK

CHECK IGNITION TIMING

1. Connect terminals TE1 and E1 of check connector.
2. Check ignition timing.
Standard: 10° BTDC @ idle

BAD

Ignition timing – Adjust
(See page IG-25, 29 or 37)

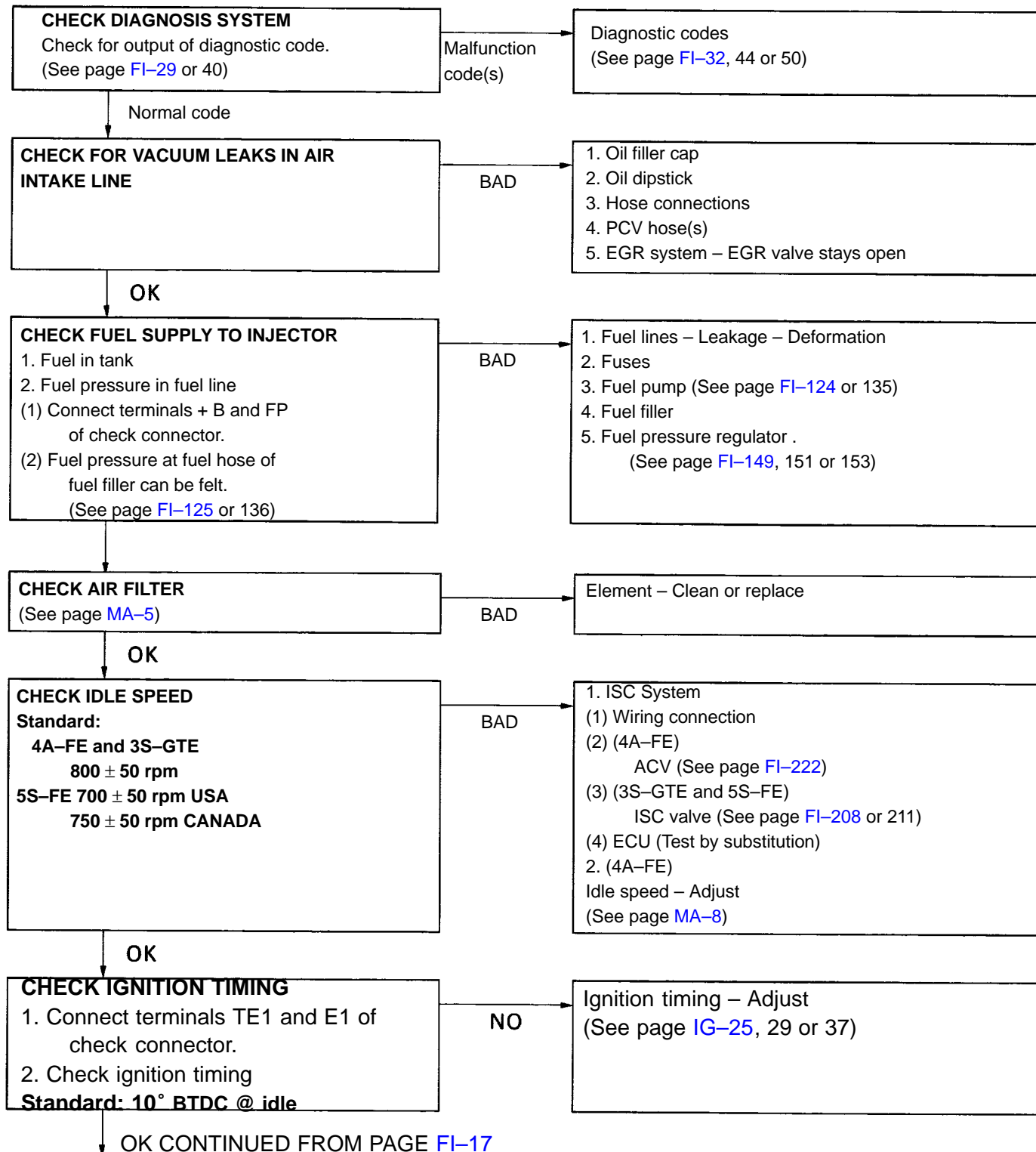
OK

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER (See page FI-58)

BAD

1. Wiring connections
2. Power to ECU
 - (1) Fusible links
 - (2) Fuses
 - (3) EFI main relay
(See page FI-216)
3. (4A-FE and 5S-FE)
Vacuum sensor (See page FI-233 or 234)
4. (3S-GTE)
Air flow meter (See page FI-183)
5. Water temp. sensor (See page FI-231)
6. Intake air temp. sensor
(See page FI-183 or 232)
- 7 Injection signal circuit
 - (1) Injector wiring
 - (2) (3S-GTE)
Solenoid resistor
(See page FI-220)
 - (3) ECU (See page FI-240)

SYMPTOM – ENGINE OFTEN STALLS



OK CONTINUED ON PAGE FI-16

CHECK SPARK PLUG**Standard:****4A-FE and 3S-GTE****0.8 mm (0.031 in.)****5S-FE 1.1 mm (0.043 in.)**

HINT: Check compression pressure and valve clearance if necessary.

NO

1. Spark plugs (See page IG-7, 11 or 16)
2. Compression pressure (See page EM-31)
Minimum (at 250 rpm):
4A-FE and 5S-FE
981 kPa
(10.0 kgf/cm², 142 psi)
3S-GTE 883 kPa
(9.0 kgf/cm², 128 psi)
3. Valve clearance (Cold)
 (See page EM-13, 17 or 22)
Standard:

4A-FE	IN	0.15 – 0.25 mm (0.006 – 0.010 in.)
	EX	0.20–0.30 mm (0.008 – 0.012 in.)
3S-GTE	IN	0.15 – 0.25 mm (0.006 – 0.010 in.)
	EX	0.28–0.38 mm (0.011 – 0.015 in.)
5S-FE	IN	0.19–0.29 (0.007 – 0.011 in.)
	EX	0.28–0.38 mm (0.011 – 0.015 in.)

OK

PS-GTE)**CHECK COLD START INJECTOR**

(See page FI-146)

BAD

1. Cold start injector
(See page FI-146)
2. Cold start injector time switch
(See page FI-219)

OK CONTINUED FROM PAGE FI-16

CHECK FUEL PRESSURE

(See page FI-125, 128 or 136)

BAD

1. Fuel pump (See page FI-124 or 135)
2. Fuel filter
3. Fuel pressure regulator
(See page FI-149, 151 or 153)

OK

CHECK INJECTORS

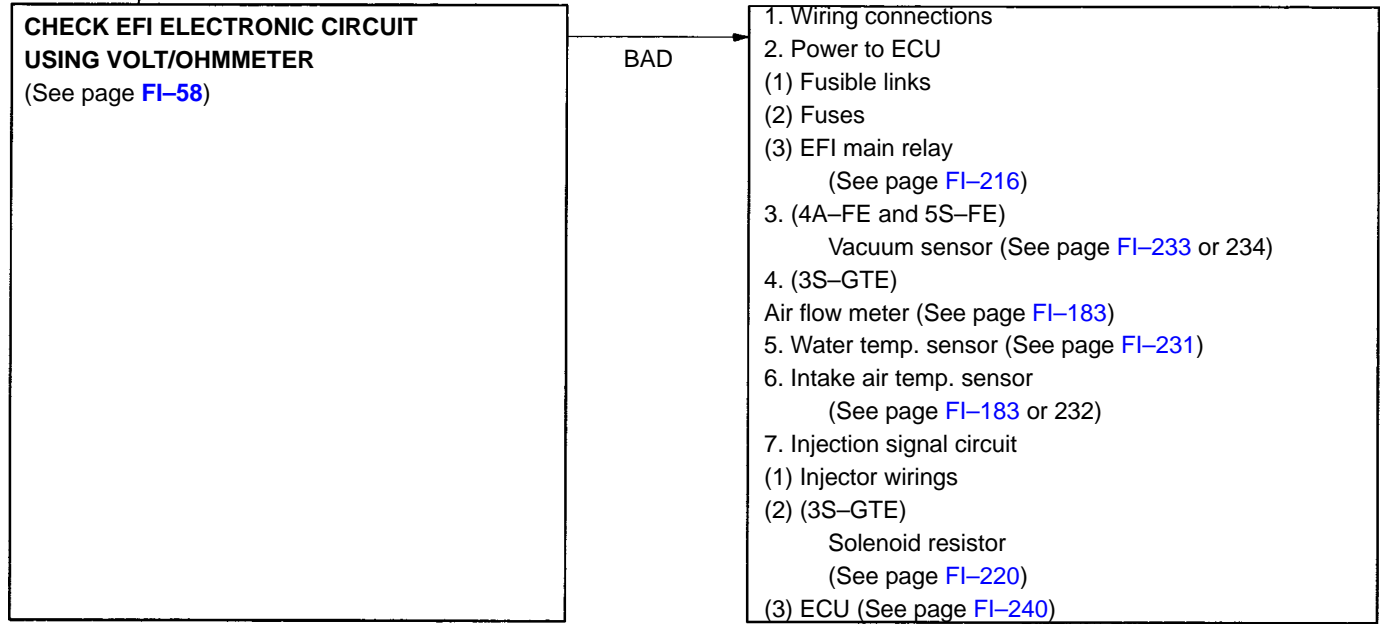
(See page FI-155, 160 or 169)

BAD

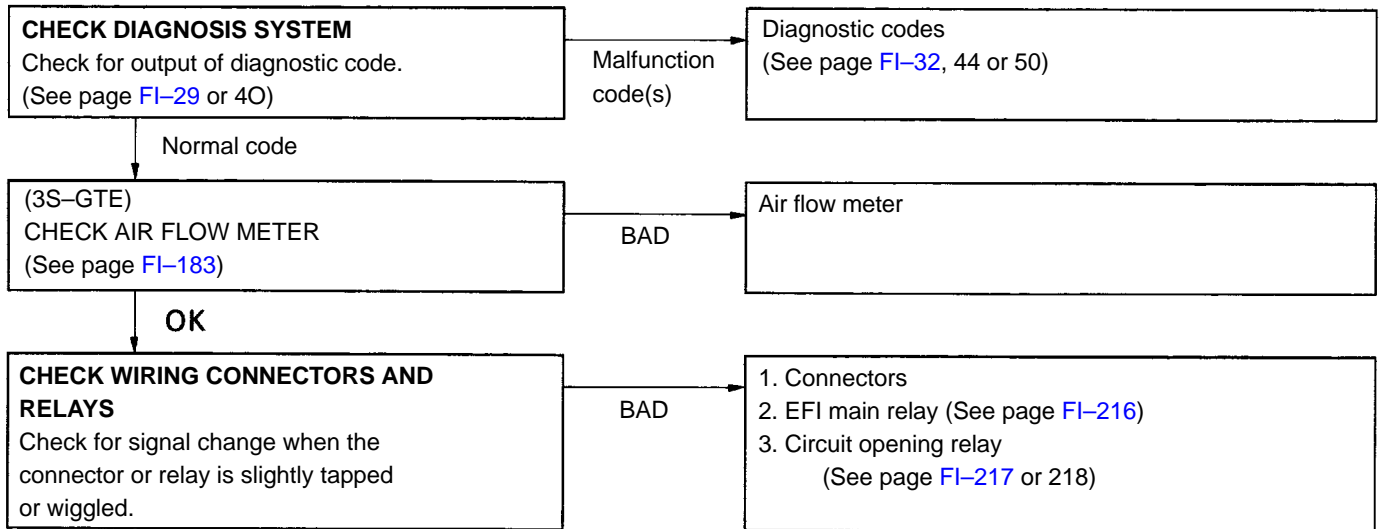
Injection condition

OK CONTINUED ON PAGE FI-18

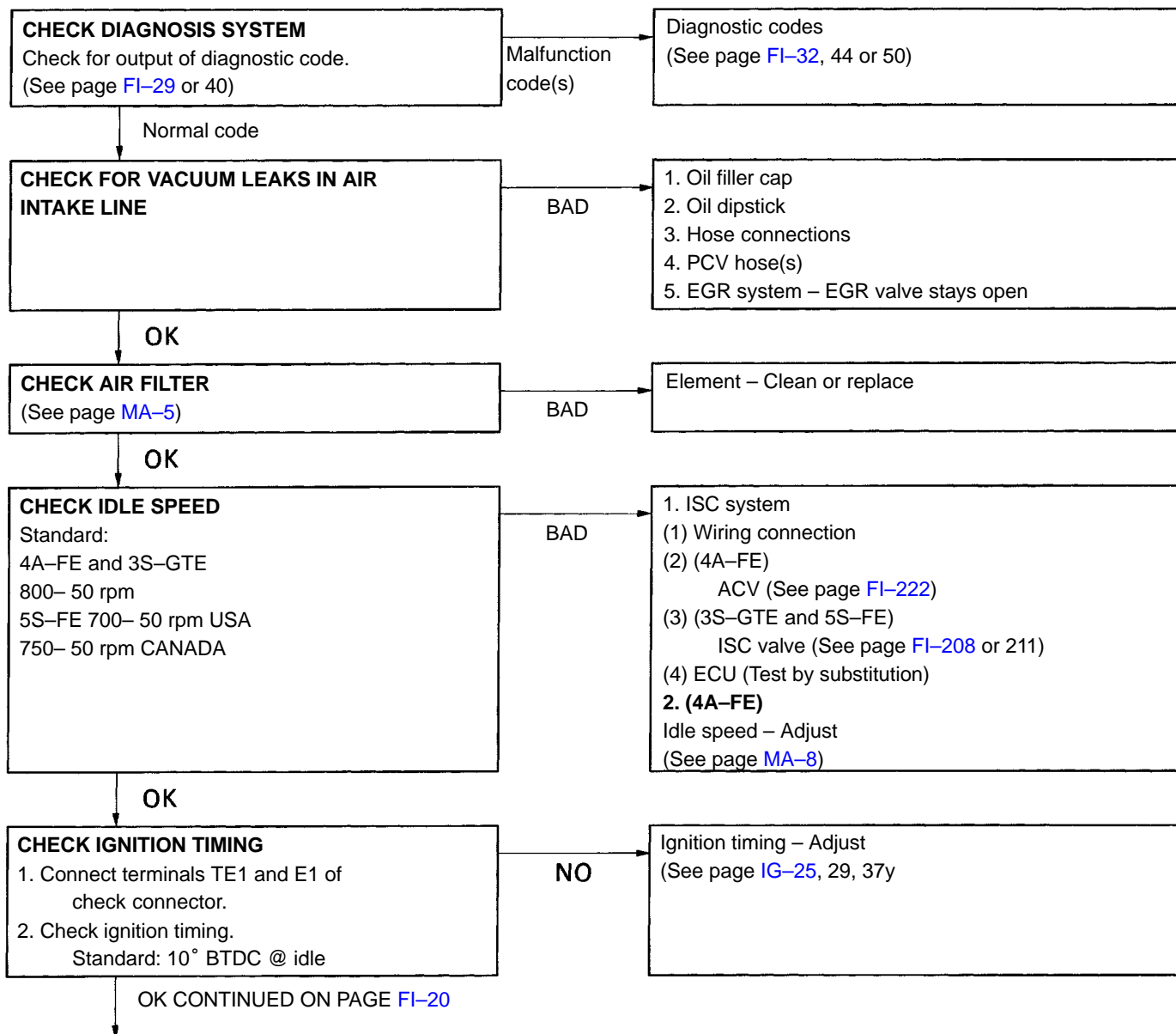
OK CONTINUED FROM PAGE [FI-17](#)



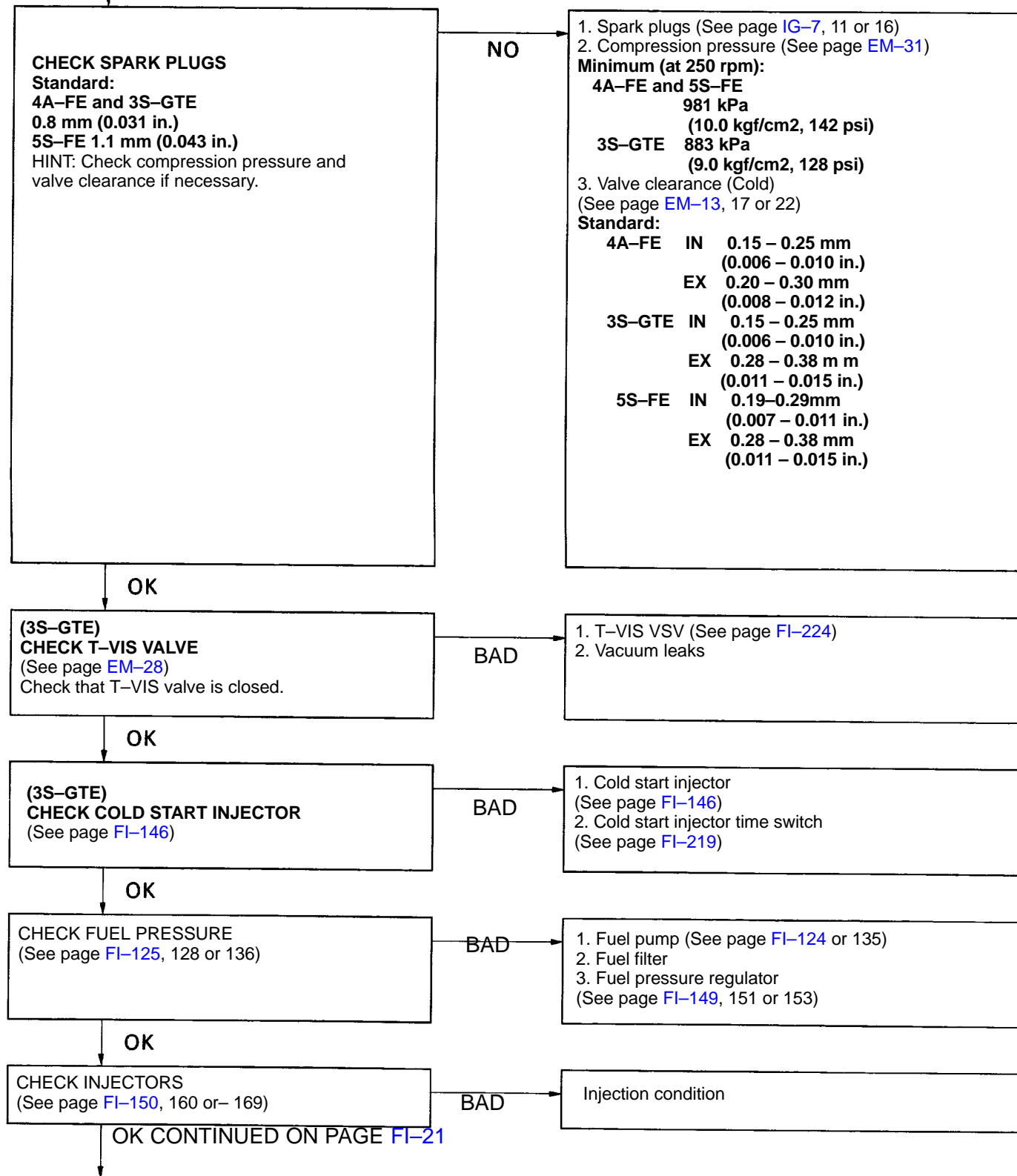
SYMPTOM – ENGINE SOMETIMES STALLS



SYMPTOM – ROUGH IDLING AND/OR MISSING



OK CONTINUED FROM PAGE FI-19



OK CONTINUED FROM PAGE [FI-20](#)

**CHECK EFI ELECTRONIC CIRCUIT
USING VOLT/OHMMETER**

(See page [FI-58](#))

BAD

1. Wiring connections
2. Power to ECU
 - (1) Fusible links
 - (2) Fuses
 - (3) ER main relay (See page [FI-216](#))
3. (4A-FE and 5S-FE)
Vacuum sensor (See page [FI-232](#) or 233)
4. (3S-GTE)
Air flow meter (See page [FI-183](#))
5. Water temp. sensor (See page [FI-231](#))
6. Intake air temp. sensor
(See page [FI-183](#) or 232)
7. Injection signal circuit
 - (1) Injector wirings
 - (2) ECU (See page [FI-240](#))
8. Oxygen sensor(s)
(See page [FI-237](#) or 239)

SYMPTOM – HIGH ENGINE SPEED (NO DROP)

HINT (5S-FE): Disconnecting the battery will cause the idling speed data in the ISC to be returned to the initial idling speed, causing the idling speed to rise above 700 rpm (5S-FE USA), 750 rpm (5S-FE CANADA). Should this happen, either carry out a driving test, including stop-go several times at a speed above 10 km/h, or start the engine, idle for 30 seconds and then turn the engine off repeatedly. By doing this, idle data will be stored in the ISC and the idle rpm will be at specified value.

CHECK ACCELERATOR LINKAGE

OK

BAD

Linkage – Stuck

**CHECK FOR VACUUM LEAKS IN AIR
INTAKE LINE**

BAD

1. Oil filler cap
2. Oil dipstick
3. Hose connections
4. PCV hose(s)
5. EGR system – EGR valve stays open

OK

**CHECK AIR CONDITIONER IDLE-UP
CIRCUIT**

BAD

VSV for air conditioner – Leakage

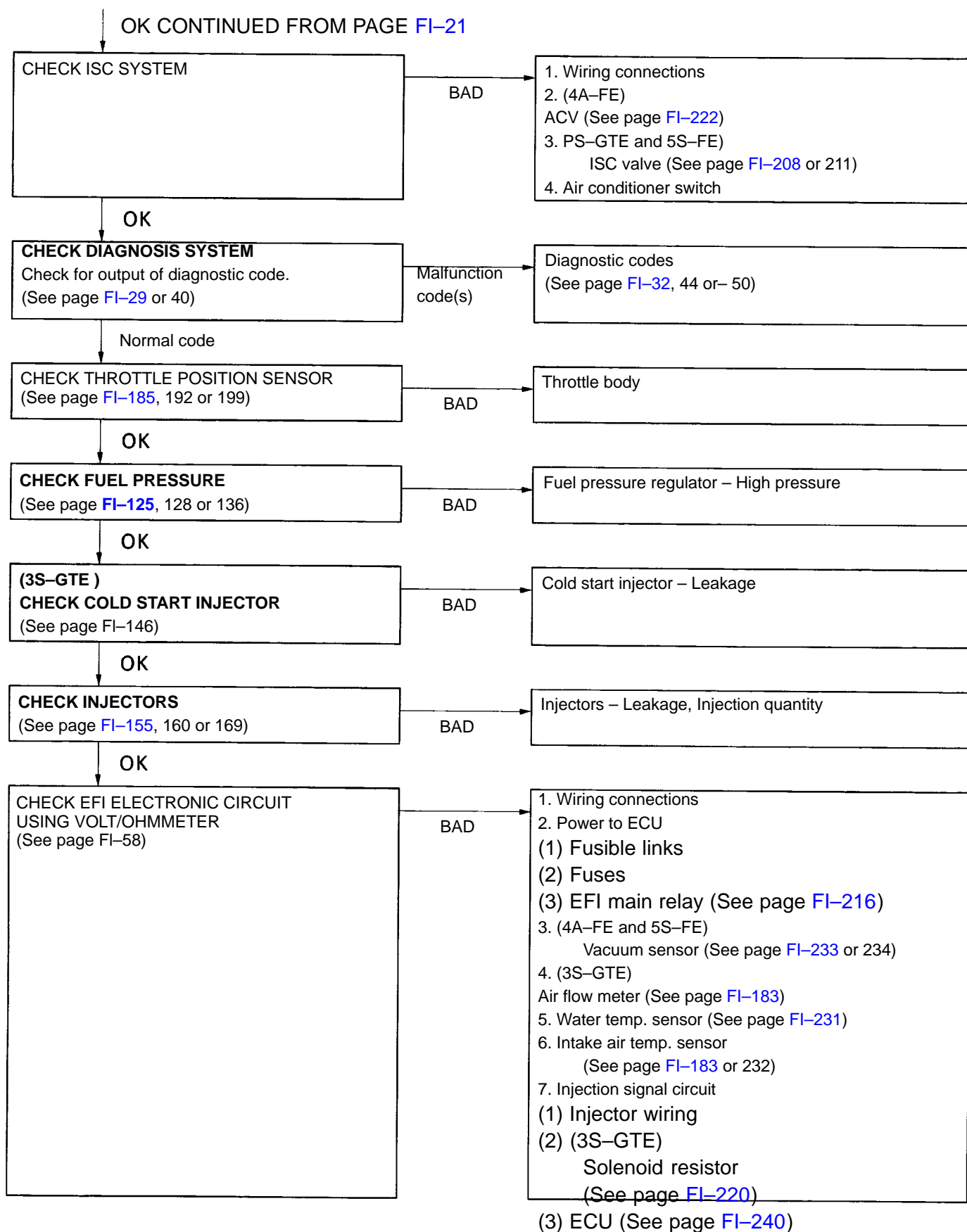
OK

**(4A-FE)
CHECK AUXILIARY AIR VALVE**
(See page [FI-206](#))

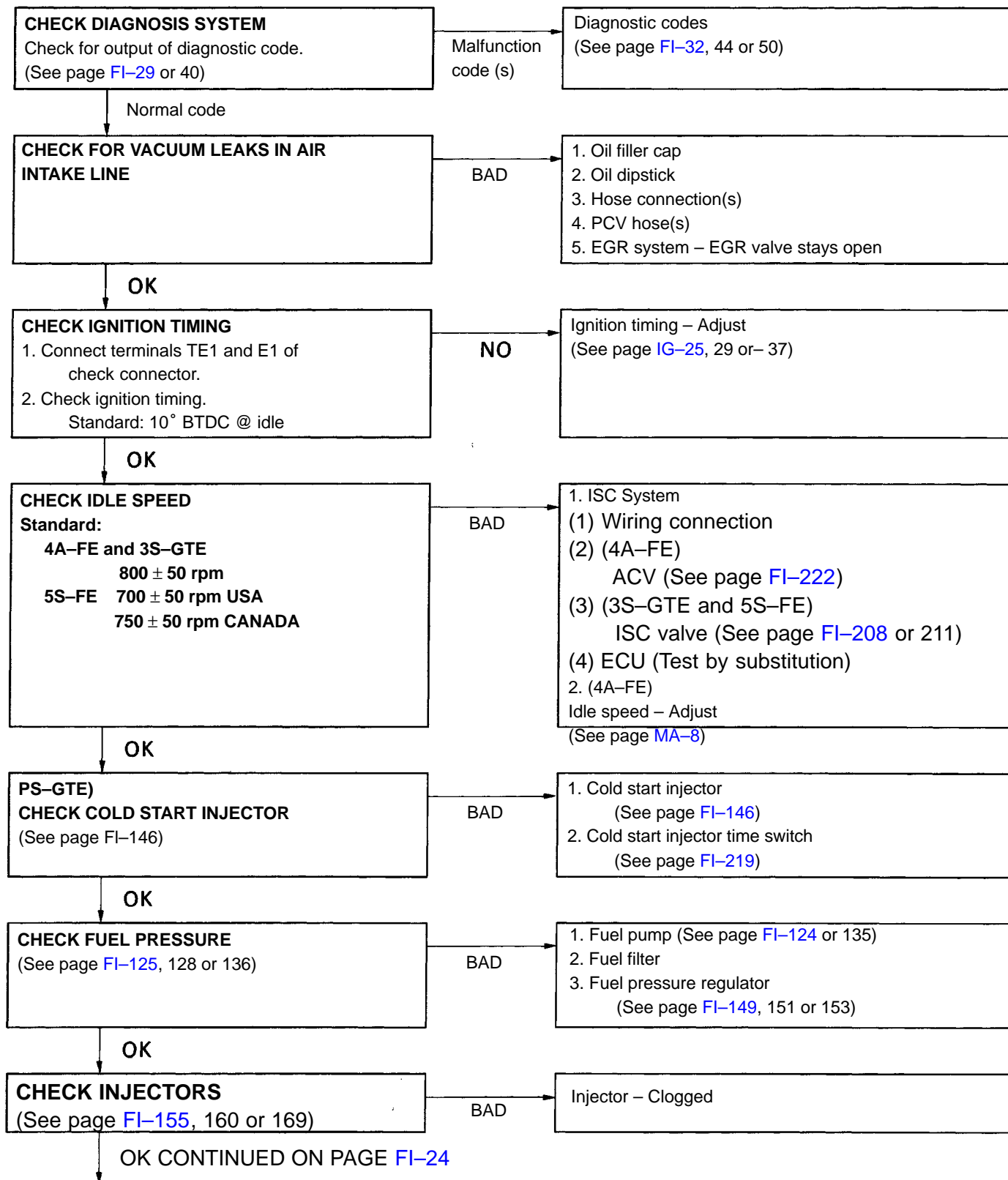
BAD

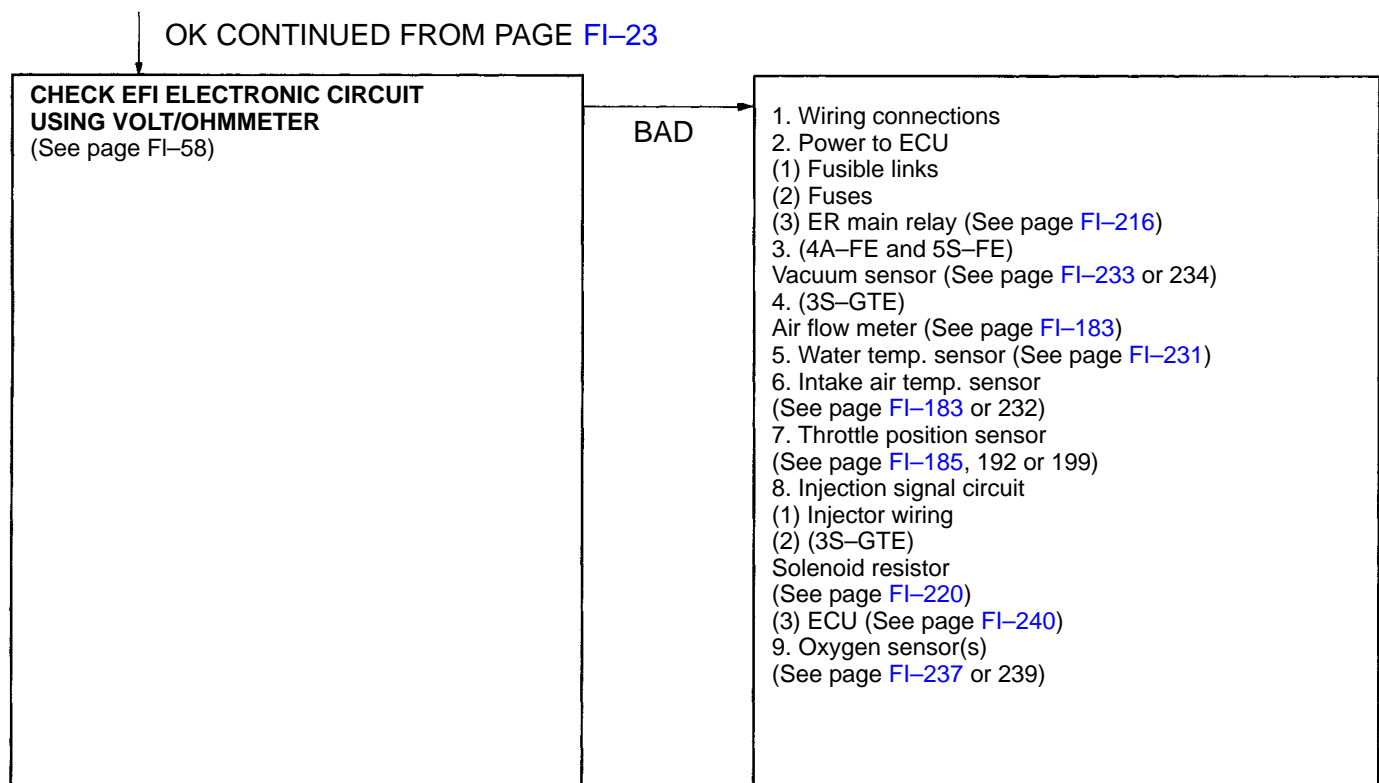
Auxiliary air valve – Always open

OK CONTINUED ON PAGE [FI-22](#)

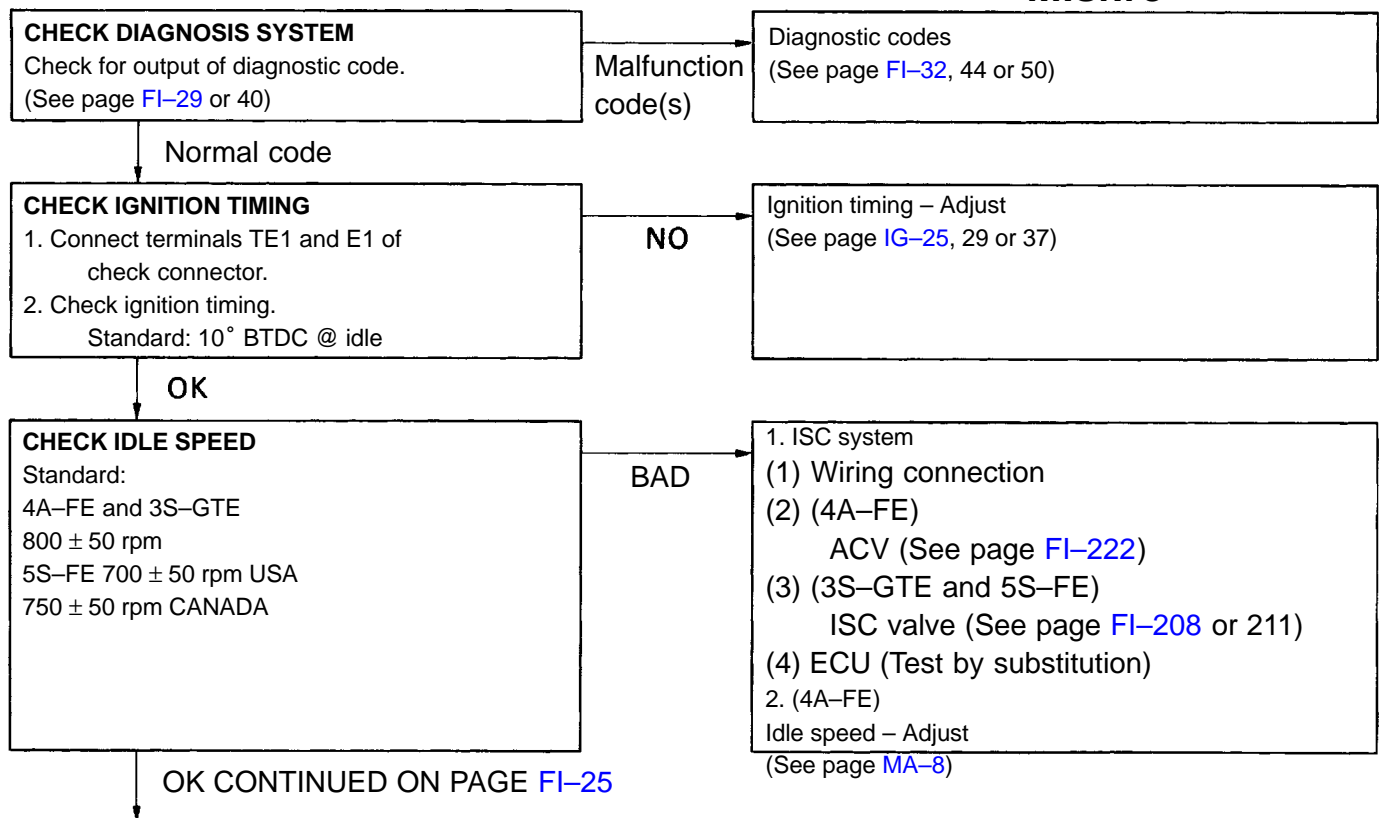


SYMPTOM – ENGINE BACKFIRES – Lean Fuel Mixture

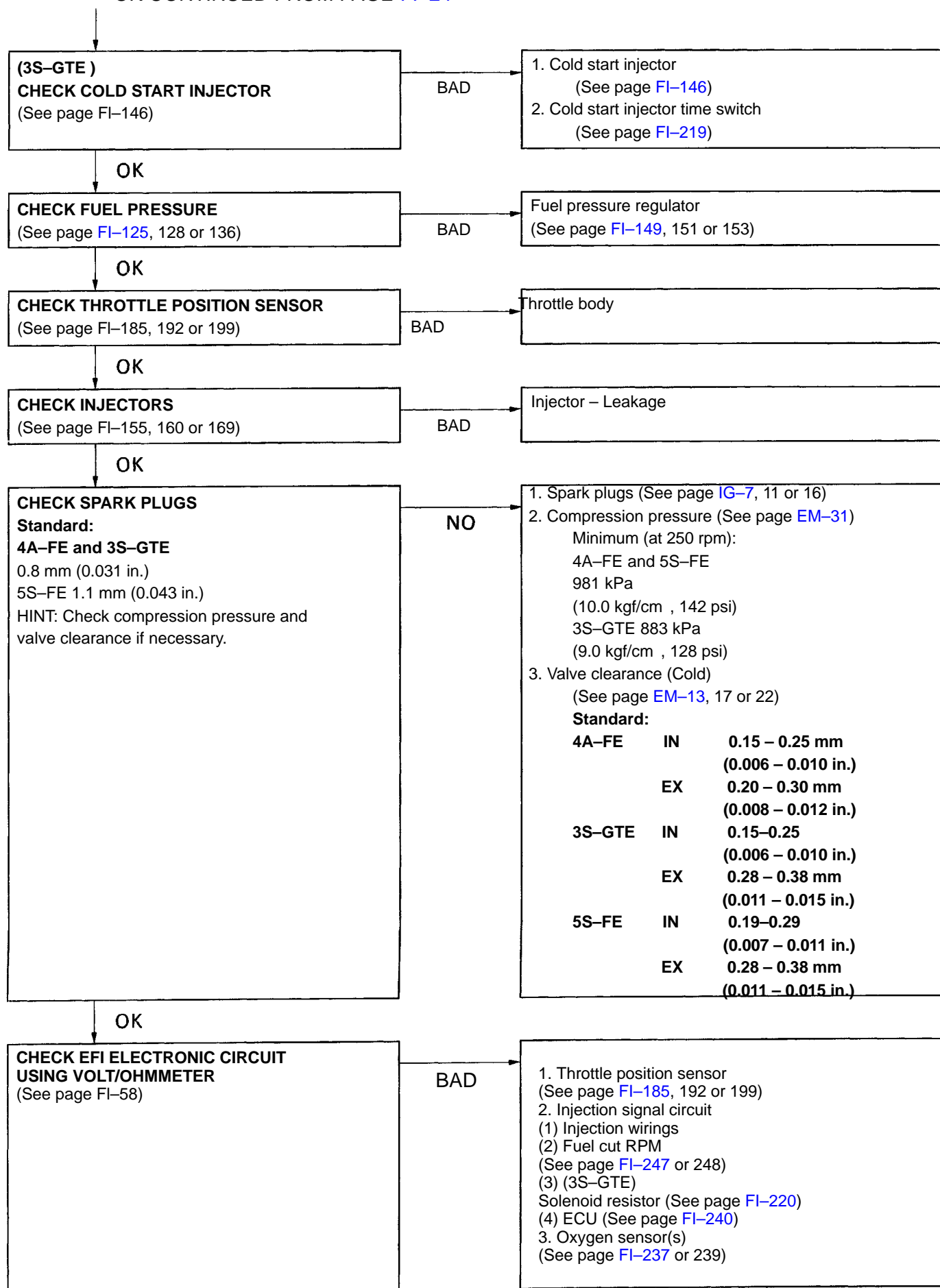




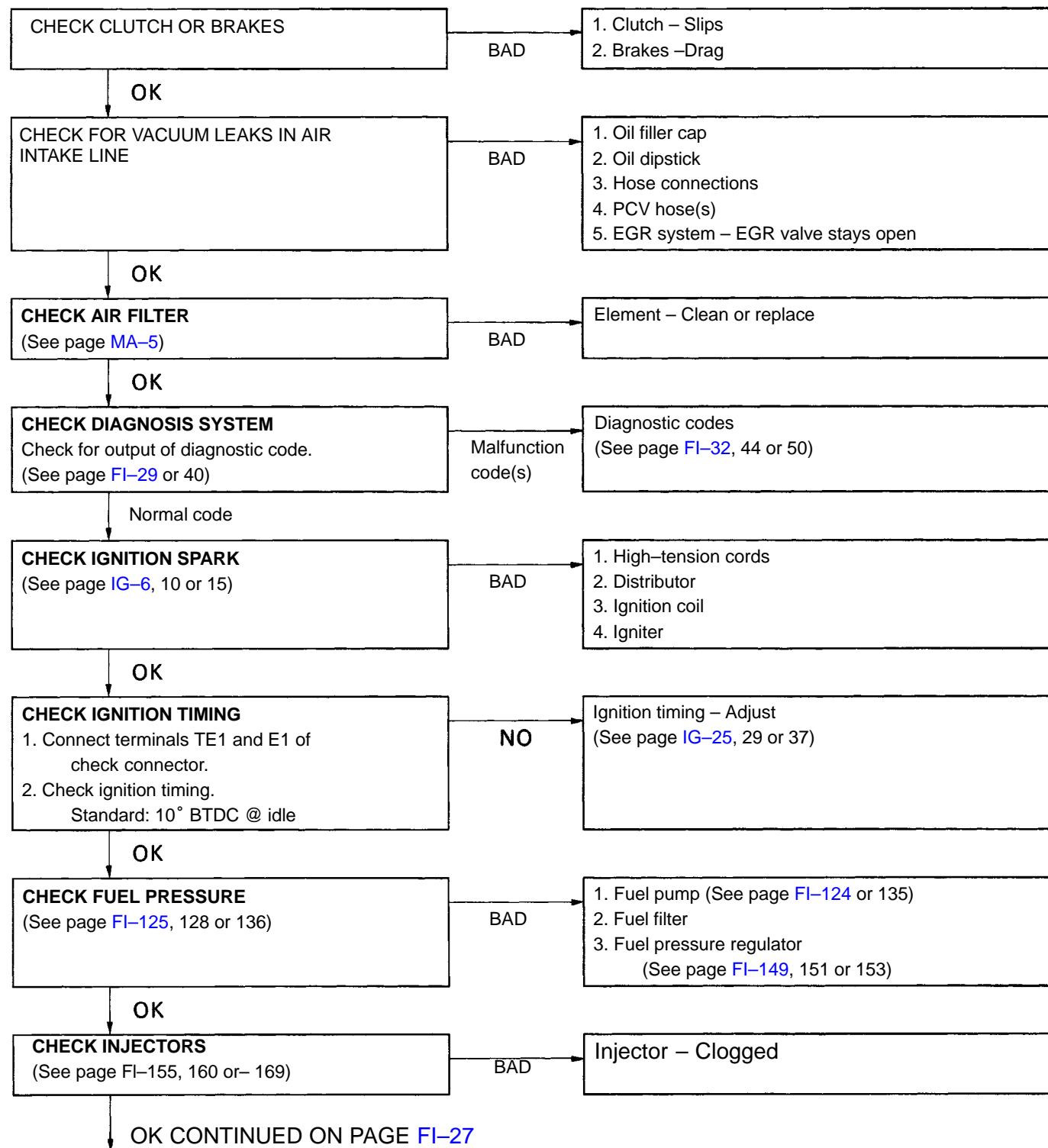
SYMPTOM – MUFFLER EXPLOSION (AFTER FIRE) – Rich Fuel Mixture Misfire



OK CONTINUED FROM PAGE FI-24



SYMPTOM – ENGINE HESITATES AND/OR POOR ACCELERATION



OK CONTINUED FROM PAGE FI-26

CHECK SPARK PLUGS**Standard:****4A-FE and 3S-GTE****0.8 mm (0.031 in.)****5S-FE 1.1 mm (0.043 in.)**

HINT: Check compression pressure and valve clearance if necessary.

NO

1. Spark plugs (See page [IG-7](#), 11 or 16)
2. Compression pressure (See page [EM-31](#))
Minimum (at 250 rpm):
4A-FE and 5S-FE
981 kPa
(10.0 kgf/cm², 142 psij)
3S-GTE 883 kPa
(9.0 kgf/cm², 128 psi)
3. Valve clearance (Cold)
 (See page [EM-13](#), 17 or 22)
Standard:

4A-FE	IN	0.15–0.25 mm (0.006 – 0.010 in.)
	EX	0.20–0.30 (0.008 – 0.012 in.)
3S-GTE	IN	0.15 – 0.25 mm (0.006 – 0.010 in.)
	EX	0.28 – 0.38 m m (0.011 – 0.015 in.)
5S-FE	IN	0.19 – 0.29 mm (0.007 – 0.011 in.)
	EX	0.28 – 0.38 mm (0.011 – 0.015 in.)

OK

(3S-GTE)**CHECK T-VIS VALVE**(See page [EM-28](#))

Check if air control valve is open with engine running at 4,200 rpm or above.

BAD

1. T-V I S VSV (See page [FI-224](#))
2. Vacuum leaks

OK

**CHECK EFI ELECTRONIC CIRCUIT
 USING VOLT/OHMMETER
 (See page FI-58)**

BAD

1. Wiring connections
2. Power to ECU
 - (1) Fusible links
 - (2) Fuses
 - (3) EFI main relay (See page [FI-216](#))
3. (4A-FE and 5S-FE)
 Vacuum sensor (See page [FI-233](#) or 234)
4. (3S-GTE)
 Air flow meter (See page [FI-183](#))
5. Water temp. sensor (See page [FI-231](#))
6. Intake air temp. sensor
 (See page [FI-183](#) or 232)
7. Throttle position sensor
 (See page [FI-185](#), 192 or 199)
8. Injection signal circuit
 - (1) Injector wirings
 - (2) (3S-GTE)
 Solenoid resistor
 (See page [FI-220](#))
 - (3) ECU (See page [FI-240](#))

DIAGNOSIS SYSTEM (4A-FE)

DESCRIPTION

The ECU contains a built-in, self-diagnosis system by which troubles with the engine signal network are detected and 2 "CHECK" engine warning light on the combination meter lights up.

By analyzing various signals as shown in the later table (See page FI-32) the ECU detects system malfunctions relating to the sensors or actuator.

If a malfunction is detected, the ECU lights up the "CHECK" engine warning light to inform the driver of the occurrence of a malfunction. (For some codes the light does not COME on.) The light goes off automatically when the malfunction has been repaired. But the diagnostic code(s) remains stored in the ECU memory (except for code No.51). The ECU stores the code(s) until it is cleared by removing the EFI fuse with the ignition switch off.

The diagnostic code can be read by the number of blinks of the "CHECK" engine warning light when TE1 and E1 terminals on the check connector are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.



FI0534

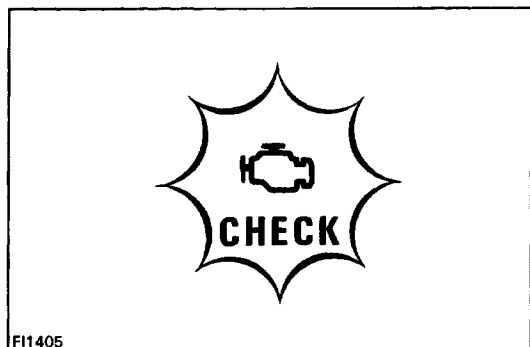
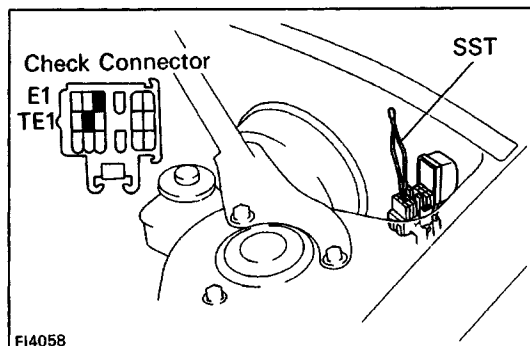
"CHECK" ENGINE WARNING LIGHT CHECK

1. The "CHECK" engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
2. When the engine is started, the "CHECK" engine warning light should go off.
If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

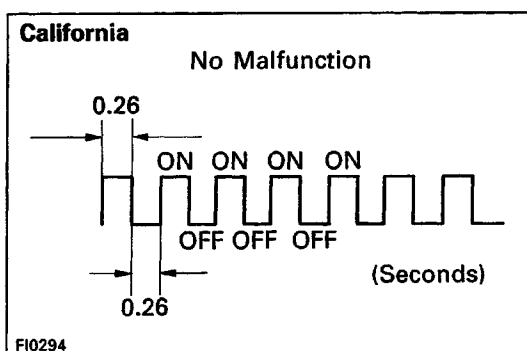
OUTPUT OF DIAGNOSTIC CODES

To obtain an output of diagnostic codes, proceed as follow:

1. Initial conditions
 - (a) Battery voltage 11 V or more
 - (b) Throttle valve fully closed (throttle position sensor IDL points closed)
 - (c) Transmission in neutral range
 - (d) Accessories switched OFF
 - (e) Engine at normal operating temperature
2. Turn the ignition switch ON. Do not start the engine.
3. Using SST, connect terminals TE1 and E1 of the check connector.
SST 09843-18020



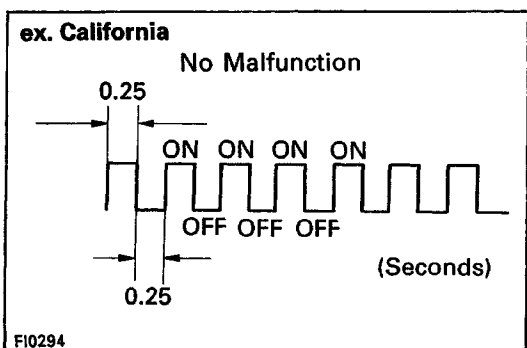
4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.

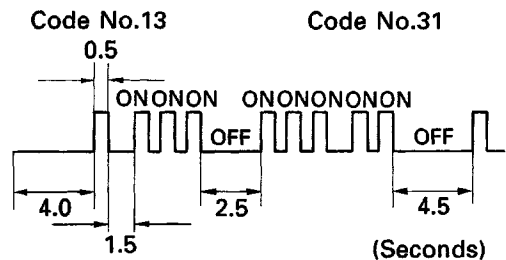


Diagnostic Codes (See page [FI-32](#))

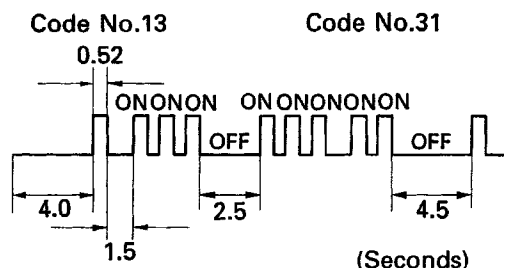
(a) Normal System Operation (no malfunction)

- The light will alternately blink ON and OFF approx. 2 times per second.



California

FI0295

ex. California

FI0295

(b) Malfunction Code Indication

- In the event of a malfunction, the light will blink every 0.5 seconds (0.52 seconds). The first number of blinks will equal the first digit of a 2-digit diagnostic code and, after a 1.5 second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5-second pause between each.
- After all the codes have been signaled, there will be a 4.5-second pause and they will all be repeated as long as the terminals TE1 and E1 of the check connector are connected.

HINT: In the event of a number of trouble codes, indication will begin from the smaller value and continue to the larger in order.

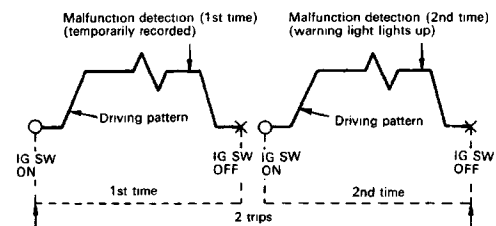
(c) (2 trip detection logic)

Diagnostic codes 21, 25, 26 and 71 use "2 trip detection logic". With this logic, when a malfunction is first detected, the malfunction is temporarily stored in the ECU memory. If the same case is detected again during the second drive test, this second detection causes the "CHECK" engine warning light to light up.

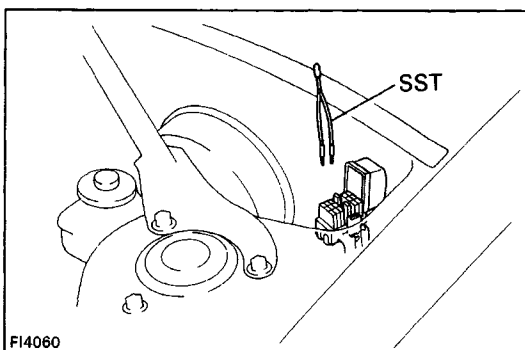
The 2 trip repeats the same mode a 2nd time. (However, the ignition switch must be turned OFF between the 1st time and 2nd time).

5. After the diagnostic check, remove the SST.

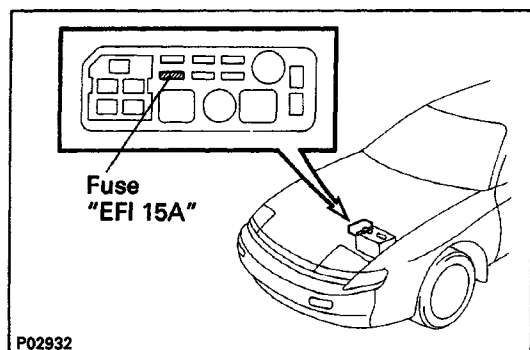
SST 09843-18020



EM9413



FI4060



CANCELLING DIAGNOSTIC CODE

1. After repair of the trouble area, the diagnostic code retained in memory by the ECU must be cancelled out by removing the fuse "EFI 15A" for 60 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.

HINT:

Cancellation can also be done by removing the battery negative H terminal, but in this case, other memory systems (clock, etc.) will also be cancelled out.

If the diagnostic code is not cancelled out, it will be retained by the ECU and appear along with a new code in the event of future trouble.

If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic code has been recorded.

2. After cancellation, perform road test of the vehicle to check that a normal code is now read on the "CHECK" engine warning light.

If the same diagnostic code appears, it indicates that the trouble area has not been repaired thoroughly.










DIAGNOSIS INDICATION

1. When 2 or more codes are indicated, the lowest number (code) will appear first.
2. All detected diagnostic codes, except code No.51, will be retained in memory by the ECU from the time of detection until cancelled out.
3. Once the malfunction is cleared, the "CHECK" engine warning light on the combination meter will go off but the diagnostic code remain stored in ECU memory (except for code No.51).







DIAGNOSTIC CODES

HINT:

- Parameters listed in the chart may not be exactly same as your reading due to type of the instruments or other factors.
- If a malfunction code is displayed during the diagnostic code check in test mode, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

Code No.	Number of blinks "CHECK" Engine Warning Light	System	"CHECK" Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See Page
—	 FI1401	Normal	—	No trouble code is recorded.	—	—	—
12	 FI1389	RPM Signal	ON	No G or NE signal is input to the ECU for 2 secs. or more after STA turns ON.	<ul style="list-style-type: none"> Open or short in 11A circuit 11A Open or short in STA circuit ECU 	○	IG-4 FI-68
13	 FI1390	RPM Signal	ON	NE signal is not input to ECU for 50 msec. or more when engine speed is 1,000 rpm or more.	<ul style="list-style-type: none"> Open or short in 11A circuit 11A ECU 	○	IG-4
14	 FI1391	Ignition Signal	ON	IGF signal from igniter is not input to ECU for 4 consecutive ignition.	<ul style="list-style-type: none"> Open or short in IGF or IGT circuit from igniter to ECU Igniter ECU 	○	FI-69
21	 FI1400	Oxygen Sensor Signal	ON	At normal driving speed (below 60 mph and engine speed is above 1,900 rpm), amplitude of oxygen sensor signal (OX) is reduced to between 0.35 – 0.70 V continuously for 60 secs. or more. *6 (2 trip detection logic)	<ul style="list-style-type: none"> Oxygen or short in circuit of oxygen sensor Oxygen sensor ECU 	○	FI-72
				Open or short in heater circuit of oxygen sensor for 0.5 sec or more. (HT) (Exe. Calif.)	<ul style="list-style-type: none"> Open or short in heater circuit of oxygen sensor Oxygen sensor heater ECU 		
22	 FI1392	Water Temp. Sensor Signal	ON	Open or short in water temp. sensor circuit for 500 msec. or more. (THW)	<ul style="list-style-type: none"> Open or short in water temp. sensor circuit Water temp. sensor ECU 	○	FI-67
24	 FI1611	Intake Air Temp. Sensor Signal	*3 ON	Open or short in intake air temp. sensor circuit for 500 msec. or more. (THA)	<ul style="list-style-type: none"> Open or short in intake air temp. circuit Intake air temp. sensor ECU 	○	FI-66
25	 FI2562	Air-Fuel Ratio Lean Malfunction	ON	(1) Oxygen sensor output in less than 0.45 V for at least 90 secs. for Calif. or 120 sees. for others when oxygen sensor is warmed up (racing at 2,000 rpm). (only for code 25 in Calif. spec.) *4	<ul style="list-style-type: none"> Engine ground bolt loose Open in E1 circuit Open in injector circuit Fuel line pressure (Injector blockage, etc.) Open or short in oxygen sensor circuit Oxygen sensor Ignition system Water temp. sensor Vacuum sensor ECU 	○	FI-65 FI-72
26	 FI2563	Air-Fuel Ratio Rich Malfunction	ON	(2) When the engine speed varies by more than 50 rpm over the preceding crank angle period during a period of 50 secs. during idling with the coolant temp. 50°C (122°F) or more. *6 (2 trip detection logic) (1) and (2)	<ul style="list-style-type: none"> Engine ground bolt loose Open in E1 circuit Short in injector circuit Fuel line pressure (Injector leakage, etc.) Open or short in cold start injector circuit Cold start injector Open or short in oxygen sensor circuit Oxygen sensor Water temp. sensor Vacuum sensor Compression pressure ECU 	○	

DIAGNOSTIC CODES (Cont'd)

Cods No.	Number of blinks CHECK Engine Warning Light	System	¹ "CHECK" Engine Warning Light	Diagnosis	Trouble Area	² Memory	See Page,
31	 FI1394	Vacuum Sensor Signal	ON	Open or short detected continuously for 500 msec. or more in vacuum sensor circuit. (PIM)	<ul style="list-style-type: none"> • Open or short in vacuum sensor circuit • Vacuum sensor • ECU 	○	FI-64
41	 FI1396	Throttle Position Sensor Signal	³ ON	Low PSW signal is input continuously to the ECU for 500 msec. or more at idling (IDL contact is ON).	<ul style="list-style-type: none"> • Open or short in throttle position sensor circuit • Throttle position sensor • ECU 	○	FI-63
42	 FI1397	Vehicle Speed Sensor Signal	OFF	SPD signal is not input to the ECU for at least 8 seconds during high load driving with engine speed between 2,600 rpm and 4,500 rpm.	<ul style="list-style-type: none"> • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • ECU 	○	—
43	 FI1398	Starter Signal	OFF	Starter signal (STA) is not input to ECU even once until engine reaches 800 rpm or more when cranking.	<ul style="list-style-type: none"> • Open or short in starter signal circuit • Open or short in IG SW circuit • ECU 	○	FI-68
⁵ 71	 FI2622	EGR System Malfunction	ON	With the coolant temp. at 70°C (158°F) or more 50 secs. from start of EGR operation. The EGR gas temp. is less than 80°C (176°F) and the EGR gas temp. has risen less than 10°C (18°F) during the 50 secs. ⁶ (2 trip detection logic)	<ul style="list-style-type: none"> • Open in EGR temp. sensor circuit • Open in VSV circuit for EGR • EGR vacuum hose disconnected, valve stuck • Clogged in EGR gas passage • ECU 	○	FI-73
51	 FI1399	Switch Condition Signal	OFF	Displayed when A/C is ON, IDL contact OFF or shift position in "R", "D", "2", or "1" ranges with the check terminals E1 and TE1 connected.	<ul style="list-style-type: none"> • A/C switch circuit • Throttle position sensor 1DL circuit • Neutral start switch circuit • Accelerator pedal, cable • ECU 	X	FI-63 FI-71

REMARKS:

*1: "ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.

"OFF" indicates that the "CHECK" Engine Warning Light does not light up during malfunction diagnosis, even if a malfunction is detected.

*2: "0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs. Accordingly, output of diagnostic results is performed with the ignition switch ON.

*3: The "CHECK ENGINE" Warning Light comes on if malfunction occurs only for California specifications.

* 4: No. (2) in the diagnostic contents of codes No.25 and 26 apply to California specification vehicles only, while (1) applies to all models.

*5: Code 71 is used only for California specifications.

*6: "2 trip detection logic" (See page FI-30.)

DIAGNOSTIC CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern.

(a) To simulate diagnostic code detecting condition after diagnostic code is recorded.

(b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	21	Main Oxygen Sensor Circuit
Malfunction: Main Oxygen Sensor Deterioration		
<p>P02539</p> <ol style="list-style-type: none"> ① Disconnect the ER fuse (15 A) for 60 seconds or more, with ignition switch OFF. ② Start the engine and warm the engine up with all accessory switches OFF. ③ After the engine is warmed up, let it idle for 3 minutes. ④ Accelerate gradually and maintain at approximately 1,500 rpm, or within the 1,300 to 1,700 rpm range. Turn the A/C on, and drive in "D" for automatic, or in case of manual transmission, upshift appropriately. Shift carefully so that the engine speed would not fall below 1,200 rpm. Depress the accelerator pedal gradually and maintain a steady speed to avoid engine braking. ⑤ Maintain the vehicle speed at 40 – 50 mph. Keep the vehicle running for 1 to 2 minutes after starting acceleration. ⑥ After driving, stop at a safe place and turn the ignition switch OFF for 3 seconds or more. ⑦ Start the engine and perform steps(3), (4) and (5). HINT: If a malfunction is detected, the "CHECK ENGINE" warning light will light up during step (7). <p>NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction</p>		

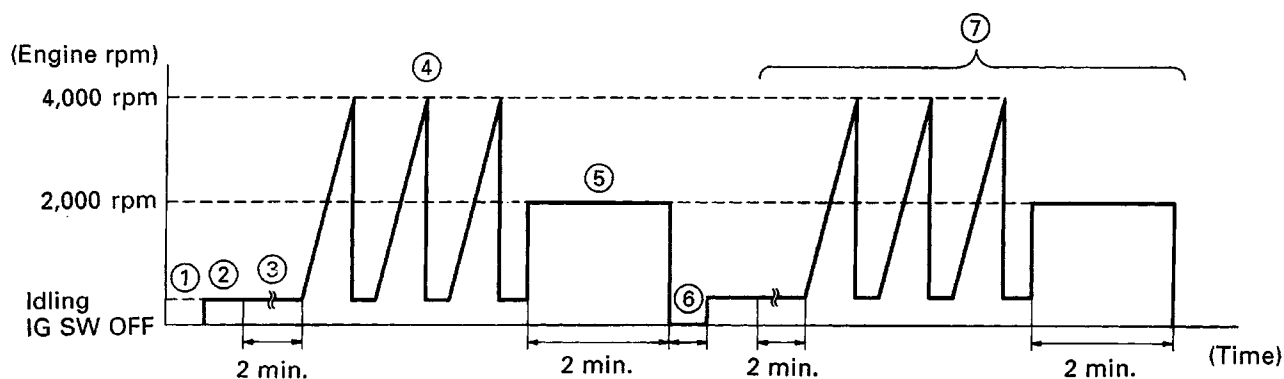
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	25	Air-Fuel Ratio Lean Malfunction
	26	Air-Fuel Ratio Rich Malfunction

Malfunction: Open or Short in Oxygen Sensor



P02492

- ① Disconnect the EFI fuse (15 A) for 60 seconds or more, with ignition switch OFF.
- ② Start the engine and warm the engine up.
- ③ After the engine is warmed up, let it idle for 2 minutes.
- ④ Accelerate rapidly to 4,000 rpm three times.
- ⑤ Maintain at 2,000 rpm for 2 minutes.
- ⑥ Turn the ignition switch OFF for 10 seconds.
- ⑦ Start the engine and repeat steps (2), (3), (4) and (5) again.

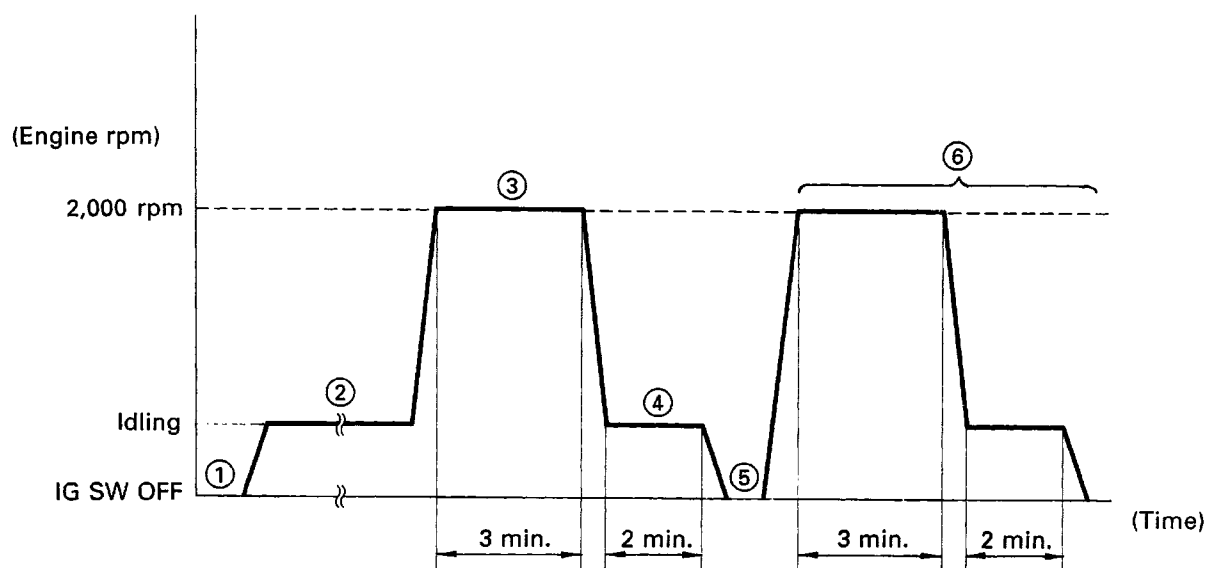
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	25	Air-Fuel Ratio Lean Malfunction (California)
	26	Air-Fuel Ratio Rich Malfunction (California)

Malfunction: Open or Short in Oxygen Sensor, Open or Short in Injector Leak, Blockage, Loose E/G Earth Bolt



P02543

- ① Disconnect the 0 Battery terminal for 60 seconds or more, with ignition switch OFF.
- ② Start the engine and warm the engine up, with all accessory switches OFF.
- ③ After the engine is warmed up, maintain at 2,000 rpm for 3 minutes.
- ④ Let it idle for 2 minutes. ("D" range for A/T)
- ⑤ Turn the ignition switch OFF for 3 seconds or more.
- ⑥ Start the engine and perform steps (3) and (4) again.

HINT: If a malfunction is detected, the "CHECK" engine warning light will light up during step (6).

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

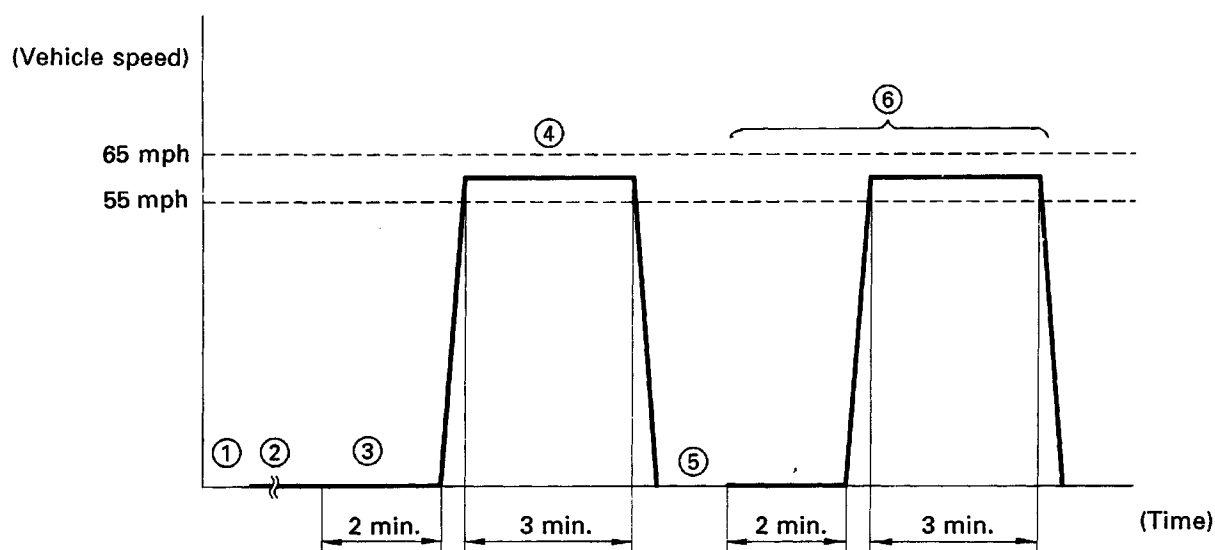
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	71	EGR System Malfunction (California)
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Malfunction: Short in VSV Circuit for EGR, Loose EGR Hose, Valve Stuck

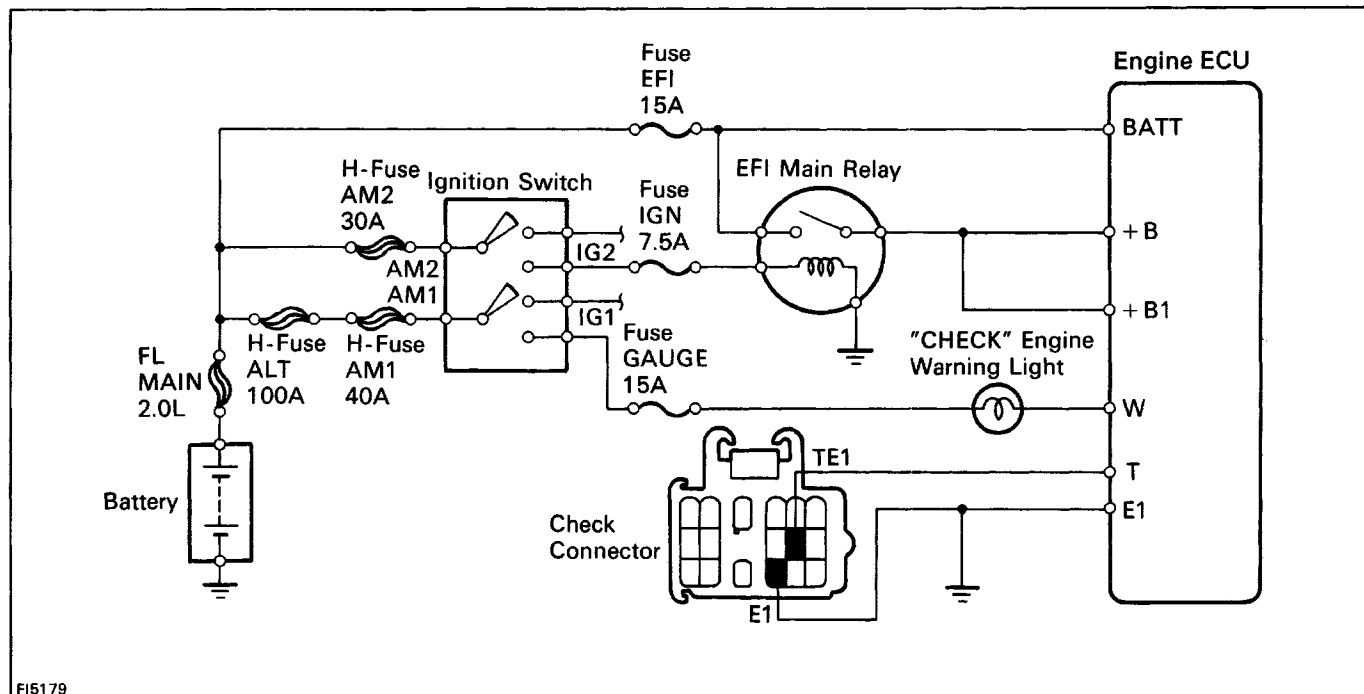


P02538

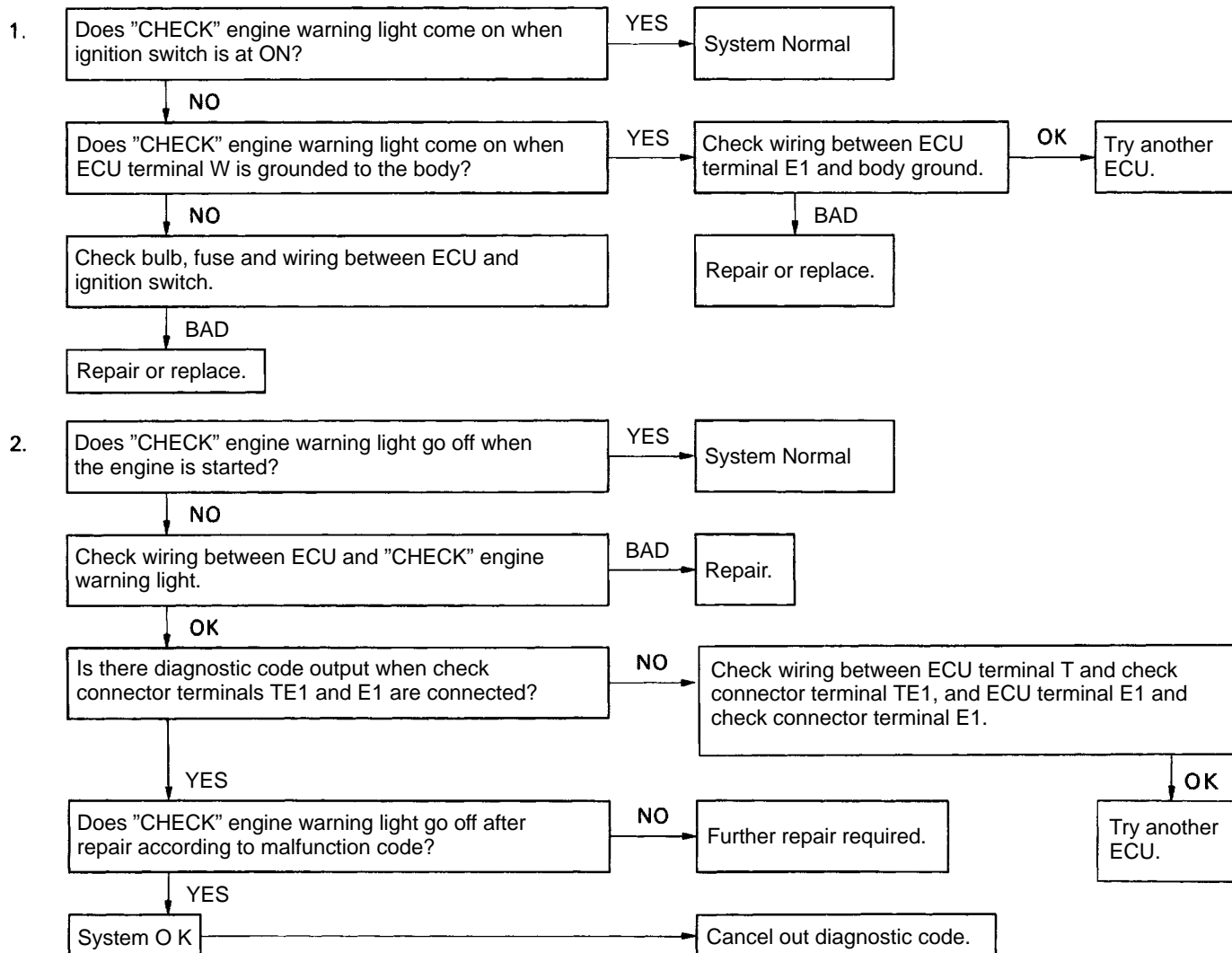
- ① Disconnect the fuse EFI (15 A) for 60 seconds or more, with ignition switch OFF.
 - ② Start the engine and warm the engine up with all accessory switches OFF.
 - ③ After the engine is warmed up, let it idle for 2 minutes.
 - ④ With the transmission in 5th gear ("D" range and O/D ON for AfT), drive at 55 – 65 mph for 3 minutes.
 - ⑤ Stop at a safe place and turn the ignition switch OFF for 3 – 10 seconds.
 - ⑦ Start the engine and perform steps (3) , and (4).
- HINT: If a malfunction is detected, the "CHECK" engine warning light will light up during step (6).

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

INSPECTION OF DIAGNOSIS CIRCUIT



FI5179



DIAGNOSIS SYSTEM (3S–GTE and 5S–FE)

DESCRIPTION

The ECU contains a built-in, self-diagnosis system by which troubles with the engine signal network are detected and a "CHECK" engine warning light on the combination meter lights up.

By analyzing various signals shown in the later table (See page [FI-44](#) or 50) the ECU detects system malfunctions relating to the sensors or actuators.

The self-diagnosis system has two modes, a normal mode and a test mode.

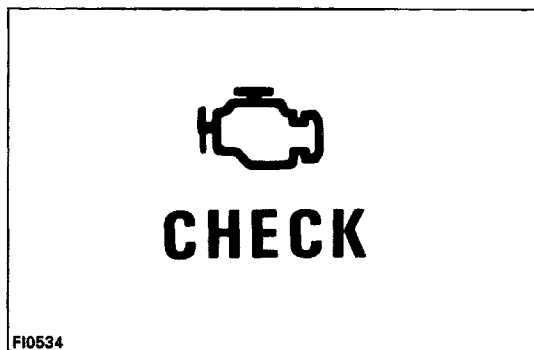
If a malfunction is detected when in the normal mode, the ECU lights up the "CHECK" engine warning light to inform the driver of the occurrence of a malfunction. (For some codes the light does not come on.) The light goes off automatically when the malfunction has been repaired. But the diagnostic code(s) remains stored in the ECU memory. The ECU stores the code(s) until it is cleaned by removing the EFI fuse with the ignition switch off.

The diagnostic code can be read by the number of blinks of the "CHECK" engine warning light when TE1 and E1 terminals of the check connector are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.

If a malfunction is detected when in the test mode, the ECU lights up the "CHECK" engine warning light to inform the technician of the occurrence of a malfunction (except for code Nos.42, 43 and 51). In this case, TE2 and E1 terminals of the check connector should be connected as shown later. (See page [FI-42](#))

In the test mode, even if the malfunction is corrected, the malfunction code is stored in the ECU memory even when the ignition switch is off (except code Nos.42, 43 and 51). This also applies in the normal mode. The diagnostic mode (normal or testy and the output of the "CHECK" engine warning light can be selected by connecting the TE1, TE2 and E1 terminals of the check connector, as shown later.

A test mode function has been added to the functions of the self-diagnosis system of the normal mode for the purpose of detecting malfunctions such as poor contact, which are difficult to detect in the normal mode. This function fills up the self-diagnosis system. The test mode can be implemented by the technician following the appropriate procedures of check terminal connection and operation described later. (See page [FI-44](#) or 50)



"CHECK" ENGINE WARNING LIGHT CHECK

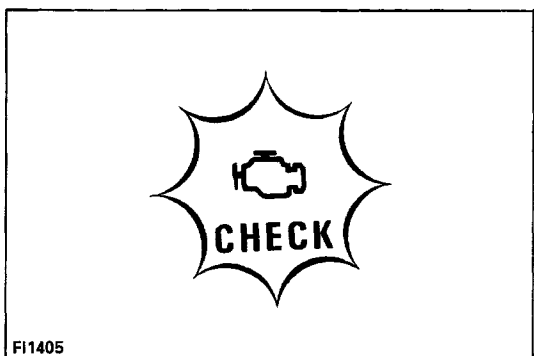
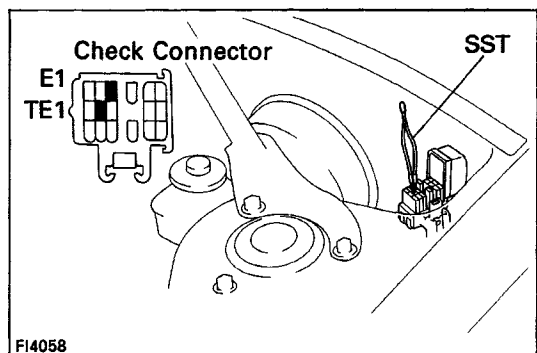
1. The "CHECK" engine warning light will come on when the ignition switch is placed at 4N and the engine is not running.
2. When the engine is started, the "CHECK" engine warning light should go off.
If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

OUTPUT OF DIAGNOSTIC CODES

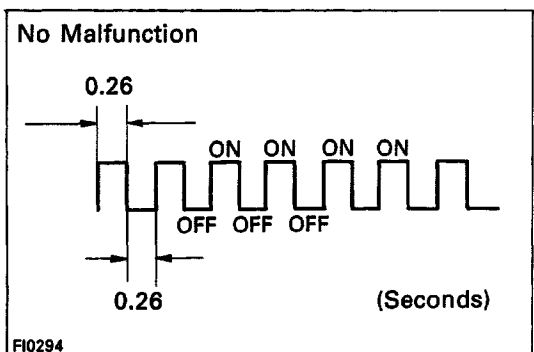
(Normal mode)

To obtain an output of diagnostic codes, proceed as follows:

1. Initial conditions
 - (a) Battery voltage 11 V or more
 - (b) Throttle valve fully closed (throttle position sensor IDL points closed)
 - (c) Transmission in neutral position
 - (d) Accessories switched OFF
 - (e) Engine at normal operating temperature
2. Turn the ignition switch ON. Do not start the engine.
3. Using SST, connect terminals TE1 and E1 of the check connector.
SST 09843-18020

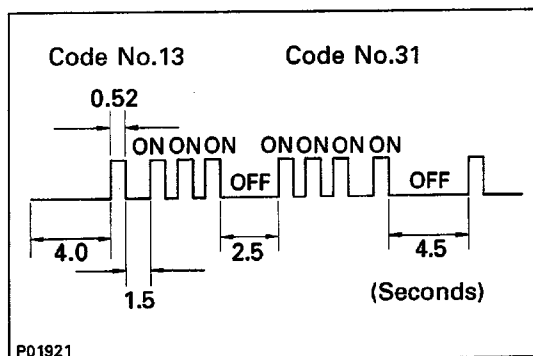


4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.



Diagnostic Codes (See page [FI-44](#) or [FI-50](#))

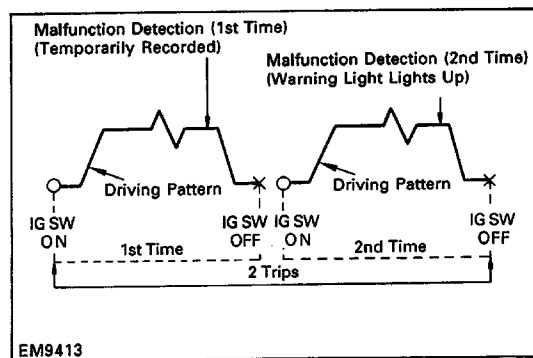
- (a) Normal System Operation (no malfunction)
The light will alternately blink ON and OFF at 0.26-second intervals.



(b) Malfunction Code Indication

- In the event of a malfunction, the light will blink every 0.5 seconds. The first number of blinks will equal the first digit of a 2-digit diagnostic code and, after a 1.5-second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5-second pause between each code.
- After all the codes have been output, there will be a 4.5-second pause and they will all be repeated as long as the terminals TE1 and E1 of the check connector are connected.

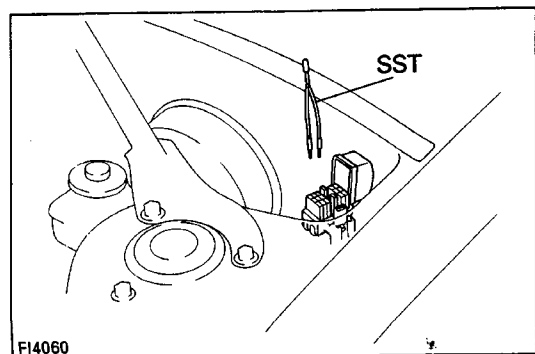
HINT: In the event of a number of trouble codes, indication will begin from the smaller value and continue to the larger.



(c) 12 Trip Detection Logic

Diagnostic codes 25, 26, 27 and 71 use "2 trip detection logic". With this logic, when a malfunction is first detected, the malfunction is temporarily stored in the ECU memory. If the same case is detected again during the second drive test, this second detection causes the "CHECK" Engine Warning Light to light up.

The 2 trip repeats the same mode a 2nd time. (However, the ignition switch must be turned OFF between the 1st time and 2nd time.) In the Test Mode, the "CHECK" Engine Warning Light lights up the 1st time a malfunction is detected.

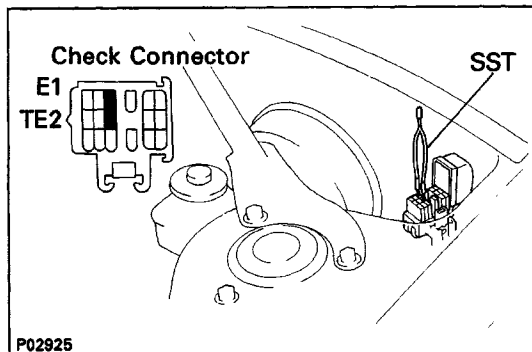


5. After the diagnostic check, remove the SST.
SST 09843-18020

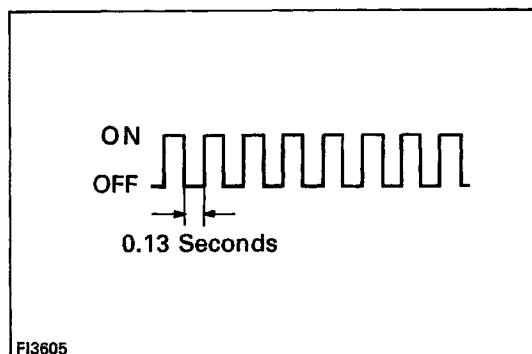
(Test mode)**HINT:**

- Compared to the normal mode, the test mode has high sensing ability to detect malfunctions.
 - It can also detect malfunctions in the starter signal circuit, air conditioner signal and neutral start switch signal.
 - Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the test mode.
- To obtain an output of diagnostic codes, proceed as follows:

1. Initial conditions
 - (a) Battery voltage 11 volts or more
 - (b) Throttle valve fully closed (throttle position sensor IDL points closed)
 - (c) Transmission in neutral range
 - (d) Accessories switched OFF

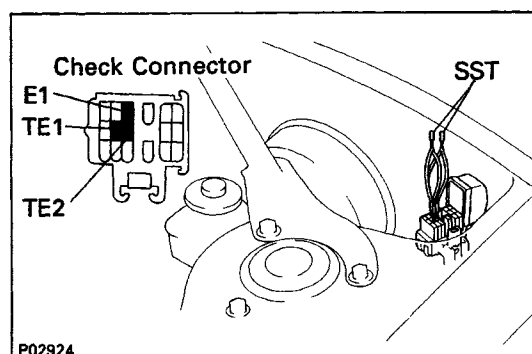


2. First, using SST, connect terminals TE2 and E1 of the check connector, then turn the ignition switch on to begin the diagnosis in the test mode.
SST 09843-18020

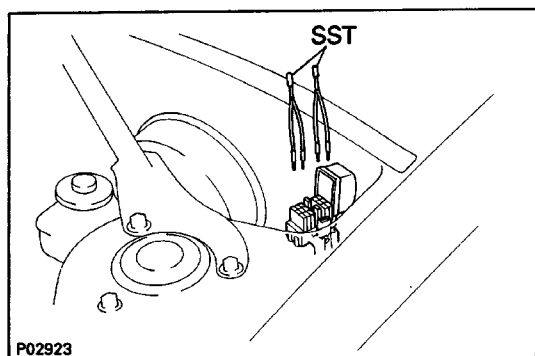


HINT: To confirm that the test mode is operating, check that the "CHECK" engine warning light flashes when the ignition switch is turned ON.

3. Start the engine and drive the vehicle at a speed of 10 km/h (6 mph) or higher.
4. Simulate the conditions of the malfunction described by the customer.



5. Using SST, connect terminals TE1 and E1 of the check connector.
SST 09843-18020
6. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light. (See page [FI-40](#))

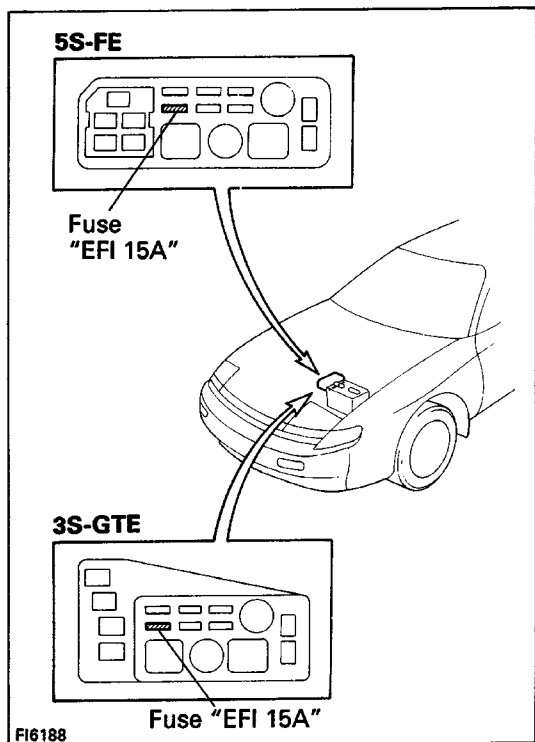


7. After the diagnostic check, remove SST.

SST 09843-18020

HINT:

- The test mode will not start if terminals TE2 and E1 are connected after the ignition switch is turned on.
- The starter signal and vehicle speed signal will be diagnosed by the ECU as malfunctions, and code Nos.42, and 43 will be output, if the operation in 3 above is not performed.



CANCELLING DIAGNOSTIC CODE

1. After repair of the trouble area, the diagnostic code retained in memory by the ECU must be cancelled out by removing the fuse "EFI 15A" for 10 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.

HINT:

- Cancellation can also be done by removing the battery negative (–) terminal, but in this case, other memory systems (clock, etc.) will also be cancelled out.
- If the diagnostic code is not cancelled out, it will be retained by the ECU and appear along with a new code in the event of future trouble.
- If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic code has been recorded.

2. After cancellation, perform road test of the vehicle to check that a normal code is now read on the "CHECK" engine warning light.

If the same diagnostic code appears, it indicates that the trouble area has not been repaired thoroughly.





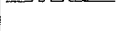
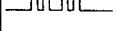

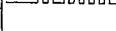

DIAGNOSIS INDICATION

1. When 2 or more codes are indicated, the lowest number (code) will appear first.
2. All detected diagnostic codes, except code No.51 and No.53, will be retained in memory by the ECU from the time of detection until cancelled out.
3. Once the malfunction is cleared, the "CHECK" engine warning light on the combination meter will go off but the diagnostic code(s) remain stored in ECU memory (except for codes No.43, No.51 and No.53).

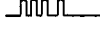







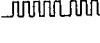


DIAGNOSTIC CODES (3S-GTE)

HINT:

- If a malfunction is detected during the diagnostic code check, refer to the circuit indicated in the table, and turn to the corresponding page.
- Your readings may vary from the parameters listed in the table, depending on the instruments used.

Code No.	Number of blinks "CHECK" Engine Warning Light	System	.1 "CHECK" Engine Warning Light		Diagnosis	Trouble Area	*2 Memory	See Page
			Normal Mode	Test Mode				
—	 FI1401	Normal	—	—	No trouble code is recorded.	—	—	—
12	 FI1606	RPM Signal	ON	N.A.	<ul style="list-style-type: none"> • No G1, G2 or NE signal is input to the ECU for 2 secs. or more after STA turns ON. • Open in G – circuit. 	<ul style="list-style-type: none"> • Open or short in NE, G circuit • Distributor • Open or short in STA circuit • ECU 	○	IG-4 FI-84
13	 FI1607	RPM Signal	ON	ON	<ul style="list-style-type: none"> • NE signal is not input to ECU for 0.1 sec or more when engine speed is 1,000 rpm or more. 	<ul style="list-style-type: none"> • Open or short in NE circuit • Distributor • ECU 	○	IG-4
14	 FI1608	Ignition Signal	ON	N.A.	IG signal from igniter is not input to ECU for 8 – 11 consecutive ignition	<ul style="list-style-type: none"> • Open or short in IGF or IGT circuit from igniter to ECU • Igniter • ECU 	○	FI-85
21	 FI1609	Oxygen Sensor Signal	ON	N.A.	Open or short in heater circuit of oxygen sensor for 0.5 sec. or more. (HT)	<ul style="list-style-type: none"> • Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • ECU 	○	FI-90
				ON	At normal driving speed (below 60 mph and engine speed is above 1,500 rpm), amplitude of oxygen sensor signal (OX1) is reduced to between 0.35 – 0.70 V continuously for 60 secs. or more. *6 (2 trip detection logic) (Exc. Calif.)	<ul style="list-style-type: none"> • Open or short in oxygen sensor circuit • Oxygen sensor • ECU 		
22	 FI1610	Water Temp. Sensor Signal	ON	ON	Open or short in water temp. sensor circuit for 0.5 sec. or more. (THW)	<ul style="list-style-type: none"> • Open or short in water temp. sensor circuit • Water temp. sensor • ECU 	○	FI-83
24	 FI1611	Intake Air Temp. Sensor Signal	*3 ON	ON	Open or short in intake air temp. sensor circuit for 0.5 sec. or more. (THA)	<ul style="list-style-type: none"> • Open or short in intake air temp. sensor circuit • Intake air temp. sensor • ECU 	○	FI-82
25	 FI2562	Air-Fuel Ratio Lean Malfunction	ON	ON	(1) Oxygen sensor output in less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 1,500 rpm). (only for code 25) *4 (2) When the oxygen sensor signal oscillates beyond 0.45 V more than 15 times within a 4 sec. period at idle and at coolant temperature of 60°C (140°F) or above. *4 (3) When the air-fuel compensation value fluctuates more than 20% from the ECU set range within an 80 sec. period, at coolant temperature of 60°C (140°F) or above. *6 (2 trip detection logic) (1) – (3)	<ul style="list-style-type: none"> • Engine ground bolt loose • Open in E1 circuit • Open in injector circuit • Fuel line pressure (Injector blockage, etc.) • Open or short in oxygen sensor circuit • Oxygen sensor • Ignition system • Water temp. sensor • Air flow meter (air intake) • ECU 	○	FI-81 FI-90
26	 FI2563	Air-Fuel Ratio Rich Malfunction	ON	ON	(1) Oxygen sensor output in less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 1,500 rpm). (only for code 25) *4 (2) When the oxygen sensor signal oscillates beyond 0.45 V more than 15 times within a 4 sec. period at idle and at coolant temperature of 60°C (140°F) or above. *4 (3) When the air-fuel compensation value fluctuates more than 20% from the ECU set range within an 80 sec. period, at coolant temperature of 60°C (140°F) or above. *6 (2 trip detection logic) (1) – (3)	<ul style="list-style-type: none"> • Engine ground bolt loose • Open in E1 circuit • Short in injector circuit • Fuel line pressure (Injector leakage, etc.) • Open or short in cold start injector circuit • Cold start injector • Open or short in oxygen sensor circuit • Oxygen sensor • Air flow meter • Compression pressure • ECU 	○	

DIAGNOSTIC CODES (3S–GTE) (Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	1 "CHECK" Engine Warning Light		Diagnosis	Trouble Area	2 Memory	See Page
			Normal Mode	Test Mode				
31	 FI1612	Air Flow Meter Signal	ON	ON	At idling, open or short detected continuously for 0.5 sec. or more in air flow meter circuit. • Open – VC • Short – VC–E2	• Open or short in air flow meter circuit • Air flow meter • ECU	○	FI-80
32	 FI1613	Air Flow Meter Signal	ON	ON	Open or short detected continuously for 0.5 sec. or more in air flow meter circuit. • Open – E2 • Short – VS–VC		○	FI-80
34	 BE3933	Turbocharging Pressure Signal	ON	N.A.	Abnormal over charge during high load driving.	• Open or short in turbocharging pressure sensor circuit • Turbocharging pressure sensor • Turbocharger • ECU	○	—
35	 BE3933	Turbocharging Pressure sensor Signal	ON	ON	Open or short detected continuously for 0.5 sec. or more in turbocharging pressure sensor signal circuit. (PIM)		○	FI-88
41	 FI1614	Throttle Position Sensor Signal	*3 ON	ON	Open or short detected in throttle position sensor signal (VTA) for 0.5 sec. or more. IDL contact is ON and VTA output exceeds 1.5 V.	• Open or short in throttle position sensor circuit • Throttle position sensor • ECU	○	FI-78
42	 FI1615	Vehicle Speed Sensor Signal	OFF	OFF	SPD signal is not input to the ECU for at least 8 seconds during high load driving with engine speed between 2,500 rpm and 5,000 rpm.	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • ECU	○	—
43	 FI1616	Starter Signal	N.A.	OFF	Starter signal (STA) is not input to ECU even once until engine reaches 800 rpm or more when cranking.	• Open or short in starter signal circuit • Open or short in IG SW or main relay circuit • ECU	X	FI-84
52	 FI1618	Knock Sensor Signal	ON	N.A.	With engine speed between 1,600 rpm and 7,200 rpm, signal from knock sensor is not input to ECU for 2 revolutions. (KNK)	• Open or short in knock sensor circuit • Knock sensor (looseness, etc.) • ECU	○	—
53	 FI1619	Knock Control Signal	ON	N.A.	Engine speed is between 700 rpm and 7,200 rpm and ECU (for knock control) malfunction is detected.	• ECM	X	—
71	 FI2622	EGR System Malfunction	ON	ON	120 secs. from start of EGR operation, EGR gas temp. is less than 80°C (176°F) with coolant temp. 80°C (176°F) or more. *6 (2 trip detection logic)	• Open in EGR gas temp. sensor circuit • Open in VSV circuit for EGR • EGR vacuum hose disconnected, valve stuck • Clogged in EGR gas passage • ECU	○	FI-91
51	 FI1617	Switch Condition Signal	N.A.	OFF	Displayed when A/C is ON or IDL contact OFF with the check terminals E1 and TE1 connected.	• A/C switch circuit • Throttle position sensor IDL circuit • Accelerator pedal, cable • ECU	X	FI-78

REMARKS:

*1: "ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.

"OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected.

"N.A." indicates that the item is not included in malfunction diagnosis.

*2: "0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs.

Accordingly, output of diagnostic results is performed with the ignition switch ON.

*3: The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.

*4: No. (2) and (3) in the diagnostic contents of codes No.25 and 26 apply to California specification vehicles only, while (1) applies to all models.

*5: Code 71 is used only for California specifications.

*6: "2 trip detection logic" (See page FI-40)

DIAGNOSTIC CODE DETECTION DRIVING PATTERN (3S-GTE)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	21	Oxygen Sensor Circuit
Malfunction: Deterioration of Oxygen Sensor		
<p>The graph illustrates the driving pattern for detecting an oxygen sensor malfunction. The vertical axis represents vehicle speed in miles per hour (mph), with dashed lines at 40 mph and 50 mph. The horizontal axis represents time, with segments for idling, ignition switch OFF, and specific durations of 3 minutes and 1-2 minutes. The pattern starts with the ignition switch OFF (1), followed by idling (2). The engine is then started and warmed up (3). After a 3-minute idle period (4), the vehicle is accelerated (5) to a steady speed of 40-50 mph (6), which is maintained for 1-2 minutes.</p>		
<p>P01713</p> <ol style="list-style-type: none"> ① Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF. ② Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF. ③ Start the engine and warm the engine up with all accessory switches OFF. ④ After the engine is warmed up, let it idle for 3 minutes. ⑤ Accelerate gradually and maintain at approximately 1,500 rpm, or within the 1,300 to 1,700 rpm range. Turn the A/C on, and drive in "D" for automatic, or in case of manual transmission, upshift appropriately. Shift carefully so that the engine speed would not fall below 1,200 rpm. Depress the accelerator pedal gradually and maintain a steady speed to avoid engine braking. ⑥ Maintain the vehicle speed at 40 – 50 mph. Keep the vehicle running for 1 – 2 minutes after starting acceleration. HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step (6) <p>NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.</p>		

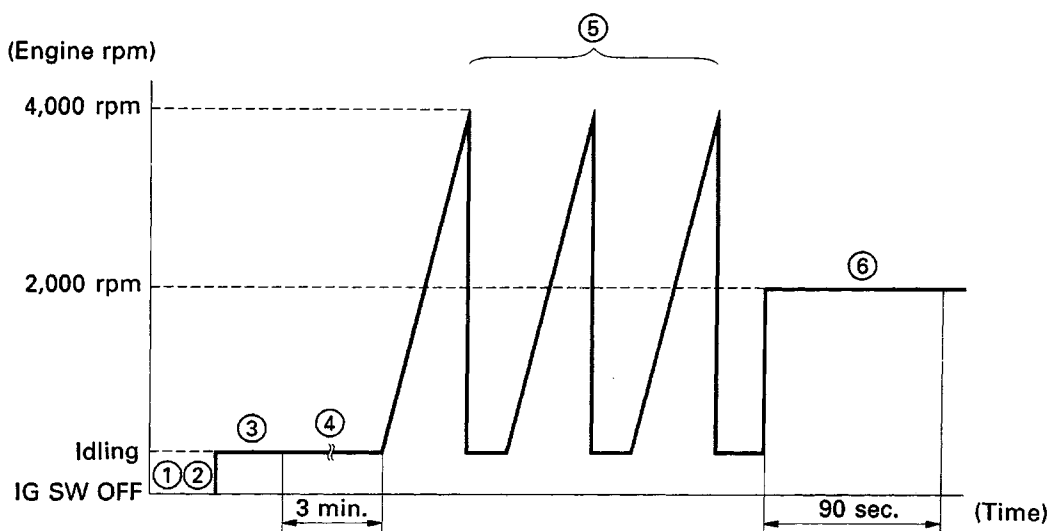
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (3S-GTE) (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected. .

Code No.	25	Air-Fuel Ratio Lean Malfunction
	26	Air-Fuel Ratio Rich Malfunction

Malfunction: Open or Short in Main Oxygen Sensor



P02491

- ① Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF.
 - ② Initial test mode: Connect terminal TE2 and E1 of check connector with ignition switch OFF.
 - ③ Start the engine and warm the engine up, with all accessory switches OFF.
 - ④ After the engine is warmed up, let it idle for 3 minutes.
 - ⑤ Accelerate rapidly to 4,000 rpm three times.
 - ⑥ Maintain at 2,000 rpm for 90 seconds.
- HINT: If a malfunction is detected, the "CHECK" engine warning light will light up during step (6).
- NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.**

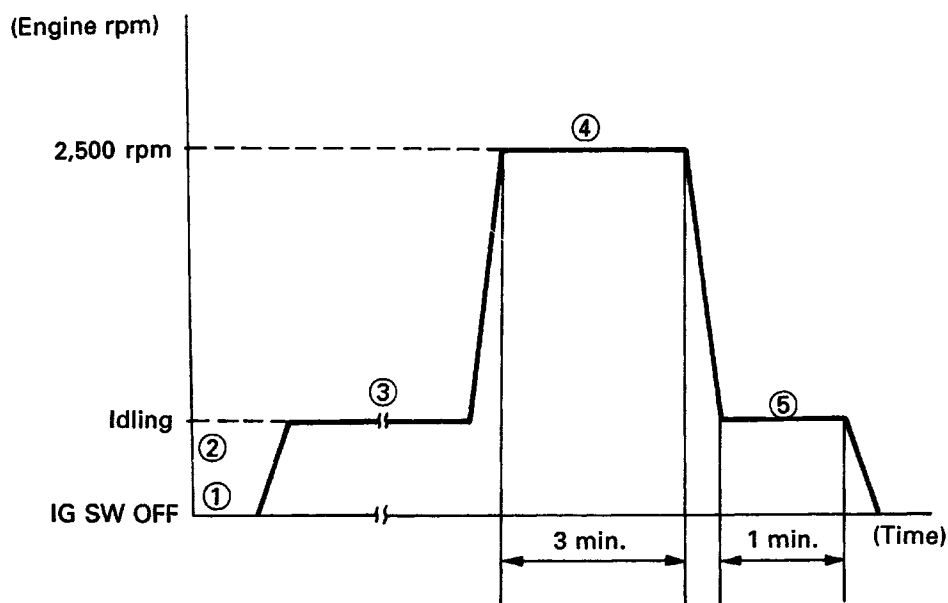
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (3S-GTE) (Cont'd)

Purpose of the driving pattern.

- To simulate diagnostic code detecting condition after diagnostic code is recorded.
- To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	25	Air-Fuel Ratio Lean Malfunction (California)
	26	Air-Fuel Ratio Rich Malfunction (California)

Malfunction: Open or Short in Injector Leak, Blockage, Loose Engine Earth Bolt



P01711

HINT: When start this test, coolant temp. is 35°C (95°F) or less and A/C switch OFF.
Before this test, check the feedback voltage for oxygen sensor.

- Disconnect the ER fuse (15 A) for 10 seconds or more, with ignition switch OFF.
- Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF.
- Start the engine and warm the engine up.
- After the engine is warmed up, maintain at 2,500 rpm for 3 minutes.
- Let it idle for 1 minute.

HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step 6.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction,

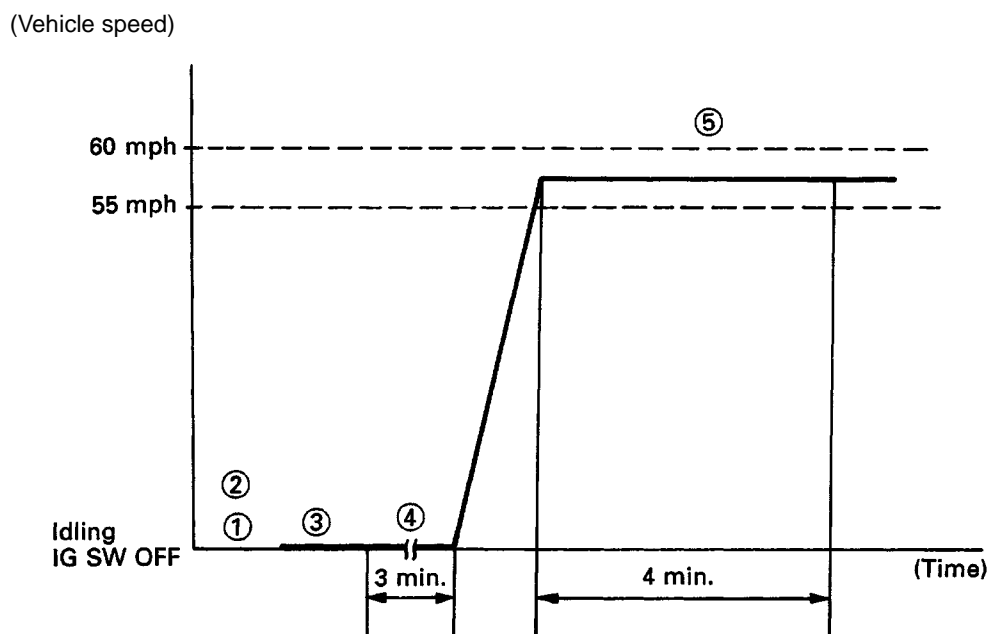
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (3S-GTE) (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	71	EGR System Malfunction (California)
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Malfunction: Short in VSV Circuit for EGR, Loose EGR Hose, Valve Stuck



P01712

HINT: When start this test, coolant temp. is 35°C (95°F) or less and A/C switch OFF.

- ① Disconnect the fuse EFI (15 A) for 10 seconds or more, with ignition switch OFF.
- ② Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF.
- ③ Start engine and warm engine up.
- ④ After engine is warmed up, let it idle for 2 minutes.
- ⑤ With the A/C switch OFF and transmission in 5th gear, drive at 55 – 60 mph for 4 minutes.








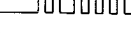


HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step 6.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

DIAGNOSTIC CODES (5S-FE)









HINT:

- If a malfunction is detected during the diagnostic code check, refer to the circuit indicated in the table, and turn to the corresponding page.
- Your readings may vary from the parameters listed in the table, depending on the instruments used.

