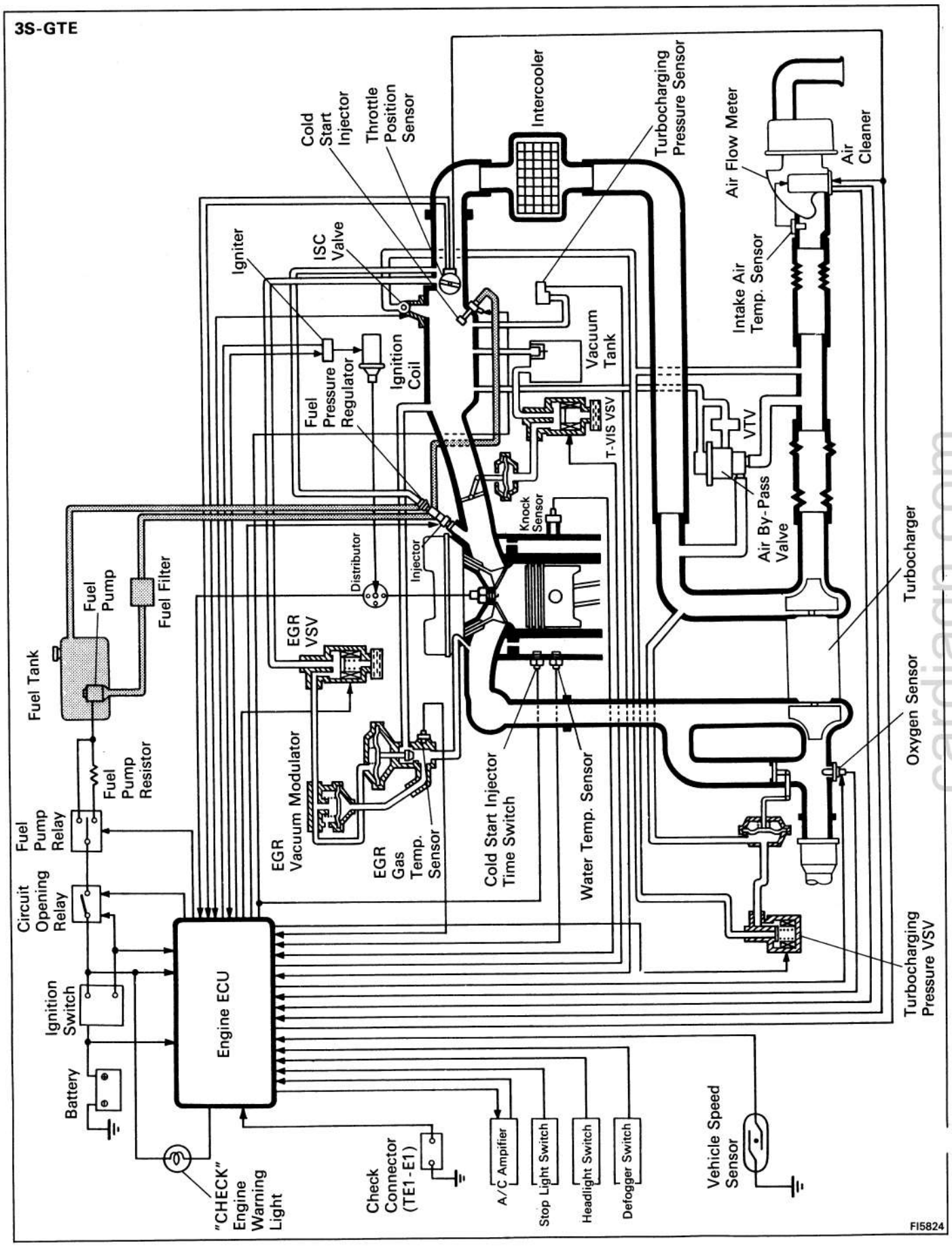
EFI SYSTEM

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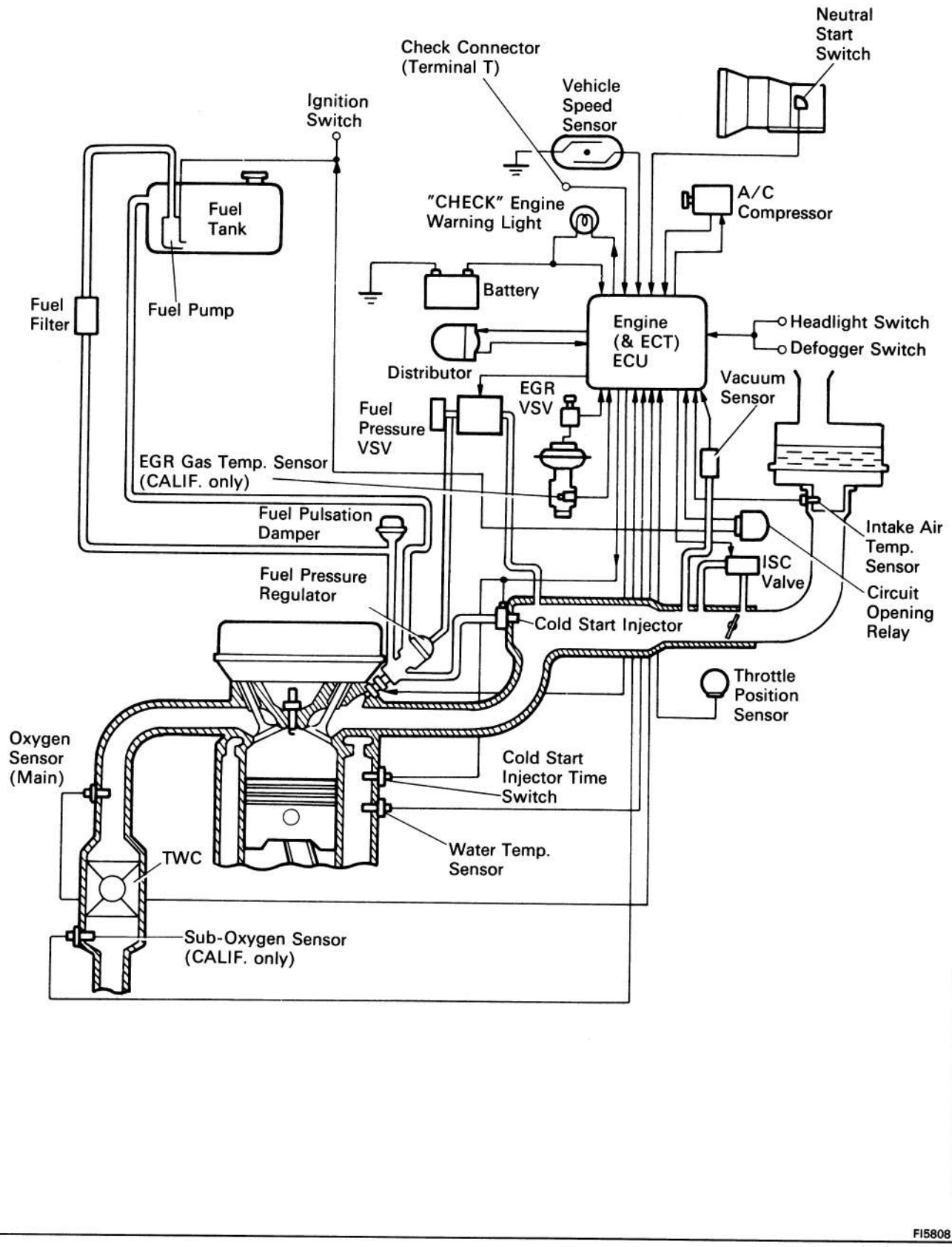
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DESCRIPTION



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5S-FE



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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 MR2 3S-GTE and 5S-FE engines are equipped with 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, TCCS controls the following functions:

1. Electronic Fuel Injection (EFI)
   The ECU receives signals from various sensors indicating changing engine operation conditions such as:
   - Intake air volume (3S-GTE)
   - Intake manifold pressure (5S-FE)
   - 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 air-fuel 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 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, 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 abnormalties in the sensor network and lights a "CHECK" engine warning light on the instrument panel. At the same time, the trouble is identified and a diagnosis code is recorded by the ECU. The diagnosis 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 refer to the later page. (See page FI-28 or 30)

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

car-diagn.com

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 on open flame when working on the fuel system.**

3. **Keep gasoline away from rubber or leather parts.**

INSPECTION PRECAUTIONS

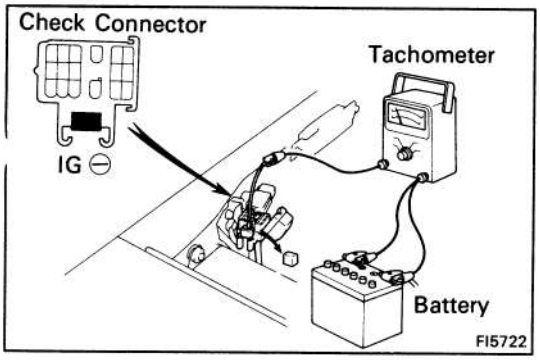
MAINTENANCE PRECAUTIONS

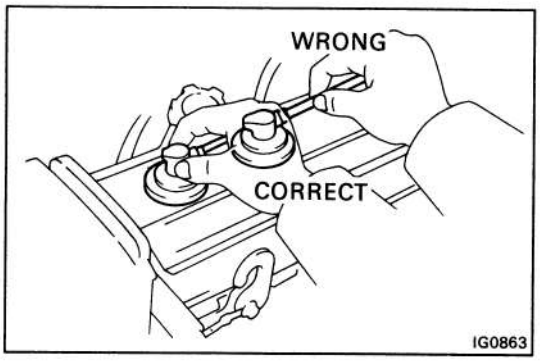
1. **CHECK CORRECT ENGINE TUNE-UP**
   (See page EM-10)

2. **PRECAUTIONS WHEN CONNECTING GAUGE**

   (a) Use the battery as the power source for the timing light, tachometer, etc.

   (b) Connect the test probe of a tachometer to the terminal IG⊖ 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.

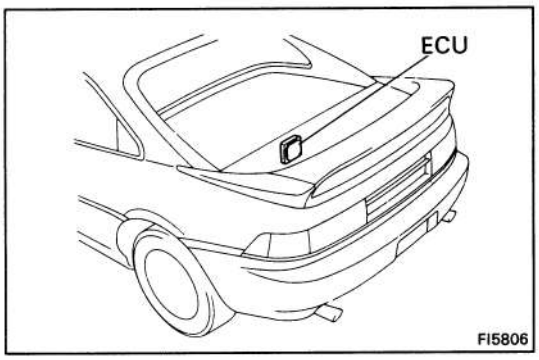
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IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

The ECU has been designed so that it will not be affected by outside interference.

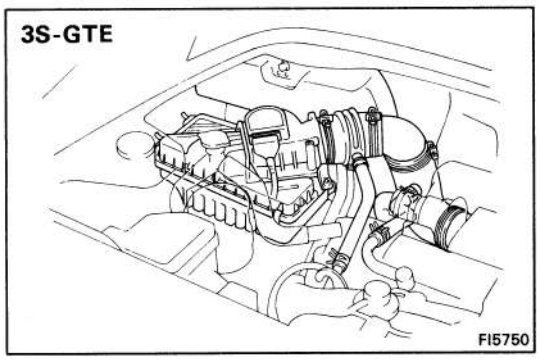
However, if your vehicle is equipped with a CB radio transceiver, etc. (even one with about 10 W output), it may, at times, have an effect upon ECU operation, especially if the antenna and feeder are installed nearby.