Code No.	Number of blinks ~CHECK~ Engine Warning Light	System	"CHECK" ** Engine Warning Light		Diagnosis	Trouble Area	*t Memory	See Page
			Normal Mode	Test Mode				
—	 FI1401	Normal	—	—	No trouble code is recorded. code is recorded.	—	—	—
12	 FI1606	RPM Signal	ON	N.A.	(7) No NE signal is input to ECU for 2 secs. or more after STA turns ON. (2) No G signal is input to ECU for 3 secs. or more between 600 – 4,000 rpm.	<ul style="list-style-type: none"> • Open or short in NE, G circuit • Distributor • Open or short in STA circuit • ECU 	○	IG-4 FI-102 FI-118
13	 FI1607	RPM Signal	ON	ON	(1) NE signal is not input to ECU for 0.3 secs. or more when engine speed is 1,500 rpm or more. (2) No G signal is input to ECU for 4 NE signal. (Test mode only)	<ul style="list-style-type: none"> • Open or short in NE circuit • Distributor • ECU 	○	IG-4
14	 FI1608	Ignition Signal	ON	N.A.	IG signal from igniter is not input to ECU for 4 – 5 consecutive ignition	<ul style="list-style-type: none"> • Open or short in IGF or IGT circuit from igniter to ECU • Igniter • ECU 	○	FI-103 FI-119
16 (A/T ONLY)	 BE3931	ECT Control Signal	ON	N.A.	Normal signal is not output from ECU CPU.	<ul style="list-style-type: none"> • Engine (& ECT) ECU 	○	—
21	 FI1609	Main Oxygen Sensor Signal	ON	N.A.	At normal driving speed (below 60 mph and engine speed is above 1,500 rpm), amplitude of oxygen sensor signal (OX) is reduced to between 0.35 – 0.70 V continuously for 60 secs. or more.	<ul style="list-style-type: none"> • Open or short in oxygen sensor circuit • Oxygen sensor • Engine (& ECT) ECU 	○	FI-106 FI-122
22	 FI1610	Water Temp. Sensor Signal	ON	ON	Open or short in water temp. sensor circuit for 0.5 sec. or more. (THW)	<ul style="list-style-type: none"> • Open or short in water temp. sensor circuit • Water temp. sensor • Engine & ECT? ECU 	○	FI-101 FI-117
24	 FI1611	Intake Air Temp. Sensor Signal	*3 ON	ON	Open or short in intake air temp. sensor circuit for 0.5 sec. or more. (THA)	<ul style="list-style-type: none"> • Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine (& ECT) ECU 	○	FI-100 FI-116
25	 FI2562	Air-Fuel Ratio Lean Malfunction	ON	ON	(1) Oxygen sensor output is less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 2,000 rpm). – only for code 25 (2) When the engine speed varies by more than 20 rpm over the preceding crank angle period during a period of 20 seconds during idling with the coolant temp. 60°C (140°F) or more. *6 (2 trip detection logic) (1) and (2)	<ul style="list-style-type: none"> • Engine ground bolt loose • Open in E1 circuit • Open in injector circuit • Fuel line pressure (injector blockage, etc.) • Open or short in oxygen sensor circuit • Oxygen sensor • Ignition system • Water temp. sensor • Vacuum sensor • Engine (& ECT) ECU 	○	FI-99 FI-106 FI-115 FI-122
26*4	 FI2563	Air-Fuel Ratio Rich Malfunction	ON	ON		<ul style="list-style-type: none"> • Engine ground bolt loose • Open in E1 circuit • Short in injector circuit • Fuel line pressure (injector leakage, etc.) • Open or short in cold start injector circuit • Cold start injector • Open or short in oxygen sensor circuit • Oxygen sensor • Water temp sensor • Vacuum sensor • Compression pressure • Engine (& ECT) ECU 	○	

DIAGNOSTIC CODES (5S–FE)

(Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	"CHECK" ** Engine Warning Light		Diagnosis	Trouble Area	*2 Memory	See page
			Normal Mode	Test Mode				
27*4	 FI3294	Sub-Oxygen Sensor Signal	ON	ON	When sub-oxygen sensor is warmed up and full acceleration continued for 2 seconds, output of main oxygen sensor is 0.45 V or more (rich) and output of sub-oxygen sensor is 0.45 V or less (lean). (OX2) *5 (2 trip detection logic)	<ul style="list-style-type: none"> Short or open in suboxy-gen sensor circuit Sub-oxygen sensor Engine (& ECT) ECU 	○	FI-106 FI-122
31	 FI1612	Vacuum Sensor Signal	ON	ON	Open or short detected continuously for 0.5 sec. or more in vacuum sensor circuit (PIM)	<ul style="list-style-type: none"> Open or short in vacuum sensor circuit Vacuum sensor ECU 	○	FI-98 FI-114
41	 FI1614	Throttle Position Sensor Signal	ON*3	ON	Open or short detected continuously for 0.5 sec. or more in throttle sensor tVTAj circuit.	<ul style="list-style-type: none"> Open or short in throttle position sensor circuit Throttle position sensor Engine (& ECT) ECU 	○	FI-96 FI-112
42	 FI1615	Vehicle Speed Sensor Signal	OFF	OFF	(MIT) SPD signal is not input to ECU for at least 8 seconds during high load driving with engine speed between 3,100 rpm and 5,000 rpm. (AJT) NSW OFF and engine speed 3,100 rpm or more	<ul style="list-style-type: none"> Open or short in vehicle speed sensor circuit Vehicle speed sensor Engine (& ECT) ECU 	○	—
43	 FI1616	Starter Signal	N.A.	OFF	No starter signal is not input to ECU even once after ignition.	<ul style="list-style-type: none"> Open or short in starter signal circuit Open or short in IG SW or main relay circuit Engine (& ECT) ECU 	X	FI-102 FI-118
52	 FI1618	Knock Sensor Signal	ON	N.A.	In area of knock control signal from knock sensor is not input to ECU for 6 revolutions. 1KNky	<ul style="list-style-type: none"> Open or short in knock sensor circuit Knock sensor (looseness, etc.) Engine 1& ECTy ECU 	○	—
71*4	 FI2622	EGR System Malfunction	ON	ON	50 seconds from start of EGR operation, EGR gas temp. is less than 70°C with coolant temp. 80°C 1176°Fj or more.	<ul style="list-style-type: none"> Open in EGR gas temp sensor circuit Open in VSV circuit for EGR EGR vacuum hose disconnected, valve stuck Clogged in EGR gas passage Engine (& ECT) ECU 	○	FI-107 FI-123
51	 FI1617	Switch Condition Signal	N.A.	OFF	Displayed when A/C is ON IDL contact OFF or shift position in "R", "D", "2", or "1" ranges with the check terminals E1 and TE1 connected.	<ul style="list-style-type: none"> A/C switch circuit Throttle position sensor IDL circuit Neutral start switch circuit Accelerator pedal, cable Engine (& ECT) ECU 	X	FI-96 FI-122

REMARKS:

- *1: "ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected. "OFF" indicates that the "CHECK" Engine Warning Light does not light up during malfunction diagnosis, even if a malfunction is detected. "N.A." indicates that the item is not included in malfunction diagnosis.
- *2: "0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs. Accordingly, output of diagnostic results in normal or test mode is performed with the ignition switch ON.
- *3: The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.
- * 4: Code 26, 27 and 71 is used only for California specifications.
- * 5: "2 trip detection logic" (See page [FI-40.](#))

DIAGNOSTIC CODE DETECTION DRIVING PATTERN (5S-FE)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	21	Main Oxygen Sensor Circuit
<p>Malfunction: Deterioration of Oxygen Sensor</p> <p>(Vehicle speed)</p> <p>50 mph</p> <p>40 mph</p> <p>⑥</p> <p>⑤</p> <p>④</p> <p>③</p> <p>②</p> <p>①</p> <p>Idling IG SW OFF</p> <p>3 min.</p> <p>1 - 2 min.</p> <p>(Time)</p>		
<p>P01713</p> <ol style="list-style-type: none"> ① Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF. ② Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF. ③ Start the engine and warm the engine up with all accessory switches OFF. ④ After the engine is warmed up, let it idle for 3 minutes. ⑤ Accelerate gradually and maintain at approximately 1,500 rpm, or within the 1,300 to 1,700 rpm range. Turn the A/C on, and drive in "D" for automatic, or in case of manual transmission, upshift appropriately. Shift carefully so that the engine speed would not fall below 1,200 rpm. Depress the accelerator pedal gradually and maintain a steady speed to avoid engine braking. ⑥ Maintain the vehicle speed at 40 – 50 mph. Keep the vehicle running for 1 – 2 minutes after starting acceleration. <p>HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step (6)</p> <p>NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.</p>		

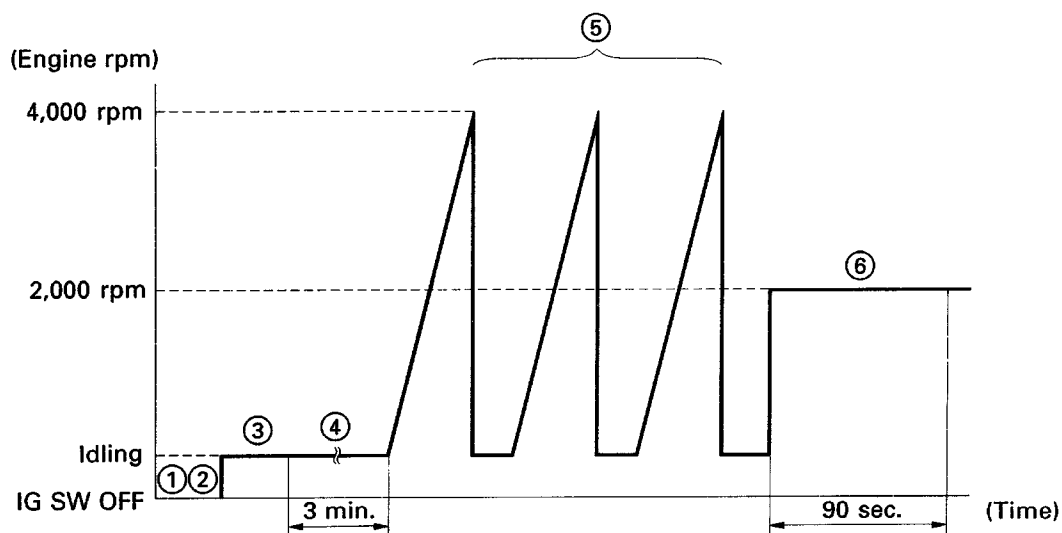
DIAGNOSTIC CODE DETECTION DRIVING PATTERN (5S-FE) (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	25	Air-Fuel Ratio Lean Malfunction
	26	Air-Fuel Ratio Rich Malfunction

Malfunction: Open or Short in Main Oxygen Sensor



P02491

- ① Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF.
- ② Initial test mode: Connect terminal TE2 and E1 of check connector with ignition switch OFF.
- ③ Start the engine and warm the engine up, with all accessory switches OFF.
- ④ After the engine is warmed up, let it idle for 3 minutes.
- ⑤ Accelerate rapidly to 4,000 rpm three times.
- ⑥ Maintain at 2,000 rpm for 90 seconds.

HINT: If a malfunction is detected, the "CHECK" engine warning light will light up during step 6.

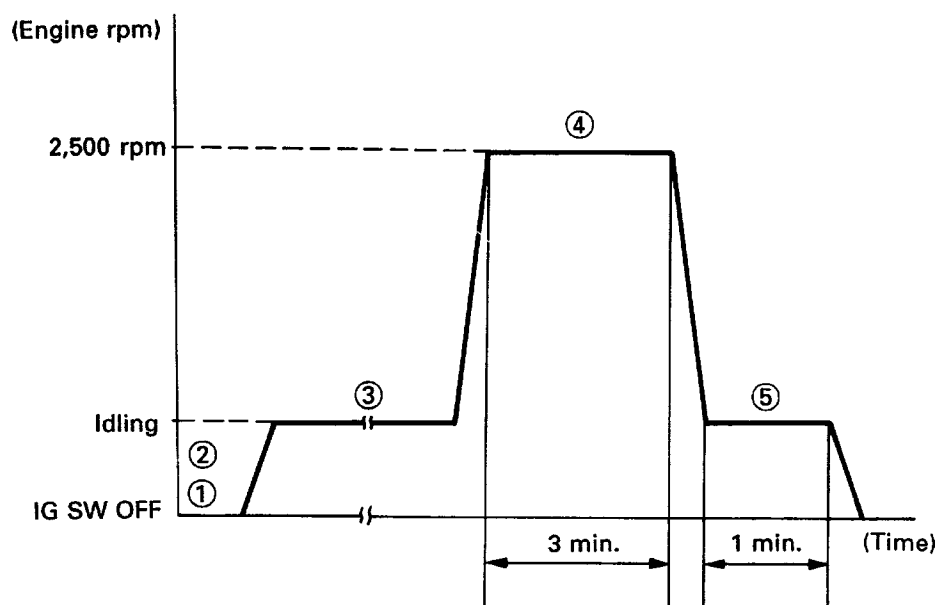
NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

DIAGNOSTIC CODE DETECTION DRIVING PATTERN (5S-FE) (Cont'd)**Purpose of the driving pattern.**

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	25	Air-Fuel Ratio Lean Malfunction (California)
	26	Air-Fuel Ratio Rich Malfunction (California)

Malfunction: Open or Short in Oxygen Sensor, Open or Short in Injector Leak, Blockage, Loose Engine Earth Bolt



P01711

HINT: Before this test, check the feedback voltage for oxygen sensor.

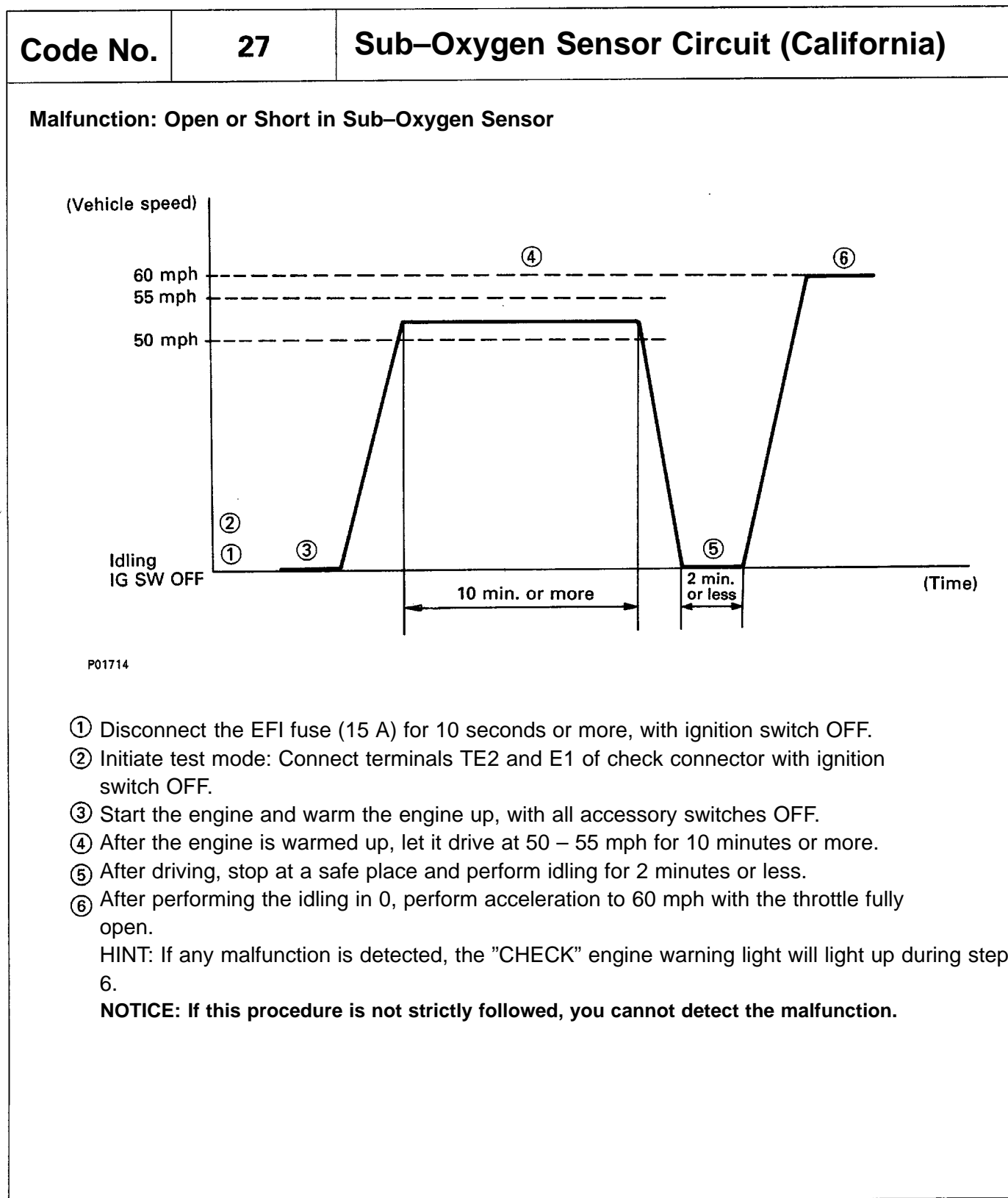
- ① Disconnect the EFI fuse ^15 Aj for 10 seconds or more, with ignition switch OFF.
 - ② Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF.
 - ③ Start the engine and warm the engine up.
 - ④ After the engine is warmed up, maintain at 2,500 rpm for 3 minutes.
 - ⑤ Let it idle for 1 minute.
- HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step 6.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

DIAGNOSTIC CODE DETECTION DRIVING PATTERN (5S-FE) (Cont'd)

Purpose of the driving pattern.

- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

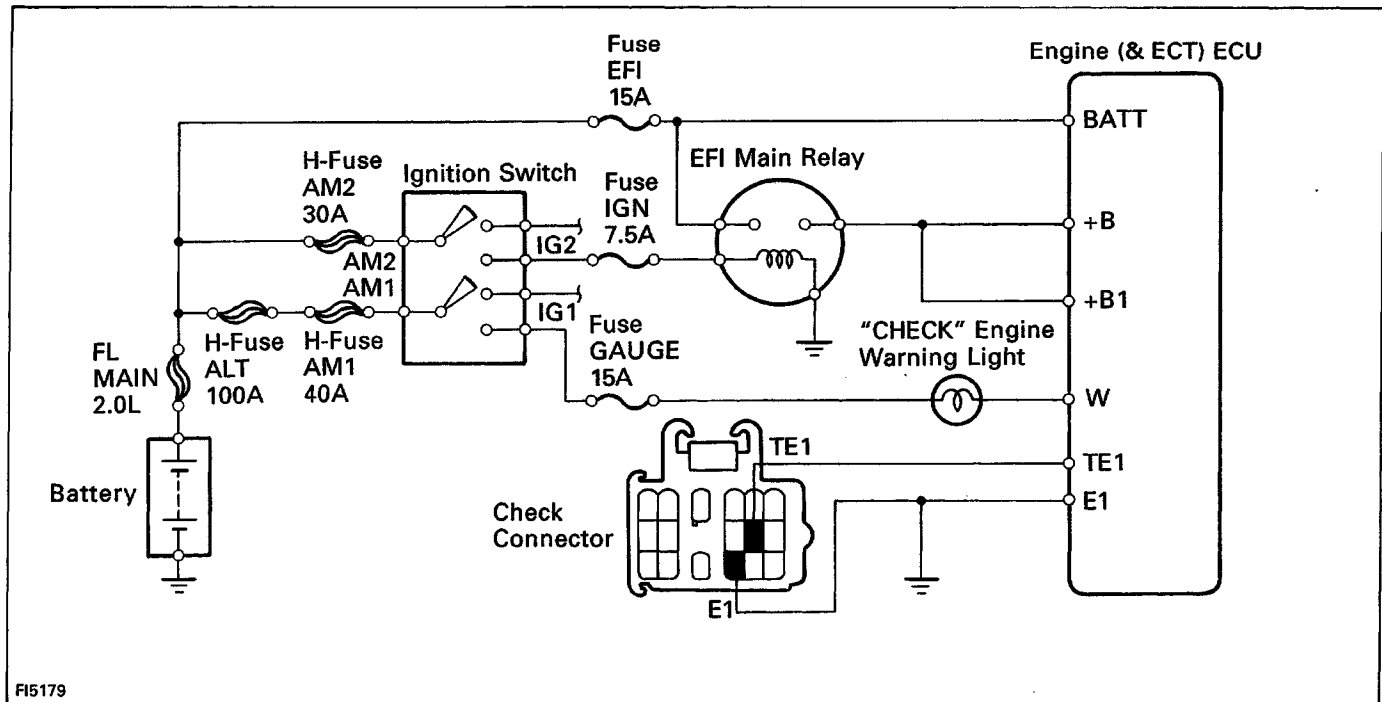


DIAGNOSTIC CODE DETECTION DRIVING PATTERN (5S-FE) (Cont'd)**Purpose of the driving pattern.**

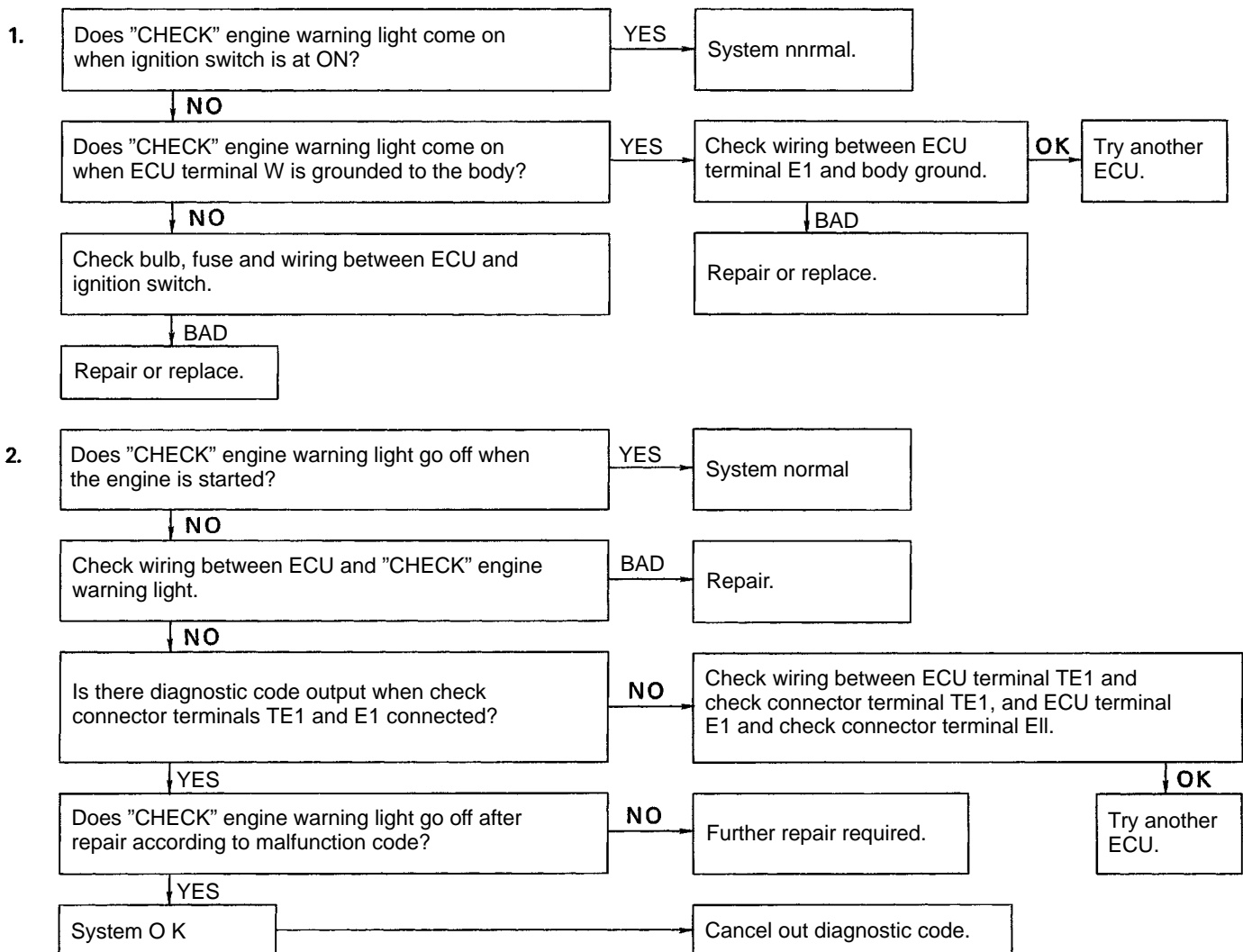
- (a) To simulate diagnostic code detecting condition after diagnostic code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed, confirming that diagnostic code is no longer detected.

Code No.	71	EGR System Malfunction (California)
<p>Malfunction: Short in VSV Circuit for EGR, Loose EGR Hose, Valve Stuck</p>		
<p>P01712</p> <ol style="list-style-type: none"> ① Disconnect the fuse EFI (15 A) for 10 seconds or more, with ignition switch OFF. ② Initiate test mode: Connect terminals TE2 and E1 of check connector with ignition switch OFF. ③ Start engine and warm engine up. ④ After engine is warmed up, let it idle for 3 minutes. ⑤ With the A/C switch OFF and transmission in 5th gear ("D" range for A/T), drive at 55 – 60 mph for 4 minutes. <p>HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step (6)</p> <p>NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.</p>		

INSPECTION OF DIAGNOSIS CIRCUIT



FI5179

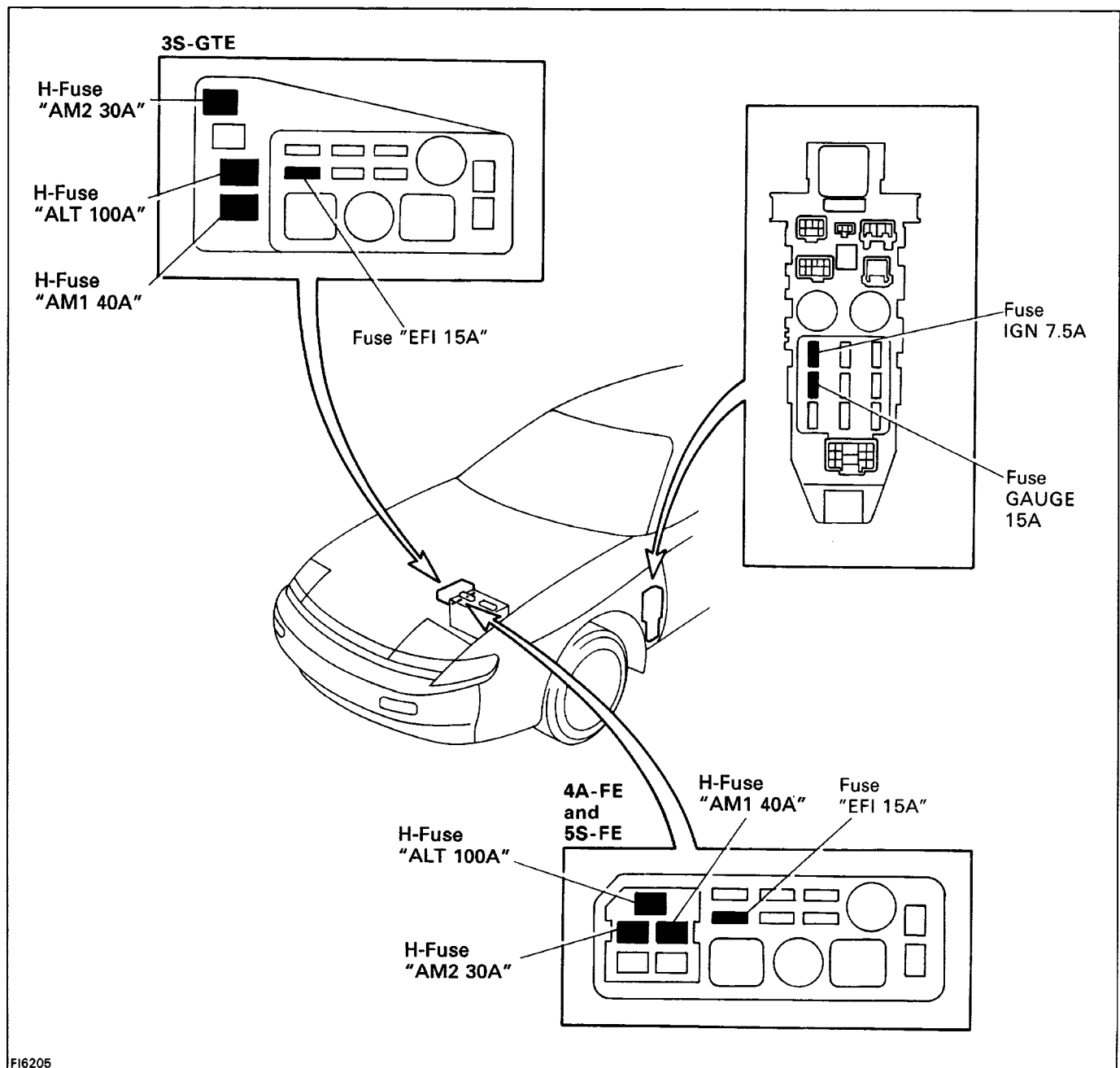


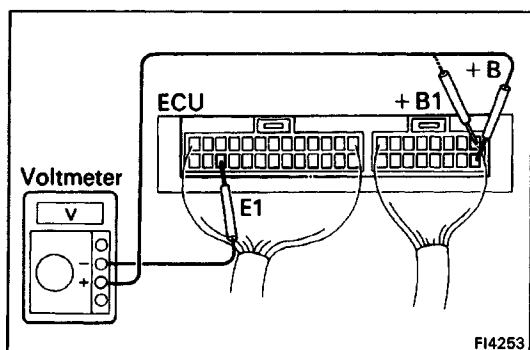
TROUBLESHOOTING WITH VOLT OHMMETER

HINT:

- The following troubleshooting procedures are designed for inspection of each separate system, and therefore the actual procedure may vary somewhat. However, troubleshooting should be performed while referring to the inspection methods described in this manual.
- Before beginning inspection, it is best to first make a simple check of the fuses, fusible links and the condition of the connectors.
- The following troubleshooting procedures are based on the supposition that the trouble lies in either a short or open circuit within the computer.
- If engine trouble occurs even though proper operating voltage is detected in the computer connector, then it can be assumed that the ECU is faulty and should be replaced.

LOCATION OF FUSES AND FUSIBLE LINKS



**EFI SYSTEM CHECK PROCEDURE (4A-FE)****HINT**

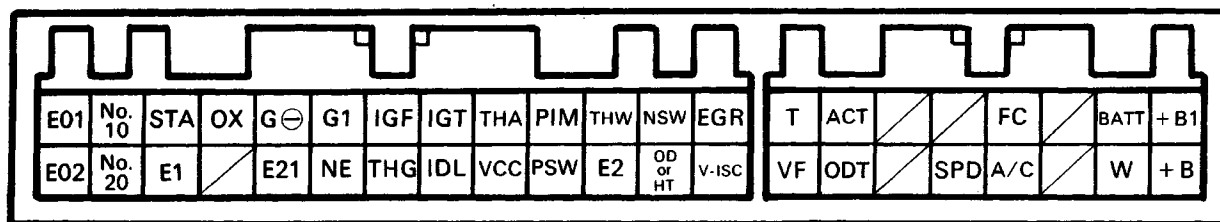
- Perform all voltage measurements with the connectors connected.
 - Verify that the battery voltage is 11 V or more when the ignition switch is in "ON" position.
- Using a voltmeter with high impedance (10 k Ω /V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of Engine ECU (4A-FE)

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	IGT	IGNITER	ACT	A/C AMPLIFIER
E02	POWER GROUND	IDL	THROTTLE POSITION SENSOR	*2 ODT	O/D SOLENOID
No.10	INJECTOR	THA	INTAKE AIR TEMP. SENSOR		
No.20	INJECTOR	VCC	VACUUM SENSOR		-
STA	STARTER SWITCH	PIM	VACUUM SENSOR		
E1	ENGINE GROUND	PSW	THROTTLE POSITION SENSOR	SPD	SPEED SENSOR
OX	OXYGEN SENSOR	THW	WATER TEMP. SENSOR	FC	CIRCUIT OPENING RELAY
	-	E2	SENSOR GROUND	A/C	A/C COMPRESSOR
G\ominus	DISTRIBUTOR GROUND	NSW	NEUTRAL START SWITCH		
E21	SENSOR GROUND	*1 OD *2 HT	O/D SOLENOID OXYGEN SENSOR HEATER		
G1	DISTRIBUTOR	EGR	EG R VSV	BATT	BATTERY
NE	DISTRIBUTOR	V-ISC	ACV vsv	W	WARNING LIGHT
IGF	IGNITER	T	CHECK CONNECTOR	+ B1	EFI MAIN RELAY
*1 THG	EGR GAS TEMP. SENSOR	VF	CHECK CONNECTOR	B	EFI MAIN RELAY

Engine ECU Terminals

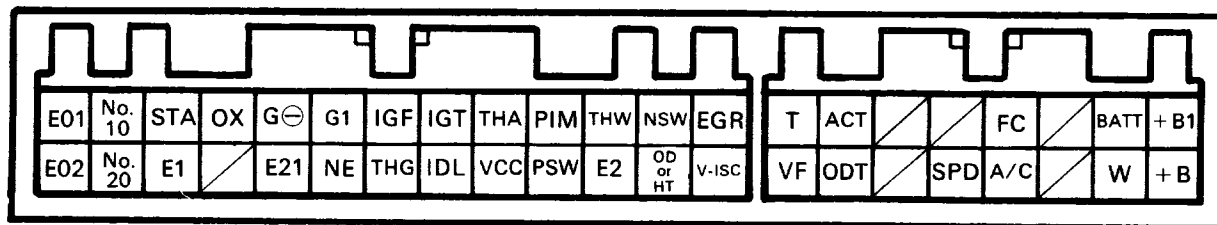
.1 CALIF. only
*2 Ex. CALI F.

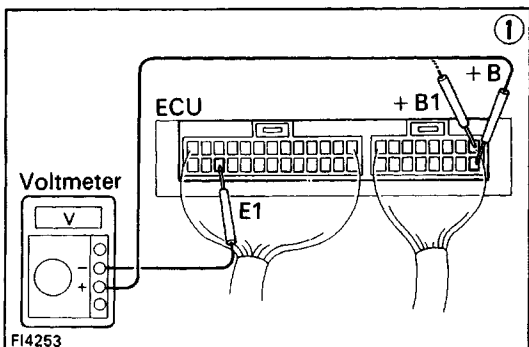
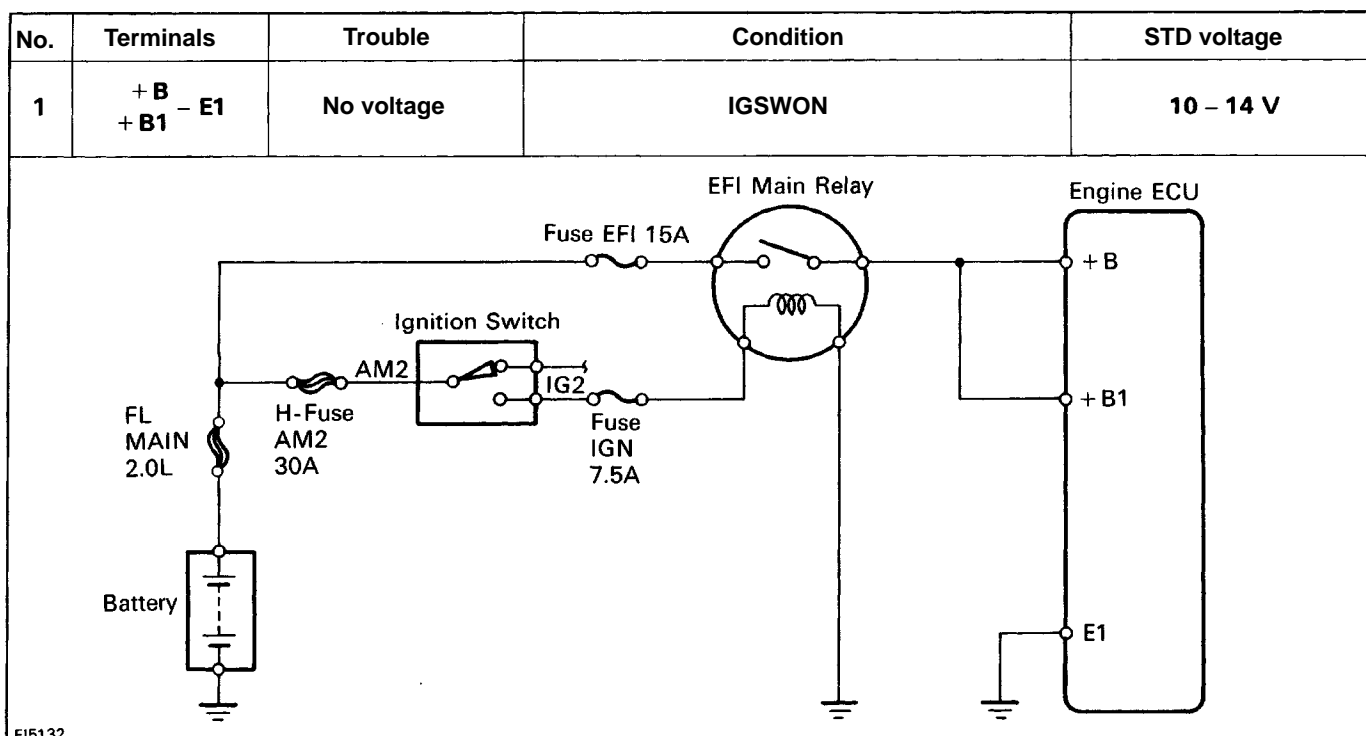


Voltage at Engine ECU Wiring Connectors (4A-FE)

No.	Terminals	Condition		STD voltage (V)	See page
1	+B – E1 +B1 – E1	IG SW ON		10 – 14	FI-61
2	BATT – E1	–		10 – 14	FI-62
3	IDL – E2	IG SW ON	Throttle valve open	10 – 14	FI-63
	PSW – E2		Throttle valve fully closed	10 – 14	
4	PIM – E2	IG SW ON		3.3 – 3.9	FI-64
	VCC – E2			4.5 – 5.5	
5	No.10 – E01 No.20 – E02			10 – 14	FI-65
6	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3	FI-66
7	THW – E2		Coolant temp. 80°C (176°F)	2.0 – 2.8	FI-67
8	STA – E1	Cranking		6 – 14	FI-68
9	IGT – E1	Cranking or idling		0.7 – 1.0	FI-69
10	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	FI-70
11	A/C – E1	IG SW ON	Air conditioning ON	8 – 14	FI-71

Engine ECU Terminals





(1) There is no voltage between ECU terminals + B or + 131 and E1. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + 131 and body ground. (IG SW ON)

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check fuses, H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check EFI main relay. (See page FI-216)

BAD

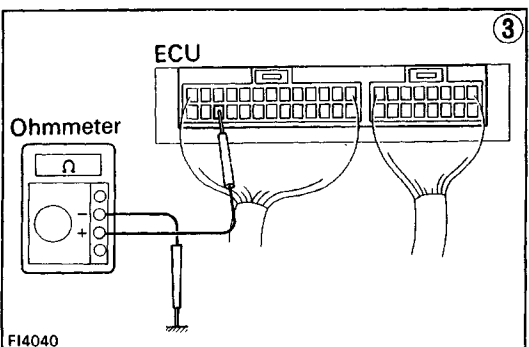
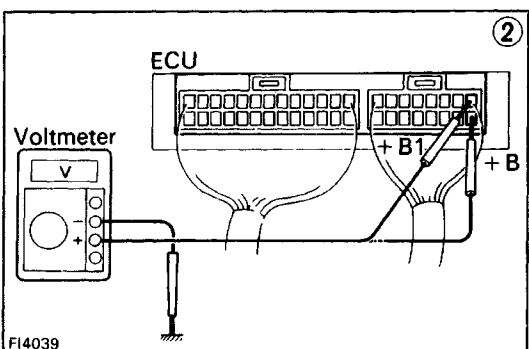
Replace.

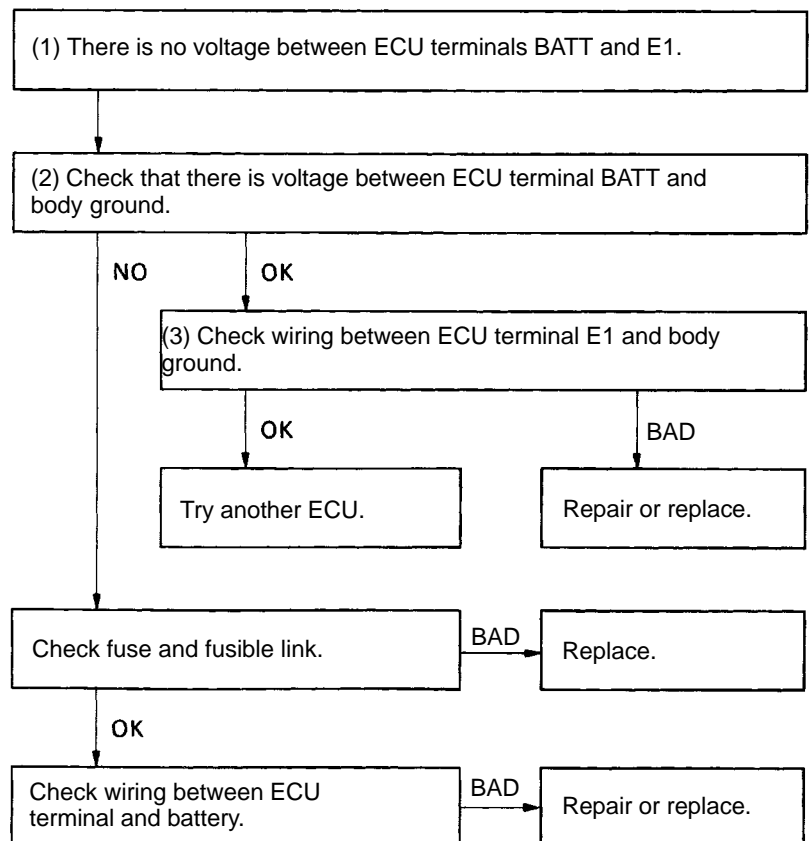
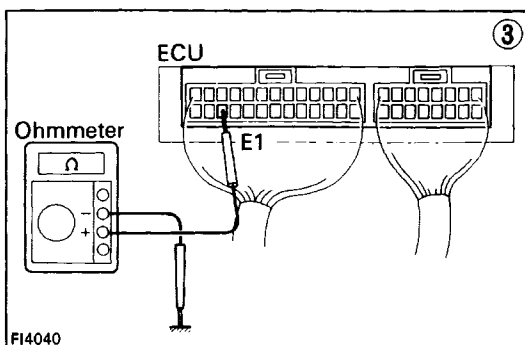
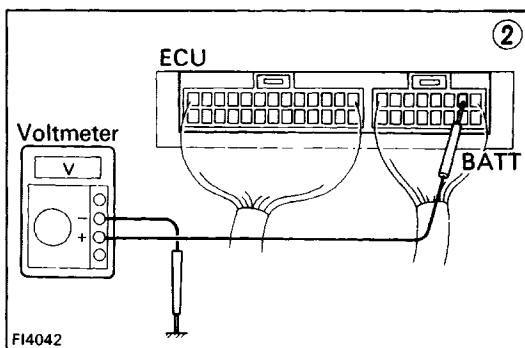
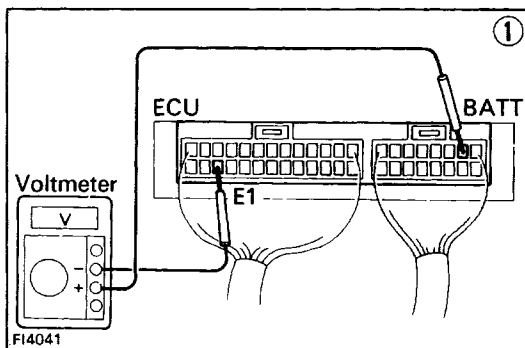
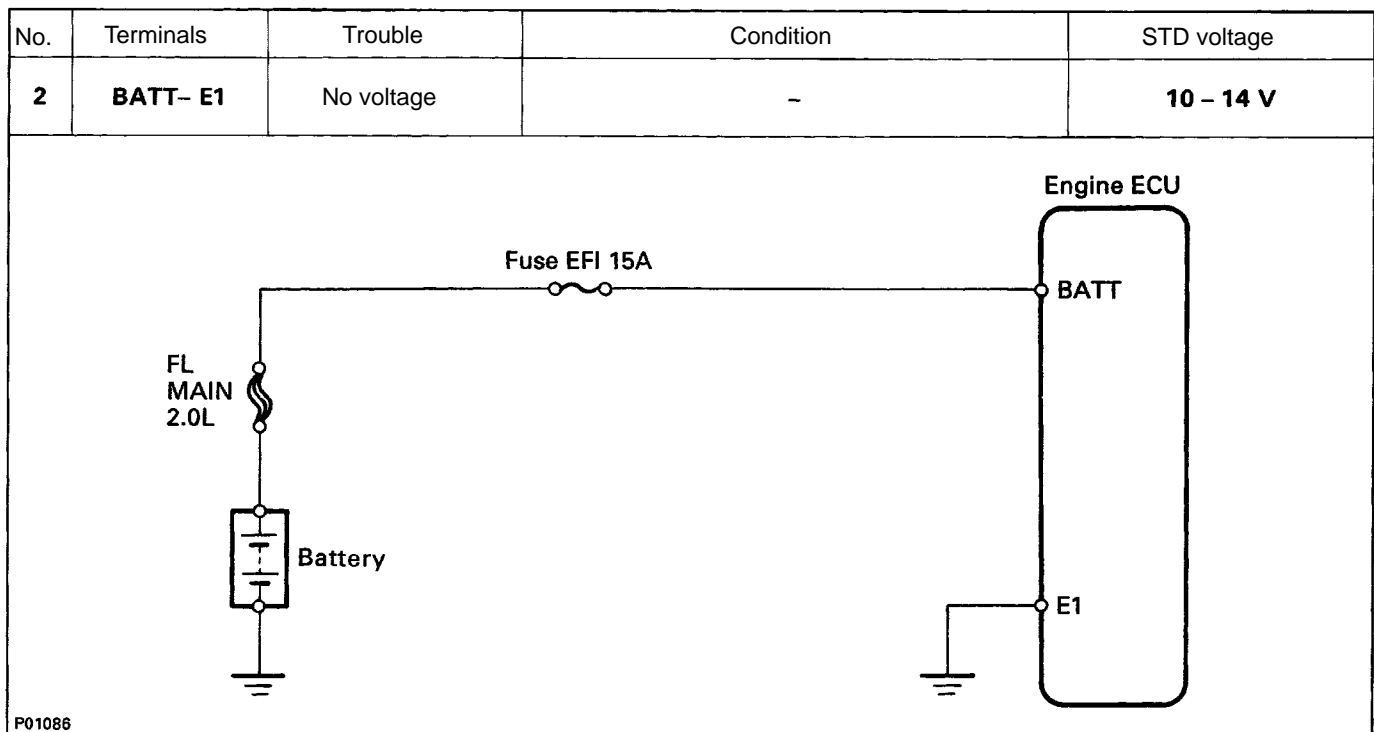
OK

Check wiring between EFI main relay and battery.

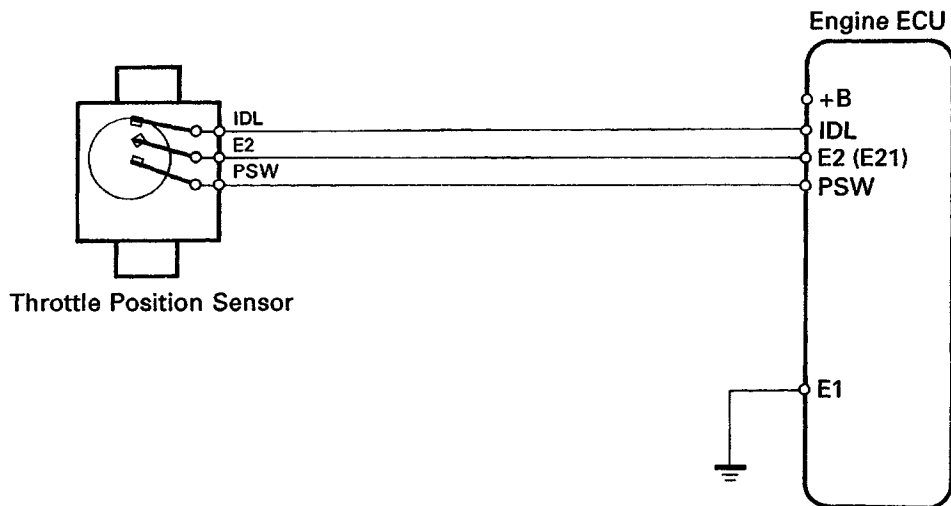
BAD

Repair or replace.

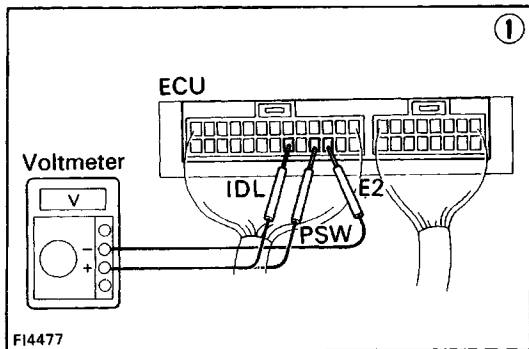




No.	Terminals	Trouble	Condition		STD voltage
3	IDL - E2	No voltage	IG SW ON	Throttle valve open	10 - 14 V
	PSW - E2			Throttle valve fully closed	10 - 14 V



P02927



• IDL - E2, PSW - E2

(1) There is no voltage between ECU terminals IDL or PSW and E2. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Refer to No.1.
(See page FI-61)

BAD

Repair or replace.

OK

(3) Check throttle position sensor.
(See page FI-185)

BAD

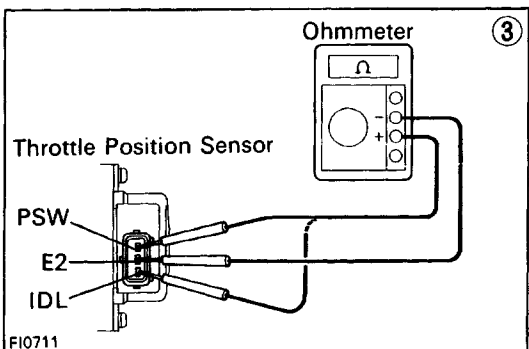
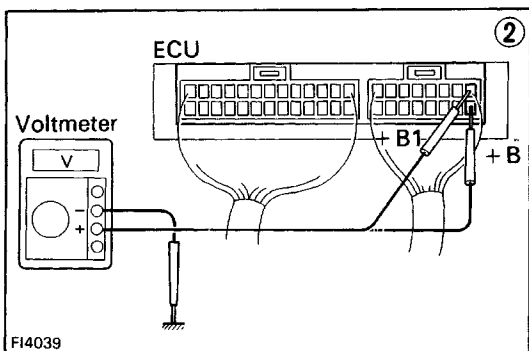
Replace or repair throttle position sensor.

OK

Check wiring between ECU and throttle position sensor.

OK

Try another ECU.

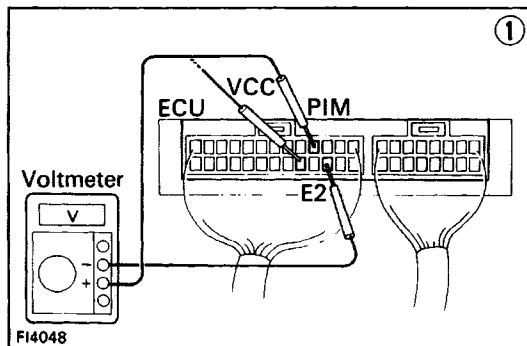


No.	Terminals	Trouble	Condition	STD voltage
4	PIM – E2	No voltage	IG SW ON	3.3 – 3.9 V
	VCC – E2			4.5 – 5.5 V

Vacuum Sensor
(Manifold Absolute Pressure Sensor)

Engine ECU

FI1226



• PIM – E2, VCC – E2

(1) There is no voltage between ECU terminals PIM or VCC and E2. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

Refer to No. 1.
(See page FI-61)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Check vacuum sensor.
(See page FI-233)

Repair or replace.

BAD

OK

Replace vacuum sensor.

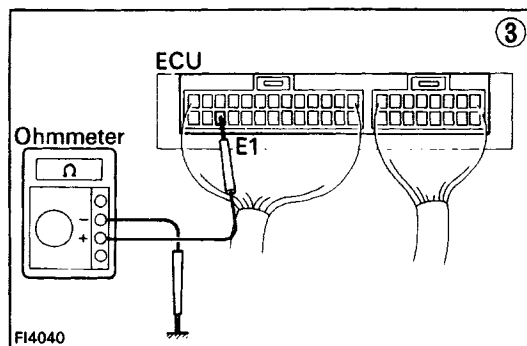
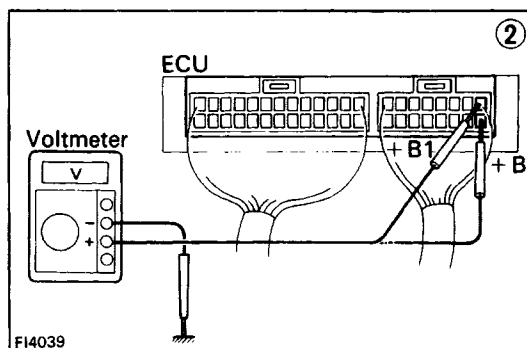
Check wiring between ECU and vacuum sensor.

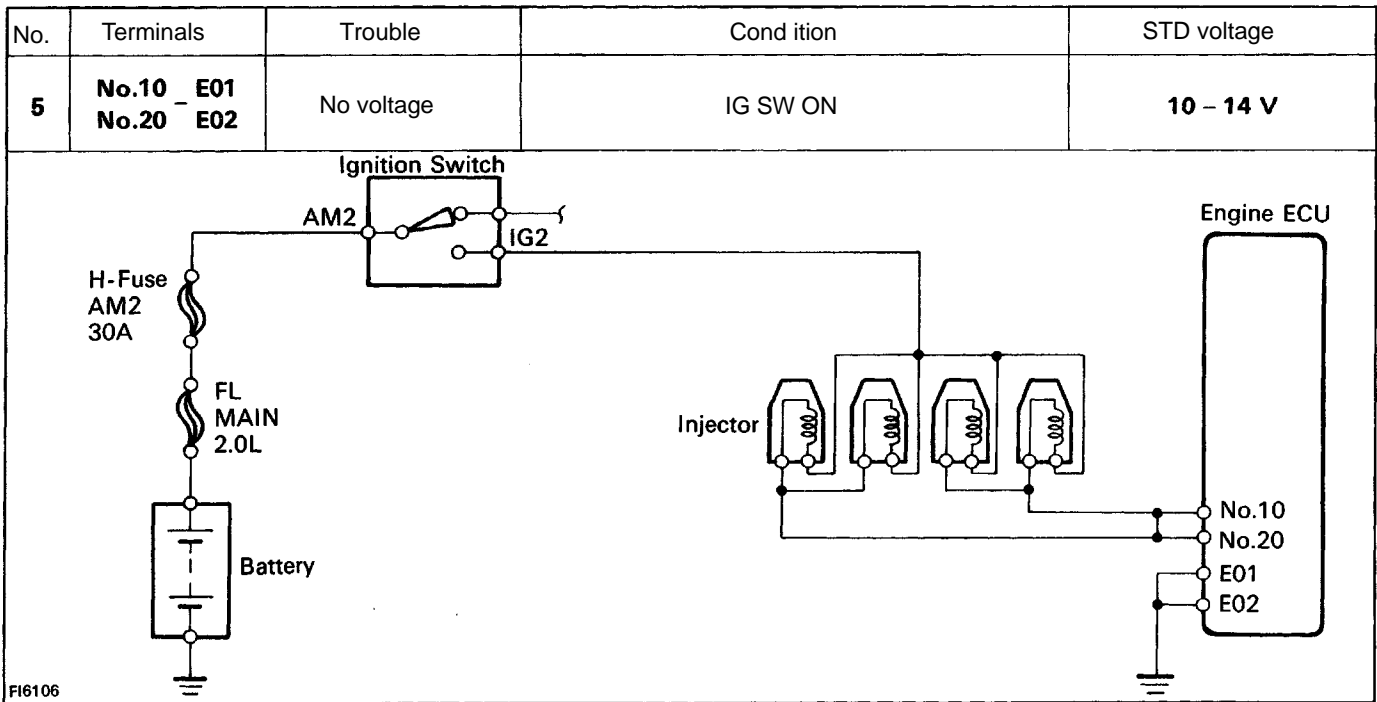
OK

BAD

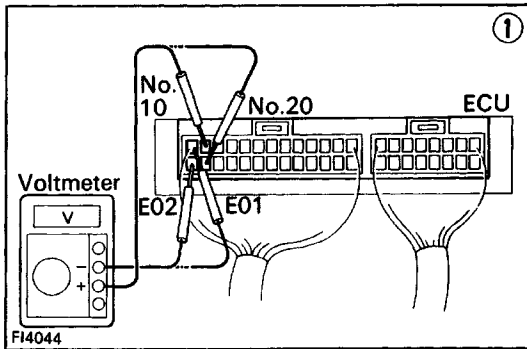
Try another ECU.

Repair or replace.

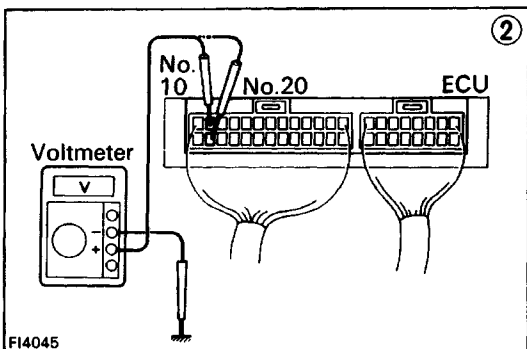




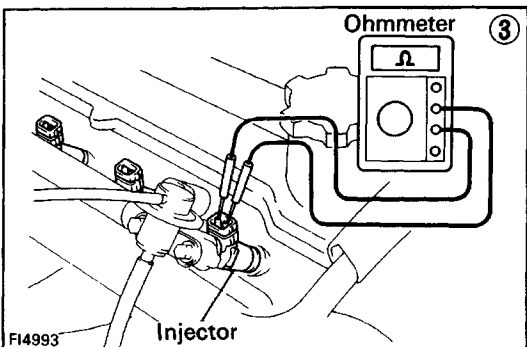
FI6106



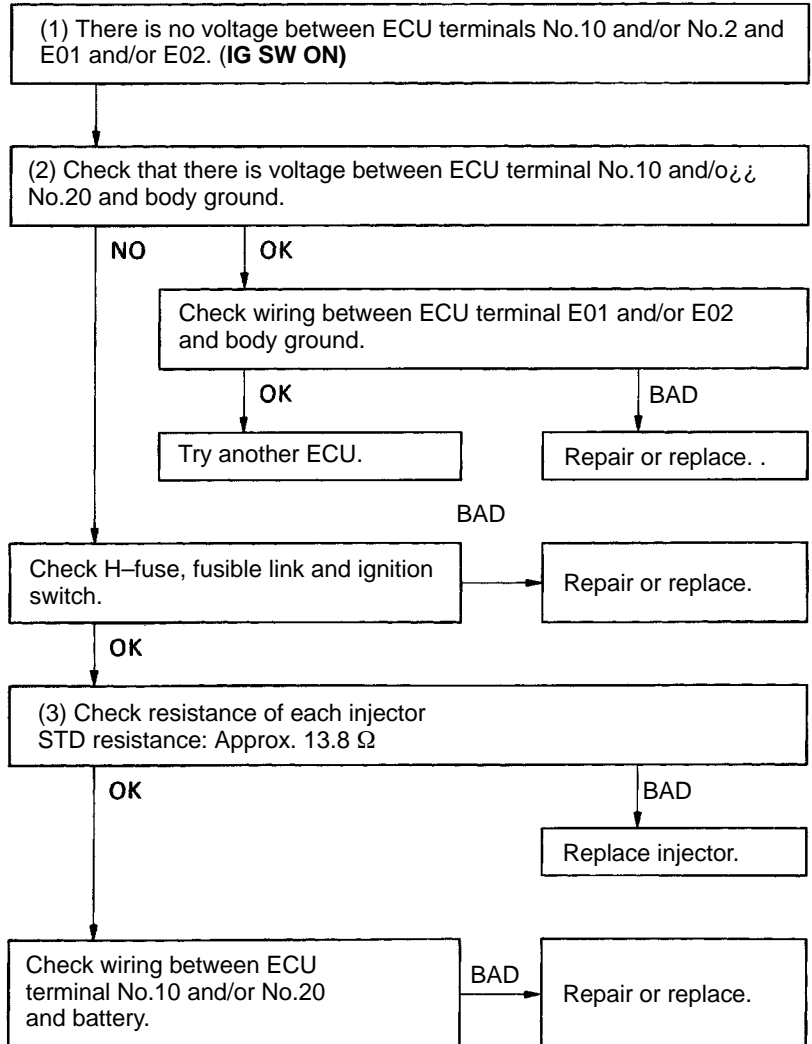
FI4044



FI4045



FI4993



No.	Terminals	Trouble	Condition		STD voltage
6	THA- E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1 - 3 V

Intake Air Temp. Sensor

Engine ECU

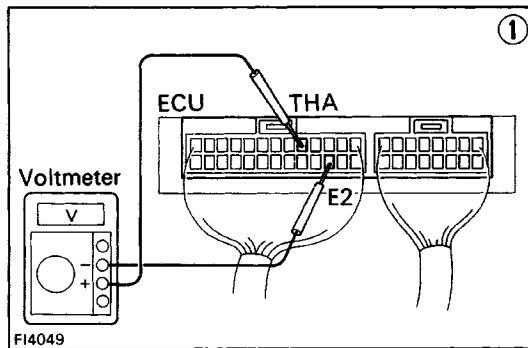
+ B (+ B1)

THA

E2 (E21)

E1

FI3572



(1) There is no voltage between ECU terminals THA and E2
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + 131 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-61)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check intake air temp. sensor.
(See page FI-232)

Repair or replace.

BAD

OK

Replace intake air temp. meter.

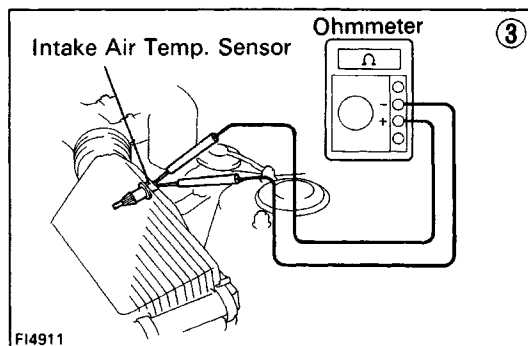
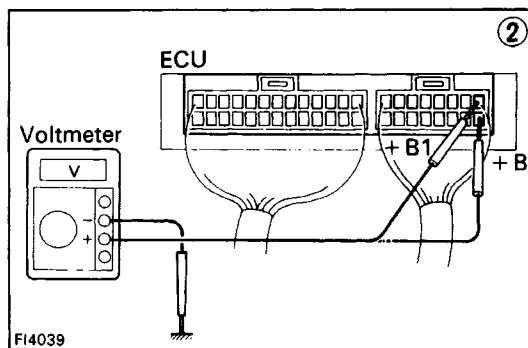
Check wiring between ECU and intake air temp. sensor.

OK

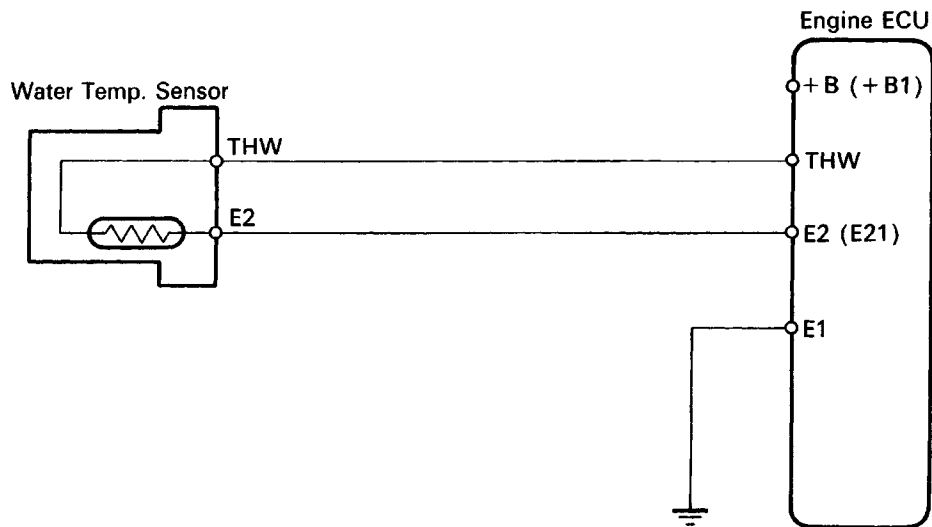
BAD

Try another ECU.

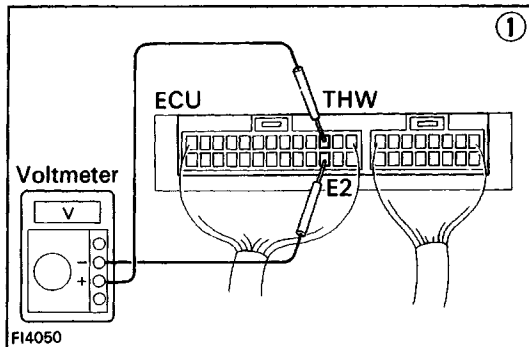
Repair or replace.



No.	Terminals	Trouble	Condition		STD voltage
7	THW- E2	No voltage	IG SW ON	Coolant temperature 80°C (176°F)	0.1 – 1.0 V



FI3572



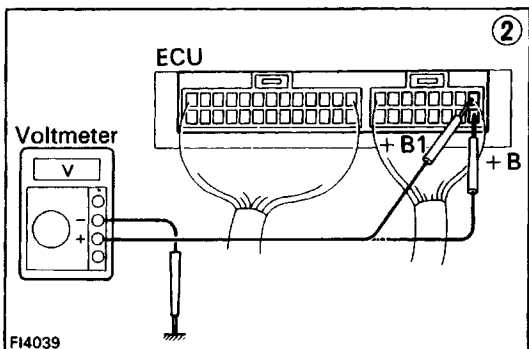
(1) There is no voltage between ECU terminals THW and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-61)



Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check water temp. sensor.
(See page FI-231)

Repair or replace.

BAD

OK

Replace water temp. sensor.

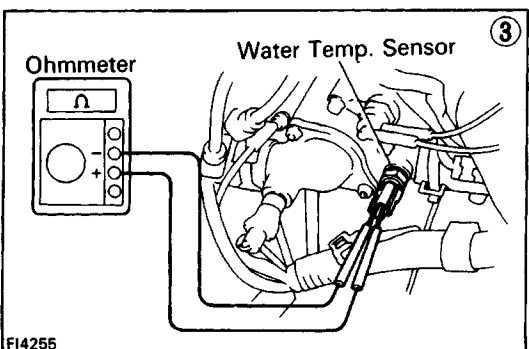
Check wiring between ECU and water temp. sensor.

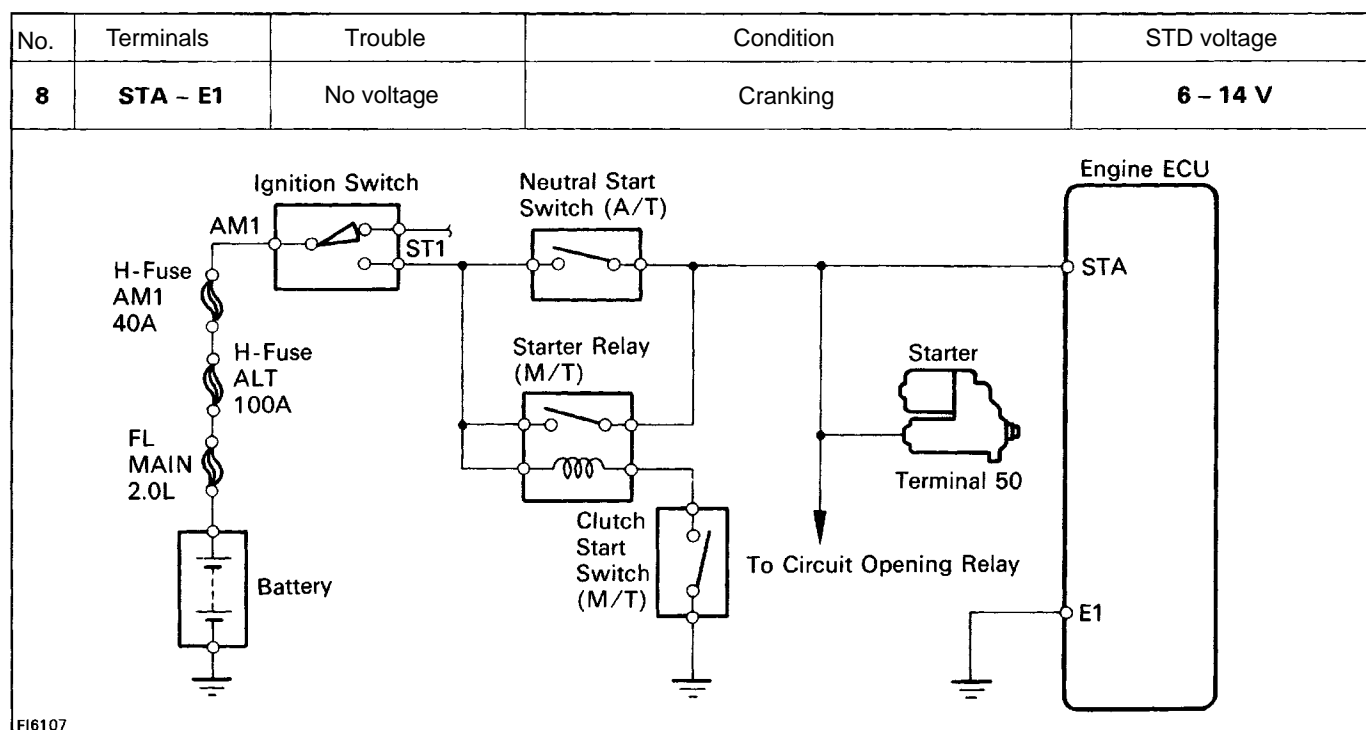
OK

BAD

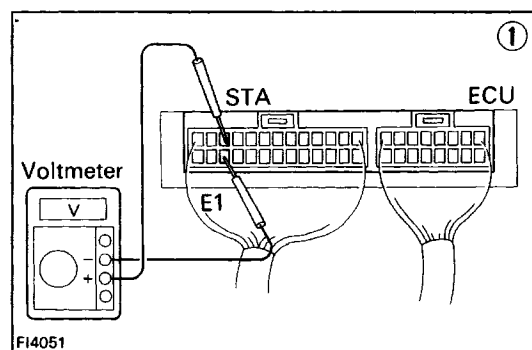
Try another ECU.

Repair or replace.

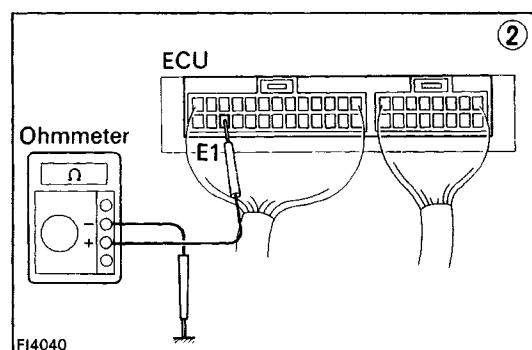




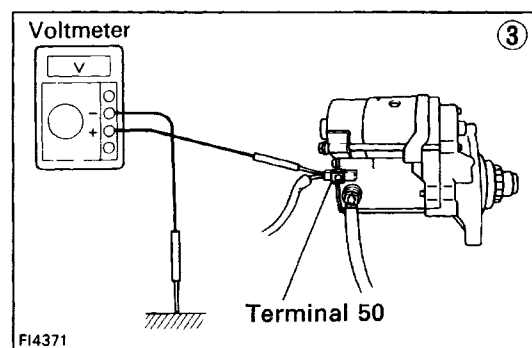
FI6107



FI4051



FI4040



FI4371

(1) There is no voltage between ECU terminals STA and E1.
(IG SW START)

Check starter operation.

OK

Check wiring between ECU terminal STA and ignition switch terminal ST1.

BAD

OK

BAD

Repair or replace.

(2) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check H-fuses fusible link, battery, wiring, ignition switch, clutch start switch, starter relay and neutral start switch.

BAD

Repair or replace.

OK

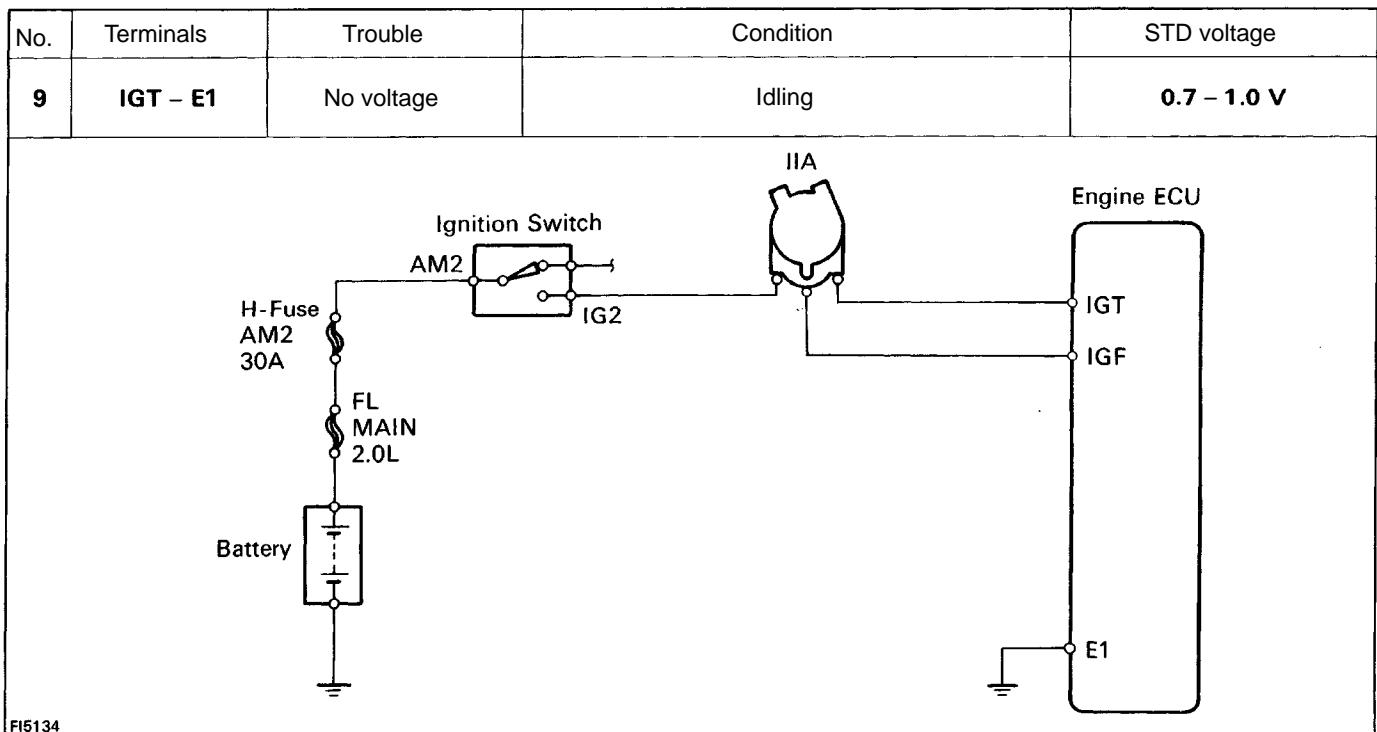
(3) Check that there is voltage at starter terminal 50.
(IG SW START) STD voltage. 6 - 14 V

OK

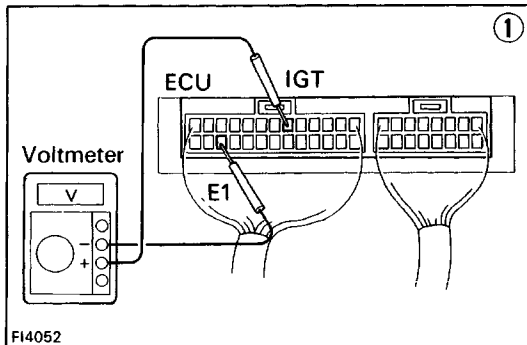
Check starter.

NO

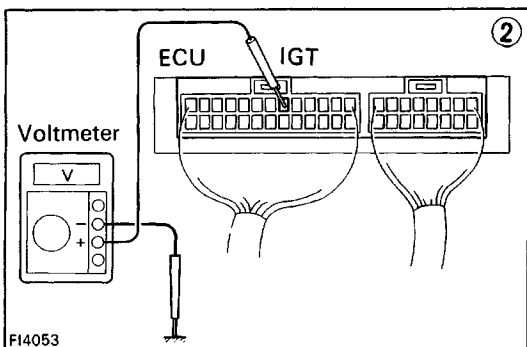
Check wiring between ignition switch terminal ST1 and starter terminal 50.



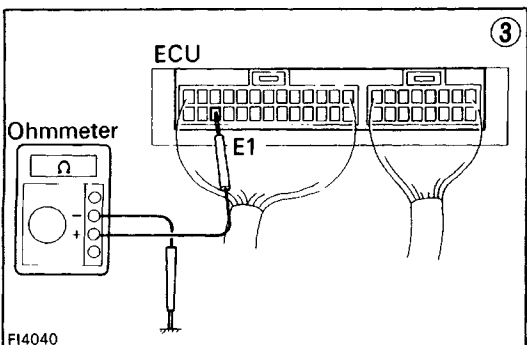
FI5134



FI4052



FI4053



FI4040

(1) There is no voltage between ECU terminals IGT and E1. **(Idling)**

(2) Check that there is voltage between ECU terminal IGT and body ground. **(Idling)**

NO OK

(3) Check wiring between ECU terminal E1 and body ground.

BAD → Repair or replace.

OK

Try another ECU.

Check H-fuse, fusible link and ignition switch.

BAD → Repair or replace.

OK

Check IIA. (See page IG-8)

BAD → Repair or replace.

OK

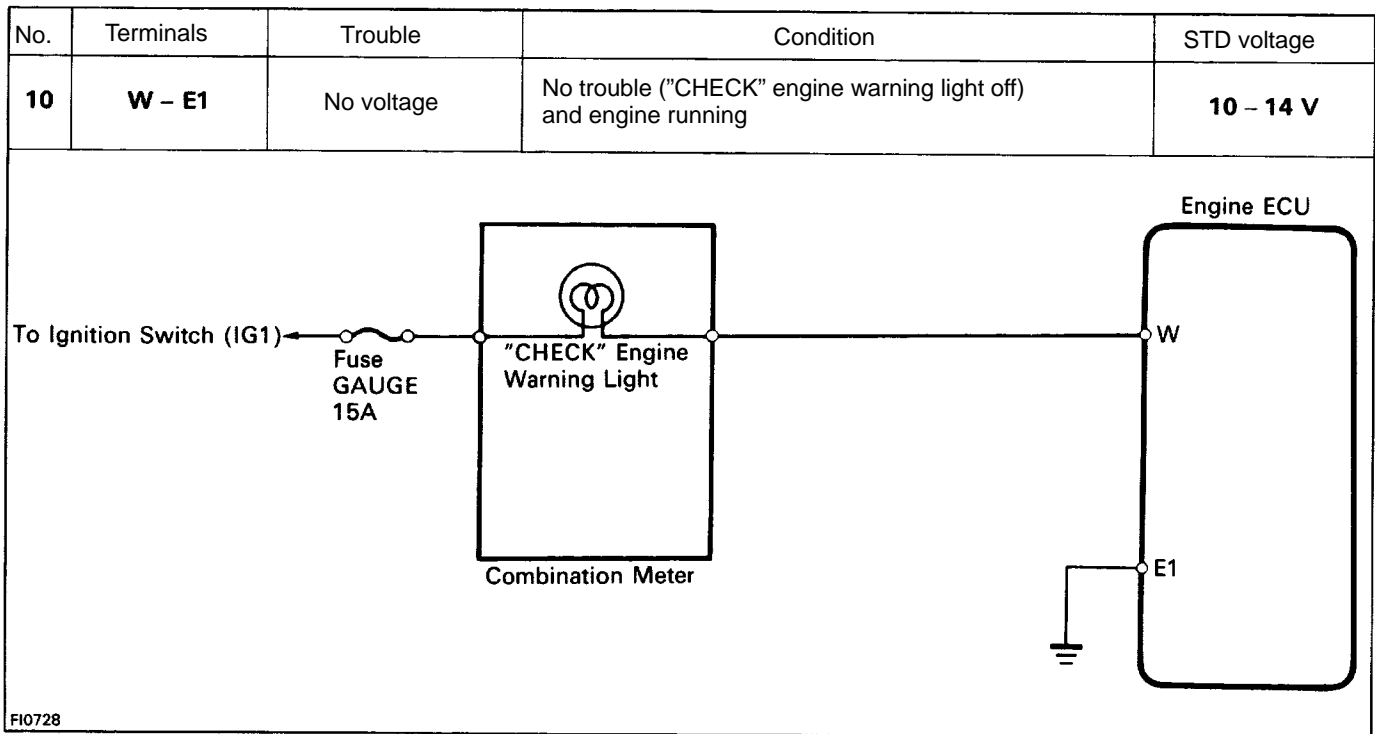
Check wiring between ECU and battery.

BAD → Repair or replace.

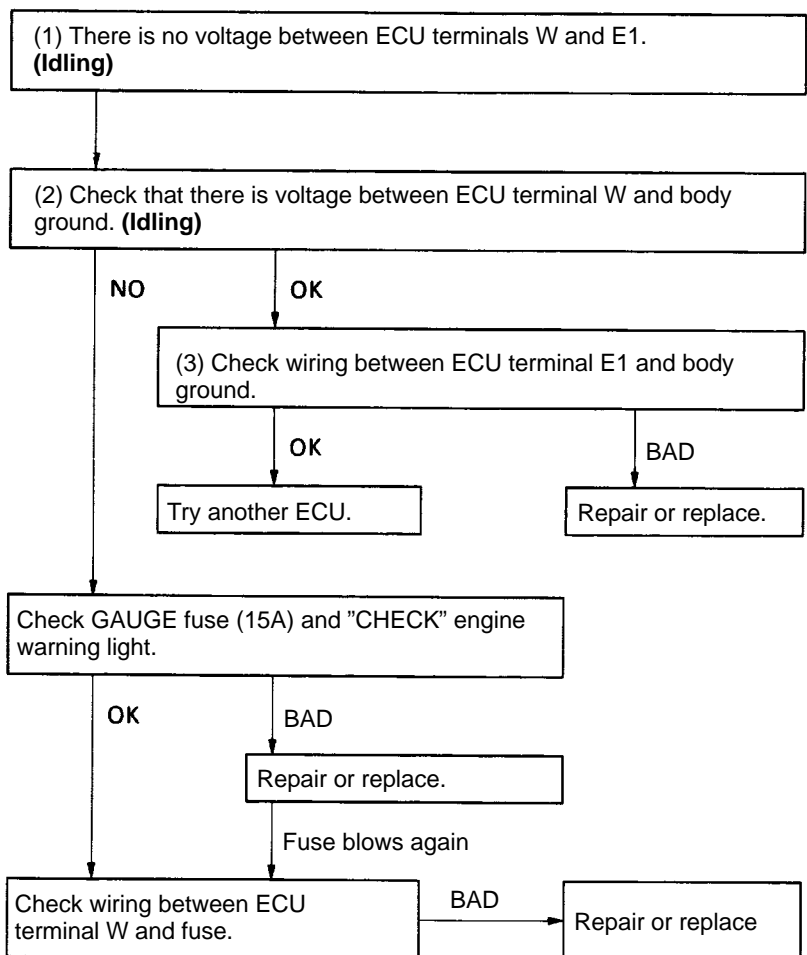
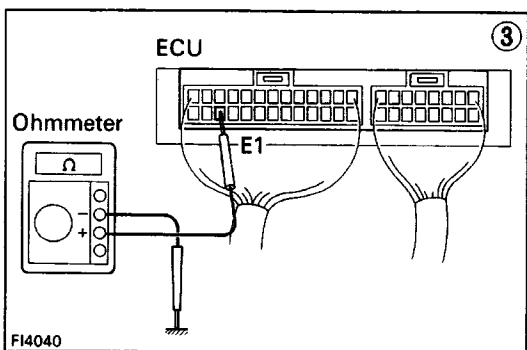
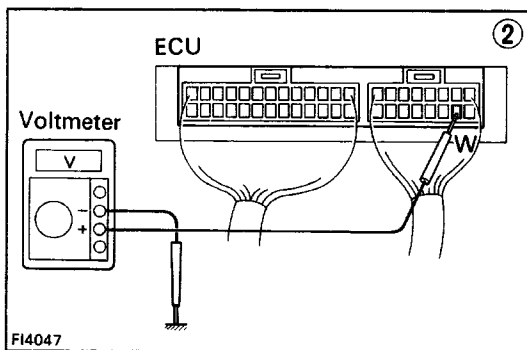
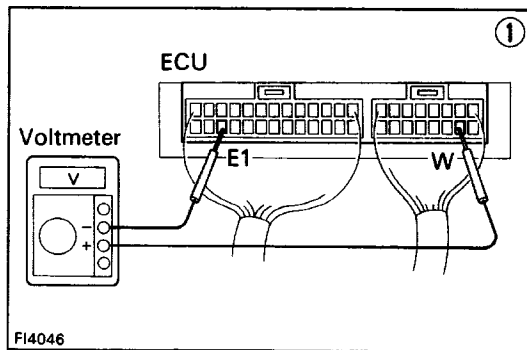
OK

Check igniter. (See page IG-9)

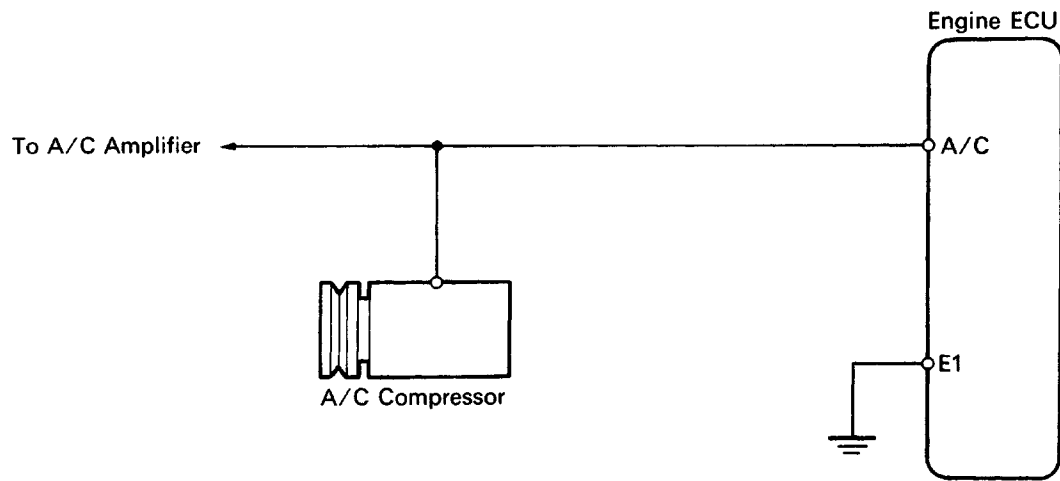
BAD → Repair or replace.



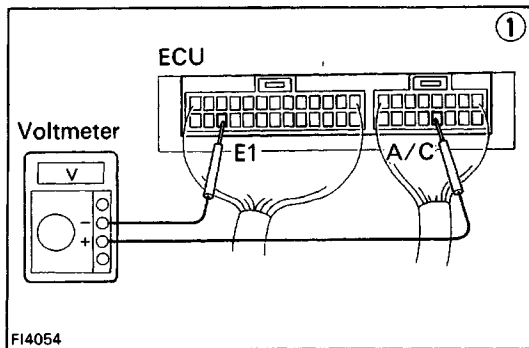
FI0728



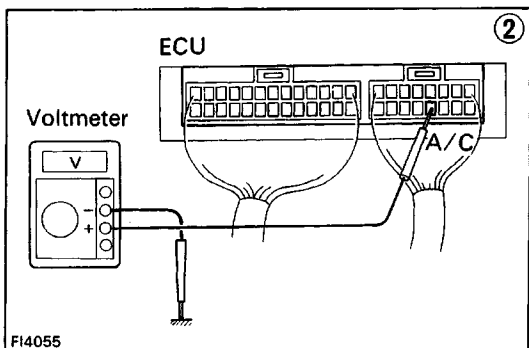
No.	Terminals	Trouble	Condition	STD voltage
11	A/C – E1	No voltage	Air conditioning ON	8 – 14 V



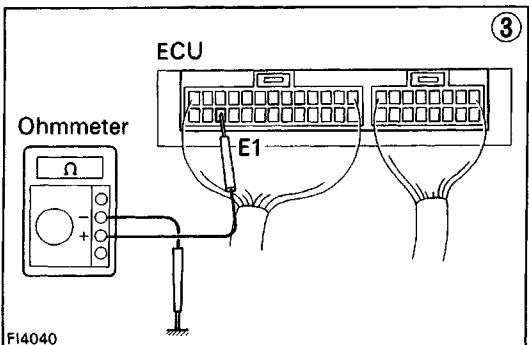
FI0922



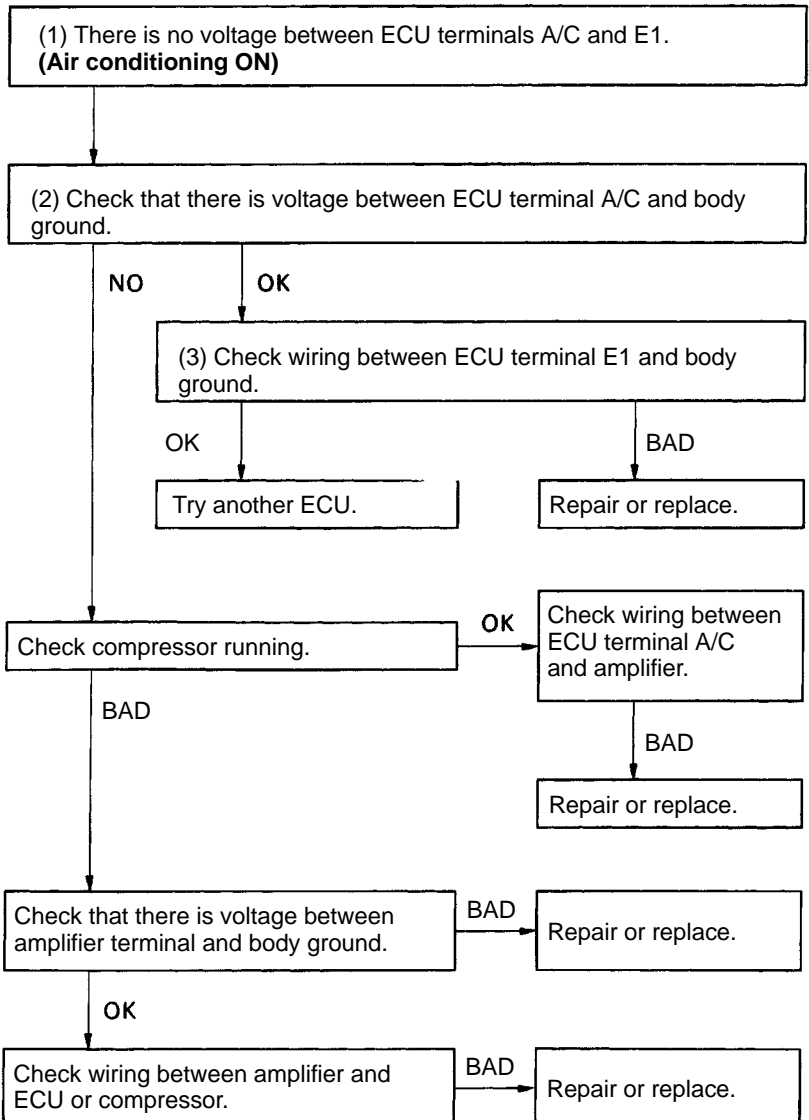
FI4054

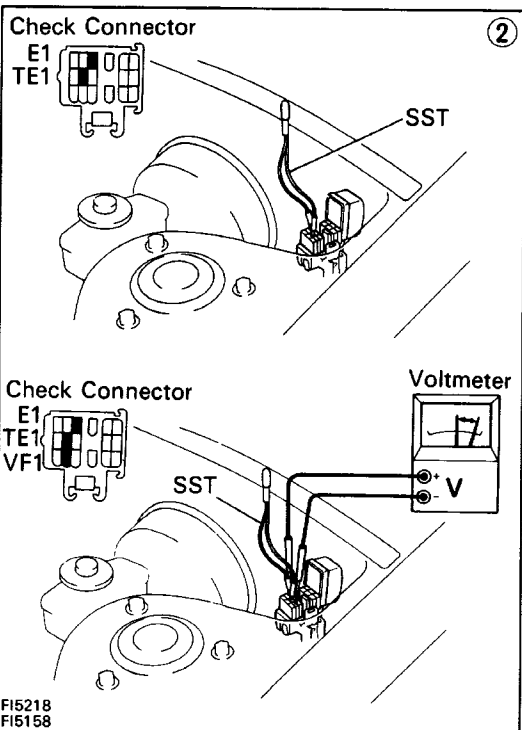
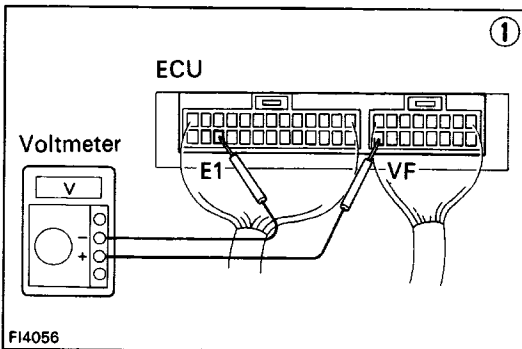
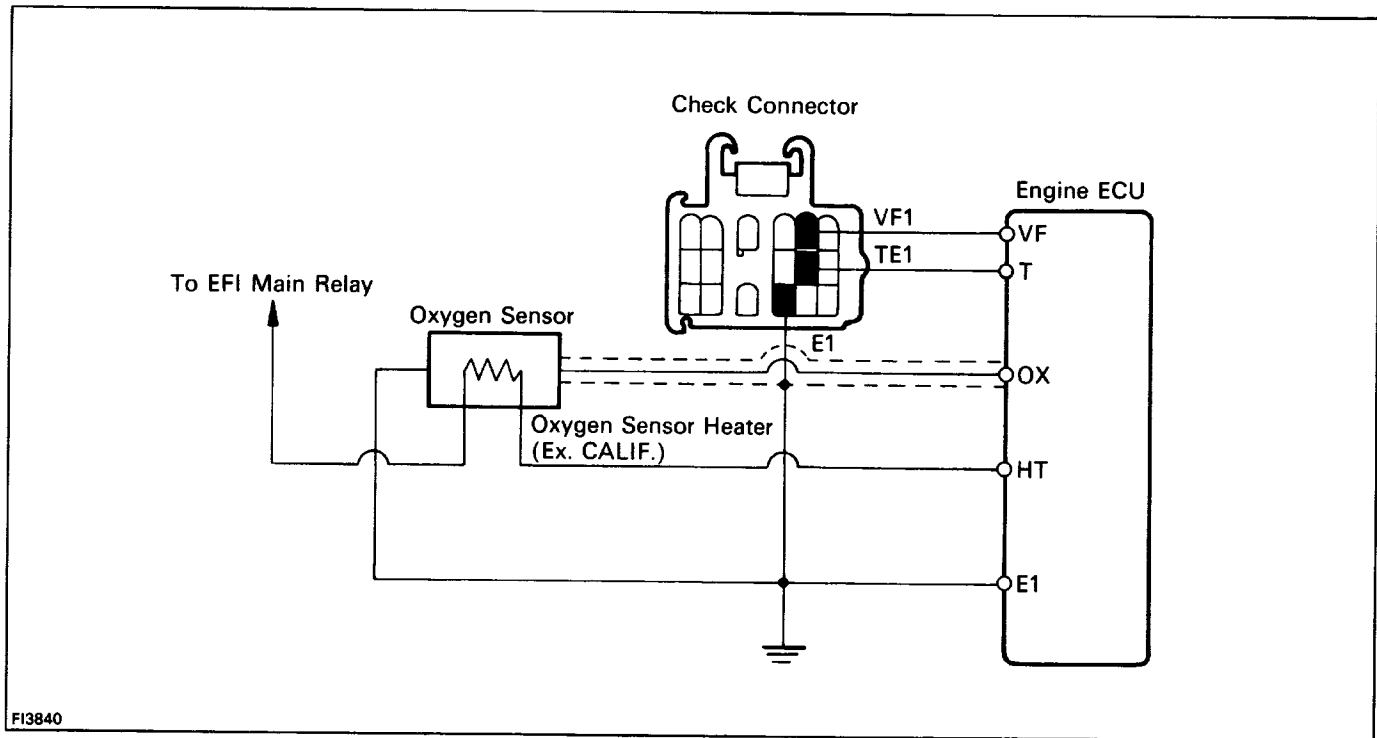


FI4055



FI4040





(1) There is no voltage between ECU terminals VF and E1.

Check that there is voltage between ECU terminal VF and body ground.

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Is air leaking into air induction system?

YES

Repair air leak.

NO

Check spark plugs. (See page IG-7)

BAD

Repair or replace.

OK

Check IIA and ignition system. (See page IG-4)

BAD

Repair or replace.

OK

Check fuel pressure. (See page FI-125)

BAD

Repair or replace.

OK

Check injectors. (See page FI-155)

BAD

Repair or replace.

OK

Check vacuum sensor. (See page FI-233)

BAD

Repair or replace.

OK

(2) Check operation of oxygen sensor. (See page FI-237)

OK

System Normal

BAD

Check wiring between oxygen sensor and ECU.

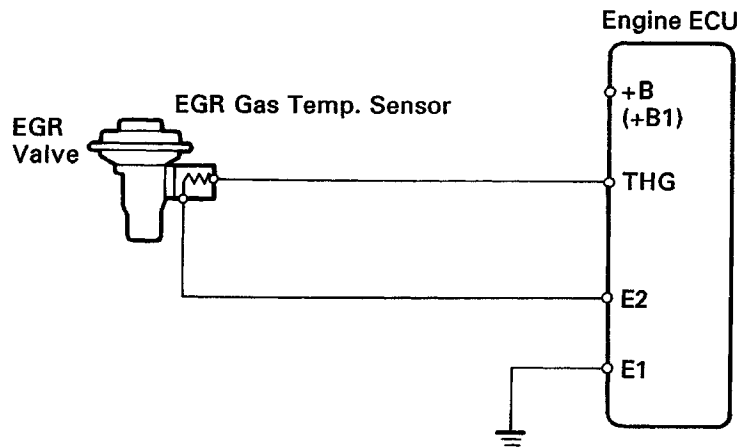
BAD

Repair wiring.

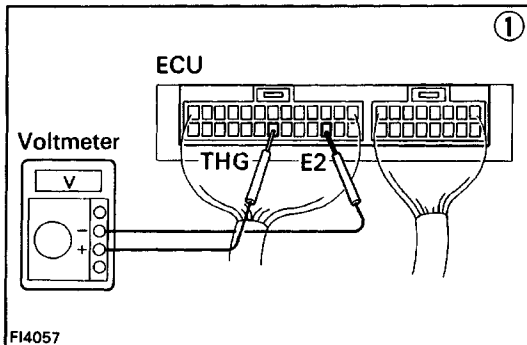
OK

Replace oxygen sensor.

CALIF. only



FI2680



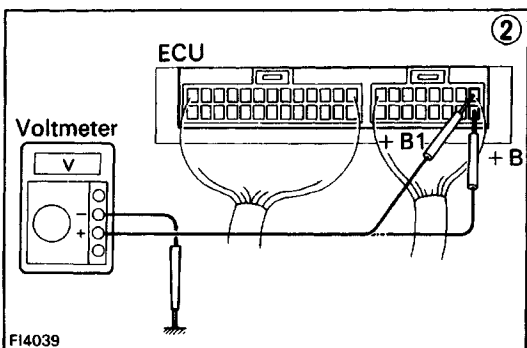
(1) There is no voltage between ECU terminals THG and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. **(IG SW ON)**

OK

NO

Refer to No.1.
(See page FI-61)



Check wiring between ECU terminal E1 and body ground.

OK

BAD

Repair or replace.

Check EGR system.
(See page EC-8)

BAD

Repair or replace.

OK

(3) Check EGR gas temp. sensor. (See page FI-236)

BAD

OK

Replace EGR gas temp. sensor.

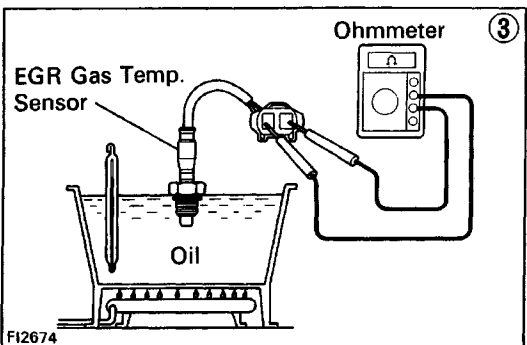
Check wiring between ECU and EGR gas temp. sensor.

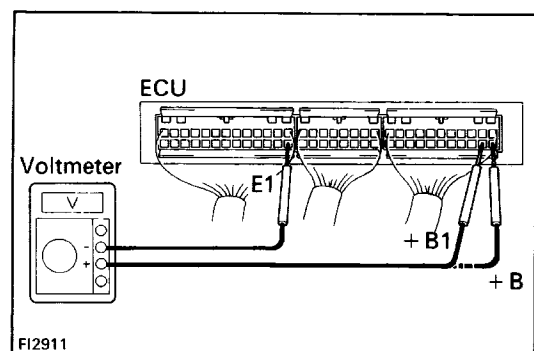
OK

BAD

Try another ECU.

Repair or replace.





EFI SYSTEM CHECK PROCEDURE (3S-GTE)

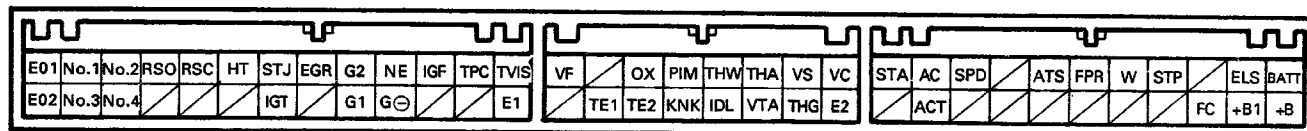
HINT:

- Perform all voltage measurements with the connectors disconnected.
 - Verify that the battery voltage is 11 V or more when the ignition switch is in "ON" position.
- Using a voltmeter with high impedance (10 kΩ/V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of Engine ECU (3S-GTE)

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	TPC	TURBOCHARGING PRESSURE VSV	AC	A/C MAGNET SWITCH
E02	POWER GROUND			ACT	A/C AMPLIFIER
No.1	INJECTOR (No.1)	T-VIS	T-VIS VSV	SPD	SPEED SENSOR
No.3	INJECTOR (No.3)	E1	ENGINE GROUND		
No.2	INJECTOR (No.2)	VF	CHECK CONNECTOR		
No.4	INJECTOR (No.4)				
RSO	ISC VALVE		—	ATS	A/C AMPLIFIER
		TE1	CHECK CONNECTOR		—
RSC	ISC VALVE	OX	OXYGEN SENSOR	FPR	FUEL PUMP RELAY
	—	TE2	CHECK CONNECTOR		
HT	OXYGEN SENSOR HEATER	PIM	TURBOCHARGING PRESSURE SENSOR	W	WARNING LIGHT
	—	KNK	KNOCK SENSOR		—
STJ	COLD START INJECTOR	THW	WATER TEMP. SENSOR	STP	STOP LIGHT SWITCH
IGT	IGNITER	IDL	THROTTLE POSITION SENSOR		
EGR	EGR VSV	THA	AIR TEMP. SENSOR		
		VTA	THROTTLE POSITION SENSOR	FC	CIRCUIT OPENING RELAY
G2	DISTRIBUTOR	VS	AIR FLOW METER	ELS	HEADLIGHT DEFOGGER
G1	DISTRIBUTOR	*THG	EGR GAS TEMP. SENSOR	+B1	EFI MAIN RELAY
NE	DISTRIBUTOR	VC	SENSOR POWER SOURCE	BATT	BATTERY
G ⊖	DISTRIBUTOR	E2	SENSOR GROUND	+B	EFI MAIN RELAY
IGF	IGNITER	STA	STARTER SWITCH	*CALIF. only	

Engine ECU Terminals

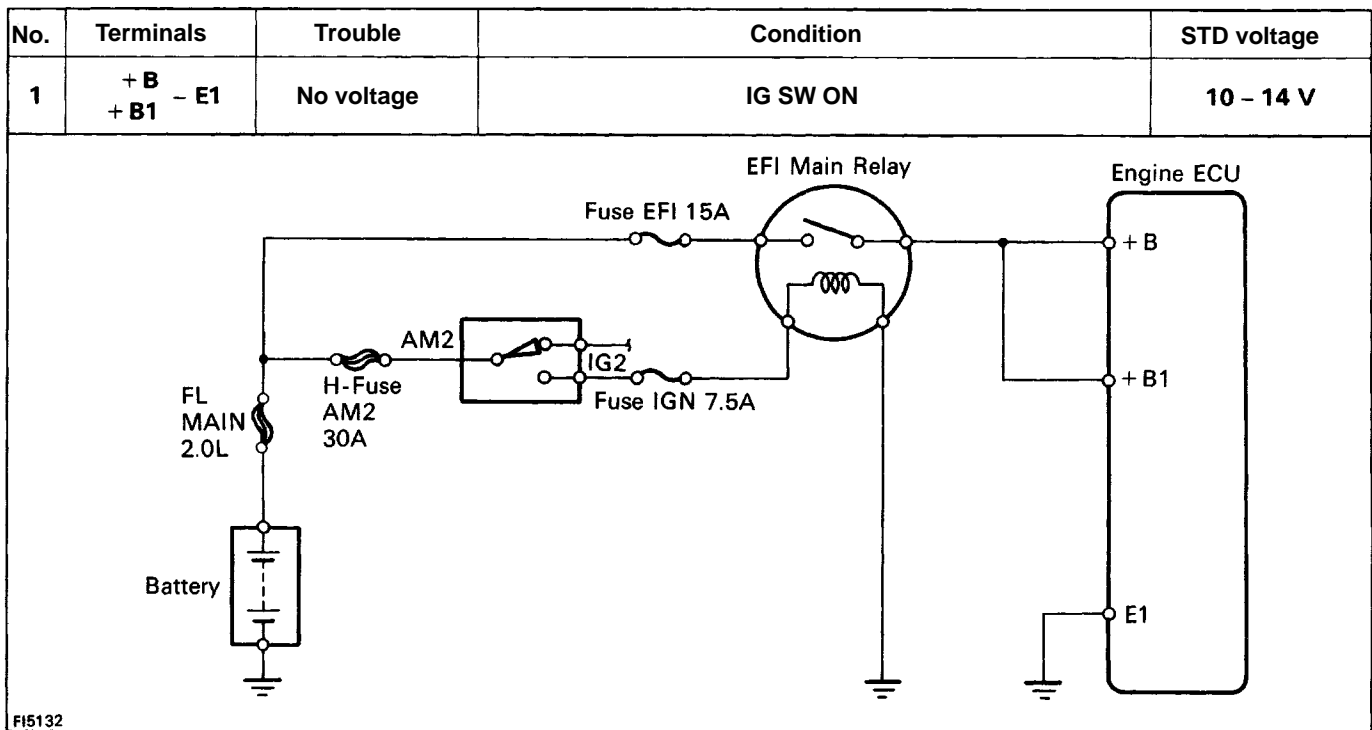


Voltage at Engine ECU Wiring Connectors (3S-GTE)

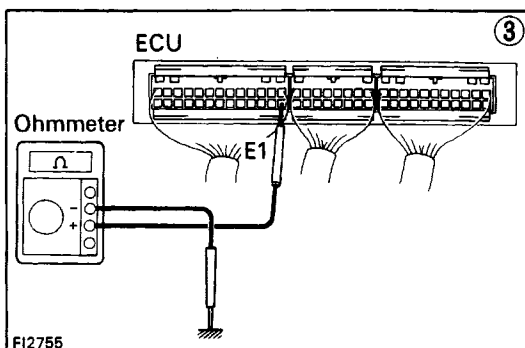
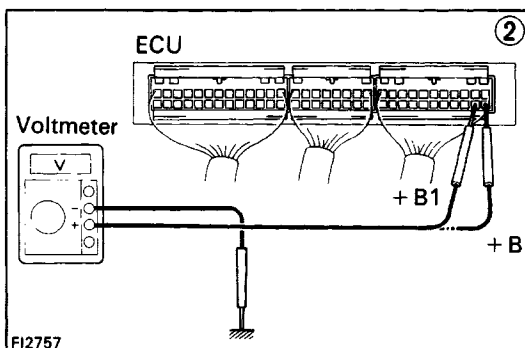
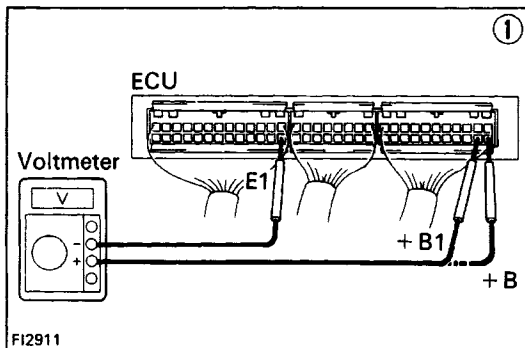
No.	Terminals	Condition		STD voltage (V)	See page
1	+B – E1 +B1	IG SW ON		10 – 14	FI-76
2	BATT – E1	–		10 – 14	FI-77
3	IDL – E2	IG SW ON	Throttle valve open	4.5 – 5.5	FI-78
	VC – E2		–	4.5 – 5.5	
	VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.1 – 1.0	
			Throttle valve fully open	3.2 – 4.2	
4	VC – E2		–	4.5 – 5.5	FI-80
	VS – E2		Measuring plate fully closed	3.7 – 4.3	
		Measuring plate fully open	0.2 – 0.5		
		Idling	1.6 – 4.1		
		3,000 rpm	1.0 – 2.0		
	5	No.1 No.2 – E01 No.3 – E02 No.4	IG SW ON		
6	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3	FI-82
7	THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1	FI-83
8	STA – E1	Cranking		6 – 14	FI-84
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-85
10	RSC – E1 RSO	IG SW ON	Engine ECU connectors disconnected	8 – 14	FI-86
11	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	FI-87
12	PIM – E2	IG SW ON		2.5 – 4.5	FI-88
	VC – E2			4.5 – 5.5	
13	AC – E1	IG SW ON	Air conditioning ON	8 – 14	FI-89

Engine ECU Terminals

E01	No.1	No.2	RSO	RSC	HT	STJ	EGR	G2	NE	IGF	TPC	TVIS	VF	OX	PIM	THW	THA	VS	VC	STA	AC	SPD	ATS	FPR	W	STP	ELS	BATT	
E02	No.3	No.4				IGT		G1	G⊖			E1	TE1	TE2	KNK	IDL	VTA	THG	E2		ACT						FC	+B1	+B



FI5132



(1) There is no voltage between ECU terminals + B or + 131 and E1. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

NO

OK

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check fuses, H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check EFI main relay. (See page FI-216)

BAD

Replace.

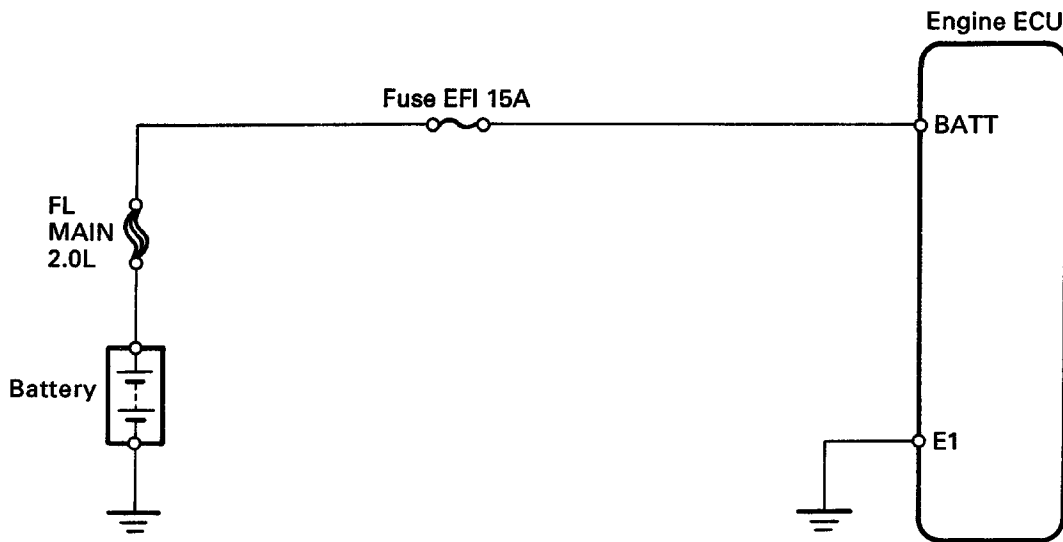
OK

Check wiring between EFI main relay and battery.

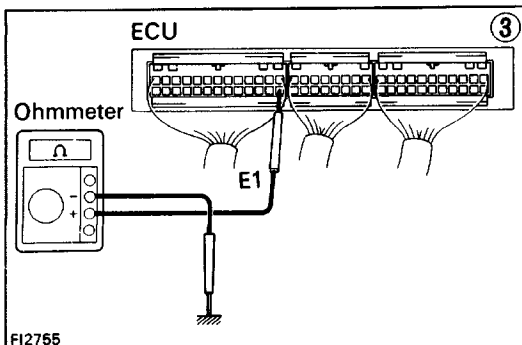
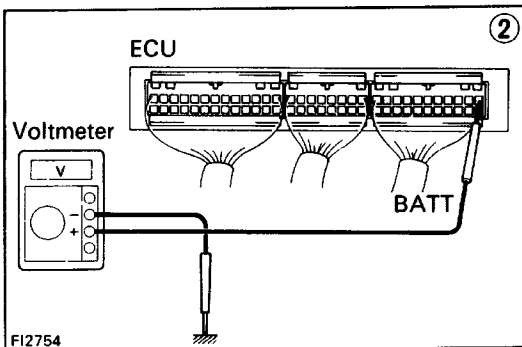
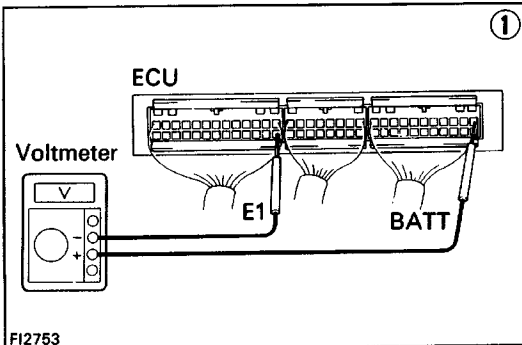
BAD

Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
2	BATT – E1	No voltage	-	10 – 14 V



P01086



(1) There is no voltage between ECU terminals BATT and E1.

(2) Check that there is voltage between ECU terminal BATT and body ground.

NO

OK

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check fuse and fusible link.

BAD

Replace.

OK

Check wiring between ECU terminal and battery.

BAD

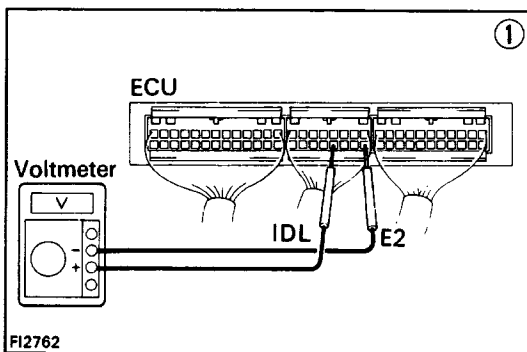
Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
3	IDL - E2	No voltage	IG SW ON	Throttle valve open
	VC - E2			
	VTA - E2			Throttle valve fully closed Throttle opener must be cancelled first
				Throttle valve fully open
				4.5 - 5.5 V
				4.5 - 5.5 V
				0.1 - 1.0 V
				3.2 - 4.2 V

Throttle Position Sensor

Engine ECU

P01419



• IDL - E2

(1) There is no voltage between ECU terminals IDL and E2.
IG SW ON) (Throttle valve open)

(2) Check that there is voltage between ECU terminal + B (+ 131) and
body ground. (IG SW ON)

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Refer to No.1.
(See page FI-76)

BAD

Repair or replace.

OK

(3) Check throttle position sensor.
(See page FI-199)

BAD

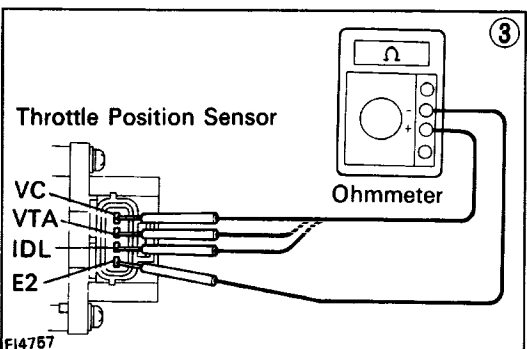
Repair or replace
throttle position sensor.

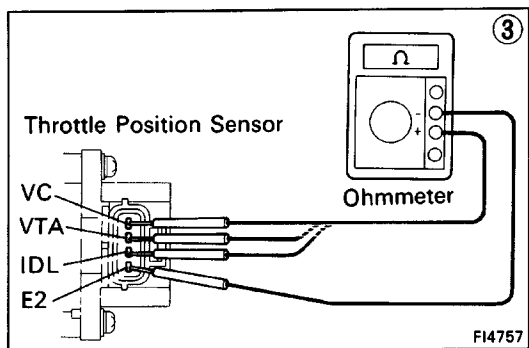
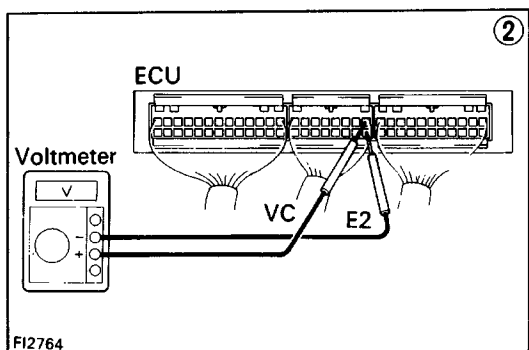
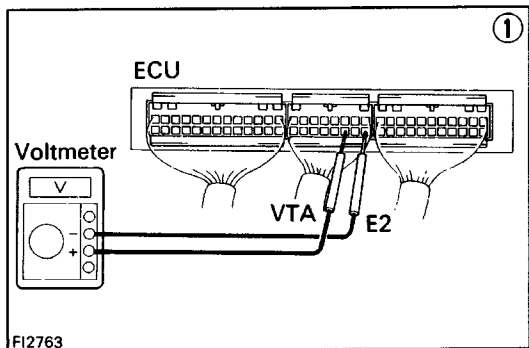
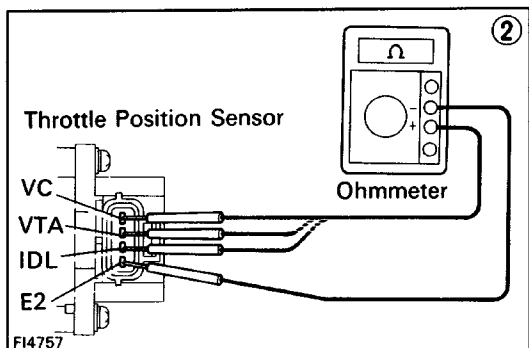
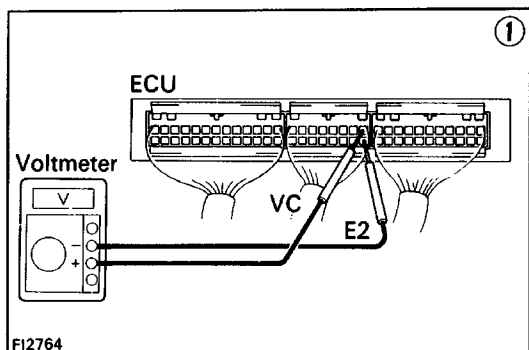
OK

Check wiring between ECU and
throttle position sensor.

OK

Try another ECU.





• VC – E2

There is no voltage between ECU terminals VC and E2.
(IG SW ON)

Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

(2) Check throttle position sensor.
(See page FI-199)

Refer to No.1.
(See page FI-76)

BAD

OK

Repair or replace.

Check wiring between ECU and throttle position sensor.

OK

BAD

Try another ECU.

Repair or replace wiring

• VTA – E2

(1) There is no specified voltage at ECU terminals VTA and E2
(IG SW ON)

(2) Check that there is voltage between ECU terminals VC and E2.
(IG SW ON)

NO

OK

Refer to VC – E2 trouble section.

OK

(3) Check throttle position sensor.
(See page FI-199)

BAD

Repair or replace.

OK

Check wiring between ECU and throttle position sensor.

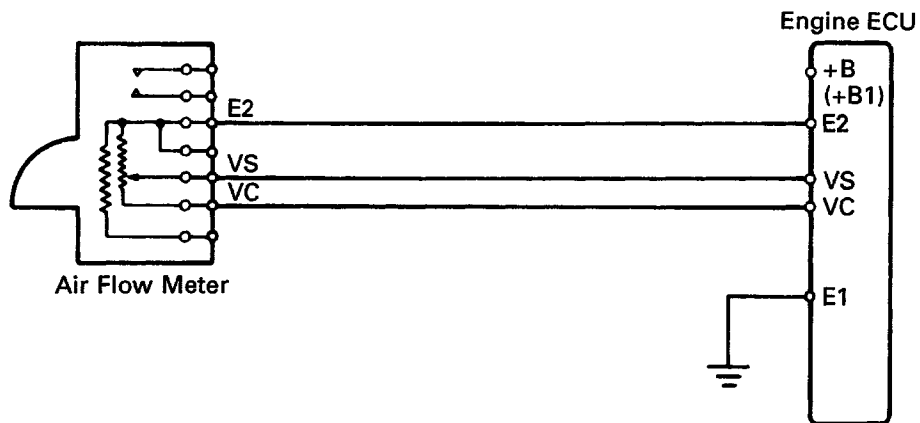
BAD

Repair or replace.

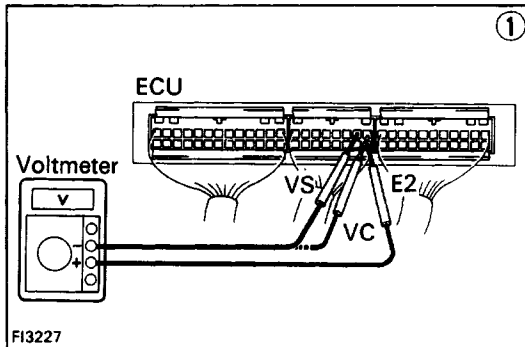
OK

Try another ECU.

No.	Terminals	Trouble	Condition		STD voltage
4	VC – E2	No voltage	IG SW ON	–	4.5 – 5.5 V
	Measuring plate fully closed			3.7 – 4.3 V	
	Measuring plate fully open			0.2 – 0.5 V	
	VS – E2		Idle	1.6 – 4.1 V	
			3,000 rpm	1.0 – 2.0 V	



FI6032



FI3227

(1) There is no specified voltage at ECU terminals VC or VS and E2. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-76)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check air flow meter
(See page FI-183)

BAD

Repair or replace
air flow meter.

OK

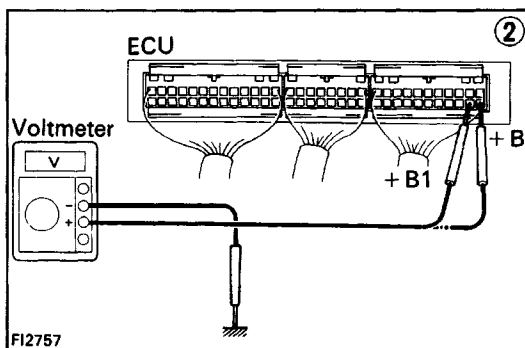
Check wiring between ECU and
air flow meter.

OK

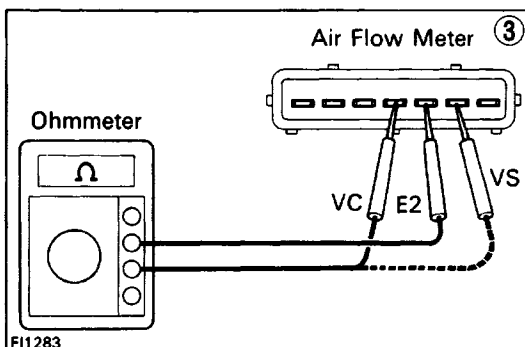
Try another ECU.

BAD

Repair or replace.

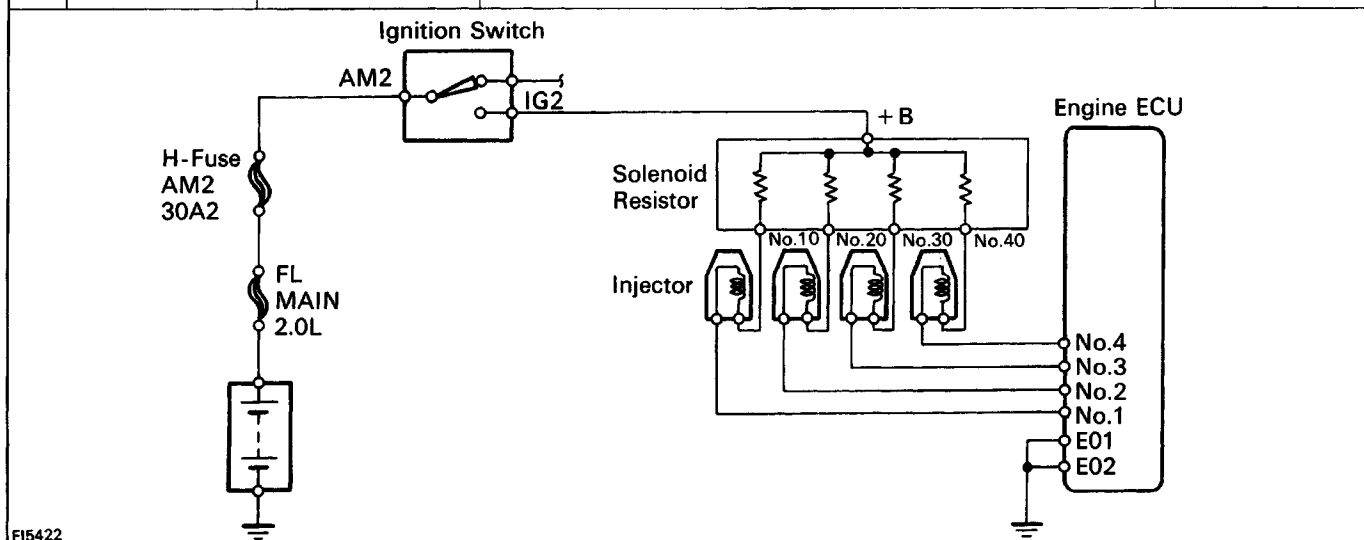


FI2757

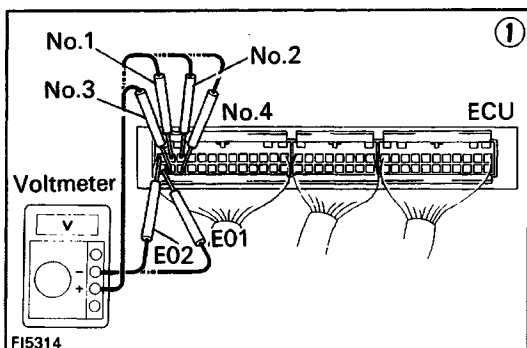


FI1283

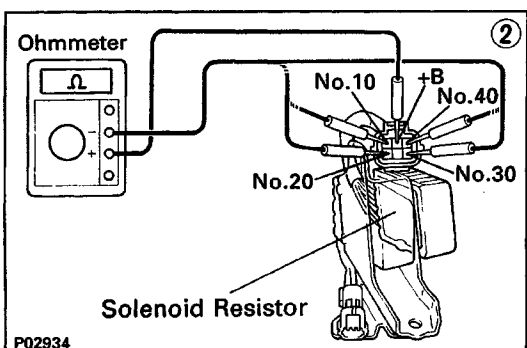
No.	Terminals	Trouble	Condition	STD voltage
5	No. 1 No. 2 - E01 No. 3 - E02 No. 4	No voltage	IG SW ON	10 - 14 V



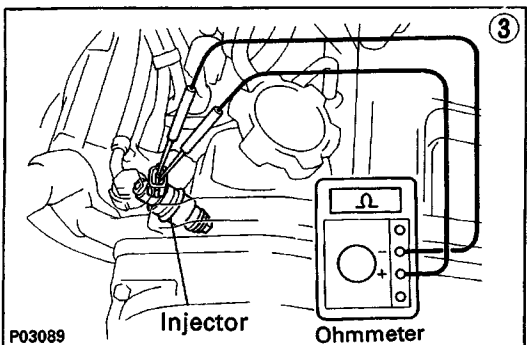
FI5422



FI5314



P02934



P03089

(1) There is no voltage between ECU terminals No.1, No.2, No.3 and/or No.4 and E01 and/or E02. (IG SW ON)

Check that there is specified voltage between solenoid resistor terminal +B and body ground. **STD voltage: 10 - 14V**

OK

NO

Check H-fuse, fusible link, wiring and ignition switch.

BAD

Repair or replace.

(2) Check resistance between +B of solenoid resistor and each other terminal. **STD resistance: 4 - 6Ω**

OK

NO

(3) Check resistance of each injector. **STD resistance: 2 - 4Ω**

Replace resistor.

OK

BAD

Replace injector.

Check wiring between ECU and resistor

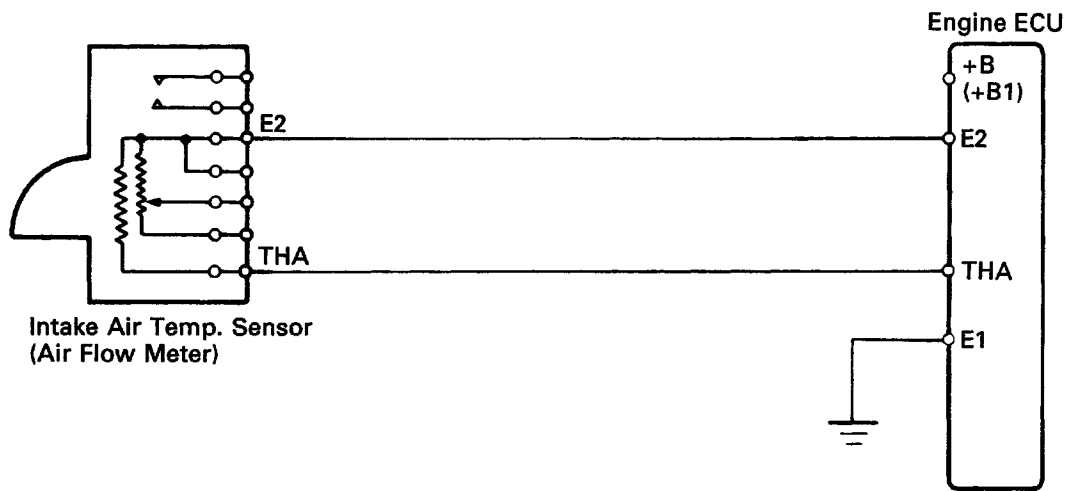
BAD

Repair or replace wiring

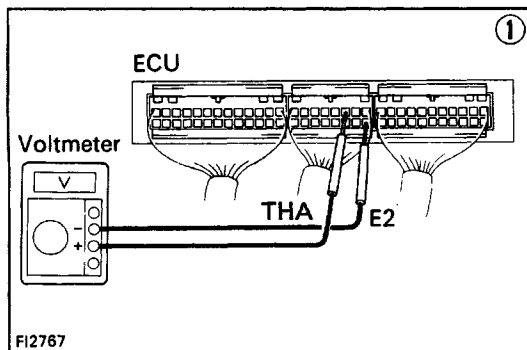
OK

Try another ECU.

No.	Terminals	Trouble	Condition		STD voltage
6	THA - E2	No voltage	• G SW ON	Intake air temperature 20°C (68°F)	1 - 3 V



FI6030



FI2767

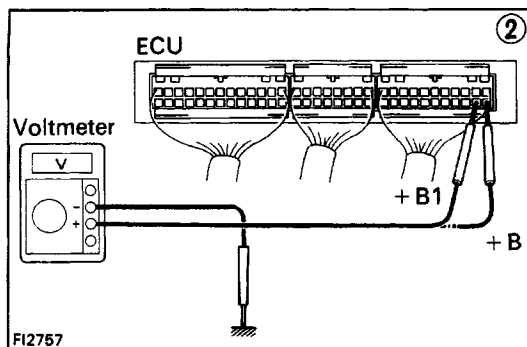
(1) There is no voltage between ECU terminals THA and E2
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-76)



FI2767

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check intake air temp. sensor
See page FI-183

BAD

OK

Replace air flow meter.

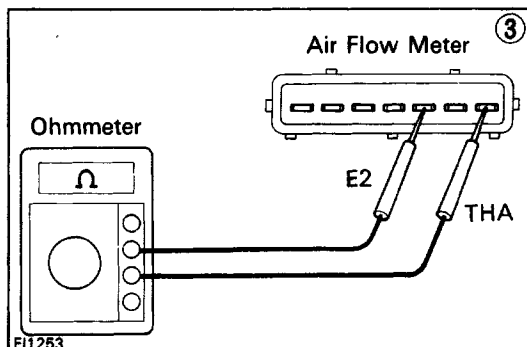
Check wiring between ECU and intake air temp. sensor.

OK

BAD

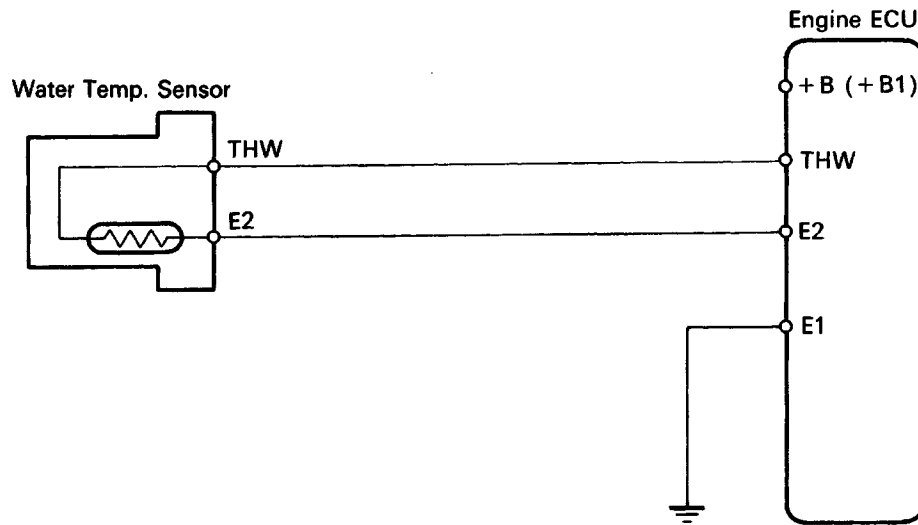
Try another ECU.

Repair or replace.

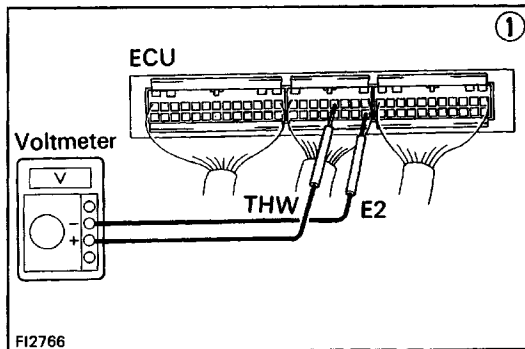


FI1253

No.	Terminals	Trouble	Condition		STD voltage
7	THW – E2	No voltage	IG SW ON	Coolant temperature 80°C (176°F)	0.1 – 1.1 V



FI3572



FI2766

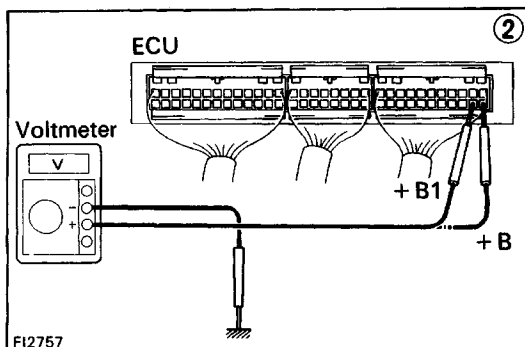
(1) There is no voltage between ECU terminals THW and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

Refer to No1.
(See page FI-76)



FI2757

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check water temp. sensor
(See page FI-231)

Repair or replace.

BAD

OK

Replace water
temp. sensor.

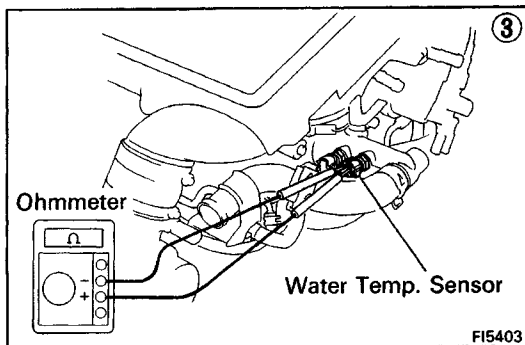
Check wiring between ECU and water
temp. sensor.

OK

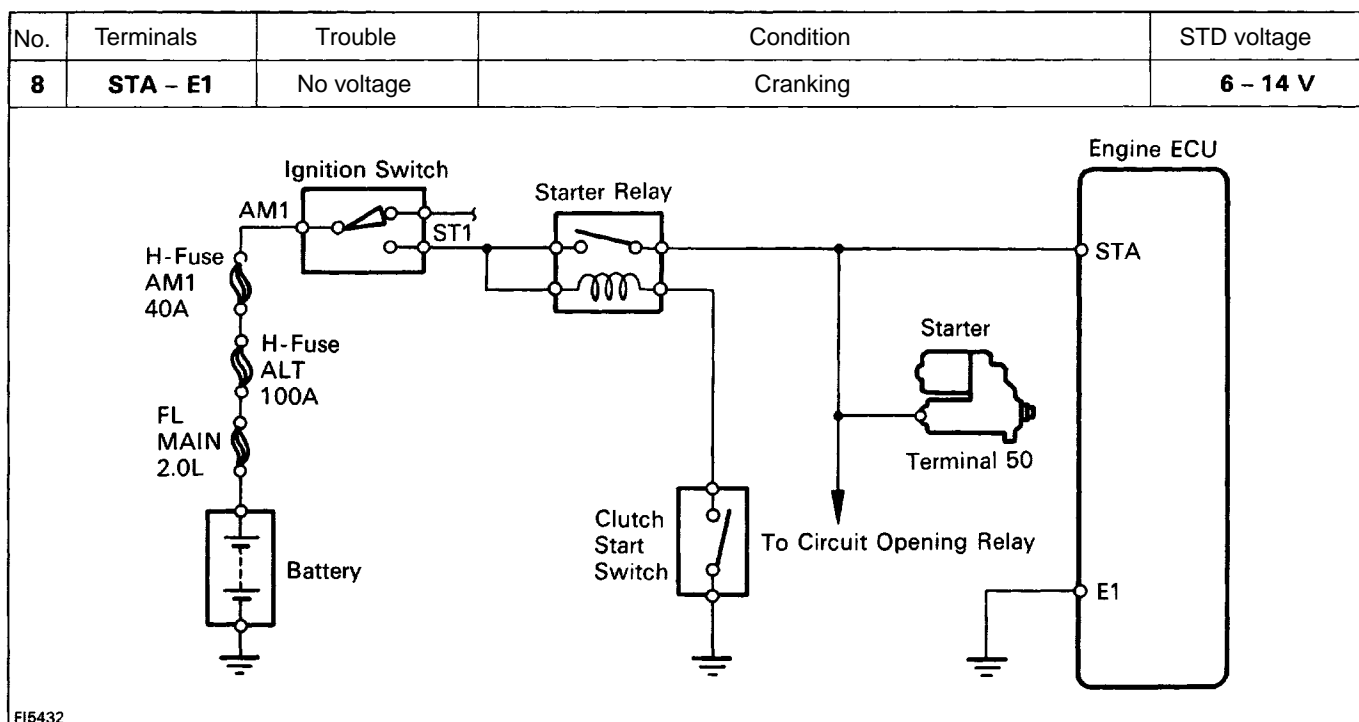
BAD

Try another ECU.

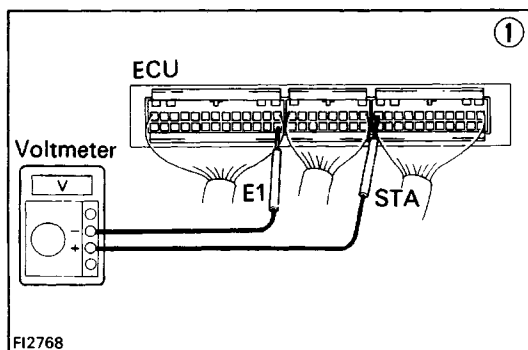
Repair or replace.



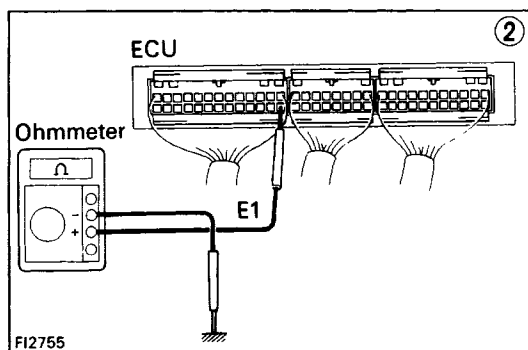
FI5403



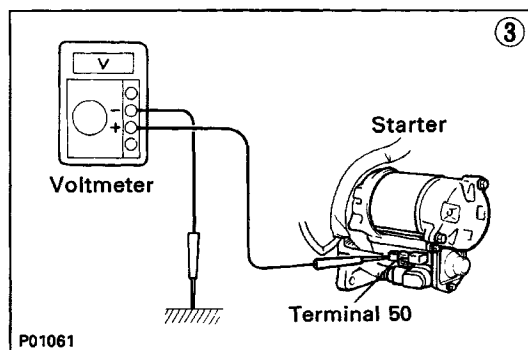
FI5432



FI2768



FI2755



P01061

(1) There is no voltage between ECU terminals STA and E1.
(IG SW ON)

Check starter operation.

OK

Check wiring between ECU terminal STA and ignition switch terminal ST1.

BAD

OK

BAD

Repair or replace.

(2) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check H-fuses, fusible link, battery, wiring, ignition switch, clutch start switch and starter relay.

BAD

Repair or replace.

OK

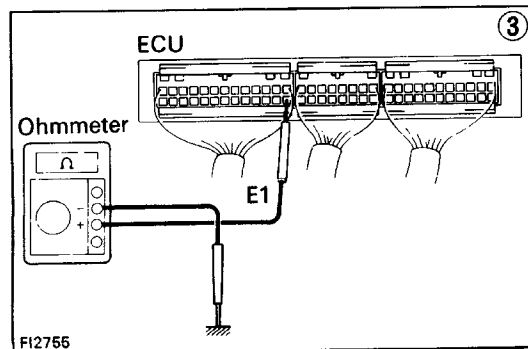
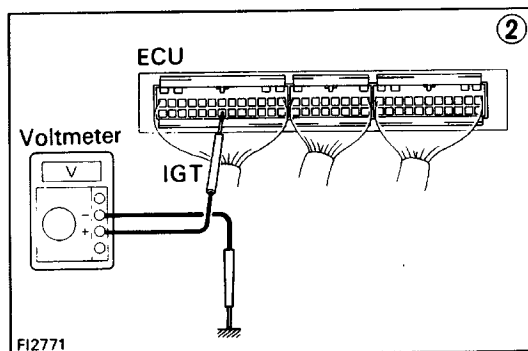
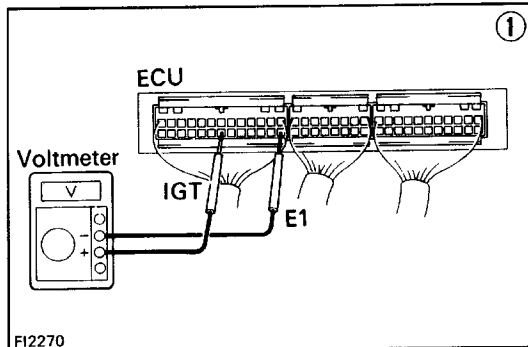
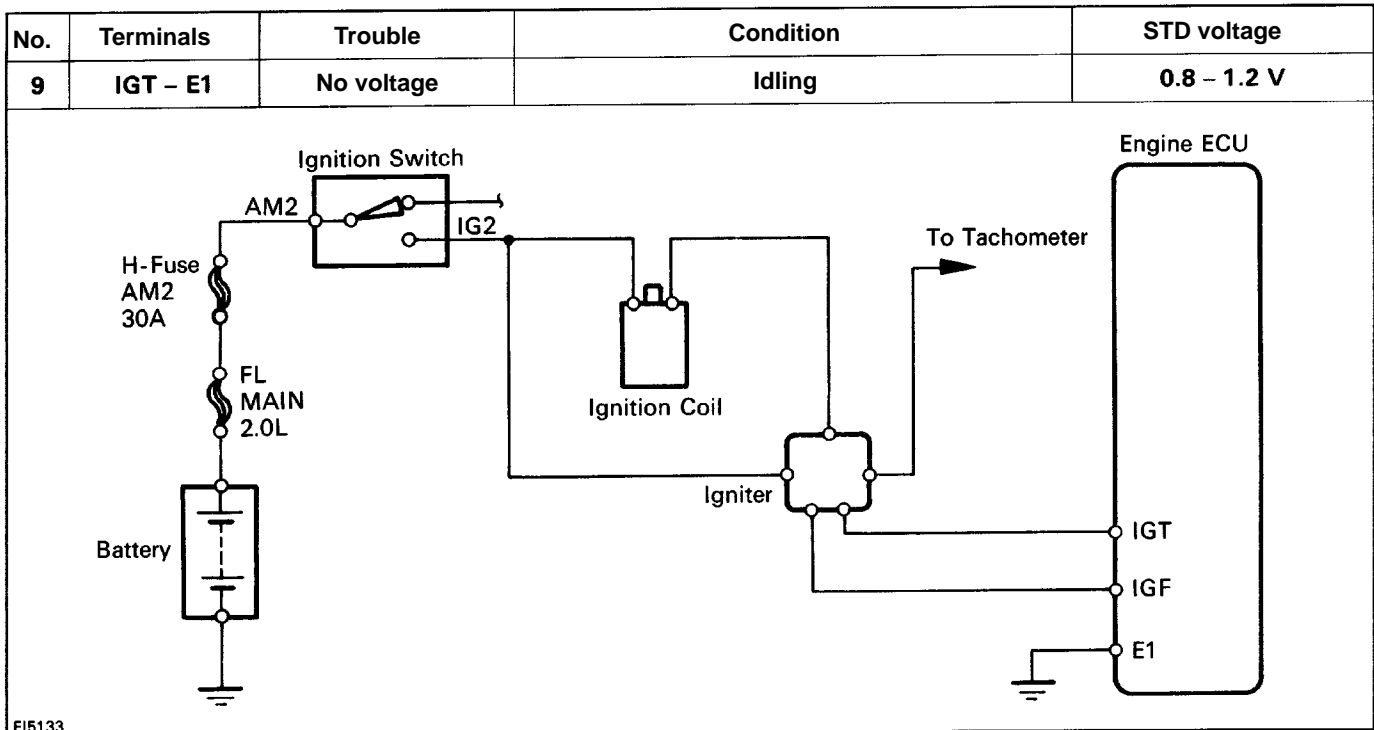
(3) Check that there is voltage at starter terminal 50.
(IG SW START) STD voltage: 6 - 14 V

OK

Check starter.

NO

Check wiring between ignition switch terminal ST1 and starter terminal 50.



(1) There is no voltage between ECU terminals IGT and E1. **(Idling)**

(2) Check that there is voltage between ECU terminal IGT and body ground. **(Idling)**

NO

OK

(3) Check wiring between ECU terminal E1 and body ground.

BAD

Repair or Replace.

OK

Try another ECU.

Check H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check distributor. (See page IG-14)

BAD

Repair or replace.

OK

Check wiring between ECU and battery.

BAD

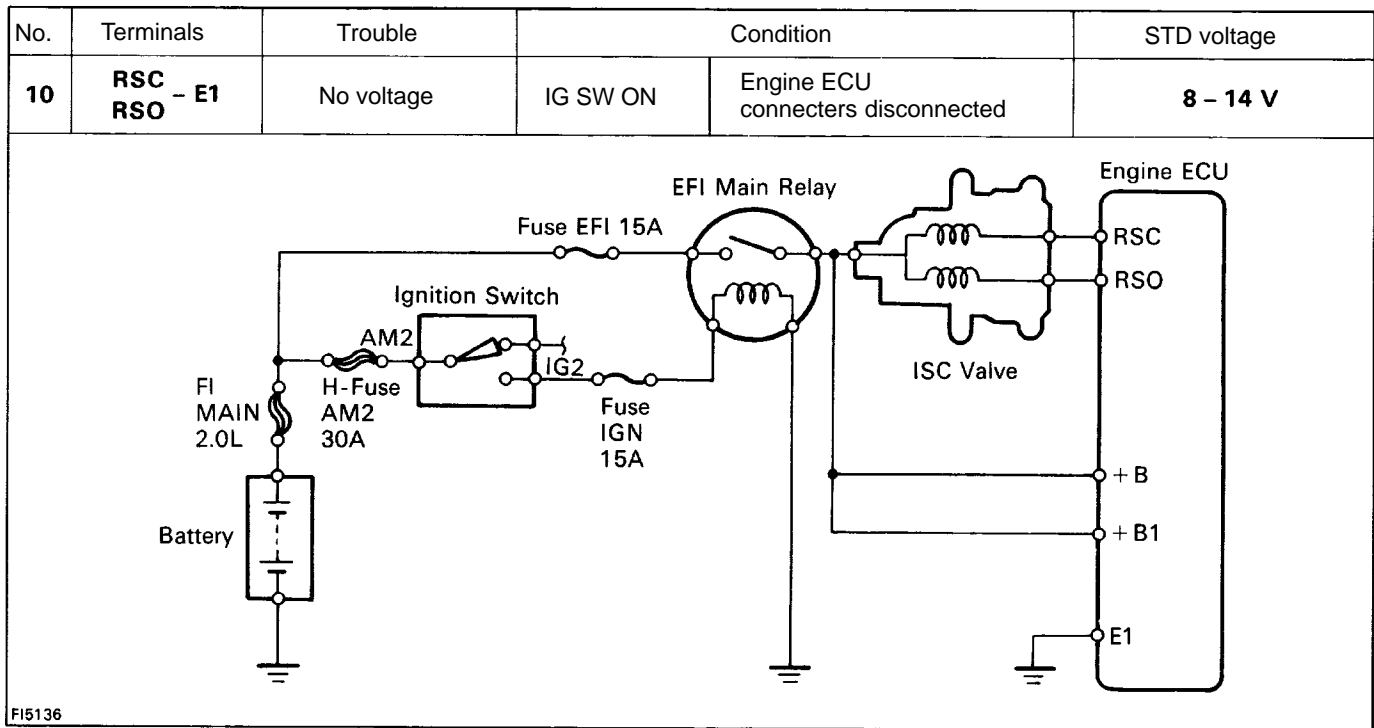
Repair or replace.

OK

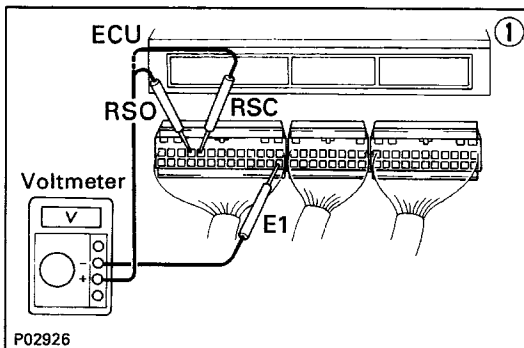
Check igniter. (See page IG.-14)

BAD

Repair or replace.



FI5136



P02926

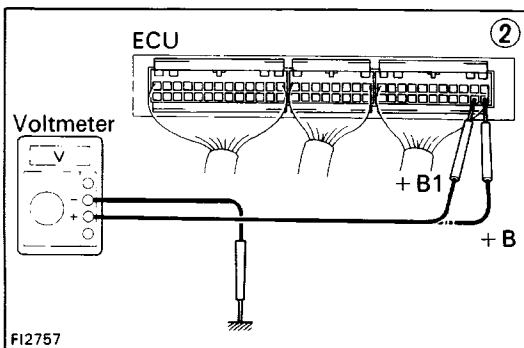
(1) There is no voltage between ECU terminals RSC or RSO and E1. **(IG SW ON)**

(2) Check that there is voltage between ECU terminal + B (+ B1) and body ground. **(IG SW ON)**

OK

NO

Refer to N o.1.
(See page FI-76)



FI2757

(3) Check resistance between ISC valve terminals + B and RSC or RSO.
STD resistance: 19.3 - 22.3Ω

BAD

Replace ISC valve.

OK

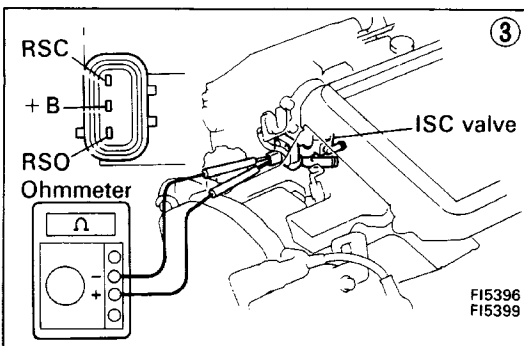
Check wiring between ECU and ISC valve.

BAD

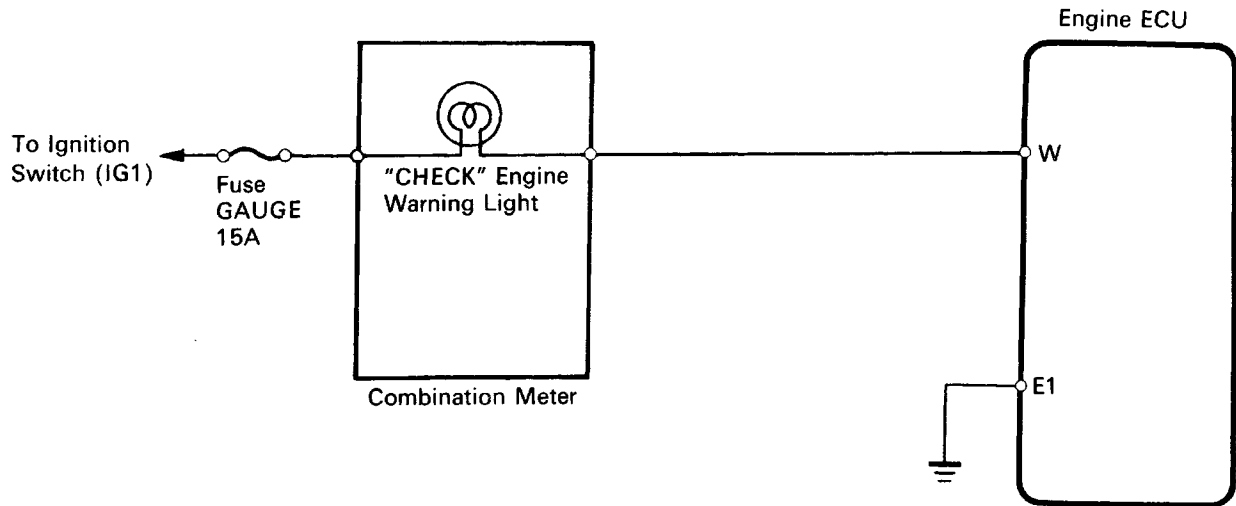
Repair or replace wiring.

OK

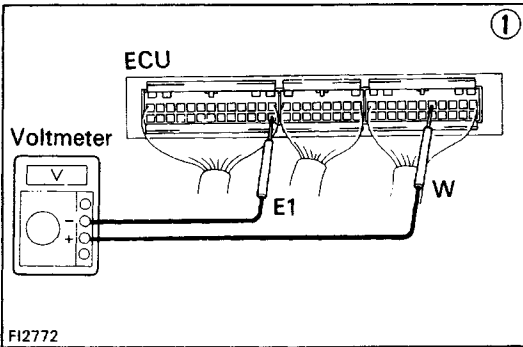
Try another ECU.

FI5396
FI5399

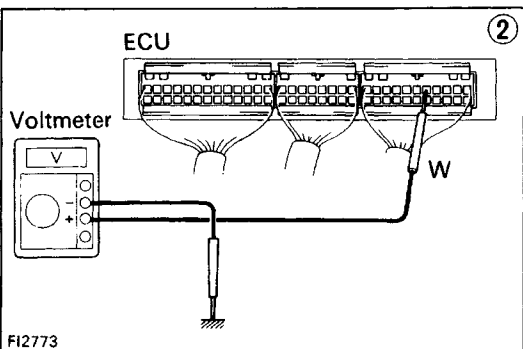
No.	Terminals	Trouble	Condition	STD voltage
11	W – E1	No voltage	No trouble ("CHECK" engine warning light off) and engine running.	10 – 14 V



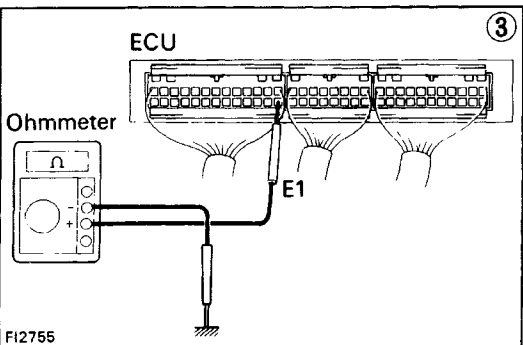
FI0728



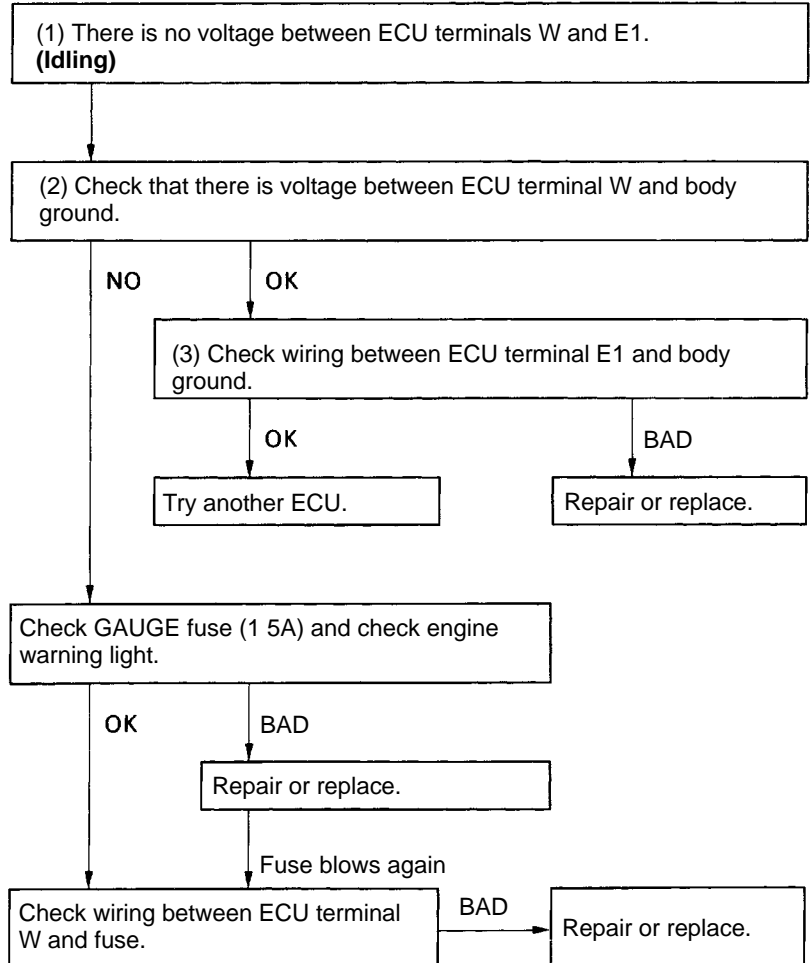
FI2772



FI2773

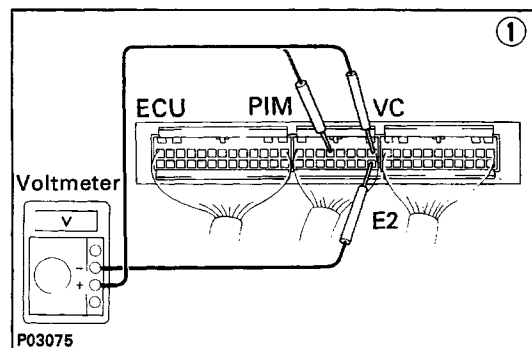


FI2755



No.	Terminals	Trouble	Condition	STD voltage
12	PIM - E2	No voltage	IG SW ON	2.5 - 4.5 V
	VC - E2			4.5 - 5.5 V

FI1226



• PIM-E2, VC -E2

(1) There is no voltage between ECU terminals PIM or VC and E2. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-76)

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Check turbocharging pressure sensor. (See page FI-235)

Repair or replace.

BAD

OK

Replace turbocharging pressure sensor.

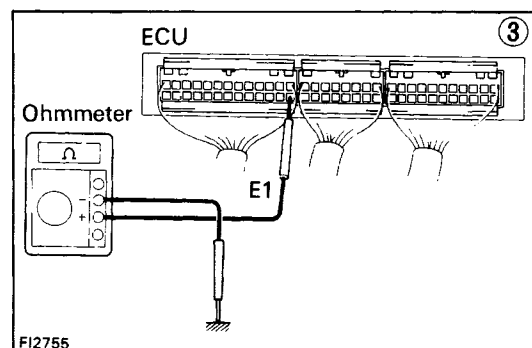
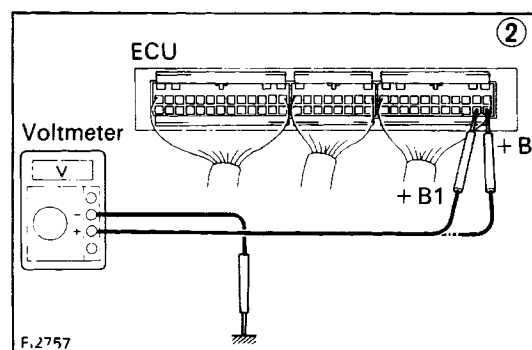
Check wiring between ECU and turbocharging pressure sensor.

OK

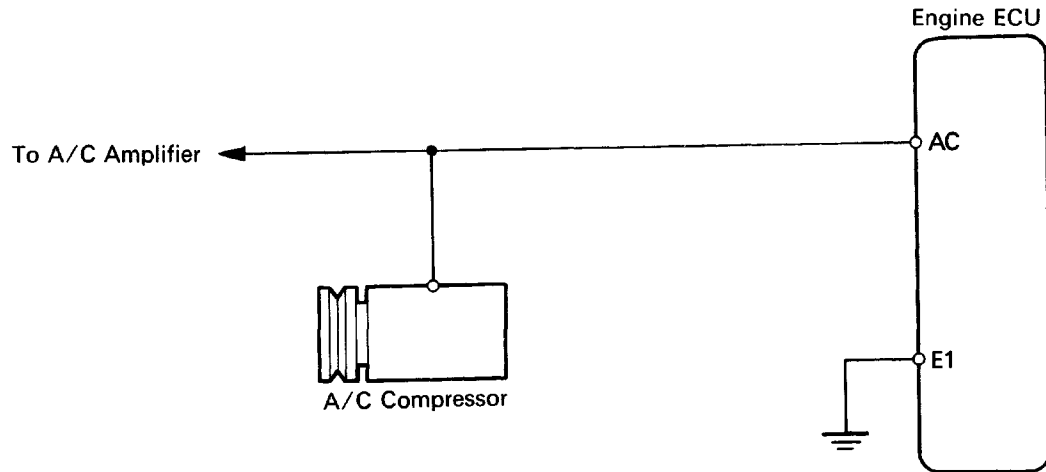
BAD

Try another ECU.

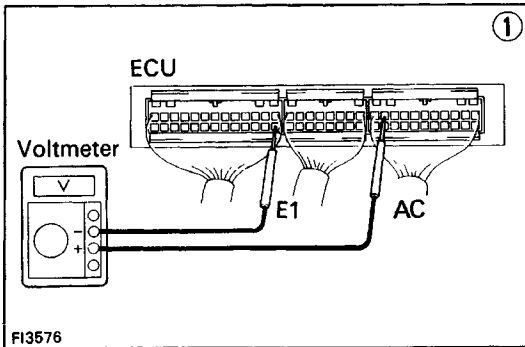
Repair or replace.



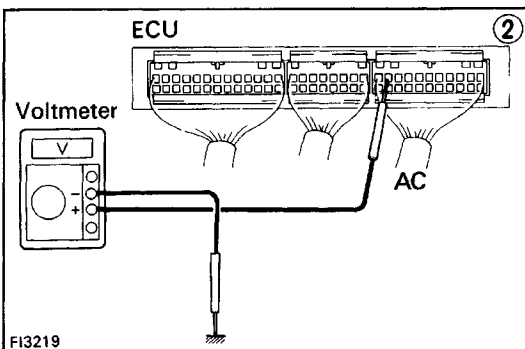
No.	Terminal	Trouble	Condition	STD voltage
13	AC – E1	No voltage	Air conditioning ON	8 – 14 V



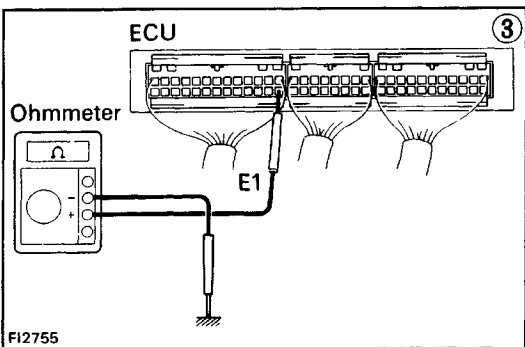
FI0922



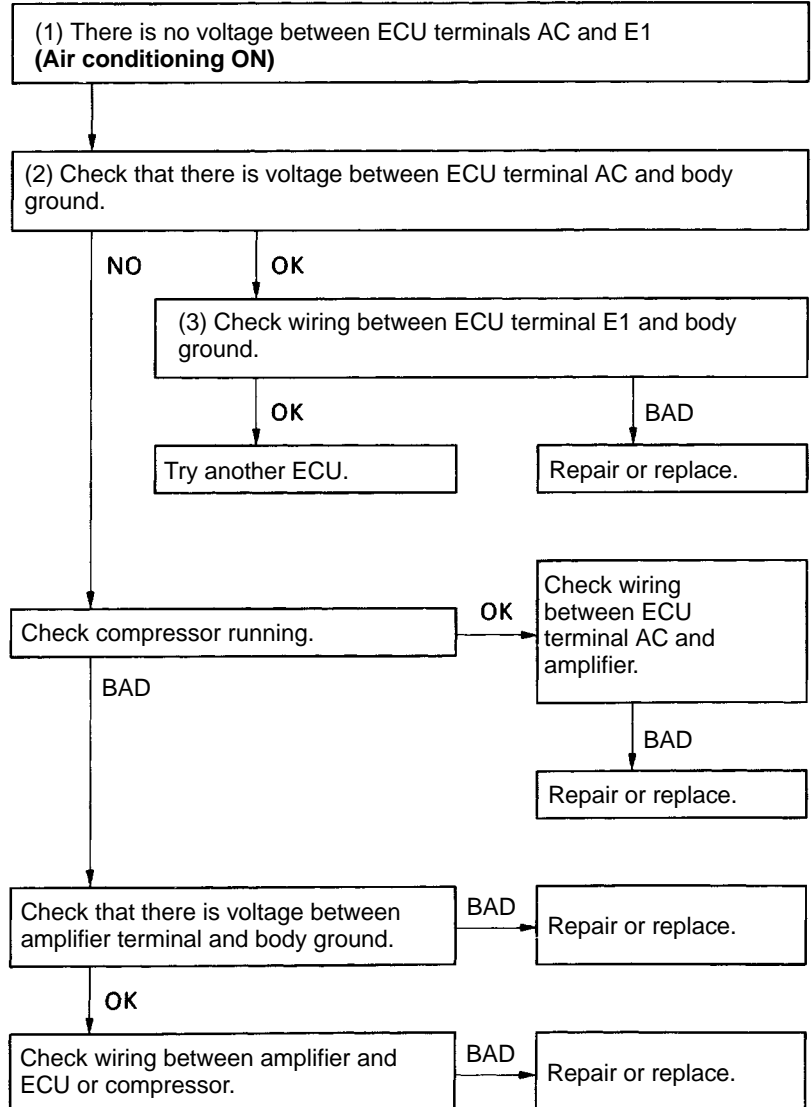
FI3576

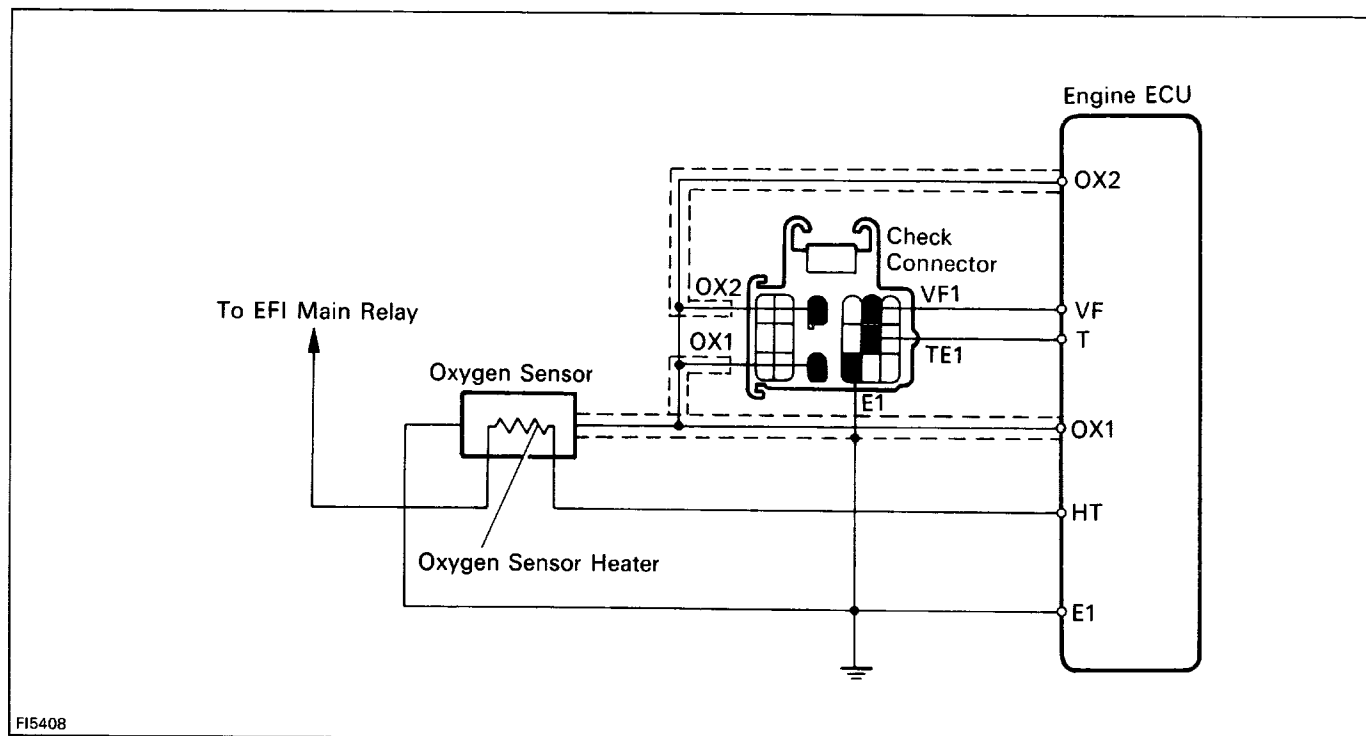


FI3219

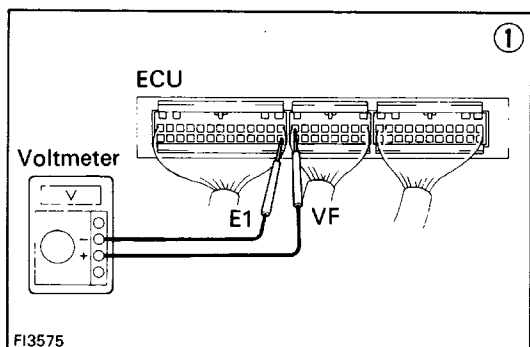


FI2755

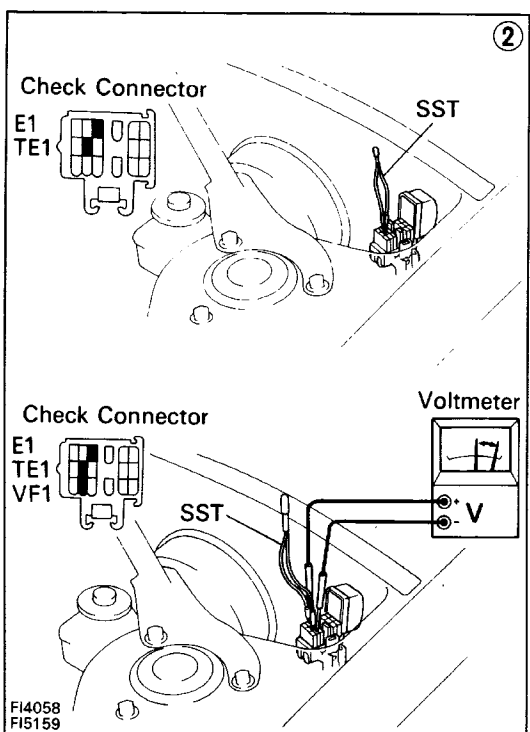




FI5408



FI3575

FI4058
FI5159

(1) There is no voltage between ECU terminals VF and E1.

Check that there is voltage between ECU terminal VF and body ground.

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Is air leaking into air induction system?

YES

Repair air leak.

NO

Check spark plugs. (See page IG-11)

BAD

Repair or replace.

OK

Check distributor and ignition system. (See page IG-4)

BAD

Repair or replace.

OK

Check fuel pressure. (See page FI-136)

BAD

Repair or replace.

OK

Check injectors. (See page FI-160)

BAD

Repair or replace.

OK

* Check cold start injector. (See page FI-146)

BAD

Repair or replace.

OK

Check air flow meter. (See page FI-183)

BAD

Repair or replace.

OK

(2) Check operation of oxygen sensor. (See page FI-237)

BAD

System Normal

BAD

Check wiring between oxygen sensor and ECU.

BAD

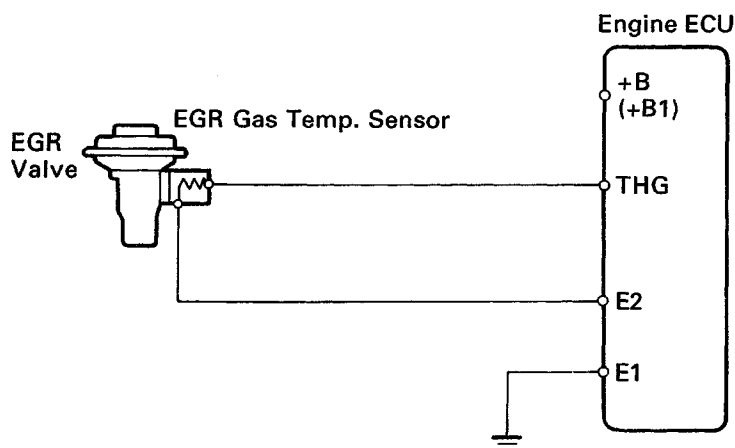
Repair wiring.

OK

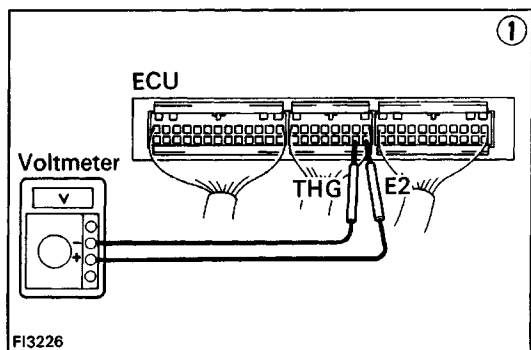
Replace oxygen sensor.

* Rich malfunction only

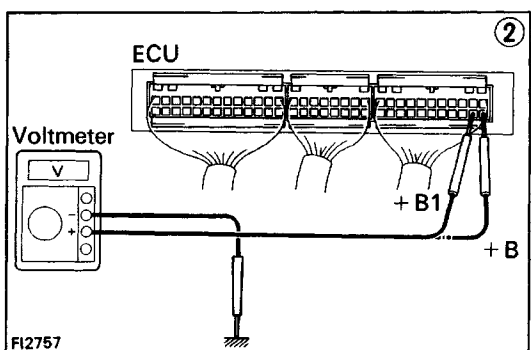
CALIF. only



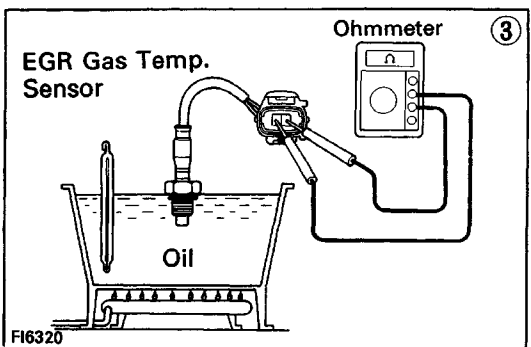
FI2680



FI3226



FI2757



FI6320

(1) There is no voltage between ECU terminals THG and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ B1)
and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-76)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Repair or replace.

Check EGR system.
(See page EC-21)

BAD

Repair or replace.

OK

(3) Check EGR gas temp.
sensor. (See page FI-236)

BAD

Replace EGR gas
temp. sensor.

OK

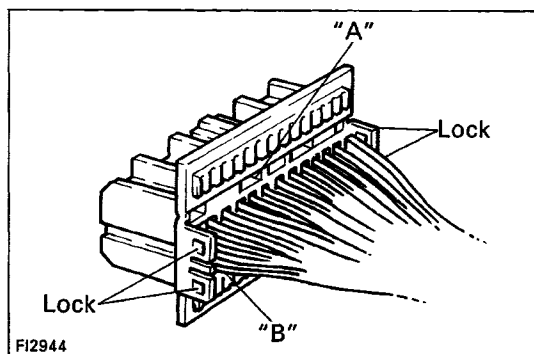
Check wiring between ECU and EGR
gas temp. sensor

OK

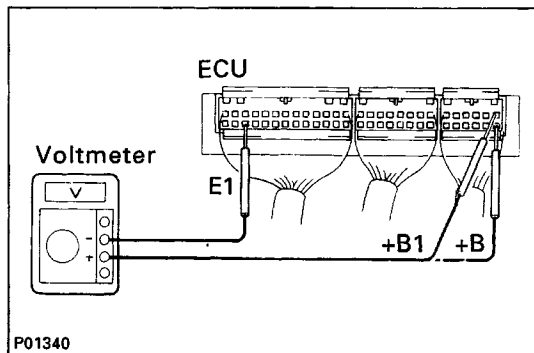
Try another ECU.

BAD

Repair or replace.



FI2944



P01340

EFI SYSTEM CHECK PROCEDURE (5S-FE M/T)

PREPARATION

- Disconnect the connectors from the engine ECU.
- Remove the locks as shown in the illustration so that the tester probe(s) can easily come in.

NOTICE: Pay attention to sections "A" and "B" in the illustration which can be easily broken.

- Reconnect the connectors to the engine ECU.

HINT:

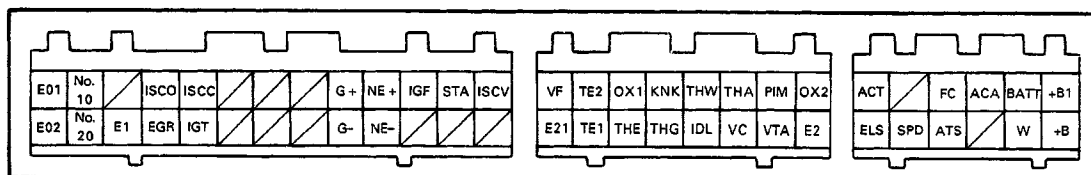
- Perform all voltage measurements with the connectors disconnected.
- Verify that the battery voltage is 11 v or more when the ignition switch is in the "ON" position. Using a voltmeter with high impedance (10 kΩ minimum), measure the voltage at each at each terminal of the wiring connectors.

Terminals of Engine ECU (5S-FE M/T)

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	NE+	DISTRIBUTOR	THA	AIR TEMP. SENSOR
E02	POWER GROUND	NE-	DISTRIBUTOR	VC	VACUUM SENSOR THROTTLE POSITION SENSOR
No.10	INJECTOR	IGF	IGNITER	PIM	VACUUM SENSOR
No.20	INJECTOR		—	VTA	THROTTLE POSITION SENSOR
	—	STA	STARTER RELAY	*OX2	SUB-OXYGEN SENSOR
E1	ENGINE GROUND		—	E2	SENSOR GROUND
ISCO	ISV VALVE	ISCV	A/C IDLE-UP VSV	ACT	A/C AMPLIFIER
EGR	EGR VSV		—	ELS	HEAD LIGHT AND DEFOGGER
ISCC	ISV VALVE	VF	CHECK CONNECTOR		—
IGT	IGNITER	E21	SENSOR GROUND	SPD	SPEED SENSOR
	—	TE2	CHECK CONNECTOR	FC	CIRCUIT OPENING RELAY
	—	TE1	CHECK CONNECTOR	ATS	A/C AMPLIFIER
	—	OX1	MAIN OXYGEN SENSOR	ACA	A/C AMPLIFIER
	—	THE	EVAPORATOR TEMP. SENSOR		—
	—	KNK	KNOCK SENSOR	BATT	BATTERY
	—	*THG	EGR GAS TEMP. SENSOR	W	WARNING LIGHT
G +	DISTRIBUTOR	THW	WATER TEMP. SENSOR	+B1	EFI MAIN RELAY
G -	DISTRIBUTOR	IDL	THROTTLE POSITION SENSOR	+B	EFI MAIN RELAY

Engine ECU Terminals

* Calif. only

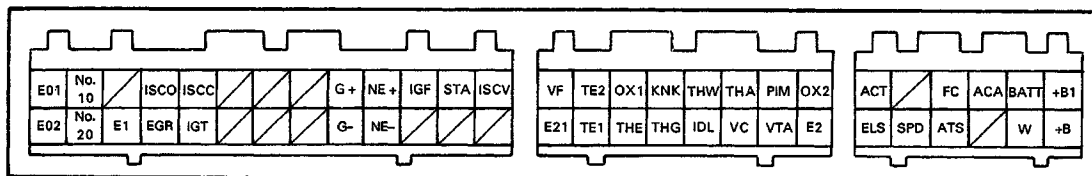


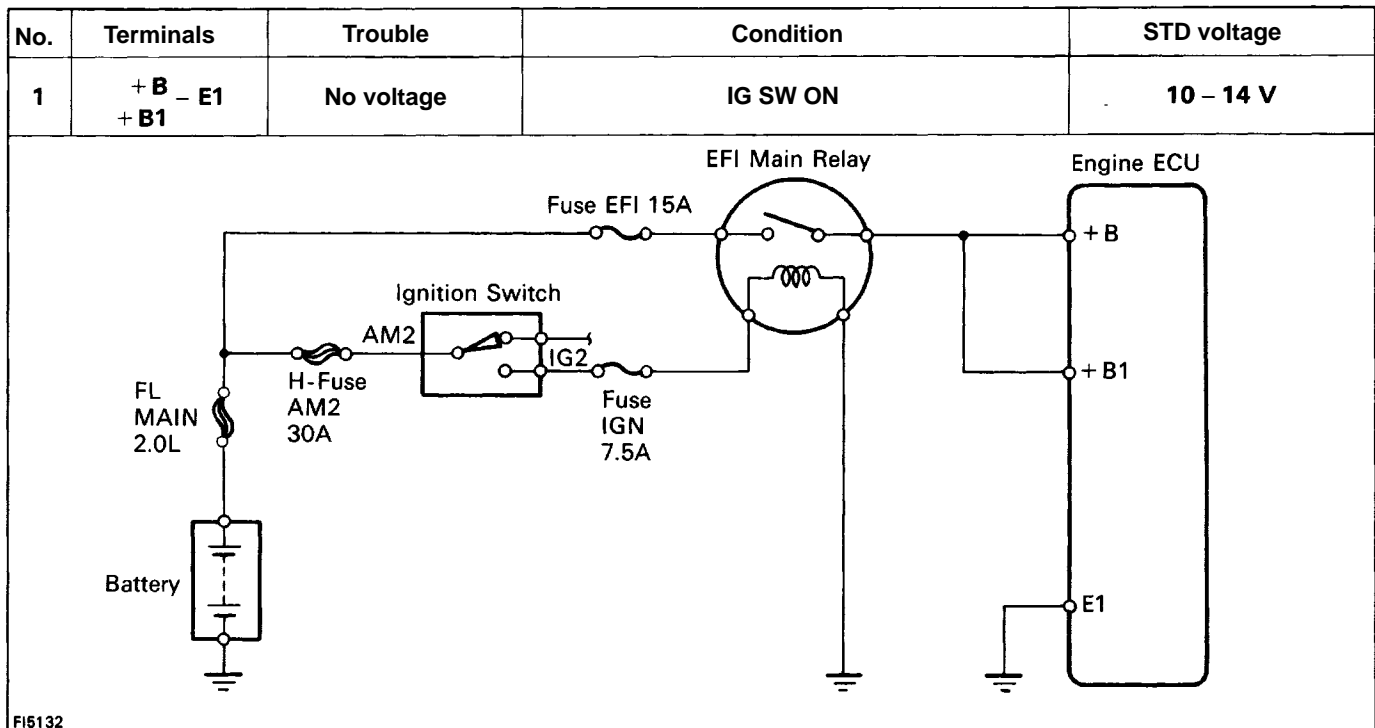
P01821

Voltage at Engine ECU Wiring Connectors (5S-FE M/T)

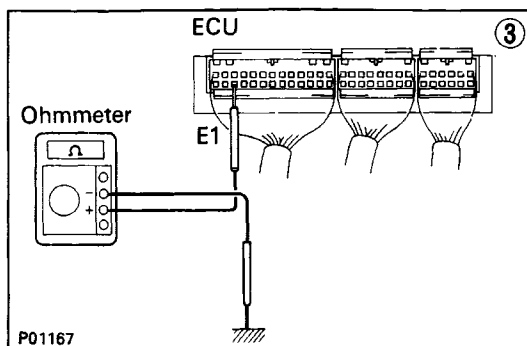
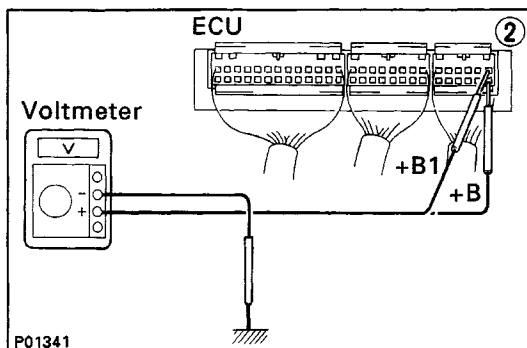
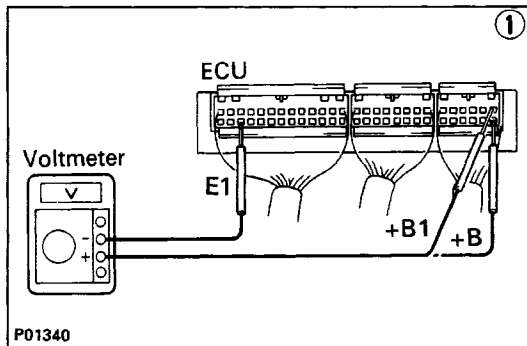
No.	Terminals	Condition		STD voltage (V)	See page
1	+B +B1 – E1	IG SW ON		10 – 14	FI-94
2	BATT – E1			10 – 14	FI-95
3	IDL – E2	IG SW ON	Throttle valve open	8 – 14	FI-96
	VC – E2		—	4.5 – 5.5	
	VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.8 – 1.2	
			Throttle valve fully open	3.2 – 4.2	
4	PIM – E2	IG SW ON		3.3 – 3.9	FI-98
	VC – E2			4.5 – 5.5	
5	No.10 E01 No.20 – E02				
6	THA – E2	IG SW ON	Intake air temp. 20°C 168°Fj	1.9 – 2.9	FI-100
7	THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1	FI-101
8	STA – E1	Cranking		6 – 14	FI-102
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-103
10	ISCC ISCO – E1	IG SW ON	Engine ECU connectors disconnected	8 – 14	FI-104
11	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	Ff-105

Engine ECU Terminals





FI5132



(1) There is no voltage between ECU terminals + B or B1 and E1. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

NO

OK

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check fuses, H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check EFI main relay. (See page FI-216)

BAD

Replace.

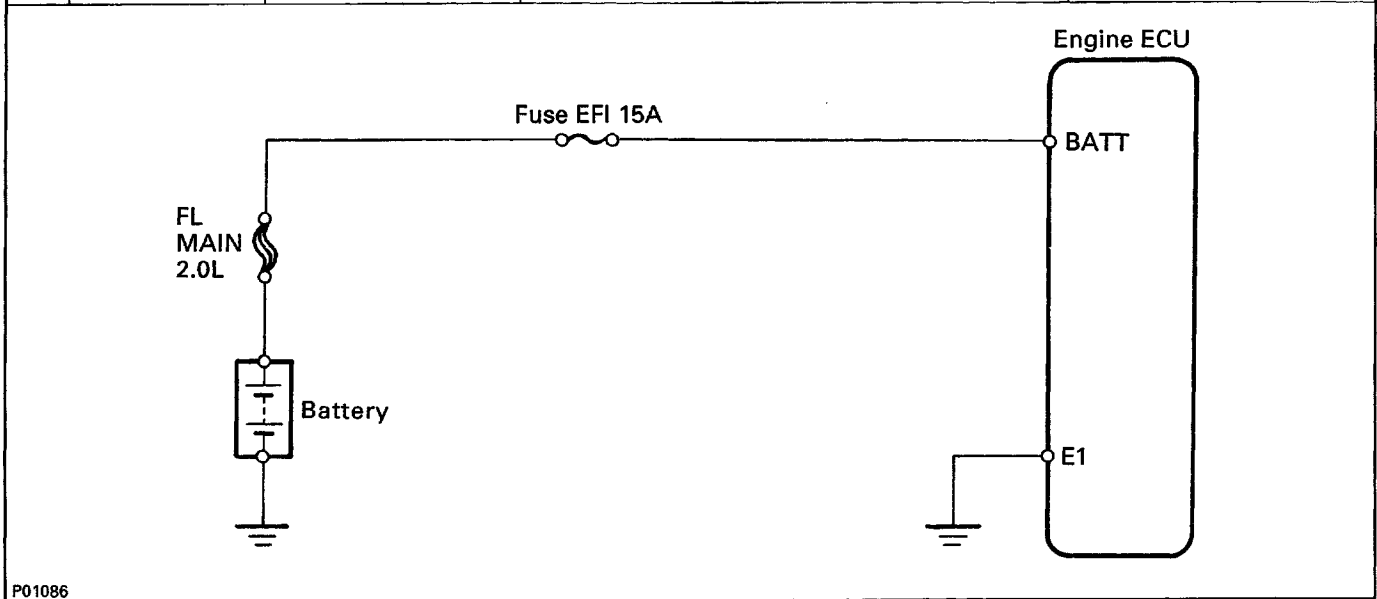
OK

Check wiring between ER main relay and battery.

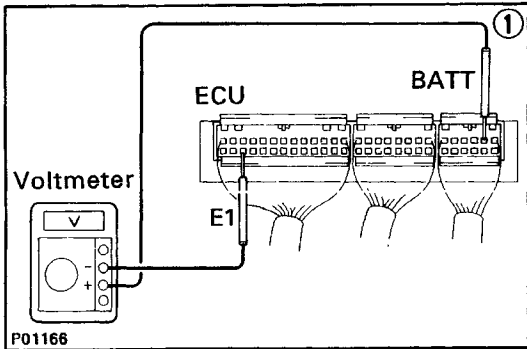
BAD

Repair or replace.

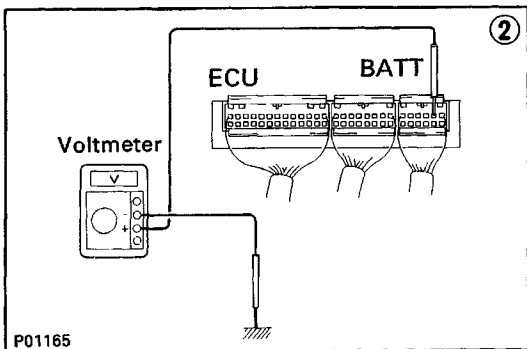
No.	Terminals	Trouble	Condition	STD voltage
2	BATT – E1	No voltage	–	10 – 14 V



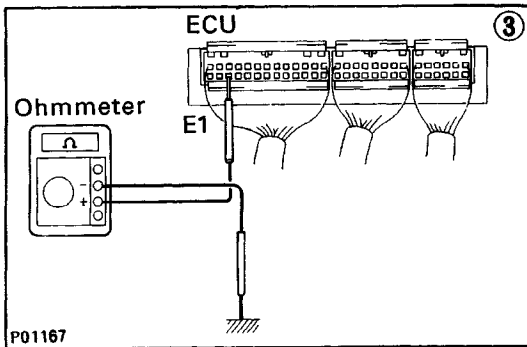
P01086



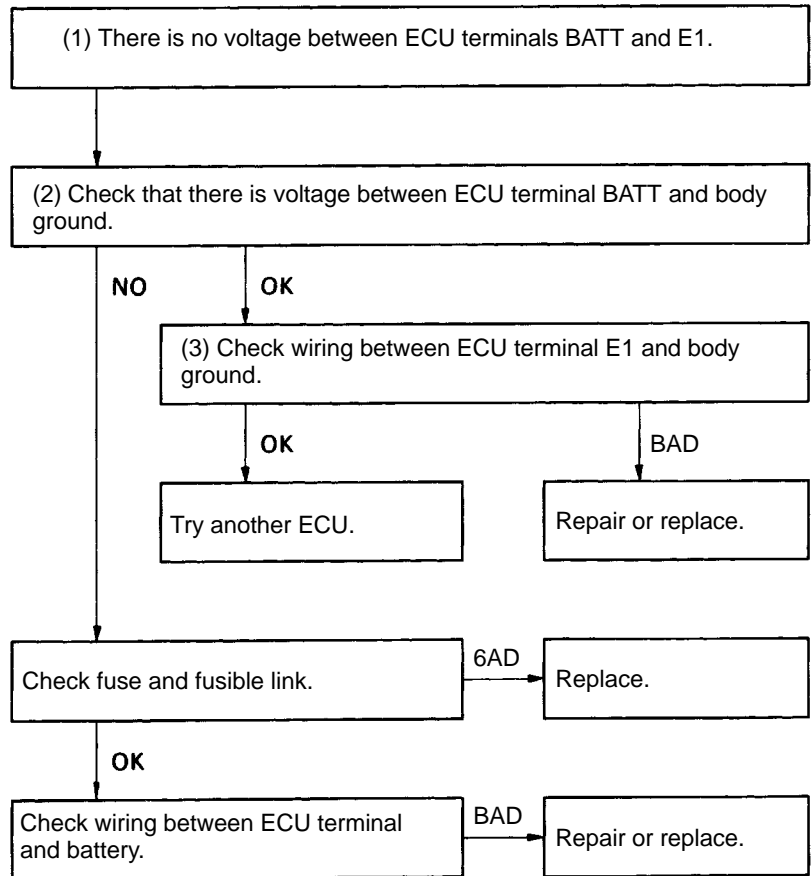
P01166



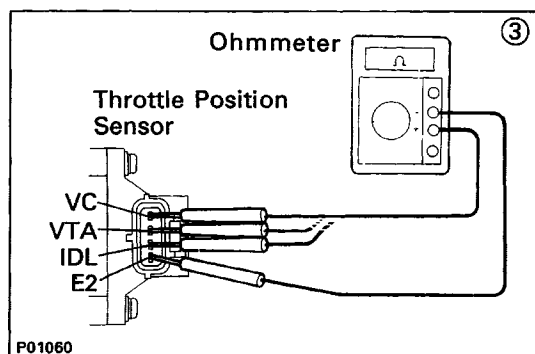
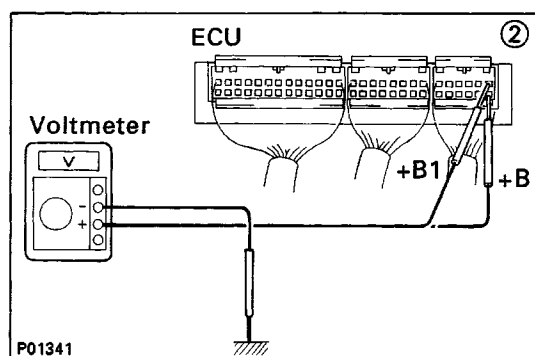
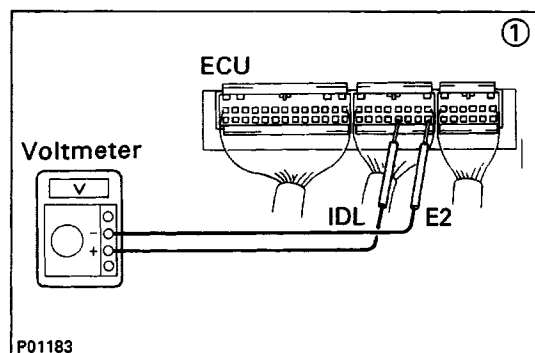
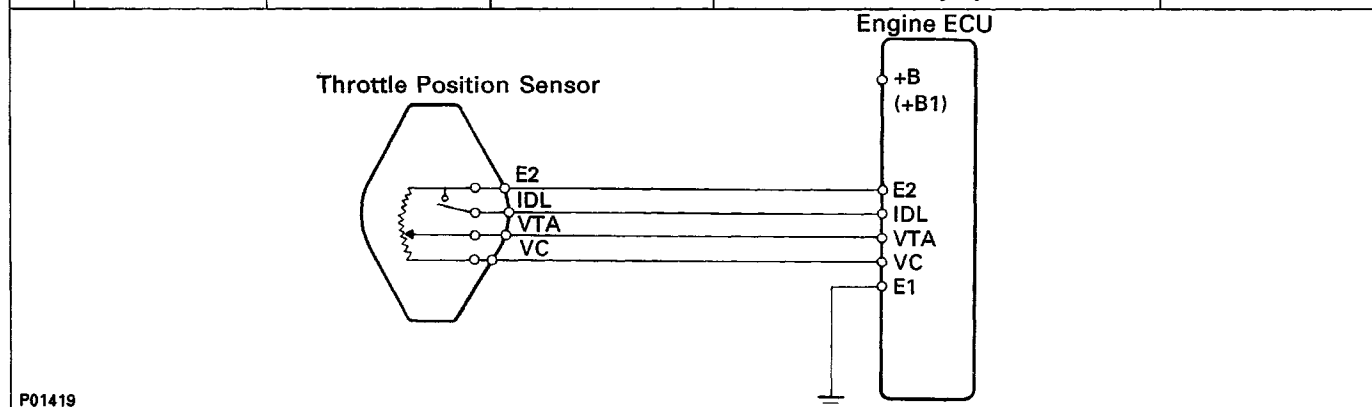
P01165



P01167



No.	Terminals	Trouble	Condition		STD voltage
3	IDL - E2	No voltage	IG SW ON	Throttle valve open	8 - 14 V
	VC - E2				4.5 - 5.5 V
	VTA - E2			Throttle valve fully closed Throttle opener must be cancelled first	0.8 - 1.2 V
				Throttle valve fully open	3.2 - 4.2 V



• IDL - E2

(1) There is no voltage between ECU terminals IDL and E2. (IG SW ON) (Throttle valve open)

(2) Check that there is voltage between ECU terminal +B (+B1) and body ground. (IG SW ON)

NO OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Refer to No.1. (See page FI-94)

BAD

Repair or replace.

OK

(3) Check throttle position sensor. (See page FI-199)

BAD

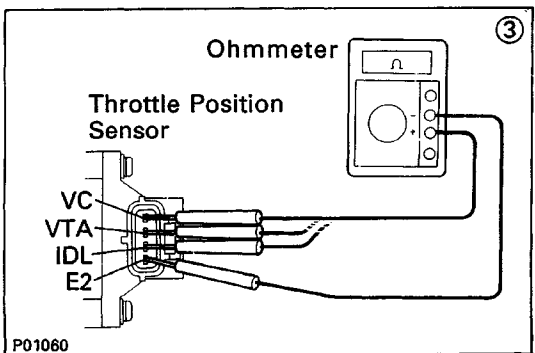
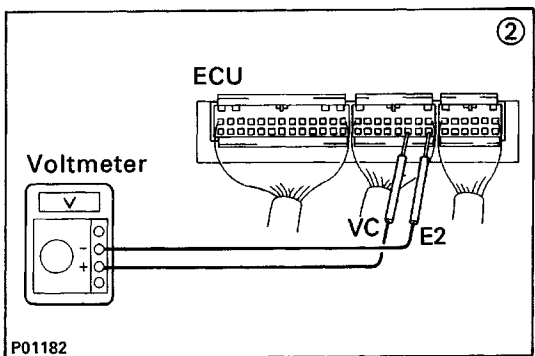
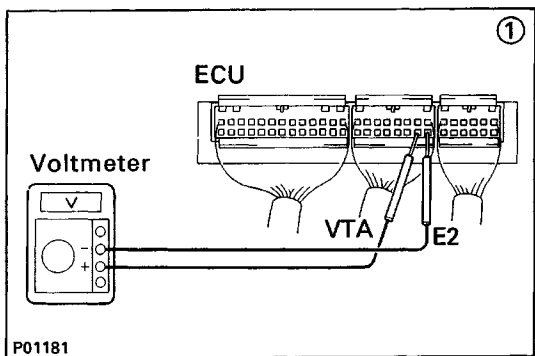
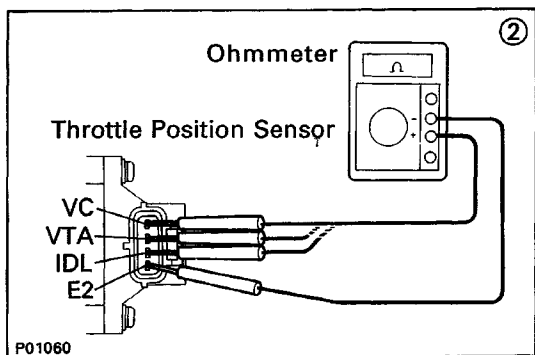
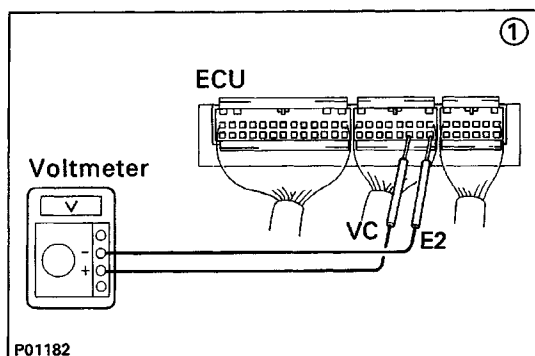
Repair or replace throttle position sensor.

OK

Check wiring between ECU and throttle position sensor.

OK

Try another ECU.



• VC - E2

(1) There is no voltage between ECU terminals VC and E2.
(IG SW ON)

Check that there is voltage between ECU terminal +B (+B1)
and body ground. (IG SW ON)

OK

NO

(2) Check throttle position
sensor. (See page FI-199)

Refer to No.1.
(See page FI-94)

BAD

OK

Repair or
replace.

Check wiring between ECU and throttle
position sensor.

OK

BAD

Try another ECU.

Repair or replace
wiring.

• VTA - E2

(1) There is no specified voltage at ECU terminals VTA and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminals VC
and E2. (IG SW ON)

NO

OK

Refer to VC - E2 trouble
section.

OK

(3) Check throttle position
sensor. (See page FI-199)

BAD

Repair or replace.

OK

Check wiring between ECU and
throttle position sensor.

BAD

Repair or replace.

OK

Try another ECU.

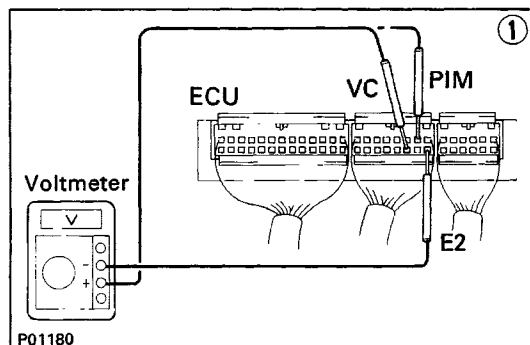
No.	Terminals	Trouble	Condition	STD voltage
4	PIM - E2	No voltage	IG SW ON	3.3 - 3.9 V
	VC - E2			4.5 - 5.5 V

Vacuum Sensor
(Manifold Absolute Pressure Sensor)

Engine ECU

E2, PIM, VCC, E2 (E21), PIM, VC, E1

FI1226



• PIM - E2, VC - E2

(1) There is no voltage between ECU terminals PIM or VC and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ B1) and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-94)

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Check vacuum sensor.
(See page FI-234)

Repair or replace.

BAD

OK

Replace vacuum sensor.

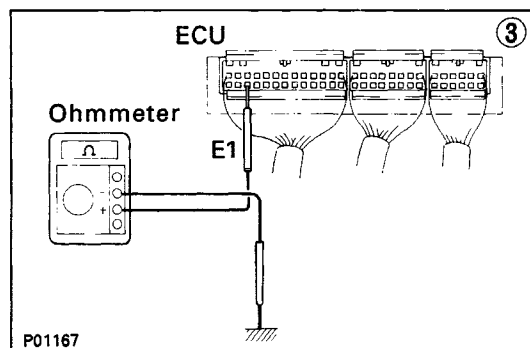
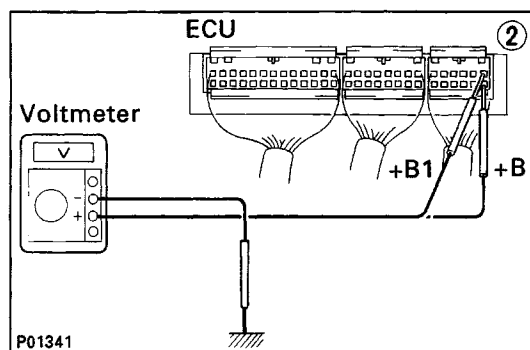
Check wiring between ECU and vacuum sensor.

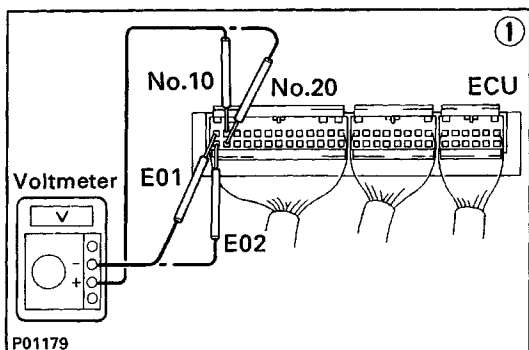
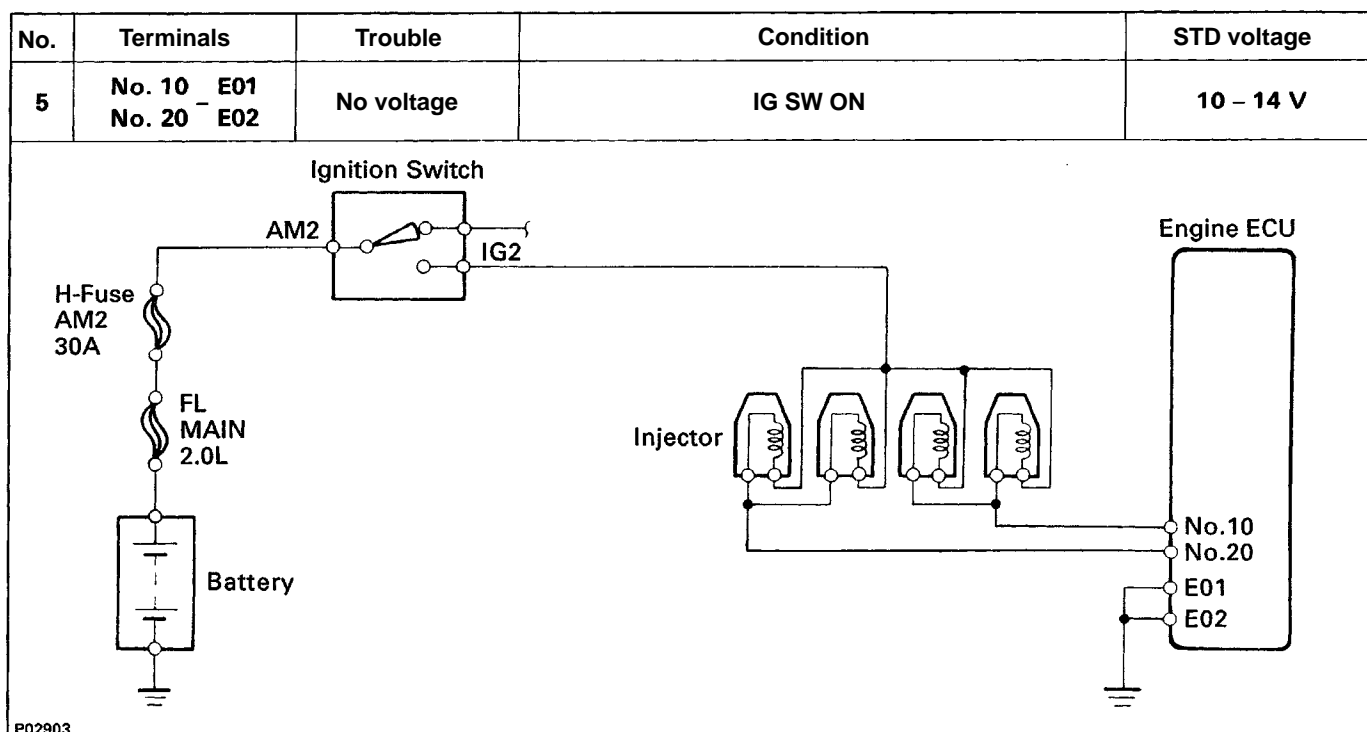
OK

BAD

Try another ECU.

Repair or replace.





(1) There is no voltage between ECU terminals No.10 and/or No.2 and E01 and/or E02. **IG SW ON**

(2) Check that there is voltage between ECU terminal No.14 and/or No.20 and body ground.

NO OK

Check wiring between ECU terminal E01 and/or E02 and body ground.

OK

Try another ECU.

BAD

Repair or replace.

Check H-fuse, fusible link and ignition switch.

BAD

Repair or Replace.

OK

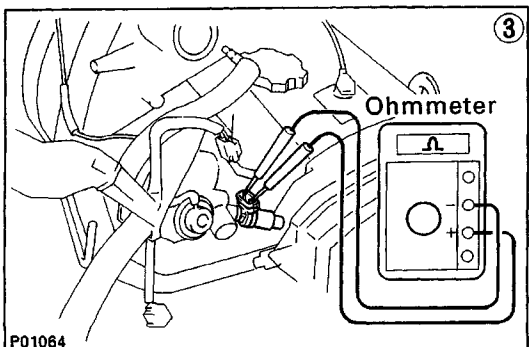
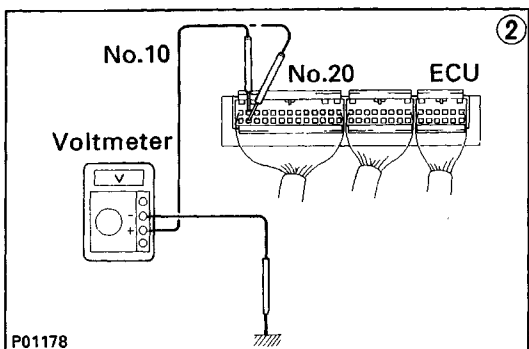
(3) Check resistance of each injector.
STD resistance: Approx. 13.8Ω

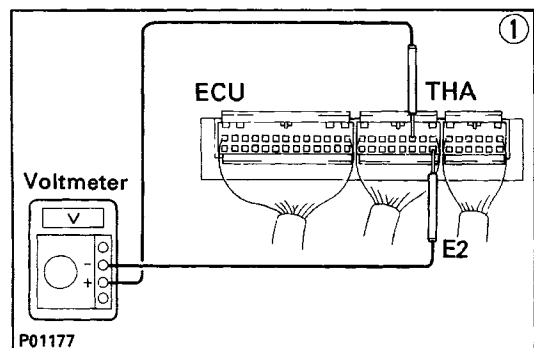
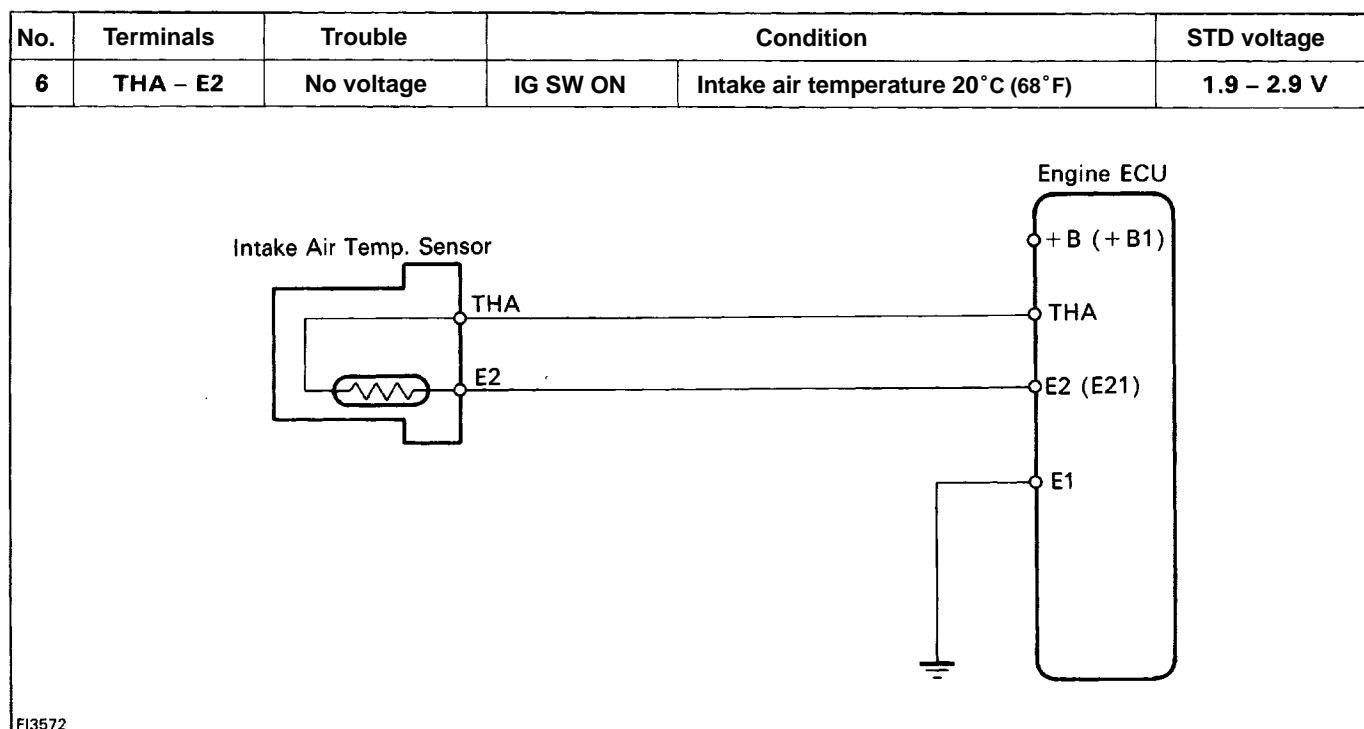
OK

Check wiring between ECU terminal No.10 and/or No.20 and battery.

BAD

Repair or replace.





(1) There is no voltage between ECU terminals THA and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal +B or +B1 and body ground. (IG SW ON)

OK

NO

Refer to No-1 .
(See page FI-94)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check intake air temp. sensor.
See page FI-232

Repair or replace.

BAD

OK

Replace air temp.
sensor.

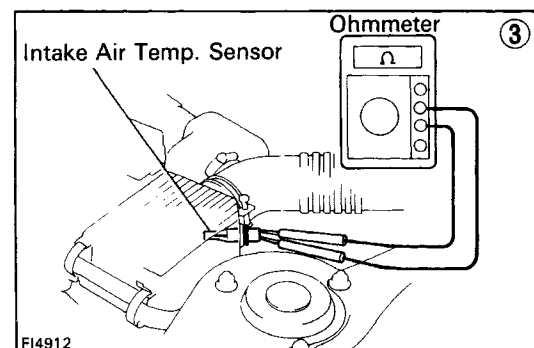
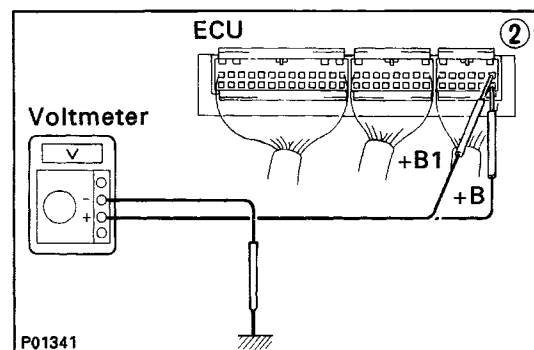
Check wiring between ECU and air temp.
sensor.

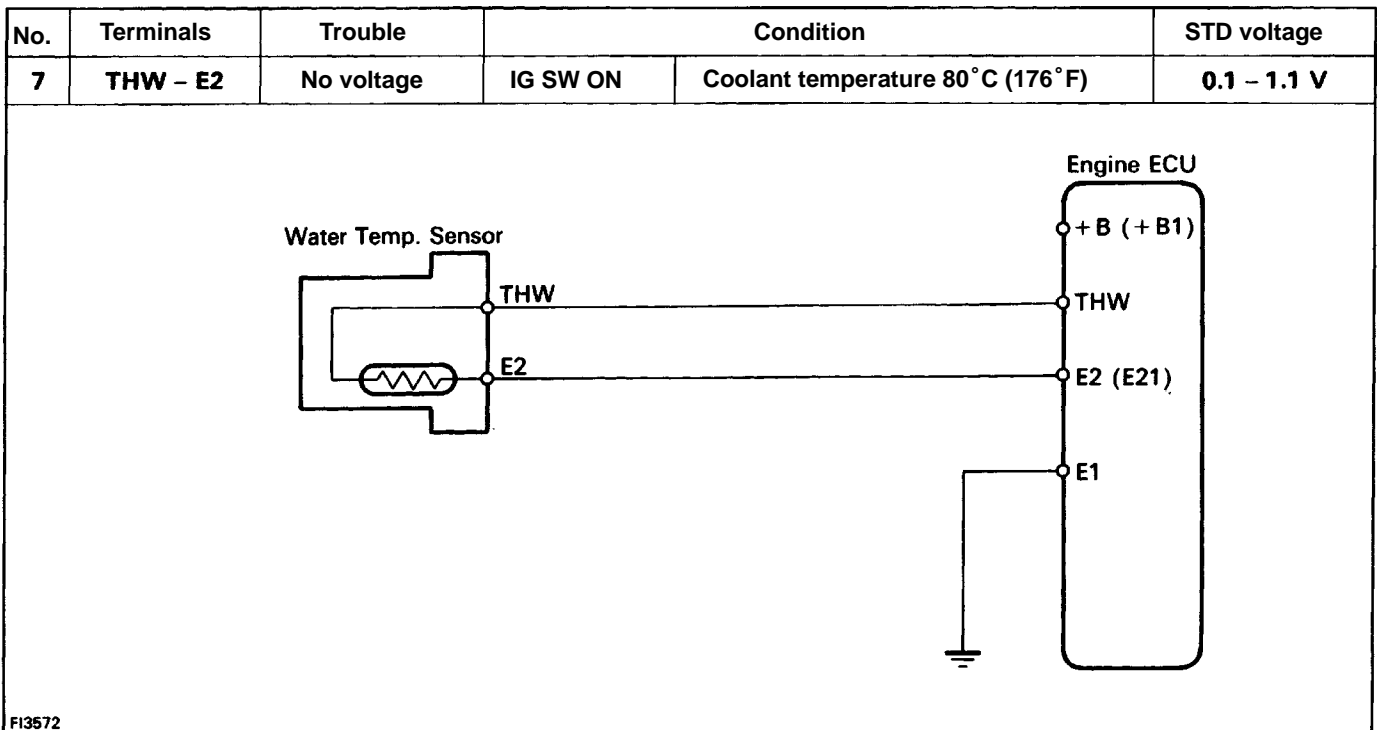
OK

BAD

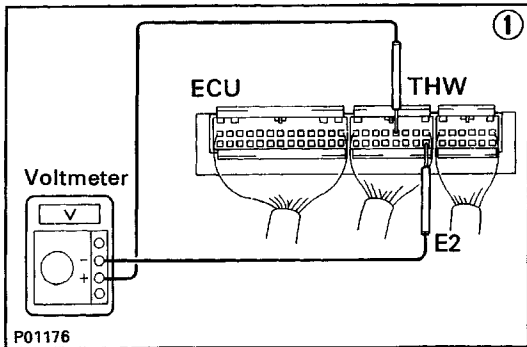
Try another ECU.

Repair or replace.





FI3572



(1) There is no voltage between ECU terminals THW and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal +B or +131 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-94)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check water temp. sensor.
(See page FI-231)

Repair or replace.

BAD

OK

Replace water temp. sensor.

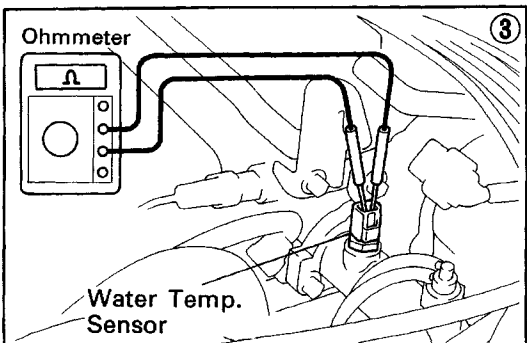
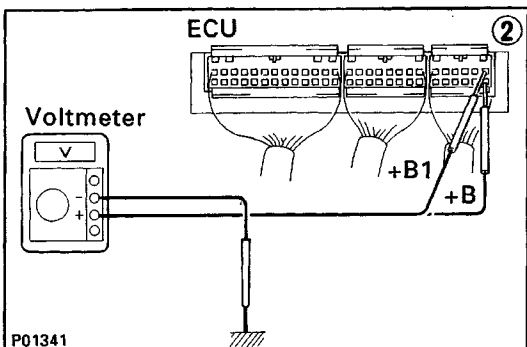
Check wiring between ECU and water temp. sensor.

OK

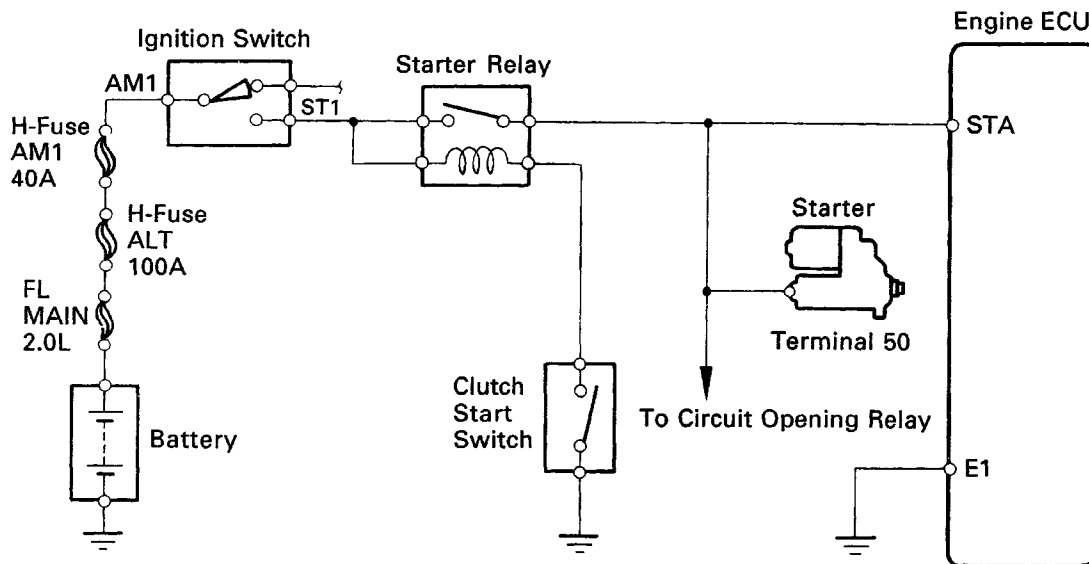
BAD

Try another ECU.

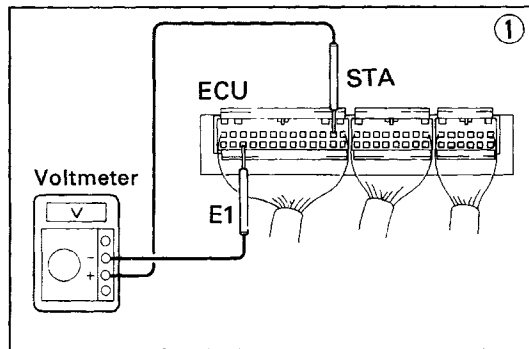
Repair or replace.



No.	Terminals	Trouble	Condition	STD voltage
8	STA - E1	No voltage	Cranking	6 - 14 V



FI5432



(1) There is no voltage between ECU terminals STA and E1.
(IG SW START)

Check starter operation.

OK

Check wiring between ECU terminal STA and ignition switch terminal ST1.

BAD

OK

BAD

Repair or replace.

(2) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check Fuse, fusible link, battery, wiring, ignition switch, clutch start switch and starter relay.

BAD

Repair or replace.

OK

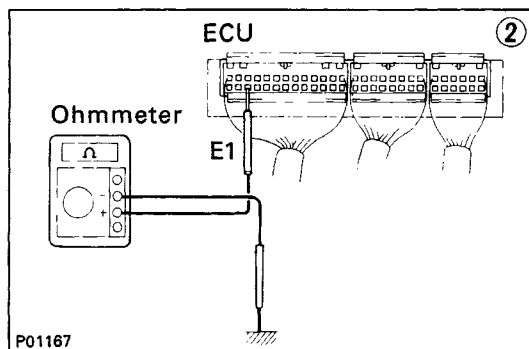
(3) Check that there is voltage at starter terminal 50.
(IG SW START) STD voltage: 6 - 14 V

OK

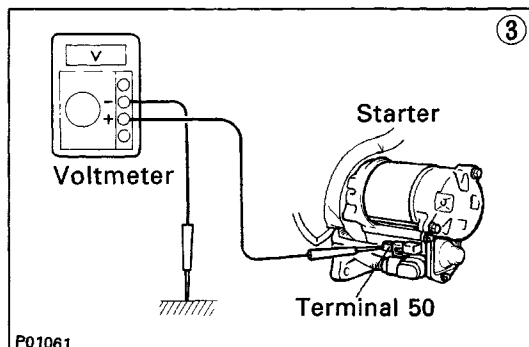
Check starter.

NO

Check wiring between ignition switch terminal ST1 and starter terminal 50.

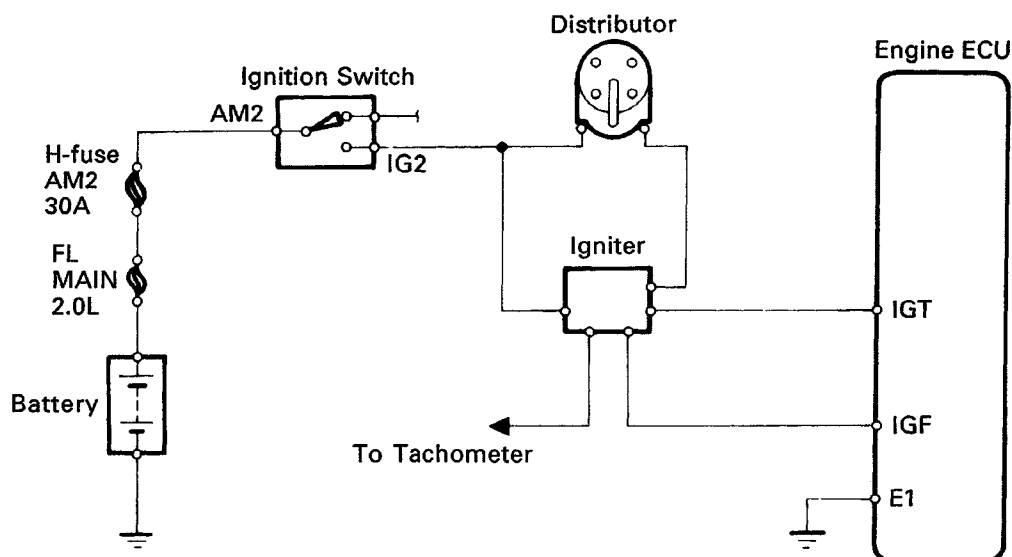


P01167

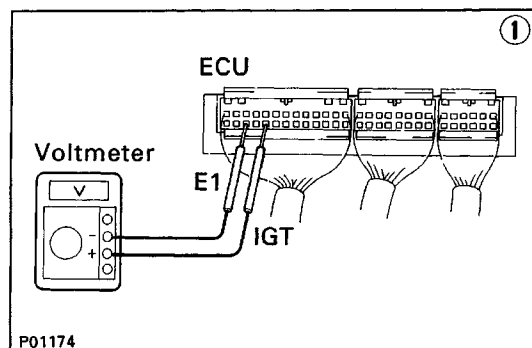


P01061

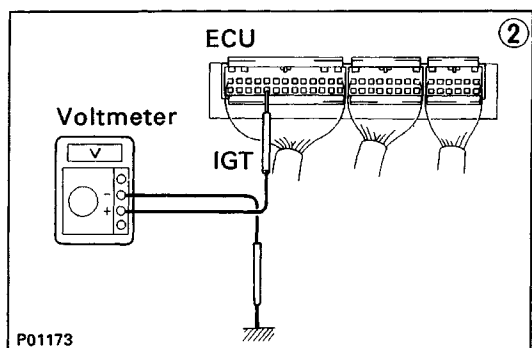
No.	Terminals	Trouble	Condition	STD voltage
9	IGT - E1	Alo voltage	Idling	0.8 - 1.2 V



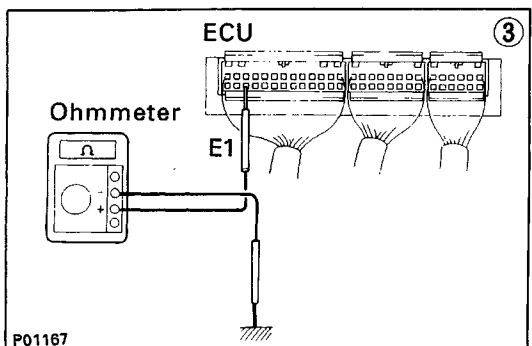
P02904



P01174



P01173



P01167

(1) There is no voltage between ECU terminals IGT and E1.
(Idling)

(2) Check that there is voltage between ECU terminal IGT and body ground. (Idling)

No OK

(3) Check wiring between ECU terminal E1 and body ground

BAD Repair or Replace.

OK

Try another ECU.

Check H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check distributor. (See page IG-18)

BAD

Repair or replace.

OK

Check wiring between ECU and battery.

BAD

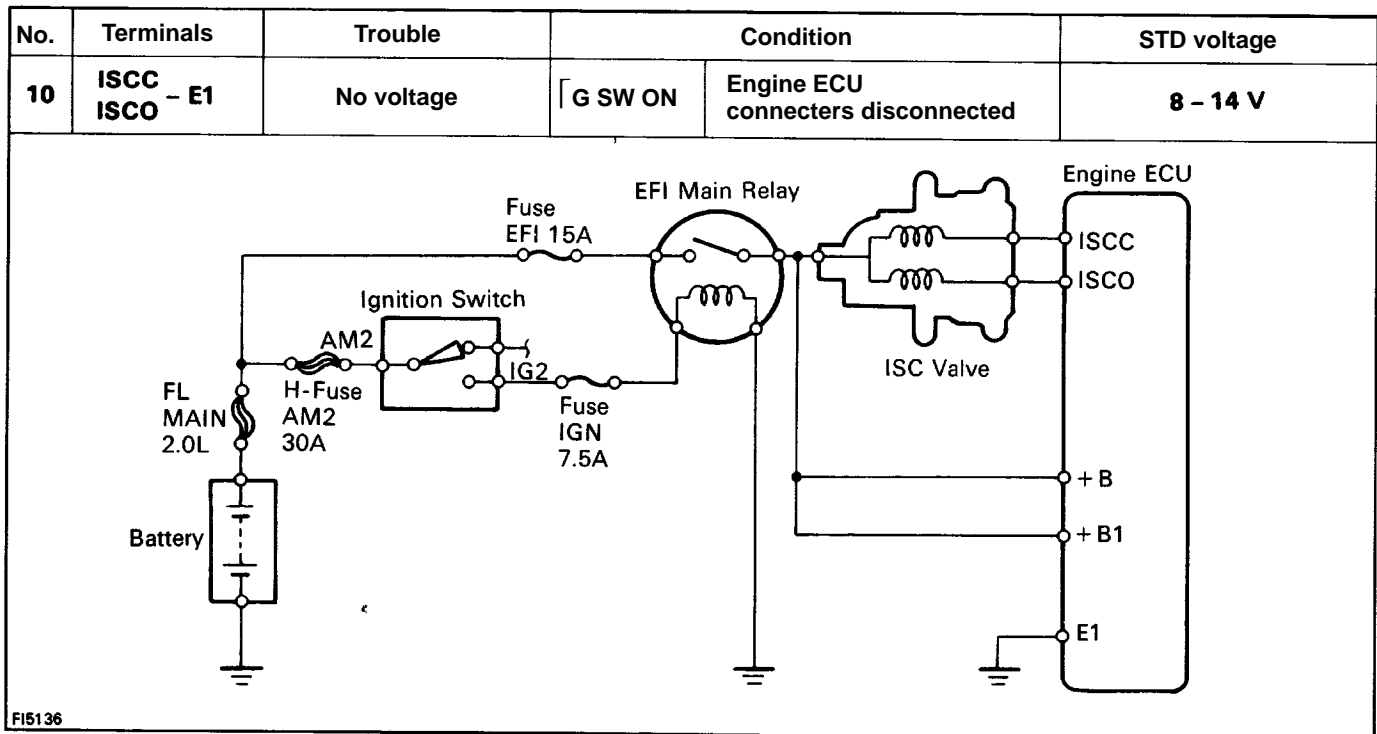
Repair or replace.

OK

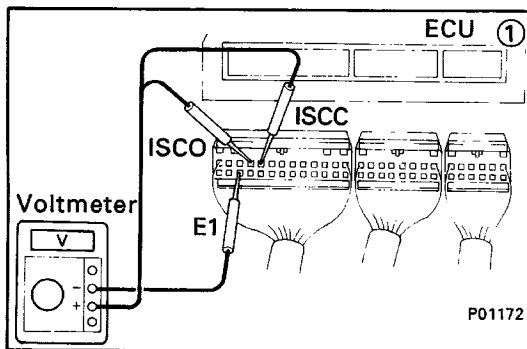
Check igniter. (See page IG-19)

BAD

Repair or replace.



FI5136



P01172

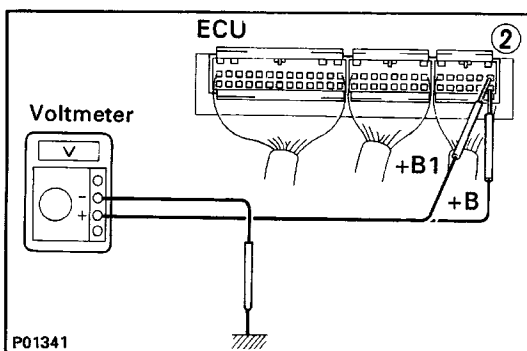
(1) There is no voltage between ECU terminals ISCC or ISCO and E1. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + 131 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-94)



P01341

(3) Check resistance between ISC valve terminals + B and ISCC or ISCO.

STD resistance:
Approx. 19.3 - 22.3 Ω

BAD

Replace ISC
valve.

OK

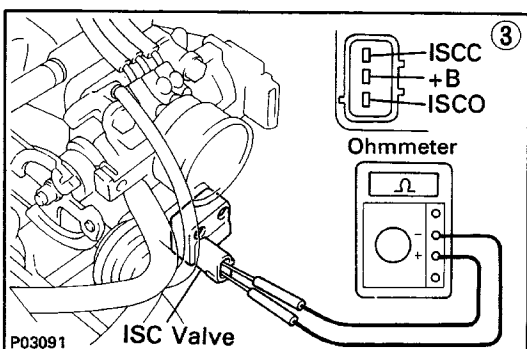
Check wiring between ECU and
ISC valve.

BAD

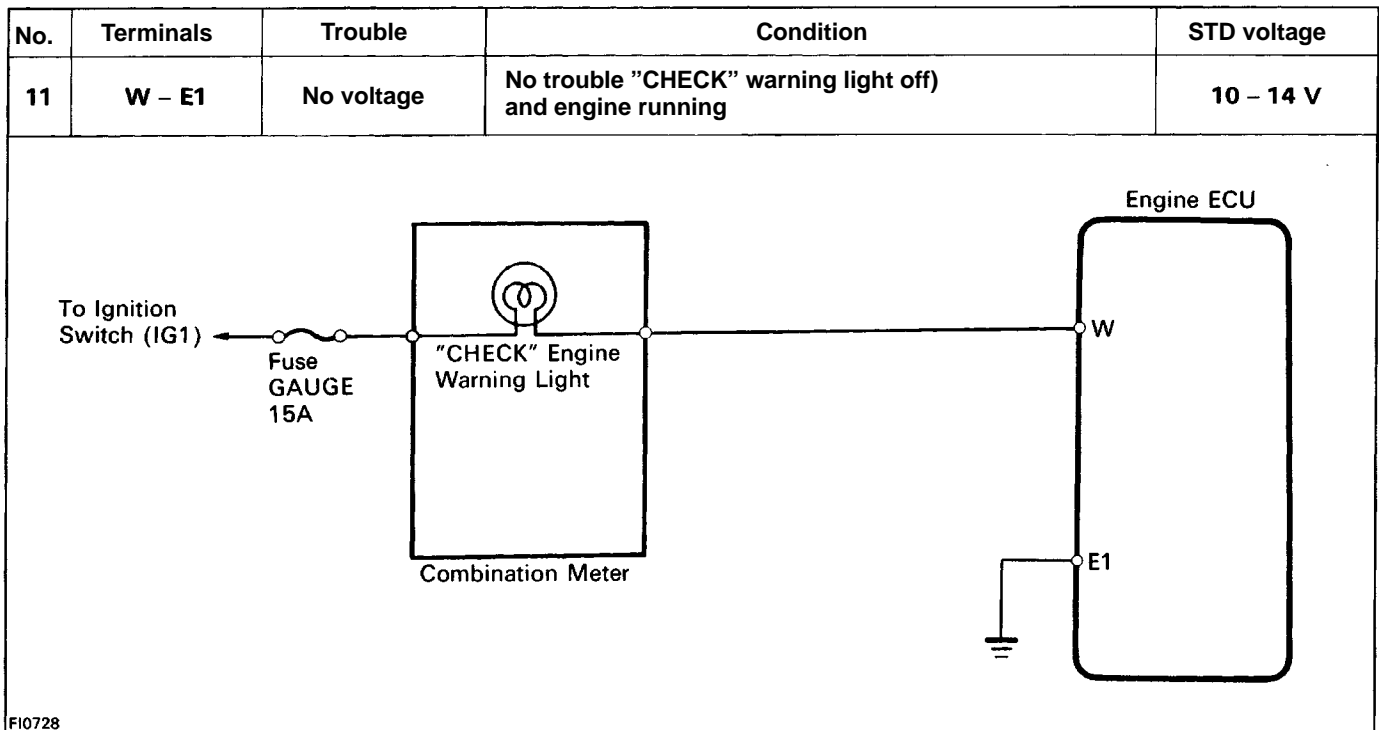
Repair or replace
wiring.

OK

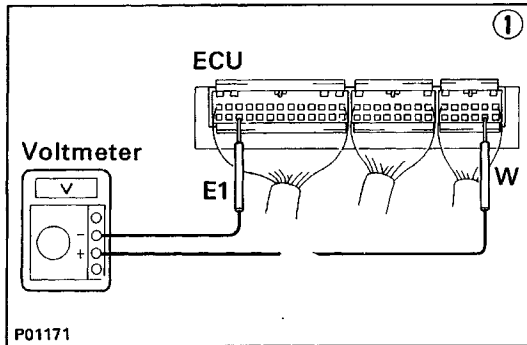
Try another ECU.



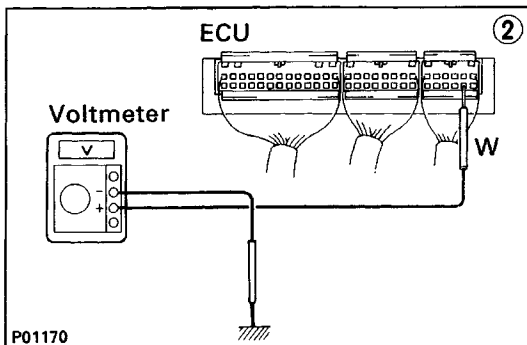
P03091



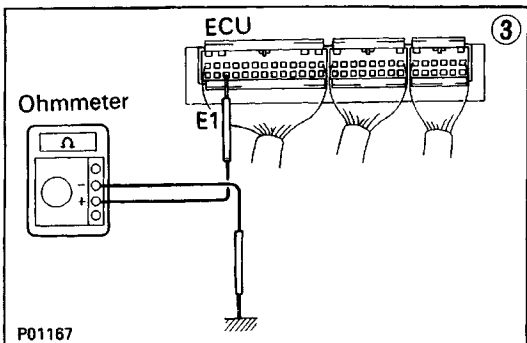
FI0728



P01171



P01170



P01167

(1) There is no voltage between ECU terminals W and E1.
(Idling)

(2) Check that there is voltage between ECU terminal W and body ground

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check GAUGE fuse (15A) and "CHECK" engine warning light.

OK

BAD

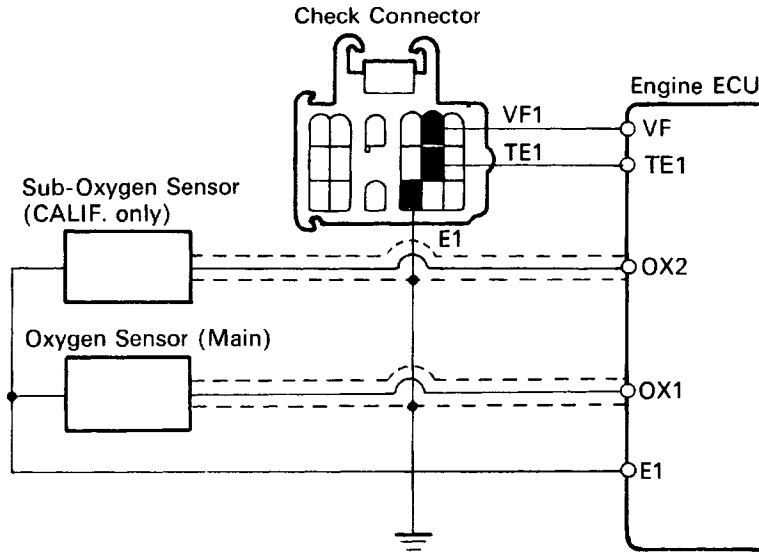
Repair or replace.

Fuse blows again

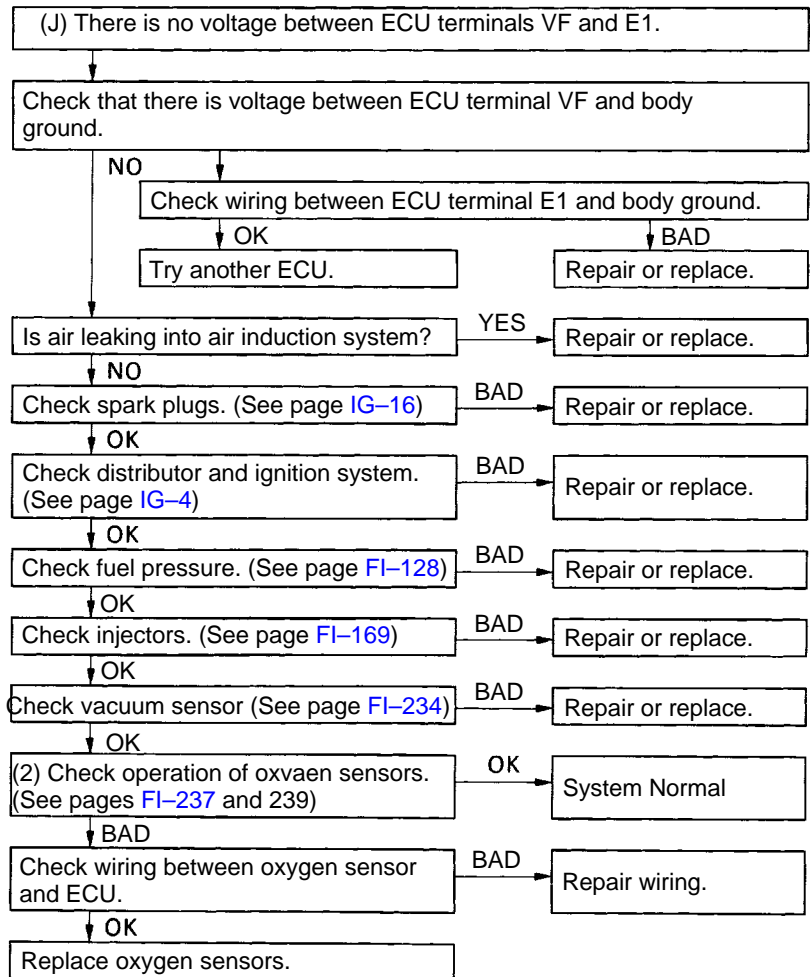
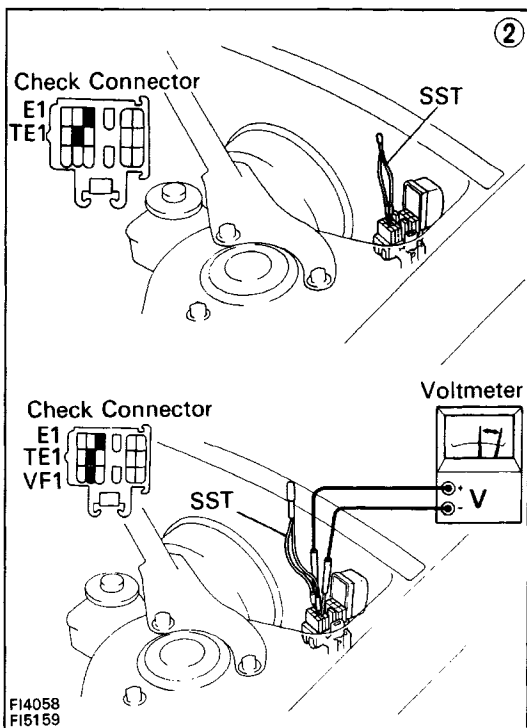
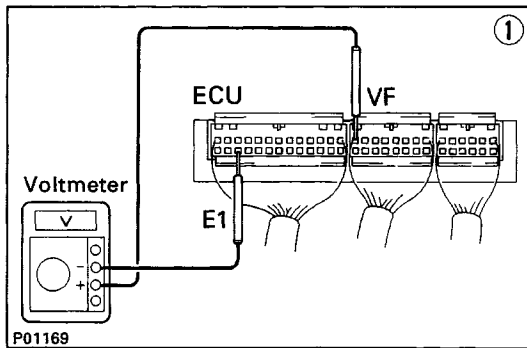
Check wiring between ECU terminal W and fuse.

BAD

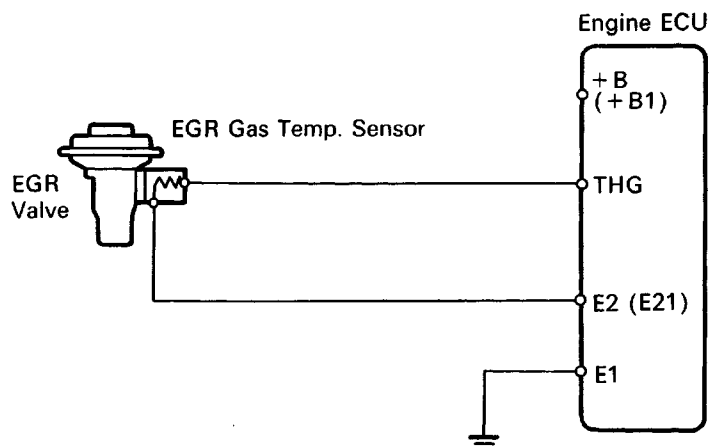
Repair or replace.



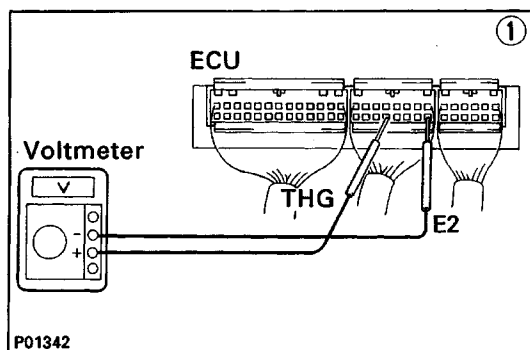
FI3841



CALIF. only



FI2680



(1) There is no voltage between ECU terminals THG and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-94)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Repair or replace.

Check EGR system.
(See page EC-36)

BAD

Repair or replace.

OK

Check EGR gas temp. sensor.
(See page FI-236)

BAD

Replace EGR gas temp. sensor.

OK

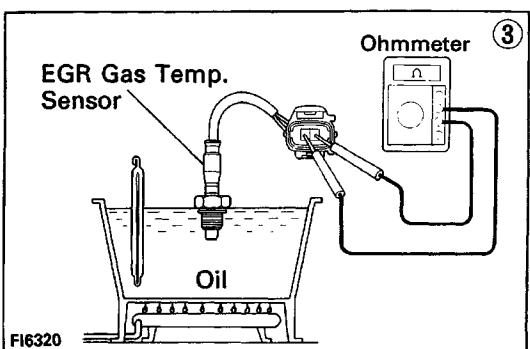
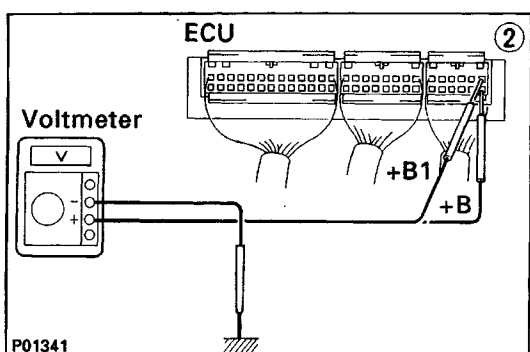
Check wiring between ECU and EGR gas temp. sensor.

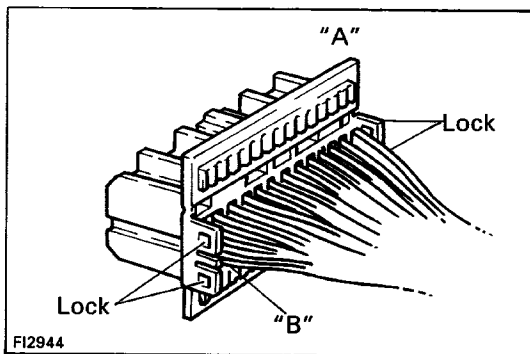
OK

Try another ECU.

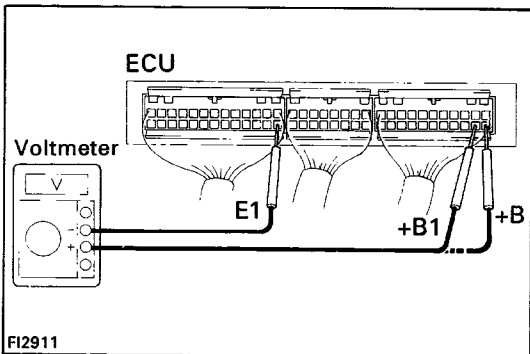
BAD

Repair or replace.





FI2944



FI2911

EFI SYSTEM CHECK PROCEDURE (5S-FE A/T)

PREPARATION

(a) Disconnect the connectors from the engine and ECT ECU.

(b) Remove the locks as shown in the illustration so that the tester probe(s) can easily come in.

NOTICE: Pay attention to sections "A" and "B" in the illustration which can be easily broken.

(c) Reconnect the connectors to engine and ECT ECU.

HINT:

- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is in the "ON" position. Using a voltmeter— with high impedance (10 k Ω /V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of Engine & ECT ECU (5S-FE A/T)

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	S1	ECT SOLENOID		—
E02	POWER GROUND	S2	ect SOLENOID	ACT	A/C AMPLIFIER
No.10	INJECTOR	SL	ECT SOLENOID	SP1	SPEED SENSOR
	—	E1	ENGINE GROUND	OD1	OD OFF SWITCH
No.20	INJECTOR	VF	CHECK CONNECTOR	ACA	A/C AMPLIFIER
	—	E21	SENSOR GROUND		—
ISCO	ISC VALVE	TT	CHECK CONNECTOR	OD2	OD MAIN SWITCH
EGR	EGR VSV	TE1	CHECK CONNECTOR		—
ISCC	SC VALVE	OX1	OXYGEN SENSOR		—
P	PATTERN SELECT SWITCH	TE2	CHECK CONNECTOR		—
	—	*OX2	SUB-OXYGEN SENSOR	W	WARNING LIGHT
	—	KNK	KNOCK SENSOR		—
ISCV	A/C IDLE-UP VSV	THW	WATER TEMP. SENSOR	B/K	STOP LIGHT SWITCH
IGT	IGNITER	IDL	THROTTLE POSITION SENSOR	ATS	A/C AMPLIFIER
2	NEUTRAL START SWITCH	THA	AIR TEMP. SENSOR	THE	EVAPORATOR TEMP. SENSOR
L	NEUTRAL START SWITCH	VTA	THROTTLE POSITION SENSOR	FC	CIRCUIT OPENING RELAY
NE -	DISTRIBUTOR	PIM	VACUUM SENSOR	ELS	HEADLIGHT RELAY DEFOGGER RELAY
G +	DISTRIBUTOR	*THG	EGR GAS TEMP. SENSOR	+B	EFI MAIN RELAY
NE +	DISTRIBUTOR	VC	VACUUM SENSOR, THROTTLE POSITION SENSOR	BATT	BATTERY
G -	DISTRIBUTOR	E2	SENSOR GROUND	+B1	EFI MAIN RELAY
IGF	IGNITER	STA	STARTER SWITCH	*Calif. only	
SP2	SPEED SENSOR	NSW	NEUTRAL START SWITCH		

Engine & ECT ECU Terminals

E01	No. 10	No. 20	ISCO	ISCC	ISCV	2	NE -	NE +	IGF	S1	SL	VF	TT	OX1	OX2	THW	THA	PIM	VC	STA	SPD	ACA	OD2	W	B/K	THE	ELS	BATT
E02			EGR	P	IGT	L	G +	G -	SP2	S2	E1	E21	TE1	TE2	KNK	IDL	VTA	THG	E2	NSW	ACT	OD1			ATS	FC	+B1	+B

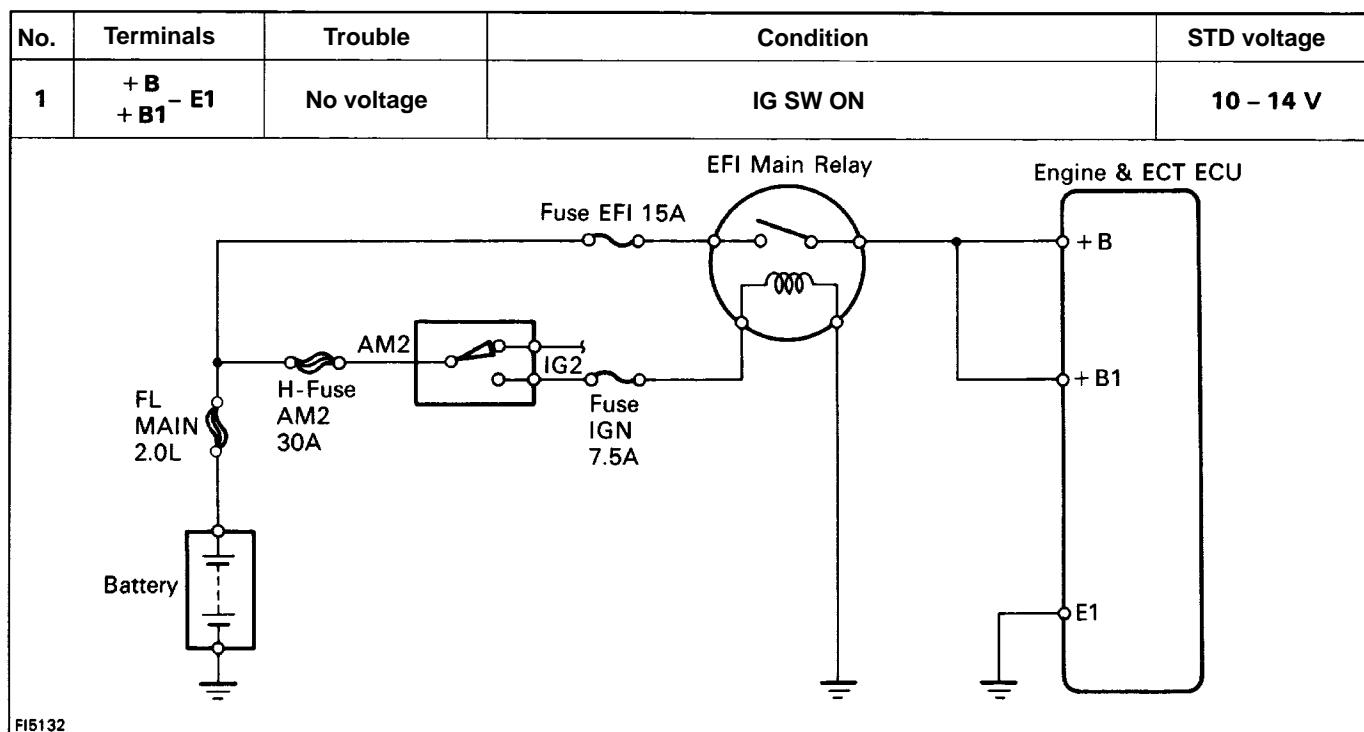
FI2796

Voltage at ECU Wiring Connectors (5S-FE A/T)

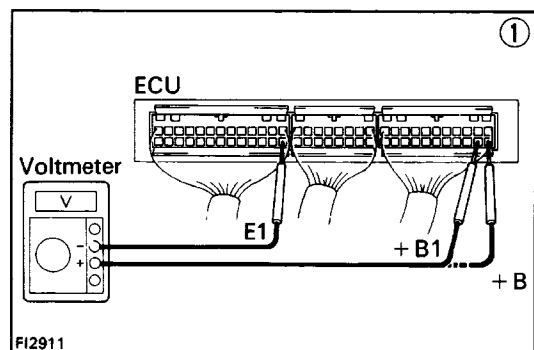
No.	Terminals	Condition		STD voltage (V)	See page
1	+ B – E1 + B1	IG SW ON		10 – 14	FI-110
2	BATT – E1	—		10 – 14	FI-111
3	IDL – E2	IG SW ON	Throttle valve open	8 – 14	FI-112
	VC – E2		—	4.5 – 5.5	
	VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.8 – 1.2	
			Throttle valve fully open	3.2 – 4.2	
4	PIM – E2	IG SW ON		3.3 – 3.9	FI-114
	VC – E2			4.5 – 5.5	
5	No. 10 _ E01 No. 20 _ E02				
6	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.9 – 2.9	FI-116
7	THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1	FI-117
8	STA – E1	Cranking		6 – 14	FI-118
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-119
10	ISCC – E1 ISCO	IG SW ON	Engine and ECT ECU connectors disconnected	8 – 14	FI-120
11	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	FI-121

Engine & ECT ECU Terminals

E01	No. 10	No. 20	ISCO	ISCC	ISCV	2	NE -	NE +	IGF	S1	SL	VF	TT	OX1	OX2	THW	THA	PIM	VC	STA	SPD	ACA	OD2	W	B/K	THE	ELS	BATT
E02			EGR	P	IGT	L	G +	G -	SP2	S2	E1	E21	TE1	TE2	KNK	IDL	VTA	THG	E2	NSW	ACT	OD1			ATS	FC	+B1	+B



FI5132



(1) There is no voltage between ECU terminals + B or + B1 and E1. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

NO

OK

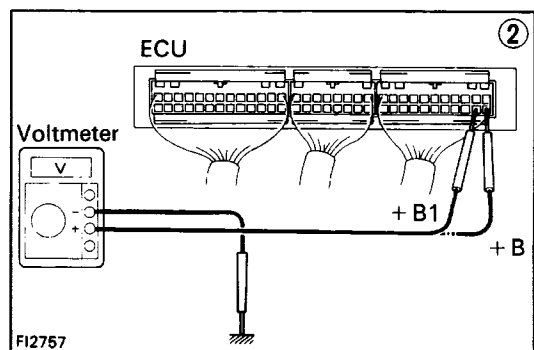
(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.



Check fuses, H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

Check EFI main relay. (See page FI-216)

BAD

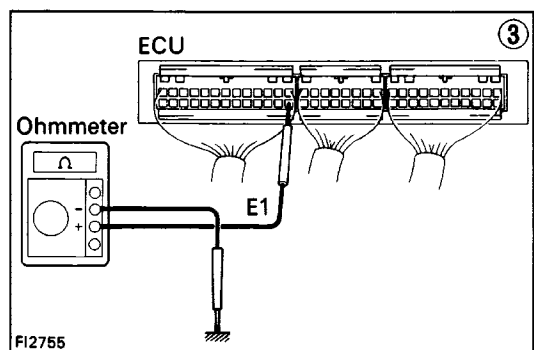
Replace.

OK

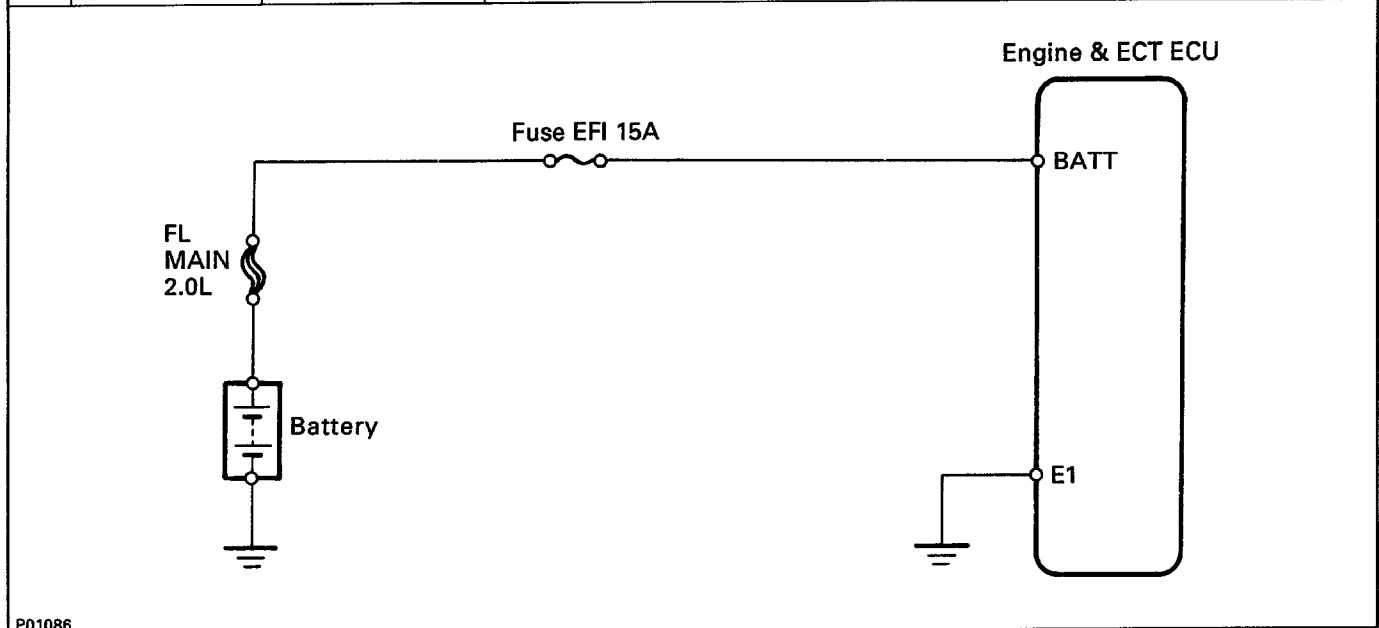
Check wiring between EFI main relay and battery.

BAD

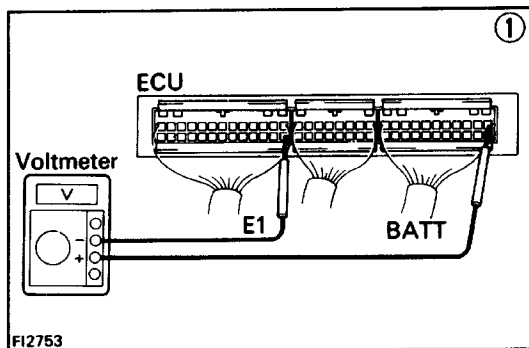
Repair or replace.



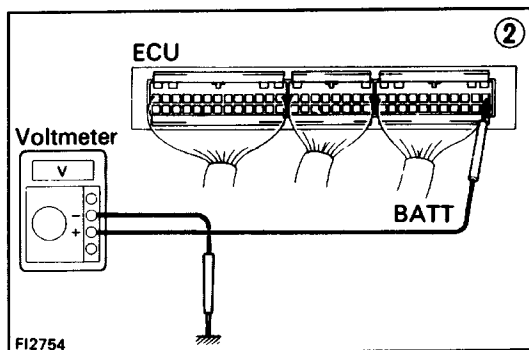
No.	Terminals	Trouble	Condition	STD voltage
2	BATT - E1	No voltage	-	10 - 14 V



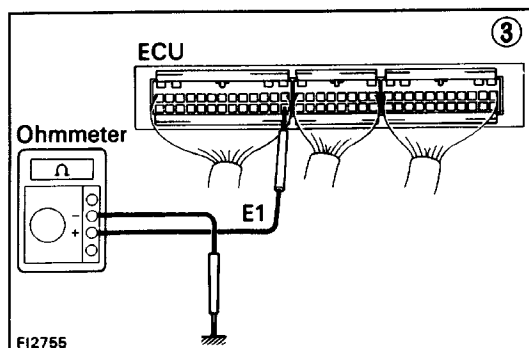
P01086



FI2753



FI2754



FI2755

(1) There is no voltage between ECU terminals BATT and E1.

(2) Check that there is voltage between ECU terminal BATT and body ground.

NO OK

(3) Check wiring between ECU terminal E1 and body ground.

OK

Try another ECU.

BAD

Repair or replace.

Check fuse and fusible link.

BAD

Replace.

OK

Check wiring between ECU terminal and battery.

BAD

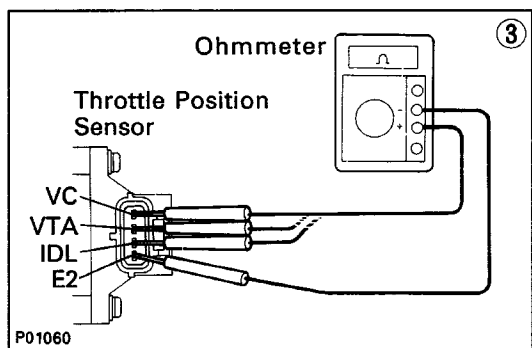
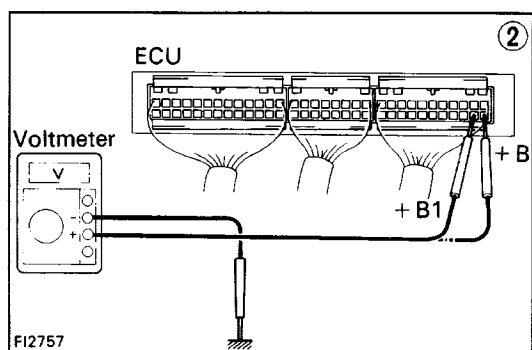
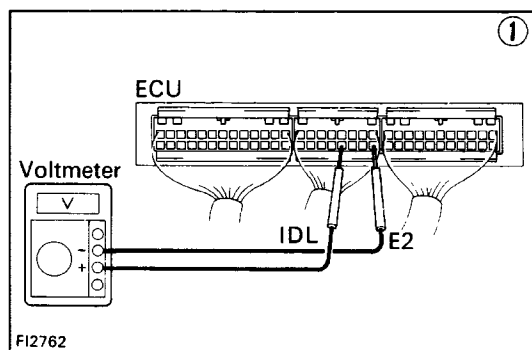
Repair or replace.

No.	Terminals	Trouble	Condition		STD voltage
3	IDL – E2	No voltage	IG SW ON	Throttle valve open	8 – 14 V
	VC – E2			–	4.5 – 5.5 V
	VTA – E2			Throttle valve fully closed Throttle opener must be cancelled first	0.8 – 1.2 V
				Throttle valve fully open	3.2 – 4.2 V

Throttle Position Sensor

Engine & ECT ECU

P01419



• IDL – E2

(1) There is no voltage between ECU terminals IDL and E2.
(IG SW ON) (Throttle valve open)

(2) Check that there is voltage between ECU terminal + B (+B1) and body ground. (IG SW ON)

NO

OK

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Refer to No.1.
(See page FI-110)

BAD

Repair or replace.

OK

(3) Check throttle position sensor.
(See page FI-199)

BAD

Repair or replace
throttle position sensor.

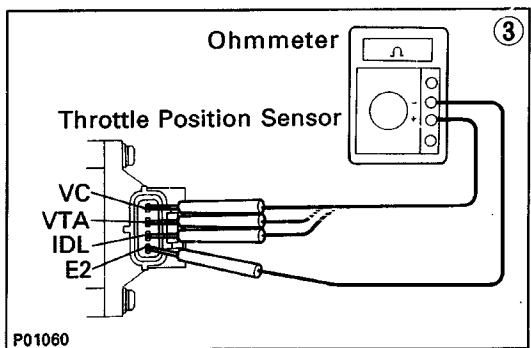
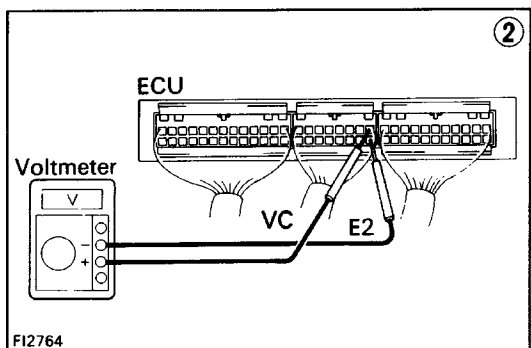
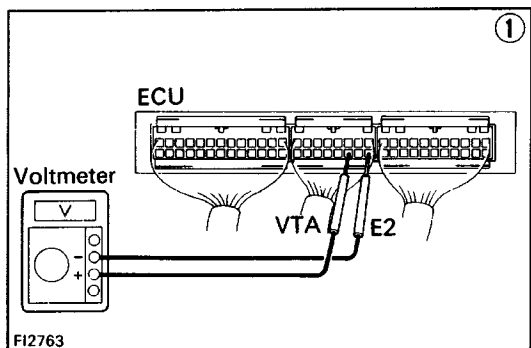
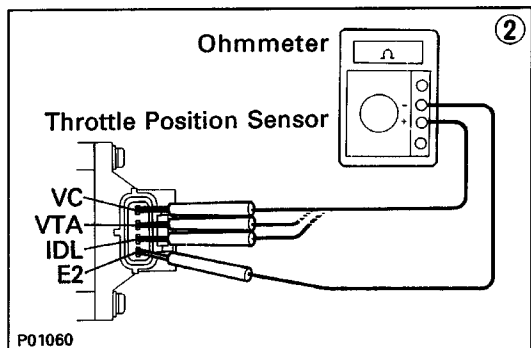
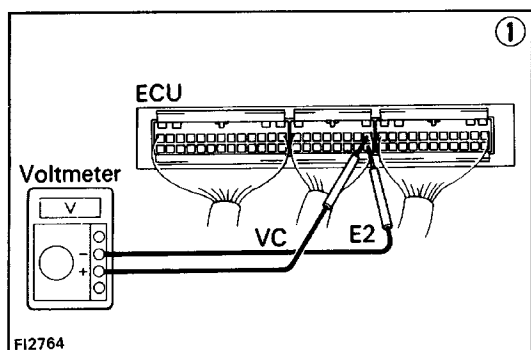
OK

Check wiring between ECU and
throttle position sensor.

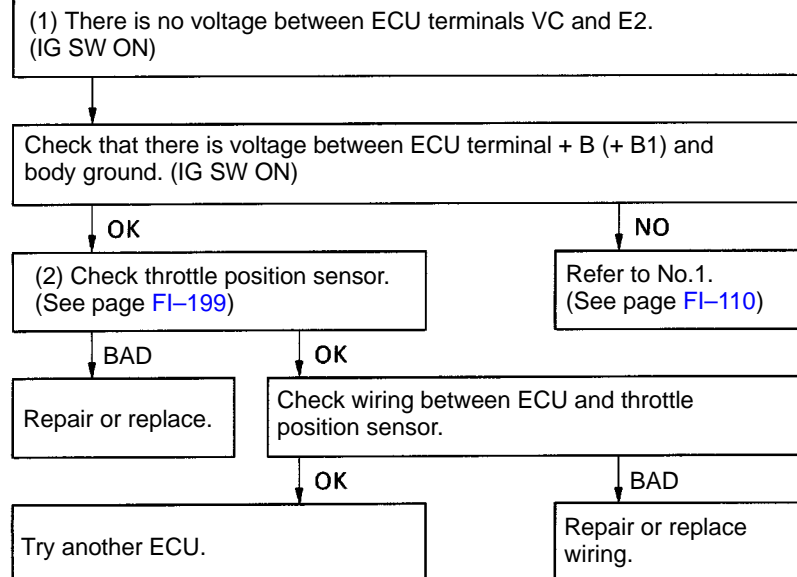
OK

Try another ECU.

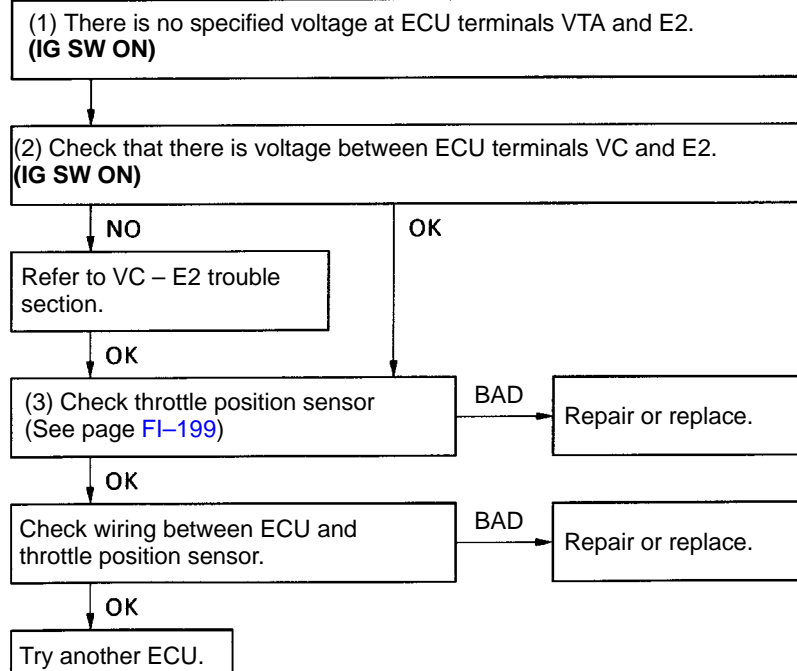
BAD



• VC-E2



• VTA – E2



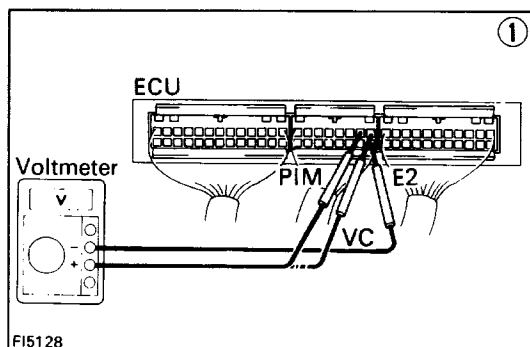
No.	Terminals	Trouble	Condition	STD voltage
4	PIM - E2	No voltage	IG SW ON	3.3 - 3.9 V
	VC - E2			4.5 - 5.5 V

Vacuum Sensor
(Manifold Absolute Pressure Sensor)

Engine & ECT ECU

E2, PIM, VC, E2 (E21), PIM, VC, E1

FI1226



• PIM - E2, VC - E2

(1) There is no voltage between ECU terminals PIM or VC and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B (+ 131) and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-110)

(3) Check wiring between ECU terminal E1 and body ground.

OK

BAD

Check vacuum sensor.
(See page FI-234)

Repair or replace.

BAD

OK

Replace vacuum sensor.

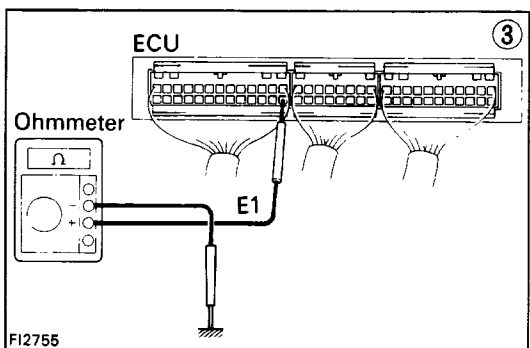
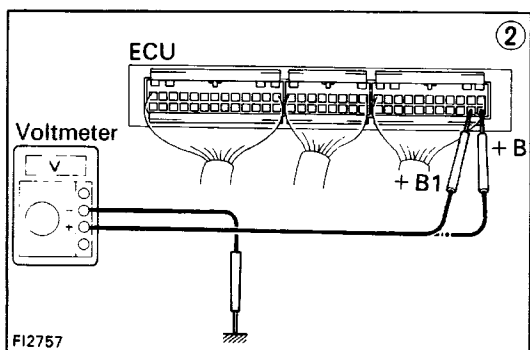
Check wiring between ECU and vacuum sensor.

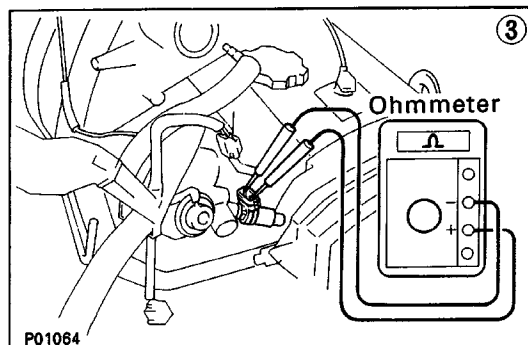
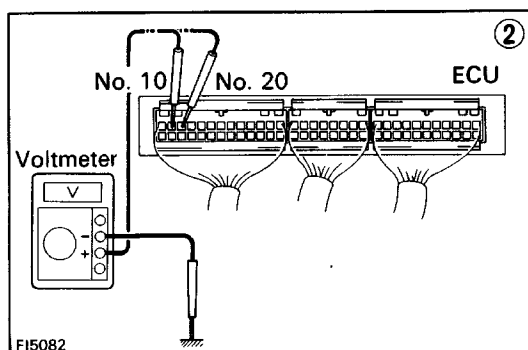
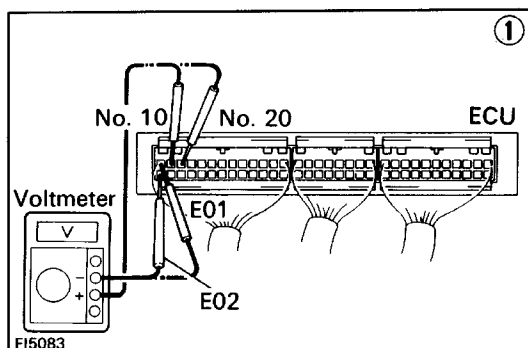
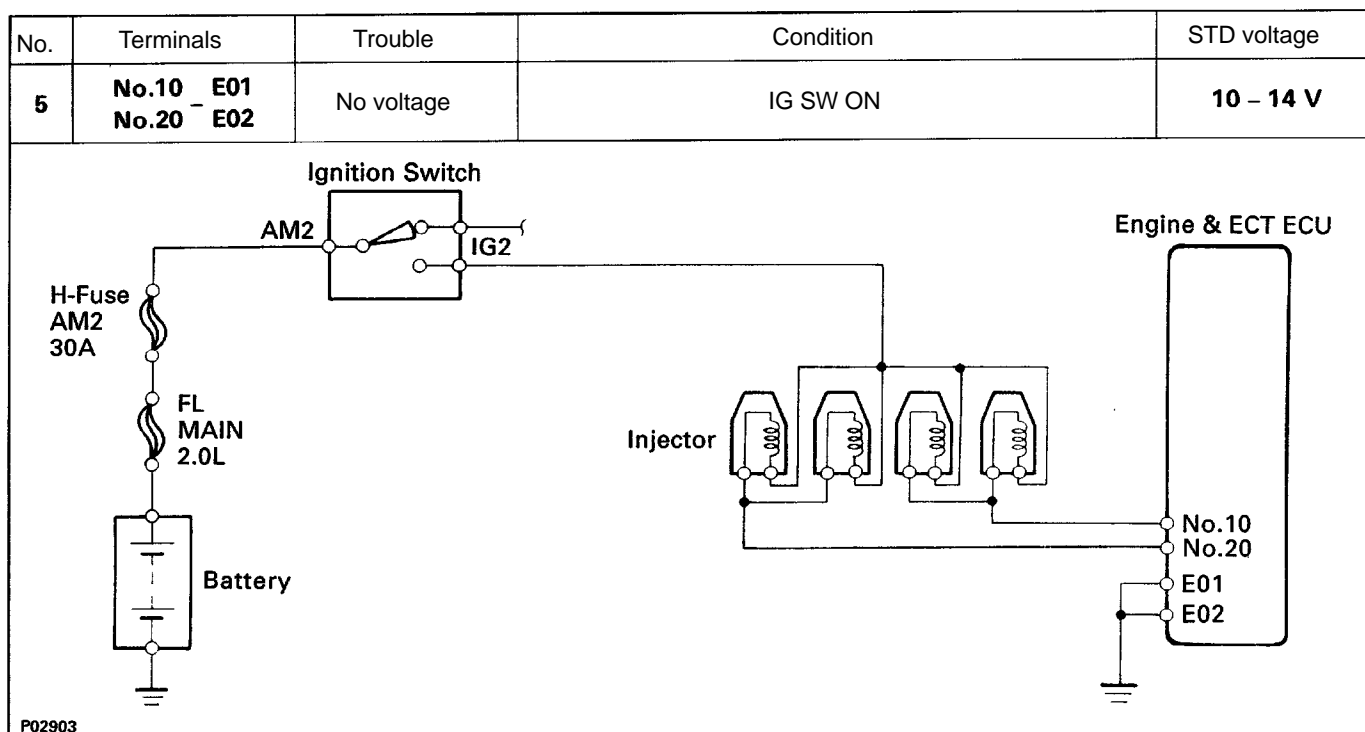
OK

BAD

Try another ECU.

Repair or replace.





(1) There is no voltage between ECU terminals No.10 and/or No.20 and E01 and/or E02.(IG SW ON)

(2) Check that there is voltage between ECU terminal No.10 and/or No.20 and body ground.

NO

OK

Check wiring between ECU terminal E01 and/or E02 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

Check H-fuse, fusible link and ignition switch.

BAD

Repair or replace.

OK

(3) Check resistance of each injector
STD resistance: Aprox. 13.8Ω

OK

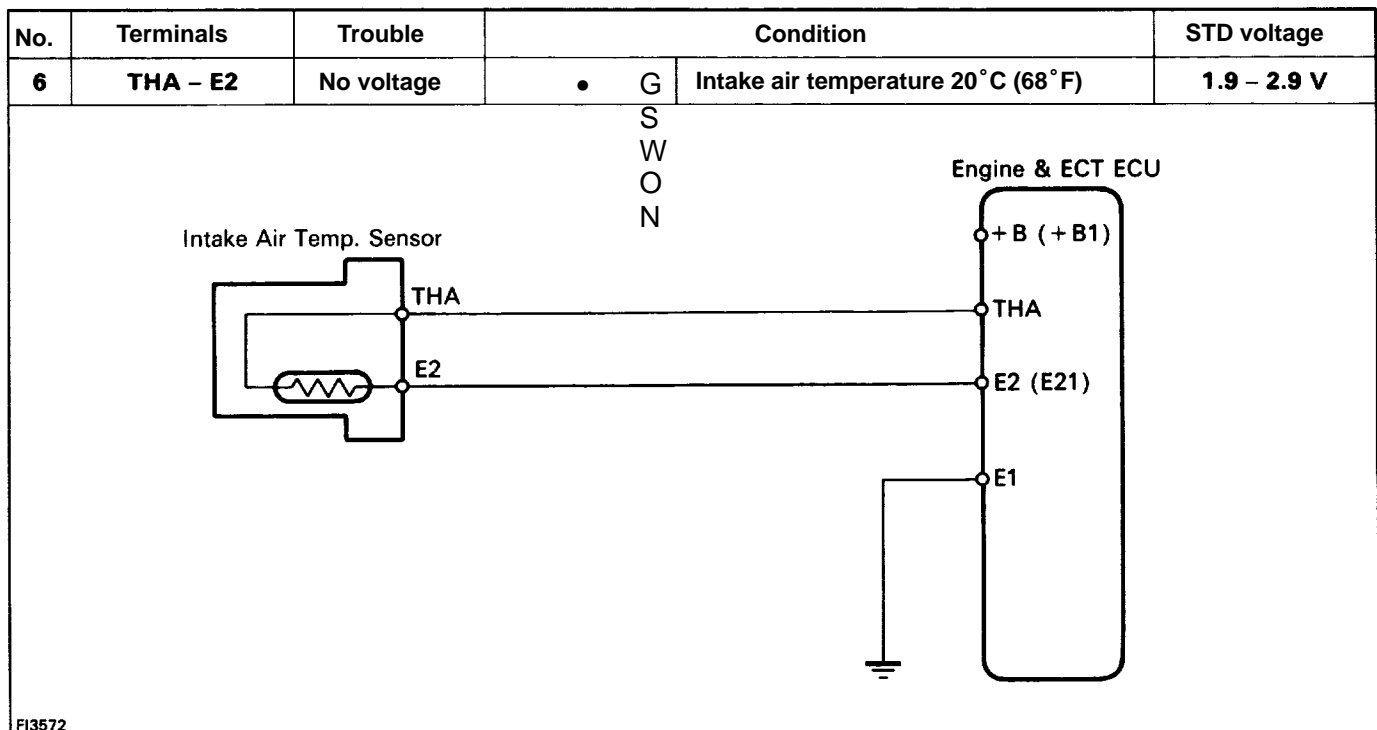
OK

Replace injector.

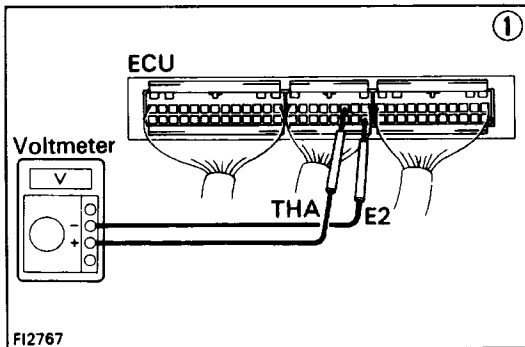
Check wiring between ECU terminal No.10 and/or No.20 and battery.

BAD

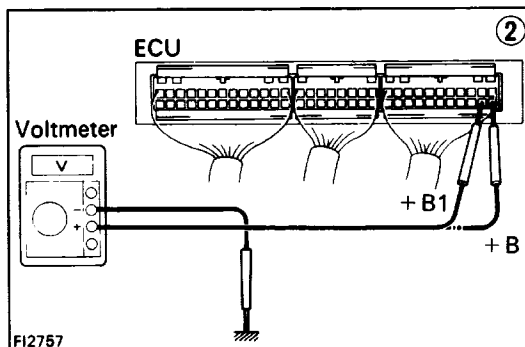
Repair or replace.



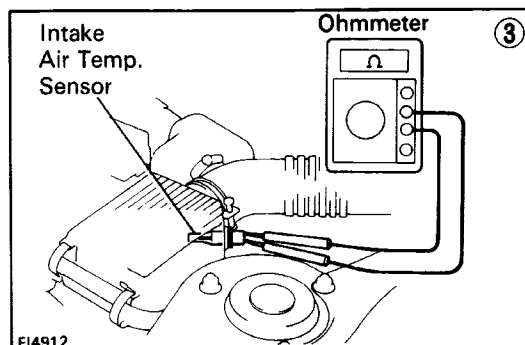
FI3572



FI2767



FI2757



FI4912

(1) There is no voltage between ECU terminals THA and E2. (IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground. (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-110)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check intake air temp. sensor
(See page FI-232)

Repair or replace.

BAD

Replace intake air temp. sensor.

OK

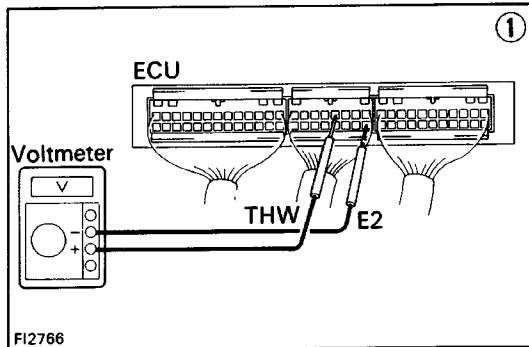
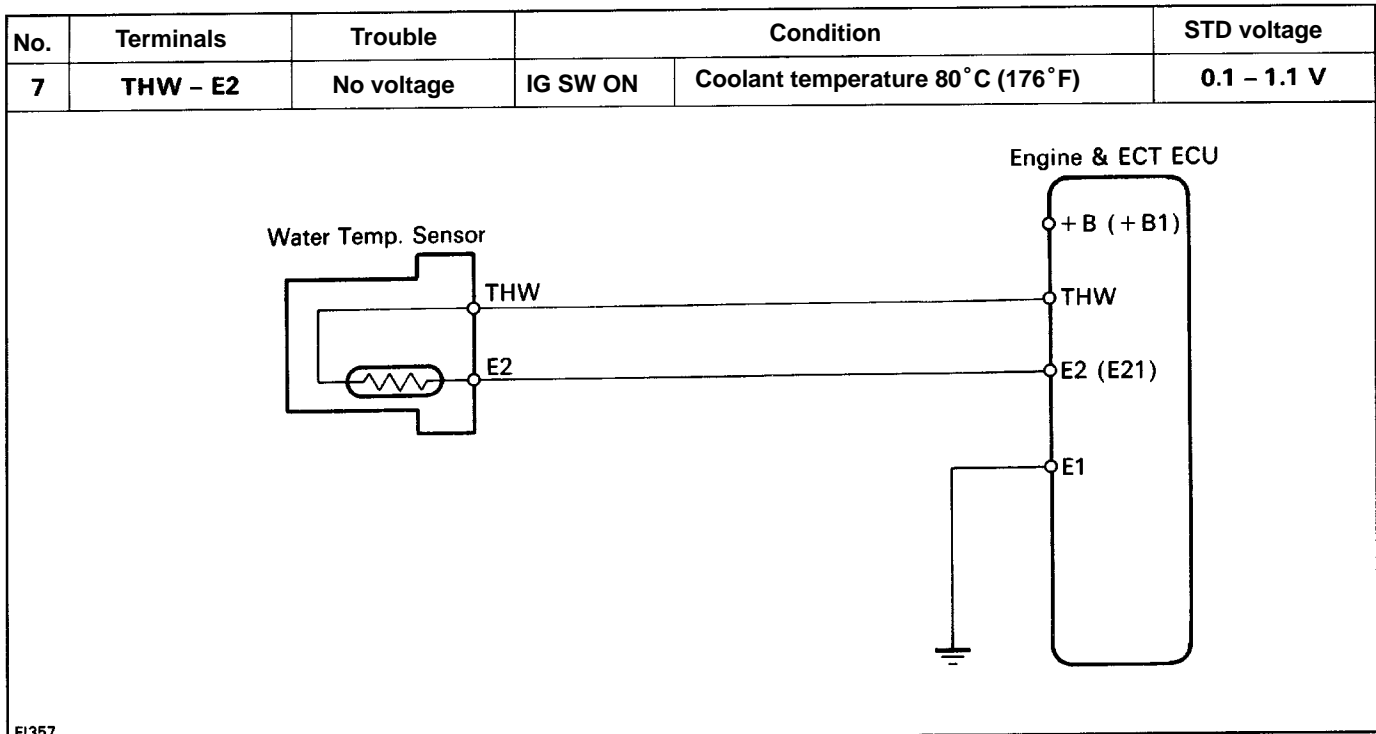
Check wiring between ECU and air temp. sensor.

Try another ECU.

OK

BAD

Repair or replace.



(1) There is no voltage between ECU terminals THW and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + 131 and body ground. (IG SW ON)

OK

NO

Refer to No.1
(See page FI-110)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

(3) Check water temp. sensor
(See page FI-231)

Repair or replace.

BAD

Replace water temp. sensor.

OK

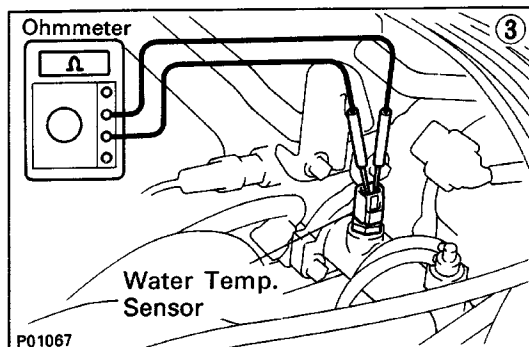
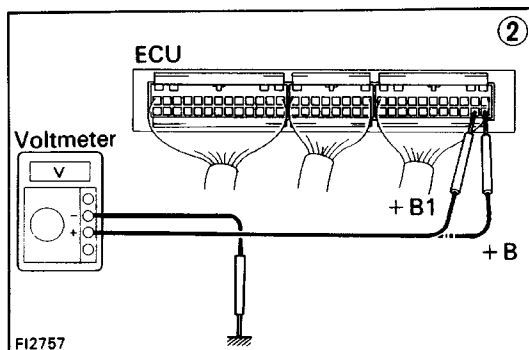
Check wiring between ECU and water temp. sensor.

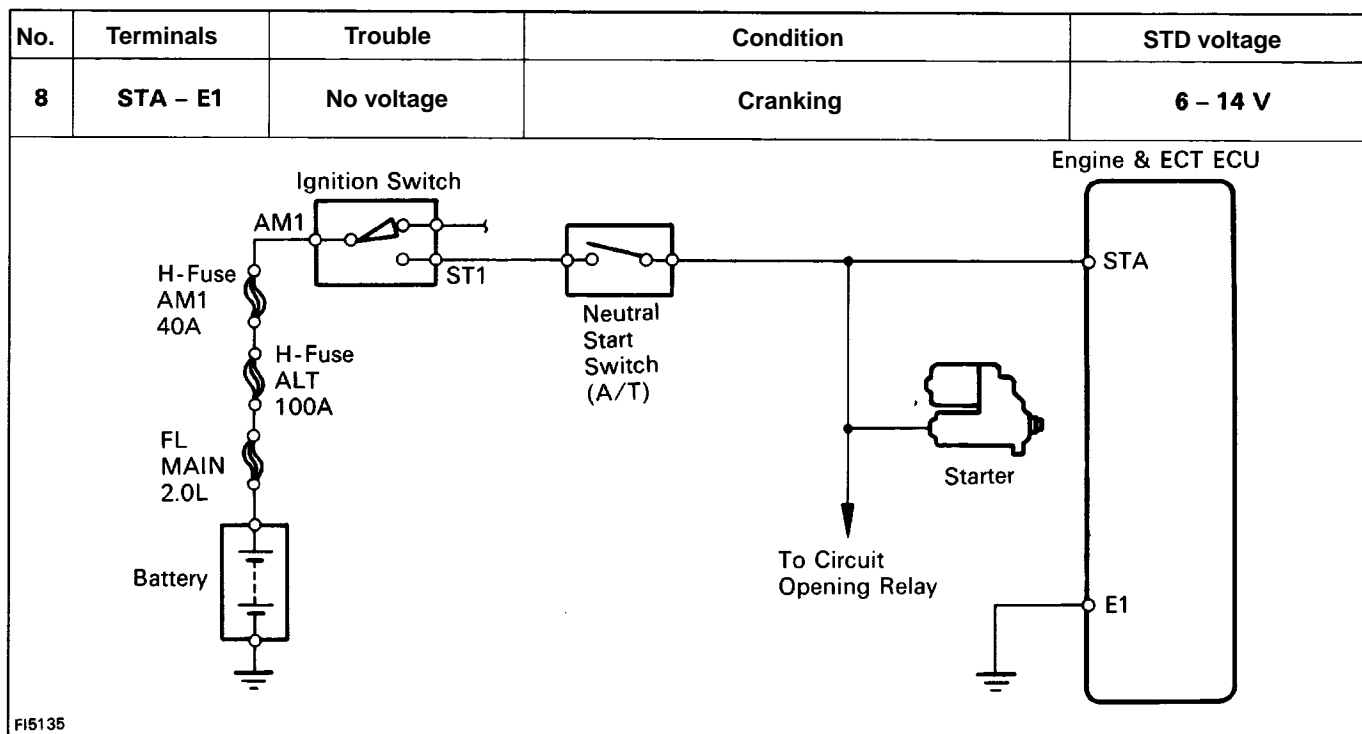
OK

Try another ECU.

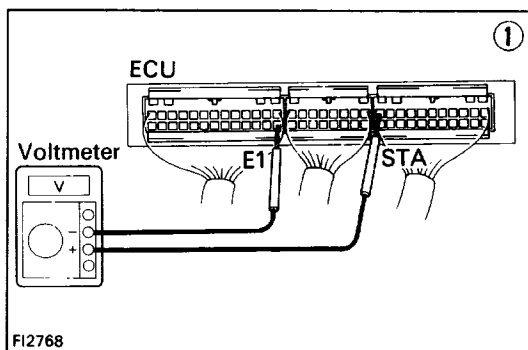
BAD

Repair or replace.

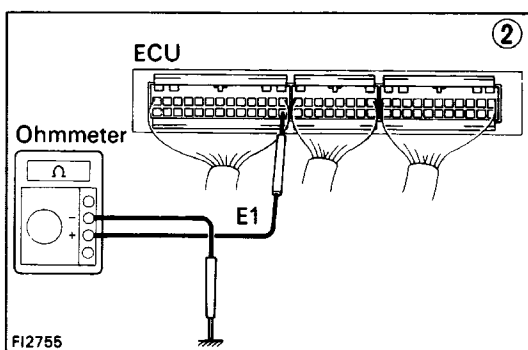




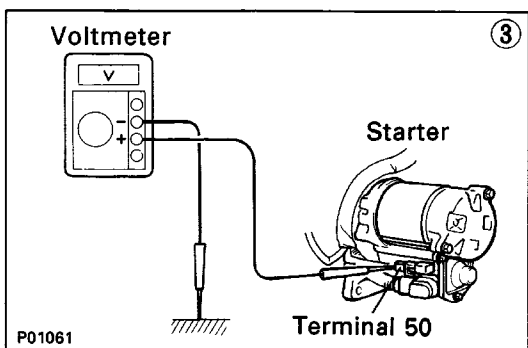
FI5135



FI2768

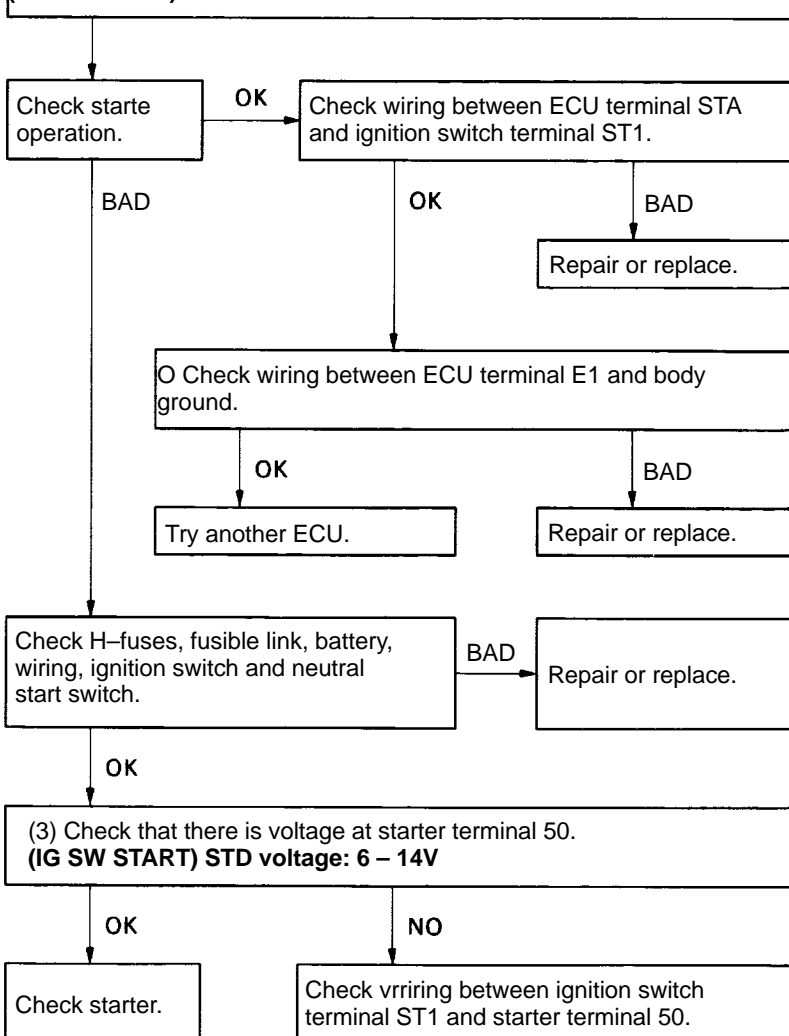


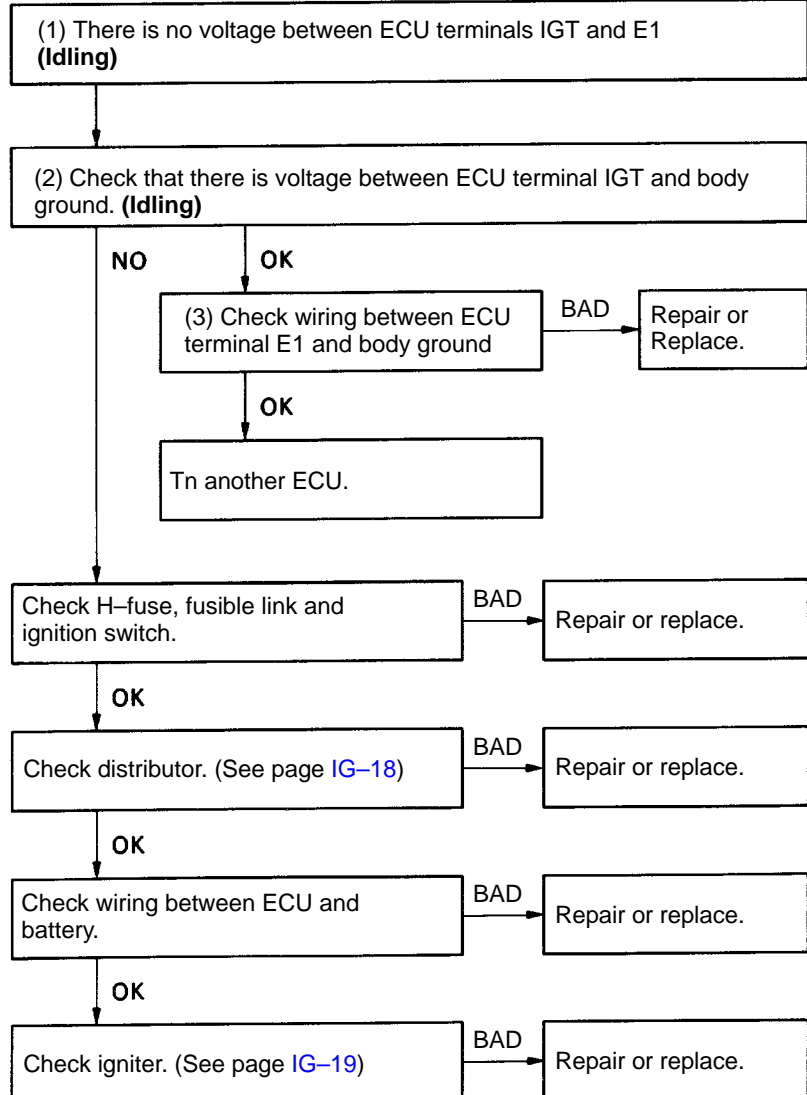
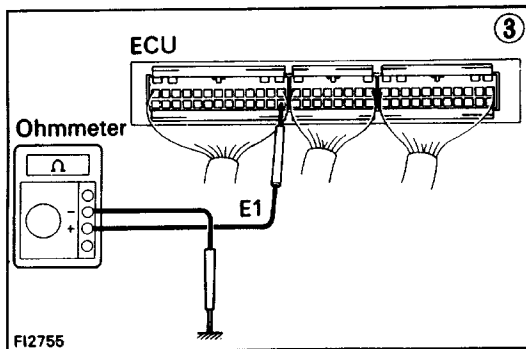
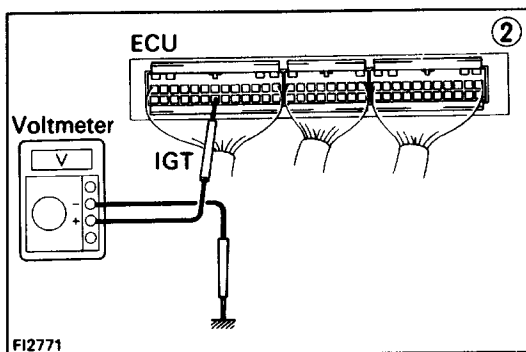
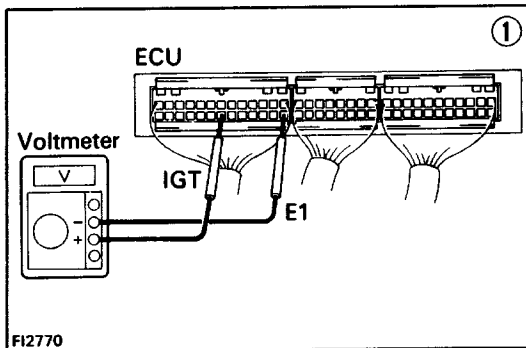
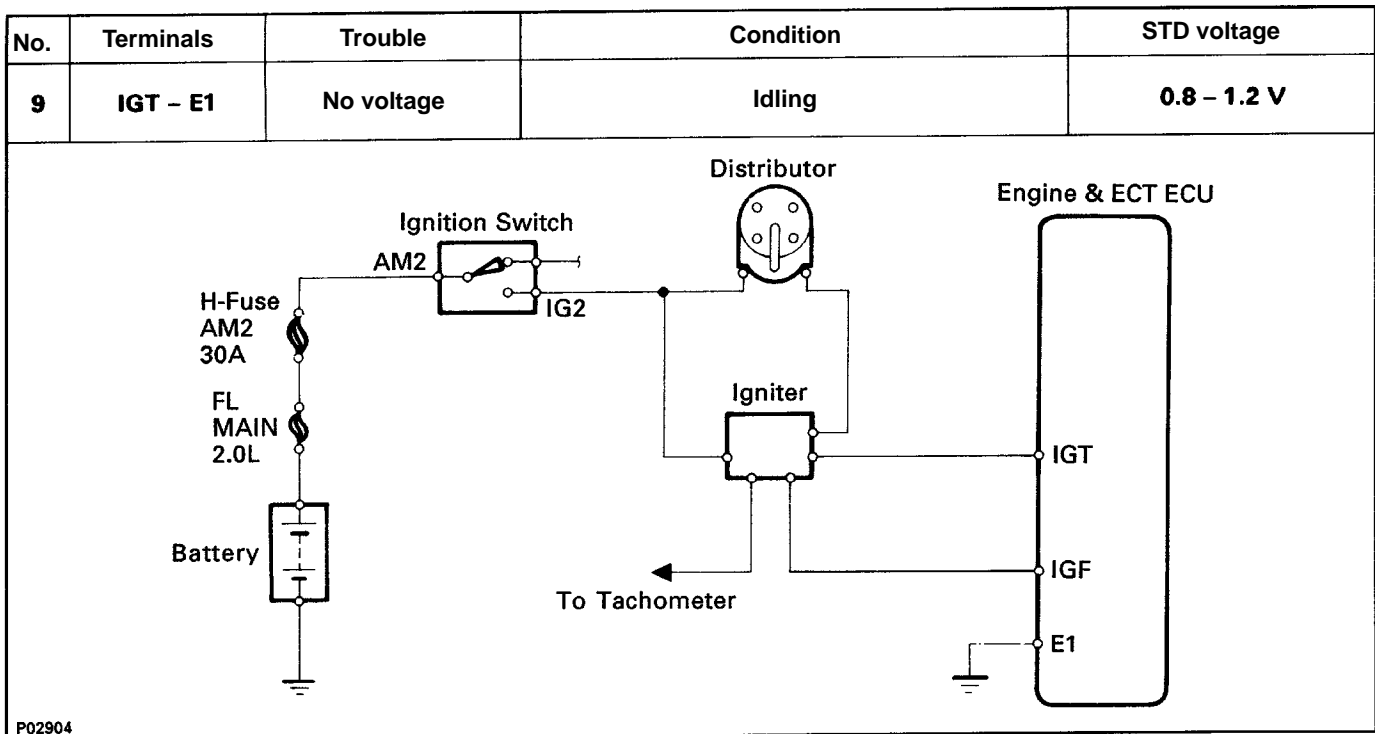
FI2755

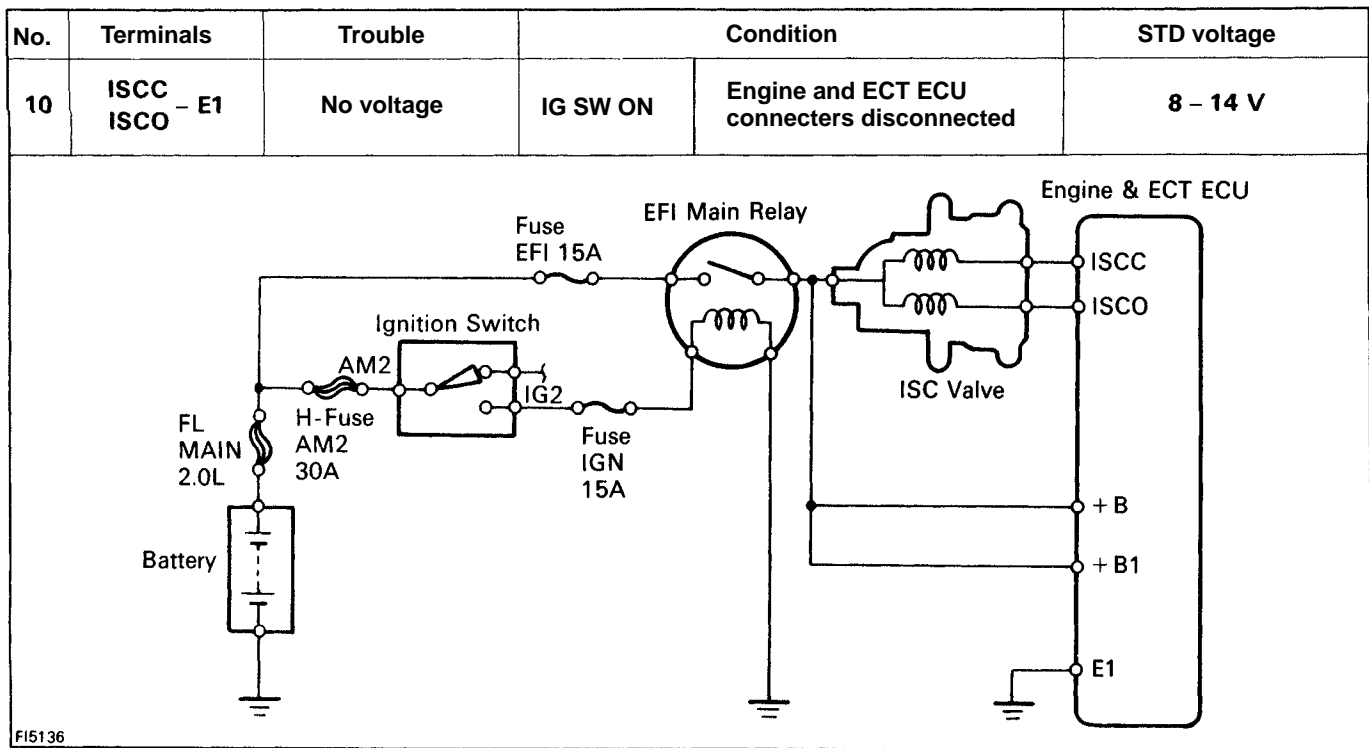


P01061

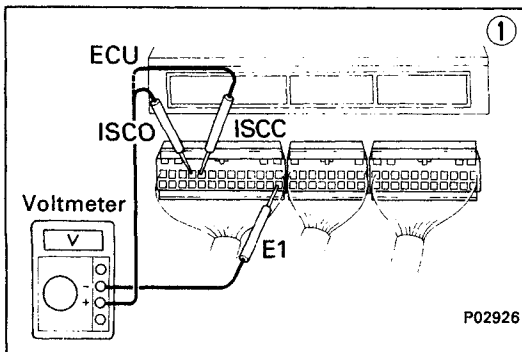
(1) There is no voltage between ECU terminals STA and E1.
(IG SW START)







FI5136



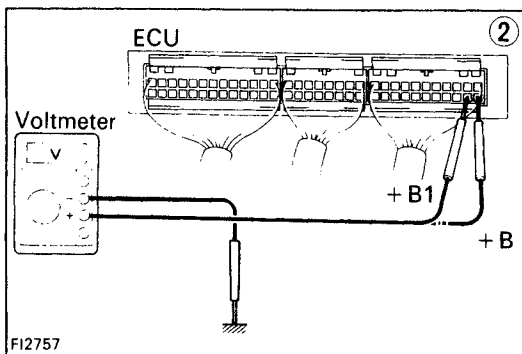
(1) There is no voltage between ECU terminals ISCC or ISCO and E1. **(IG SW ON)**

(2) Check that there is voltage between ECU terminal + B or + 131 and body ground. **(IG SW ON)**

OK

NO

Refer to No.1.
(See page FI-110)



(3) Check resistance between ISC valve terminals + B and ISCC or ISCO. **STD resistance: 19.3 - 22.3Ω**

BAD

Replace ISC valve.

OK

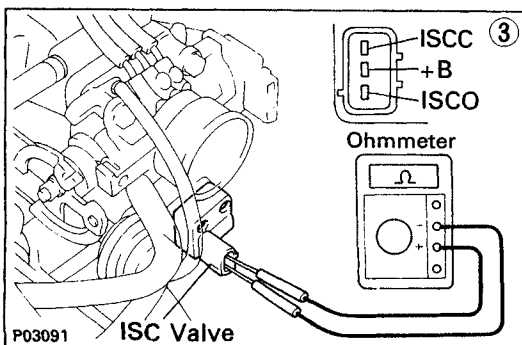
Check wiring between ECU and ISC valve.

BAD

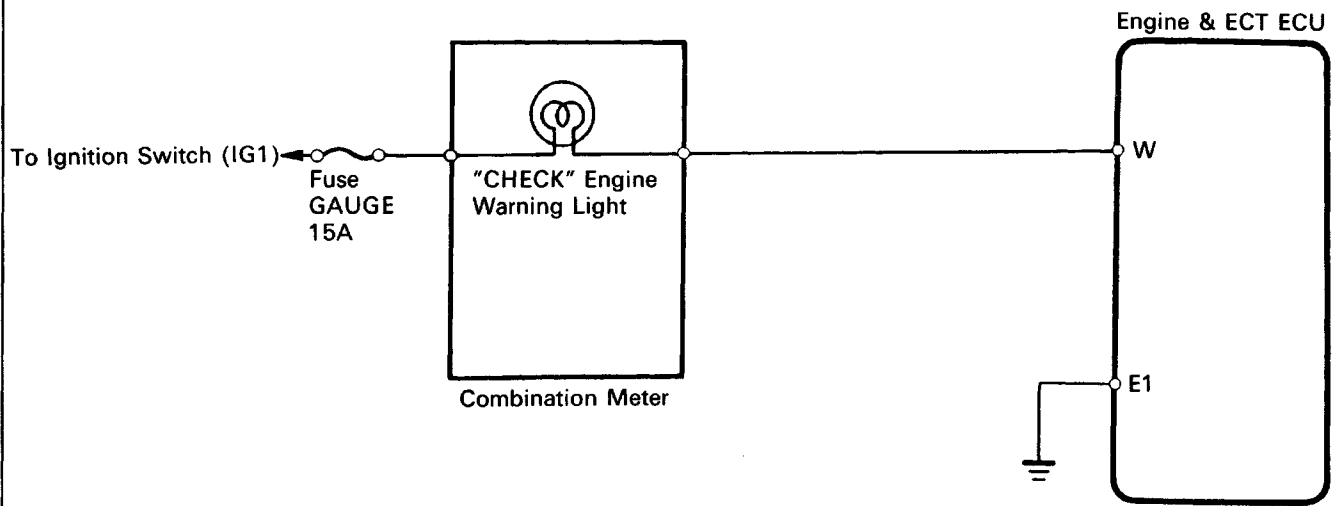
Repair or replace wiring.

OK

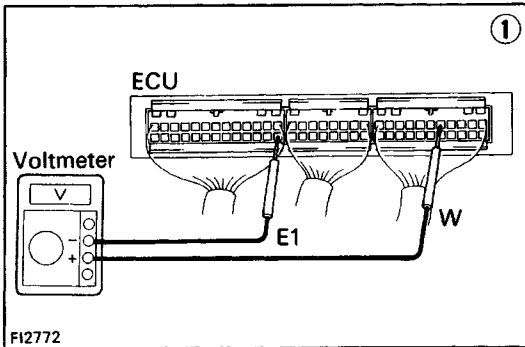
Try another ECU.



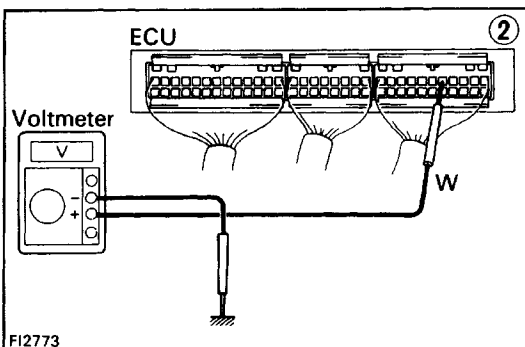
No.	terminals	Trouble	Condition	STD voltage
11	W - E1	No voltage	No trouble ("CHECK" engine warning light off) and engine running.	10 - 14 V



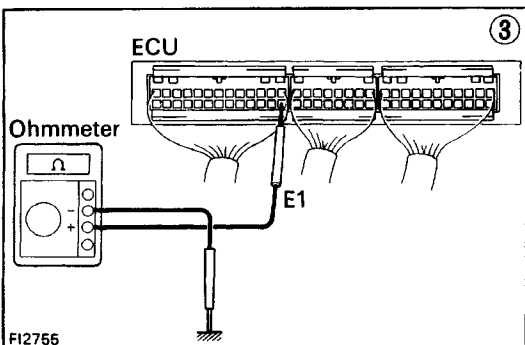
FI0728



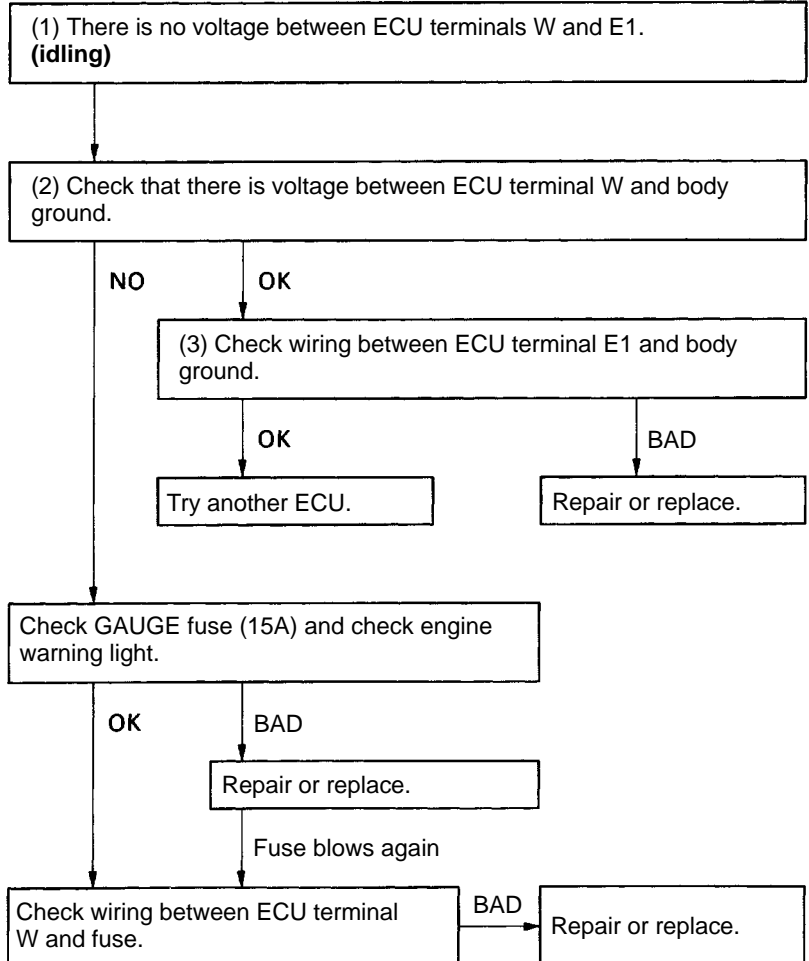
FI2772

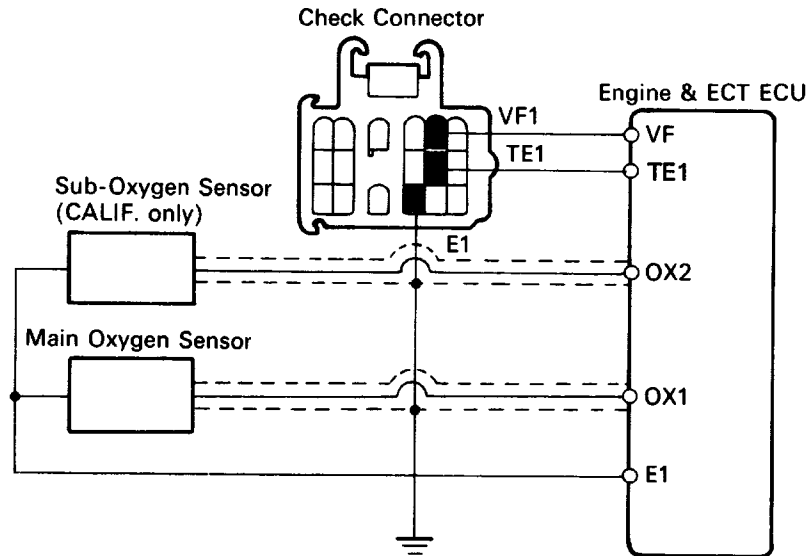


FI2773

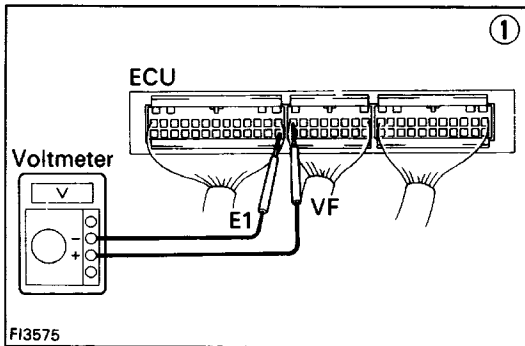


FI2755

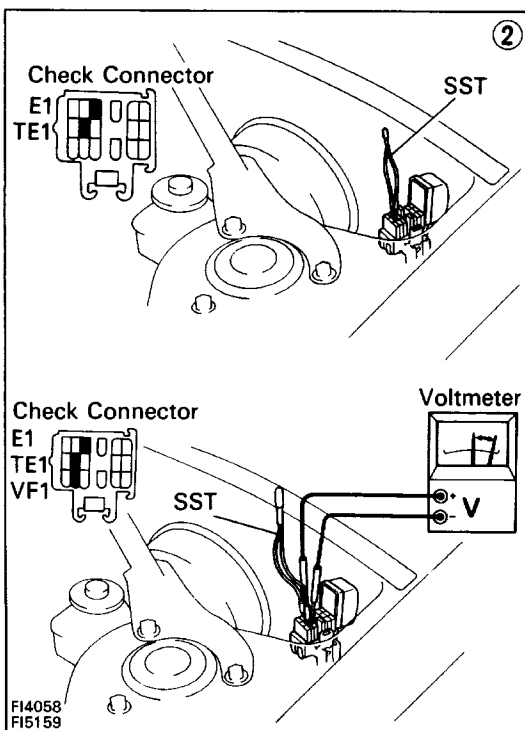
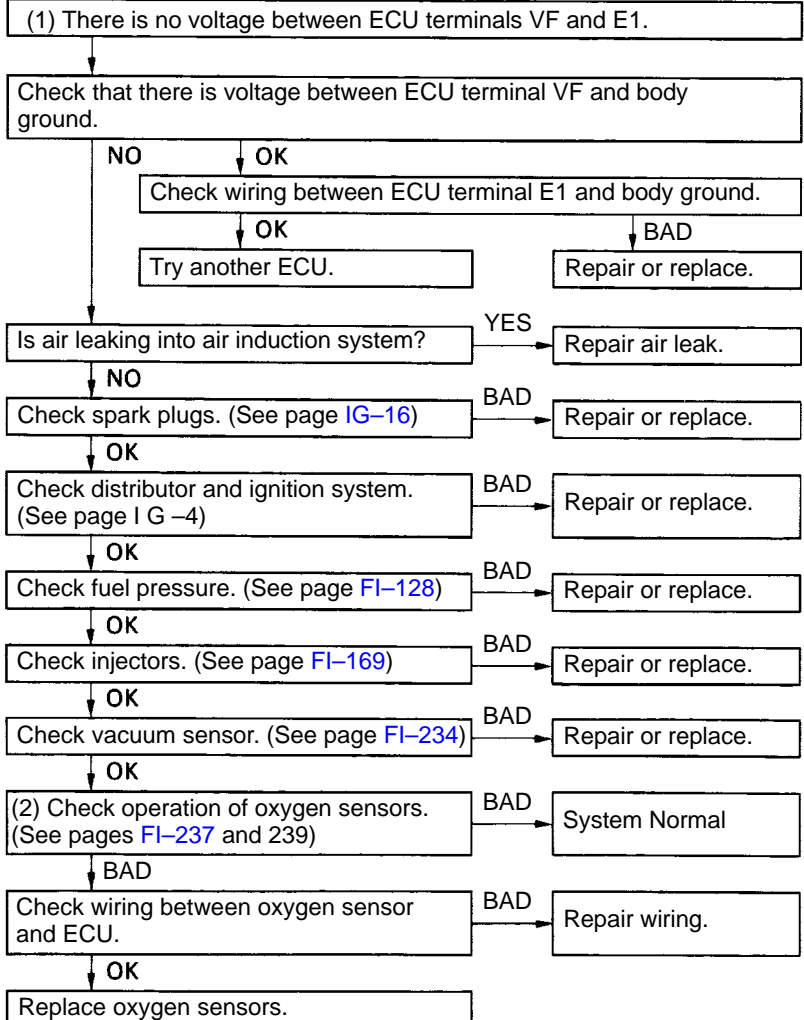




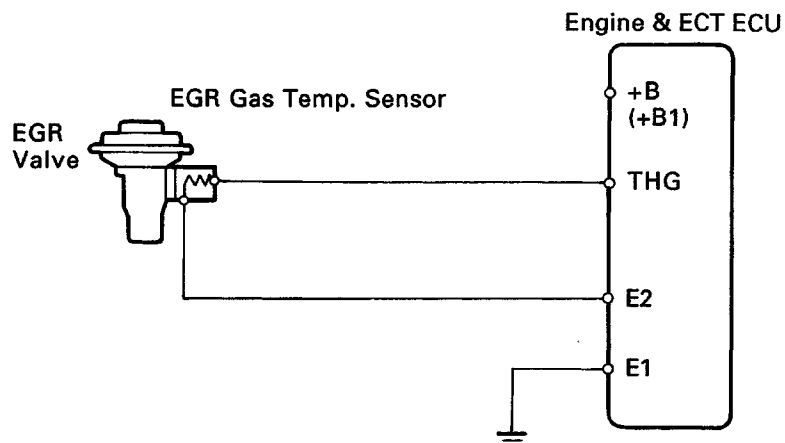
FI3841



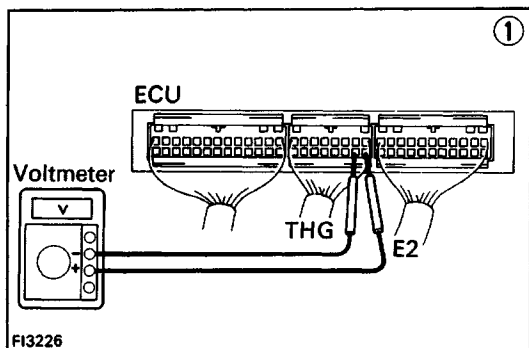
FI3575

FI4058
FI5159

CALIF. only



FI6320



FI3226

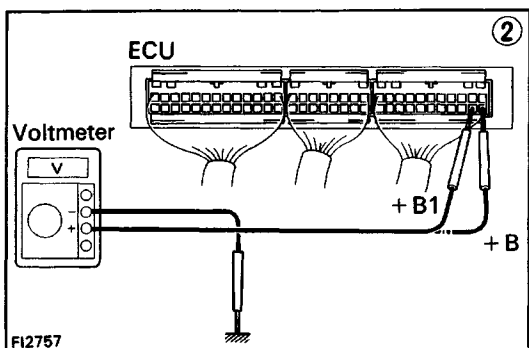
(1) There is no voltage between ECU terminals THG and E2.
(IG SW ON)

(2) Check that there is voltage between ECU terminal + B or + B1 and body ground (IG SW ON)

OK

NO

Refer to No.1.
(See page FI-110)



FI2757

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Repair or replace.

Check EGR system.
(See page EC-21)

BAD

Repair or replace.

OK

(3) Check EGR gas temp. sensor
(See page FI-236)

BAD

Replace EGR gas
temp. sensor.

OK

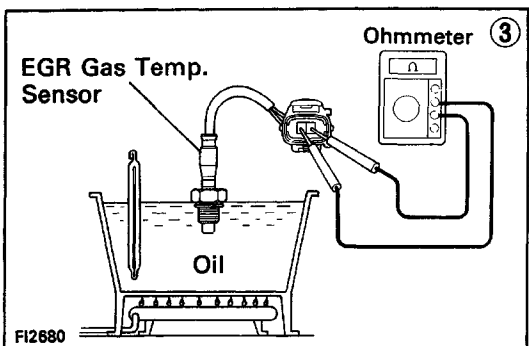
Check wiring between ECU and EGR
gas temp. sensor.

OK

Try another ECU.

BAD

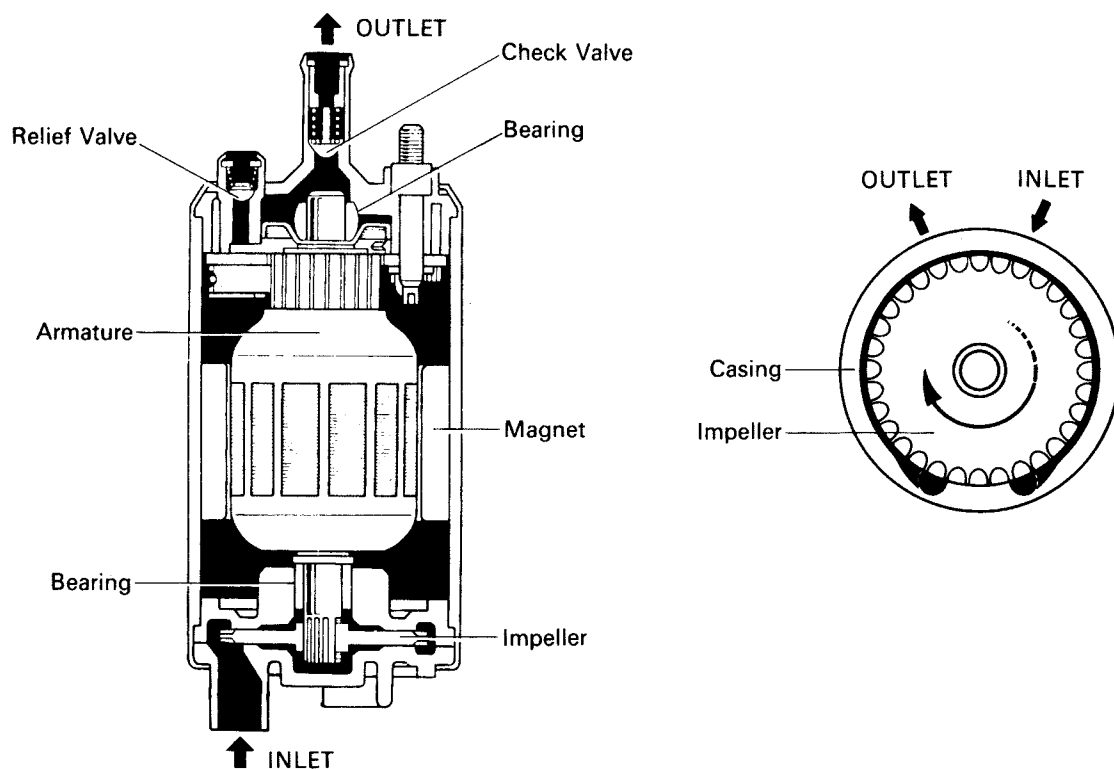
Repair or replace.



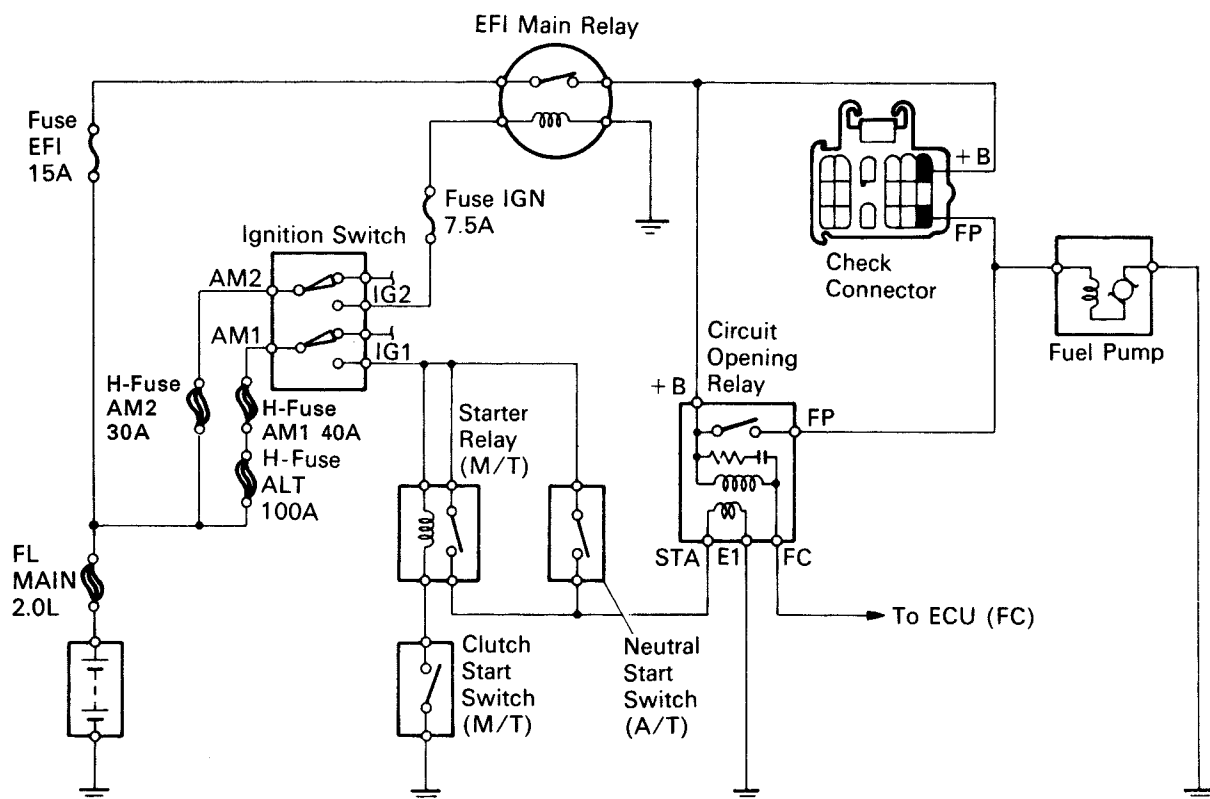
FI2680

FUEL SYSTEM

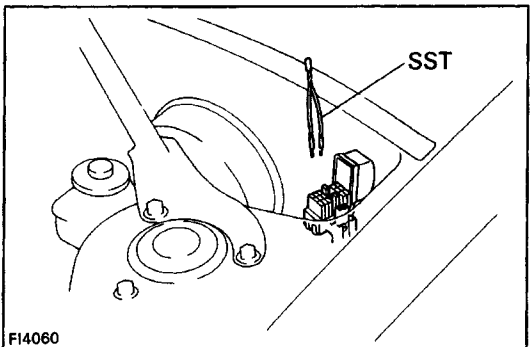
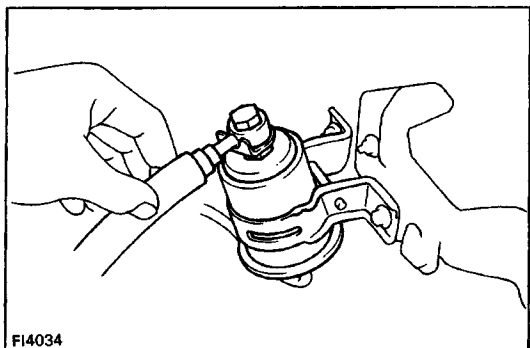
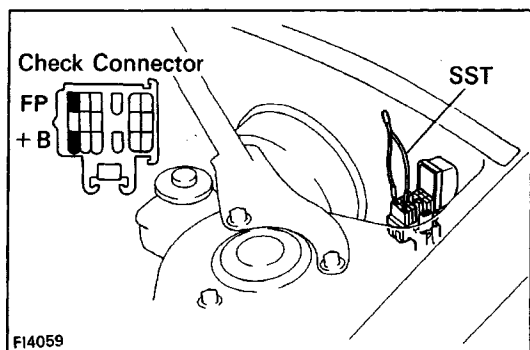
Fuel Pump (4A-FE and 5S-FE)



FI0530 FI1479



FI5137



ON-VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

- (a) Using SST, connect terminals + B and FP of the check connector.

SST 09843-18020

- (b) Turn the ignition switch ON.

NOTICE: Do not start the engine.

- (c) Check that there is pressure in the hose from the fuel filter.

HINT: At this time, you will hear fuel return noise.

- (d) Remove SST.

SST 09843-18020

- (e) Turn the ignition switch OFF.

If there is no pressure, check the following parts:

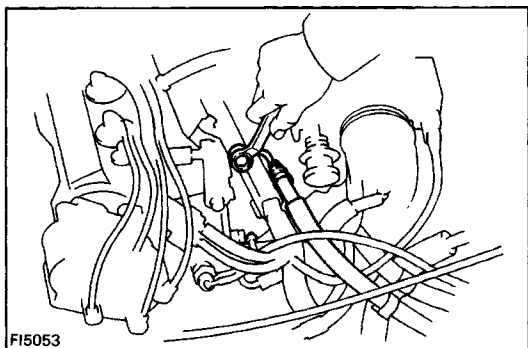
- Fusible link
- Fuse (AM2 30A)
- Fuses (EFI 15A, IGN 7.5A)
- EFI main relay
- Fuel pump
- Wiring connections

2. (4A- FE)

CHECK FUEL PRESSURE

- (a) Check that the battery voltage is above 12 volts.
- (b) Disconnect the cable from the negative (–) terminal of the battery.

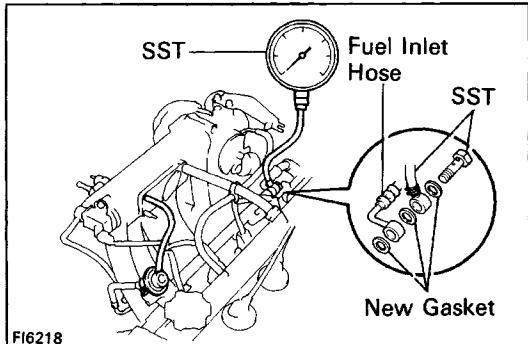
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.



- (c) Remove the union bolt and two gaskets, and disconnect the fuel inlet hose from the delivery pipe.

H I N T:

- Put a suitable container or shop towel under the cold start injector pipe.
- Slowly loosen the union bolt.

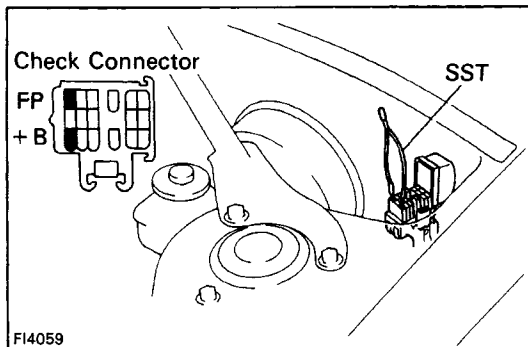


- (d) Install the fuel inlet hose and SST (pressure gauge) to the delivery pipe with three new gaskets and SST (union bolt).

SST 09268-45012

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

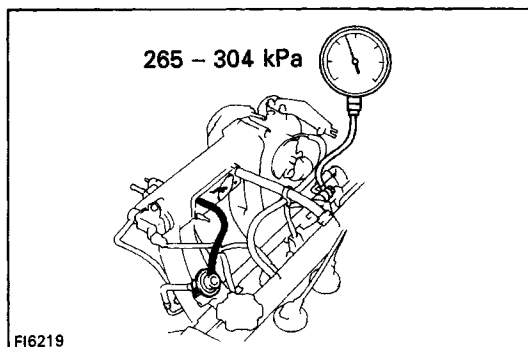
- (e) Wipe off any splattered gasoline.



- (f) Using SST, connect terminals + B and FP of the check connector.

SST 09843-18020

- (g) Reconnect the battery negative (–) cable.



- (h) Turn the ignition switch ON.

- (i) Measure the fuel pressure.

Fuel pressure: 265 – 304 kPa

(2.7 – 3.1 kgf/cm², 38 – 44 psi)

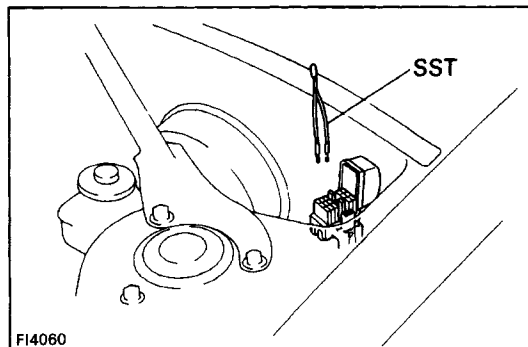
If pressure is high, replace the fuel pressure regulator.

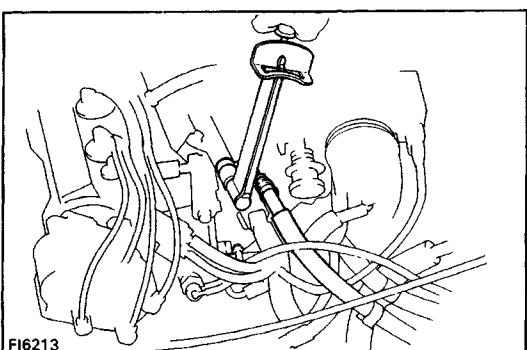
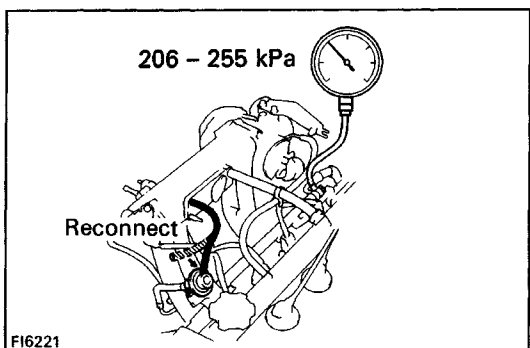
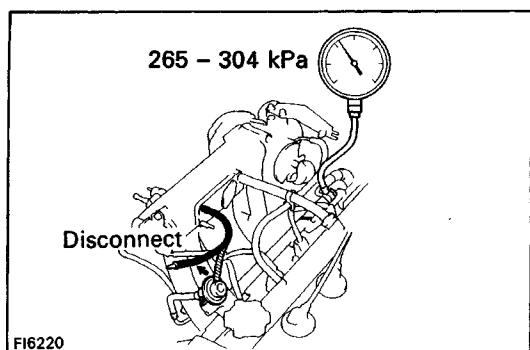
If pressure is low, check the following parts:

- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

- (j) Remove SST.

SST 09843-18020





- (k) Start the engine.
- (l) Disconnect the vacuum sensing hose from the fuel pressure regulator.
- (m) Measure the fuel pressure at idle.

Fuel pressure: **265 – 304 kPa**
 (2.7 – 3.1 kgf/cm² , 38 – 44 psi)

- (n) Reconnect the vacuum sensing hose to the fuel pressure regulator, and plug the hose end.
- (o) Measure the fuel pressure at idle.

Fuel pressure: **206 – 255 kPa**
 (2.1 – 2.6 kgf/cm², 31 – 37 psi)

If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

- (p) Stop the engine. Check that the fuel pressure remains 147 kPa (1.5 kg/cm² , 21 psi) or more for 5 minutes after the engine is turned off.
 If pressure is not as specified, check the fuel pump, pressure regulator and/or injector.
- (q) After checking fuel pressure, disconnect the battery negative (–) cable and carefully remove the SST to prevent gasoline from splashing.
 SST 09268–45012

- (r) Reconnect the fuel inlet hose to delivery pipe with two new gaskets and the union bolt.

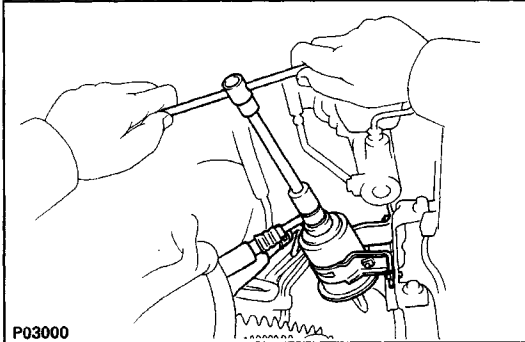
Torque: 29 N–m (300 kgf–cm, 29 ft–lbf)

- (s) Reconnect the cable to the negative (–) terminal of the battery.
- (t) Check for fuel leakage. (See page [FI-10](#))

3. (5S-FE)**CHECK FUEL PRESSURE**

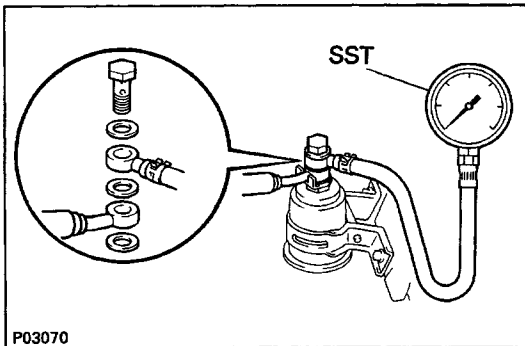
- (a) Check that the battery voltage is above 12 volts.
- (b) Disconnect the cable from the negative (–) terminal of the battery.

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.



- (c) Put a suitable container or shop towel under the fuel filter.
- (d) Remove the union bolt and two gaskets, and disconnect the fuel inlet hose from the fuel filter outlet.

HINT: Slowly loosen the union bolt.

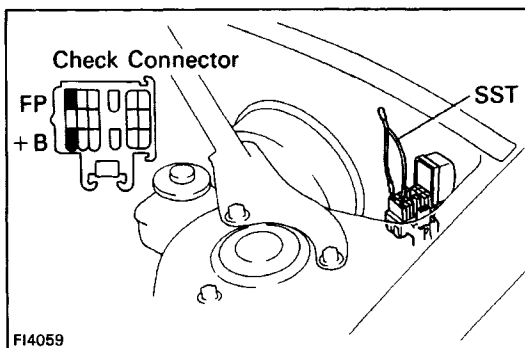


- (e) Install the fuel inlet hose and SST (pressure gauge) to the fuel filter outlet with three new gaskets and the union bolt.

SST 09268-45012

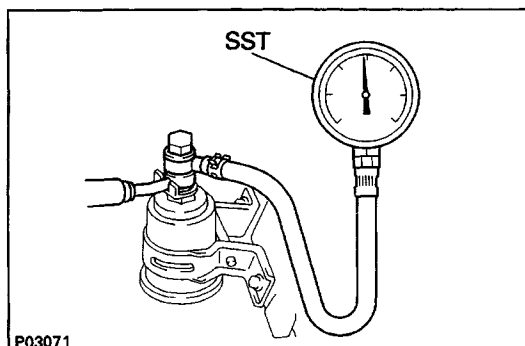
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

- (f) Wipe off any splattered gasoline.
- (g) Reconnect the battery negative H cable.



- (h) Using SST, connect terminals +B and FP of the check connector.

SST 09843-18020



- (i) Turn the ignition switch ON.
- (j) Measure the fuel pressure.

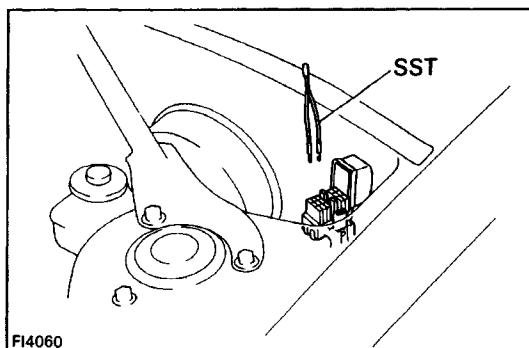
Fuel pressure: 265 – 304 kPa

(2.7 – 3.1 kgf/cm², 38 – 44 psi)

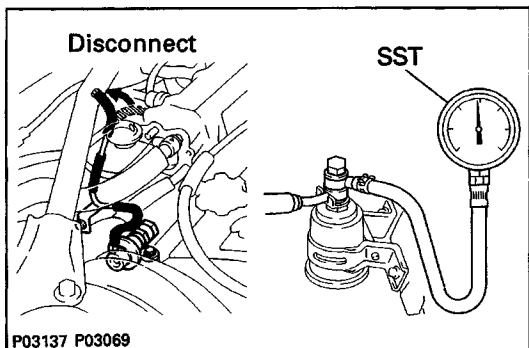
If pressure is high, replace the fuel pressure regulator.

If pressure is low, check the following parts:

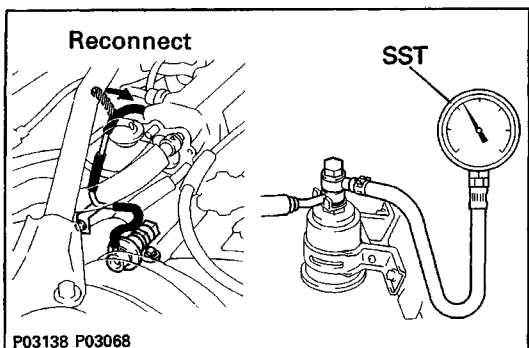
- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator



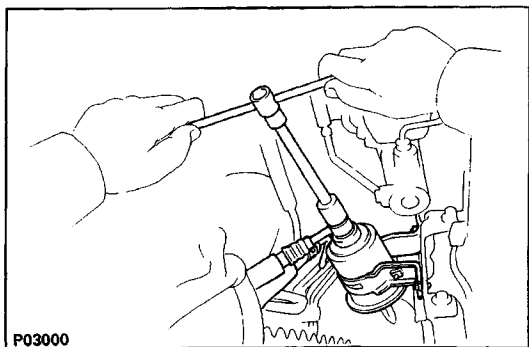
- (k) Remove SST.
SST 09843-18020



- (l) Start the engine.
(m) Disconnect the vacuum sensing hose from the air intake chamber and plug the air intake chamber outlet.
(n) Measure the fuel pressure at idle.
Fuel pressure: 265 – 304 kPa
(2.7 – 3.1 kgf/cm² , 38 – 44 psi)



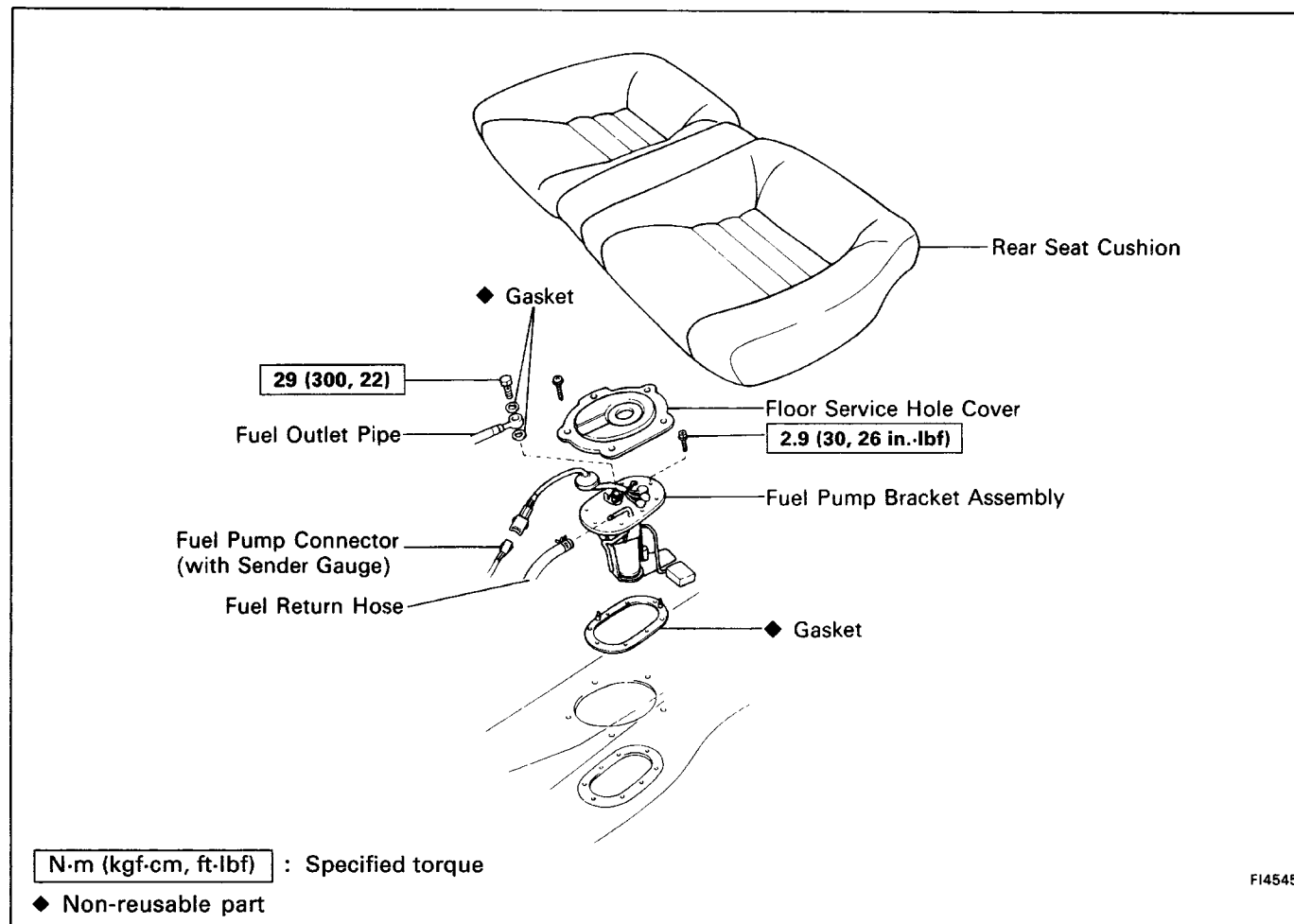
- (o) Reconnect the vacuum sensing hose to the air intake chamber.
(p) Measure the fuel pressure at idle.
Fuel pressure: 206 – 255 kPa
(2.1 – 2.6 kgf/cm² , 31 – 37 psi)
If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.
(q) Stop the engine. Check that the fuel pressure remains 147 kPa (1.5 kgf/cm², 21 psi) or more for 5 minutes after the engine is turned off.
If pressure is not as specified, check the fuel pump, pressure regulator and/or injector.
(r) After checking fuel pressure, disconnect the battery negative (–) cable and carefully remove the SST to prevent gasoline from splashing.
SST 09268-45012



- (s) Connect the fuel inlet hose with two new gaskets and the union bolt.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
(t) Reconnect the cable to the negative (–) terminal of the battery.
(u) Check for fuel leaks. (See page [FI-10](#))

REMOVAL OF FUEL PUMP

CAUTION: Do not smoke or work near an open flame when working on the fuel pump.



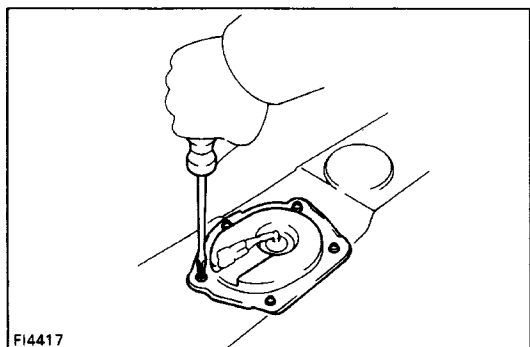
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

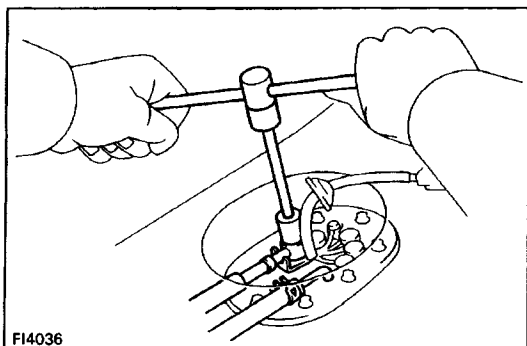
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE REAR SEAT CUSHION

3. REMOVE FLOOR SERVICE HOLE COVER

- Disconnect the fuel pump (with fuel sender gauge) connector.
- Remove the five screws and service hole cover.



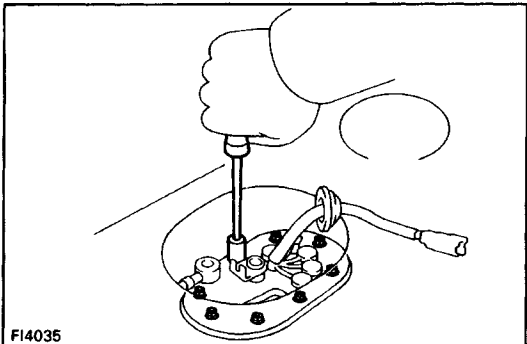


FI4036

4. DISCONNECT FUEL PIPE AND HOSE FROM FUEL PUMP BRACKET

CAUTION: Remove the fuel filter cap to prevent the fuel from flowing out.

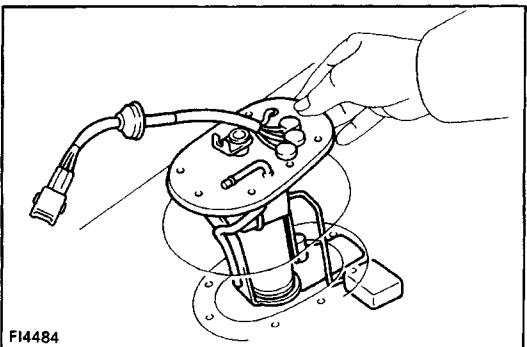
- (a) Remove the union bolt and two gaskets, and disconnect the outlet pipe from the pump bracket.
- (b) Disconnect the return hose from the pump bracket.



FI4035

5. REMOVE FUEL PUMP BRACKET ASSEMBLY FROM FUEL TANK

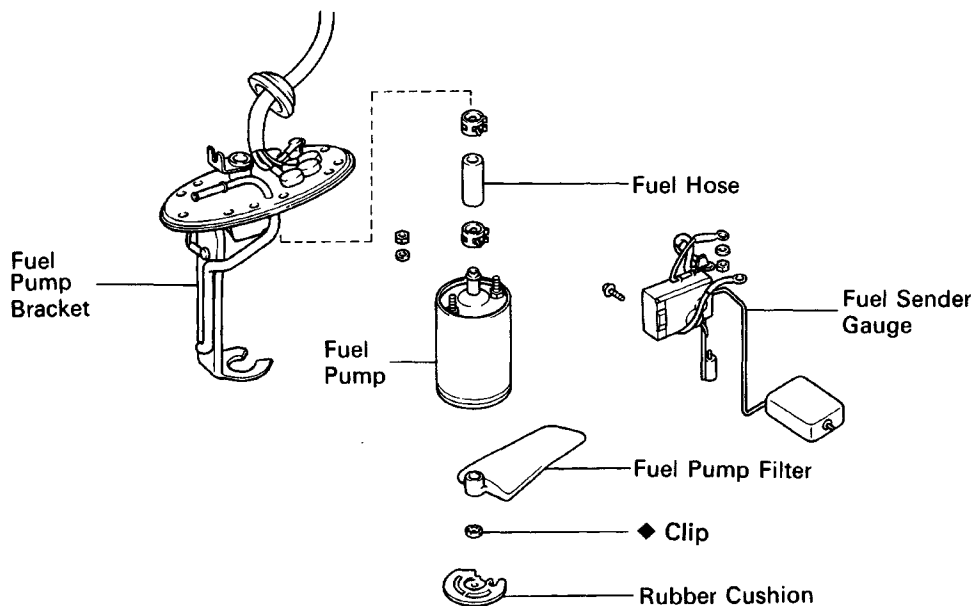
- (a) Remove the eight bolts.



FI4484

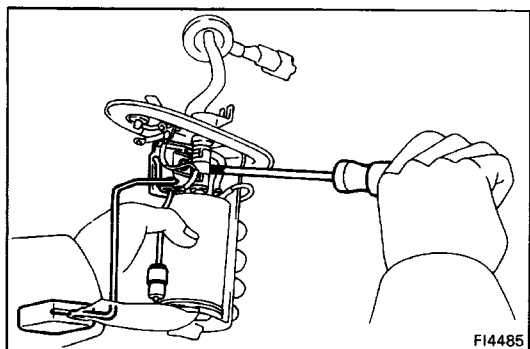
- (b) Pull out the pump bracket assembly.
- (c) Remove the gasket from the pump bracket.

COMPONENTS



FI5107

◆ Non-reusable part



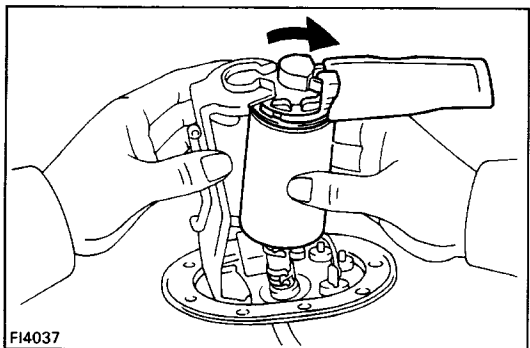
FI4485

DISASSEMBLY OF FUEL PUMP

(See page [FI-137](#))

1. REMOVE FUEL SENDER GAUGE FROM FUEL PUMP BRACKET

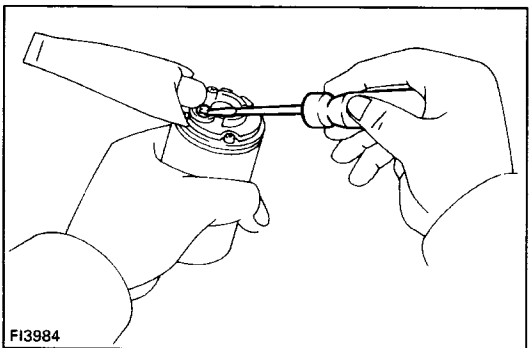
- (a) Remove the nut and spring washer, and disconnect the lead wire from the pump bracket. Disconnect the three lead wires.
- (b) Remove the two screws and sender gauge.



FI4037

2. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

- (a) Remove the nut and spring washers, and disconnect the lead wire from the fuel pump. Disconnect the two lead wires.
- (b) Pull out the lower side of the fuel pump from the pump bracket.
- (c) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.
- (d) Remove the rubber cushion from the fuel pump.



FI3984

3. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

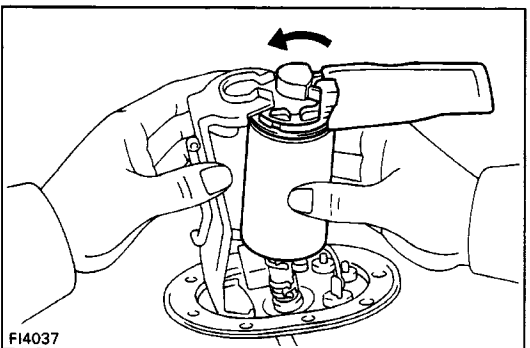
- (a) Using a small screwdriver, remove the clip.
- (b) Pull out the pump filter.

ASSEMBLY OF FUEL PUMP

(See page [FI-131](#))

1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

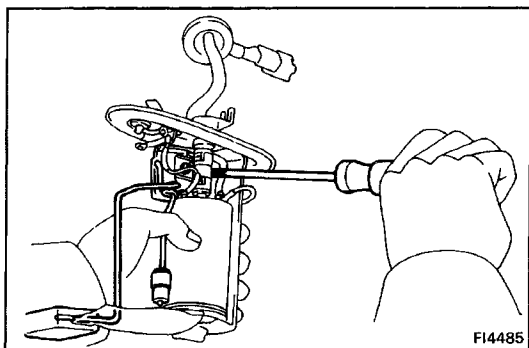
Install the pump filter with a new clip.



FI4037

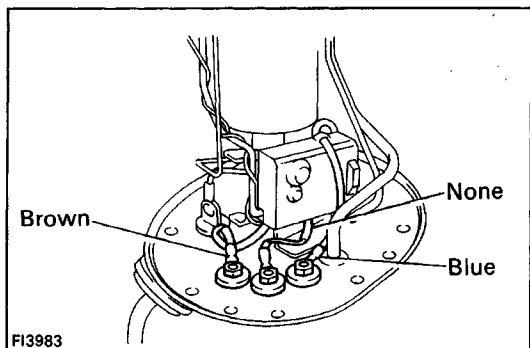
2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

- (a) Install the rubber cushion to the fuel pump.
- (b) Connect the fuel hose to the outlet port of the fuel pump.
- (c) Connect the lead wire to the fuel pump with the spring washer and nut. Connect the two lead wires.
- (d) Install the fuel pump by pushing the lower side of the fuel pump.

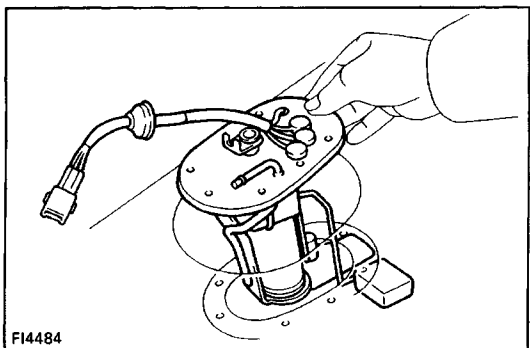


3. INSTALL FUEL SENDER GAUGE TO FUEL PUMP BRACKET

- (a) Install the sender gauge with the two screws.



- (b) Connect the lead wire to the pump bracket with the spring washer and nut. Connect the three lead wires as shown.

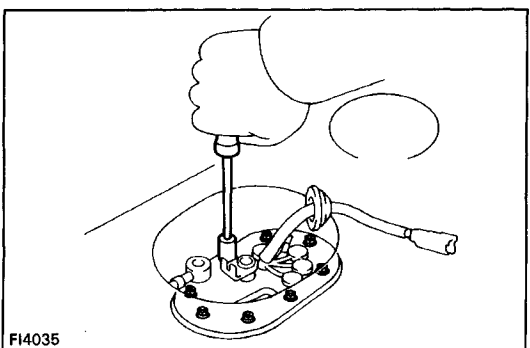


INSTALLATION OF FUEL PUMP

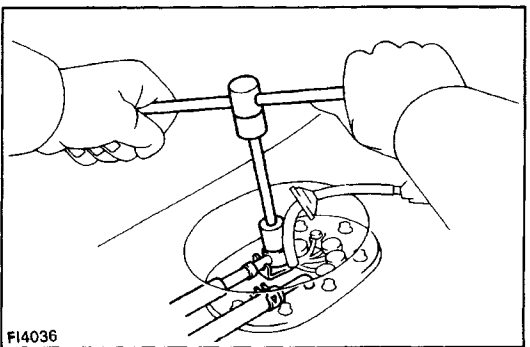
(See page [FI-130](#))

1. INSTALL FUEL PUMP BRACKET ASSEMBLY TO FUEL TANK

- (a) Install a new gasket to the pump bracket.
(b) Insert the pump bracket assembly into the fuel tank.



- (c) Install the pump bracket with the eight bolts.
Torque: 2.9 N·m (30 kgf·cm, 26 in.-lbf)



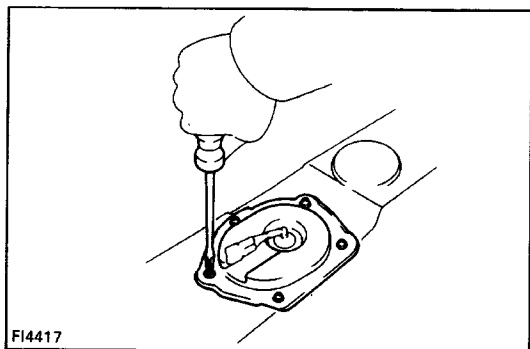
2. CONNECT FUEL PIPE AND HOSE TO FUEL PUMP BRACKET

- (a) Connect the outlet pipe to the pump bracket with two new gaskets and the union bolt.

Torque: 29 N·m (300 kgf·cm, 22 ft-lbf)

- (b) Connect the return hose to the pump bracket.

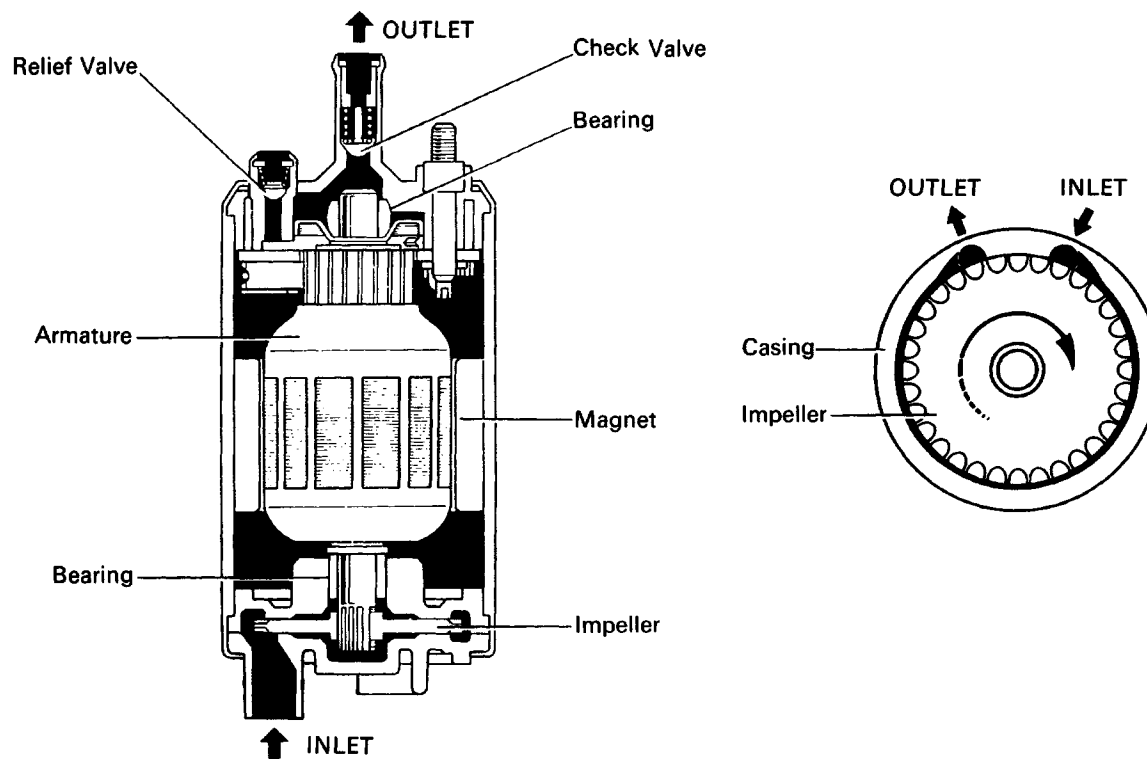
3. CHECK FOR FUEL LEAKAGE (See page [FI-10](#))

**4. INSTALL FLOOR SERVICE HOLE COVER**

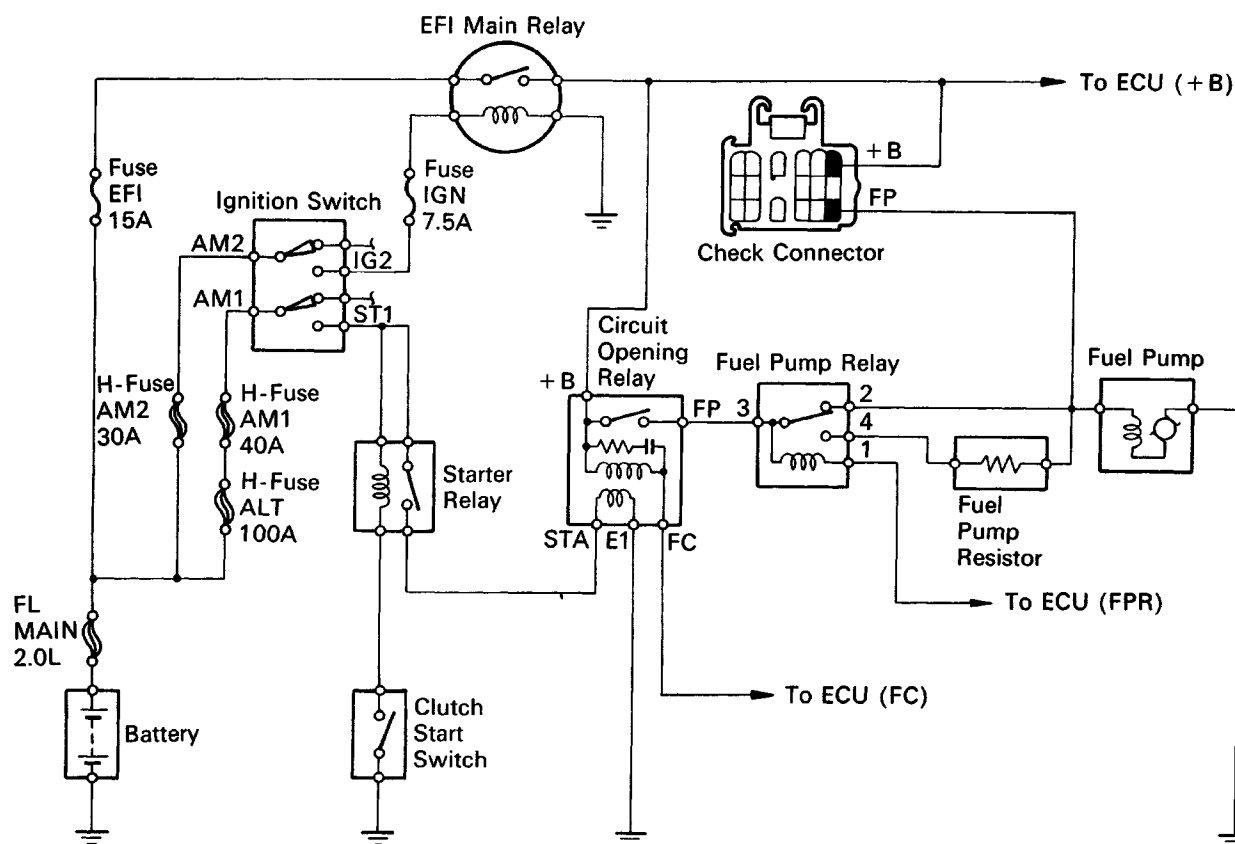
- (a) Install the service hole cover with the five screws.
- (b) Connect the fuel pump (with fuel sender gauge) connector.

5. INSTALL REAR SEAT CUSHION**6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

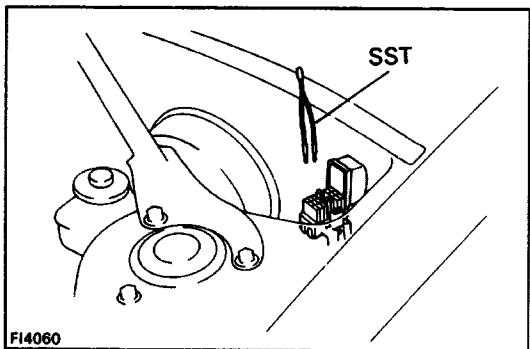
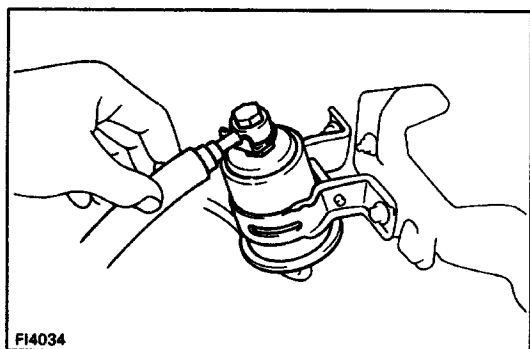
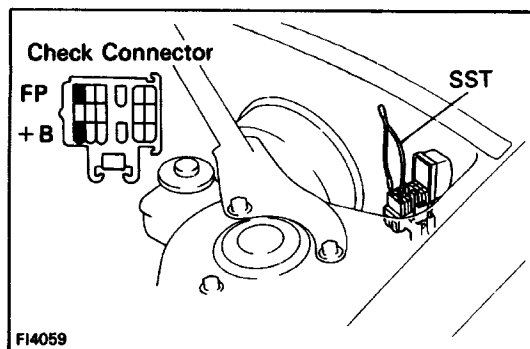
Fuel Pump (3S-GTE)



FI0530 FI1479



FI5423



ON-VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

- (a) Using SST, connect terminals + B and FP of the check connector.

SST 09843-18020

- (b) Turn the ignition switch ON.

NOTICE: Do not start the engine.

- (c) Check that there is pressure in the hose from the fuel filter.

HINT: At this time, you will hear fuel return noise.

- (d) Turn the ignition switch OFF.

- (e) Remove SST.

SST 09843-18020

If there is no pressure, check the following parts:

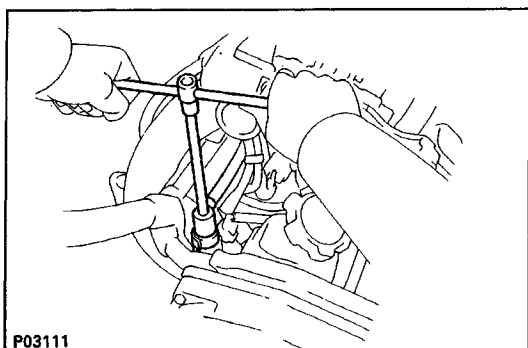
- Fusible link
- H-fuse (AM2 30A)
- Fuses (EF1 15A, IGN 7.5A)
- EFI main relay
- Fuel pump
- Wiring connections .

2. CHECK FUEL PRESSURE

- (a) Check that the battery voltage is above 12 volts.

- (b) Disconnect the cable from the negative (–) terminal of the battery.

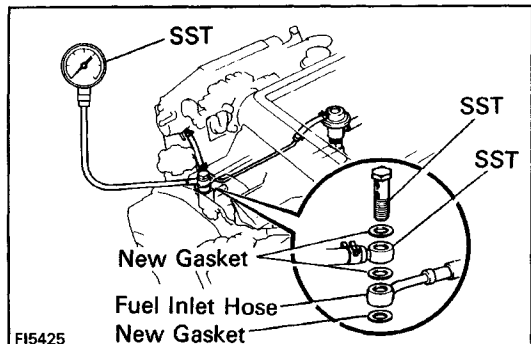
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the “LOCK” position and the negative (–) terminal cable is disconnected from the battery.



- (c) Remove the union bolt and two gaskets, and disconnect the fuel inlet hose from the delivery pipe.

H I N T:

- Put a suitable container or shop towel under the cold start injector pipe.
- Slowly loosen the union bolt.

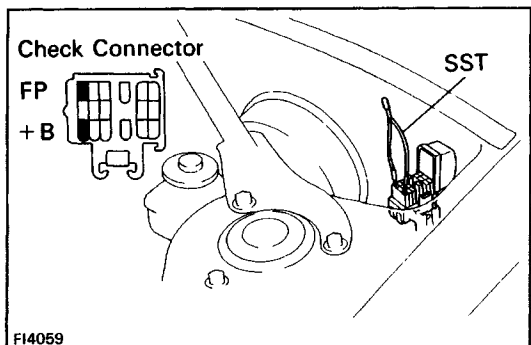


- (d) Install the fuel inlet hose and SST (pressure gauge) to the delivery pipe with three new gaskets and SST(union bolt).

SST 09268-45012

Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

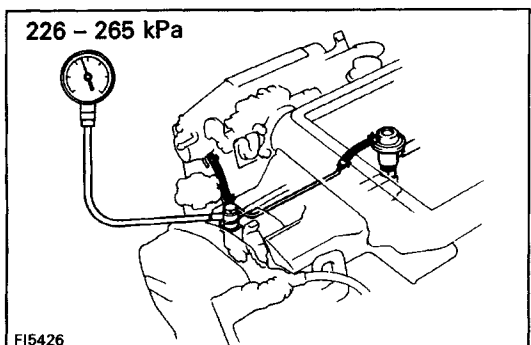
- (e) Wipe off any splattered gasoline.



- (f) Using SST, connect terminals + B and FP of the check connector.

SST 09843-18020

- (g) Reconnect the battery negative (-) cable.



- (h) Turn the ignition switch ON.

- (i) Measure the fuel pressure.

Fuel pressure: 226 - 265 kPa

(2.3 - 2.7 kgf/cm , 33 - 38 psi)

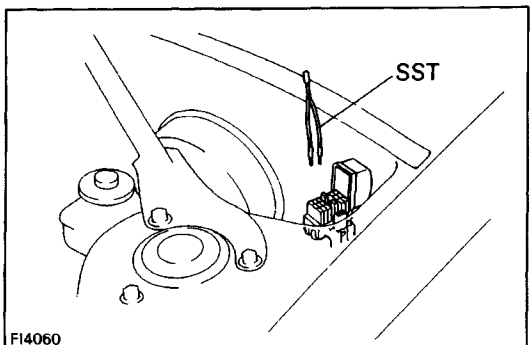
If pressure is high, replace the fuel pressure regulator.

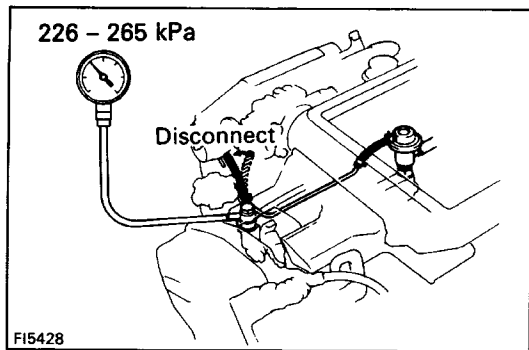
If pressure is low, check the following parts:

- Fuel hoses and connection
- Fuel pump
- Fuel filter
- Fuel pressure regulator

- (j) Remove SST.

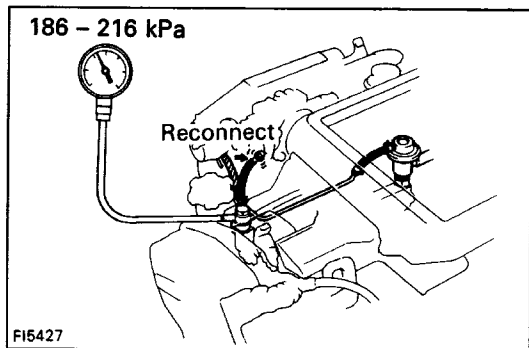
SST 09843-18020





- (k) Start the engine.
- (l) Disconnect the vacuum sensing hose from the fuel pressure regulator, and plug the hose end.
- (m) Measure the fuel pressure at idle.

Fuel pressure: 226 – 265 kPa
(2.3 – 2.7 kgf/cm , 33 – 38 psi)



- (n) Reconnect the vacuum sensing hose to the fuel pressure regulator and plug the hose end.
- (o) Measure the fuel pressure at idle.

Fuel pressure: 186 – 216 kPa
(1.9 – 2.2 kgf/cm , 27 – 31 psi)

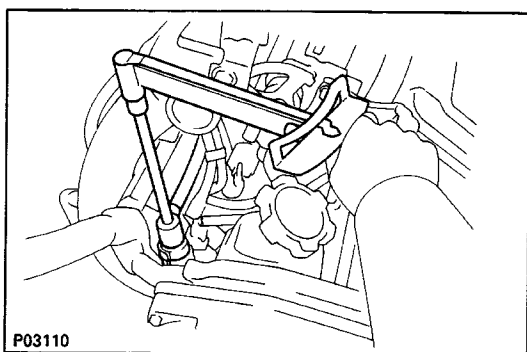
If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

- (p) Stop the engine. Check that the fuel pressure remains 147 kPa (1.5 kgf/cm , 21 psi) or more for 5 minutes after the engine is turned off.

If pressure is not as specified, check the fuel pump, pressure regulator and/or injector.

- (q) After checking fuel pressure, disconnect the battery negative (–) cable and carefully remove the SST to prevent gasoline from splashing.

SST 09268–45012



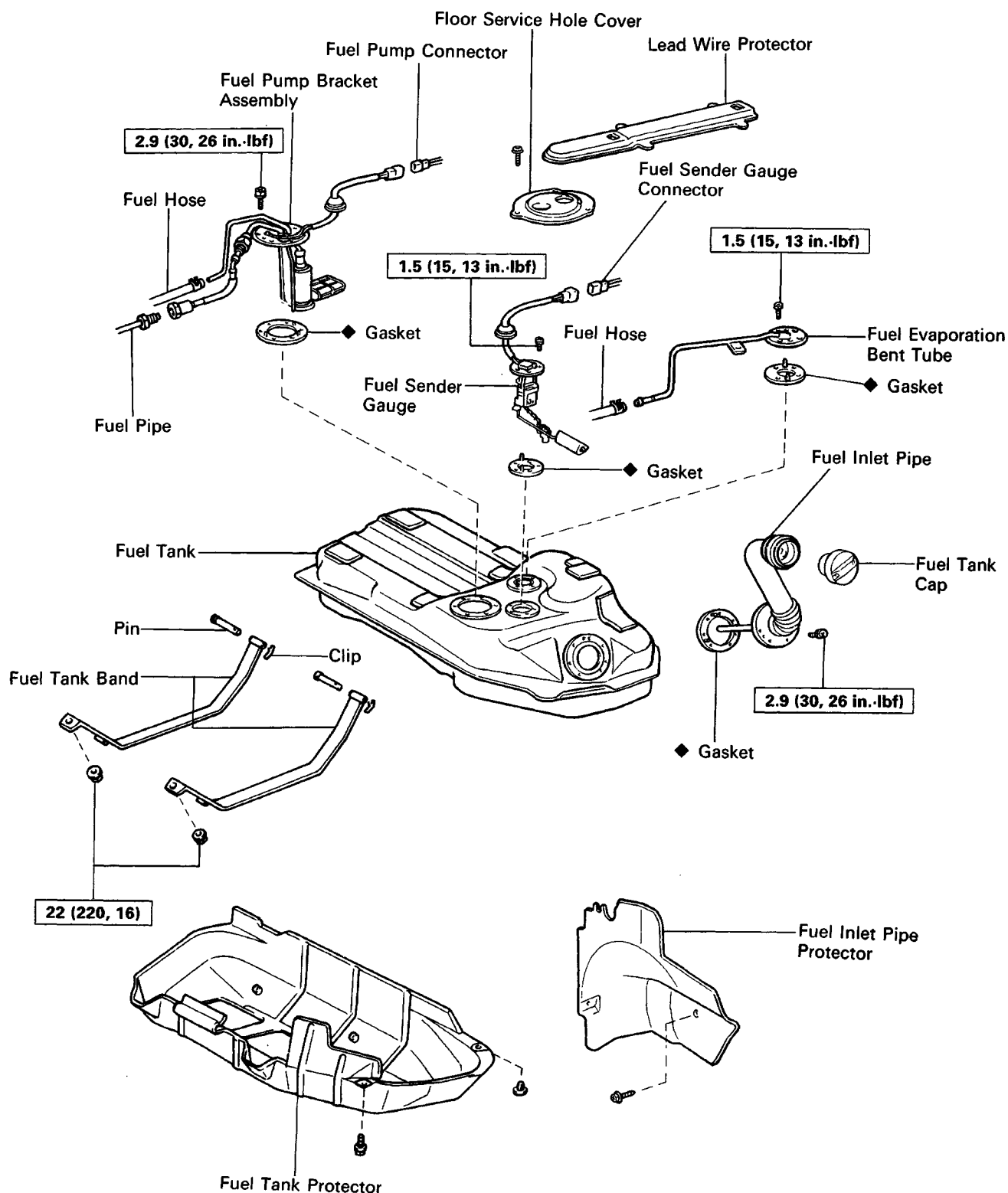
- (r) Reconnect the fuel inlet hose with two new gas-kets and the union bolt.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

- (s) Reconnect the cable to the negative (–) terminal of the battery.
- (t) Check for fuel leakage. (See page [FI-10](#))

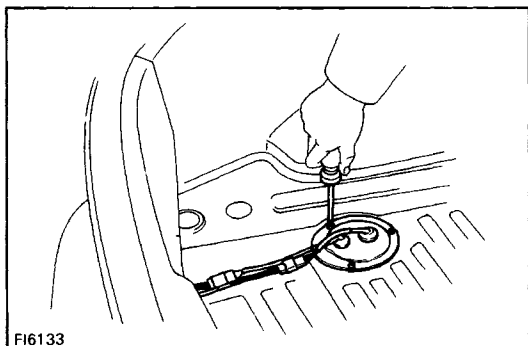
REMOVAL OF FUEL PUMP

CAUTION: Do not smoke or work near an open flame when working on the fuel pump.



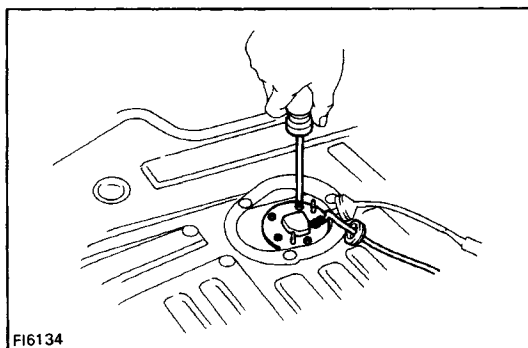
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the “LOCK” position and the negative (–) terminal cable is disconnected from the battery.



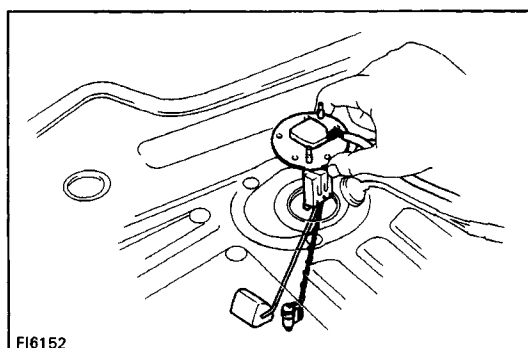
2. REMOVE FLOOR SERVICE HOLE COVER

- (a) Remove the lead wire protector.
- (b) Disconnect the fuel pump and fuel sender gauge connectors.
- (c) Remove the three screws and service hole cover.

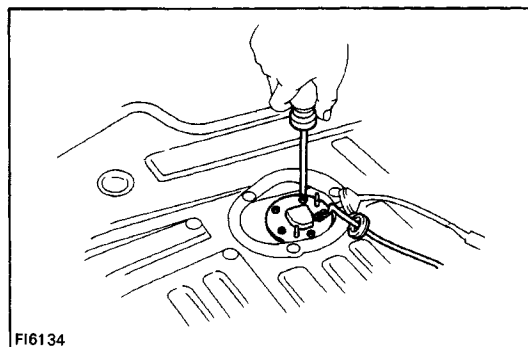


3. DRAW OUT FUEL FROM FUEL TANK

- (a) Remove the five screws and fuel sender gauge.
- (b) Remove the gasket from the fuel sender gauge.
- (c) Draw out the fuel from the fuel tank.

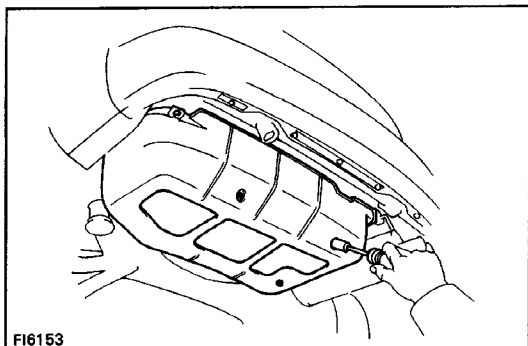


- (d) Install a new gasket to the fuel sender gauge.
- (e) Insert the sender gauge into the fuel tank.

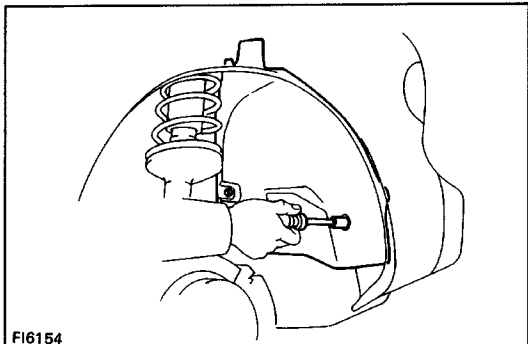


- (f) Reinstall the fuel sender gauge with the five screws.
Torque: 1.5 N-m (15 kgf-cm, 13 in.-lbf)

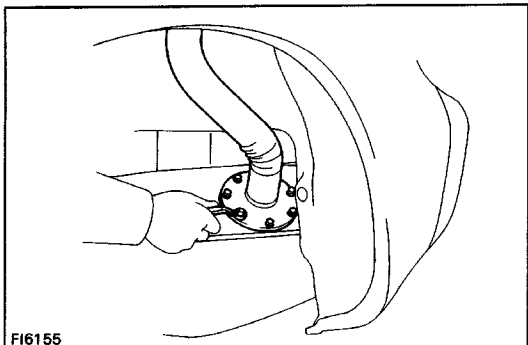
4. REMOVE LH REAR WHEEL

**5. REMOVE FUEL TANK PROTECTOR**

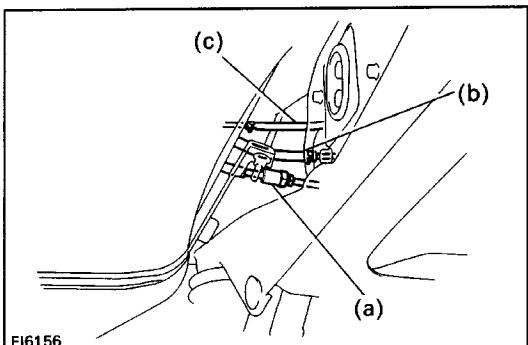
Remove the clip, six bolts and tank protector.

**6. REMOVE FUEL INLET PIPE PROTECTOR**

Remove the two screws and pipe protector.

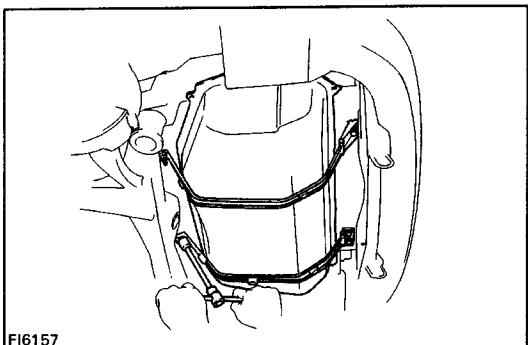
**7. DISCONNECT FUEL INLET PIPE FROM FUEL TANK**

- (a) Remove the seven bolts, and disconnect the inlet pipe.
- (b) Remove the gasket from the inlet pipe.

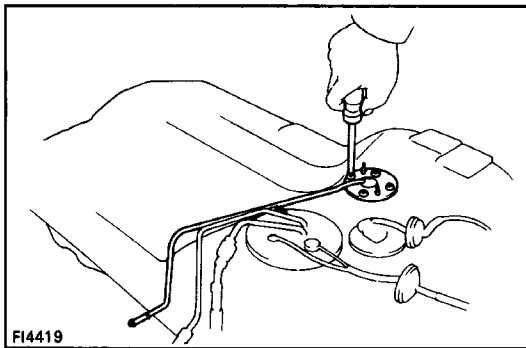
**8. DISCONNECT FUEL HOSES**

CAUTION: Remove the fuel filter cap to prevent the fuel from flowing out.

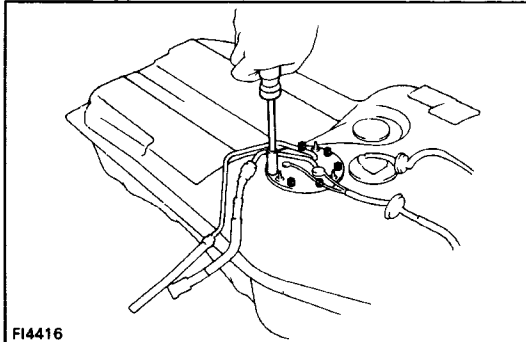
- (a) Fuel outlet hose
- (b) Fuel return hose
- (c) Fuel evaporation bent hose

**9. REMOVE FUEL TANK**

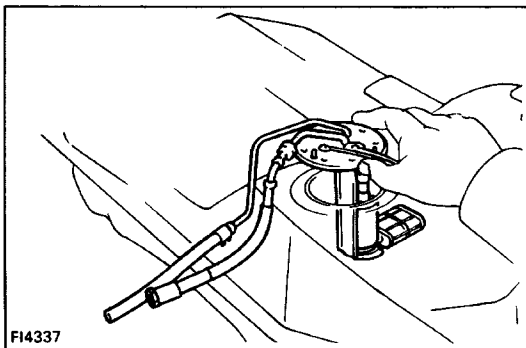
- (a) Support the fuel tank with a jack.
- (b) Remove the nut, clip, pin and fuel tank bands. Remove the two tank bands.
- (c) Remove the fuel tank.

**10. REMOVE FUEL EVAPORATION BENT TUBE**

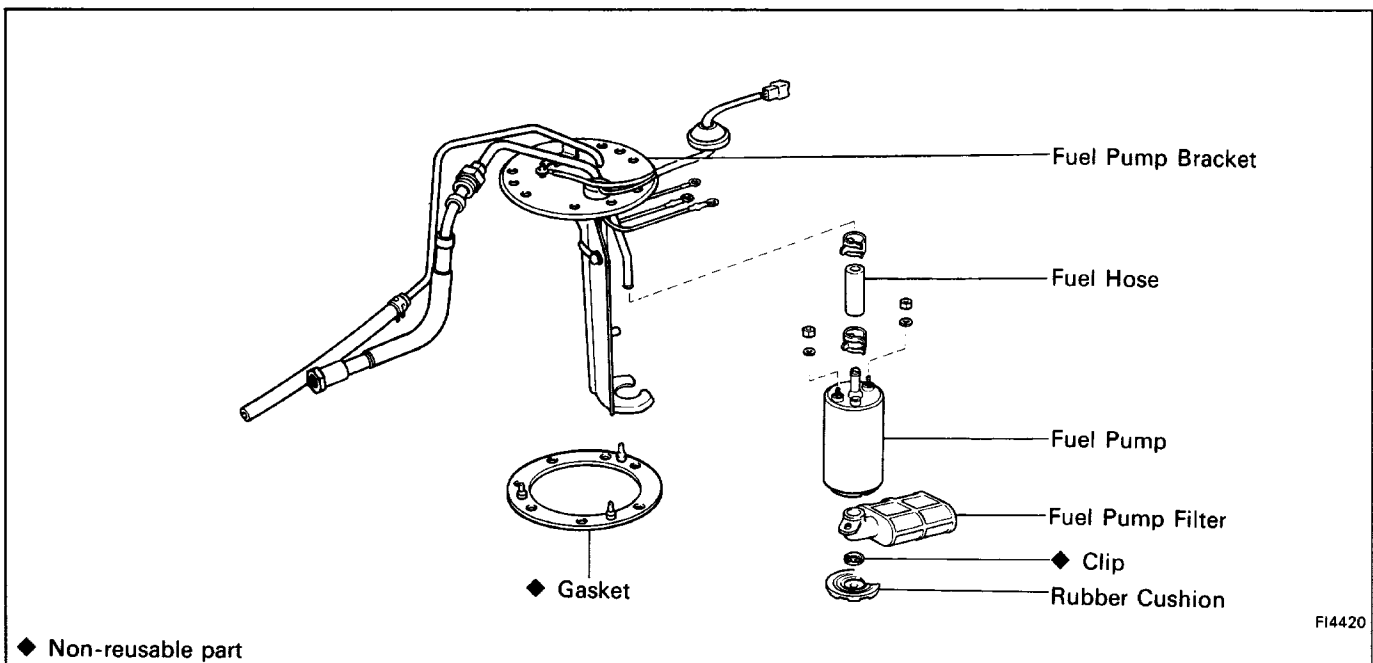
- (a) Remove the bolt holding the bent tube to the fuel pump bracket.
- (b) Remove the four screws, bent tube and gasket.

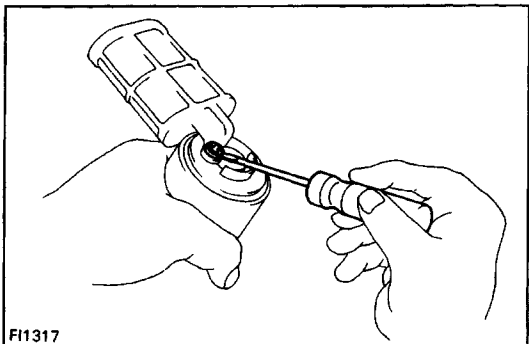
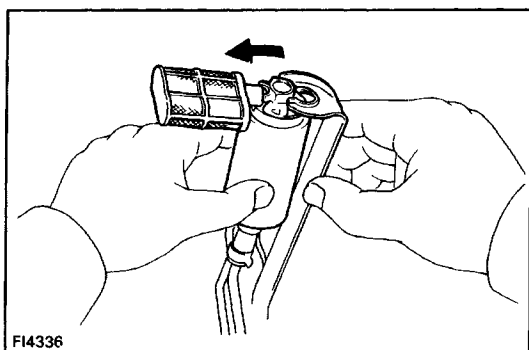
**11. REMOVE FUEL PUMP BRACKET ASSEMBLY FROM FUEL TANK**

- (a) Remove the six bolts.



- (b) Pull out the pump bracket assembly.
- (c) Remove the gasket from the pump bracket.

COMPONENTS



DISASSEMBLY OF FUEL PUMP

(See page [FI-142](#))

1. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

- Pull out the lower side of the fuel pump from the pump bracket.
- Remove the rubber cushion from the fuel pump.
- Remove the nut and spring washer, and disconnect the lead wire from the fuel pump. Disconnect the three lead wires.
- Disconnect the fuel hose from the fuel pump, and remove the fuel pump.

2. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

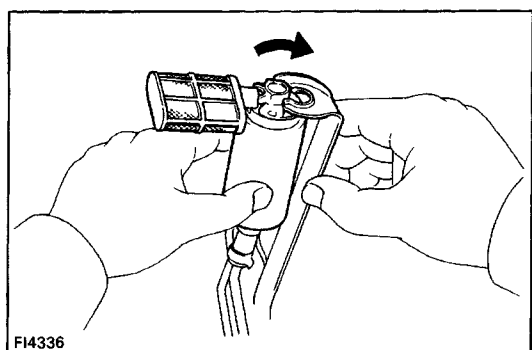
- Using a small screwdriver, remove the clip.
- Pull out the pump filter.

ASSEMBLY OF FUEL PUMP

(See page [FI-142](#))

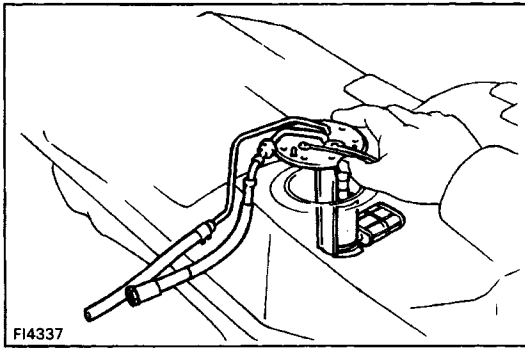
1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

Install the pump filter with a new clip.



2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

- Connect the fuel hose to the outlet port of the fuel pump.
- Connect the lead wire to the fuel pump with the spring washer and nut. Connect the two lead wires.
- Install the rubber cushion to the fuel pump.
- Install the fuel pump by pushing the lower side of the fuel pump.



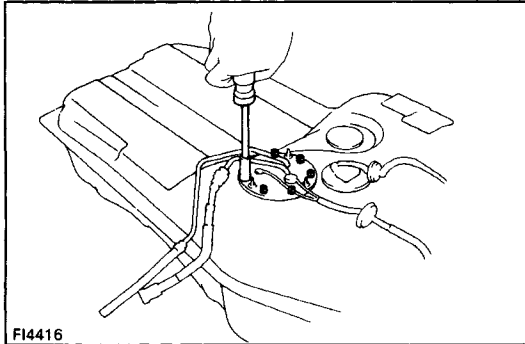
FI4337

INSTALLATION OF FUEL PUMP

(See page [FI-139](#))

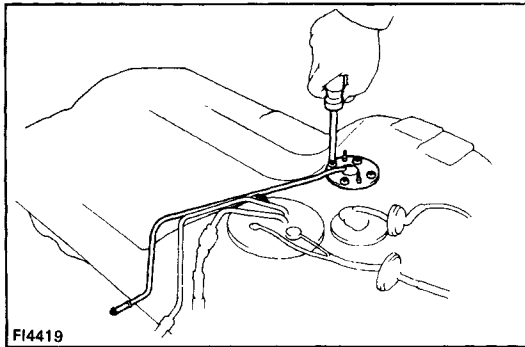
1. INSTALL FUEL PUMP BRACKET ASSEMBLY TO FUEL TANK

- (a) Install a new gasket to the pump bracket.
- (b) Insert the pump bracket assembly into the fuel tank.



FI4416

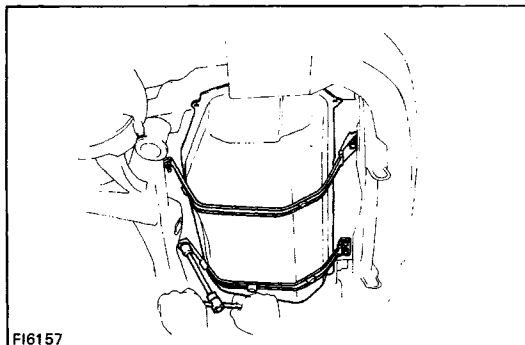
- (c) Install the pump bracket with the six bolts.
Torque: 2.9 N-m (30 kgf-cm, 26 in.-lbf)



FI4419

2. INSTALL FUEL EVAPORATION BENT TUBE

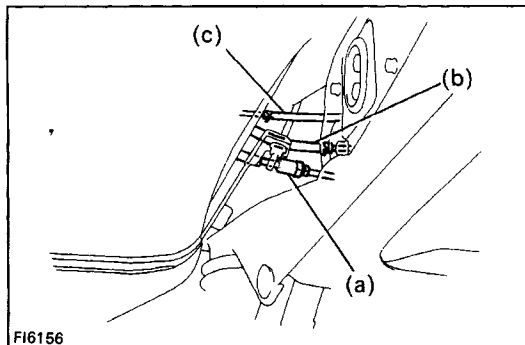
- (a) Install a new gasket to the bent tube.
- (b) Install the bent tube with the four screws.
Torque: 1.5 N-m (15 kgf-cm, 13 in.-lbf)
- (c) Install the bolt holding the bent tube to the fuel pump bracket.
Torque: 2.9 N-m (30 kgf-cm, 26 in.-lbf)



FI6157

3. INSTALL FUEL TANK

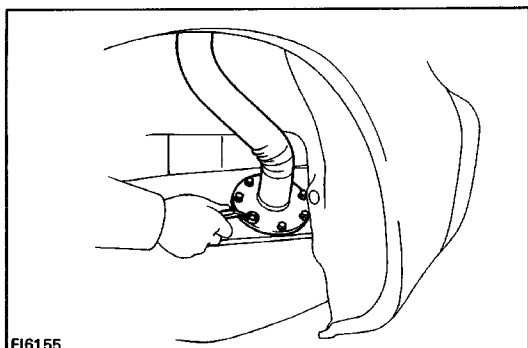
- (a) Attach the fuel tank to the body.
- (b) Install the fuel tank band with the pin, clip and nut.
Install the two tank bands.
Torque: 22 N-m (220 kgf-cm, 16 ft-lbf)



FI6156

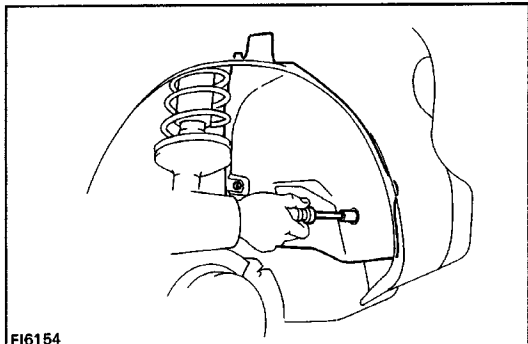
4. CONNECT FUEL HOSES

- (a) Fuel outlet hose
Torque (See page [FI-9](#)):
30 N-m (310 kgf-cm, 22 ft-lbf)
- (b) Fuel return hose
- (c) Fuel evaporation bent hose

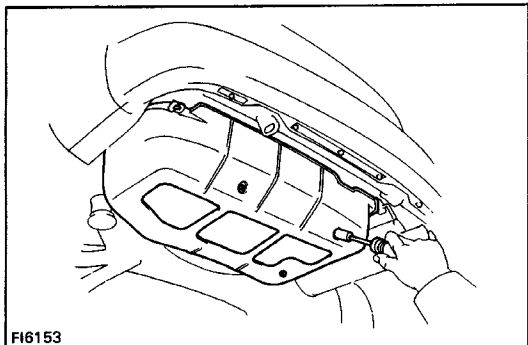
**5. INSTALL FUEL INLET PIPE**

- (a) Install a new gasket to the inlet pipe.
- (b) Install the inlet pipe with the seven bolts.

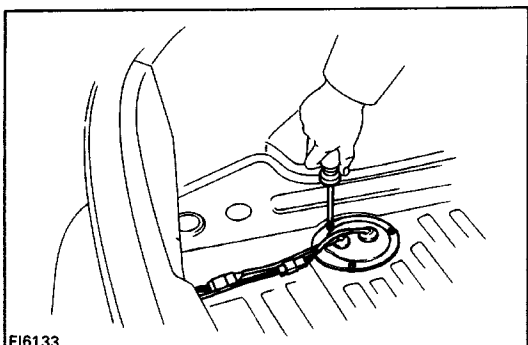
Torque: 2.9 N-m (30 kgf-cm, 26 in-lbf)

**6. INSTALL FUEL INLET PIPE PROTECTOR**

- (a) Attach the pipe protector to the body.
- (b) Install the pipe protector with the two screws.

**7. INSTALL FUEL TANK PROTECTOR**

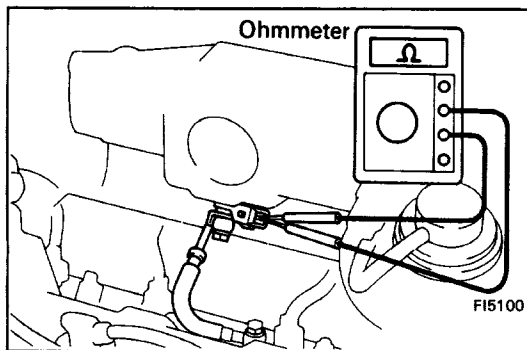
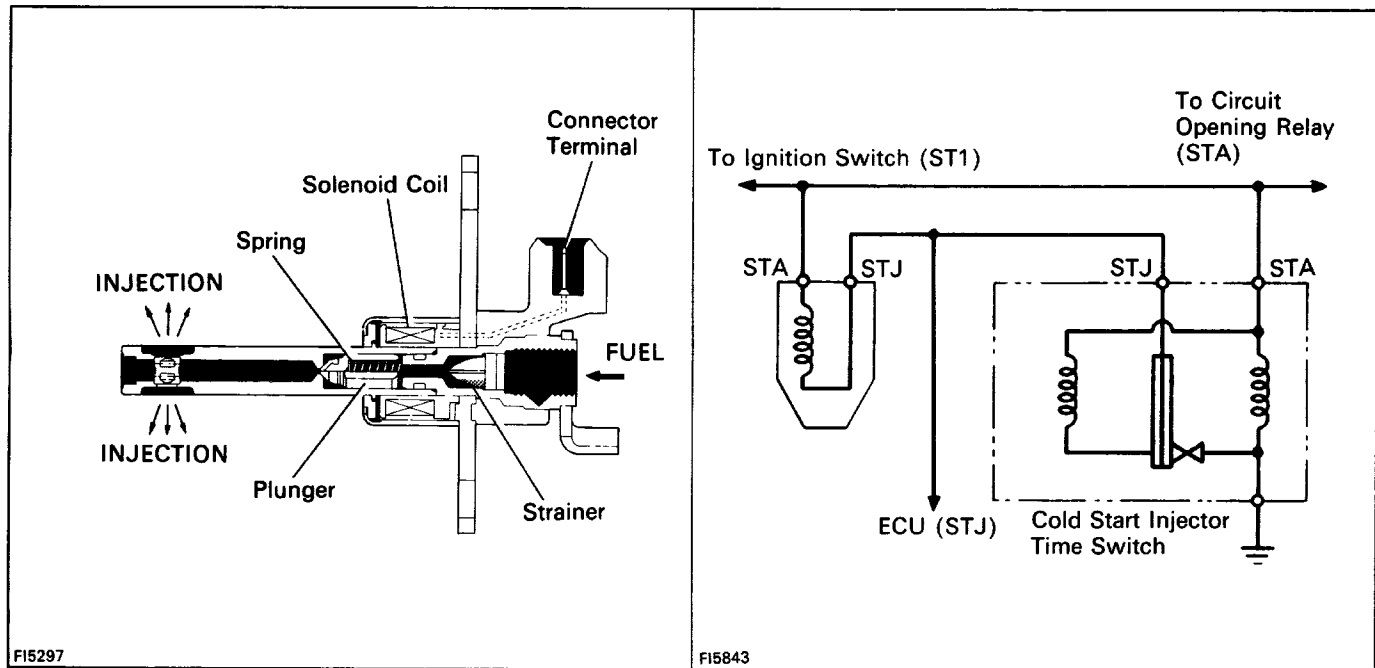
- (a) Attach the tank protector to the body.
- (b) Install the tank protector with the clip and six bolts.

8. INSTALL LH REAR WHEEL**9. INSTALL FLOOR SERVICE HOLE COVER**

- (a) Run the lead wires of the fuel pump and sender gauge through the holes in the service hole cover.
- (b) Install the service hole cover with the three screws.
- (c) Install the lead wire protector.

10. FILL WITH FUEL**11. CHECK FOR FUEL LEAKAGE (See page [FI-10](#))****12. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

Cold Start Injector (3S-GTE)



ON-VEHICLE INSPECTION

INSPECT RESISTANCE OF COLD START INJECTOR

- Remove the throttle body.
(See steps 1 to 8, 10 and 11 on pages FI-194 and 195)
- Disconnect the cold start injector connector.
- Using an ohmmeter, measure the resistance between the terminals.

Resistance: 2 – 4

If the resistance is not as specified, replace the cold start injector.

- Reconnect the cold start injector connector.
- Reinstall the throttle body.
(See steps 2, 3 and 5 to 12 on pages FI-197 and 198)

REMOVAL OF COLD START INJECTOR

1. REMOVE THROTTLE BODY

(See steps 1 to 8, 10 and 11 on pages FI-173 and 174)

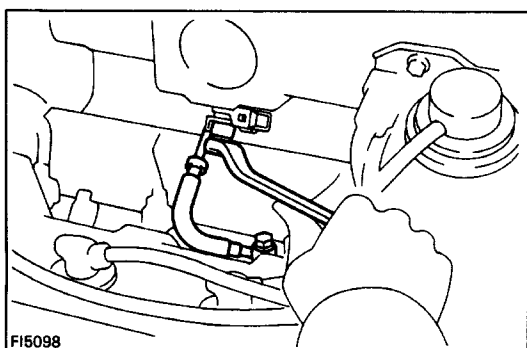
2. DISCONNECT COLD START INJECTOR CONNECTOR

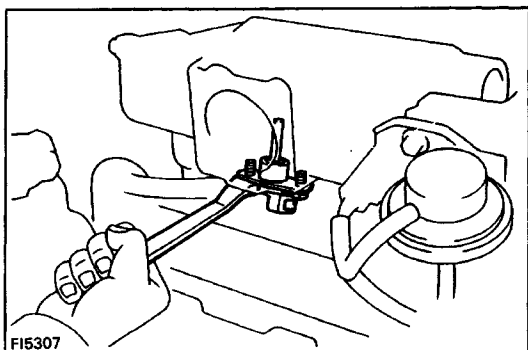
3. REMOVE COLD START INJECTOR PIPE

Remove the two union bolts and four gaskets and injector pipe.

HINT:

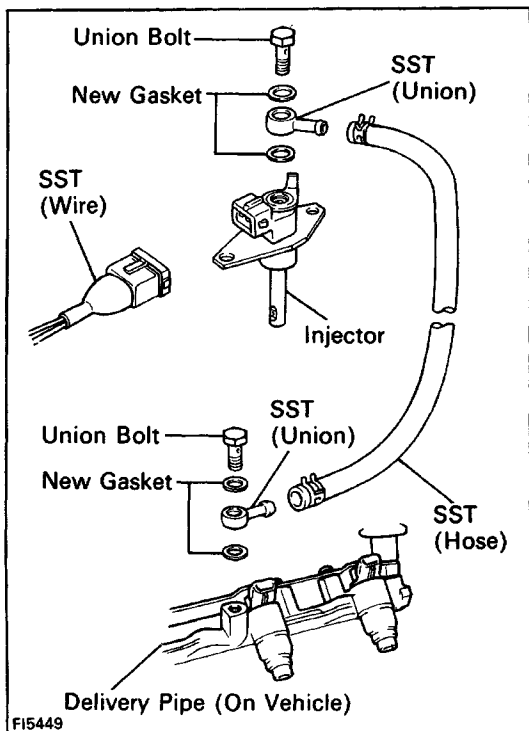
- Put a suitable container or shop towel under the injector pipe.
- Slowly loosen the union bolt.





4. REMOVE COLD START INJECTOR

Remove the two bolts, cold start injector and gasket.



INSPECTION OF COLD START INJECTOR

1. INSPECT INJECTION OF COLD START INJECTOR

CAUTION: Keep injector clear of sparks during the test.

(a) Install SST (two unions) to the injector and delivery pipe with four new gaskets and the union bolts.

SST 09268-41045 (09268-41080)

Torque: 12 N-m (125 kgf-cm, 9 ft-lbf)

(b) Connect SST (hose) to the unions.

SST 09268-41045

(c) Connect SST (wire) to the injector.

SST 09842-30050

(d) Put a container under the injector.

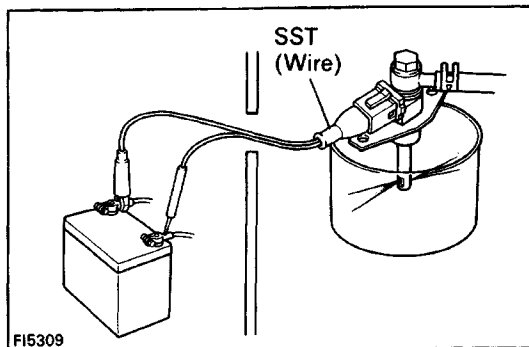
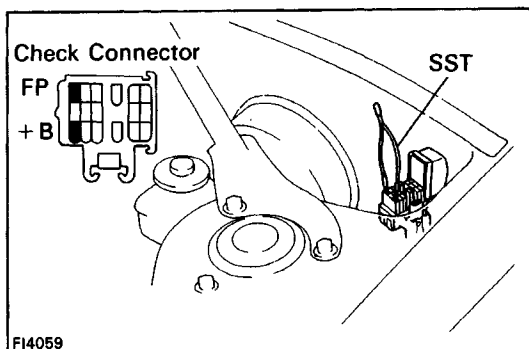
(e) Using SST, connect terminals + B and FP of the check connector.

SST 09843-18020

(f) Reconnect the battery negative (–) cable.

(g) Turn the ignition switch ON.

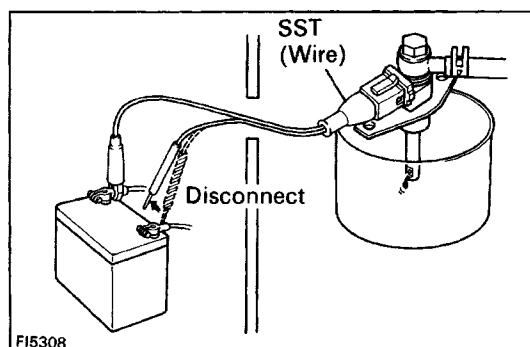
NOTICE: Do not start the engine.



(h) Connect the test probes of the SST (wire) to the battery, and check that the fuel spray is as shown.

SST 09842-30050

NOTICE: Perform this check within the shortest possible time.



2. INSPECT LEAKAGE

- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check for fuel leakage from the injector.

SST 09842-30050

Fuel drop: One drop or less per minute

- (b) Disconnect the battery negative (-) cable.

- (c) Remove SST.

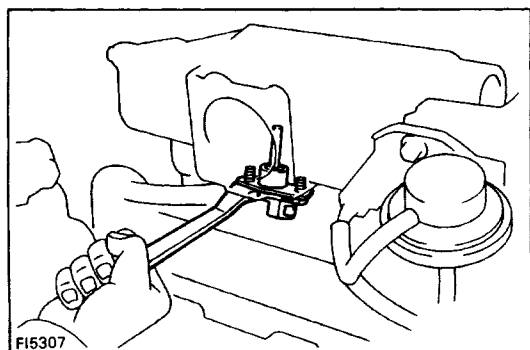
SST 09268-41045, 09842-30050 and 09843-18020

INSTALLATION OF COLD START INJECTOR

1. INSTALL COLD START INJECTOR

Install a new gasket and the injector with the two bolts.

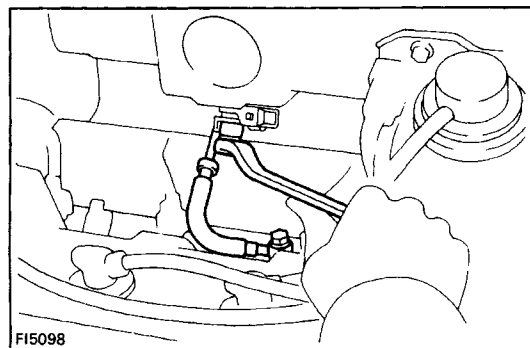
Torque: 5.9 N-m (60 kgf-cm, 52 in.-lbf)



2. INSTALL COLD START INJECTOR PIPE

Install the injector pipe with four new gaskets and the two union bolts.

Torque: 12 N-m (125 kgf-cm, 9 ft-lbf)

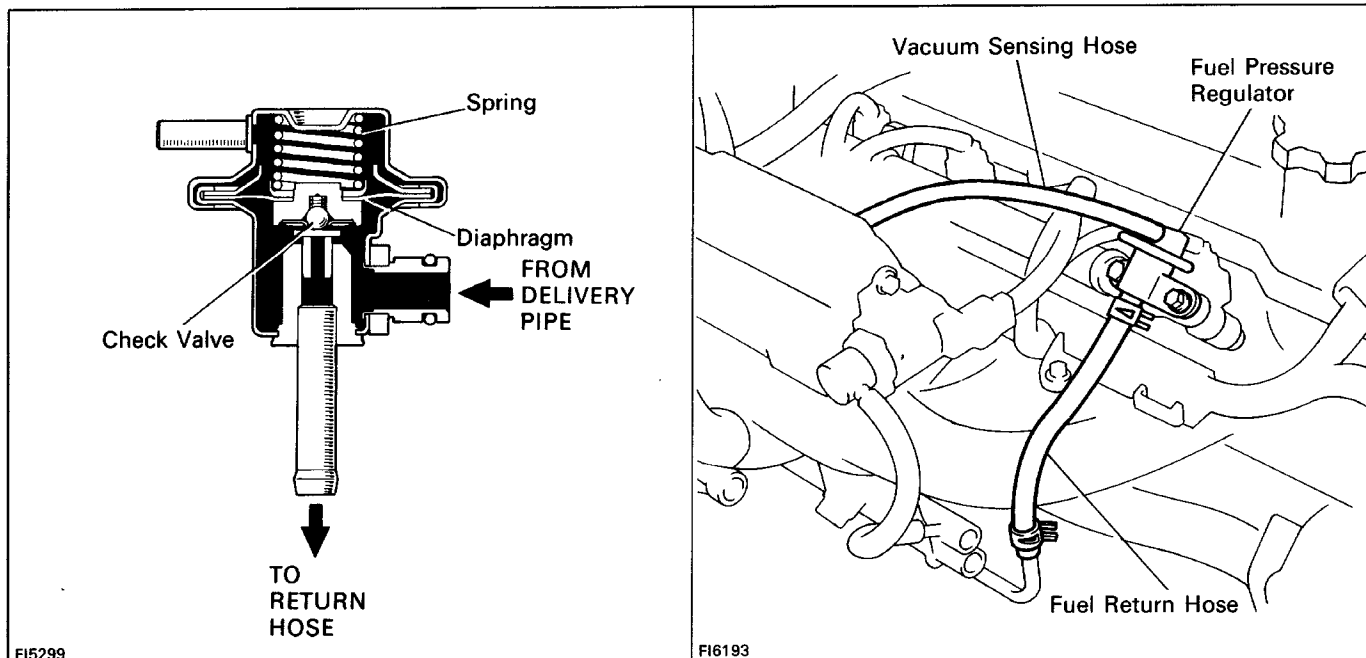


3. CONNECT COLD START INJECTOR CONNECTOR

4. INSTALL THROTTLE BODY

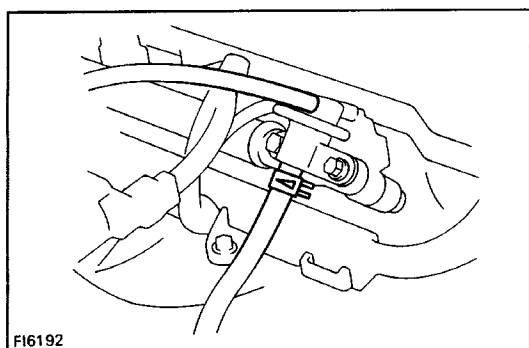
(See steps 2, 3 and 5 to 12 on pages [FI-197](#) and 198)

Fuel Pressure Regulator (4A-FE)



ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page [FI-125](#))



REMOVAL OF FUEL PRESSURE REGULATOR

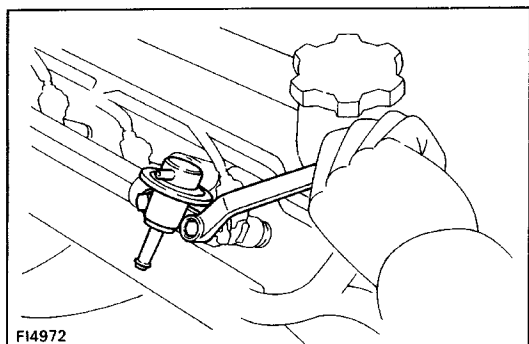
1. DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR
2. DISCONNECT FUEL RETURN HOSE FROM FUEL PRESSURE REGULATOR

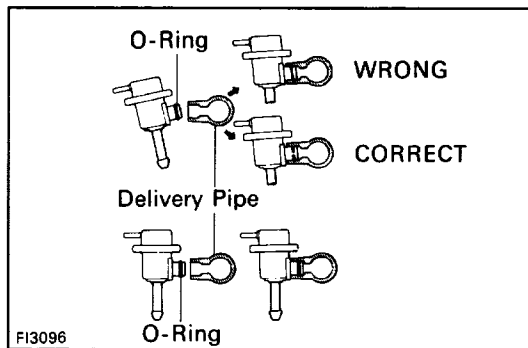
HINT:

- Put a suitable container or shop towel under the pressure regulator.
- Slowly loosen the union bolt.

3. REMOVE FUEL PRESSURE REGULATOR

- (a) Remove the two bolts, and pull out the pressure regulator.
- (b) Remove the O-ring from the pressure regulator.



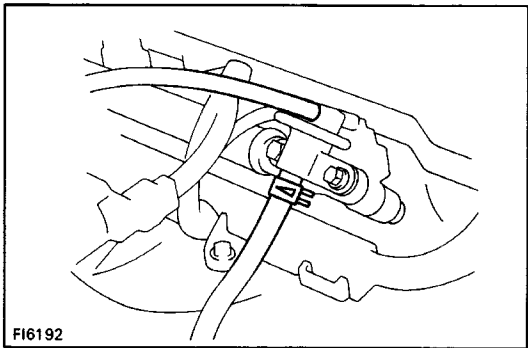
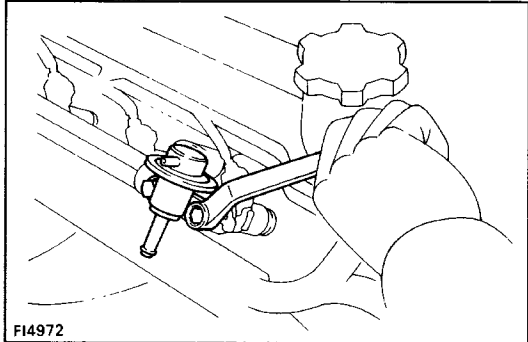


INSTALLATION OF FUEL PRESSURE REGULATOR

1. INSTALL FUEL PRESSURE REGULATOR

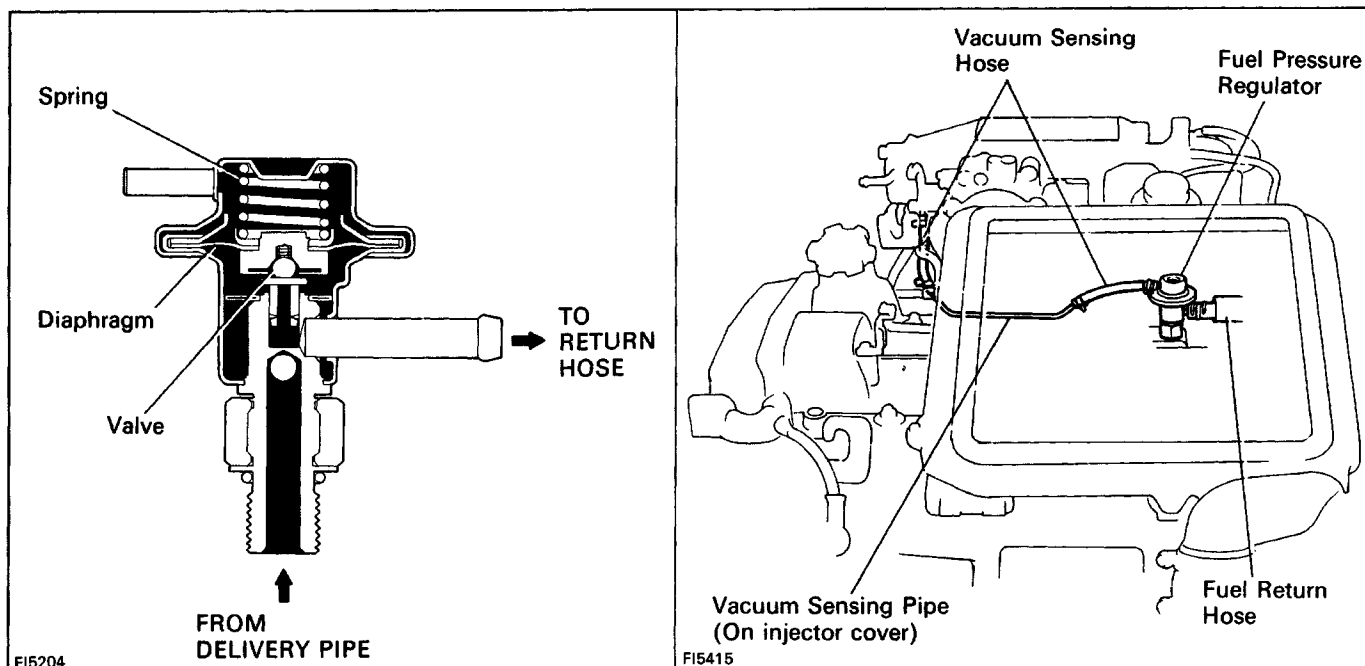
- (a) Apply a light coat of gasoline to a new O-ring, and install it to the pressure regulator.

- (b) Install the pressure regulator with the two bolts.
Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)



2. CONNECT FUEL RETURN HOSE TO FUEL PRESSURE REGULATOR
3. CONNECT VACUUM SENSING HOSE TO FUEL PRESSURE REGULATOR
4. CHECK FOR FUEL LEAKAGE (See page [FI-10](#))

Fuel Pressure Regulator (3S-GTE)

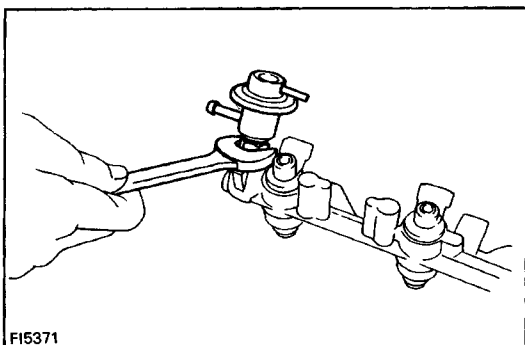


ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page [FI-136](#))

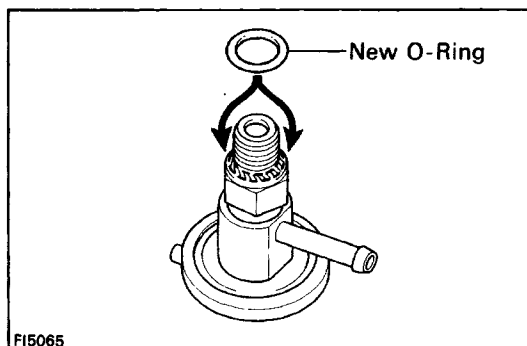
REMOVAL OF FUEL PRESSURE REGULATOR

1. REMOVE THROTTLE BODY
(See steps 1 to 8, 10 and 11 on pages [FI-194](#) and 195)
2. REMOVE INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY
(See steps 1 to 14 on pages [FI-161](#) and 162)
3. REMOVE FUEL INLET HOSE FROM DELIVERY PIPE
(See step 15 on page [FI-162](#))
4. REMOVE INJECTOR COVER FROM DELIVERY PIPE
(See step 1 on page [FI-164](#))



5. REMOVE FUEL PRESSURE REGULATOR

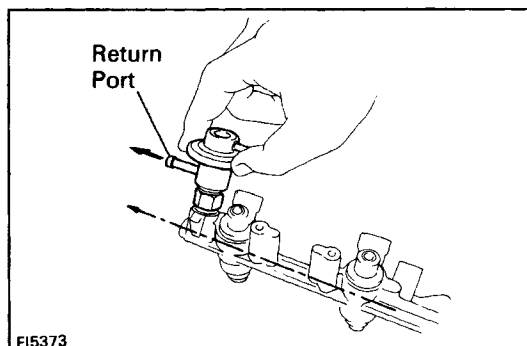
- (a) Loosen the lock nut, and remove the pressure regulator.
- (b) Remove the O-ring from the pressure regulator.



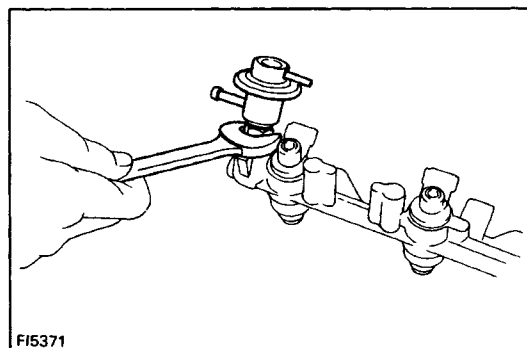
INSTALLATION OF FUEL PRESSURE REGULATOR

1. INSTALL FUEL PRESSURE REGULATOR

- (a) Fully loosen the lock nut on the pressure regulator.
- (b) Apply a light coat of gasoline to a new O-ring, and install it to the pressure regulator.



- (c) Completely thrust the pressure regulator into the delivery pipe by hand.
- (d) Turn the pressure regulator counterclockwise until the fuel return port faces in the direction indicated in the illustration.



- (e) Tighten the lock nut.
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

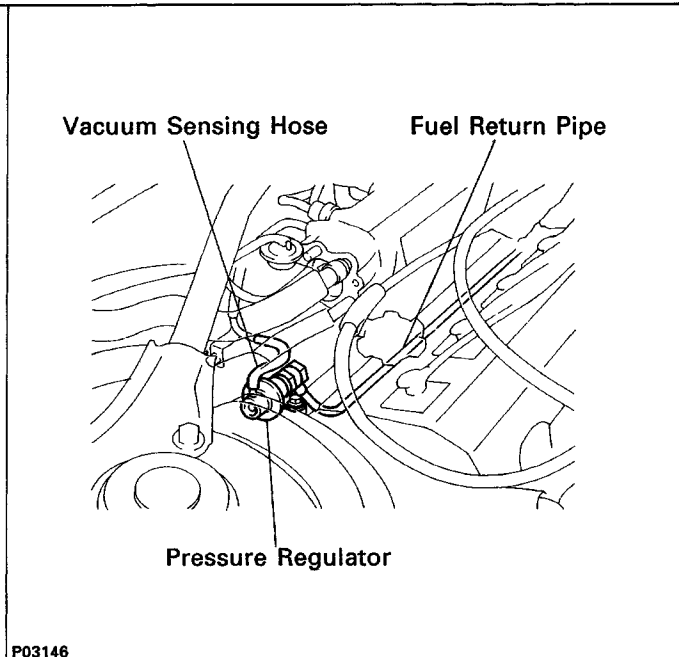
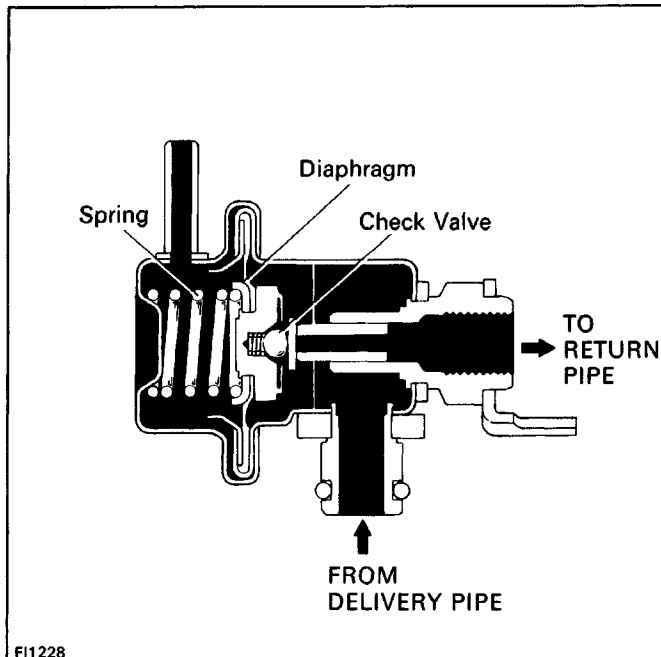
2. INSTALL INJECTOR COVER TO DELIVERY PIPE (See step 4 on page [FI-165](#))

3. INSTALL FUEL INLET HOSE TO DELIVERY PIPE (See step 1 on page [FI-166](#))

4. INSTALL INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY (See steps 2 to 14 on pages [FI-166](#) and 167)

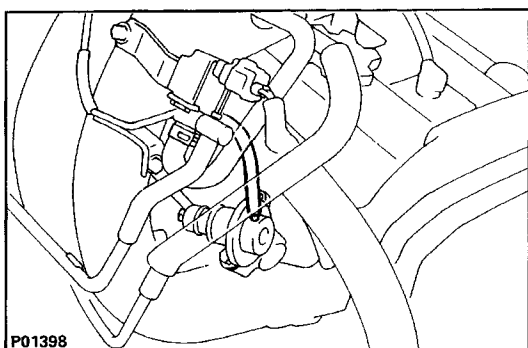
5. INSTALL THROTTLE BODY (See steps 2, 3 and 5 to 12 on pages [FI-197](#) and 198)

Fuel Pressure Regulator (5S–FE)



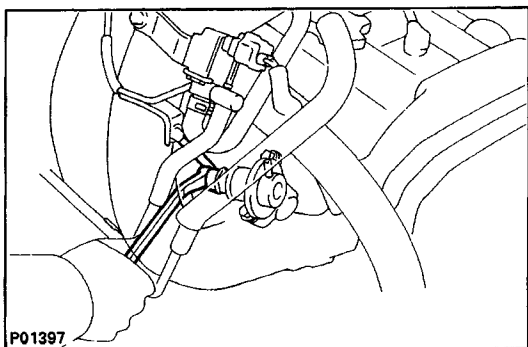
ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page [FI-128](#))



REMOVAL OF FUEL PRESSURE REGULATOR

1. DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR

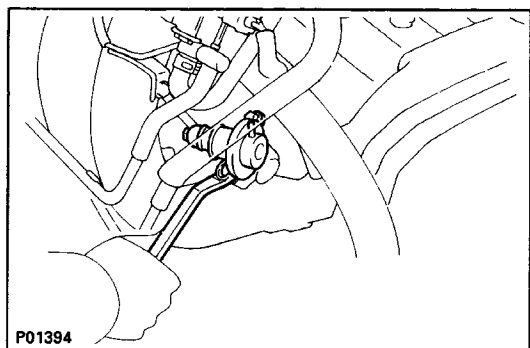


2. DISCONNECT FUEL RETURN PIPE FROM FUEL PRESSURE REGULATOR

Remove the union bolt and two gaskets, and disconnect the return pipe from the pressure regulator.

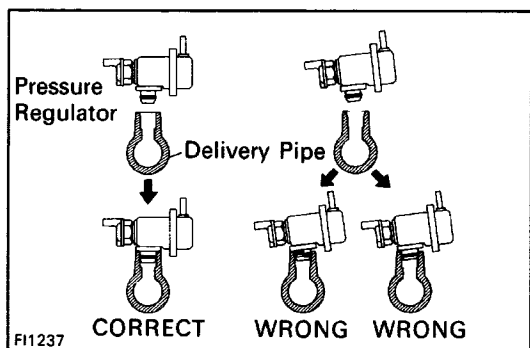
HINT:

- Put a suitable container or shop towel under the pressure regulator.
- Slowly loosen the union bolt.



3. REMOVE FUEL PRESSURE REGULATOR

- (a) Remove the two bolts, and pull out the pressure regulator.
- (b) Remove the O-ring from the pressure regulator.

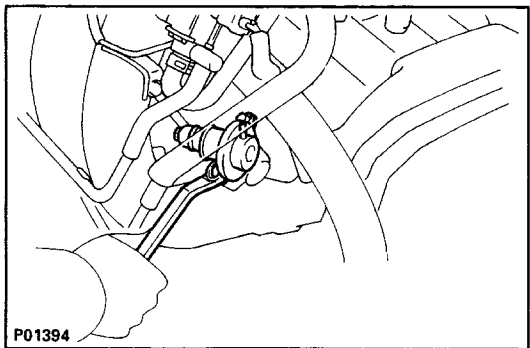


INSTALLATION OF FUEL PRESSURE REGULATOR

1. INSTALL FUEL PRESSURE REGULATOR

- (a) Apply a light coat of gasoline to a new O-ring, and install it to the pressure regulator.

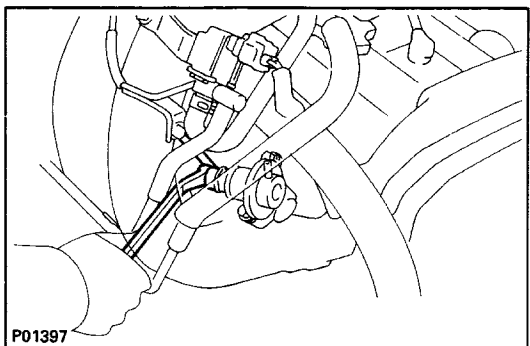
- (b) Install the pressure regulator with the two bolts.
- Torque: 5.4 N-m (55 kgf-cm, 48 in.-lbf)**



2. CONNECT FUEL RETURN PIPE TO FUEL PRESSURE REGULATOR

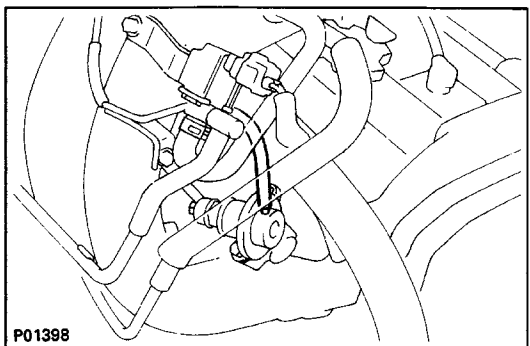
Install the return pipe with new two gaskets and the union bolt.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

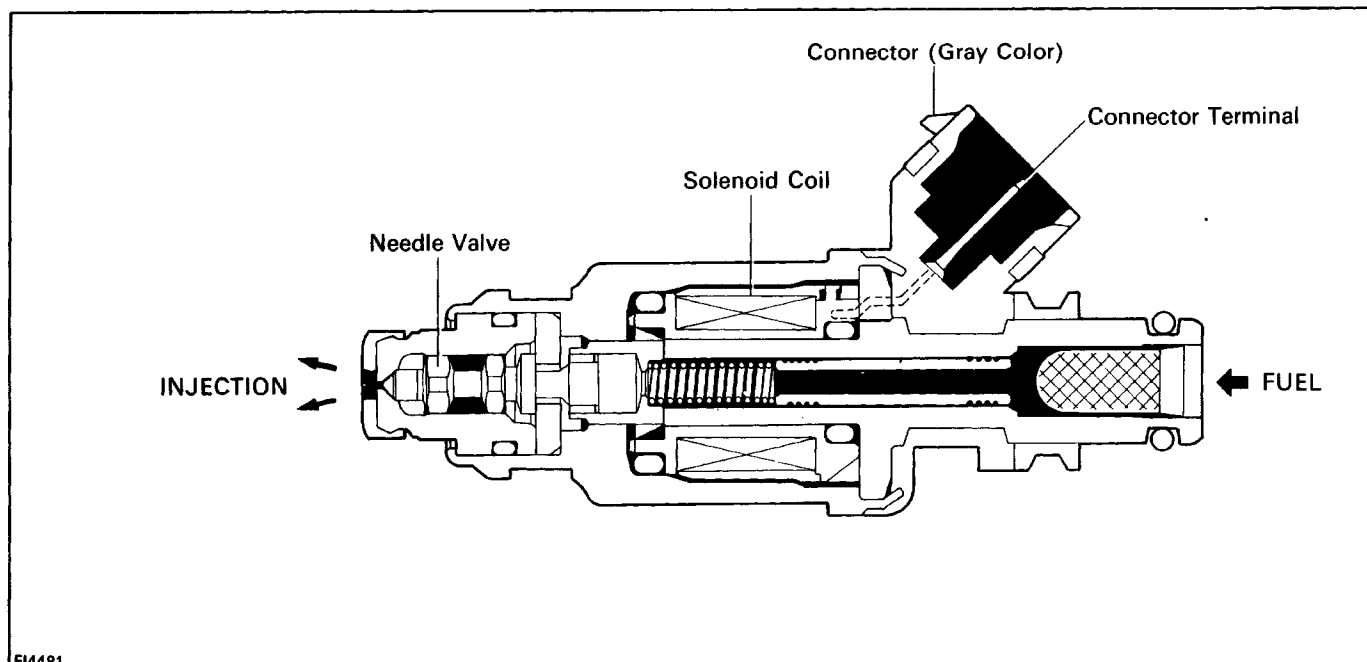


3. CONNECT VACUUM SENSING HOSE TO FUEL PRESSURE REGULATOR

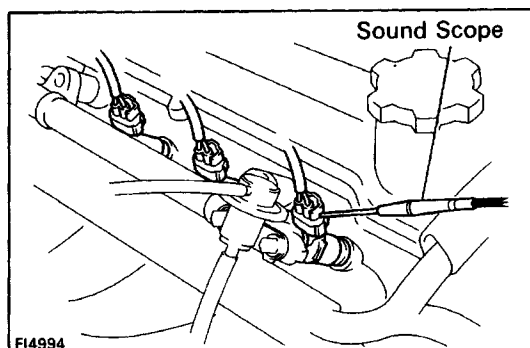
4. CHECK FOR FUEL LEAKAGE (See page [FI-10](#))



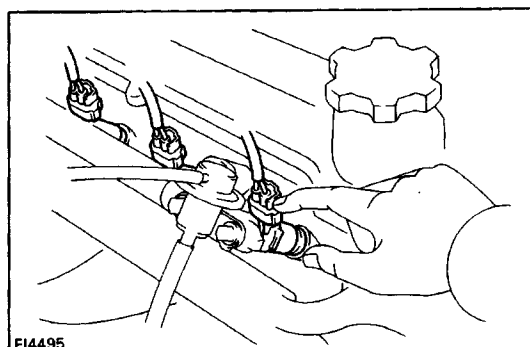
Injectors (4A-FE)



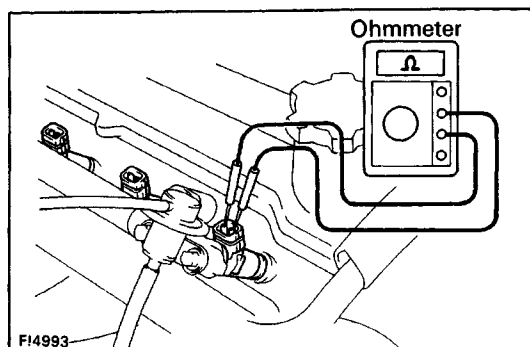
FI4481



FI4994



FI4495



FI4993

ON-VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

Check operation sound from each injector.

- (a) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine rpm.

- (b) If you have no sound scope, you can check the injector transmission operation with your finger. If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the engine ECU.

2. INSPECT INJECTOR RESISTANCE

- (a) Disconnect the injector connector.
- (b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: Approx. 13.8

If the resistance is not as specified, replace the injector.

- (c) Reconnect the injector connector.

REMOVAL OF INJECTORS

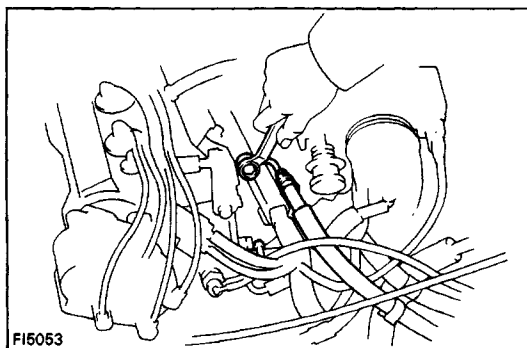
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR

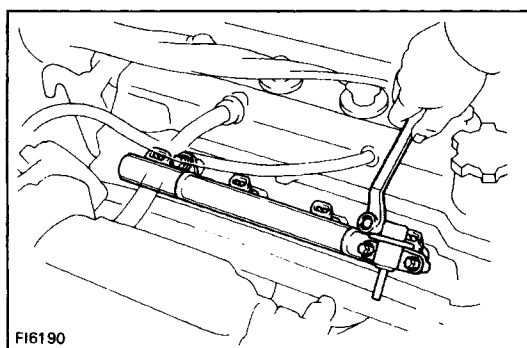
3. DISCONNECT FUEL RETURN HOSE FROM FUEL PRESSURE REGULATOR

4. DISCONNECT INJECTOR CONNECTORS



5. DISCONNECT FUEL INLET HOSE FROM DELIVERY PIPE

Remove the union bolt and two gaskets, and disconnect the inlet hose from the delivery pipe.



6. REMOVE DELIVERY PIPE AND INJECTORS

(a) Remove the two bolts and delivery pipe together with the four injectors.

NOTICE: Be careful not to drop the injectors when removing the delivery pipe.

(b) Remove the four insulators and two spacers from the cylinder head.

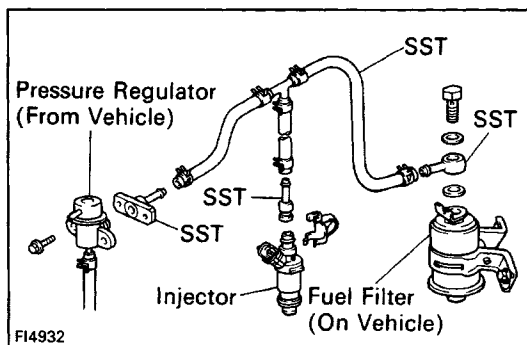
(c) Pull out the four injectors from the delivery pipe.

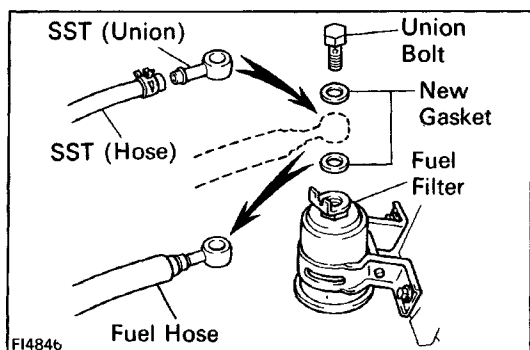
(d) Remove the O-ring and grommet from each injector

INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

CAUTION: Keep injector clear of sparks during this test.

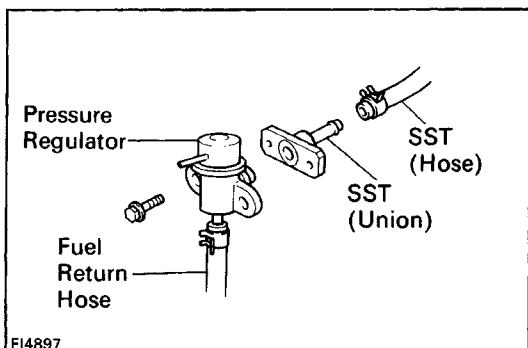




- (a) Disconnect the fuel hose from the fuel filter outlet.
- (b) Connect SST (union and hose) to the fuel filter outlet with two new gaskets and the union bolt.
SST 09268-41045 (90405-09015)

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

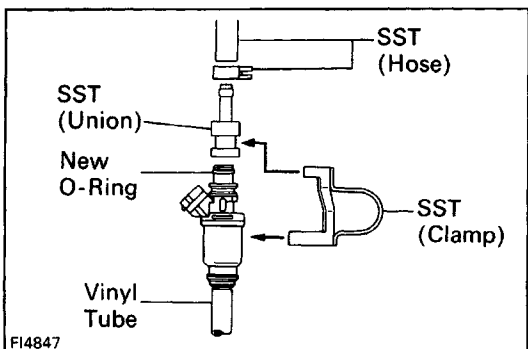
HINT: Use the vehicle's fuel filter.



- (c) Remove the pressure regulator from the delivery pipe, and connect the fuel return hose to the pressure regulator.

- (d) Install a new O-ring to the pressure regulator.
- (e) Connect the SST (hose) to the pressure regulator with SST (union) and the two bolts.
SST 09268-41045 (09268-41090)

Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)



- (f) Install the grommet and a new O-ring to the injector.
- (g) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268-41045

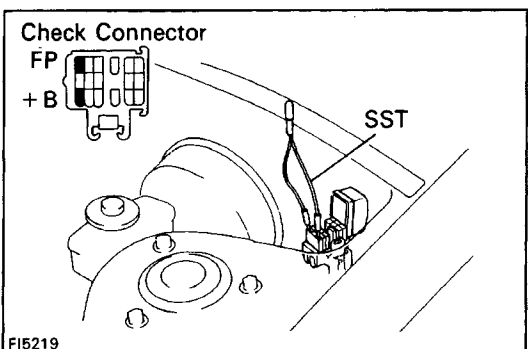
- (h) Put the injector into the graduated cylinder.
HINT: Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.

- (i) Using SST, connect terminals + B and FP of the check connector.
SST 09843-18020

- (j) Reconnect the battery negative (-) cable.

- (k) Turn the ignition switch ON.

NOTICE: Do not start the engine.



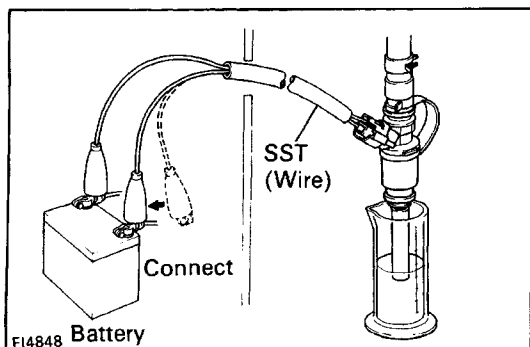
- (l) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.

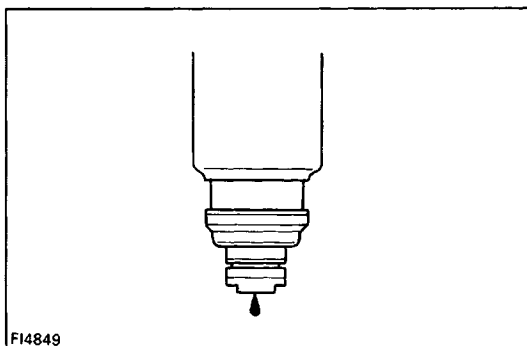
SST 09842-30070

Volume: 40 - 50 cm³ (2.4 - 3.1 cu in.) per 50 sec.
Difference between each injector:

5 cm³ (0.3 cu in.) or less

If the injection volume is not as specified, replace the injector.





2. INSPECT LEAKAGE

- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.

SST 09842-30070

Fuel drop: One drop or less per minute

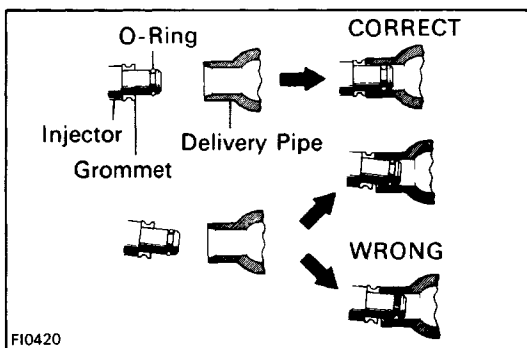
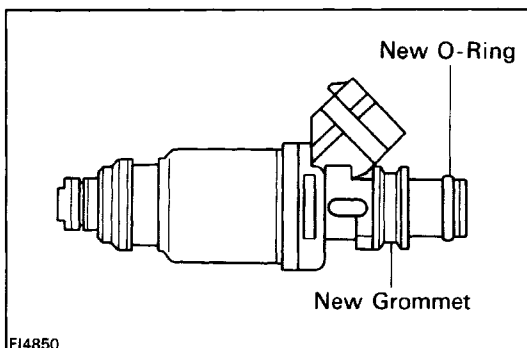
- (b) Disconnect the battery negative (–) cable.
(c) Remove SST.

SST 09268-41045 and 09843-18020

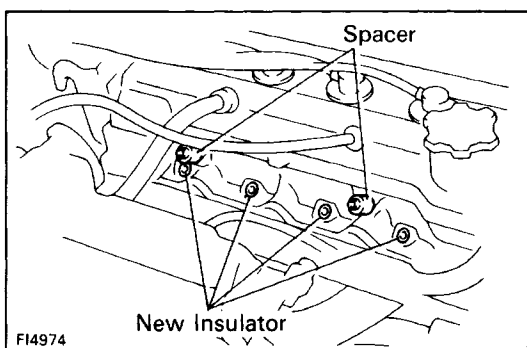
INSTALLATION OF INJECTORS

1. INSTALL INJECTORS AND DELIVERY PIPE

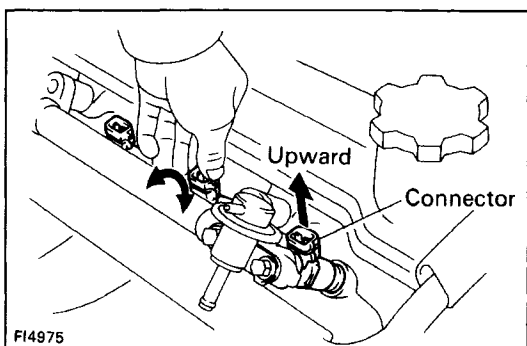
- (a) Install a new grommet to the injector.
(b) Apply a light coat of gasoline to a new O-ring and install it to the injector.



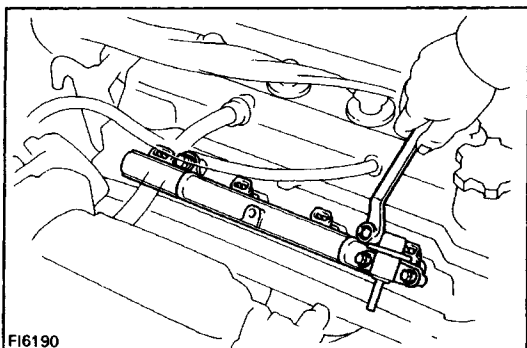
- (c) While turning the injector left and right, install it to the delivery pipes. Install the four injectors.



- (d) Place four new insulators and the two spacers in position on the cylinder head.

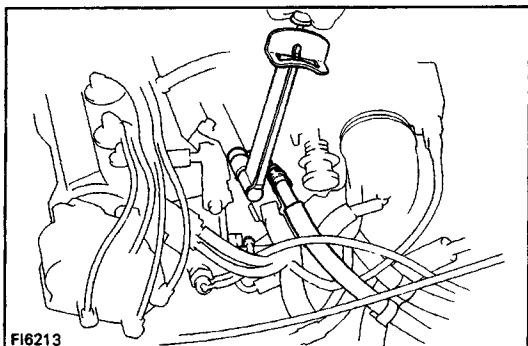


- (e) Place the four injectors together with the delivery pipe in position on the cylinder head.
(f) Check that the injectors rotate smoothly.
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.
(g) Position the injector connector upward.



(h) Install the two bolts.

Torque: 15 N-m (150 kgf-cm, 11 ft-lbf)



2. CONNECT FUEL INLET HOSE TO DELIVERY PIPE

Connect the inlet hose with two new gaskets and the union bolt.

Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

3. CONNECT INJECTOR CONNECTORS

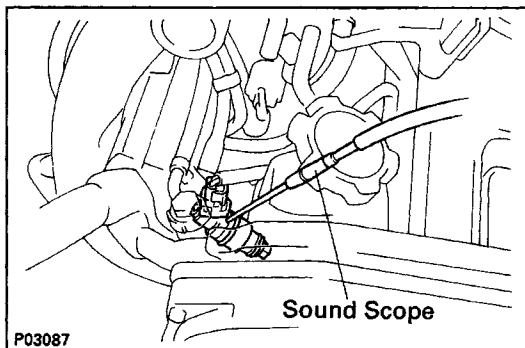
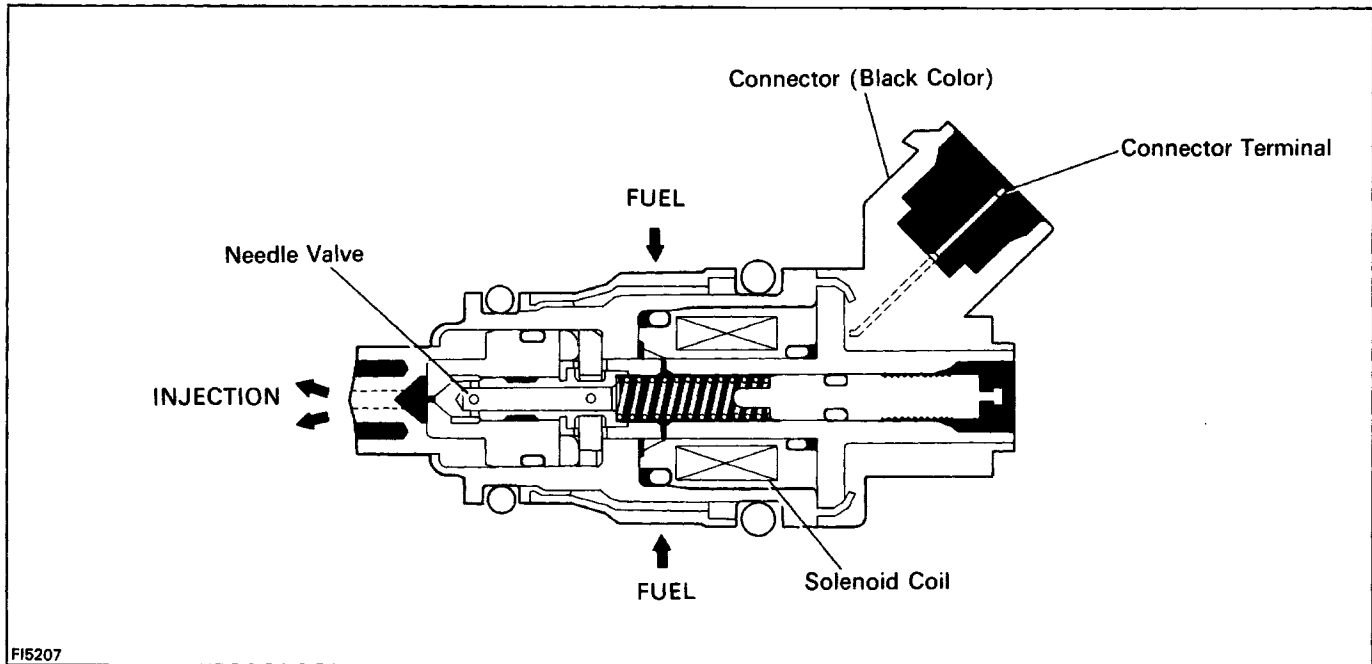
4. CONNECT FUEL RETURN HOSE TO FUEL PRESSURE REGULATOR

5. CONNECT VACUUM SENSING HOSE TO FUEL PRESSURE REGULATOR

6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

7. CHECK FOR FUEL LEAKAGE (See page [FI-10](#))

Injectors (3S-GTE)

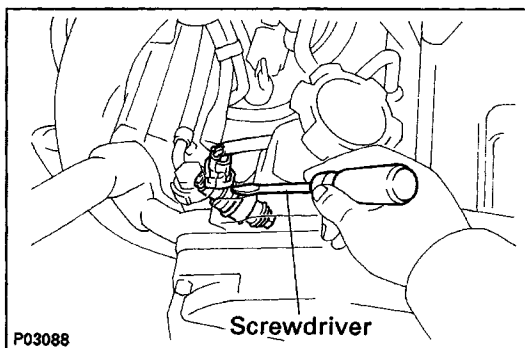


ON-VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

Check operation sound from each injector.

- (a) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine rpm.



- (b) If you have no sound scope, you can check the injector transmission operation with a screwdriver. If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the engine ECU.

2. INSPECT INJECTOR RESISTANCE

- (a) Remove the throttle body.
(See steps 1 to 8, 10 and 11 on pages [FI-194](#) and [195](#))
- (b) Disconnect the injector connector.
- (c) Using an ohmmeter, measure the resistance between the terminals.

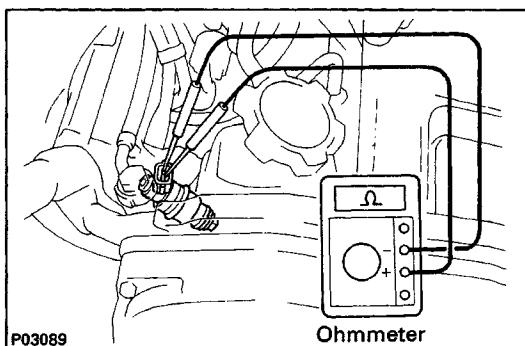
Resistance: 2 – 4

If the resistance is not as specified, replace the injector.

- (d) Reconnect the injector connector.

- (e) Reinstall the throttle body.

(See steps 2, 3 and 5 to 12 on pages [FI-197](#) and [198](#))



REMOVAL OF INJECTORS

1. REMOVE THROTTLE BODY

(See steps 1 to 8, 10 and 11 on pages FI-194 and 195)

2. REMOVE AIR CLEANER

(See step 7 on page EM-224)

3. REMOVE CHARCOAL CANISTER

(See step 20 on page EM-226)

4. REMOVE EGR VSV AND VACUUM MODULATOR

(See step 20 on page EM-121)

5. REMOVE EGR VALVE AND PIPE

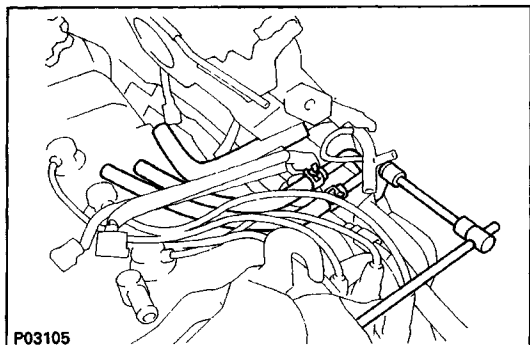
(See step 21 on page EM-121)

6. REMOVE COLD START INJECTOR PIPE

(See step 3 on page FI-146)

7. REMOVE COLD START INJECTOR

(See step 4 on page FI-147)

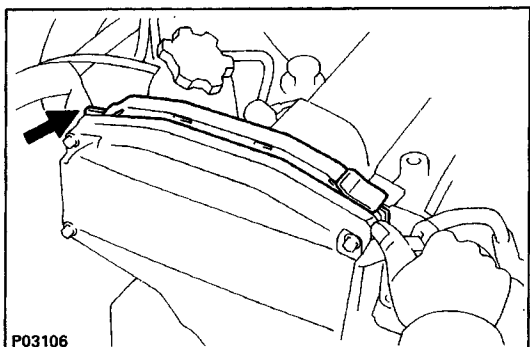


8. REMOVE AIR HOSE

9. DISCONNECT WATER BY-PASS PIPE WITH HOSES

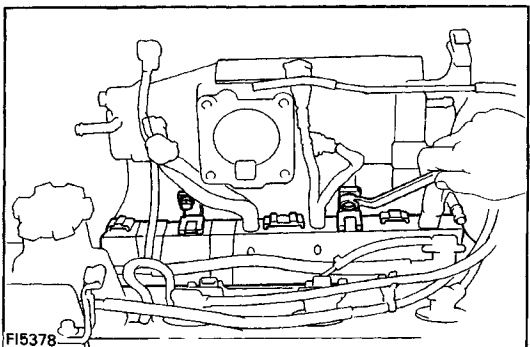
Remove the bolt and disconnect the water by-pass pipe with hoses.

10. DISCONNECT INJECTOR CONNECTORS

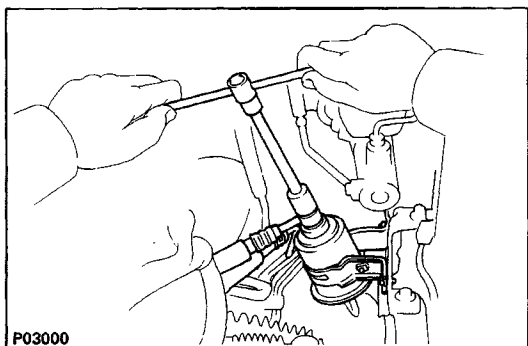


11. DISCONNECT ENGINE WIRE

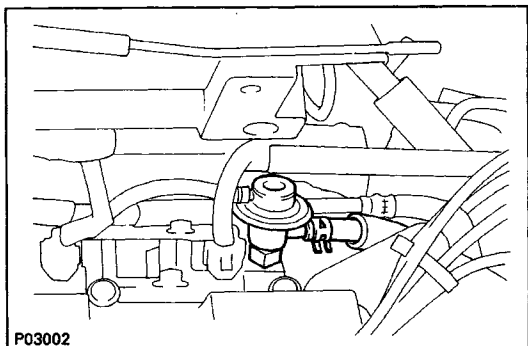
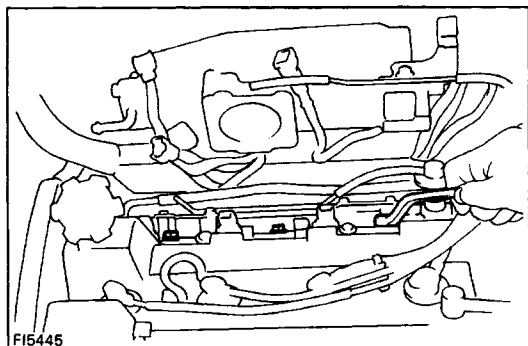
(a) Disconnect the two wire clamps from the mounting bolts of the No.2 timing belt cover.



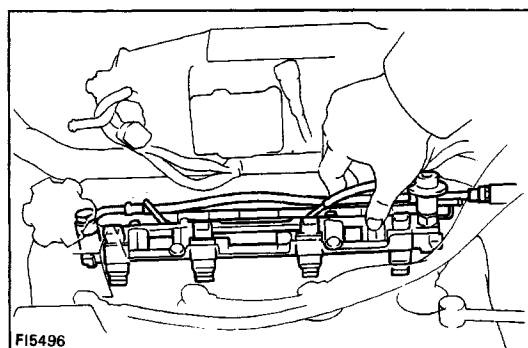
(b) Disconnect the two wire clamps from the wire brackets on the intake manifold.

**12. DISCONNECT FUEL INLET HOSE FROM FUEL FILTER**

Remove the union bolt and two gaskets, and disconnect the inlet hose.

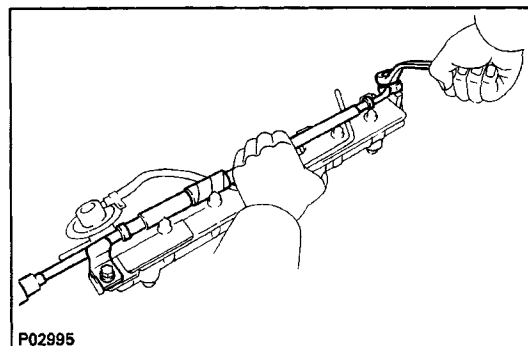
**13. DISCONNECT FUEL RETURN HOSE FROM FUEL PRESSURE REGULATOR****14. REMOVE INJECTOR, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY**

(a) Remove the three bolts holding the delivery pipe to the cylinder head.

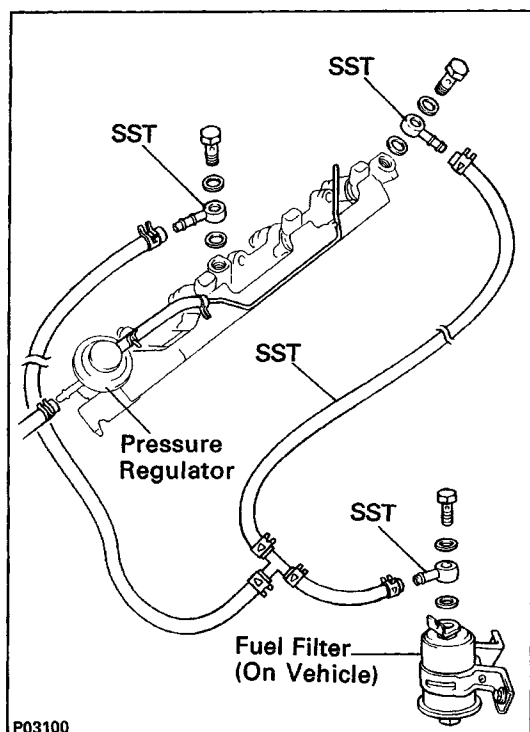


(b) Remove the delivery pipe assembly.

(c) Remove the four insulators and three spacers.

**15. REMOVE FUEL INLET HOSE FROM DELIVERY PIPE**

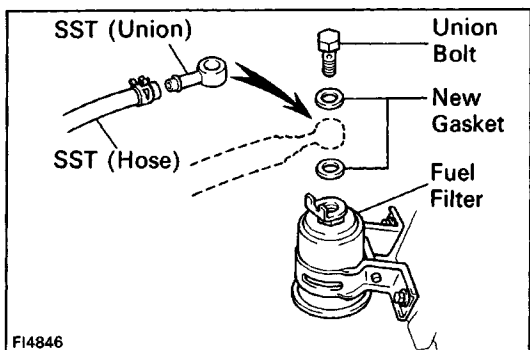
Remove the bolt, union bolt, two gaskets and inlet hose.



INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

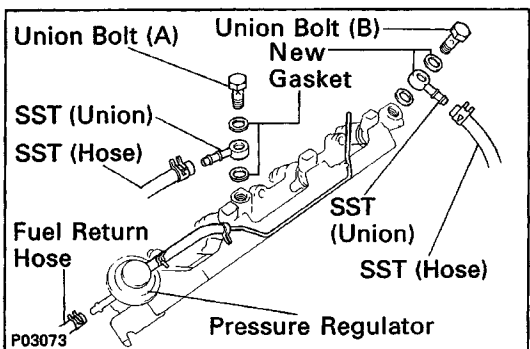
CAUTION: Keep injector clear of sparks during the test.



- (a) Connect SST (union and hose) to the fuel filter outlet with two new gaskets and the union bolt.
SST 09268-41045 (90405-09015)

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

HINT: Use the vehicle's fuel filter.



- (b) Connect the fuel return hose to the fuel outlet of the pressure regulator on the delivery pipe.

- (c) Connect SST (union and hose) to the delivery pipe with four new gaskets and the two union bolts (A and B).

SST 09268-41045 (09268-41080, 90405-09015)

Torque:

A 12 N·m (125 kgf·cm, 9 ft·lbf)

B 29 N·m (300 kgf·cm, 22 ft·lbf)

- (d) Put the injector into the graduated cylinder.

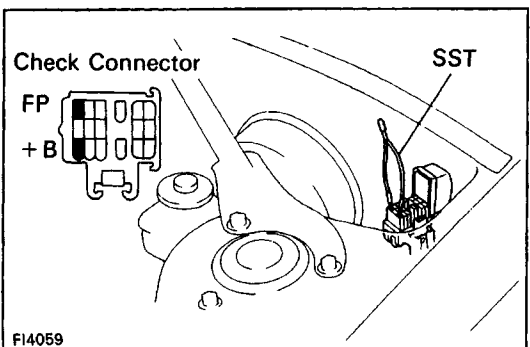
- (e) Using SST, connect terminals + B and FP of the check connector.

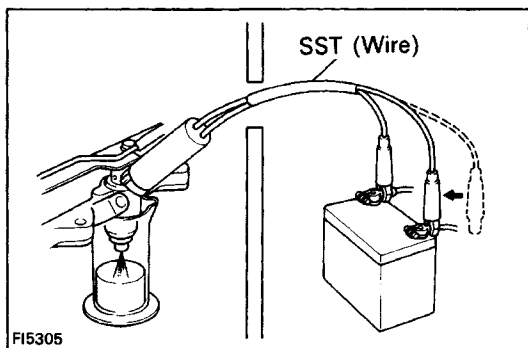
SST 09843-18020

- (f) Reconnect the battery negative (-) cable.

- (g) Turn the ignition switch ON.

NOTICE: Do not start the engine.





- (h) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.

SST 09842-30060

Volume: 95 – 120 cm³ (5.8 – 7.3 cu in.) per 50 sec.

Difference between each injector:

5 cm³ (0.3 cu in.) or less

If the injection volume is not as specified, replace the injector.

2. INSPECT LEAKAGE

- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check for fuel leakage from the injector.

SST 09842-30060

Fuel drop: One drop or less per minute

- (b) Disconnect the battery negative (–) cable.

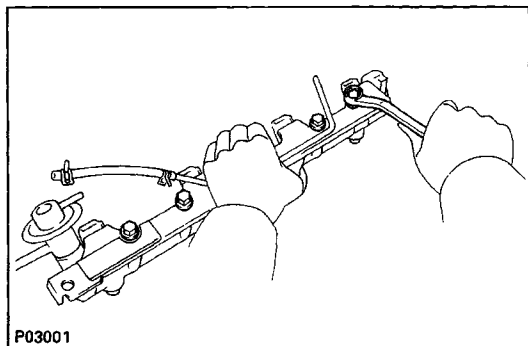
- (c) Remove SST.

SST 09268-41045 and 09843-18020

REPLACEMENT OF INJECTORS

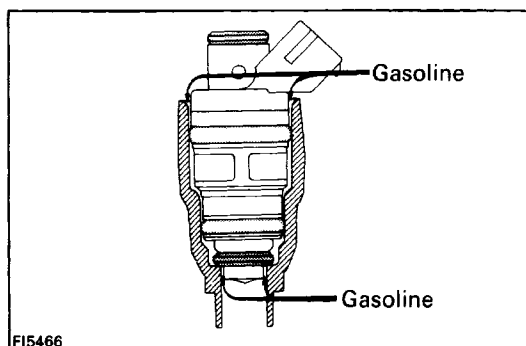
1. REMOVE INJECTOR COVER

- (a) Disconnect the vacuum sensing hose from the pressure regulator.
- (b) Remove the four bolts and injector cover.
- (c) Remove the four insulators from the injectors.



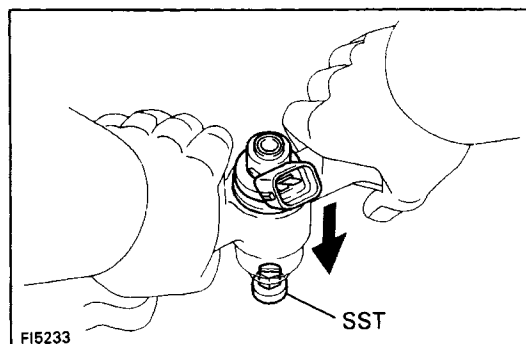
2. REMOVE INJECTORS

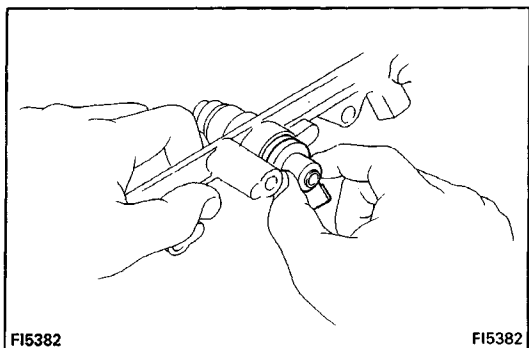
- (a) Apply gasoline between the delivery pipe and injectors.



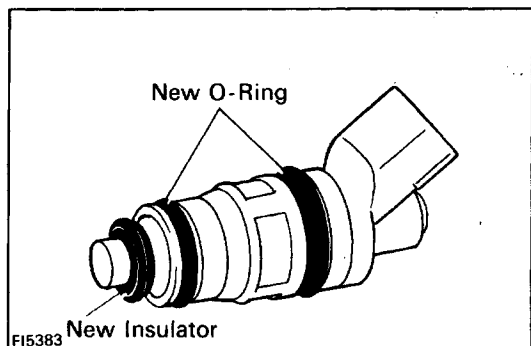
- (b) Using SST, lift up the injector.

SST 09268-74010



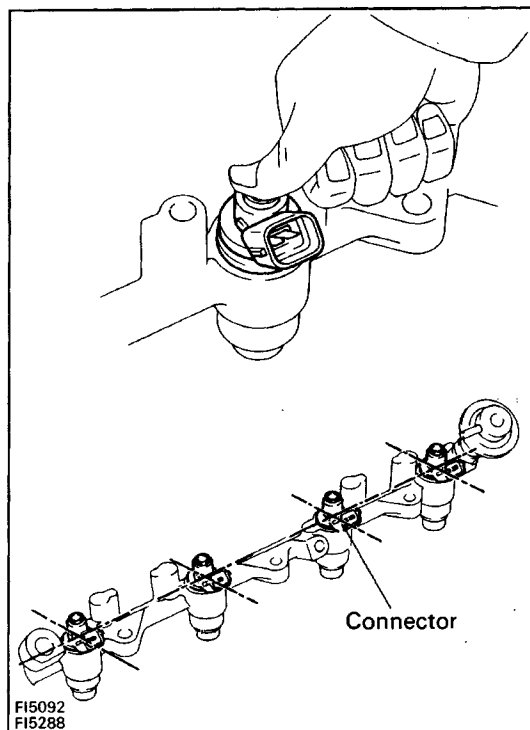


- (c) Pull out the four injectors from the delivery pipe.
- (d) Remove the insulator and two O-rings from each injector.

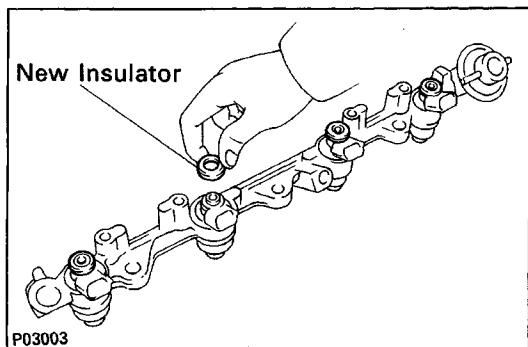


3. INSTALL INJECTORS

- (a) Apply a light coat of gasoline to two new O-rings, and install them to the injector.
- (b) Install new insulator and two O-rings to each injector.

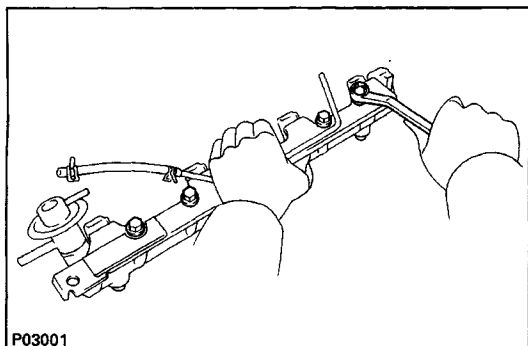


- (c) Push in the four injectors so that the injector connectors are positioned as shown in the illustration.



4. INSTALL INJECTOR COVER

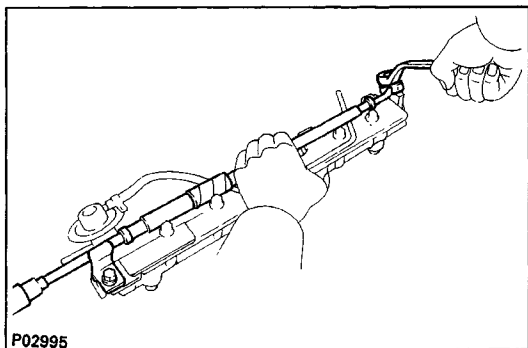
- (a) Place a new insulator on each injector.



(b) Install the injector cover with the four bolts.

Torque: 7.8 N-m (80 kgf-cm, 69 in-lbf)

(c) Connect the vacuum sensing hose to the pressure regulator.



INSTALLATION OF INJECTORS

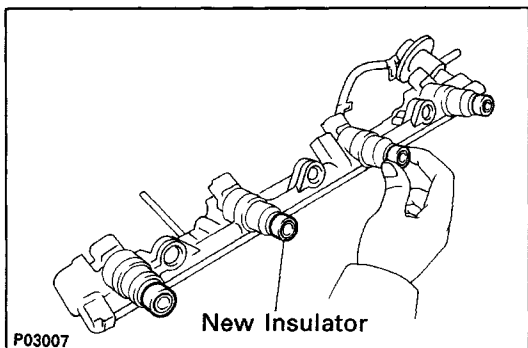
1. INSTALL FUEL INLET HOSE TO DELIVERY PIPE

Install the inlet hose with the bolt, two new gaskets and union bolt.

Torque:

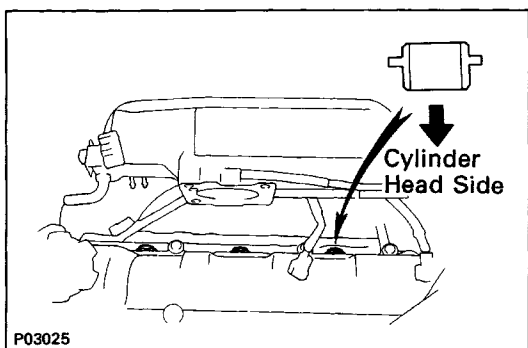
Bolt 7.8 N-m (80 kgf-cm, 69 in.-lbf)

Union bolt 29 N-m (300 kgf-cm, 22 ft-lbf)

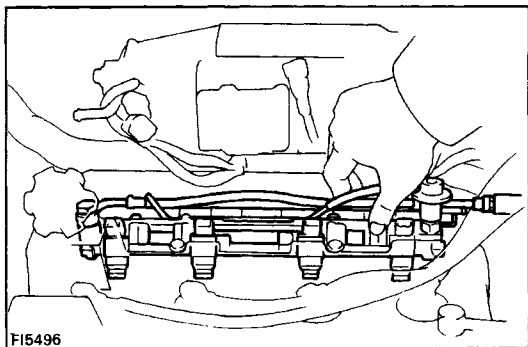


2. INSTALL INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY

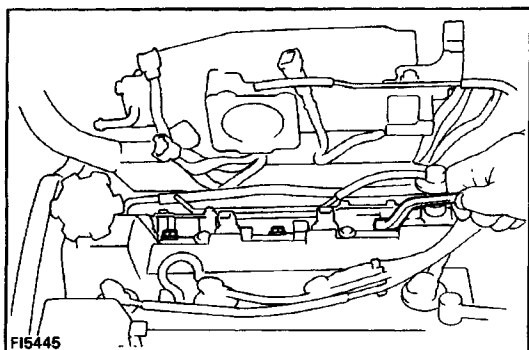
(a) Install a new insulator to each injector.



(b) Place the three spacers in position on the cylinder head.

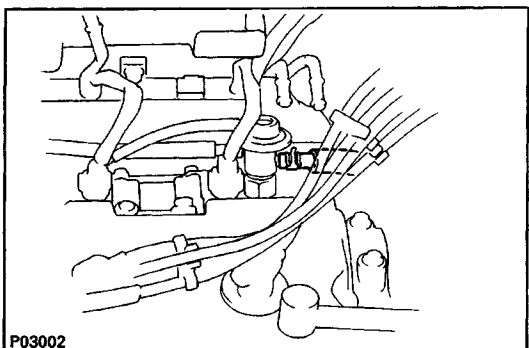


(c) Place the delivery pipe in position on the cylinder head.

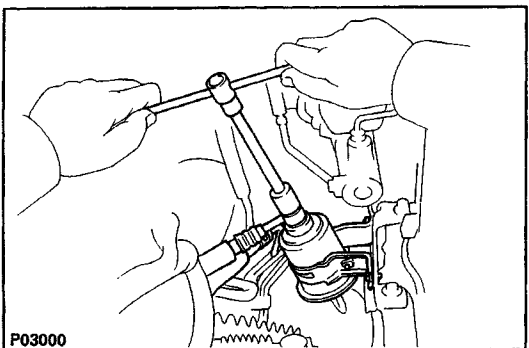


(d) Install the three bolts.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)



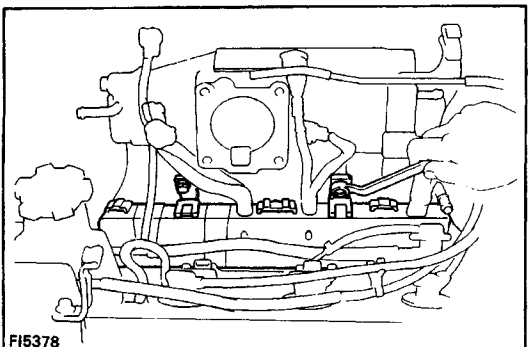
3. CONNECT FUEL RETURN HOSE TO FUEL PRESSURE REGULATOR



4. CONNECT FUEL INLET HOSE TO FUEL FILTER

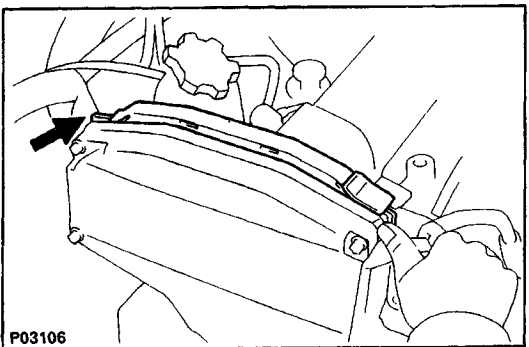
Install the inlet hose with two new gaskets and the union bolt.

Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

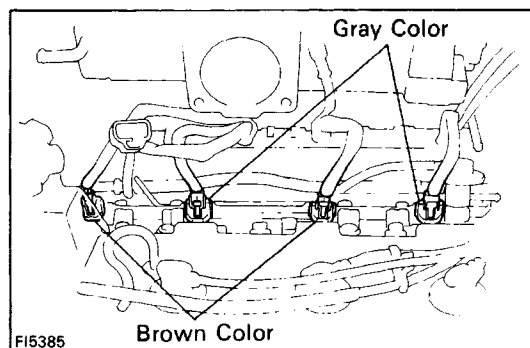


5. INSTALL ENGINE WIRE

(a) Install the two wire clamps to the wire brackets on the intake manifold.



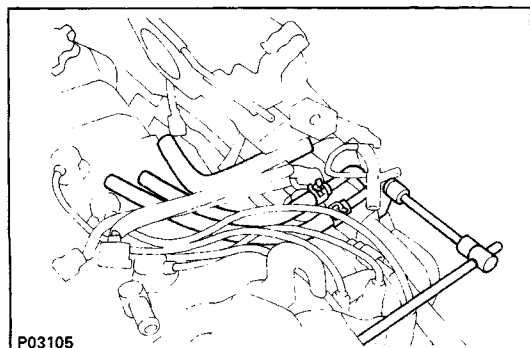
(b) Install the two wire clamps to the mounting bolts of the No.2 timing belt cover.



6. CONNECT INJECTOR CONNECTORS

Connect the injector connectors as shown in the illustration.

HINT: No.1 and No. 3 injector connectors are brown.
No. 2 and No. 4 injector connectors are gray.



7. CONNECT WATER BY-PASS PIPE WITH HOSES

Install the water by-pass pipe with hoses with the bolt.

8. INSTALL AIR HOSE

9. INSTALL COLD START INJECTOR

(See step 1 on page FI-148)

10. INSTALL COLD START INJECTOR PIPE

(See step 2 on page FI-148)

11. INSTALL EGR VALVE AND PIPE

(See step 19 on page EM-145)

12. INSTALL EGR VSV AND VACUUM MODULATOR

(See step 20 on page EM-146)

13. INSTALL CHARCOAL CANISTER

(See step 32 on page EM-264)

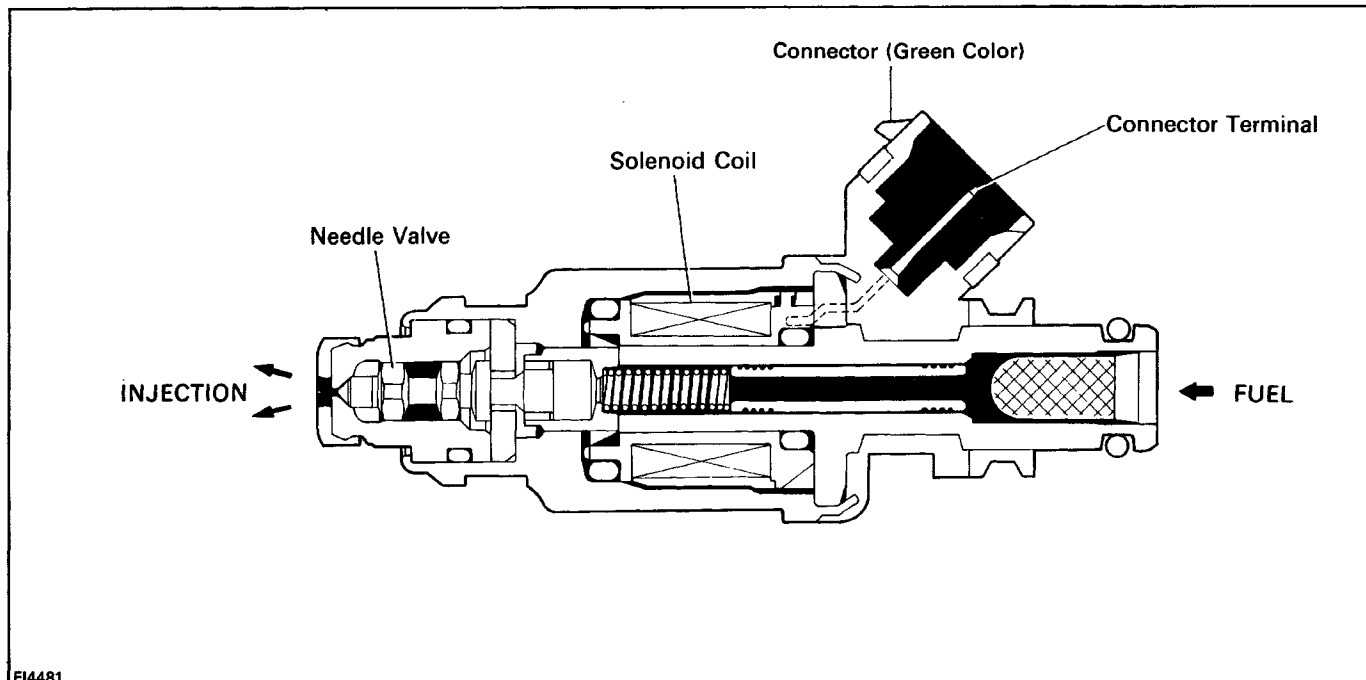
14. INSTALL AIR CLEANER

(See step 45 on page EM-266)

15. INSTALL THROTTLE BODY

(See steps 2, 3 and 5 to 12 on pages FI-197 and 198)

Injectors (5S-FE)



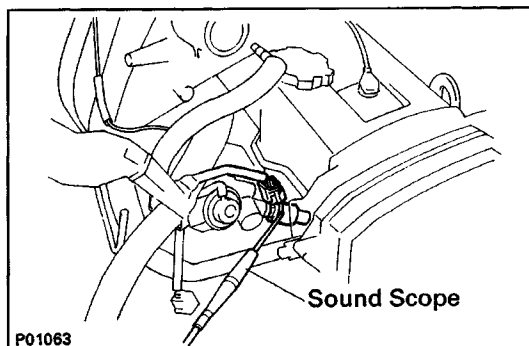
FI4481

ON-VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

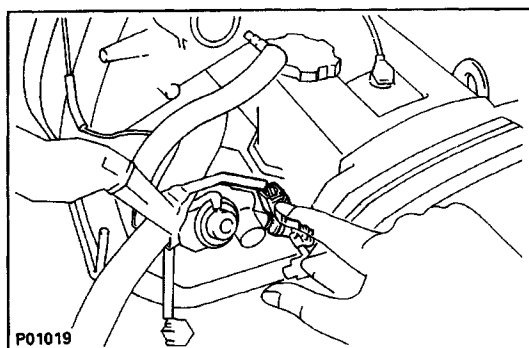
Check operation sound from each injector.

- (a) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine rpm.



P01063

- (b) If you have no sound scope, you can check the injector transmission operation with your finger. If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the ECU.



P01019

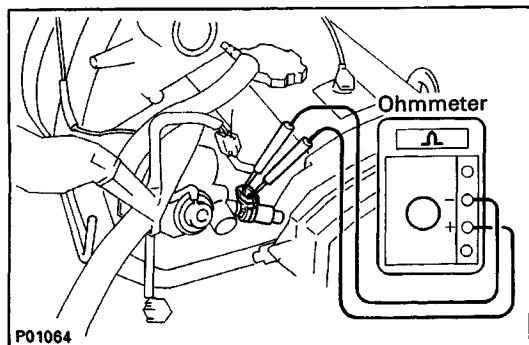
2. INSPECT INJECTOR RESISTANCE

- (a) Disconnect the injector connector.
- (b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: Approx. 13.8

If the resistance is not as specified, replace the injector.

- (c) Reconnect the injector connector.



P01064

REMOVAL OF INJECTORS

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT

3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY

4. (A/T)

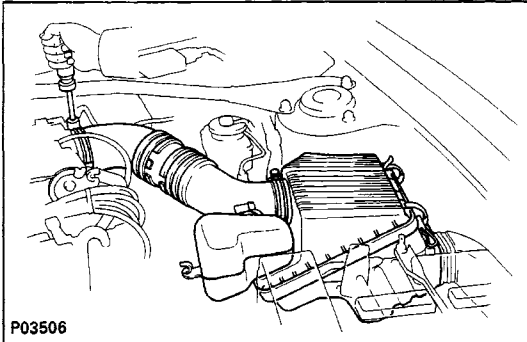
DISCONNECT THROTTLE CABLE FROM THROTTLE BODY

5. REMOVE AIR CLEANER CAP, RESONATOR AND AIR CLEANER HOSE

- Disconnect the air intake temperature sensor connector.
- Disconnect the cruise control actuator cable from the clamp on the resonator.
- Loosen the air cleaner hose clamp bolt.
- Disconnect the four air cleaner cap clips.
- Disconnect the air cleaner hose from the throttle body, and remove the air cleaner cap together with the resonator and air cleaner hose.

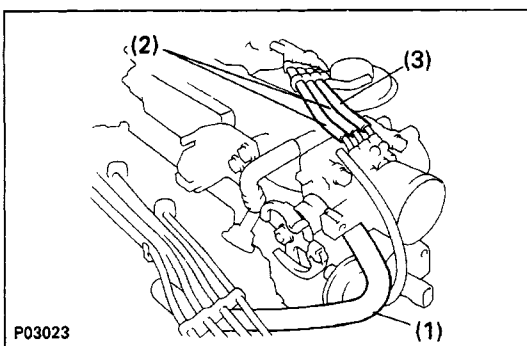
6. REMOVE THROTTLE BODY

- Disconnect throttle position sensor connector.
- Disconnect ISC valve connector.

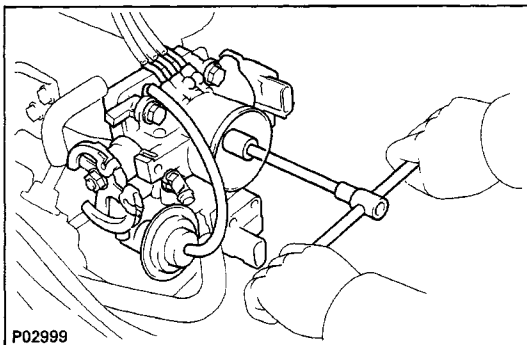


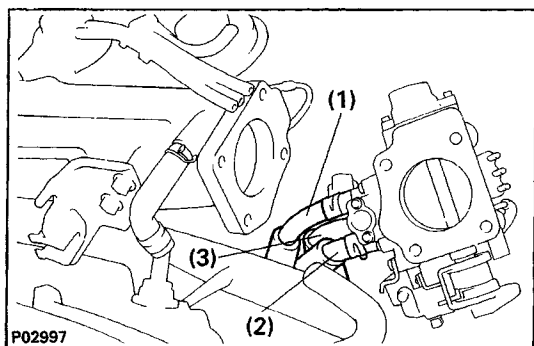
- Disconnect the following hoses from the throttle body:

- PCV hose
- Two vacuum hoses from EGR vacuum modulator
- Vacuum hose from EVAP VSV

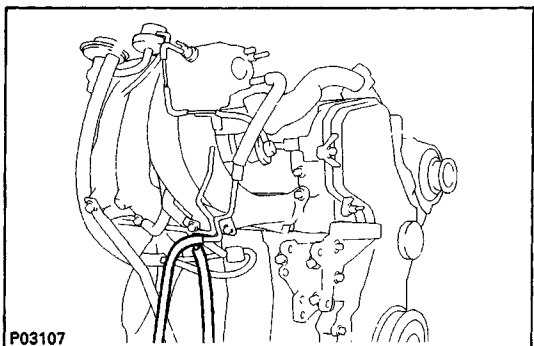


- Remove the four throttle body mounting bolts.

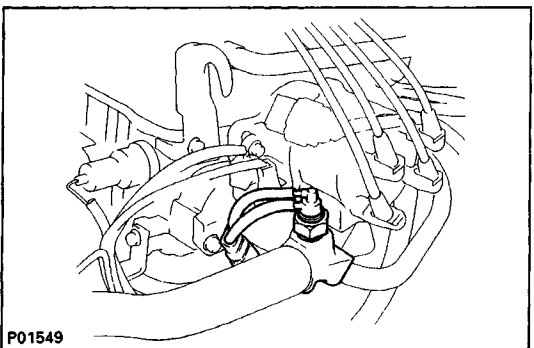




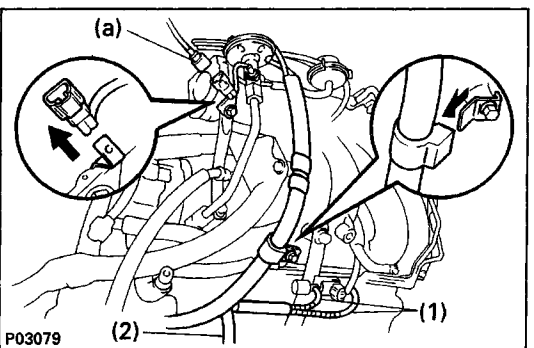
- (e) Disconnect the hoses from the throttle body, and remove the throttle body.
- (1) Water by-pass hose from water outlet
 - (2) Water by-pass hose from water by-pass pipe
 - (3) Air hose from air tube



7. DISCONNECT PS VACUUM HOSES

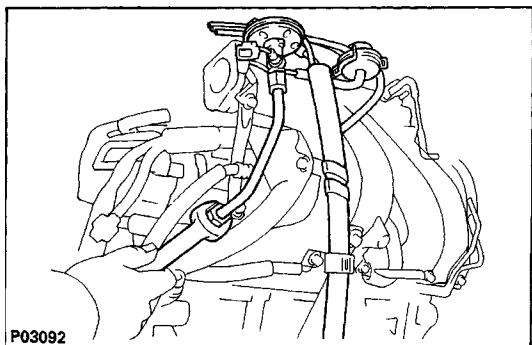


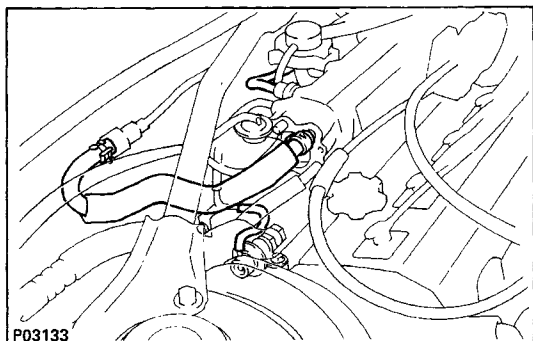
8. DISCONNECT VACUUM HOSES FROM EVAP BVS



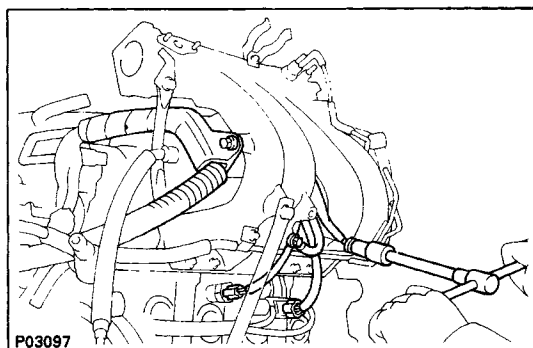
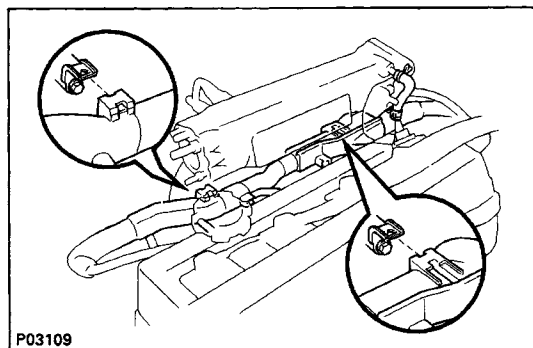
9. REMOVE EGR VALVE AND VACUUM MODULATOR

- (a) (Calif. only)
Disconnect EGR gas temperature sensor connector.
- (b) Remove the following hoses:
 - (1) Two vacuum hoses from EGR VSV
 - (2) Vacuum hose from charcoal canister
- (c) Disconnect the vacuum hose clamp.
- (d) Loosen the union nut of the EGR pipe, and remove two nuts, the EGR valve, vacuum modulator, vacuum hoses assembly and gasket.

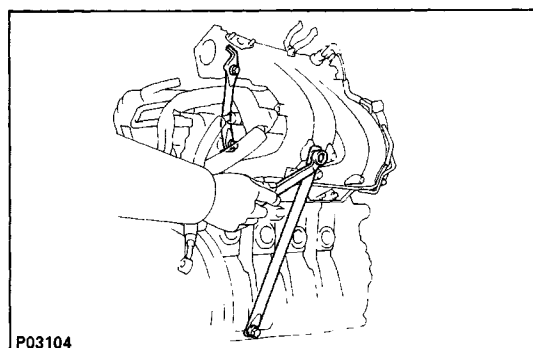


**10. DISCONNECT VACUUM HOSES**

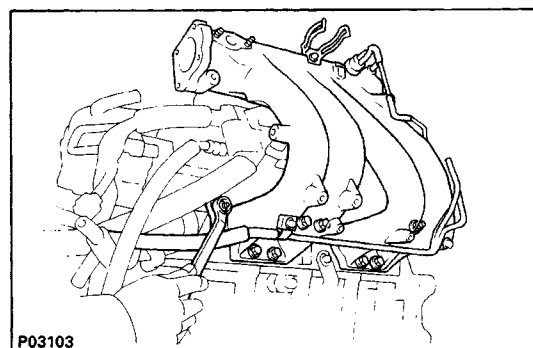
- (a) Vacuum sensor hose from air intake chamber
- (b) Brake booster vacuum hose from air intake chamber
- (c) Vacuum sensing hose

11. (w/ A/C)**DISCONNECT A/C MAGNET SWITCH VSV CONNECTOR****12. DISCONNECT ENGINE WIRE GROUND STRAPS FROM INTAKE MANIFOLD****13. DISCONNECT KNOCK SENSOR AND EGR VSV CONNECTORS****14. REMOVE BOLT AND WIRE CLAMP, AND DISCONNECT ENGINE WIRE HARNESS****15. REMOVE INTAKE MANIFOLD**

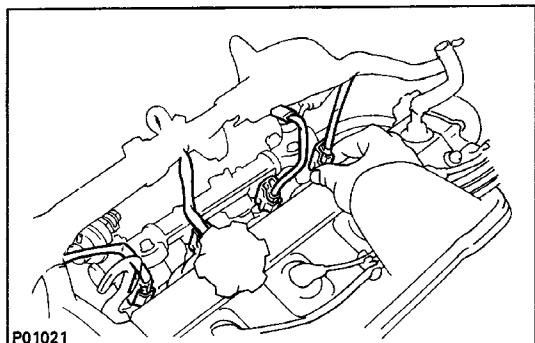
- (a) Disconnect the two wire clamps from the wire brackets on the intake manifold.



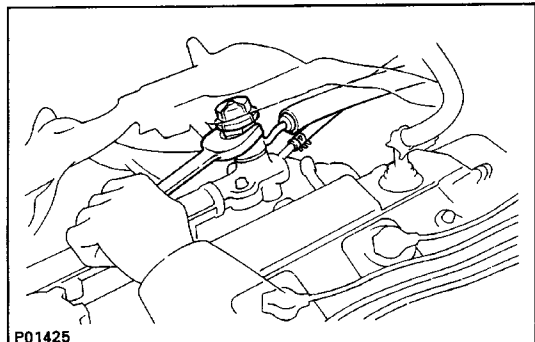
- (b) Remove the four bolts, wire bracket (Calif. only), No.1 air- intake chamber and manifold stays.



- (c) Remove the six bolts, two nuts, intake manifold and gasket.

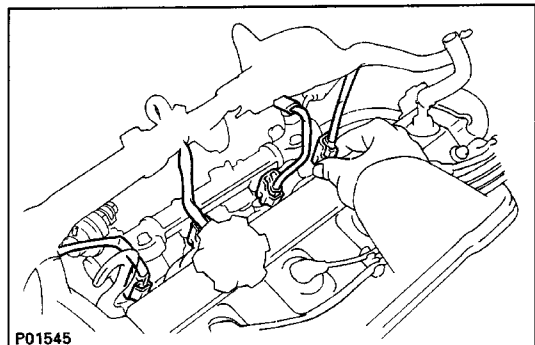


16. DISCONNECT INJECTOR CONNECTORS



17. REMOVE DELIVERY PIPE AND INJECTORS

- (a) Loosen the pulsation damper, and disconnect the fuel inlet pipe.
- (b) Disconnect the fuel return hose.



- (c) Remove the two bolts and delivery pipe together with the four injectors.

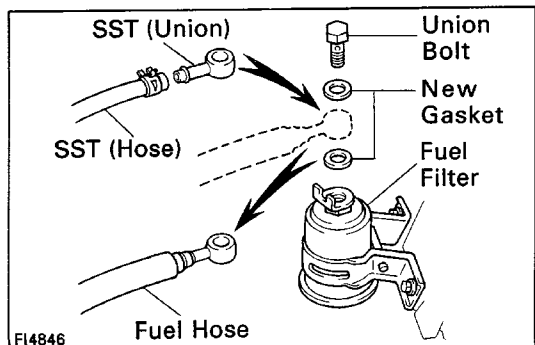
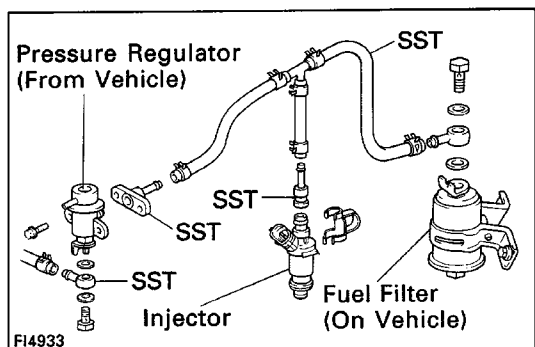
NOTICE: Be careful not to drop the injectors when removing the delivery pipe.

- (d) Remove the four insulators and two spacers from the cylinder head.
- (e) Pull out the four injectors from the delivery pipe.
- (f) Remove the O-ring and grommet from each injector.

INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

CAUTION: Keep injector clear of sparks during the test.

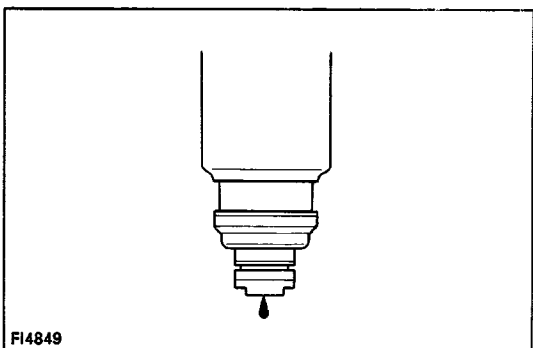
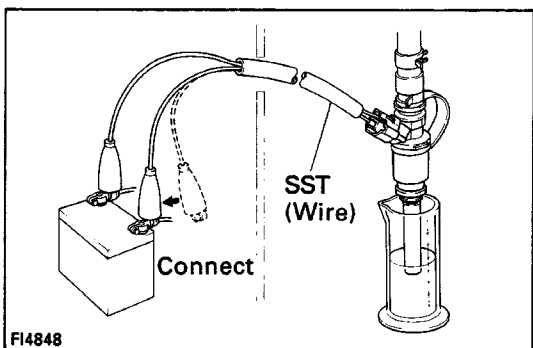
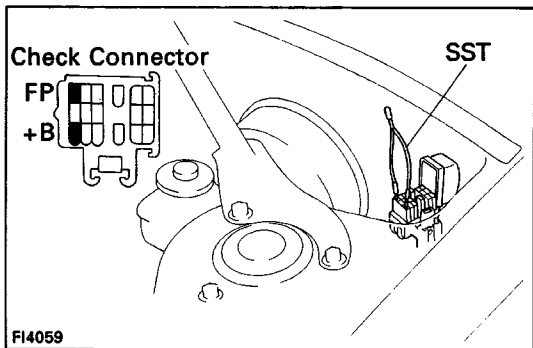
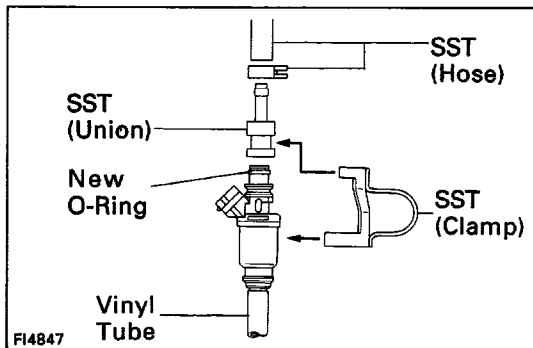
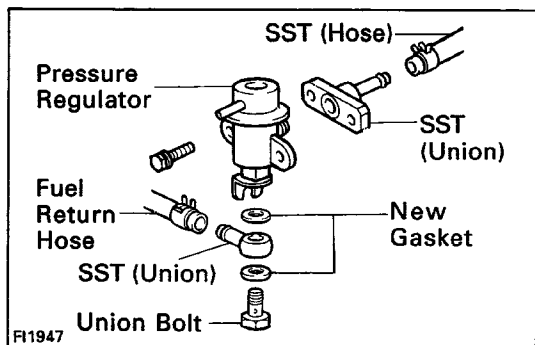


- (a) Disconnect the fuel hose from the fuel filter outlet.
- (b) Connect SST (union and hose) to the fuel filter outlet with two new gaskets and the union bolt.

SST 09268-41045 (90405-09015)

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

HINT: Use the vehicle's fuel filter.



- (c) Install a new O-ring to the fuel inlet of pressure regulator.
 - (d) Connect SST (hose) to the fuel inlet of the pressure regulator with SST (union) and the two bolts.
SST 09268-41045 (09268-41090)
Torque: 5.4 N-m (55 kgf-cm, 48 in.-lbf)
 - (e) Connect the fuel return hose to the fuel outlet of the pressure regulator with SST (union), two new gaskets and union bolt.
SST 09268-41045 (09268-41080)
Torque: 18 N-m (180 kgf-cm, 13 ft-lbf)
 - (f) Install the grommet and a new O-ring to the injector.
 - (g) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268-41045
 - (h) Put the injector into the graduated cylinder.
HINT: Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.
 - (i) Using SST, connect terminals +B and FP of the check connector.
SST 09843-18020
 - (j) Reconnect the battery negative (-) cable.
 - (k) Turn the ignition switch ON.
- NOTICE: Do not start the engine.**

- (l) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.

SST 09842-30070

Volume: 49 – 59 cm³ (3.0 – 3.6 cu in.) per 15 sec.

Difference between each injector:

5 cm³ (0.3 cu in.) or less

If the injection volume is not as specified, replace the injector.

2. INSPECT LEAKAGE

- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.

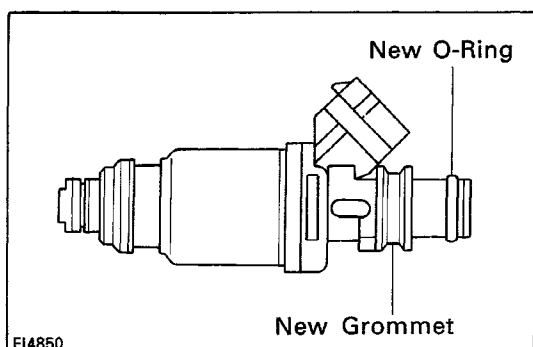
SST 09842-30070

Fuel drop: One drop or less per minute

- (b) Disconnect the battery negative H cable.

- (c) Remove SST.

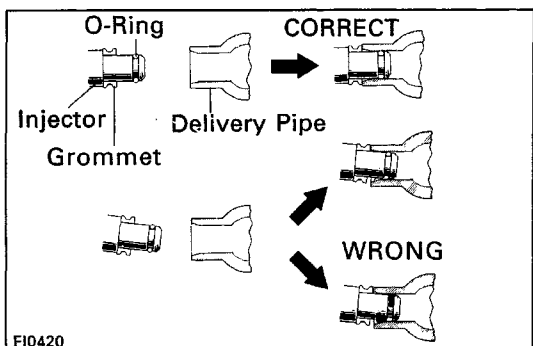
SST 09268-41045 and 09843-18020



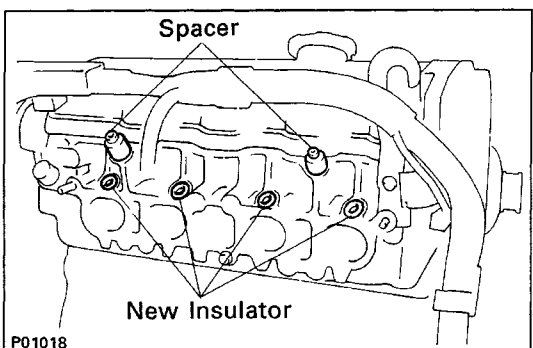
INSTALLATION OF INJECTORS

1. INSTALL INJECTORS AND DELIVERY PIPE

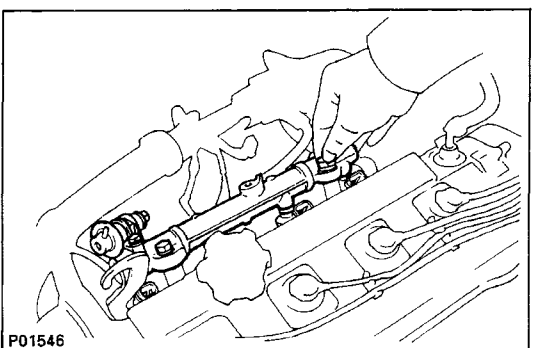
- (a) Install a new grommet to the injector.
- (b) Apply a light coat of gasoline to a new O-ring and install it to the injector.



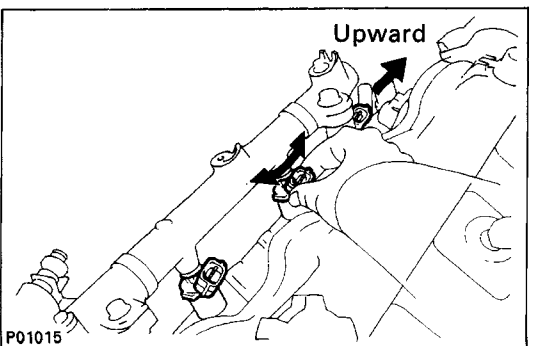
- (e) While turning the injector left and right, install it to the delivery pipes. Install the four injectors.



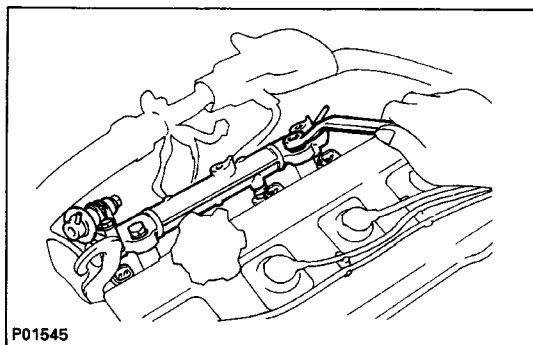
- (d) Place four new insulators and the two spacers in position on the cylinder-head.



- (e) Place the four injectors together with the delivery pipe in position on the cylinder head.
- (f) Temporarily install the two bolts holding the delivery pipe to the cylinder head.

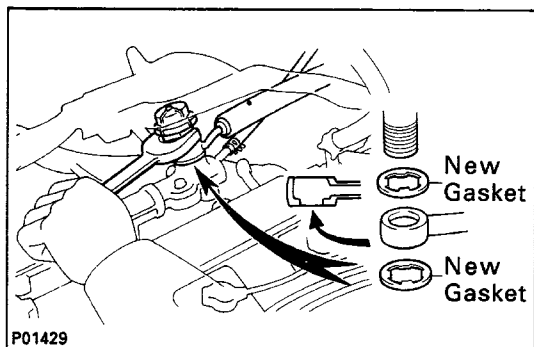


- (g) Check that the injectors rotate smoothly.
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.
- (h) Position the injector connector upward.



- (i) Tighten the two bolts holding the delivery pipe to the cylinder head.

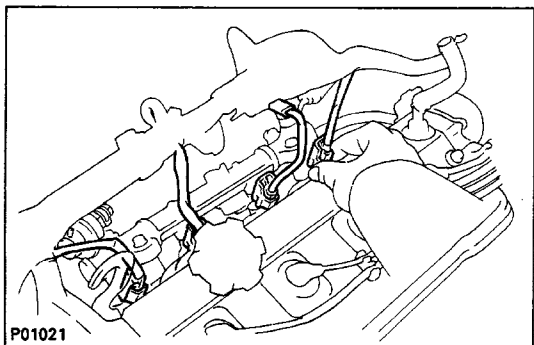
Torque: 13 N-m (130 kgf-cm, 9 ft-lbf)



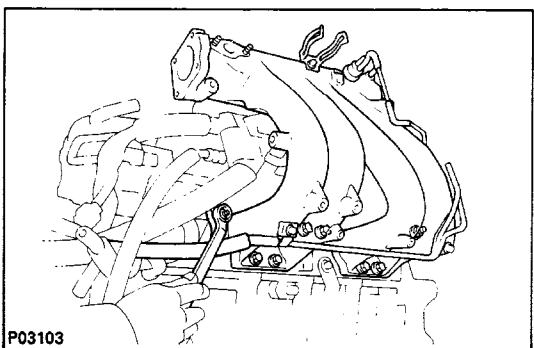
- (j) Connect the fuel return hose.

- (k) Connect the fuel inlet pipe to the delivery pipe with two new gaskets and the pulsation damper.

Torque: 34 N-m (350 kgf-cm, 25 ft-lbf)



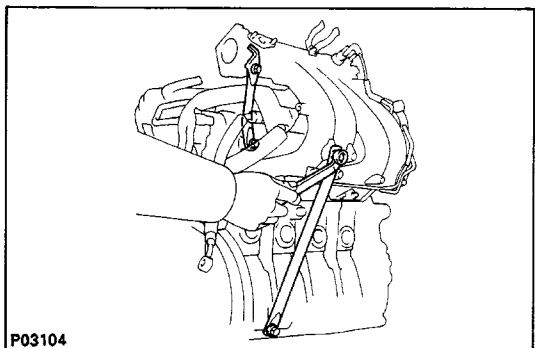
2. CONNECT INJECTOR CONNECTORS



3. INSTALL INTAKE MANIFOLD

- (a) Install a new gasket and the intake manifold with the six bolts and two nuts. Uniformly tighten the bolts and nuts in several passes.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

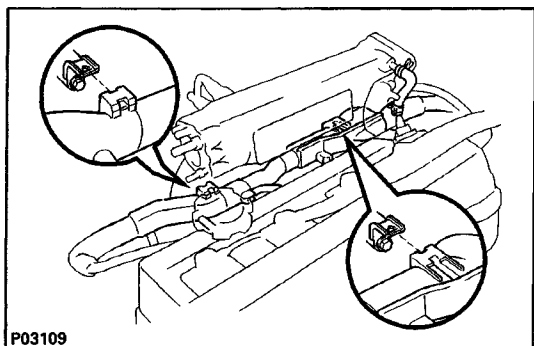


- (b) Install the No.1 air intake chamber and manifold stays, wire bracket (Calif. only) with the four bolts.

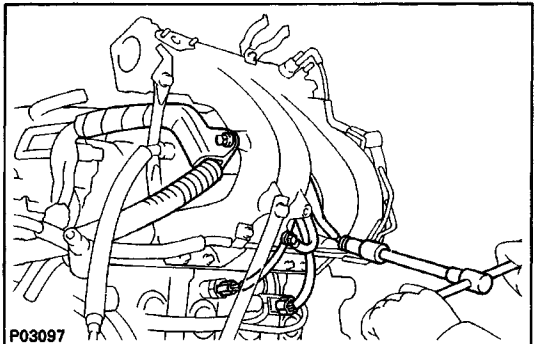
Torque:

14 mm head bolt 42 N-m (425 kgf-cm, 31 ft-lbf)

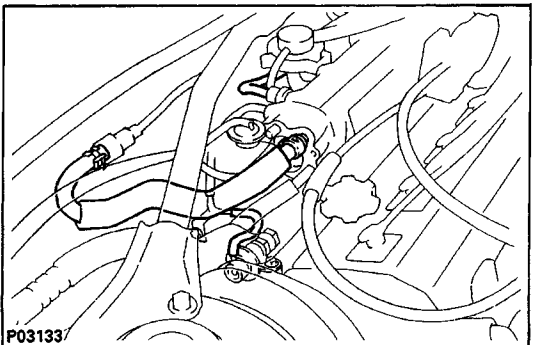
12 mm head bolt 22 N-m (220 kgf-cm, 16 ft-lbf)



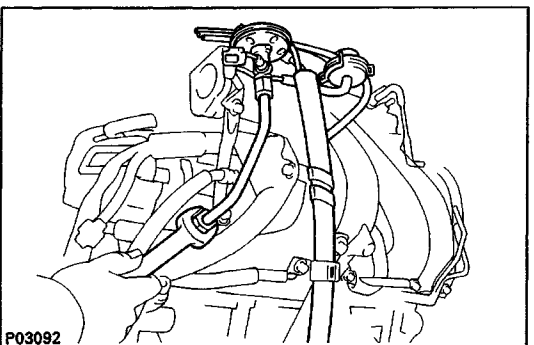
- (c) Connect the two wire clamps to the wire brackets on the intake manifold.



4. CONNECT ENGINE WIRE HARNESS WITH WIRE CLAMP AND BOLT
5. CONNECT KNOCK SENSOR AND EGR VSV CONNECTORS
6. CONNECT TWO ENGINE WIRE GROUND STRAP TO INTAKE MANIFOLD



7. (w/ A/C)
CONNECT A/C MAGNET SWITCH VSV CONNECTOR
8. CONNECT VACUUM HOSES
 - (a) Vacuum sensor hose to air intake chamber.
 - (b) Brake booster vacuum hose to air intake chamber.
 - (c) Vacuum sensing hose.



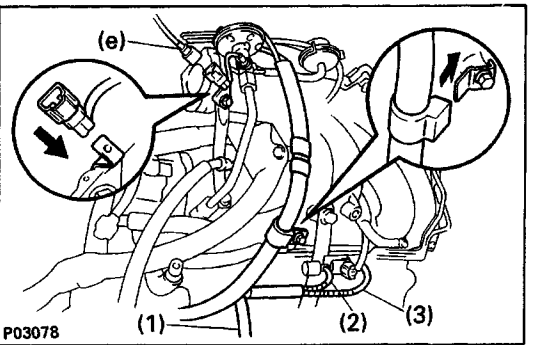
9. INSTALL EGR VALVE AND VACUUM MODULATOR
 - (a) Install a new gasket and the EGR valve with the union nut and two nuts.

Torque:

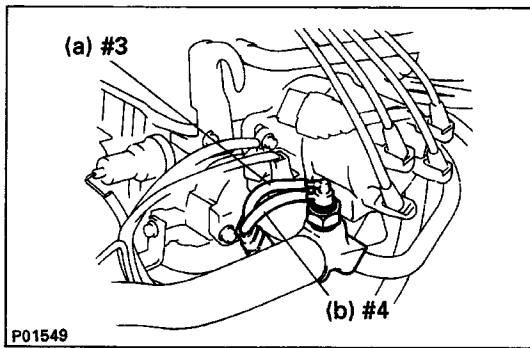
Union nut 59 N·m (600 kgf·cm, 43 ft·lbf)

Nut 13 N·m (130 kgf·cm, 9 ft·lbf)

 - (b) Install the EGR modulator to the clamp.



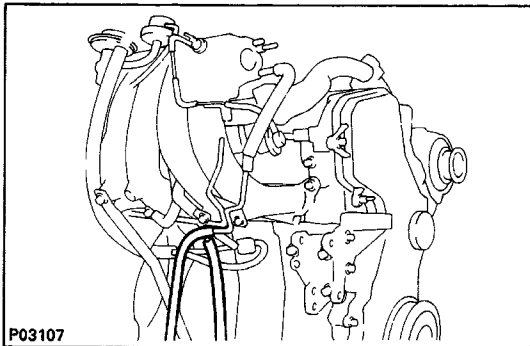
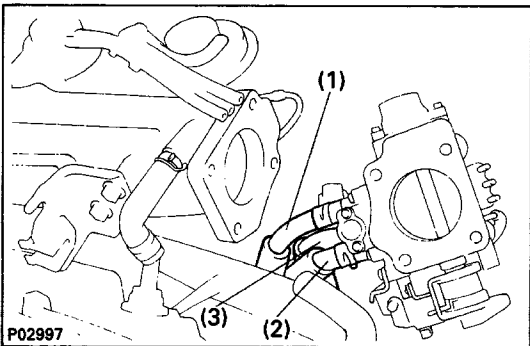
- (c) Connect the vacuum hose clamp.
- (d) Connect the following hoses:
 - (1) Vacuum hose to charcoal canister
 - (2) Vacuum hose (from EGR valve) to E port of EGR VSV
 - (3) Vacuum hose (from Q port EGR vacuum modulator) to G port of EGR VSV
- (e) (Calif. only)
Connect the EGR gas temperature sensor connector.

**10. CONNECT TWO VACUUM HOSES TO EVAP BSV**

(a) To P port of throttle body

(b) To charcoal canister

HINT: Hose Nos. are indicated in the illustration.

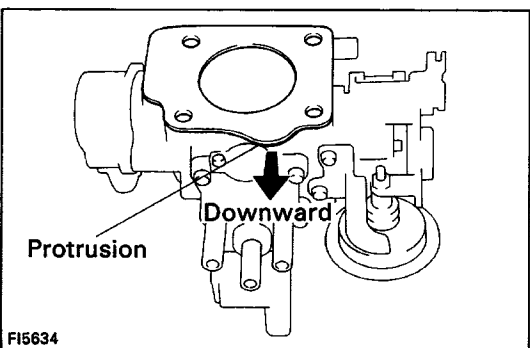
**11. CONNECT TWO PS VACUUM HOSES****12. INSTALL THROTTLE BODY**

(a) Connect the following hoses to the throttle body:

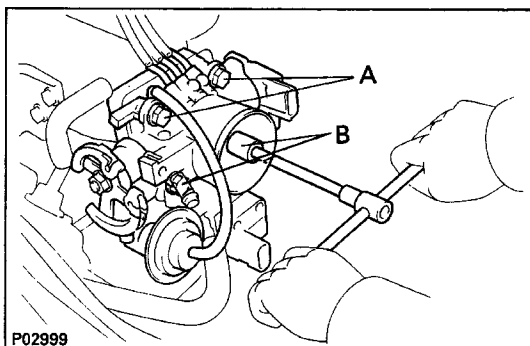
Water by-pass hose to water outlet

(2) Water by-pass hose to water by-pass pipe

(3) Air hose to air tube



(b) Place a new gasket on the throttle body, facing the protrusion downward.



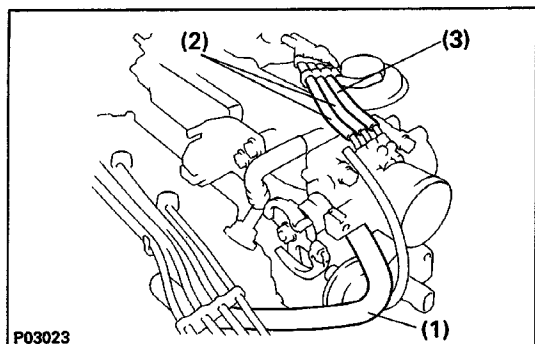
(c) Install the throttle body with the four bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

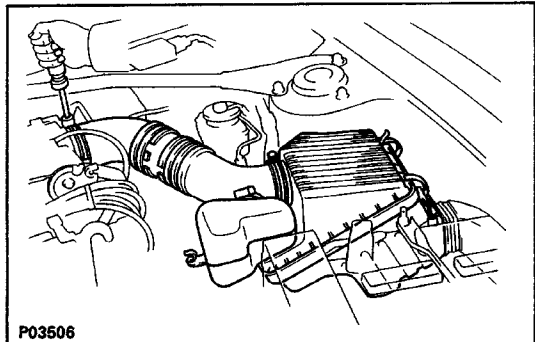
HINT: Each bolt is indicated in the illustration.

Bolt length: A 45 mm (1.77 in.)

B 55 mm (2.17 in.)



- (d) Connect the following hoses to the throttle body:
 - (1) PCV hose
 - (2) Two vacuum hoses to EGR vacuum modulator
 - (3) Vacuum hose to EGR VSV
- (e) Connect the ISC valve connector.
- (f) Connect the throttle position sensor connector.



13. INSTALL AIR CLEANER CAP, RESONATOR AND AIR CLEANER HOSE

- (a) Connect the air cleaner hose to the throttle body.
- (b) Install the air cleaner cap together with the resonator and air cleaner hose.
- (c) Connect the air intake temperature sensor connector.
- (d) Connect the cruise control actuator cable to the clamp on the resonator.

14. (A/T)

CONNECT THROTTLE CABLE, AND ADJUST IT

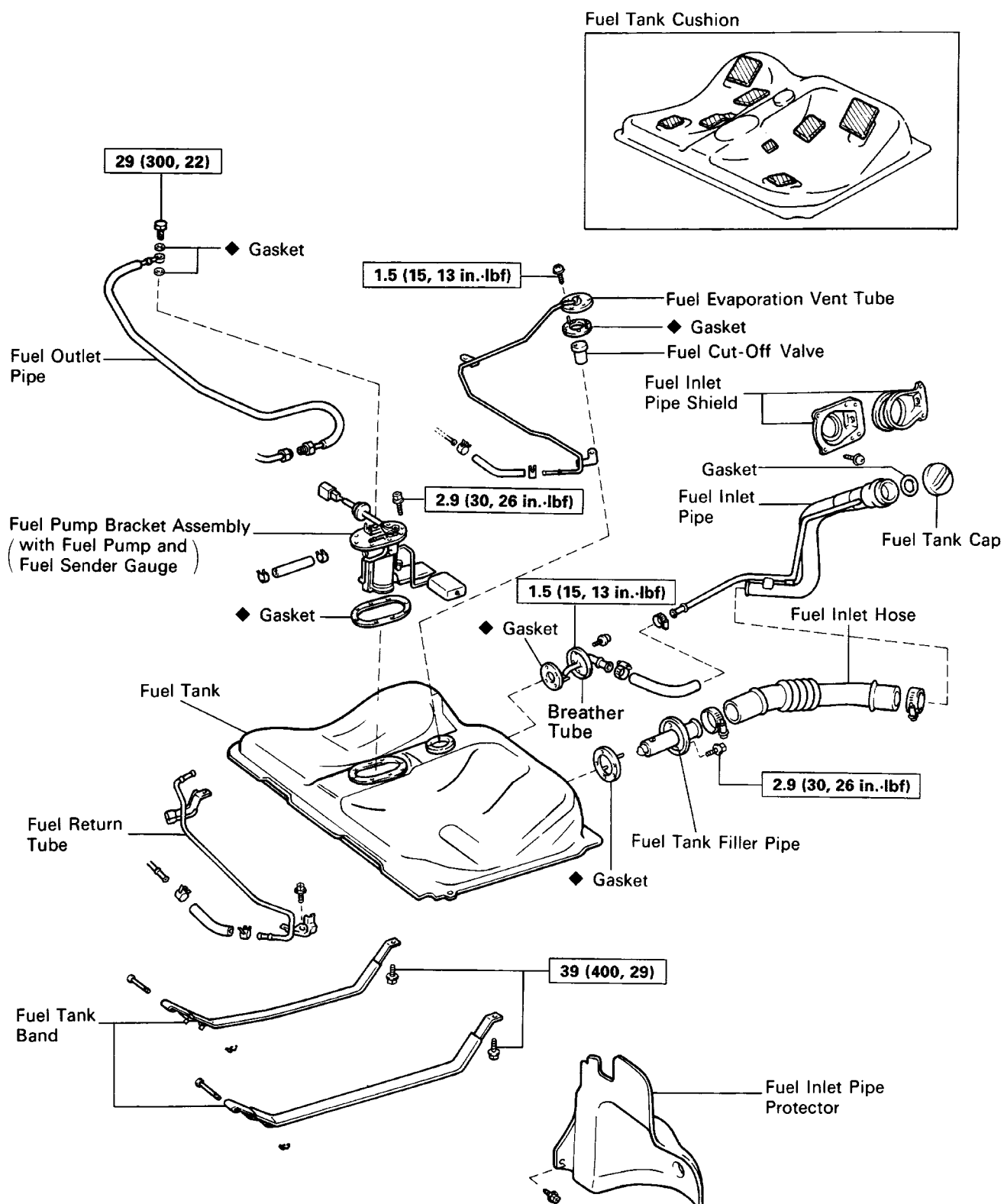
15. CONNECT ACCELERATOR CABLE, AND ADJUST IT

16. FILL WITH ENGINE COOLANT (See page [CO-6](#))

17. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

Fuel Tank and Lines

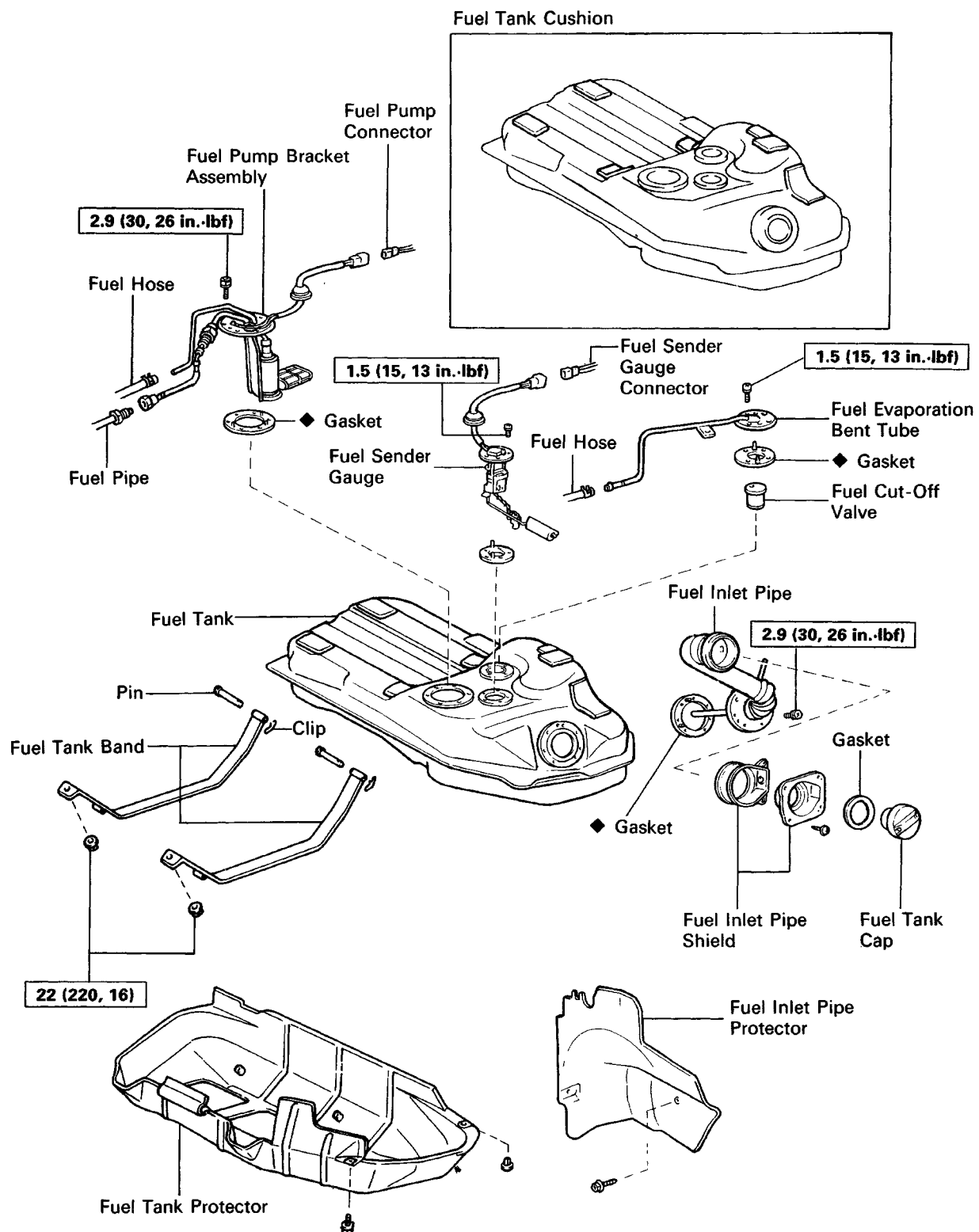
COMPONENTS (4A-FE AND 5S-FE)



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

COMPONENTS (3S-GTE)

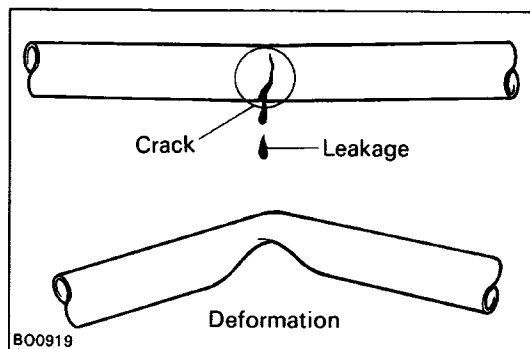


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

PRECAUTIONS

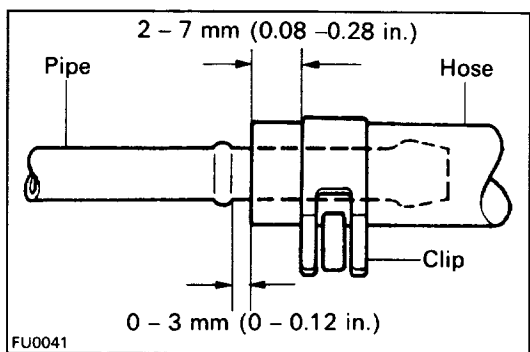
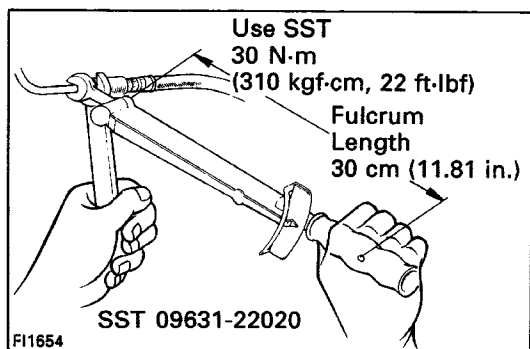
1. Always use new gaskets when replacing the fuel tank or component parts.
2. Apply the proper torque to all parts tightened.



INSPECT FUEL LINES AND CONNECTIONS

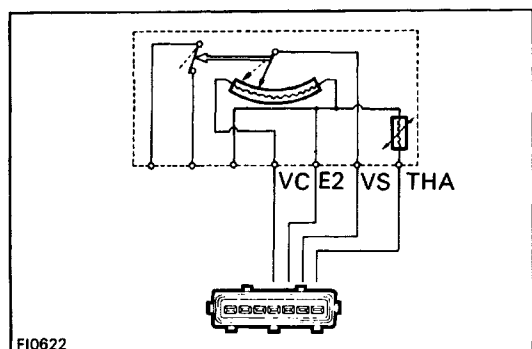
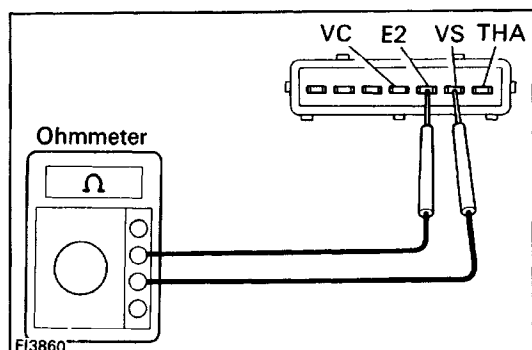
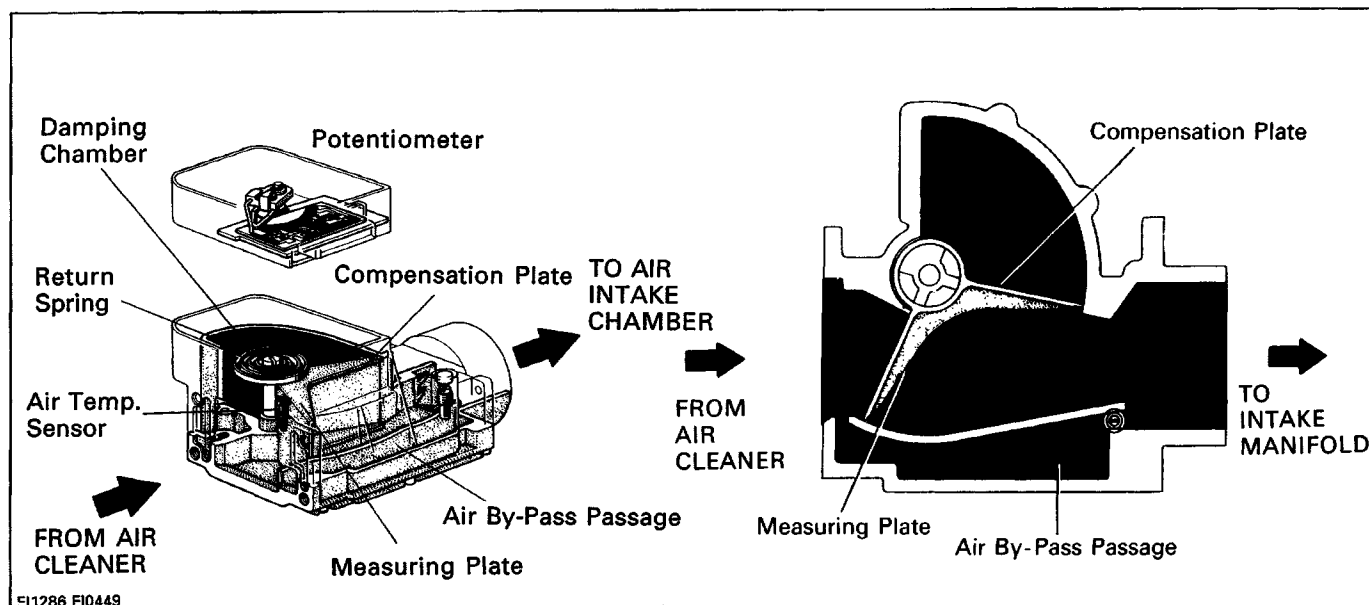
- (a) Check the fuel lines for cracks or leakage, and all connections for deformation.
- (b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.
- (c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
- (d) Check the filler neck for damage or fuel leakage.
- (e) Hose and tube connections are as shown in the illustration.

If a problem is found, repair or replace the parts as necessary.



AIR INDUCTION SYSTEM

Air Flow Meter (3S-GTE)



ON-VEHICLE INSPECTION

INSPECT RESISTANCE OF AIR FLOW METER

- Disconnect the air flow meter connector.
- Using an ohmmeter, measure the resistance between each terminal.

Between terminals	Resistance	Temperature
VS - E2	200 - 600 Ω	-
VC - E2	200 - 400 Ω	-
THA - E2	10 - 20 k Ω	-20°C (-4°F)
	4 - 7 k Ω	0°C (32°F)
	2 - 3 k Ω	20°C (68°F)
	0.9 - 1.3 k Ω	40°C (104°F)
	0.4 - 0.7 k Ω	60°C (140°F)

If the resistance is not as specified, replace the air flow meter.

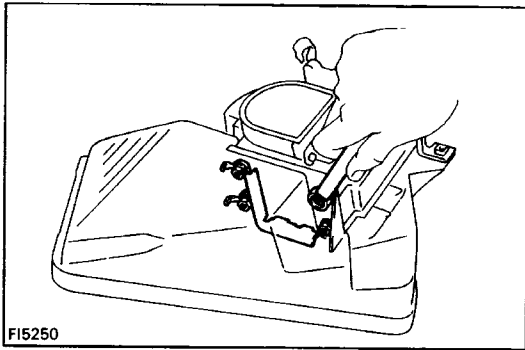
- Reconnect the air flow meter connector.

REMOVAL OF AIR FLOW METER

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. DISCONNECT AIR FLOW METER CONNECTOR



3. DISCONNECT AIR CLEANER HOSE FROM AIR FLOW METER
4. REMOVE AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY
5. REMOVE AIR FLOW METER FROM AIR CLEANER CAP
 - (a) Pry off the lock plates.
 - (b) Remove the bolt, four nuts, air flow meter and gasket.

INSPECTION OF AIR FLOW METER

INSPECT AIR FLOW METER

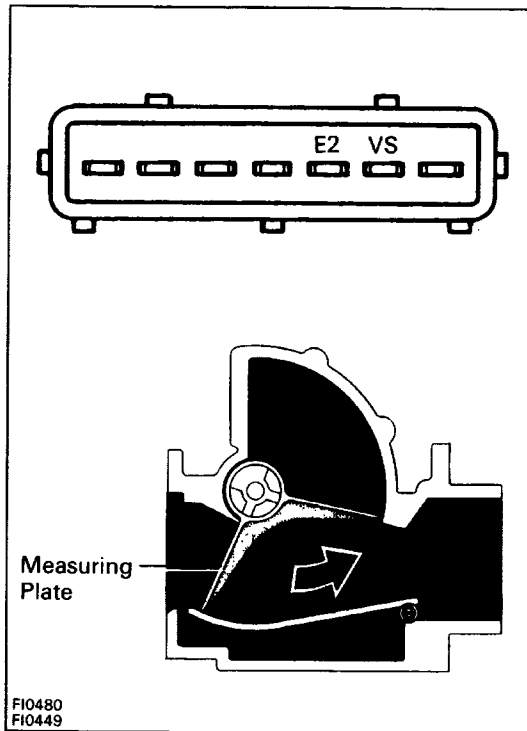
Using an ohmmeter, measure the resistance between terminals VS and E2 by moving the measuring plate.

Resistance: 200– 600 at fully closed

20 –1,200 at fully open

HINT: Resistance will change in a wave pattern as the measuring plate slowly opens.

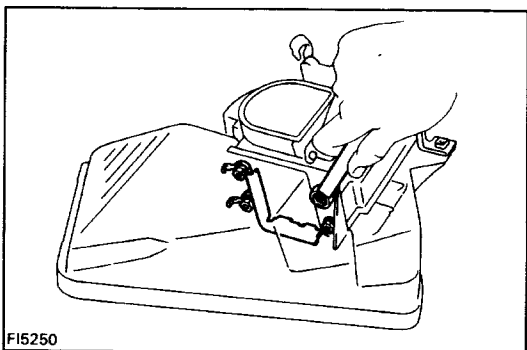
If the resistance is not as specified, replace the air flow meter.



INSTALLATION OF AIR FLOW METER

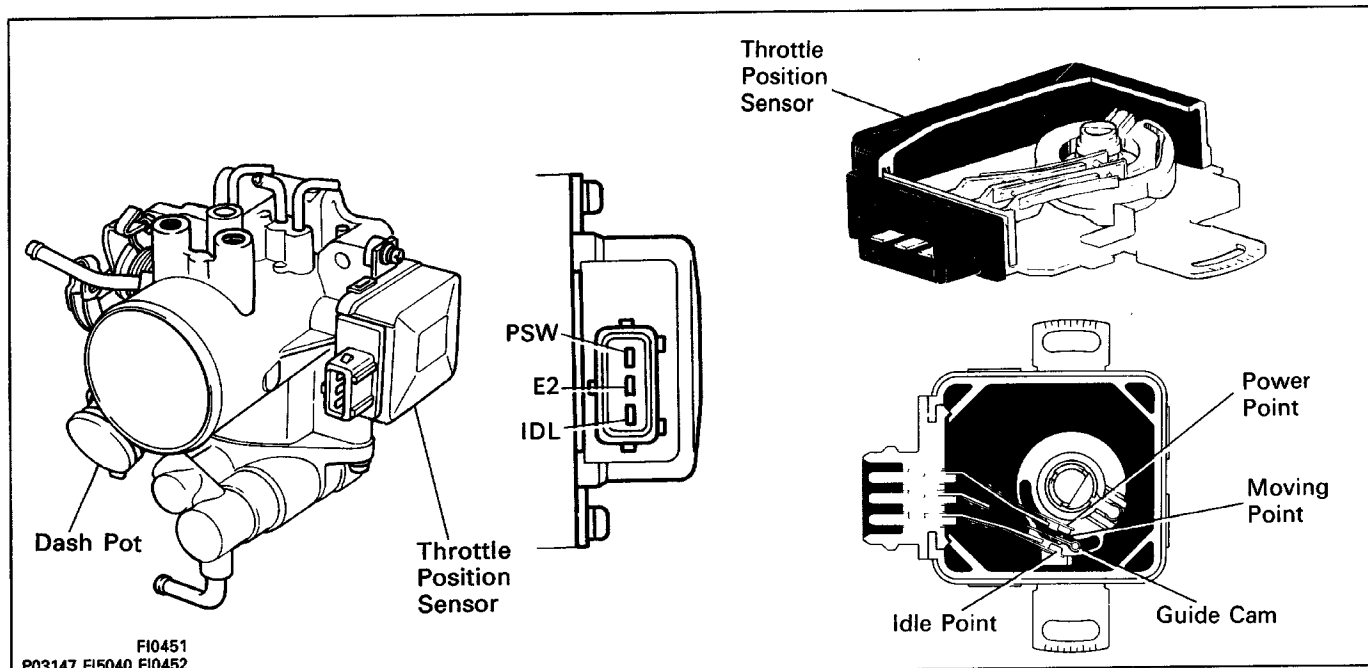
1. INSTALL AIR FLOW METER TO AIR CLEANER CAP

- (a) Install a new gasket and the air flow meter with the bolt, two lock plates and four nuts.
- (b) Pry the lock plates.



2. INSTALL AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY
3. CONNECT AIR CLEANER HOSE TO AIR FLOW METER
4. CONNECT AIR FLOW METER CONNECTOR
5. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

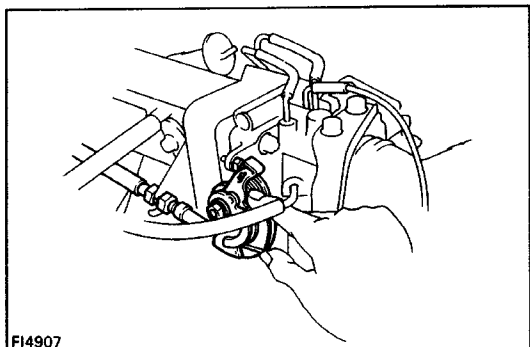
Throttle Body (4A-FE)



ON-VEHICLE INSPECTION

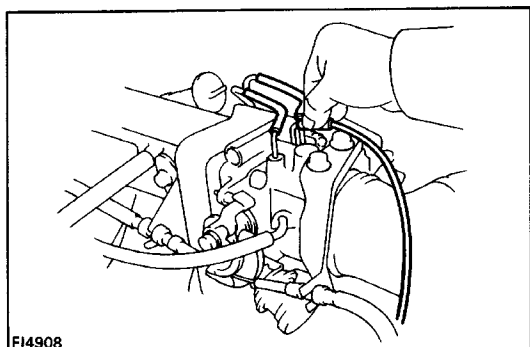
1. INSPECT THROTTLE BODY

(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

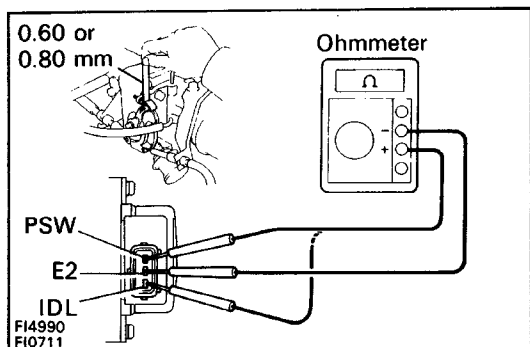
- Start the engine.
- Check the vacuum with your finger.



Port name	At idle	Other than idle
P	No vacuum	Vacuum
E	No vacuum	Vacuum
R	No vacuum	Vacuum

2. INSPECT THROTTLE POSITION SENSOR

- Disconnect the sensor connector.
- Insert a thickness gauge between the throttle stop screw and stop lever.
- Using an ohmmeter, measure the resistance between each terminal.



Clearance between lever and stop screw	Continuity between terminals	
	I D L – E2	PSW – E2
0.60 mm (0.024 in.)	Continuity	No continuity
0.80 mm (0.031 in.)	No continuity	No continuity
Throttle valve fully open	No continuity	Continuity

(d) Reconnect the sensor connector.

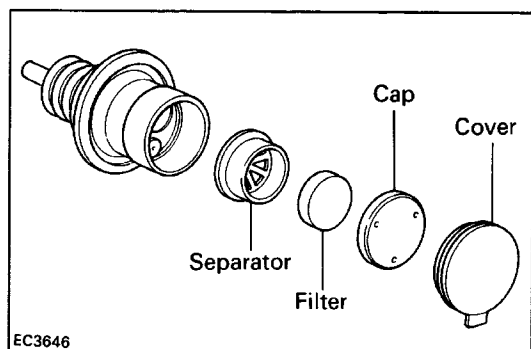
3. INSPECT AND ADJUST DASH POT (DP)

A. Warm up engine

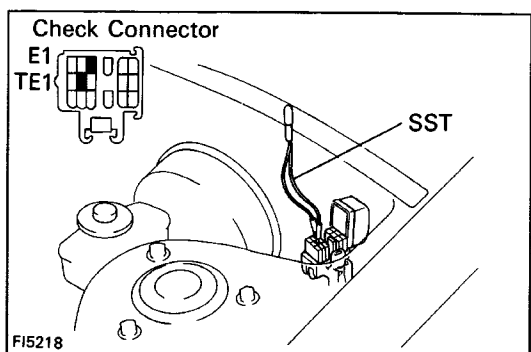
Allow the engine to warm up to normal operating temperature.

B. Check idle speed

Idle speed: 800 ± 50 rpm

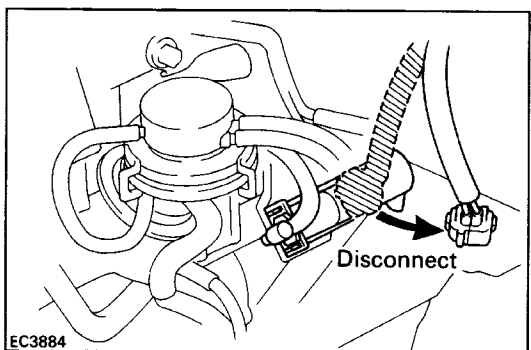


C. Remove cover, cap, filter and separator from DP

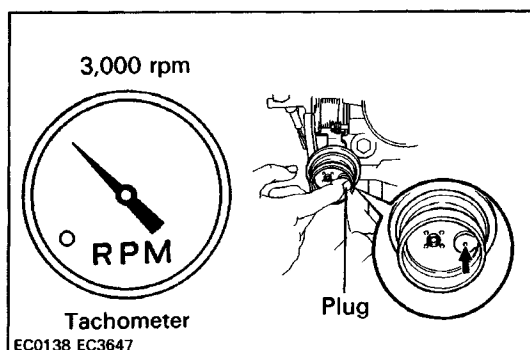


D. Check and adjust DP setting speed

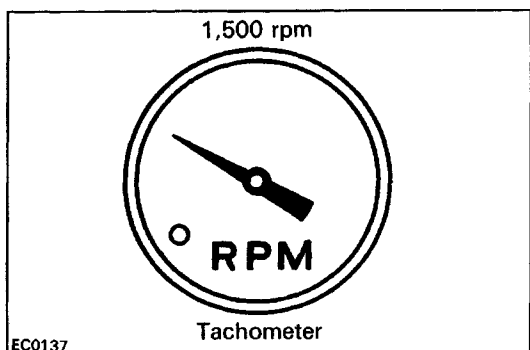
- (a) Using SST, connect the terminals TE1 and E1 of the check connector.
SST 09843-18020



- (b) Disconnect the EGR VSV connector.



- (c) Maintain the engine at 3,000 rpm.
- (d) Plug the VTV hole with your finger.

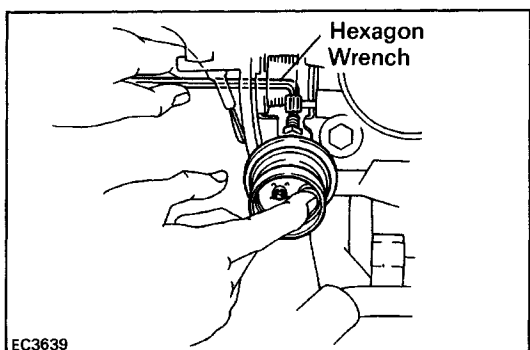


- (e) Release the throttle valve.
- (f) Check that the DP is set.

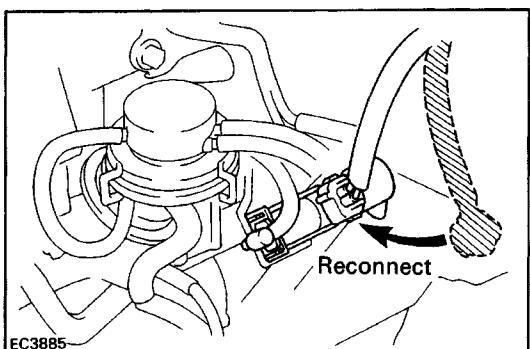
DP setting speed (w/ Cooling fan OFF):

M/T 1,800 rpm

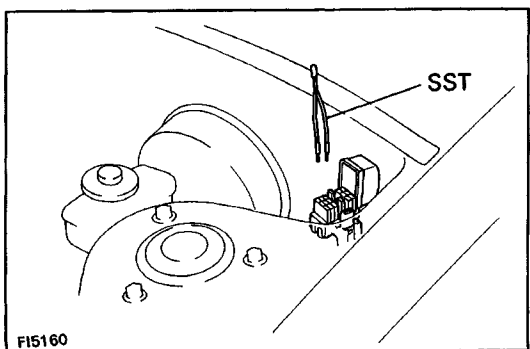
A/T 2,200 rpm



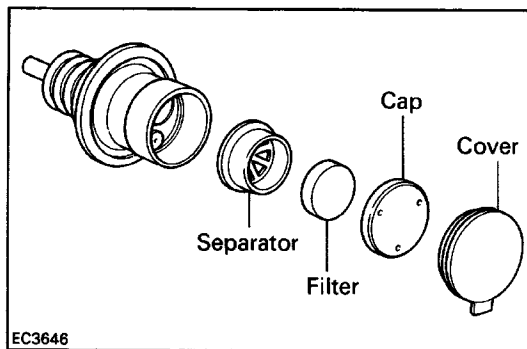
- (g) Using a hexagon wrench, adjust the DP setting speed by turning the DP adjusting screw.
- (h) Repeat steps from (c) to (e), and recheck the DP setting speed.



- (i) Reconnect the EGR VSV connector.



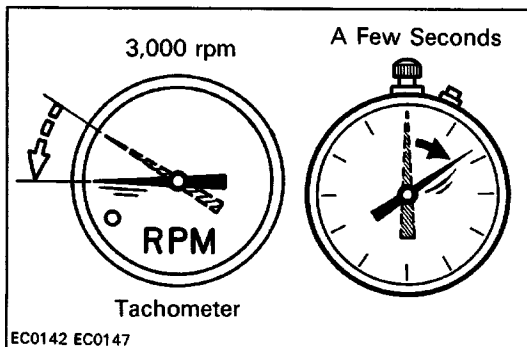
- (j) Remove the SST.
SST 09843-18020



E. Reinstall DP separator, filter, cap and cover

HINT:

- Install the filter with the coarser surface facing the atmospheric side (outward).
- Install the cover with ventilate holes below.



F. Check VTV operation

Race the engine at 3,000 rpm for a few seconds, release the throttle valve and check that the engine returns to idle in a few seconds.

REMOVAL OF THROTTLE BODY

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT (See page [CO-6](#))

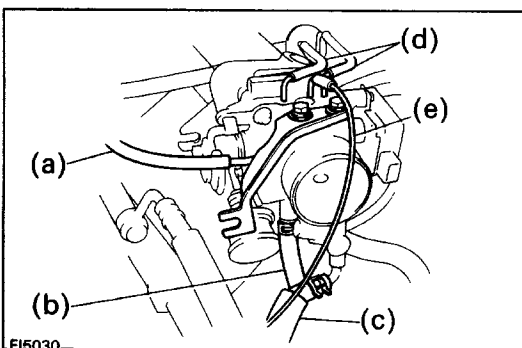
3. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

4. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

5. REMOVE AIR CLEANER CAP AND AIR CLEANER HOSE (See step 6 on page [EM-185](#))

6. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

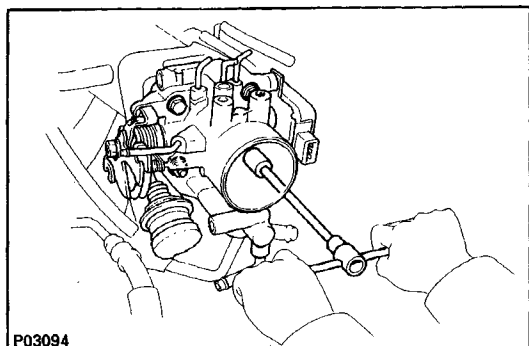


7. REMOVE ACCELERATOR BRACKET FROM THROTTLE BODY

Remove the two bolts and bracket.

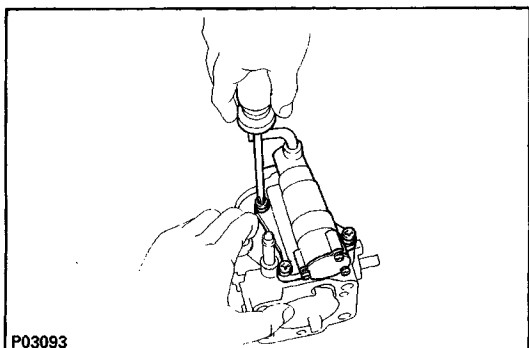
8. DISCONNECT HOSES FROM THROTTLE BODY

- (a) PCV hose
- (b) Water by-pass hose from air pipe
- (c) Water by-pass hose from water inlet housing
- (d) Two vacuum hoses from vacuum pipe
- (e) Vacuum hose from EVAP VSV



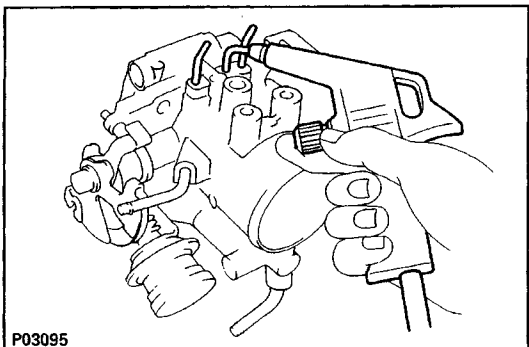
9. REMOVE THROTTLE BODY

Remove the two bolts, two nuts, throttle body and gasket.



10. IF NECESSARY, REMOVE AUXILIARY AIR VALVE

Remove the four screws, air valve, gasket and O-ring.

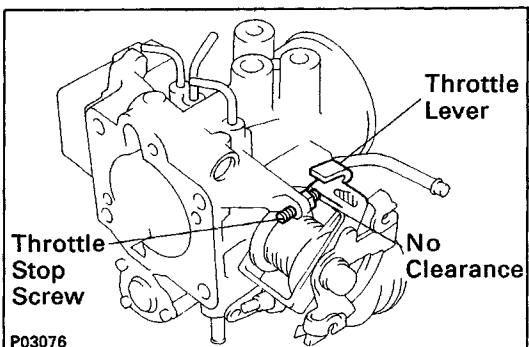


INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

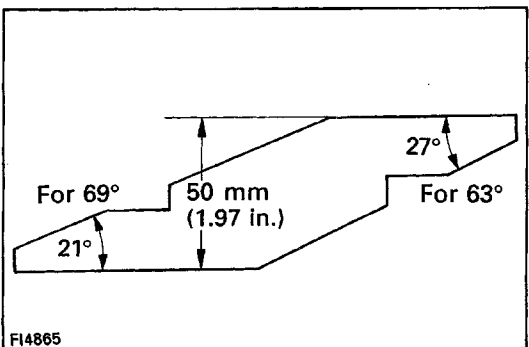
- Using a soft brush and carburetor cleaner, clean the cast parts.
- Using compressed air, clean all the passages and apertures.

NOTICE: To prevent deterioration, do not clean the throttle position sensor and DP.



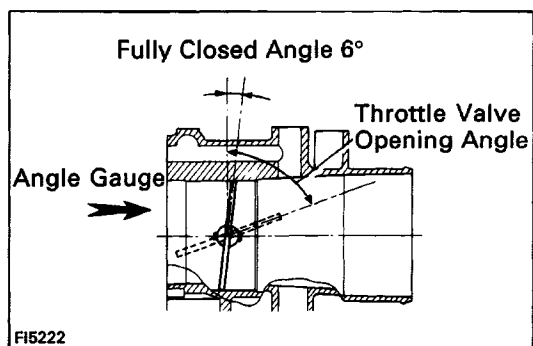
2. INSPECT THROTTLE VALVE

Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.

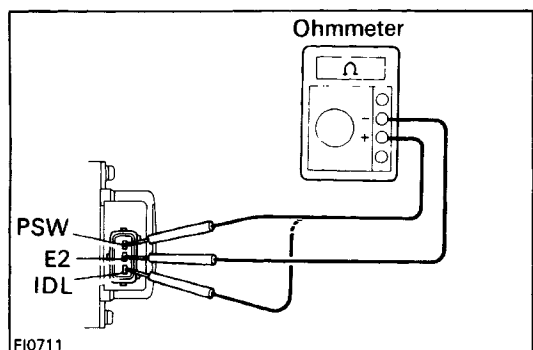


3. INSPECT THROTTLE POSITION SENSOR

- Make an angle gauge as shown in the illustration.

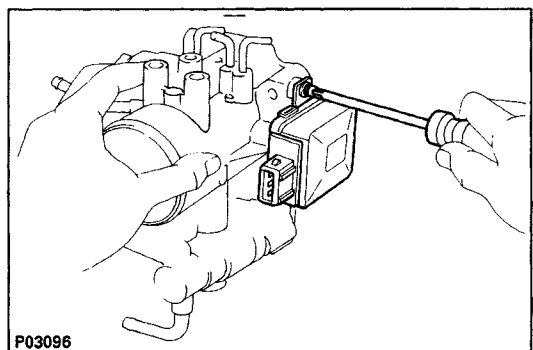


- (b) Set the throttle valve opening angle to 63° or 69° from the vertical position (incl. throttle valve fully closed angle 6°).



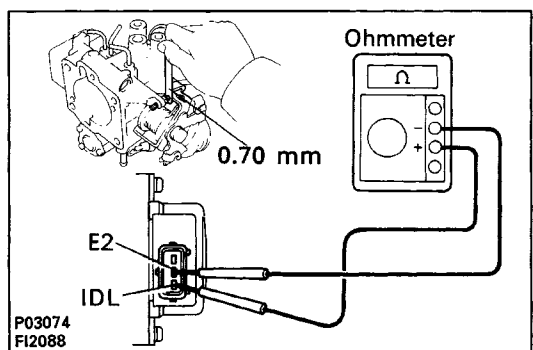
- (c) Using an ohmmeter, check the continuity between each terminal.

Throttle valve opening angle	Continuity	
	IDL – E2	PSW – E2
63° from vertical	No continuity	No continuity
69° from vertical	No continuity	Continuity
Less than 7.5° from vertical	Continuity	No continuity

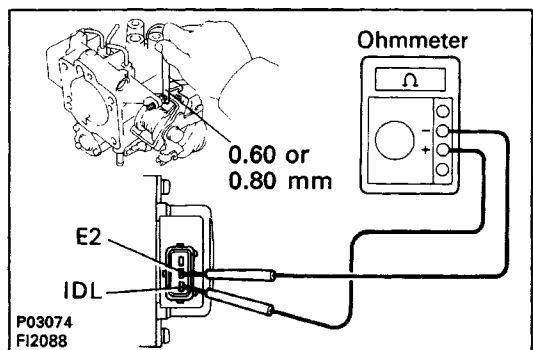


4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

- (a) Loosen the two set screws of the sensor.

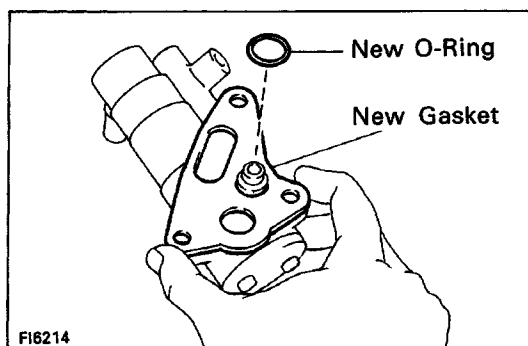


- (b) Insert a 0.70 mm (0.028 in.) thickness gauge, between the throttle stop screw and stop lever.
 (c) Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.
 (d) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



- (e) Recheck the continuity between terminals IDL and E2.

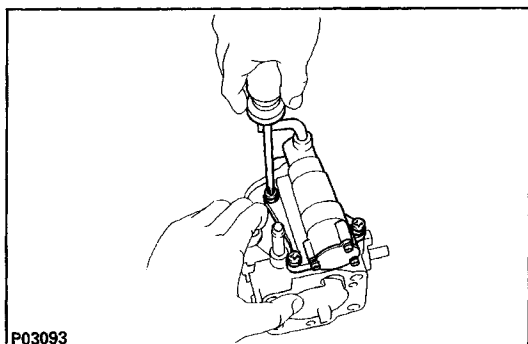
Clearance between lever and stop screw	Continuity (IDL – E2)
0.60 mm (0.024 in.)	Continuity
0.80 mm (0.031 in.)	No continuity



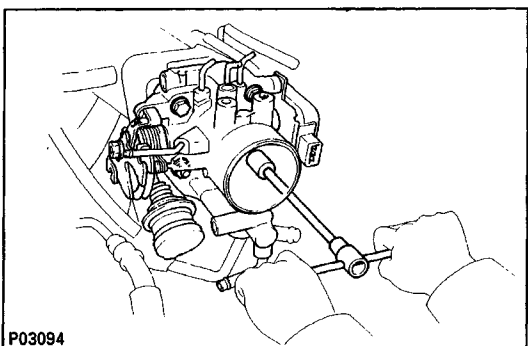
INSTALLATION OF THROTTLE BODY

1. INSTALL AUXILIARY AIR VALVE

- (a) Place a new gasket and O-ring on the auxiliary air valve.



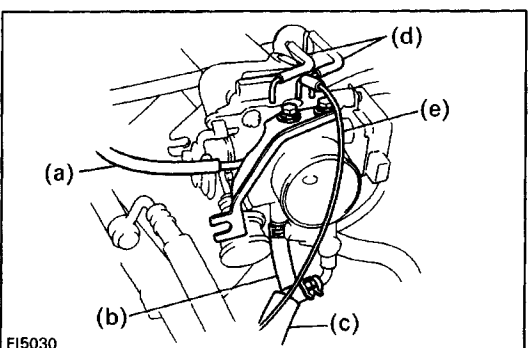
- (b) Install the air valve with the three screws.



2. INSTALL THROTTLE BODY

Install a new gasket and the throttle body with the two bolts and two nuts.

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)



3. CONNECT HOSES TO THROTTLE BODY

- (a) PCV hose
(b) Water by-pass hose to air pipe
(c) Water by-pass hose to water inlet housing
(d) Two vacuum hoses to vacuum pipe
(e) Vacuum hose to EVAP VSV

4. INSTALL ACCELERATOR BRACKET TO THROTTLE BODY

Install the bracket with the two bolts.

5. CONNECT THROTTLE POSITION SENSOR CONNECTOR

6. INSTALL AIR CLEANER CAP AND AIR CLEANER HOSE

(See step 36 on page [EM-221](#))

7. CONNECT ACCELERATOR CABLE, AND ADJUST IT

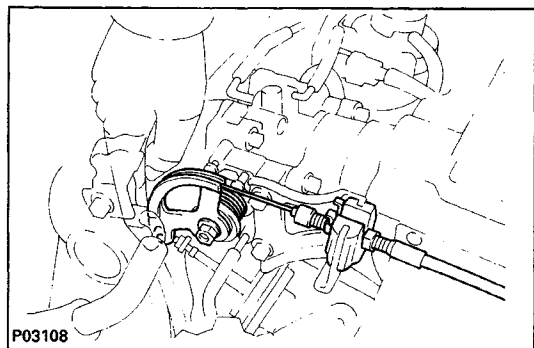
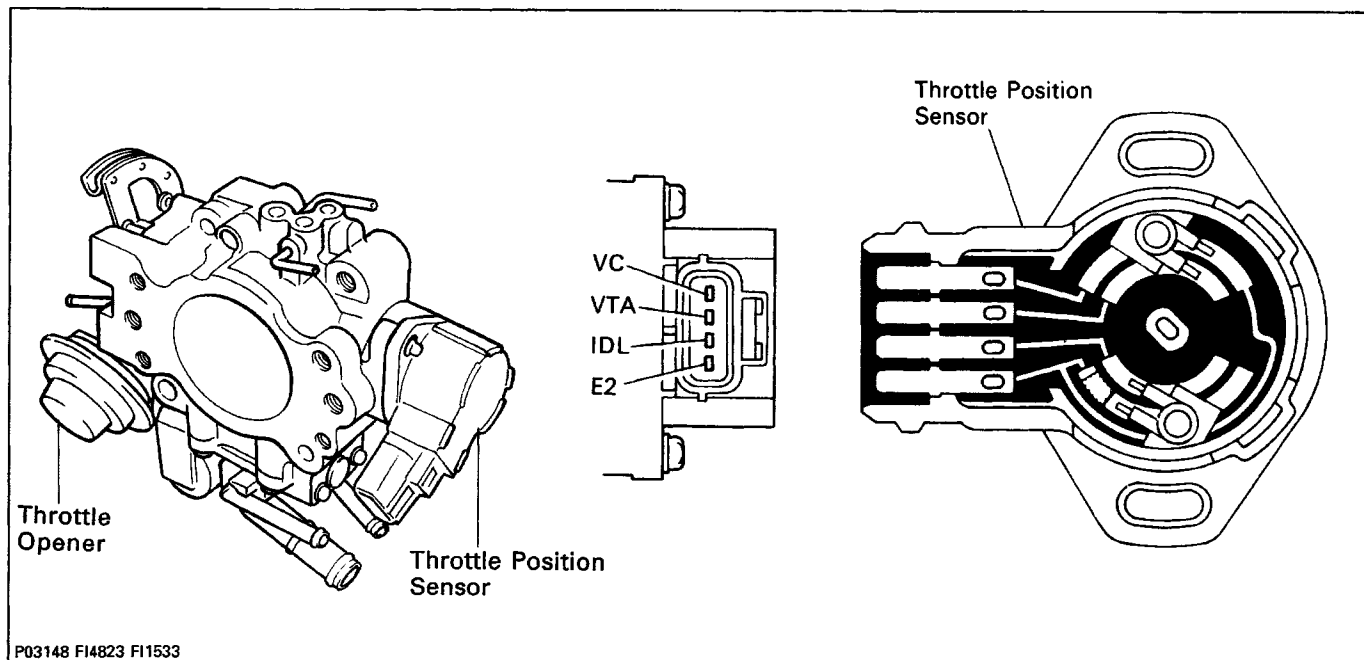
8. (A/T)

CONNECT THROTTLE CABLE, AND ADJUST IT

9. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

10. FILL WITH ENGINE COOLANT (See page [CO-6](#))

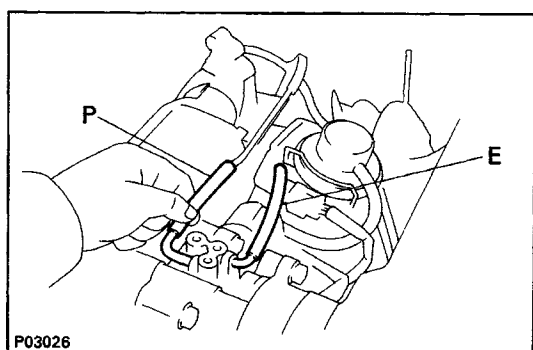
Throttle Body (3S-GTE)



ON-VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

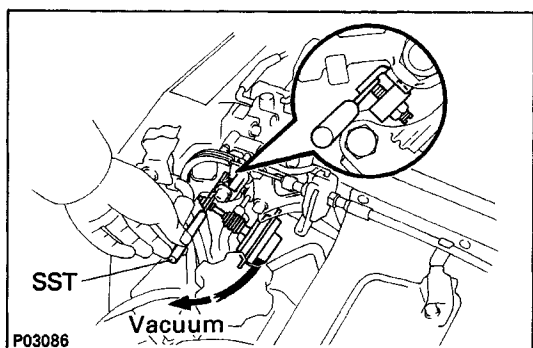
(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

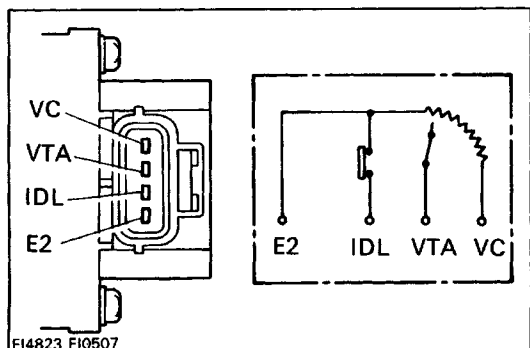
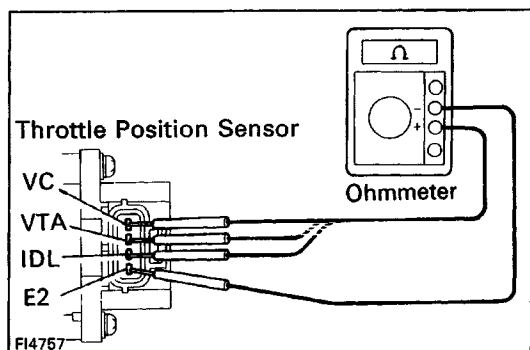
- Start the engine.
- Check the vacuum with your finger.

Port No.	At idle	Other than idle
E	No vacuum	Vacuum
P	No vacuum	Vacuum



2. INSPECT THROTTLE POSITION SENSOR

- Apply vacuum to the throttle opener.
 - Disconnect the sensor connector.
 - Insert SST between the throttle stop screw and stop lever.
- SST 09240-00020



(d) Using an ohmmeter, measure the resistance between each terminal.

Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA - E2	0.47 - 6.1 k Ω
0.50 mm (0.020 in.)	IDL - E2	2.3 k Ω or less
0.70 mm (0.028 in.)	IDL - E2	Infinity
Throttle valve fully open	VTA - E2	3.1 - 12.1 k Ω
-	VC - E2	3.9 - 9.0 k Ω

(d) Reconnect the sensor connector.

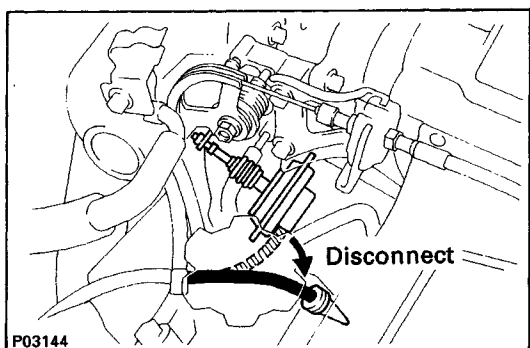
3. INSPRECT THROTTLE OPENER

A. Warm up engine

Allow the engine to warm up to normal operating temperature.

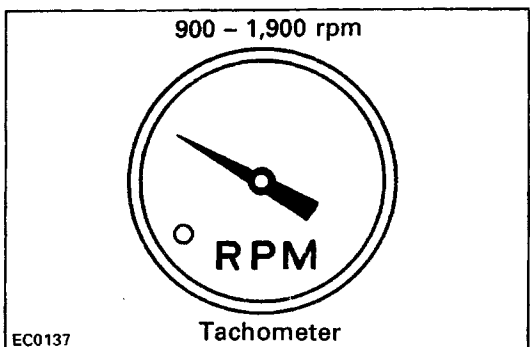
B. Check idle speed

Idle speed: 800 \pm 50 rpm



C. Check throttle opener setting speed

(a) Disconnect the vacuum hose from the throttle opener, and plug the hose end.



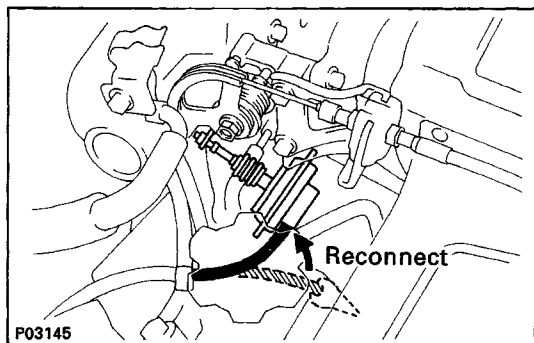
(b) Check the throttle opener setting speed.

Throttle opener setting speed:

900 - 1,900 rpm

If the throttle opener setting is not as specified, replace the throttle body.

(c) Stop the engine.



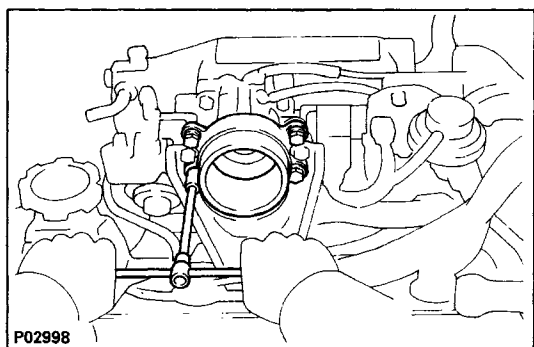
- (d) Reconnect the vacuum hose to the throttle opener.
- (e) Start the engine and check that the idle rpm returns to the correct speed.

REMOVAL OF THROTTLE BODY

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

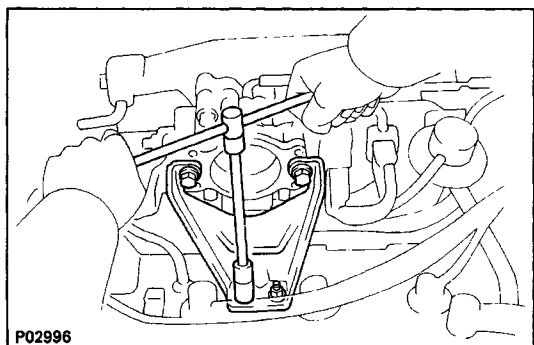
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

- 2. DRAIN ENGINE COOLANT (See page [CO-6](#))
- 3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE
- 4. REMOVE INTERCOOLER
(See steps 13 to 15 on pages [TC-9](#) and 10)



5. REMOVE INTAKE AIR CONNECTOR

Remove the four bolts and air connector.

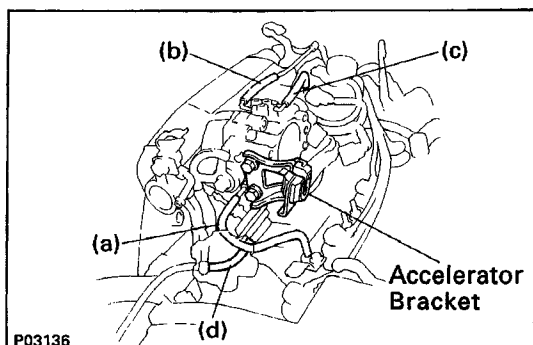


6. REMOVE INTAKE AIR CONNECTOR STAY

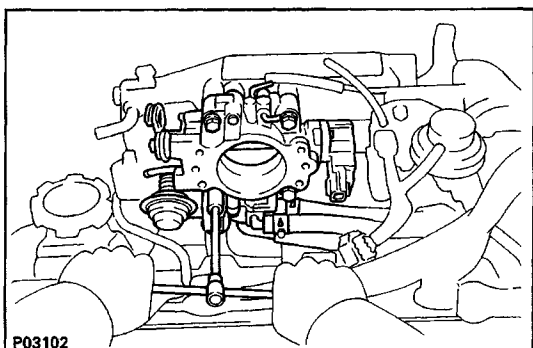
Remove the two bolts, two nuts and air connector stay.

7. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

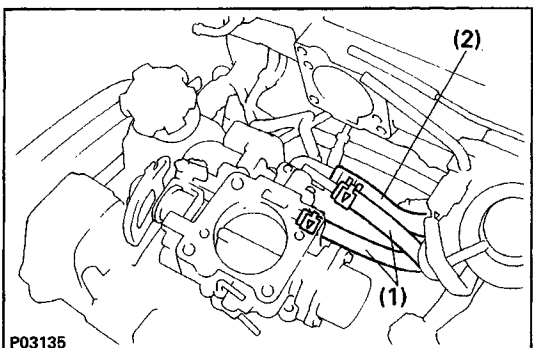
8. DISCONNECT ISC VALVE CONNECTOR

**9. REMOVE ACCELERATOR BRACKET****10. DISCONNECT HOSES FROM THROTTLE BODY**

- (a) PCV hose from cylinder head cover
- (b) Vacuum hose (from throttle body P port) from vacuum pipe
- (c) Vacuum hose (from throttle body E port) from EGR VsV
- (d) Vacuum hose from throttle opener

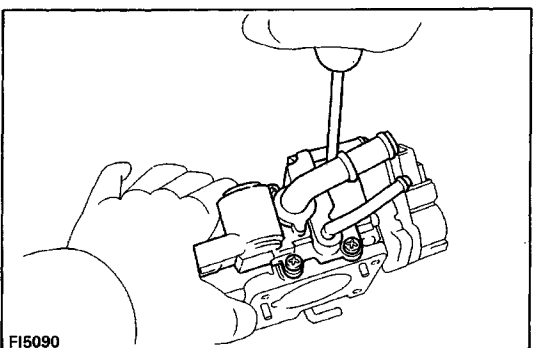
**11. REMOVE THROTTLE BODY**

- (a) Remove the four bolts, throttle body and gasket.

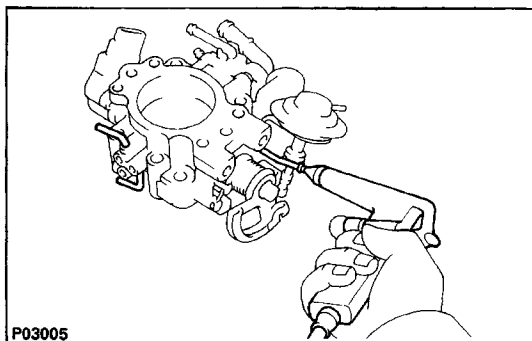


- (b) Disconnect the hoses from the throttle body, and remove the throttle body.

- (1) Two water-by-pass hoses from No. 1 air tube
- (2) Air hose from No. 1 air tube

**12. IF NECESSARY, REMOVE ISC VALVE FROM THROTTLE BODY**

Remove the four screws, ISC valve and gasket.

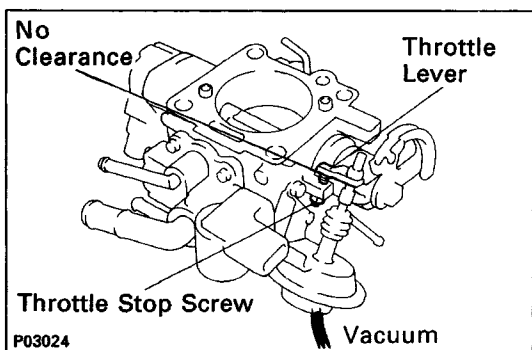


INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

- Using a soft brush and carburetor cleaner, clean the cast parts.
- Using compressed air, clean all the passages and apertures.

NOTICE: To prevent deterioration, do not clean the throttle position sensor.

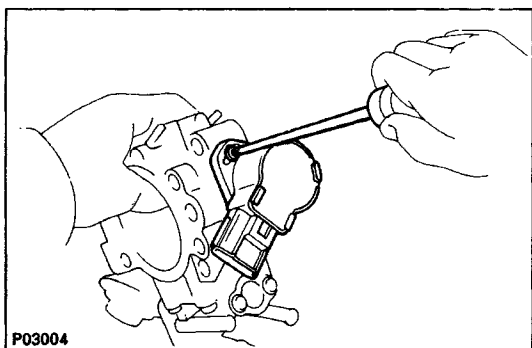


2. INSPECT THROTTLE VALVE

- Apply vacuum to the throttle opener.
- Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.

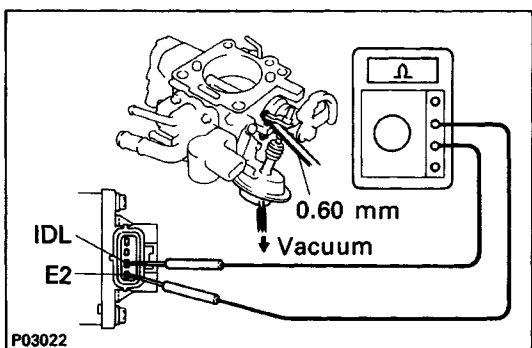
3. INSPECT THROTTLE POSITION SENSOR

(See step 2 on page [FI-192](#))

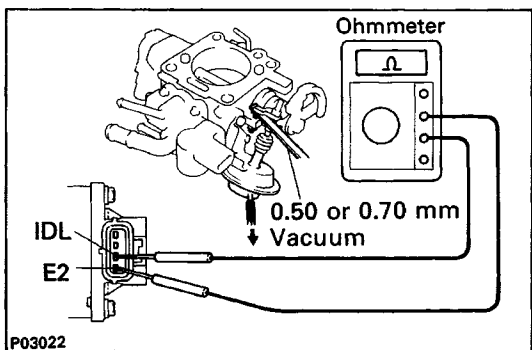


4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

- Loosen the two set screws of the sensor.



- Apply vacuum to the throttle opener.
- Insert a 0.60 mm (0.024 in.) thickness gauge, between the throttle stop screw and stop lever.
- Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.
- Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



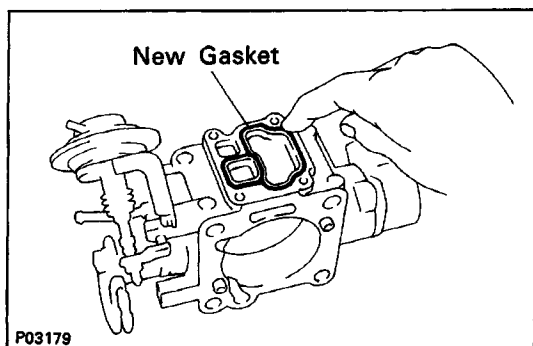
- Recheck the continuity between terminals IDL and E2.

Clearance between lever and stop screw	Continuity (IDL – E2)
0.50 mm (0.020 in.)	Continuity
0.70 mm (0.028 in.)	No continuity

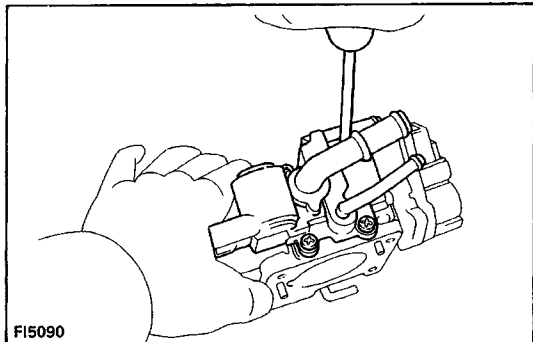
INSTALLATION OF THROTTLE BODY

1. INSTALL ISC VALVE TO THROTTLE BODY

- (a) Place a new gasket on the throttle body.



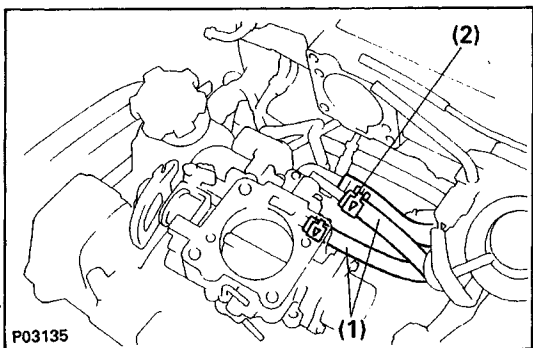
- (b) Install the ISC valve with the four screws.



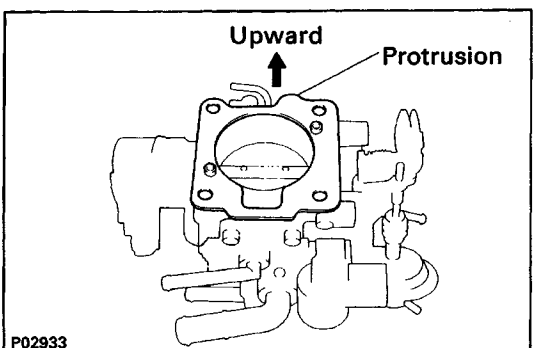
2. INSTALL THROTTLE BODY

- (a) Connect the following hoses to the throttle body:

- (1) Two water by-pass hoses to No.1 air tube
- (2) Air hose to No.1 air tube



- (b) Place a new gasket on the throttle body, facing the protrusion upward.



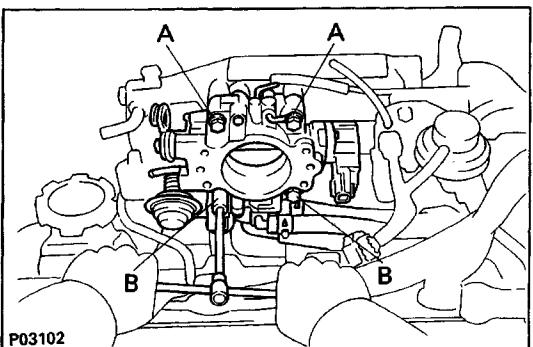
- (c) Install the throttle body with the four bolts.

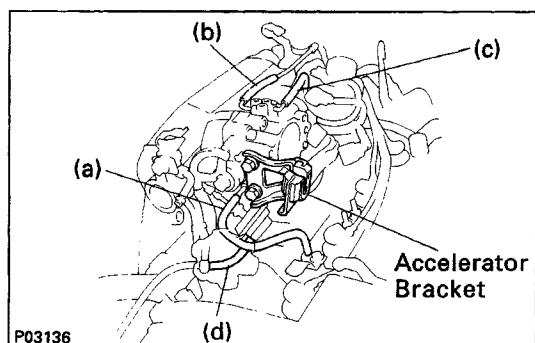
Torque: 79 N-m (195 kgf-cm, 14 ft-lbf)

HINT: Each bolt is indicated in the illustration.

Bolt length: A 45 mm (1.77 in.)

B 70 mm (2.76 in.)





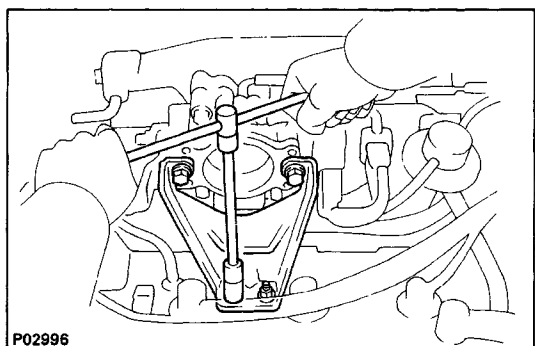
3. CONNECT HOSES TO THROTTLE BODY

- (a) PCV hose to cylinder head cover
- (b) Vacuum hose (from throttle body P port) to vacuum pipe
- (c) Vacuum hose (from throttle body E port) to EGR VSV
- (d) Vacuum hose from throttle opener

4. INSTALL ACCELERATOR BRACKET

5. CONNECT ISC VALVE CONNECTOR

6. CONNECT THROTTLE POSITION SENSOR CONNECTOR



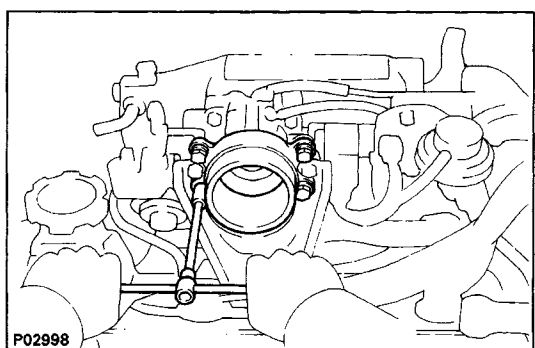
7. INSTALL INTAKE AIR CONNECTOR STAY

Install the air connector stay with the two bolts and two nuts.

Torque:

Bolt 19 N·m (195 kgf·cm, 14 ft·lbf)

Nut 7.8 N·m (80 kgf·cm, 69 in.-lbf)



8. INSTALL INTAKE AIR CONNECTOR

Install the air connector with the four bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

9. INSTALL INTERCOOLER

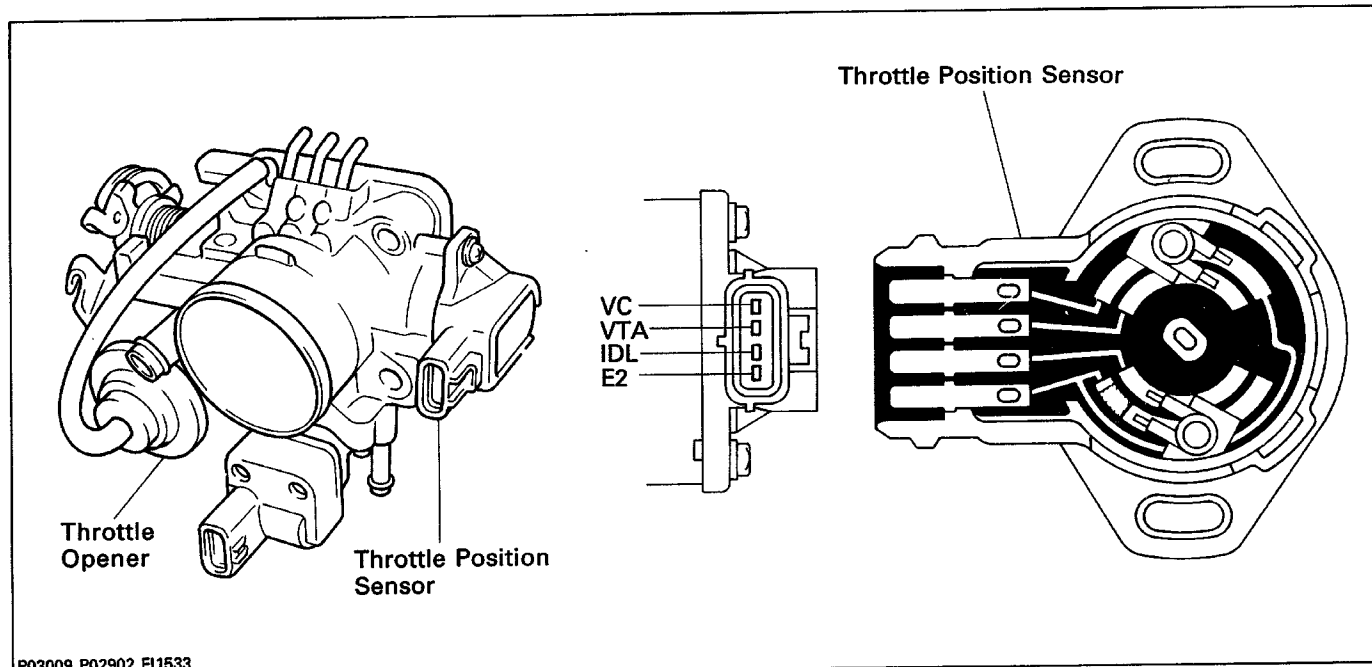
(See steps 11 to 13 on page [TC-17](#))

10. CONNECT ACCELERATOR CABLE, AND ADJUST IT

11. FILL WITH ENGINE COOLANT (See page [CO-6](#))

12. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

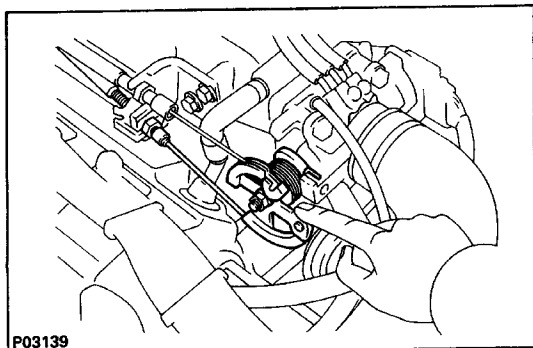
Throttle Body (5S-FE)



ON-VEHICLE INSPECTION

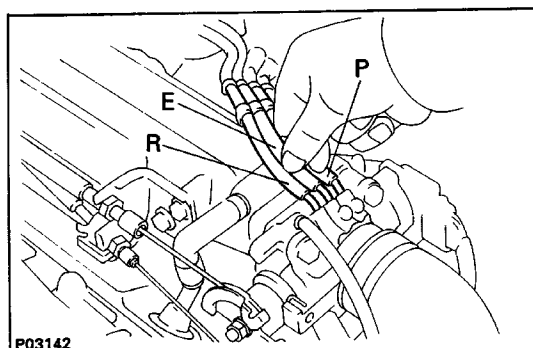
1. INSPECT THROTTLE BODY

(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

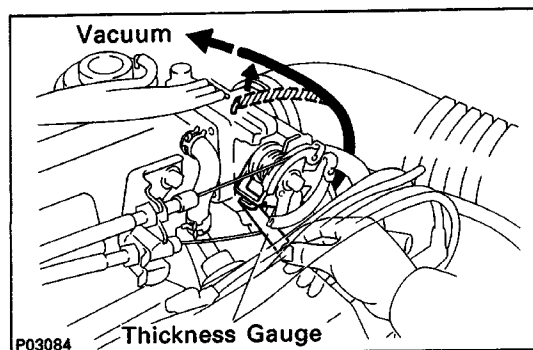
- Start the engine.
- Check the vacuum with your finger.

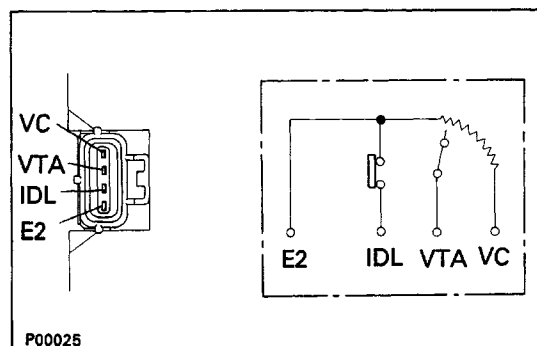
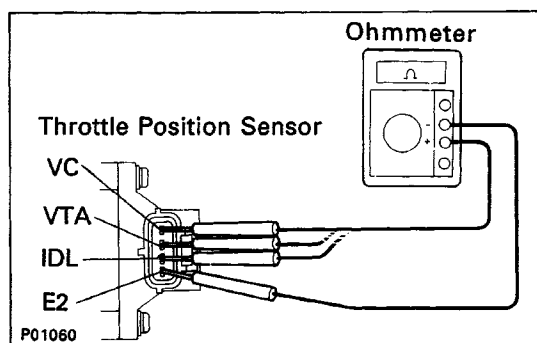


Port name	At idle	Other than idle
P	No vacuum	Vacuum
E	No vacuum	Vacuum
R	No vacuum	No vacuum

2. INSPECT THROTTLE POSITION SENSOR

- Apply vacuum to the throttle opener.
- Disconnect the sensor connector.
- Insert a thickness gauge between the throttle stop screw and stop lever.





(d) Using an ohmmeter, measure the resistance between each terminal.

Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA – E2	0.2 – 5.7 k Ω
0.50 mm (0.020 in.)	IDL – E2	2.3 k Ω or less
0.70 mm (0.028 in.)	IDL – E2	Infinity
Throttle valve fully open	VTA – E2	2.0 – 10.2 k Ω
–	VC – E2	2.5 – 5.9 k Ω

(e) Reconnect the sensor connector.

3. INSPECT AND ADJUST THROTTLE OPENER

A. Warm up engine

Allow the engine to warm up to normal operating temperature.

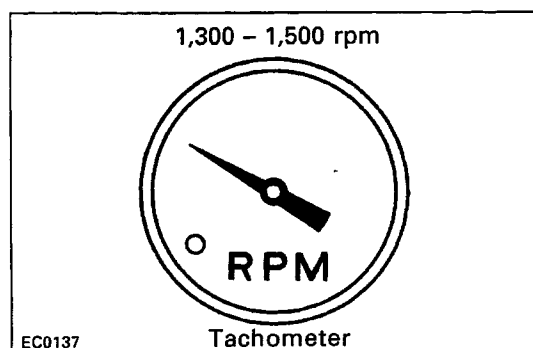
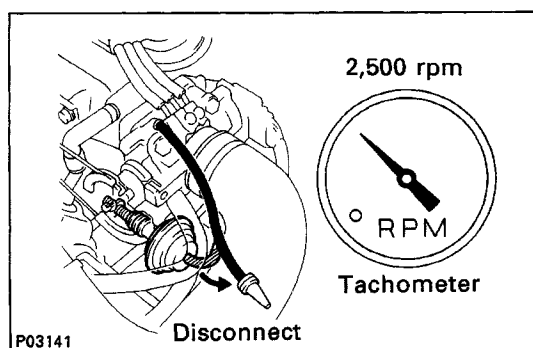
B. Check idle speed

Idle speed: 700 \pm 50 rpm USA

750 \pm 50 rpm CANADA

C. Check and adjust throttle opener setting speed

- Disconnect the vacuum hose from the throttle opener, and plug the hose end.
- Maintain the engine at 2,500 rpm.

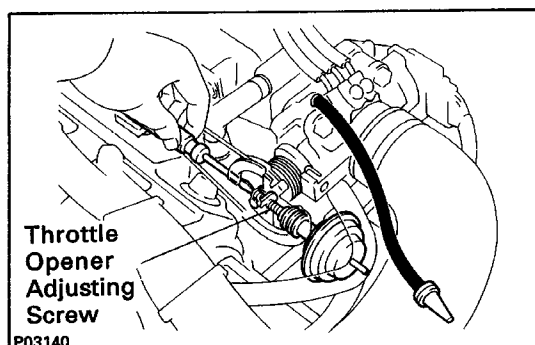


(c) Release the throttle valve.

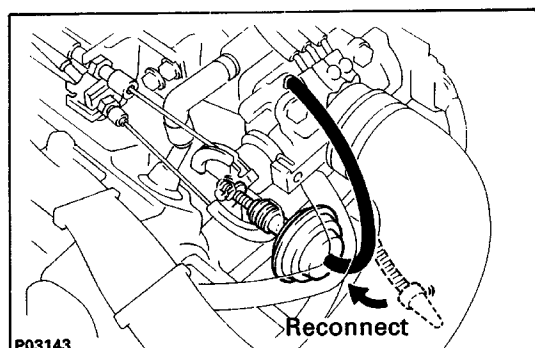
(d) Check that the throttle opener is set.

Throttle opener setting speed:

1,300 – 1,500 rpm (w/ Cooling fan OFF)



- (e) Adjust the throttle opener setting speed by turning the throttle opener adjusting screw.



- (f) Reconnect the vacuum hose to the throttle opener.

REMOVAL OF THROTTLE BODY

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT (See page CO-6)

3. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

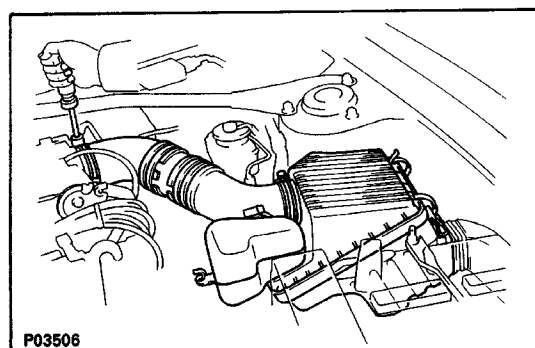
4. . DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

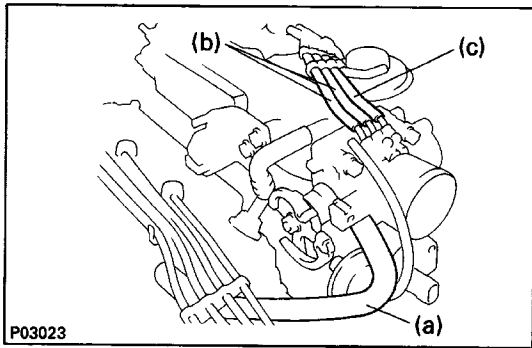
5. REMOVE AIR CLEANER CAP AND AIR CLEANER HOSE

- Disconnect the air intake temperature sensor connector.
- Disconnect the cruise control actuator cable from the clamp on the resonator.
- Loosen the air cleaner hose clamp bolt.
- Disconnect the four air cleaner cap clips.
- Disconnect the air cleaner hose from the throttle body, and remove the air cleaner cap together with the resonator and air cleaner hose.

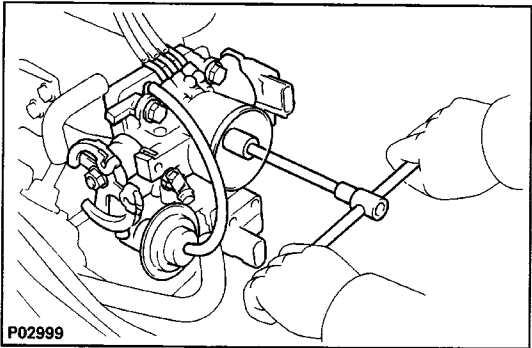
6. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

7. DISCONNECT ISC VALVE CONNECTOR

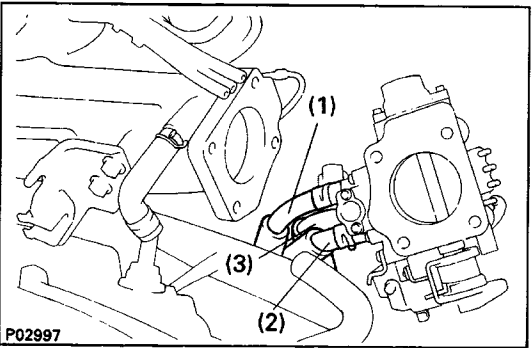


**8. DISCONNECT HOSES FROM THROTTLE BODY**

- (a) PCV hose
- (b) Two vacuum hoses from EGR vacuum modulator
- (c) Vacuum hoses from EVAP VSV

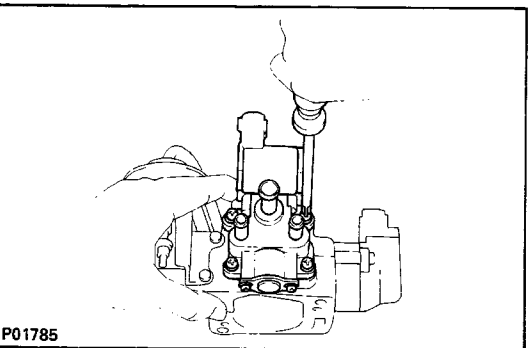
**9. REMOVE THROTTLE BODY**

- (a) Remove the four bolts, throttle body and gasket.

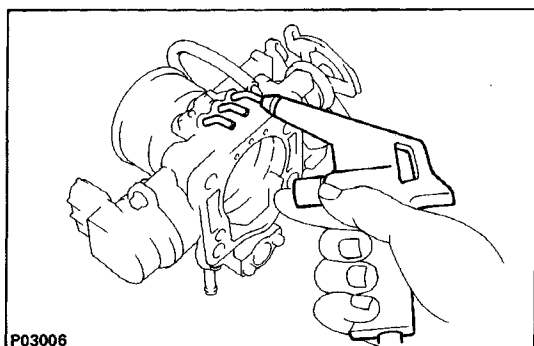


- (b) Disconnect the hoses from the throttle body, and remove the throttle body.

- (1) Water by-pass hose from water outlet
- (2) Water by-pass hose from water by-pass pipe
- (3) Air hose from air tube

**10. IF NECESSARY, REMOVE ISC VALVE FROM THROTTLE BODY**

Remove the four screws, ISC valve and gasket.

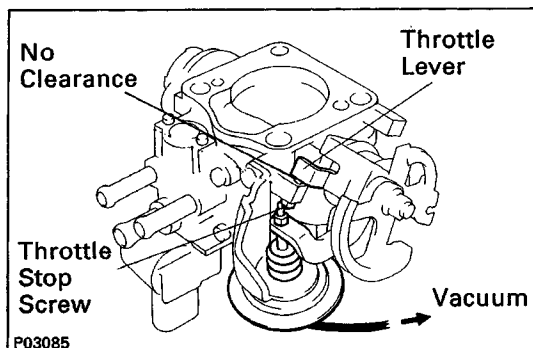


INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

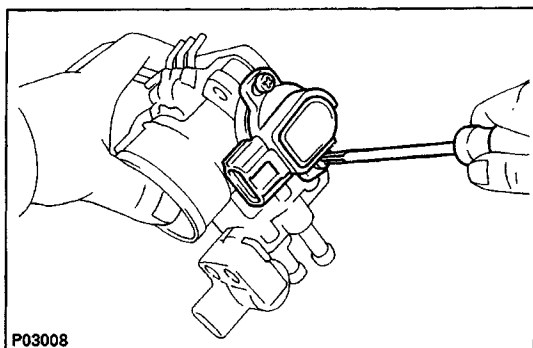
- Using a soft brush and carburetor cleaner, clean the cast parts.
- Using compressed air, clean all the passages and apertures.

NOTICE: To prevent deterioration, do not clean the throttle position sensor.



2. INSPECT THROTTLE VALVE

- Apply vacuum to the throttle opener.
- Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.

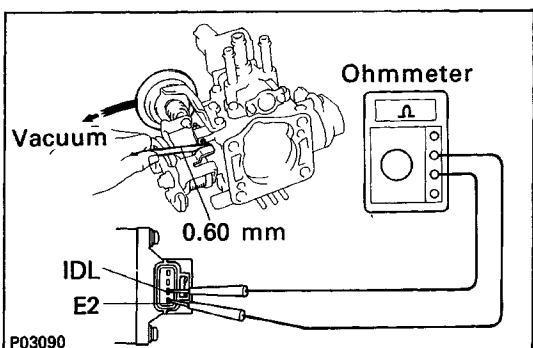


3. INSPECT THROTTLE POSITION SENSOR

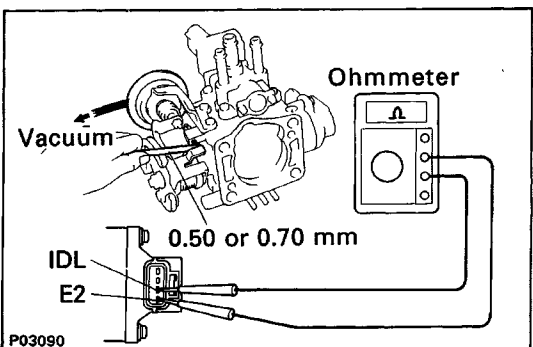
(See step 2 on page FI-199)

4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

- Loosen the two set screws of the sensor.

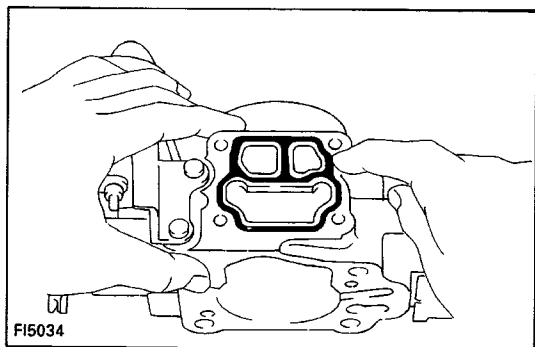


- Apply vacuum to the throttle opener.
- Insert a 0.60 mm (0.024 in.) thickness gauge, between the throttle stop screw and stop lever.
- Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.
- Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



- Recheck the continuity between terminals IDL and E2.

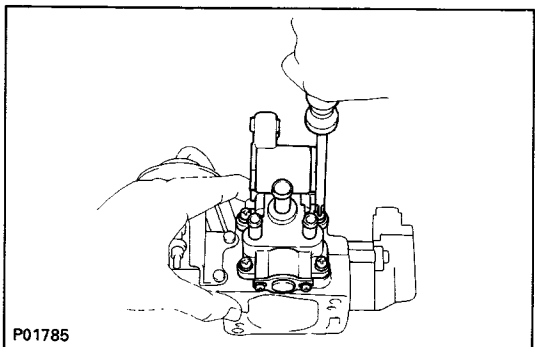
Clearance between lever and stop screw	Continuity (IDL – E2)
0.50 mm (0.020 in.)	Continuity
0.70 mm (0.028 in.)	No continuity



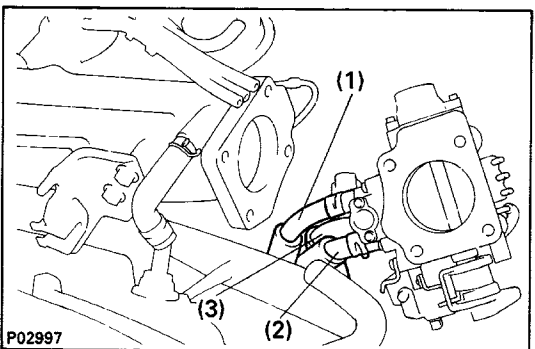
INSTALLATION OF THROTTLE BODY

1. INSTALL ISC VALVE TO THROTTLE BODY

(a) Place a new gasket on the throttle body.



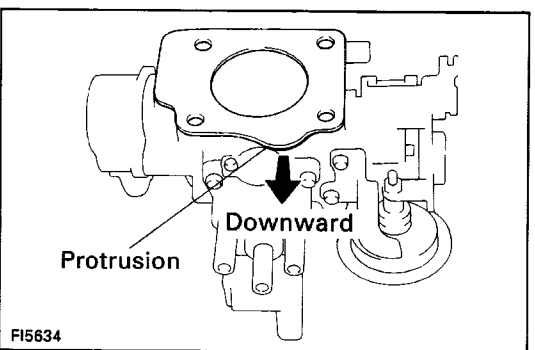
(b) Install the ISC valve with the four screws.



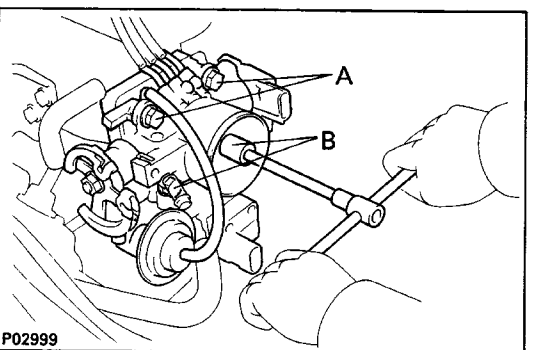
2. INSTALL THROTTLE BODY

(a) Connect the following hoses to the throttle body:

- (1) Water by-pass hose to water outlet
- (2) Water by-pass hose to water by-pass pipe
- (2) Air hose to air tube



(b) Place a new gasket on the throttle body, facing the protrusion downward.



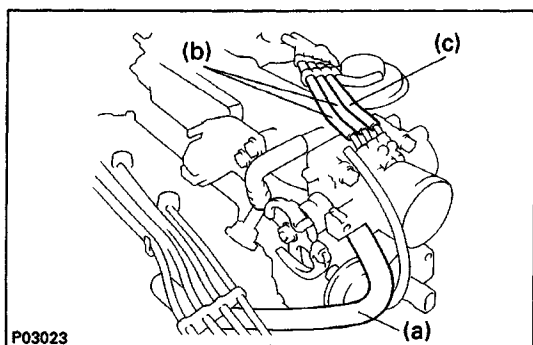
(c) Install the throttle body with the four bolts.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

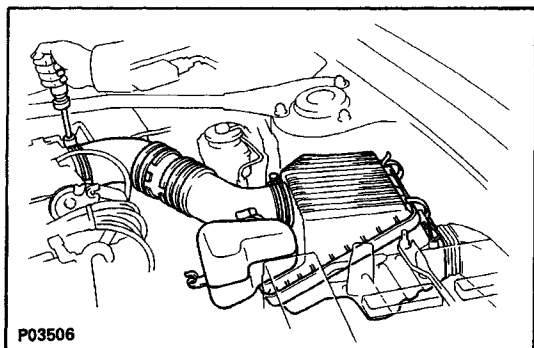
HINT: Each bolt is indicated in the illustration.

Bolt length: A 45 mm (1.77 in.)

B 55 mm (2.17 in.)

**3. CONNECT HOSES TO THROTTLE BODY**

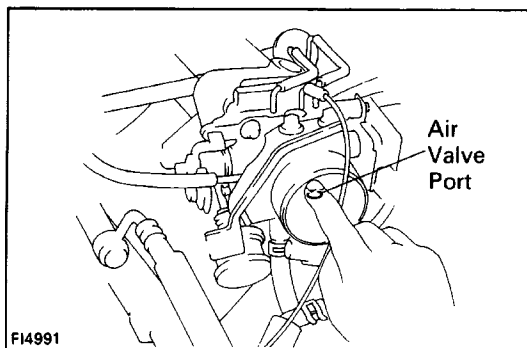
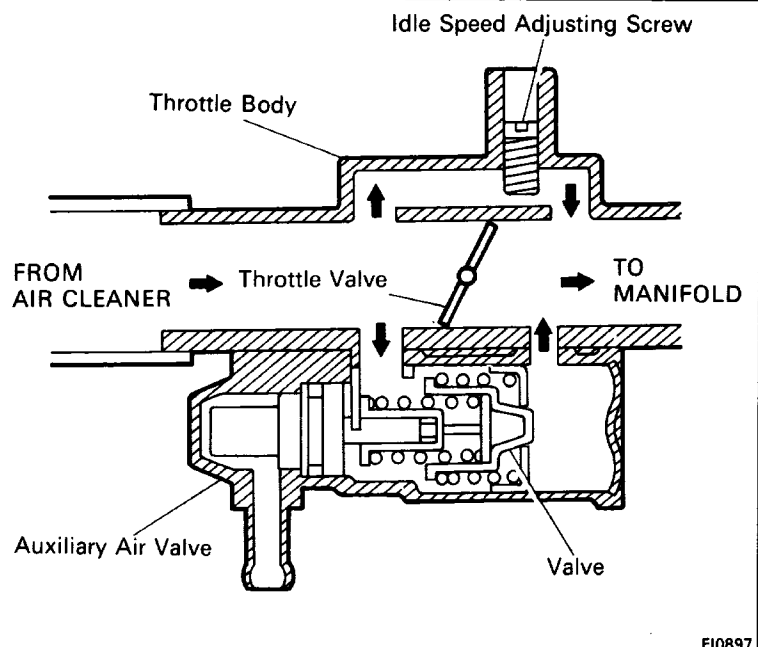
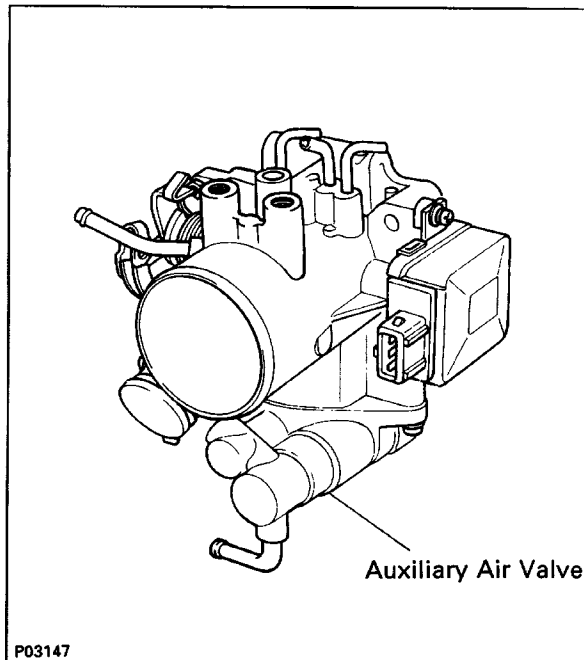
- (a) PCV hose
- (b) Two vacuum hoses to EGR vacuum modulator
- (c) Vacuum hose to EGR VSV

4. CONNECT ISC VALVE CONNECTOR**5. CONNECT THROTTLE POSITION SENSOR CONNECTOR****6. INSTALL AIR CLEANER CAP AND AIR CLEANER HOSE**

- (a) Connect the air cleaner hose to the throttle body.
- (b) Install the air cleaner cap together with the resonator– and air cleaner hose.
- (c) Connect the air intake temperature sensor connector.
- (d) Connect the cruise control actuator cable to the clamp on the resonator.

7. CONNECT ACCELERATOR CABLE, AND ADJUST IT**8. (A/T)****CONNECT THROTTLE CABLE, AND ADJUST IT****9. FILL WITH ENGINE COOLANT (See page [CO-6](#))****10. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

Auxiliary Air Valve (4A-FE)



ON-VEHICLE INSPECTION

1. DISCONNECT AIR CLEANER HOSE FROM THROTTLE BODY

2. INSPECT AIR VALVE OPERATION

Check the engine RPM by closing the air valve port on the throttle body.

At low temp. (Coolant temp.: below 80°C (176°F))

- When the air valve port is closed, the engine RPM should drop.

After warm up

- When the air valve port is closed, engine RPM should not drop more than 50 rpm.
If operation is not as specified, replace the auxiliary air valve.

3. RECONNECT AIR CLEANER HOSE TO THROTTLE BODY

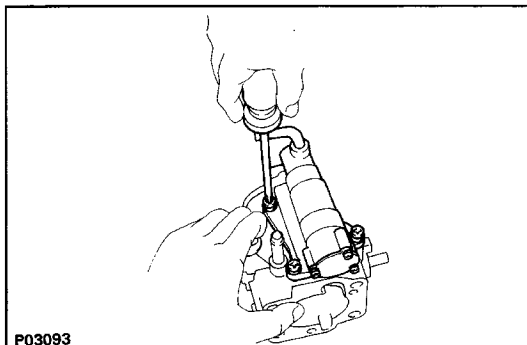
REMOVAL OF AUXILIARY AIR VALVE

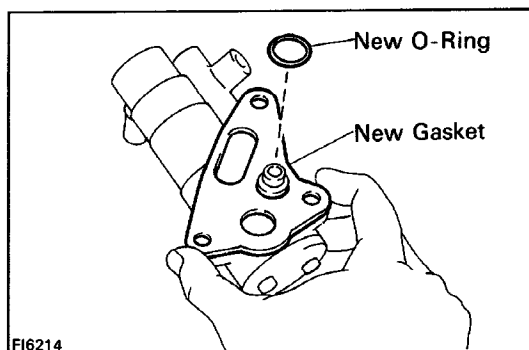
1. REMOVE THROTTLE BODY

(See steps 1 to 9 on pages [FI-188](#) and 189)

2. REMOVE AUXILIARY AIR VALVE FROM THROTTLE BODY

Remove the four screws, air valve, gasket and O-ring.

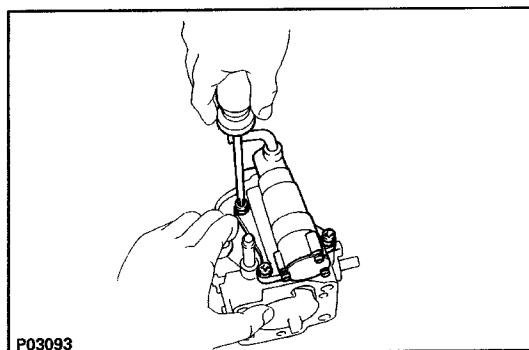




INSTALLATION OF AUXILIARY AIR VALVE

1. INSTALL AUXILIARY AIR VALVE

- (a) Place a new gasket and O-ring on the auxiliary air valve.

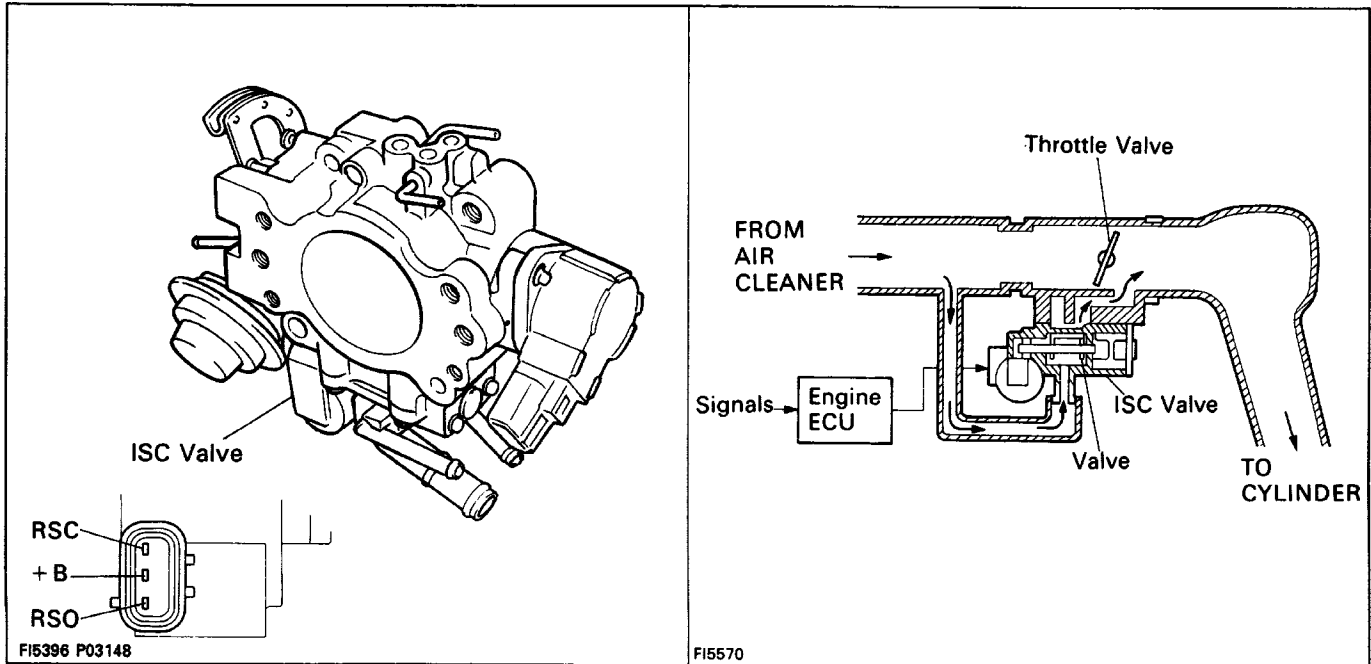


- (b) Install the air valve with the three screws.

2. INSTALL THROTTLE BODY

(See steps 2 to 10 on page [FI-191](#))

Idle Speed Control (ISC) Valve (3S-GTE)

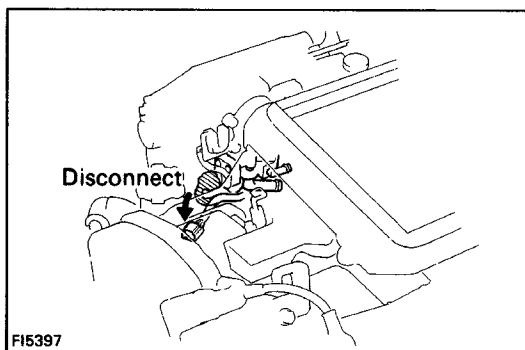


ON-VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

(a) Initial conditions:

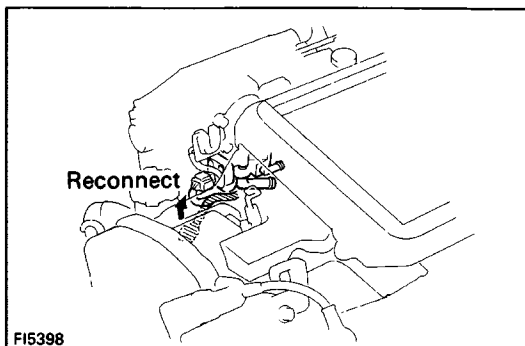
- Engine at normal operating temperature
- Idle speed set correctly



(b) Disconnect the ISC valve connector.

(c) Check the engine rpm.

Engine rpm: 1,000 rpm or more

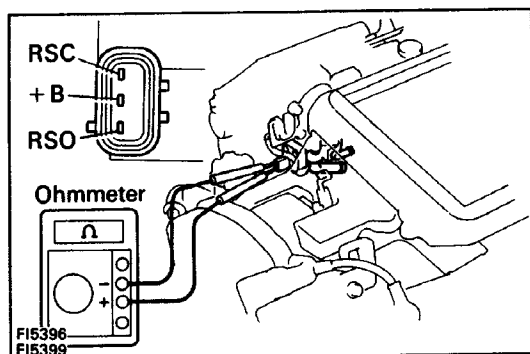


(d) Reconnect the ISC valve connector.

(e) Check that they return to the idle speed.

Idle speed: 800 ± 50 rpm

If the rpm operation is not as specified, check the ISC valve, wiring and ECU.



2. INSPECT ISC VALVE RESISTANCE

- Disconnect the ISC valve connector.
- Using an ohmmeter, measure the resistance between terminal + B and other terminals (RSC, RSO).

Resistance: 19.3 – 22.3

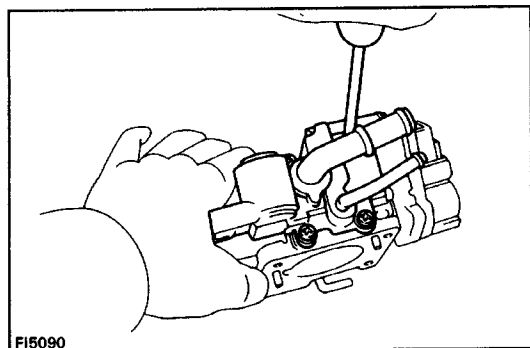
If resistance is not as specified, replace the ISC valve.

- Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

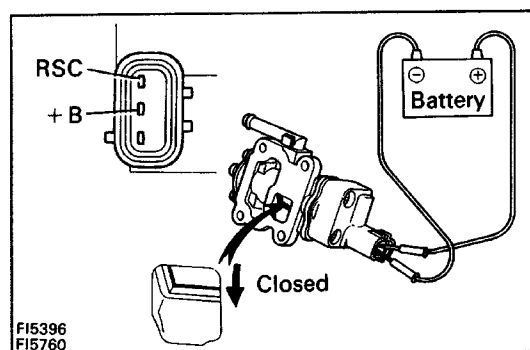
1. REMOVE THROTTLE BODY

(See steps 1 to 11 on pages [FI-194](#) and [195](#))



2. REMOVE ISC VALVE

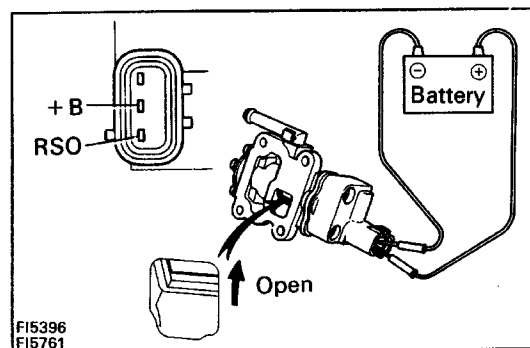
Remove the four screws, ISC valve and gasket.



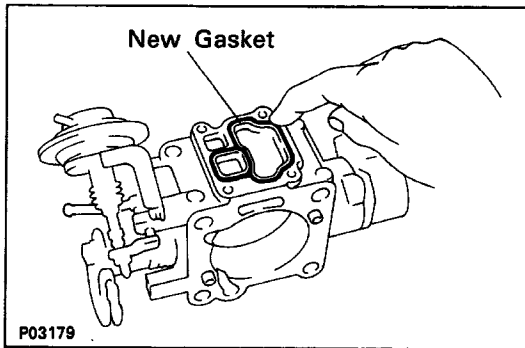
INSPECTION OF ISC VALVE

INSPECT ISC VALVE OPERATION

- Connect the positive (+) lead from the battery to terminal + B and negative (-) lead to terminal RSC, and check that the valve is closed.



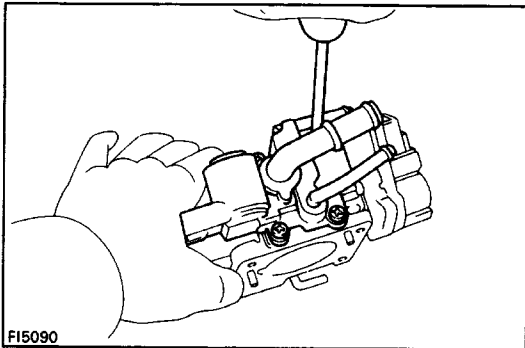
- Connect the positive (+) lead from the battery to terminal + B and negative (-) lead to terminal RSO, and check that the valve is open.



INSTALLATION OF ISC VALVE

1. INSTALL ISC VALVE

(a) Place a new gasket on the throttle body.

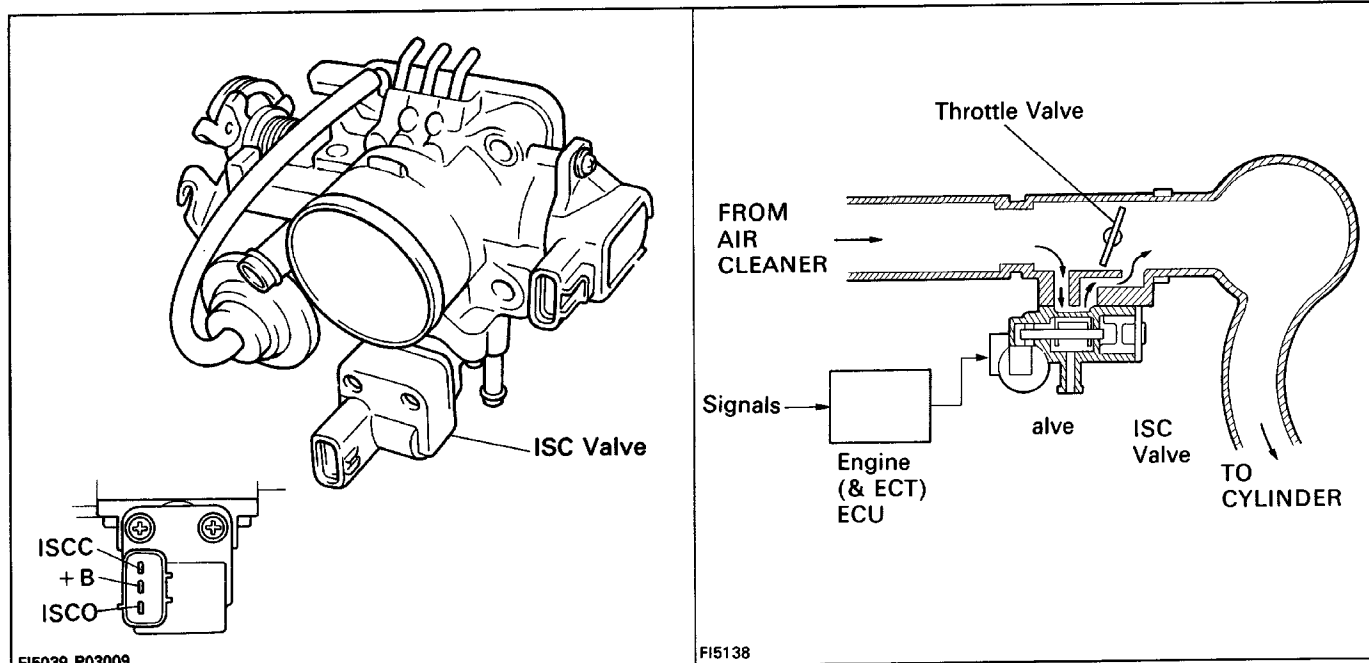


(b) Install the ISC valve with the four screws.

2. INSTALL THROTTLE BODY

(See steps 2 to 12 on pages [FI-197](#) and 198)

Idle Speed Control (ISC) Valve (5S–FE)

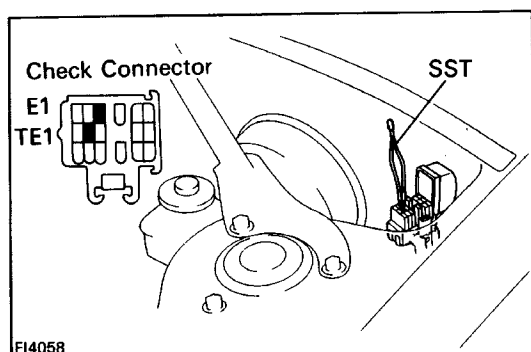


ON-VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

(a) Initial conditions:

- Engine at normal operating temperature
- Idle speed set correctly
- Transmission in neutral range

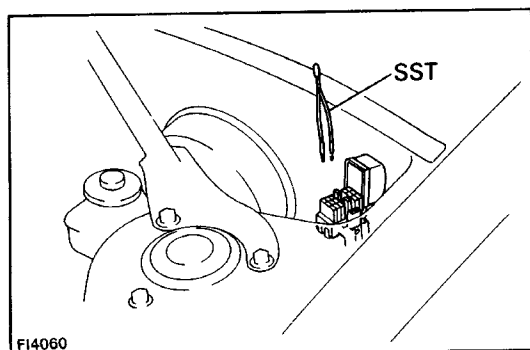


(b) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843–18020

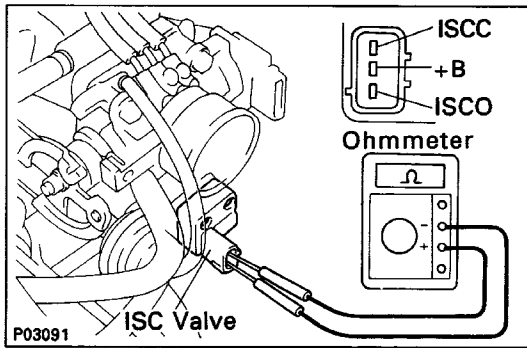
(c) After engine rpm are kept at 900 – 1,300 rpm for 5 seconds, check that they return to idle speed.

If the rpm operation is not as specified, check the ISC valve, wiring and ECU.



(d) Remove SST.

SST 09843–18020



2. INSPECT ISC VALVE RESISTANCE

- Disconnect the ISC valve connector.
- Using an ohmmeter, measure the resistance between terminal + B and other terminals (ISCC, ISCO).

Resistance: 19.3 – 22.3

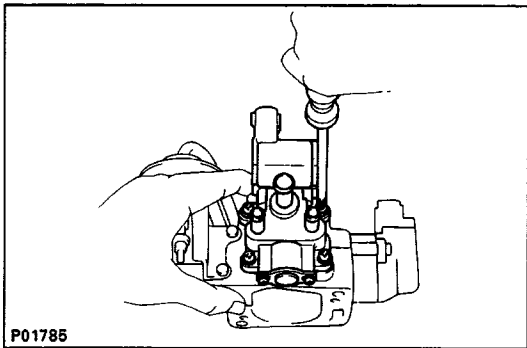
If resistance is not as specified, replace the ISC valve.

- Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

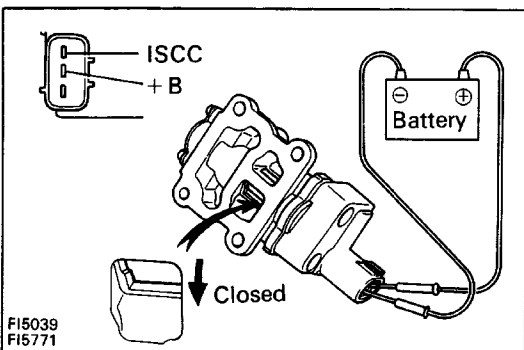
1. REMOVE THROTTLE BODY

(See steps 1 to 9 on pages [FI-201](#) and 202)



2. REMOVE ISC VALVE

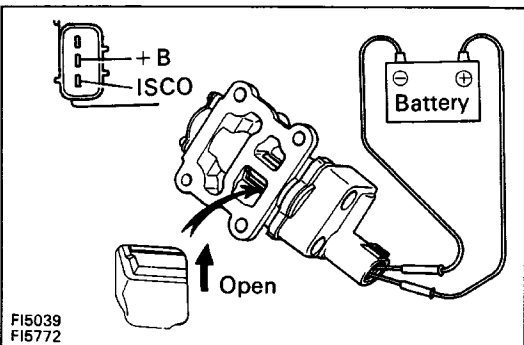
Remove the four screws, ISC valve and gasket.



INSPECTION OF ISC VALVE

INSPECT ISC VALVE OPERATION

- Connect the positive (+) lead from the battery to terminal + B and negative (-) lead to terminal ISCC, and check that the valve is closed.

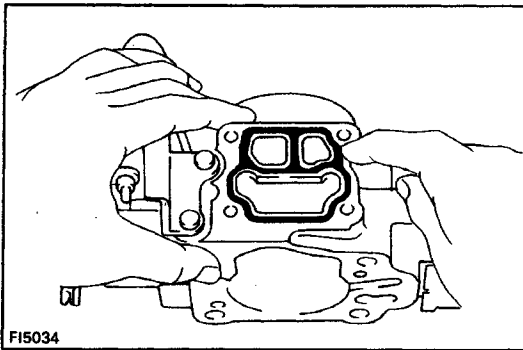


- Connect the positive (+) lead from the battery to terminal + B and negative (-) lead to terminal ISCO, and check that the valve is open.

INSTALLATION OF ISC VALVE

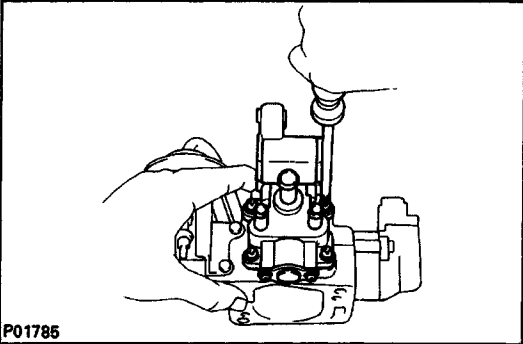
1. INSTALL ISC VALVE

(a) Place a new gasket on the throttle body.



FI5034

(b) Install the ISC valve with the four screws.



P01785

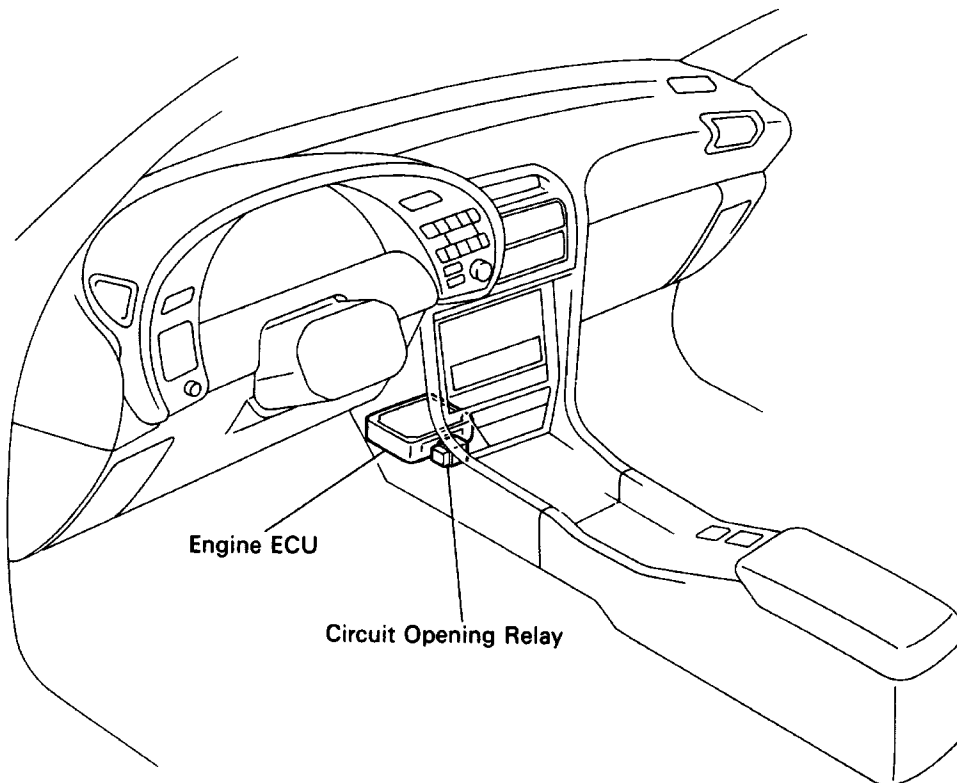
2. INSTALL THROTTLE BODY

(See steps 2 to 10 on pages [FI-204](#) and 205)

ELECTRONIC CONTROL SYSTEM

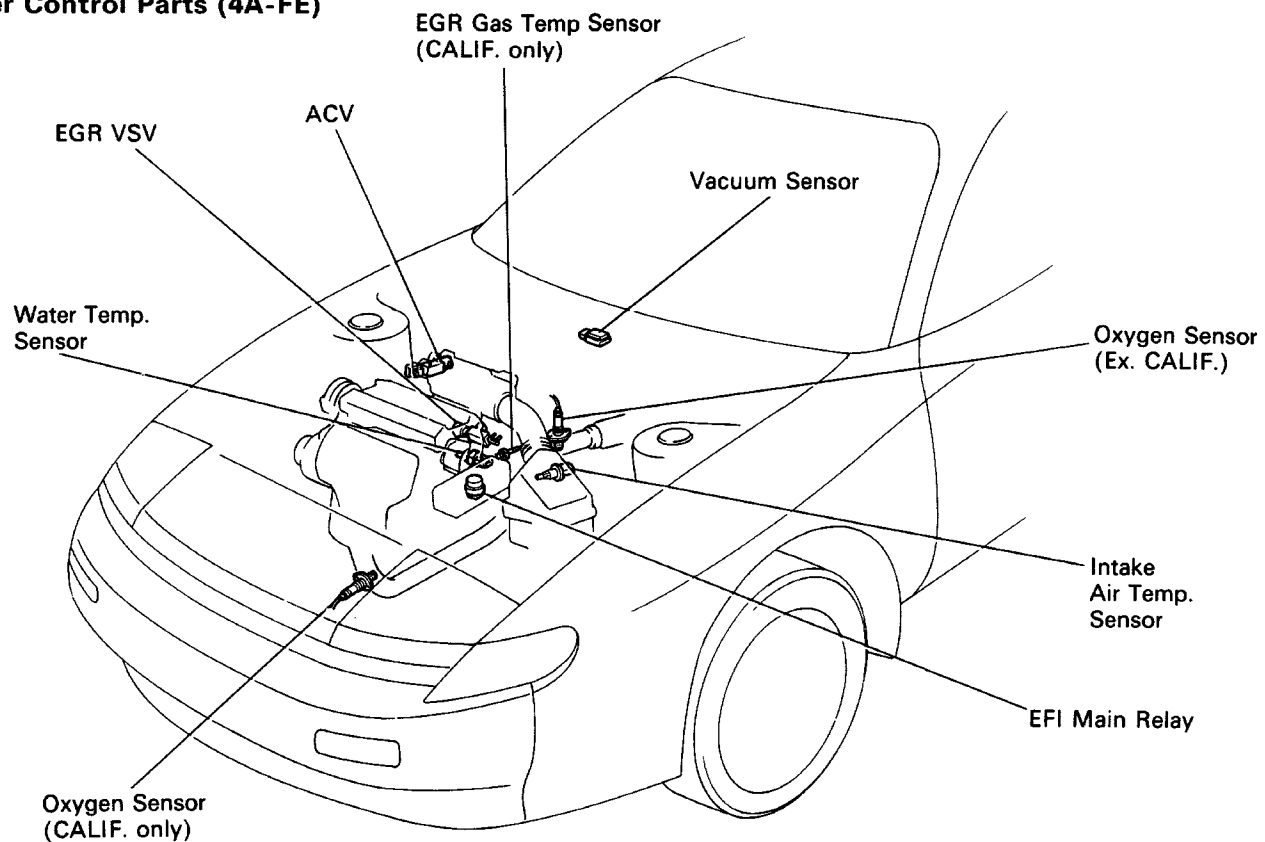
Location of Electronic Control Parts

ECU and Circuit Opening Relay



FI5450

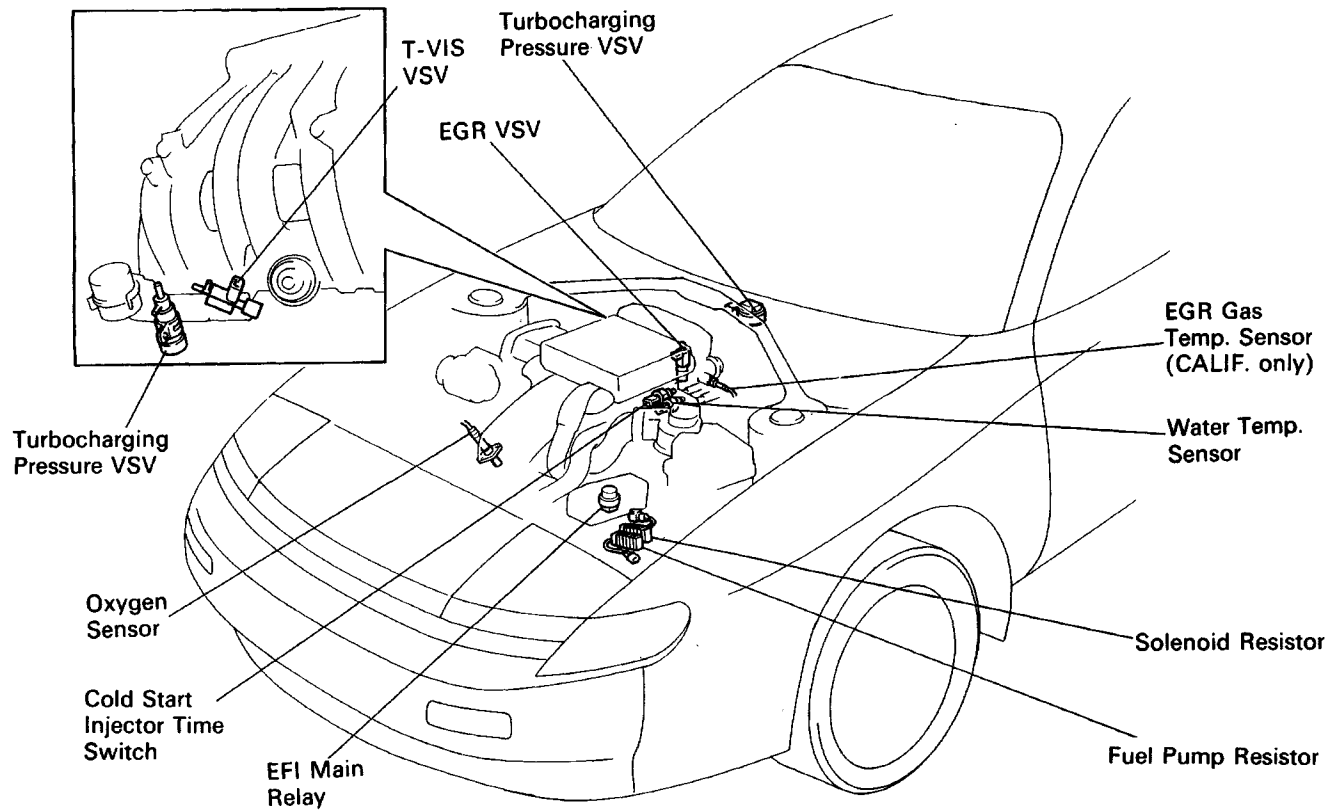
Other Control Parts (4A-FE)



FI6189

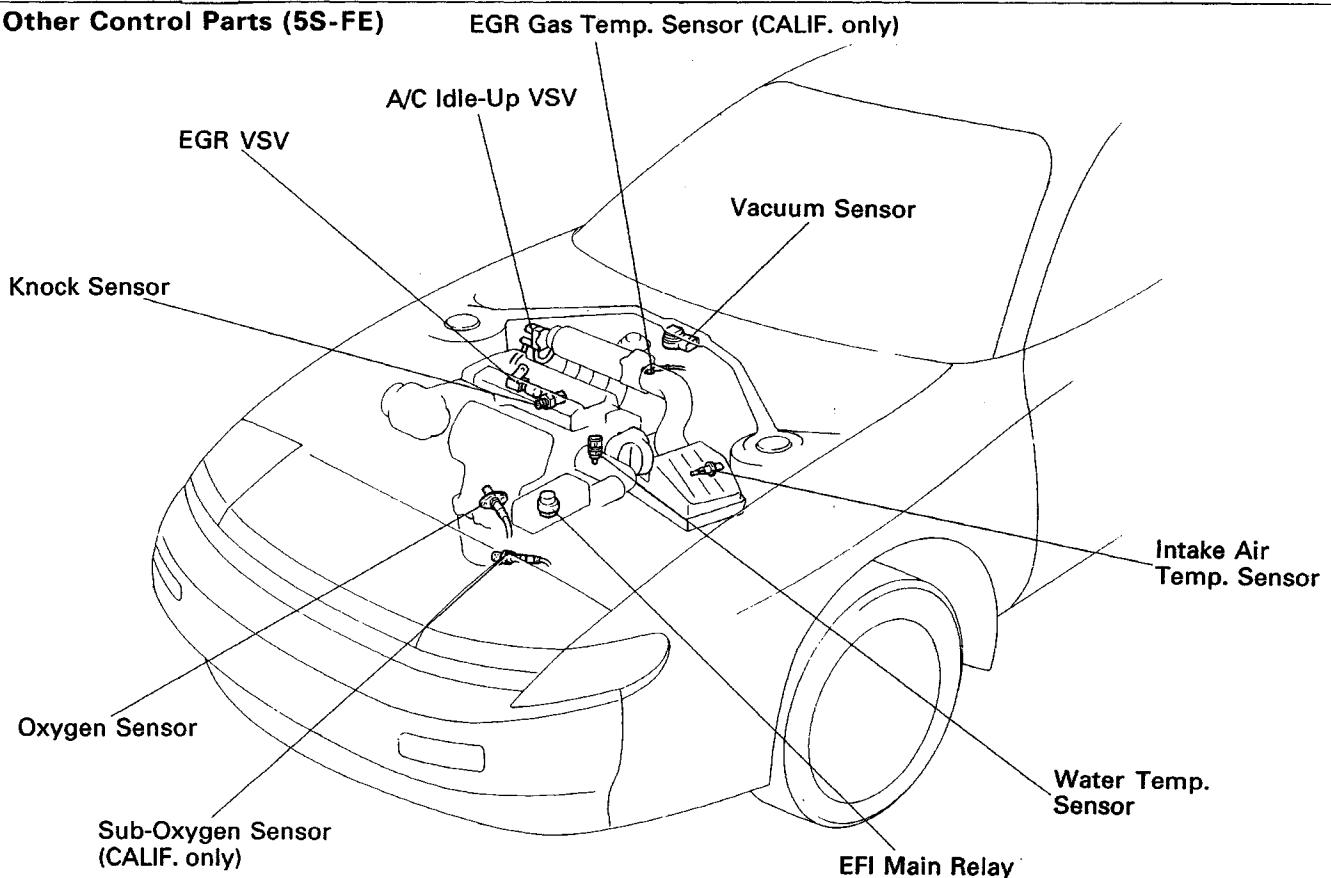
Location of Electronic Control Parts (Cont'd)

Other Control Parts (3S-GTE)



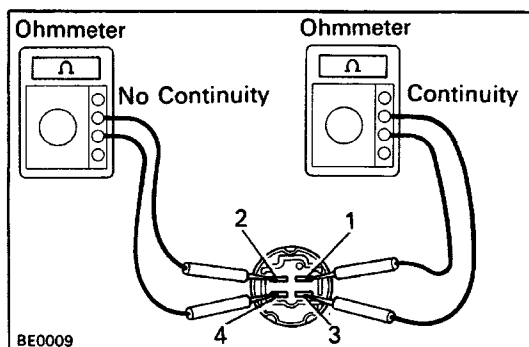
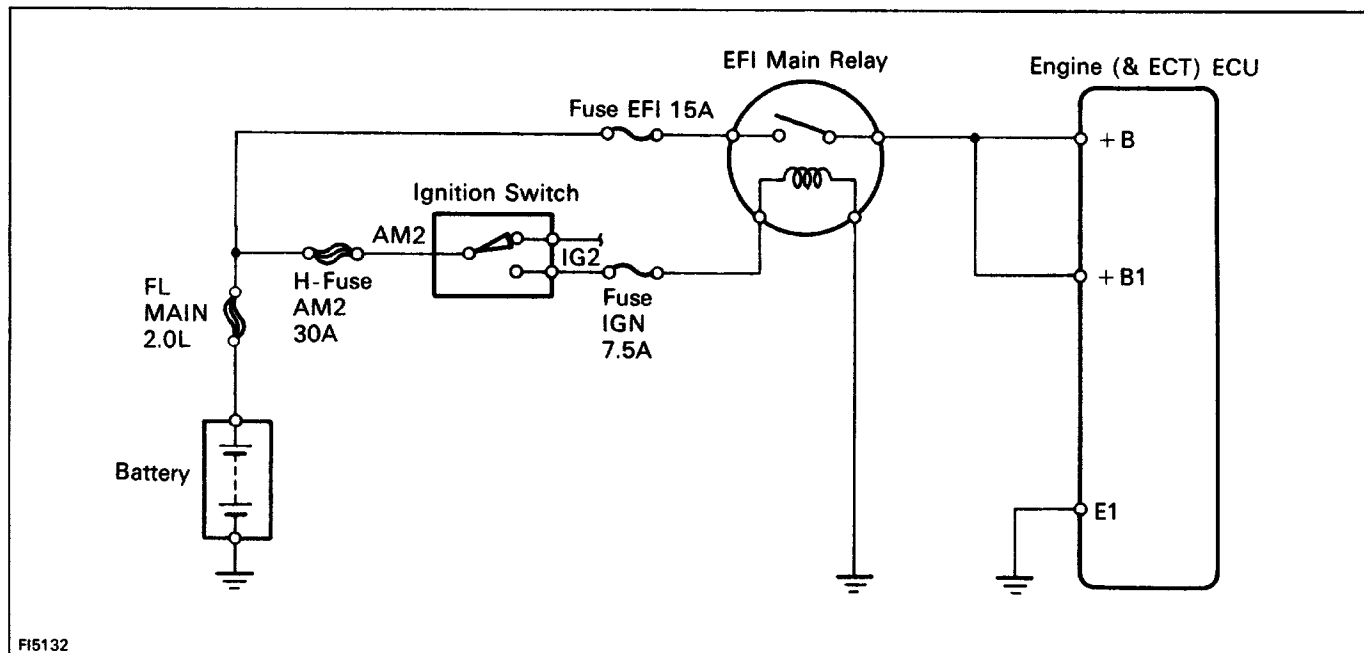
P03180

Other Control Parts (5S-FE)



P03019

EFI Main Relay

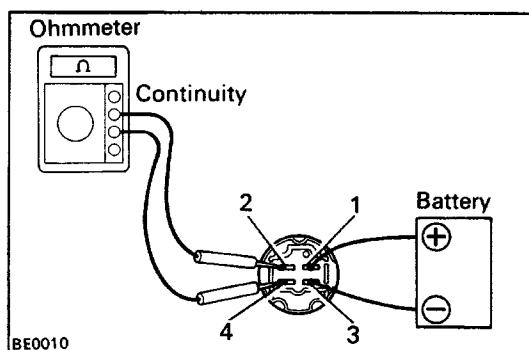


INSPECTION OF EFI MAIN RELAY

1. INSPECT RELAY CONTINUITY

- Using an ohmmeter, check that there is continuity between terminals 1 and 3.
- Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.

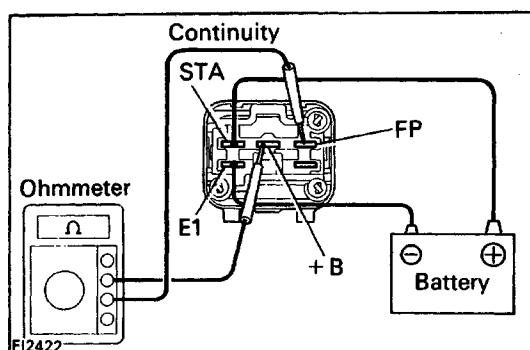
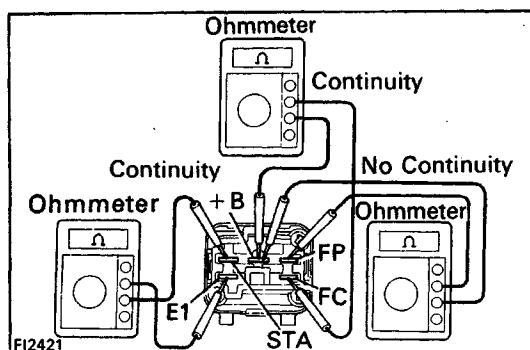
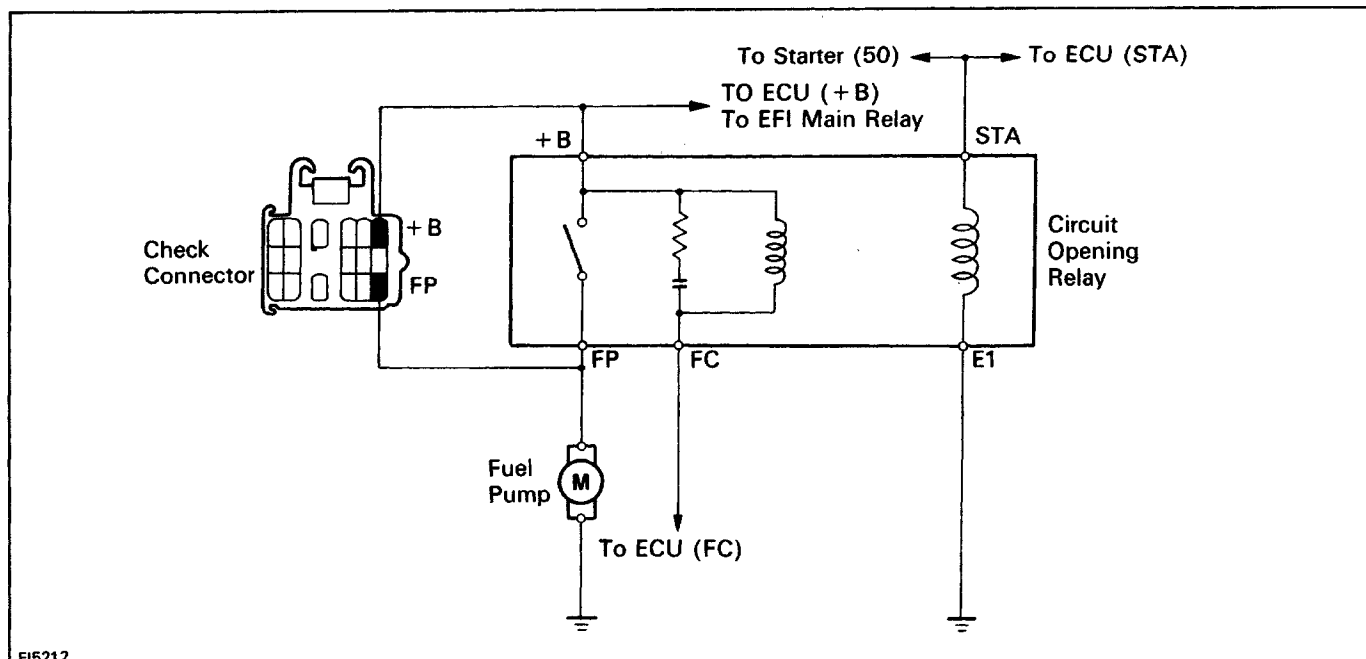


2. INSPECT RELAY OPERATION

- Apply battery voltage across terminals 1 and 3.
- Using an ohmmeter, check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

Circuit Opening Relay (4A-FE and 5S-FE)



INSPECTION OF CIRCUIT OPENING RELAY

1. INSPECT RELAY CONTINUITY

- Using an ohmmeter, check that there is continuity between terminals STA and E1.
- Check that there is continuity between terminals + B and FC.
- Check that there is no continuity between terminals + B and FP.

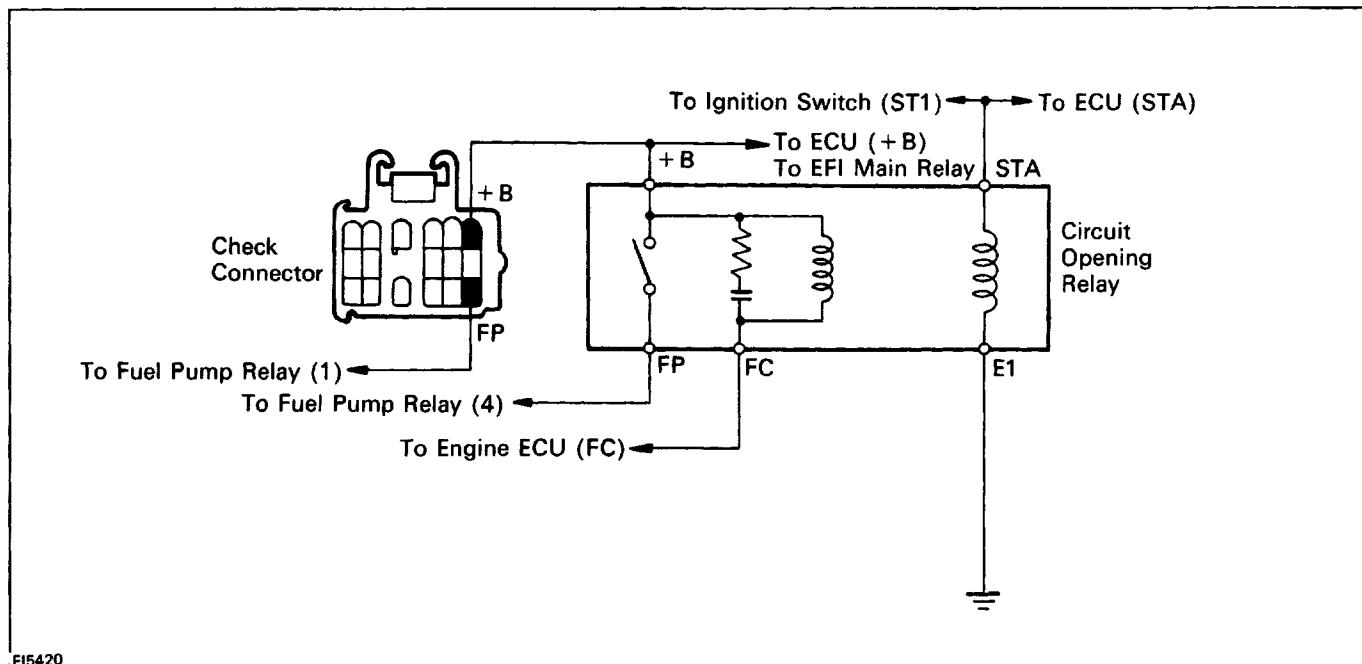
If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

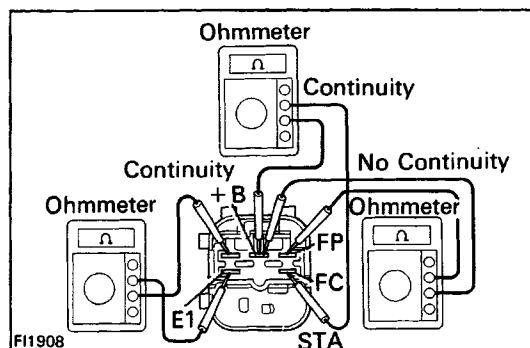
- Apply battery voltage across terminals STA and E1.
- Using an ohmmeter, check that there is continuity between terminals + B and FP.

If operation is not as specified, replace the relay.

Circuit Opening Relay (3S-GTE)



FI5420



FI1908

INSPECTION OF CIRCUIT OPENING RELAY

1. INSPECT RELAY CONTINUITY

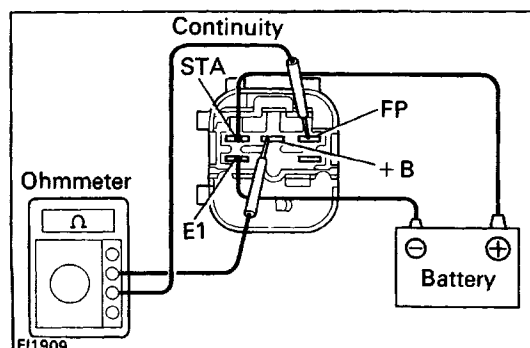
- Using an ohmmeter, check that there is continuity between terminals STA and E1.
- Check that there is continuity between terminals +B and FC.
- Check that there is no continuity between terminals +B and FP.

If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

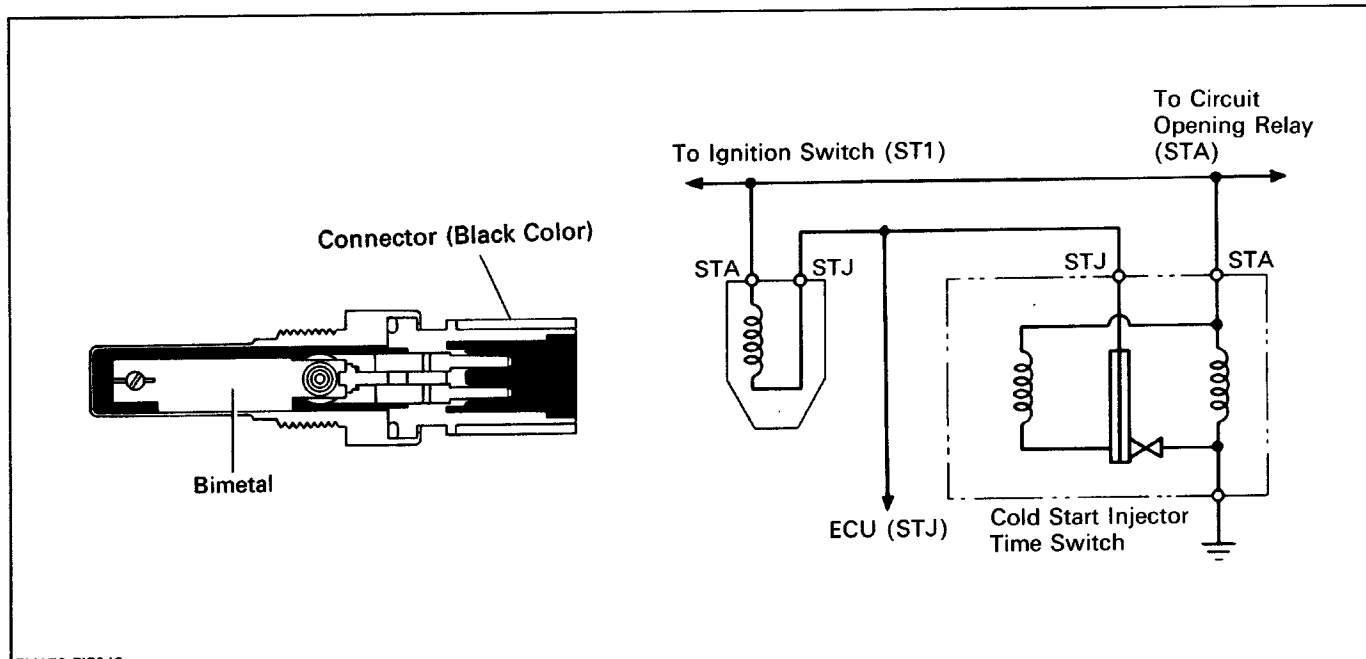
- Apply battery voltage across terminals STA and E1.
- Using an ohmmeter, check that there is continuity between terminals +B and FP.

If operation is not as specified, replace the relay.

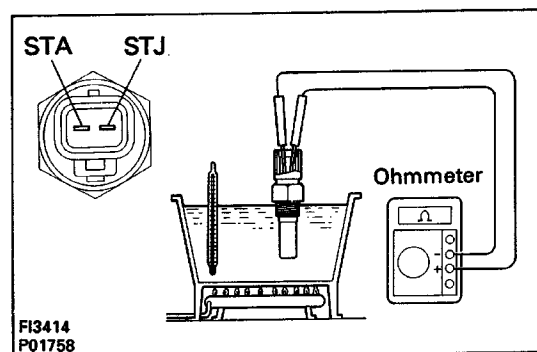


FI1909

Cold Start Injector Time Switch (3S–GTE)



FI4172 FI5843



FI3414
P01758

INSPECTION OF COLD START INJECTOR TIME SWITCH

INSPECT RESISTANCE OF COLD START INJECTOR TIME SWITCH

Using an ohmmeter, measure the resistance between each terminal.

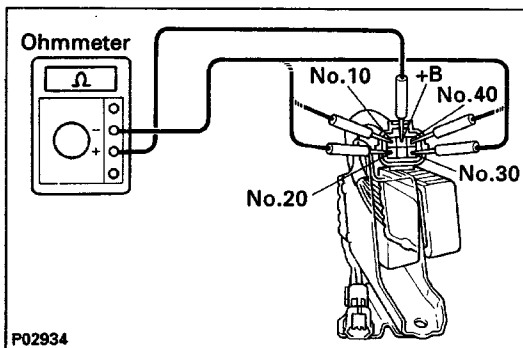
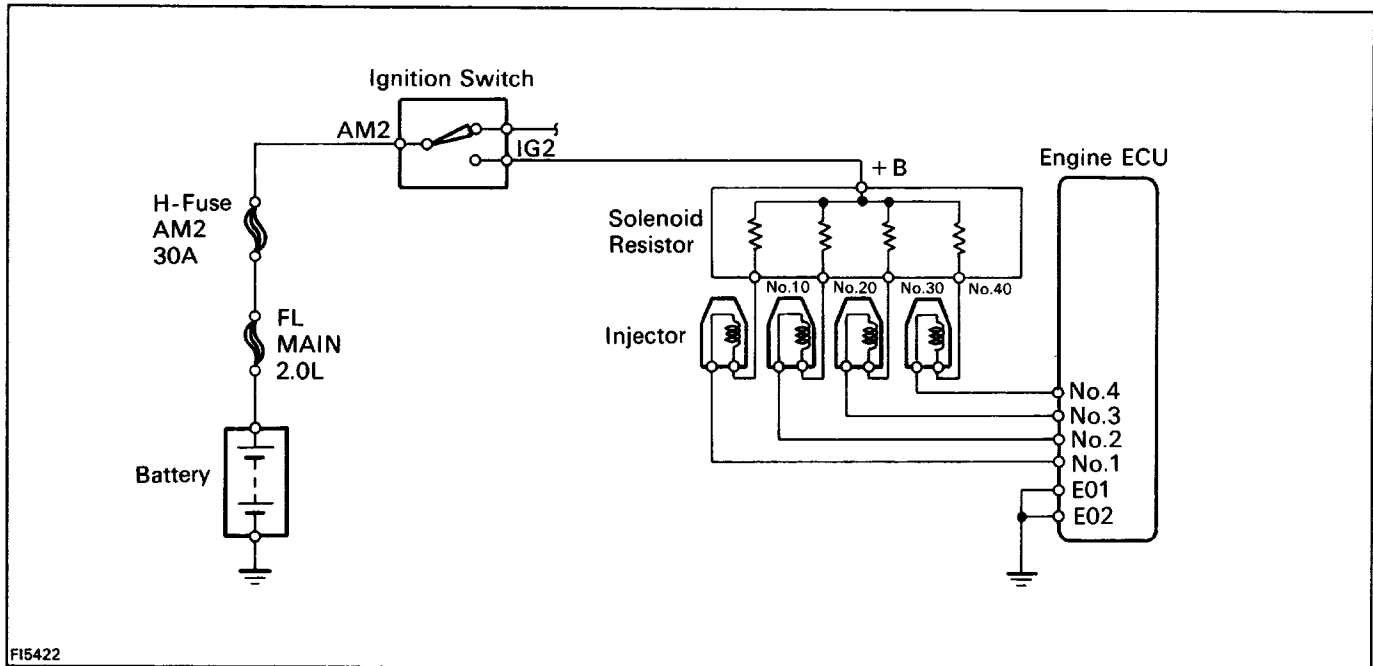
Resistance:

STA – STJ 30 – 50 below 10°C (50°F)
 70 – 90 above 25°C (77°F)

STA – Ground 30 – 90

If the resistance is not as specified, replace the switch.

Solenoid Resistor (3S-GTE)



INSPECTION OF SOLENOID RESISTOR

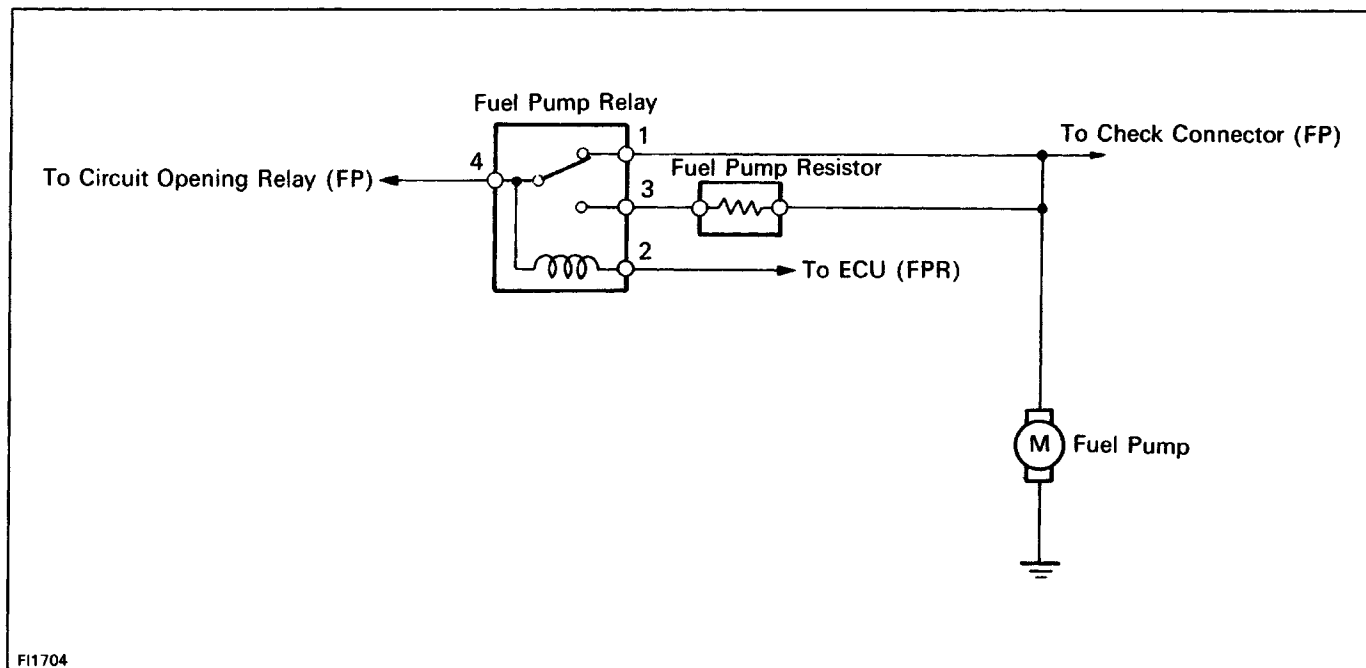
INSPECT SOLENOID RESISTOR

Using an ohmmeter, measure the resistance between terminal + B and other terminals.

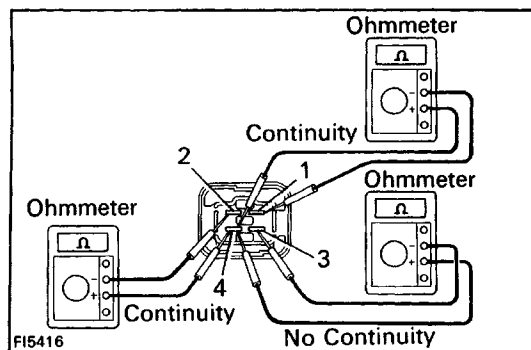
Resistance: 4 – 6

If the resistance is not as specified, replace the resistor.

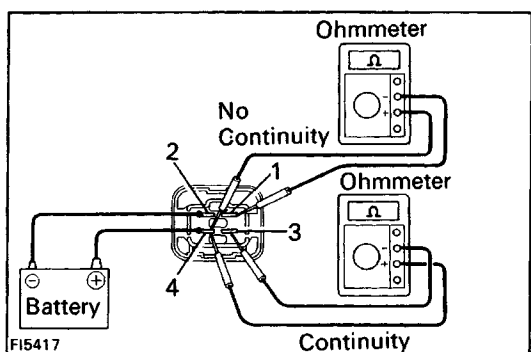
Fuel Pump Relay and Resistor (3S–GTE)



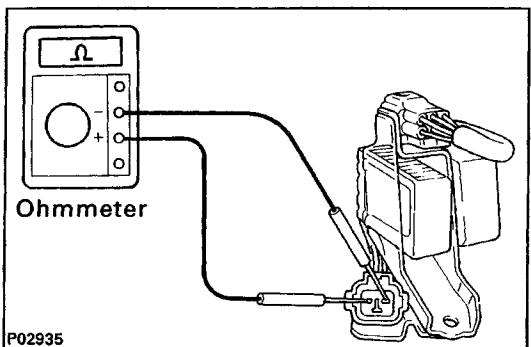
FI1704



FI5416



FI5417



P02935

INSPECTION OF FUEL PUMP RELAY AND RESISTOR

1. INSPECT FUEL PUMP RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 2 and 4.
- Check that there is continuity between terminals 1 and 4.
- Check that there is no continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.

B. Inspect relay operation

- Apply battery voltage across terminals 2 and 4.
- Using an ohmmeter, check that there is no continuity between terminals 1 and 4.
- Check that there is continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.

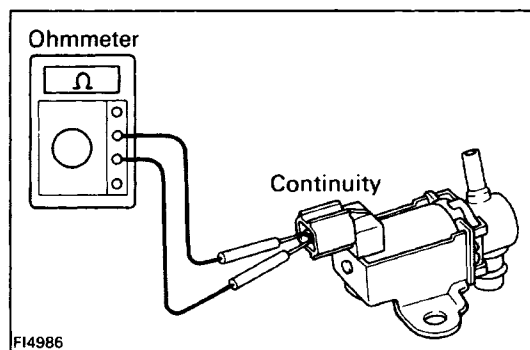
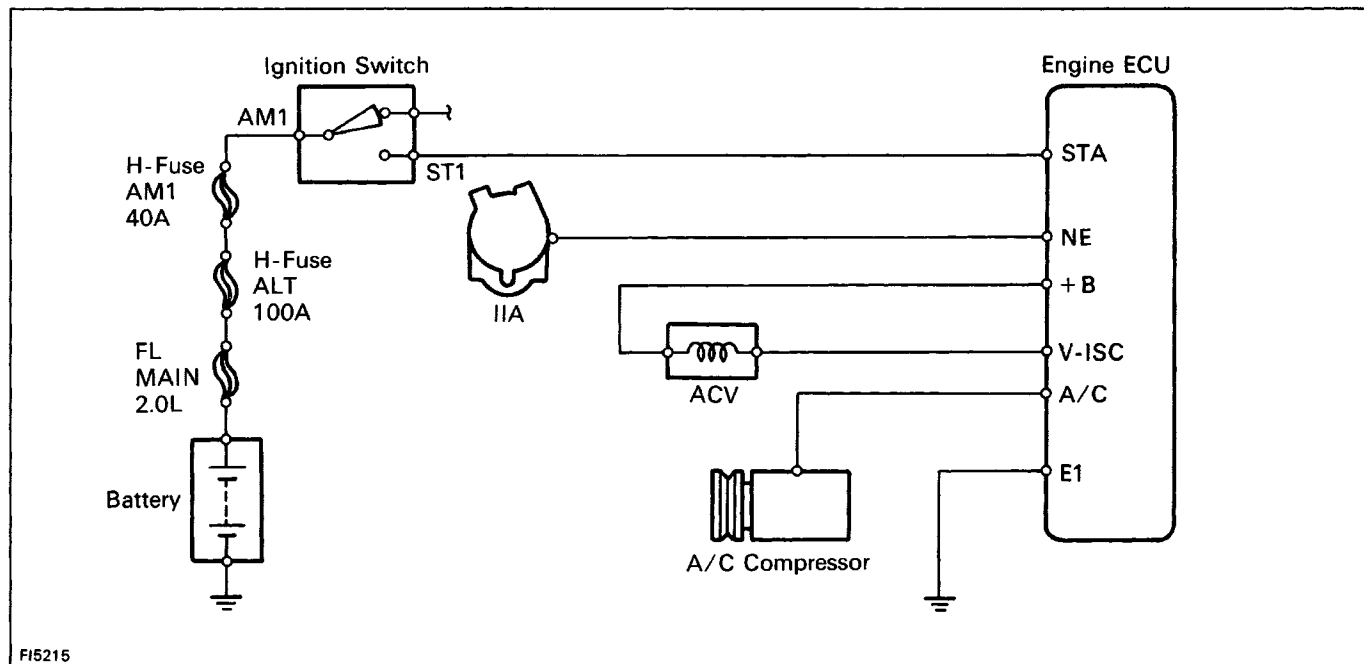
2. INSPECT FUEL PUMP RESISTOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Approx. 0.73

If the resistance is not as specified, replace the resistor.

Air Control Valve (ACV) (4A-FE)



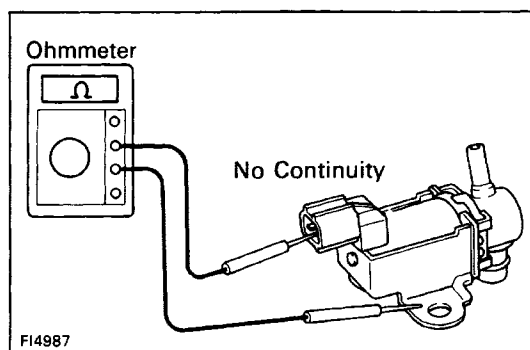
INSPECTION OF ACV

1. INSPECT ACV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 27 – 33

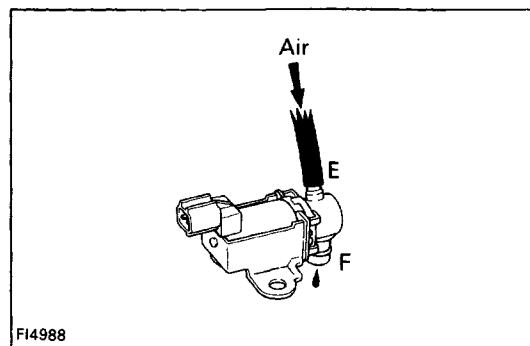
If there is no continuity, replace the ACV.



2. INSPECT ACV FOR GROUND

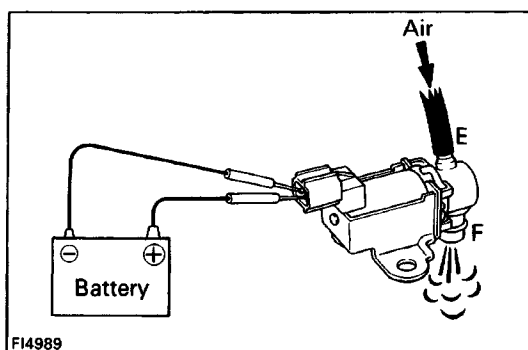
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the ACV.



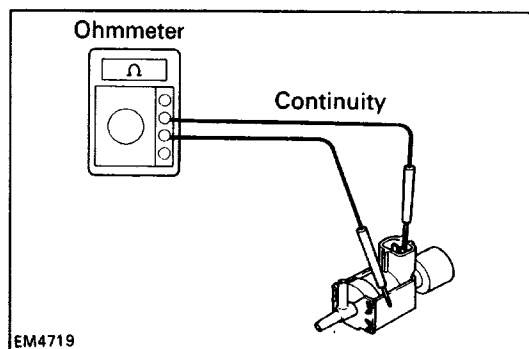
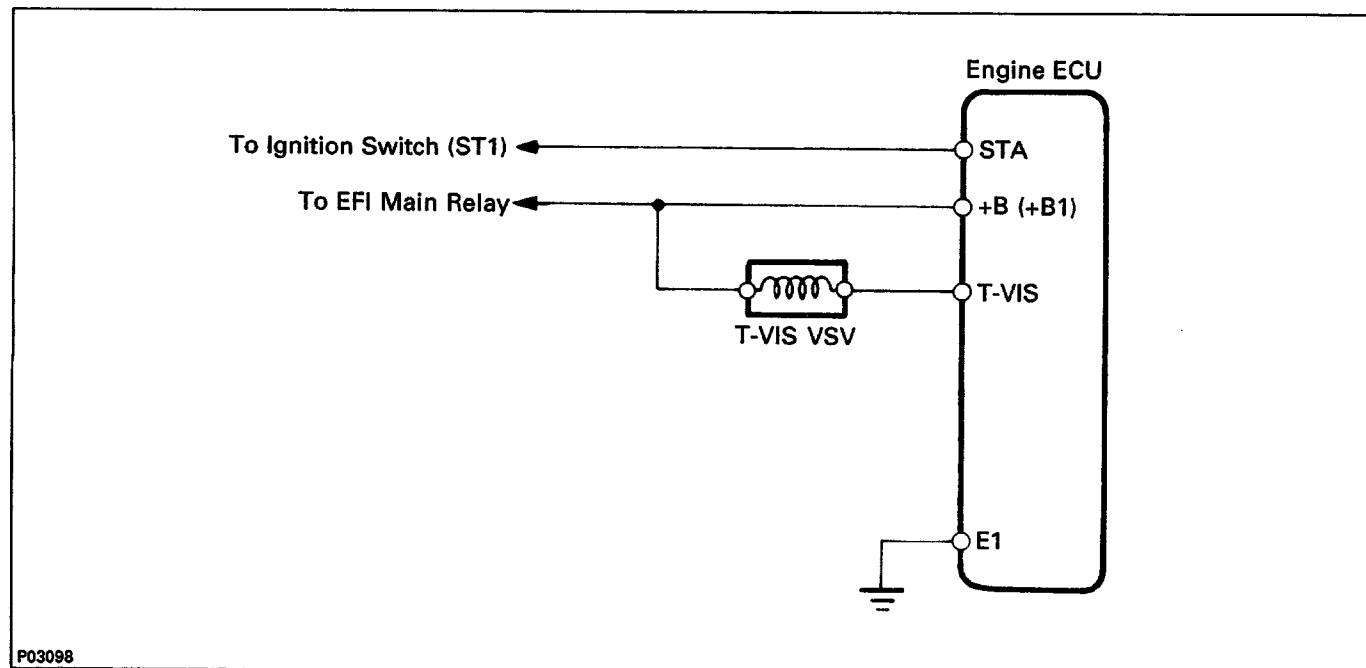
3. INSPECT ACV OPERATION

- (a) Check that the air does not flow from port E to port F.



- (b) Apply battery voltage across the terminals.
- (c) Check that the air flows from port E to port F.
If operation is not as specified, replace the ACV.

T-VIS VSV (3S-GTE)



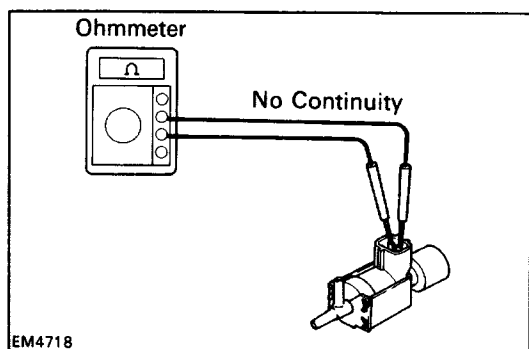
INSPECTION OF T-VIS VSV

1. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 33 – 39

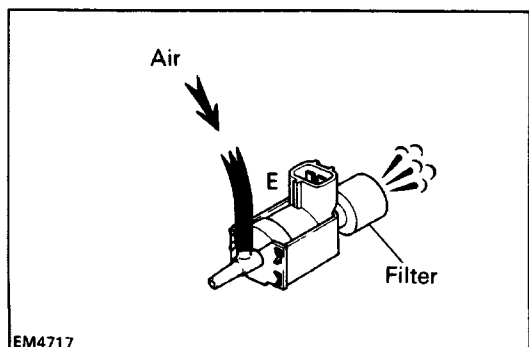
If there is no continuity, replace the VSV.



2. INSPECT VSV FOR GROUND

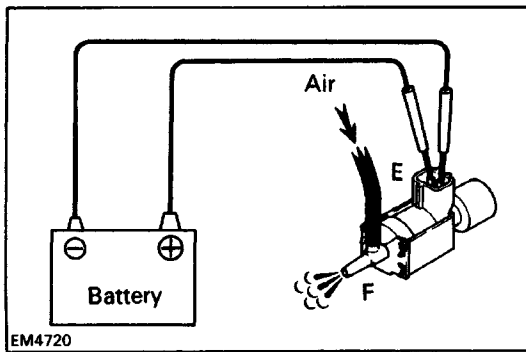
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



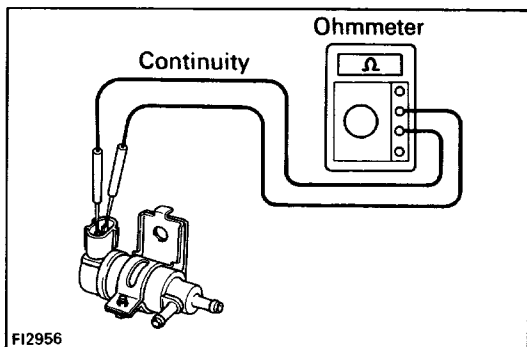
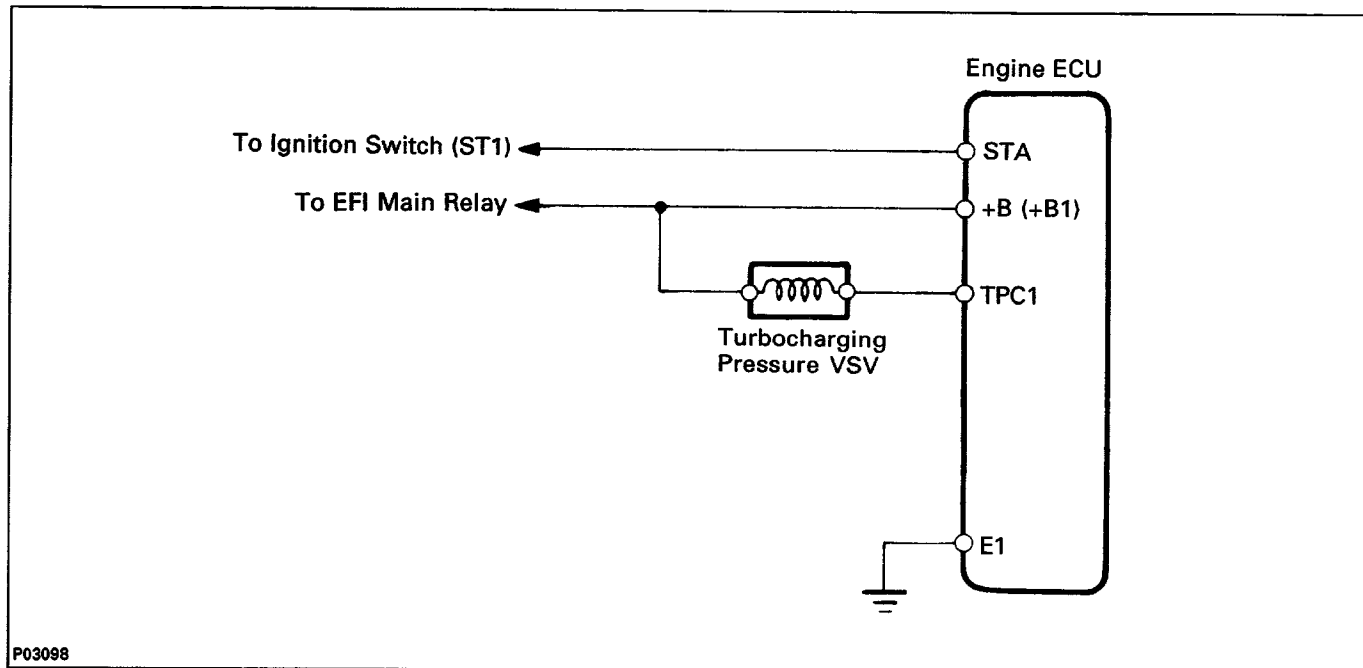
3. INSPECT VSV OPERATION

(a) Check that the air flows from port E to the filter.



- (b) Apply battery voltage across the terminals.
- (c) Check that the air flows from port E to port F. If operation is not as specified, replace the VSV.

Turbocharging Pressure VSV (3S-GTE)



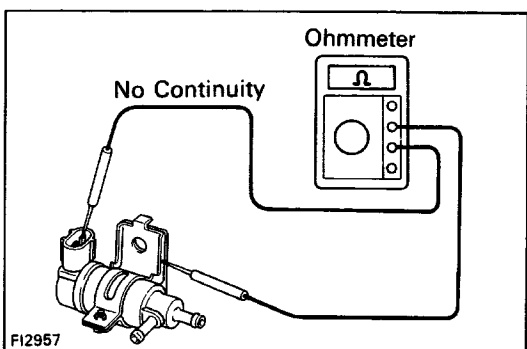
INSPECTION OF TURBOCHARGING PRESSURE VSV

1. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 24 – 30

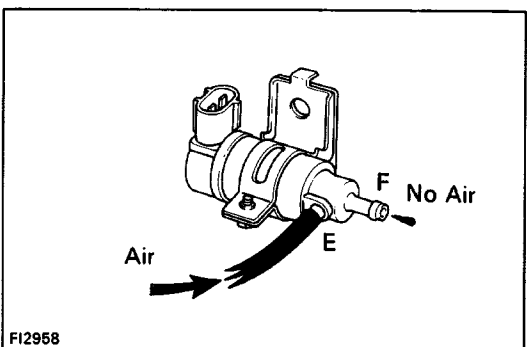
If there is no continuity, replace the VSV.



2. INSPECT VSV FOR GROUND

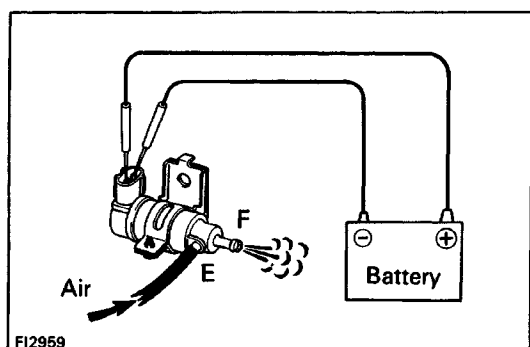
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



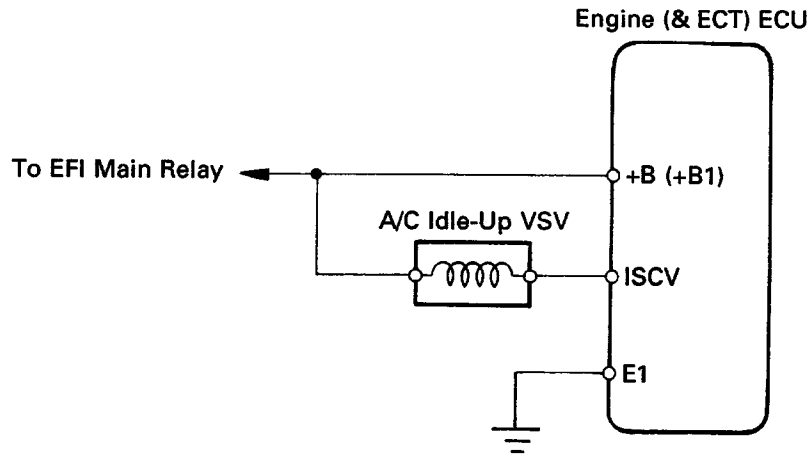
3. INSPECT VSV OPERATION

- (a) Check that the air does not flow from port E to port F.

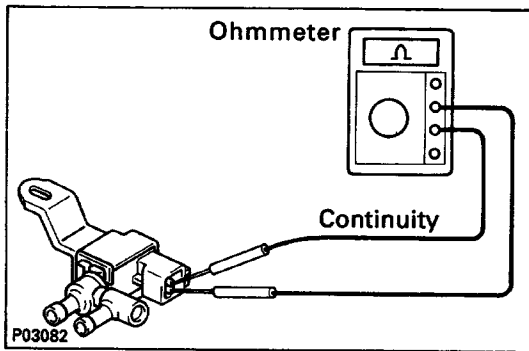


- (b) Apply battery voltage across the terminals.
- (c) Check that the air flows from port E to port F.
If operation is not as specified, replace the VSV.

AC Idle-Up VSV (5S-FE)



P01447



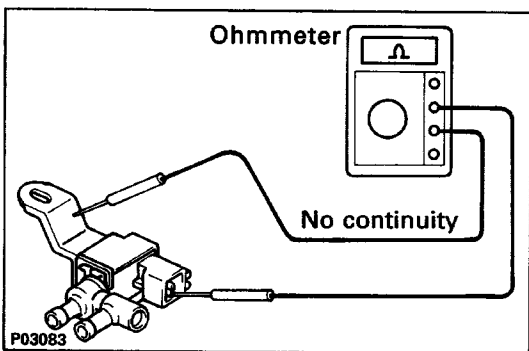
INSPECTION OF A/C IDLE-UP VSV

1. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 30 – 34Ω

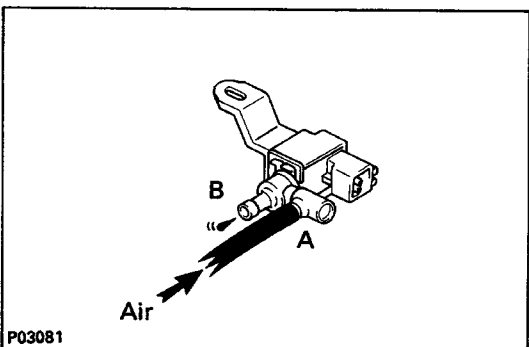
If there is no continuity, replace the VSV.



2. INSPECT VSV FOR GROUND

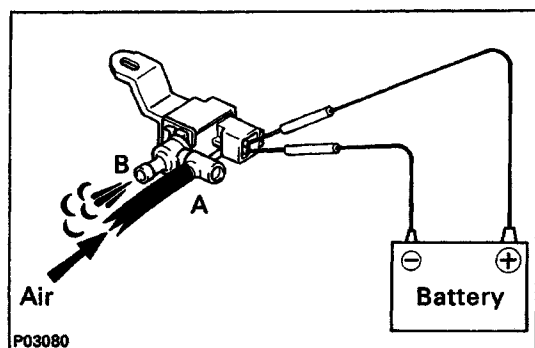
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



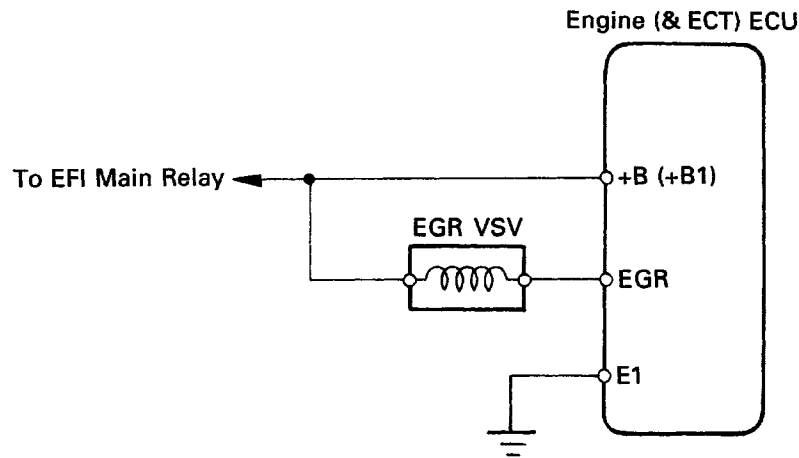
3. INSPECT VSV OPERATION

- (a) Check that the air does not flow from port A to port B.



- (b) Apply battery voltage across the terminals.
- (c) Check that the air flows from port A to port B.
If operation is not as specified, replace the VSV.

EGR VSV

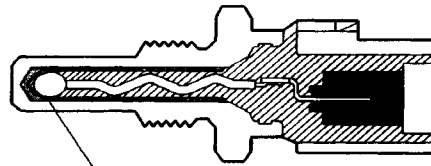


P01447

INSPECTION OF EGR VSV

4A-FE (See page [EC-11](#))3S-GTE (See page [EC-23](#))5S-FE (See page [EC-38](#))

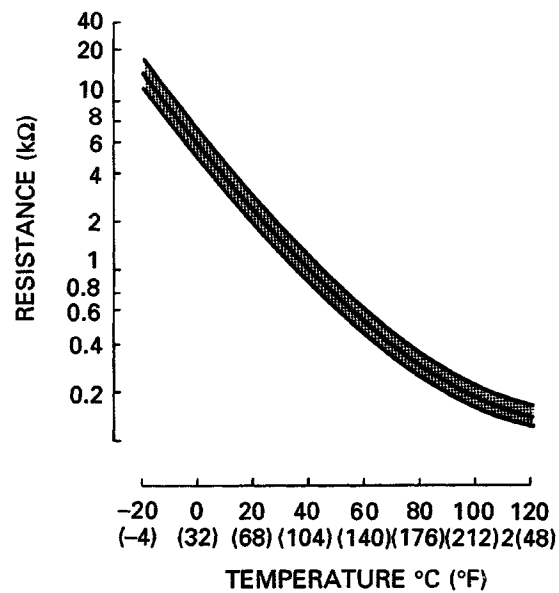
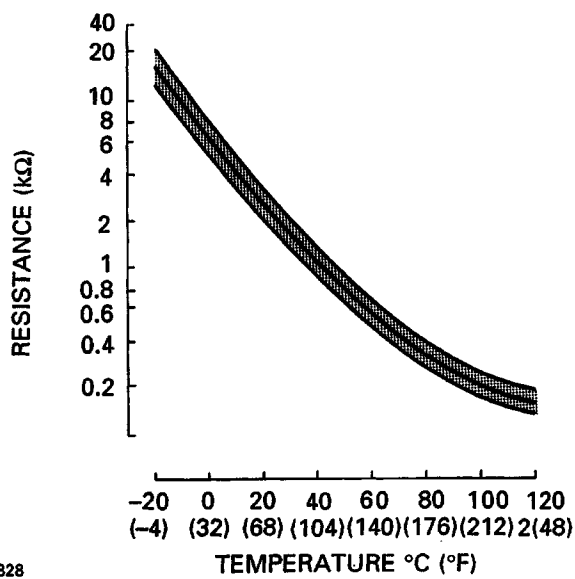
Water Temperature Sensor



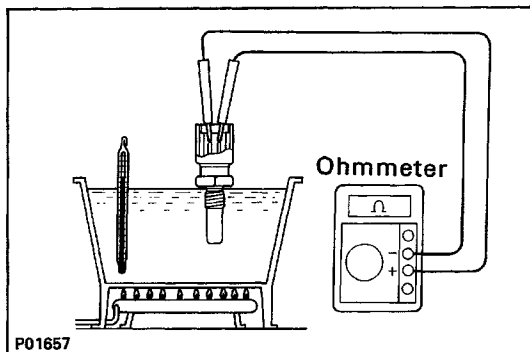
Thermistor

4A-FE

3S-GTE and 5S-FE

FI3828
P03525 P03524

TEMPERATURE °C (°F)



P01657

INSPECTION OF WATER TEMPERATURE SENSOR

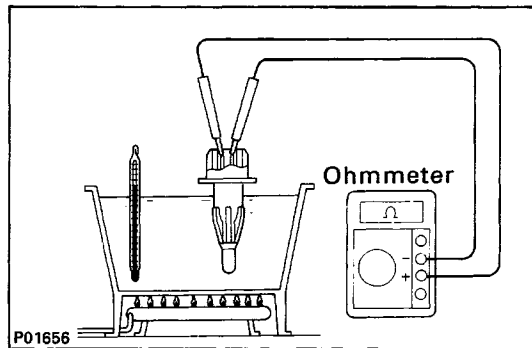
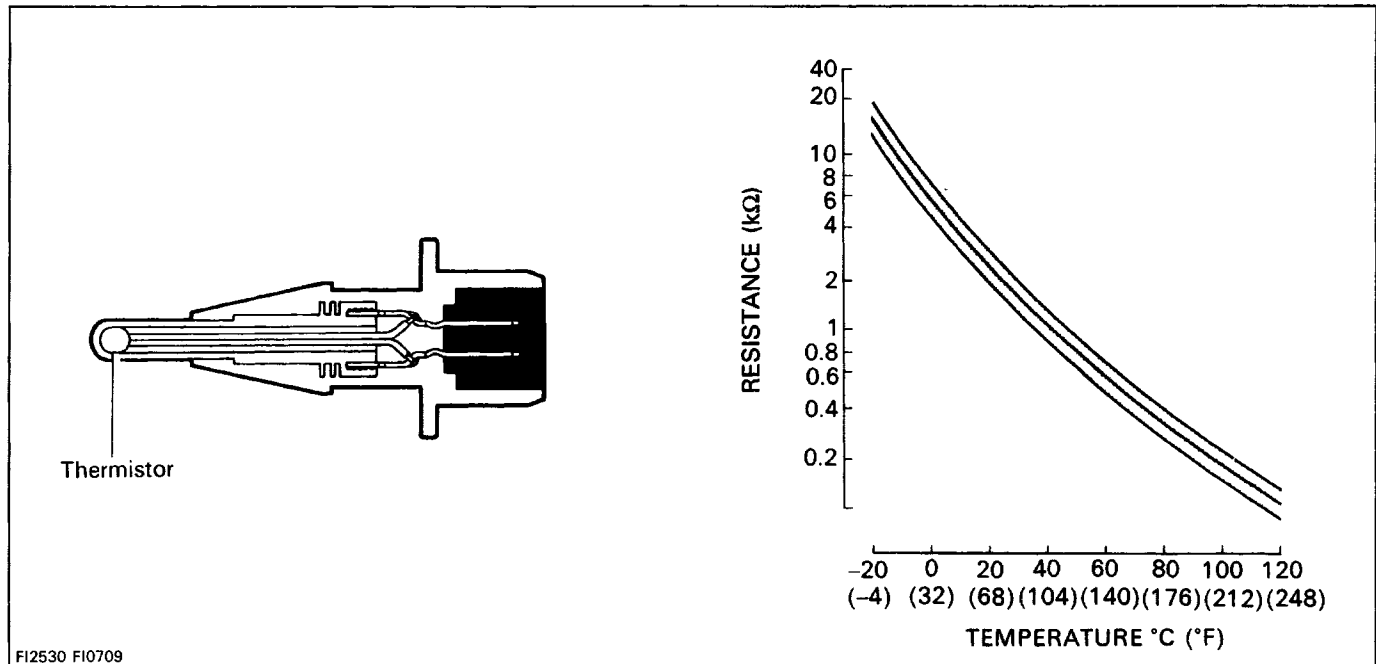
INSPECT RESISTANCE OF WATER TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the chart above

If the resistance is not as specified, replace the sensor.

Intake Air Temperature Sensor (4A-FE and 5S-FE)



INSPECTION OF INTAKE AIR TEMPERATURE SENSOR

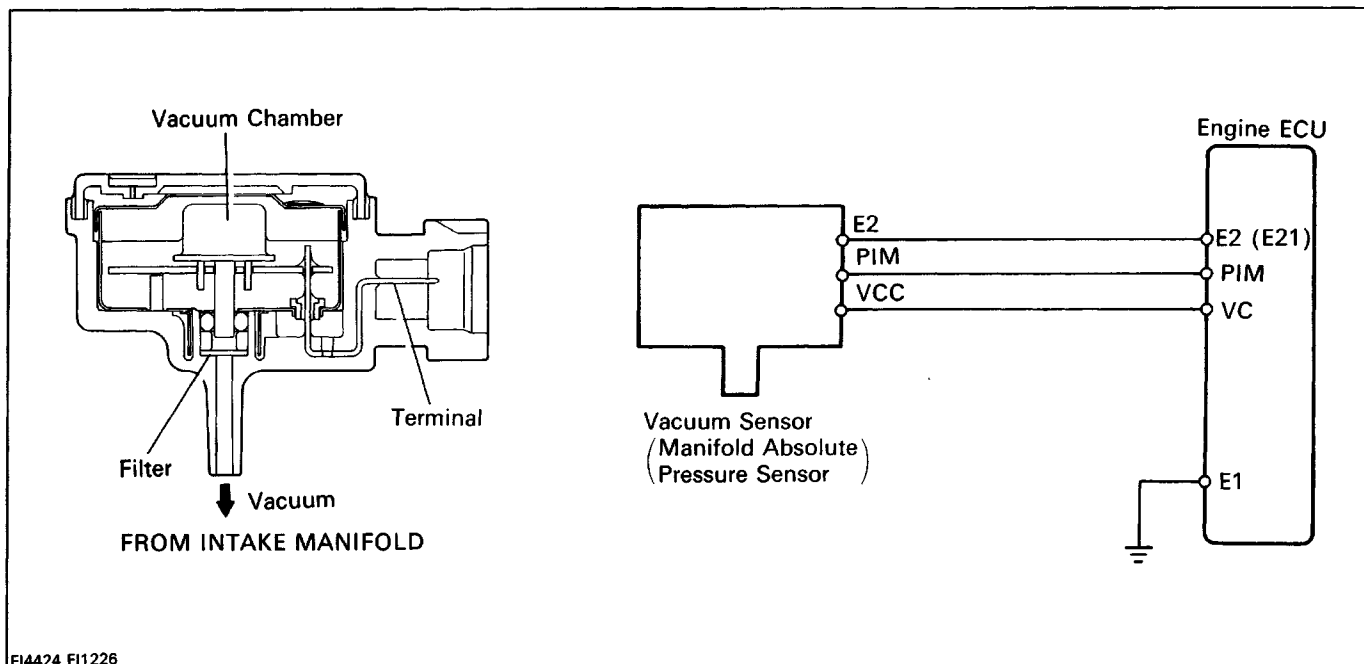
INSPECT RESISTANCE OF INTAKE AIR TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

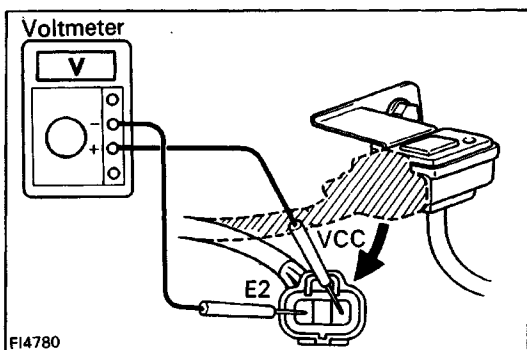
Resistance: Refer to the chart above

If the resistance is not as specified, replace the sensor.

Vacuum Sensor (Manifold Absolute Pressure Sensor) (4A-FE)



FI4424 FI1226



FI4780

INSPECTION OF VACUUM SENSOR

1. INSPECT POWER SOURCE VOLTAGE OF VACUUM SENSOR

- Disconnect the vacuum sensor connector.
- Turn the ignition switch ON.
- Using a voltmeter, measure the voltage between connector terminals VCC and E2 of the wiring harness side.

Voltage: 4.5 – 5.5 V

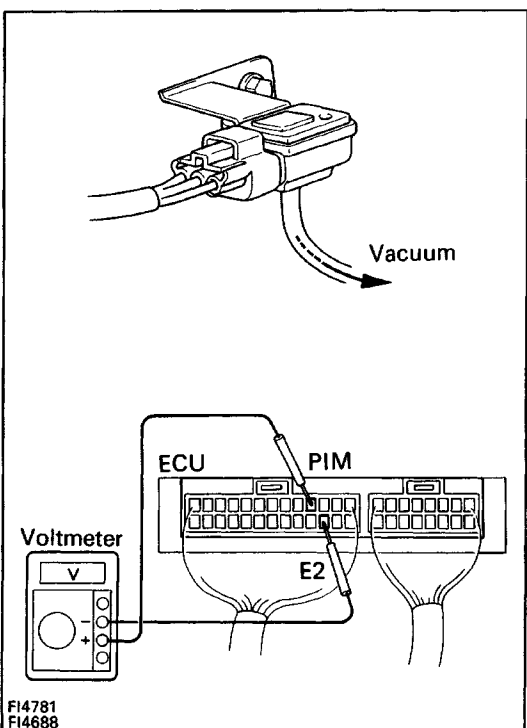
- Reconnect the vacuum sensor connector.

2. INSPECT POWER OUTPUT OF VACUUM SENSOR

- Turn the ignition switch ON.
- Disconnect the vacuum hose of the intake manifold (chamber) side.
- Connect a voltmeter to terminals PIM and E2 of the ECU, and measure and record the output voltage under ambient atmospheric pressure.
- Apply vacuum to the vacuum sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) segments to 66.7 kPa (500 mmHg, 19.69 in.Hg).
- Measure voltage drop from step (c) above for each segment.

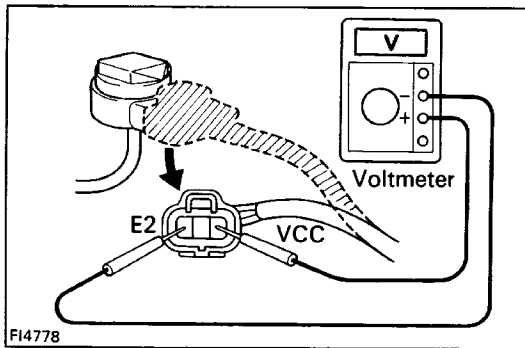
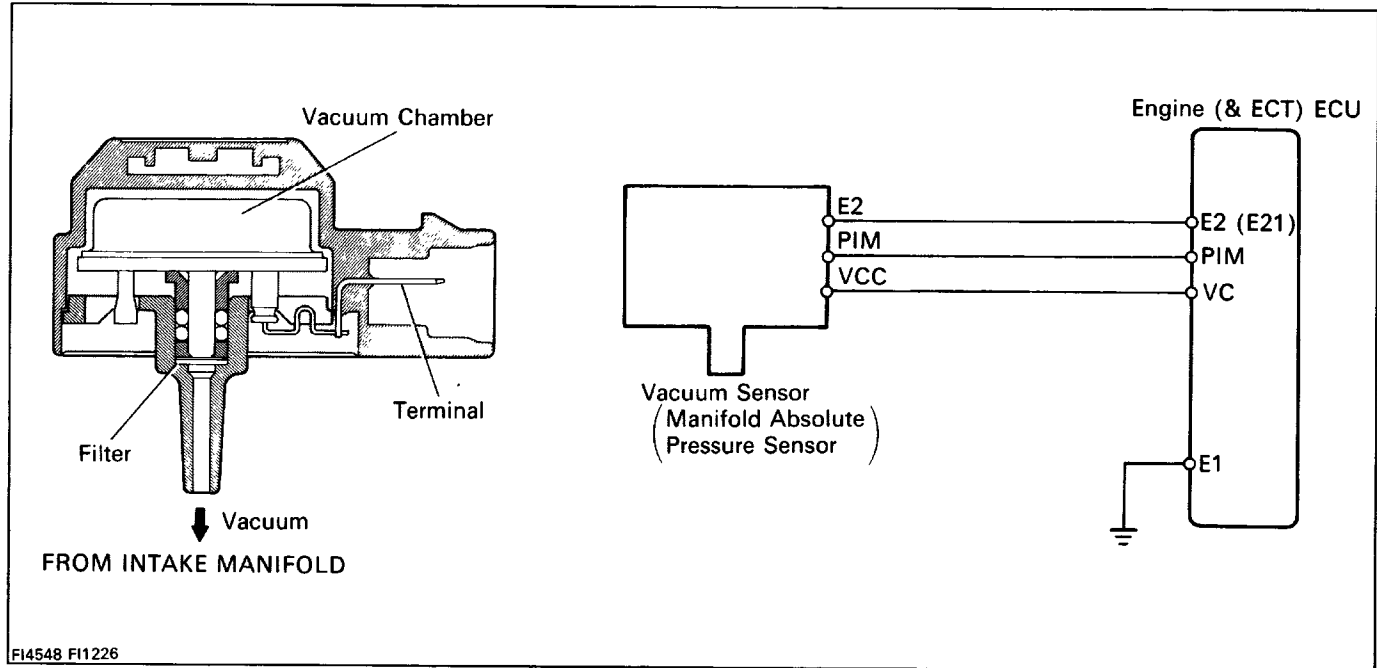
Voltage drop:

Applied Vacuum kPa (mmHg in.Hg)	13.3 (100 3.94)	26.7 (200 7.87)	40.0 (300 11.81)	53.5 (400 15.75)	66.7 (500 19.69)
Voltage drop (V)	0.3 – 0.5	0.7 – 0.9	1.1 – 1.3	1.5 – 1.7	1.9 – 2.1



FI4781
FI4688

Vacuum Sensor (Manifold Absolute Pressure Sensor) (5S-FE)



INSPECTION OF VACUUM SENSOR

1. INSPECT POWER SOURCE VOLTAGE OF VACUUM SENSOR

- Disconnect the vacuum sensor connector.
- Turn the ignition switch ON.
- Using a voltmeter, measure the voltage between connector terminals VCC and E2 of the wiring harness side.

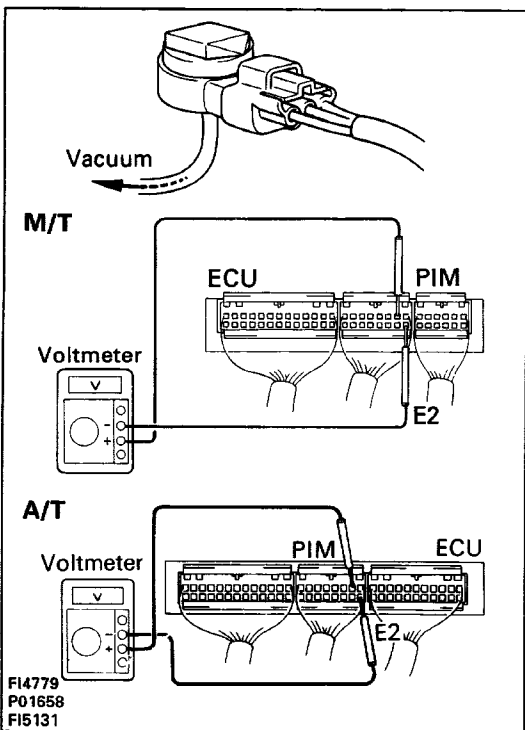
Voltage: 4.5 – 5.5 V

- Reconnect the vacuum sensor connector.

2. INSPECT POWER OUTPUT OF VACUUM SENSOR

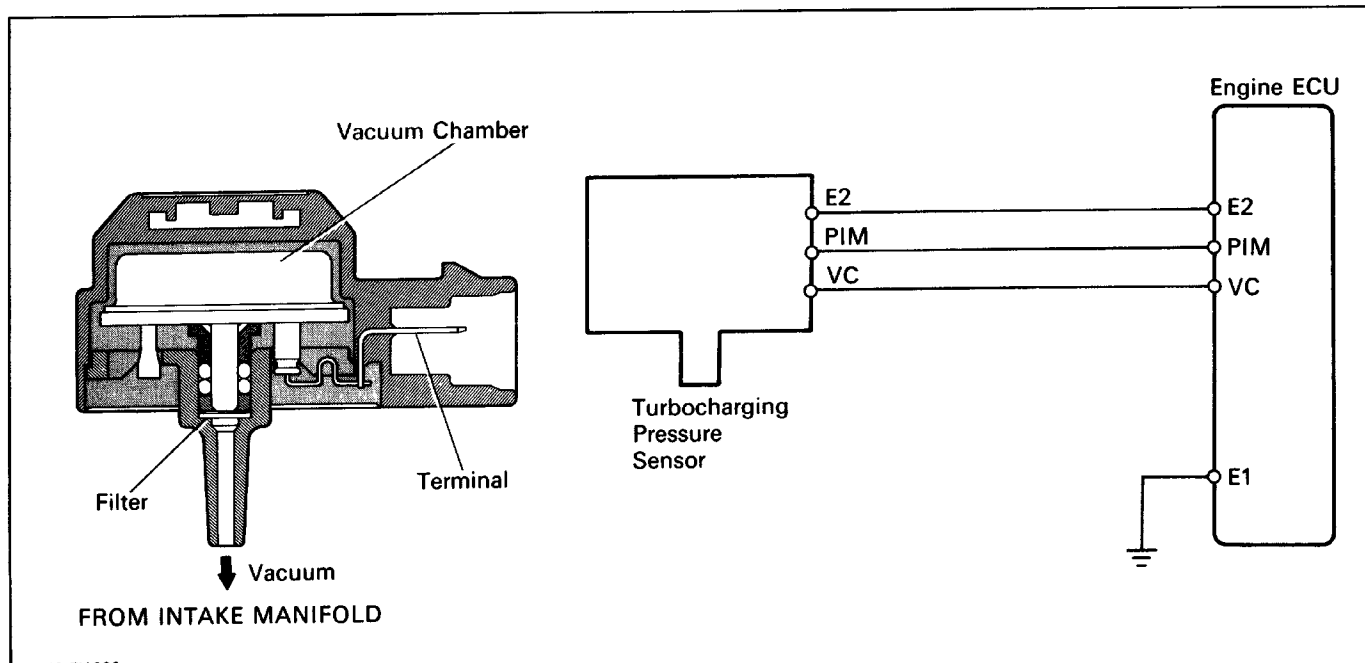
- Turn the ignition switch ON.
- Disconnect the vacuum hose of the intake manifold (chamber) side.
- Connect a voltmeter to terminals PIM and E2 of the ECU, and measure and record the output voltage under ambient atmospheric pressure.
- Apply vacuum to the vacuum sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) segments to 66.7 kPa (500 mmHg, 19.69 in.Hg).
- Measure voltage drop from step (c) above for each segment.

Voltage drop:



Applied Vacuum kPa (mmHg in.Hg)	13.3 (100 3.94)	26.7 (200 7.87)	40.0 (300 11.81)	53.5 (400 15.75)	66.7 (500 19.69)
Voltage drop (V)	0.3 – 0.5	0.7 – 0.9	1.1 – 1.3	1.5 – 1.7	1.9 – 2.1

Turbocharging Pressure Sensor (3S–GTE)



FI4548 FI1226

INSPECTION OF TURBOCHARGING PRESSURE SENSOR

1. INSPECT POWER SOURCE VOLTAGE OF TURBOCHARGING PRESSURE SENSOR

- Disconnect the pressure sensor connector.
- Turn the ignition switch ON.
- Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.

Voltage: 4.5 – 5.5 V

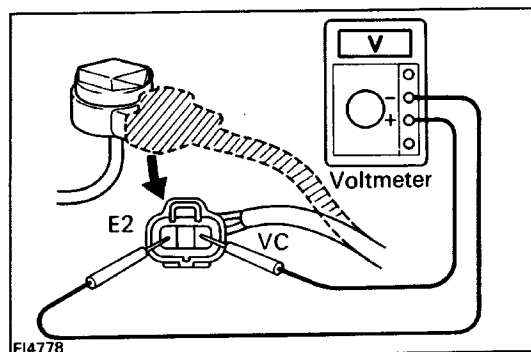
- Reconnect the pressure sensor connector.

2. INSPECT POWER OUTPUT OF TURBOCHARGING PRESSURE SENSOR

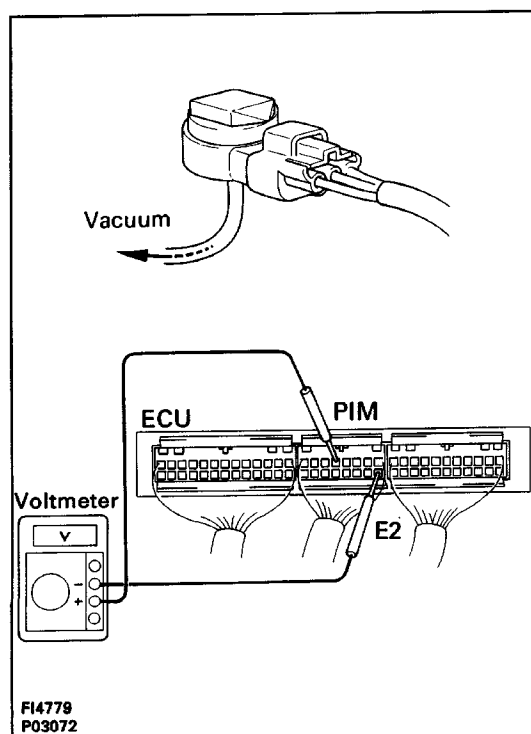
- Turn the ignition switch ON.
- Disconnect the vacuum hose of the intake manifold (chamber) side.
- Connect a voltmeter to terminals PIM and E2 of the ECU, and measure and record the output voltage under ambient atmospheric pressure.
- Apply vacuum to the pressure sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) segments to 66.7 kPa (500 mmHg, 19.69 in.Hg).
- Measure voltage drop from step (c) above for each segment.

Voltage drop:

Applied Vacuum kPa (mmHg in.Hg)	13.3 (100) (3.94)	26.7 (200) (7.87)	40.0 (300) (11.81)	53.5 (400) (15.75)	66.7 (500) (19.69)
Voltage drop(V)	0.15 – 0.35	0.4 – 0.6	0.65 – 0.85	0.9 – 1.1	1.15 – 1.35

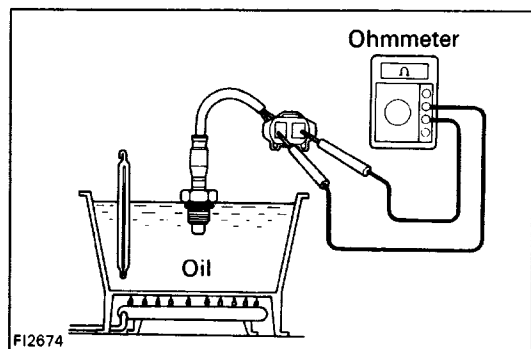
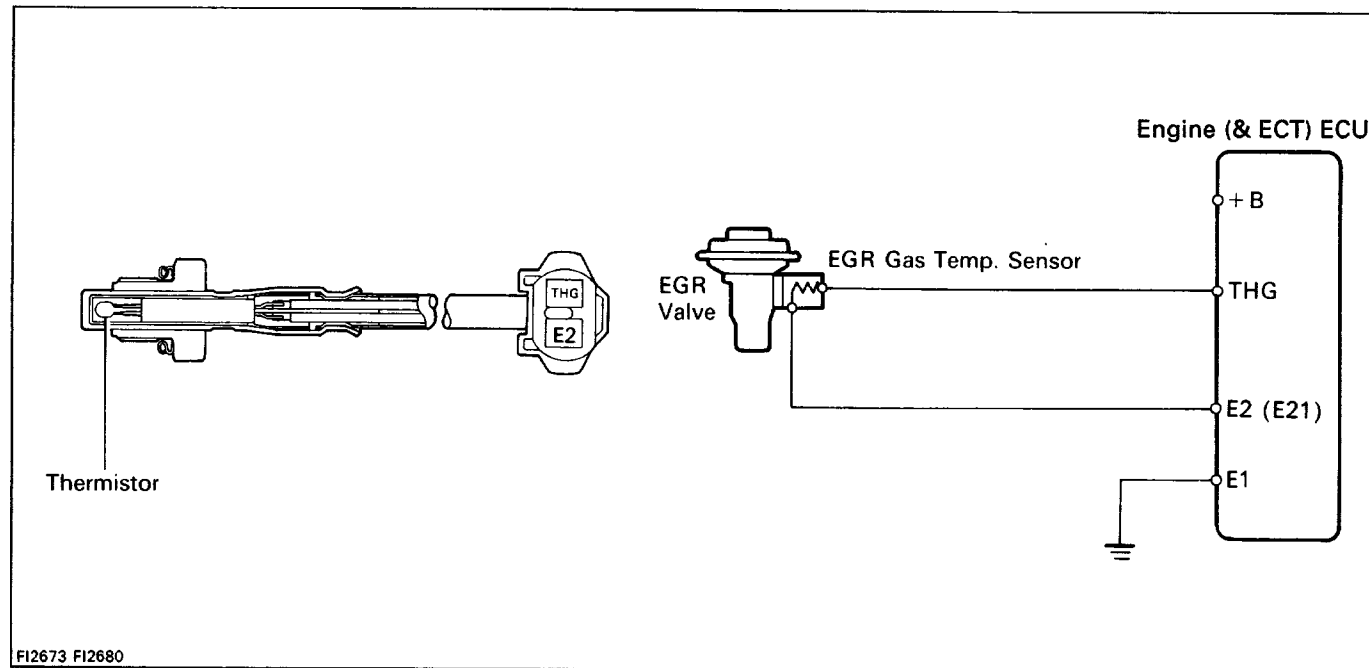


FI4778



FI4779
P03072

EGR Gas Temperature Sensor (CALIF. only)



INSPECTION OF EGR GAS TEMPERATURE SENSOR

INSPECT EGR GAS TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

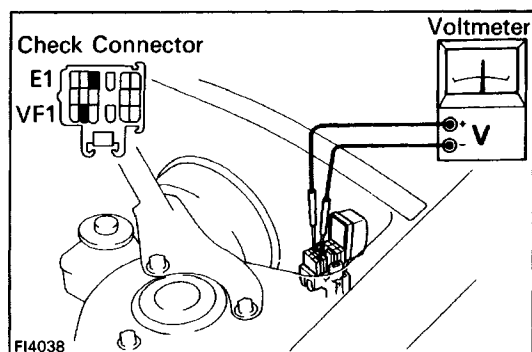
Resistance:

69 – 89k at 50°C (112°F)

11 – 15 k at 100°C (212°F)

2 – 4 k at 150°C (302°F)

If the resistance is not as specified, replace the sensor.



Oxygen Sensor (Main)

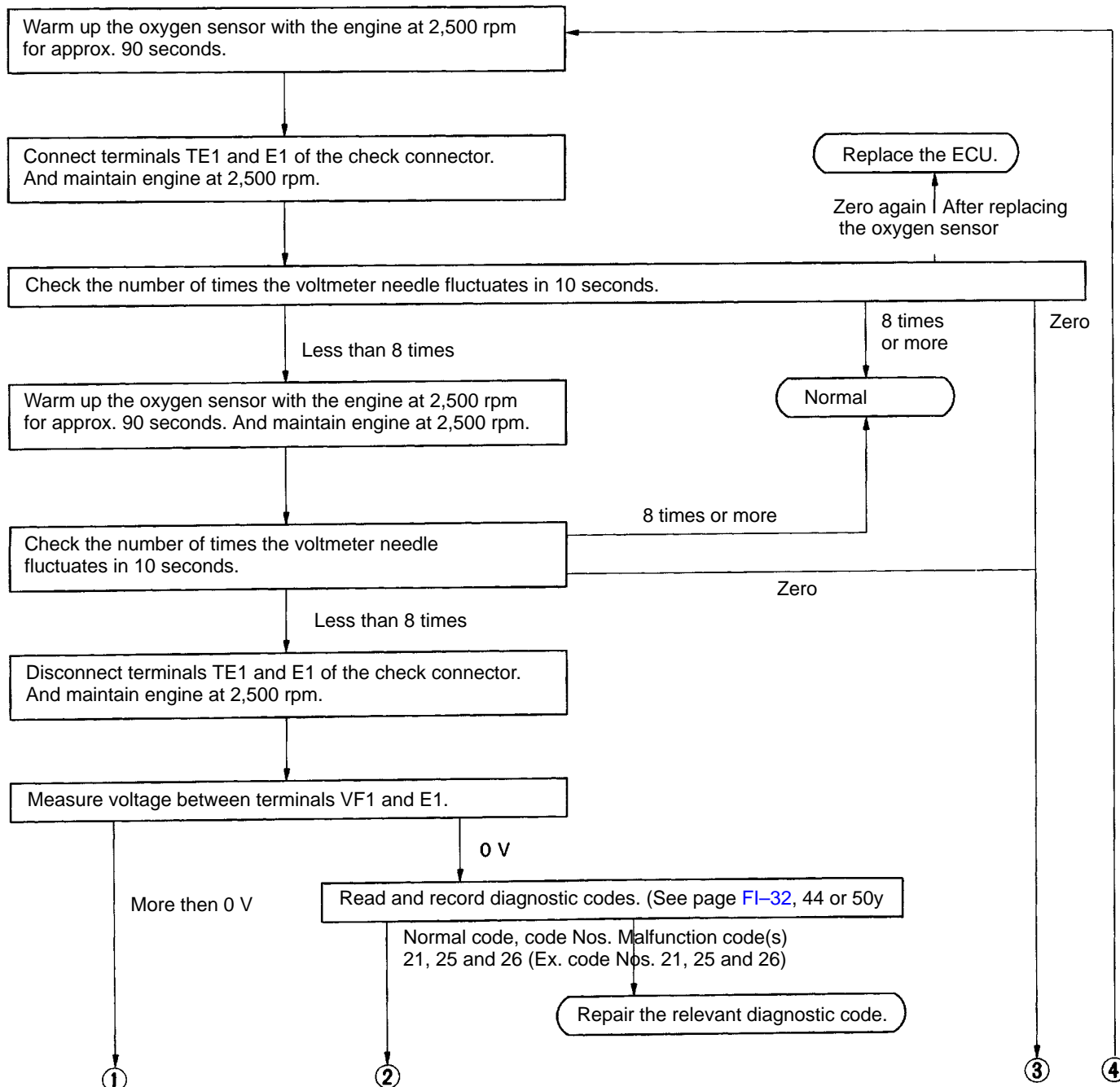
INSPECTION OF OXYGEN SENSOR

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

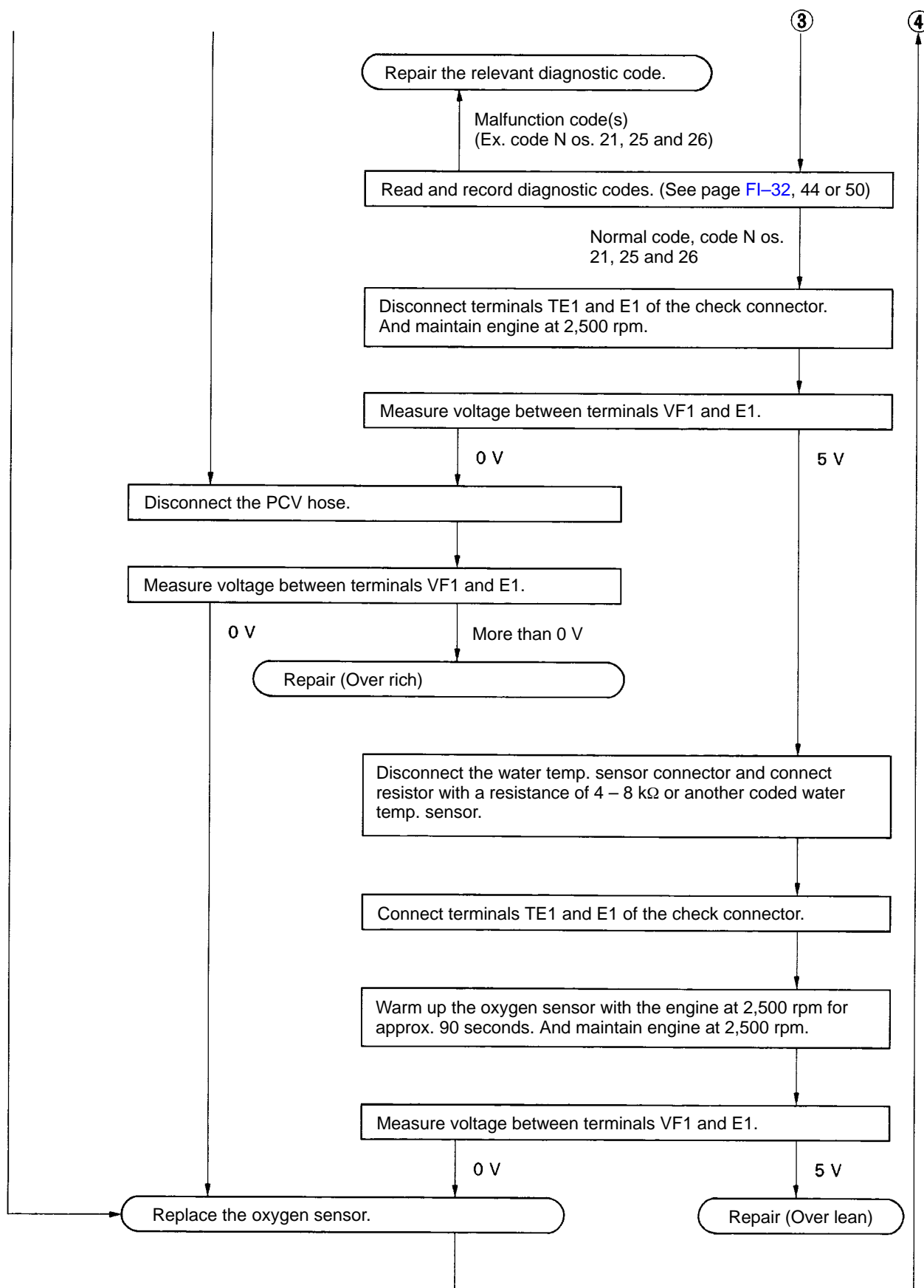
2. INSPECT FEEDBACK VOLTAGE

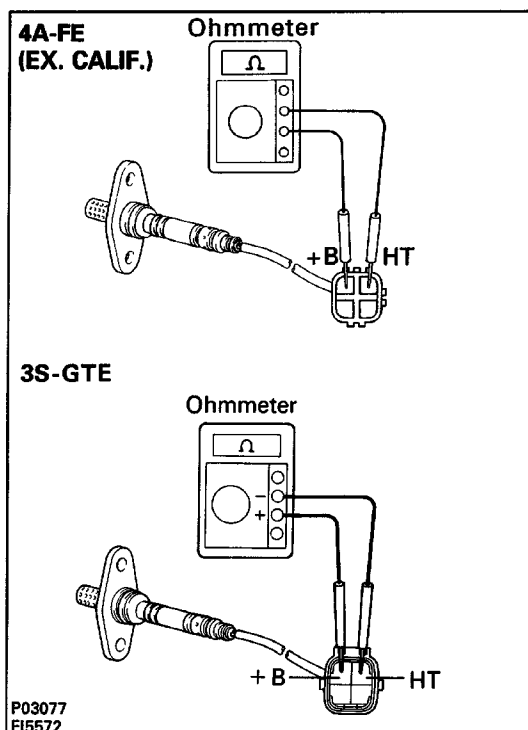
Connect the positive (+) probe of a voltmeter to terminal VF1 of the check connector, and negative (-) probe to terminal E1. Perform the test as follows:



CONTINUED FROM PAGE FI-237

T T





3. (4A-FE (Ex. CALIF.) AND 3S-GTE)

INSPECT HEATER RESISTANCE OF OXYGEN SENSOR

Using an ohmmeter, measure the resistance between the terminals + B and HT.

Resistance (Cold): 5.1 – 6.3 k at 20°C (68°F)

If the resistance is not as specified, replace the sensor.

Sub-Oxygen Sensor (5S-FE CALIF. only)

INSPECTION OF SUB-OXYGEN SENSOR

INSPECT SUB-OXYGEN SENSOR

HINT: Inspect it only when code No.27 is displayed.

- Cancel diagnostic code. (See page [FI-43](#))
- Warm up the engine until it reaches normal operating temperature.
- (M /T)
Drive for 5 minutes or more between 80 km/h (50 mph) and 100 km/h in 4th or 5th gear.
(A/T)

Drive for 5 minutes or more between 80 km/h (50 mph) and 100 km/h (62 mph) in "D" range.

- Following the conditions in step (c), press fully on the accelerator pedal for 2 seconds or more.

HINT: Do not exceed 100 km/h (62 mph), or diagnostic code will be cancelled.

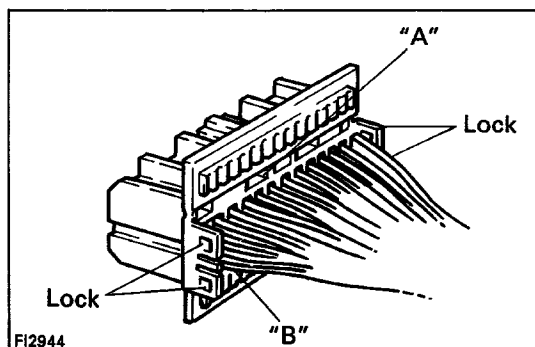
- Stop the vehicle and turn the ignition switch OFF.
- Carry out steps (b), (c) and (d) again to test acceleration.

If code No. 27 appears again, check the sub-oxygen sensor circuit. If the circuit is normal, replace the sub-oxygen sensor.

Electronic Control Unit (ECU)

INSPECTION OF ECU

HINT: The EFI circuit can be checked by measuring the resistance and voltage at the wiring connectors of the ECU.



1. PREPARATION

- Disconnect the connectors from the ECU.
- Remove the locks as shown in the illustration so that the tester probe(s) can easily come in.

NOTICE: Pay attention to sections "A" and "B" in the illustration which can easily be broken.

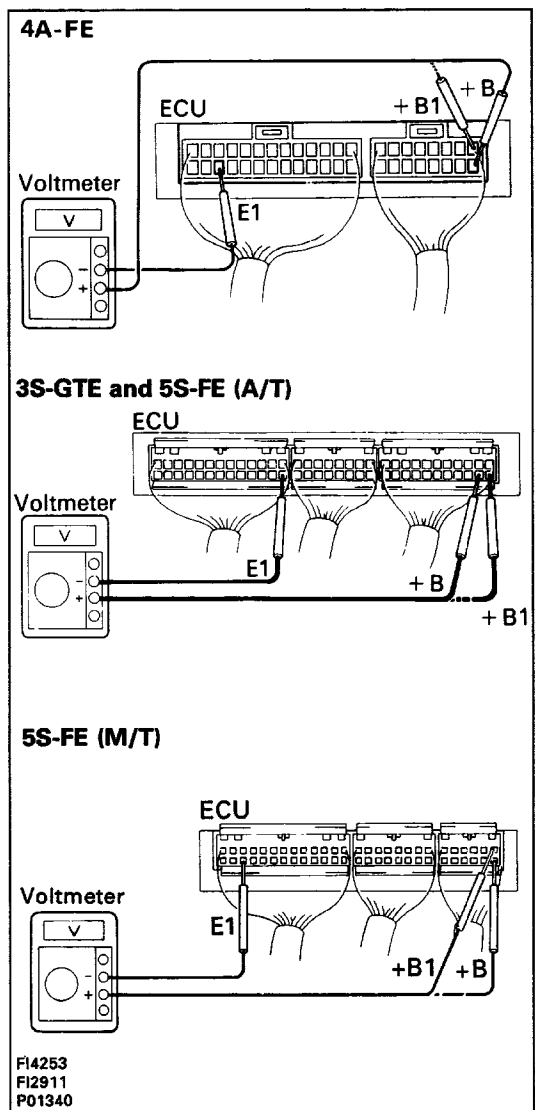
2. INSPECT VOLTAGE OF ECU

Check the voltage between each terminal of the wiring connectors.

- Turn the ignition switch ON.
- Measure the voltage at each terminal.

HINT:

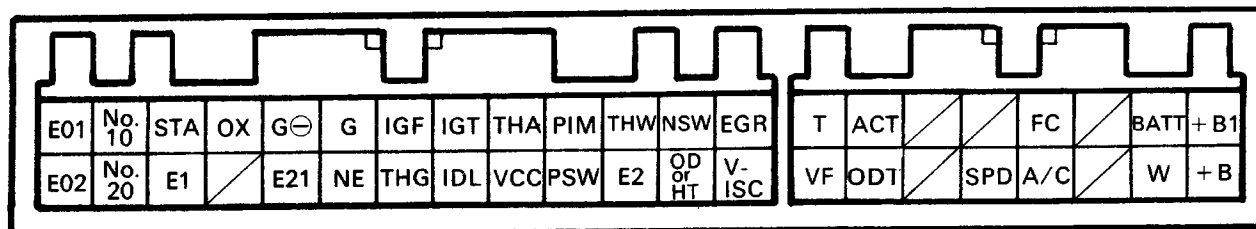
- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is ON.



Voltage at ECU Wiring Connectors (4A-FE)

Terminals	Condition		STD voltage (V)
+ B + B1 – E1	IG SW ON		10 – 14
BATT – E1	–		10 – 14
IDL – E2	IG SW ON	Throttle valve open	10 – 14
PSW – E2		Throttle valve fully closed	10 – 14
PIM – E2	IG SW ON		3.3 – 3.9
VCC – E2			4.5 – 5.5
No.10 – E01 No.20 – E02			10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3
THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.0
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		0.7 – 1.0
W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14
A/C – E1	IG SW ON	Air conditioning ON	8 – 14
ACT – E1		Heater blower SW ON	4 – 6
T – E1		Check connector TE1 – E1 not connected	10 – 14
		Check connector TE1 – E1 connected	0.5 or less
NSW – E1		Neutral start switch P or N range	0 – 2
		Ex. neutral start switch P or N range	6 – 14
V-ISC – E1	Cracking for ten seconds after starting		10 – 14

Engine ECU Terminals



Voltage at ECU Wiring Connectors (3S–GTE)

Terminals	Condition		STD voltage (V)
+ B + B1 – E1	●		10 – 14
BATT – E1	G S –		10 – 14
IDL – E2	W O N IG SW ON	Throttle valve open	4.5 – 5.5
VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.1 – 1.0
		Throttle valve fully open	3.2 – 4.2
VC – E2			4.5 – 5.5
VS – E2		Measuring plate fully closed	3.7 – 4.3
		Measuring plate fully open	0.2 – 0.5
		Idling	1.6 – 4.1
	3,000 rpm	1.0 – 2.0	
No. 1 No. 2 – E01 No. 3 – E02 No. 4	IG SW ON		10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3
THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		0.8 – 1.2
RSC RSO – E1	IG SW ON	Engine ECU connectors disconnected	8 – 14
W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14
PIM – E2	IG SW ON		2.5 – 4.5
AC – E1	IGSWON	Air conditioning ON	8 – 14
*1 TVIS – E1		Throttle valve fully closed	2.0 or less
		Throttle valve open	10 – 14
*2 TVIS – E1	Idling		2.0 or less
	4,200 rpm or more		10 – 14
TE1 – E1	IG SW ON	Check connector TE1 – E1 not connected	10 – 14
		Check connector TE1 – E1 connected	0.5 or less

Engine ECU Terminals

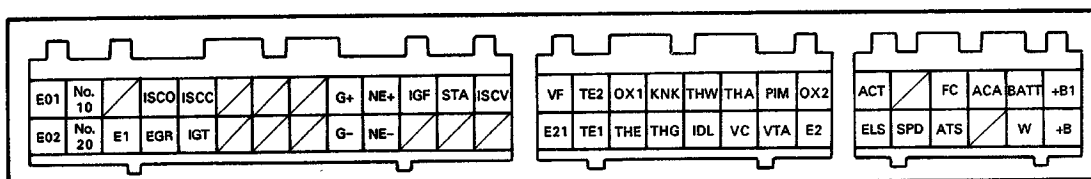
*1 w/ Regular Unleaded Gasoline * w/ Premium Unleaded Gasoline

E01	No.1	No.2	RSO	RSC	HT	STJ	EGR	G2	NE	IGF	TPC	TVIS	VF	OX	PIM	THW	THA	VS	VC	STA	AC	SPD	ATS	FPR	W	STP	ELS	BATT	
E02	No.3	No.4				IGT		G1	G3			E1	TE1	TE2	KNK	IDL	VTA	THG	E2		ACT						FC	+B1	+B

Voltage at ECU 'Wiring Connectors (5S-FE)

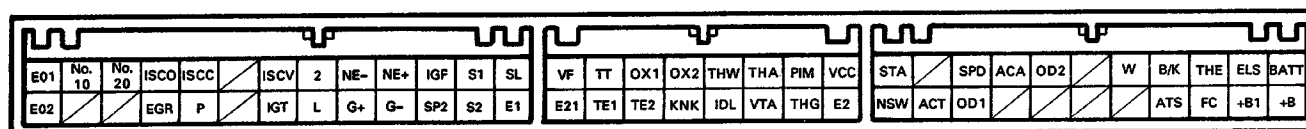
Terminals	Condition		STD voltage (V)
+ B – E1 + B1 – E1	IG SW ON		10 – 14
BATT – E1	–		10 – 14
IDL – E2	IG SW ON	Throttle valve open	8 – 14
VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.8 – 1.2
		Throttle valve fully open	3.2 – 4.2
PIM – E2	IG SW ON		3.3 – 3.9
VC – E2			4.5 – 5.5
No.10 – E01 No.20 – E02			10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.9 – 2.9
THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		0.8 – 1.2
ISCC – E1 ISCO – E1	IG SW ON	Engine (& ECT) ECU connectors disconnected	8 – 14
W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14
A/C – E1	IG SW ON	Air conditioning ON	8 – 14
ACT – E1		Air conditioning ON	4.5 – 5.5
ACA – E1		Air conditioning ON	2 or less
TE1 – E1		Check connector TE1 – E1 not connected	10 – 14
		Check connector TE1 – E1 connected	1 or less
NSW – E1		Neutral start switch P or N range	0 – 2
		Ex. neutral start switch P or N range	6 – 14
B/K – E1	Stop light SW ON (Brake pedal depressed)		10 – 14

Engine ECU Terminals

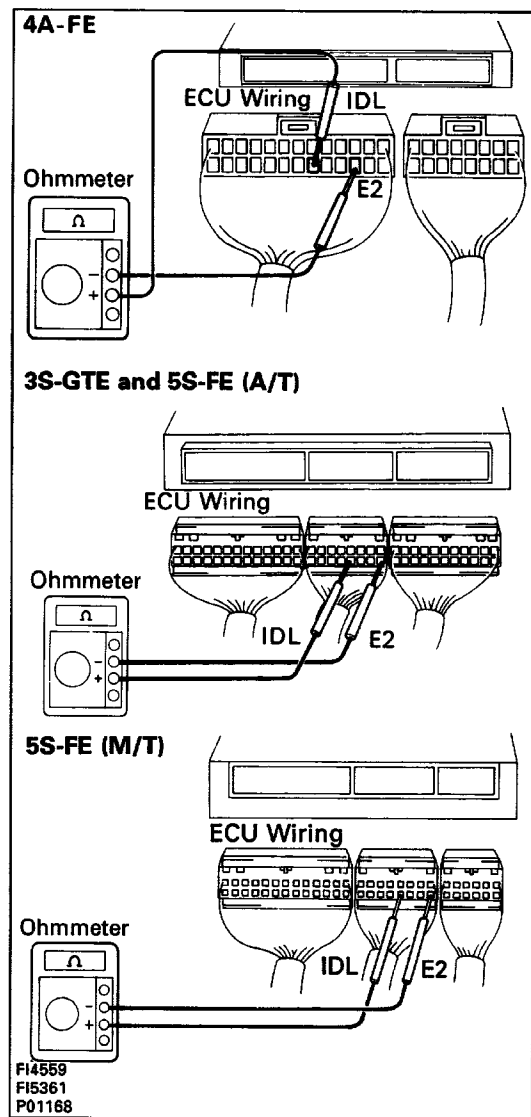


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Engine & ECT ECU Terminals



FI2796



2. INSPECT RESISTANCE OF ECU

NOTICE:

- Do not touch the ECU terminals.
- The tester probe should be inserted into the wiring connector from the wiring side.

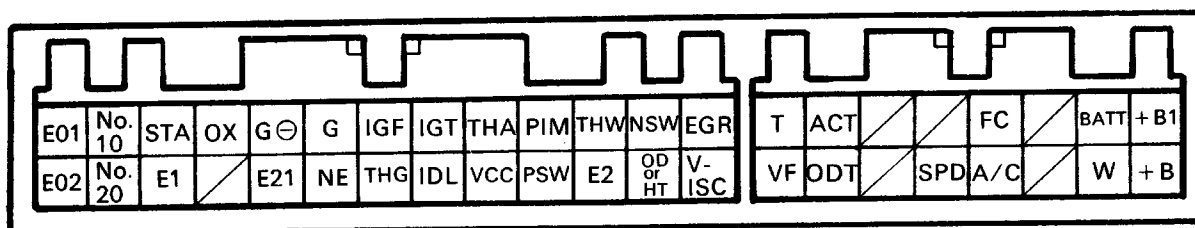
Check the resistance between each terminal of the wiring connectors.

- Disconnect the connectors from the ECU.
- Measure the resistance at each terminal.

Resistance of ECU Wiring Connectors (4A–FE)

Terminals	Condition	STD resistance (n)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed	0
PSW – E2	Throttle valve fully open	0
	Throttle valve fully closed	Infinity
THA – E2	Intake air temperature 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temperature 80°C (176°F)	200 – 400
G1 NE – G⊖	Cold	185 – 265

Engine ECU Terminals

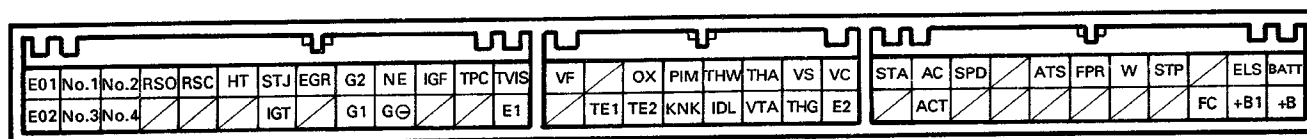


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Resistance of ECU Wiring Connectors (3S–GTE)

Terminals	Condition	STD resistance (Ω)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed	2,300 or less
VTA – E2	Throttle valve fully open	3,100 – 12,100
	Throttle valve fully closed	470 – 6,100
VC – E2	–	3,900 – 9,000
VS – E2	Measuring plate fully closed	200 – 600
	Measuring plate fully open	20 – 1,200
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G1 G2 – G⊖	C	125 – 190
NE – G⊖	Cold	155 – 240
RSC + B RSO – + B1	d –	19.3 – 22.3

Engine ECU Terminals

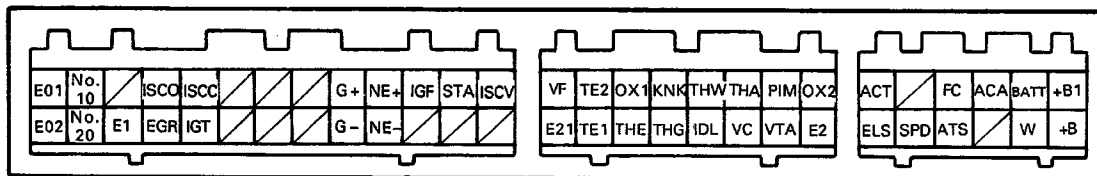


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Resistance of ECU Wiring Connectors (5S-FE)

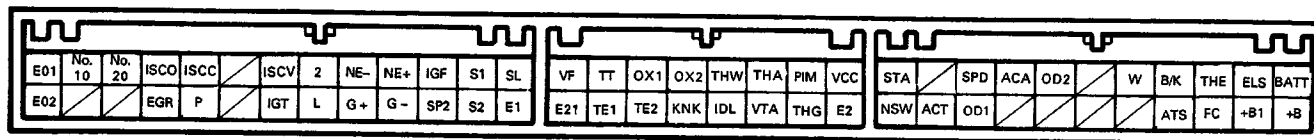
Terminals	Condition	STD resistance (Ω)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed (Throttle opener must be cancelled first)	2,300 or less
VTA – E2	Throttle valve fully open	2,000 – 10,200
	Throttle valve fully closed (Throttle opener must be cancelled first)	200 – 5,700
VC – E2	—	2,500 – 5,900
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G+ – G–	Cold	185 – 265
NE+ – NE–	Cold	370 – 530
ISCC – +B ISCO – +B1		19.3 – 22.3

Engine ECU Terminals



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Engine & ECT ECU Terminals



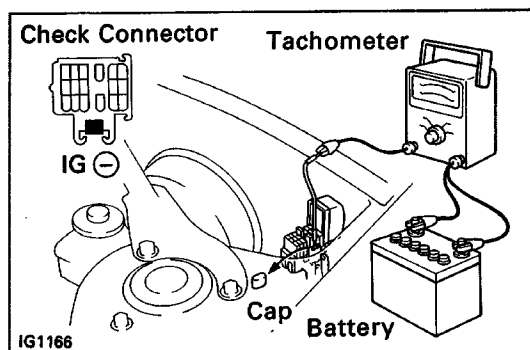
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Fuel Cut RPM (4A-FE)

INSPECTION OF FUEL CUT RPM

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



2. CONNECT TACHOMETER

Connect the test probe of a tachometer to terminal IG (-) of the check connector.

NOTICE:

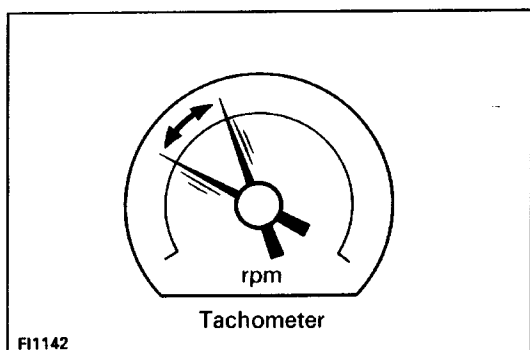
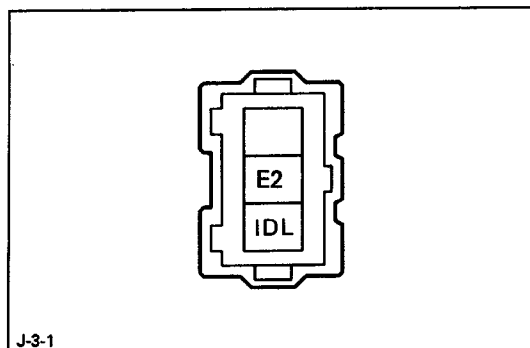
- NEVER allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.

3. INSPECT FUEL CUT RPM

- Disconnect the connector from the throttle position sensor.
- Connect terminals IDL and E2 of the wiring connector.
- Gradually raise the engine rpm and check that there is fluctuation between the fuel cut and fuel return points.

NOTE:

- The vehicle should be stopped.
 - Measure with the A/C OFF.
- Fuel cut rpm: 2,300 rpm**
Fuel return rpm: 1,700 rpm



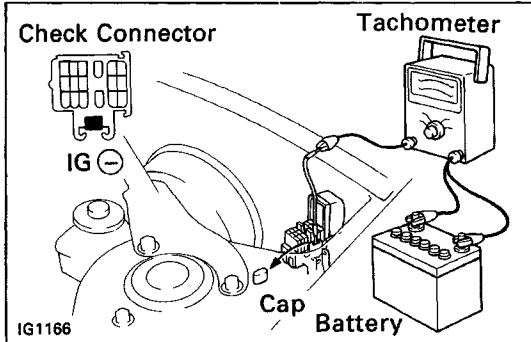
4. DISCONNECT TACHOMETER

Fuel Cut RPM (3S-GTE and 5S-FE)

INSPECTION OF FUEL CUT RPM

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



2. CONNECT TACHOMETER TO ENGINE

Connect the test probe of a tachometer to terminal IG (-) of the check connector.

NOTICE:

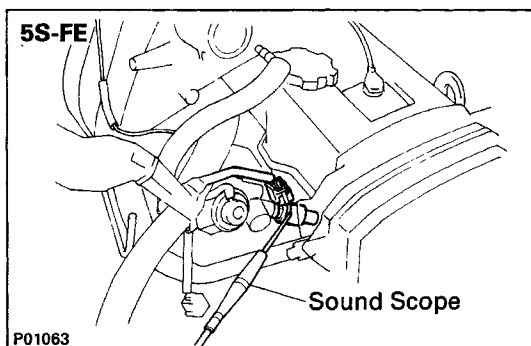
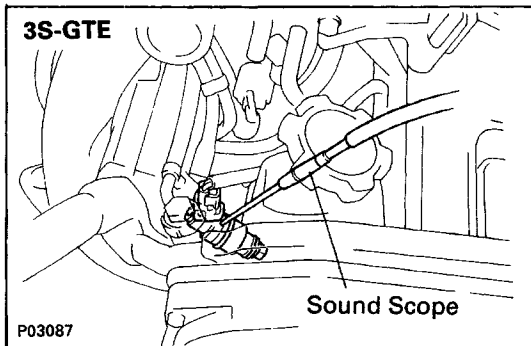
- **NEVER** allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.

3. INSPECT FUEL CUT RPM

- (a) Increase the engine speed to at least 2,500 rpm.
- (b) Use a sound scope to check for injector operating noise.
- (c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

HINT: Measure with the A/C OFF.

Fuel return rpm: 3S-GTE 1,600 rpm
5S-FE 1,500 rpm



4. DISCONNECT TACHOMETER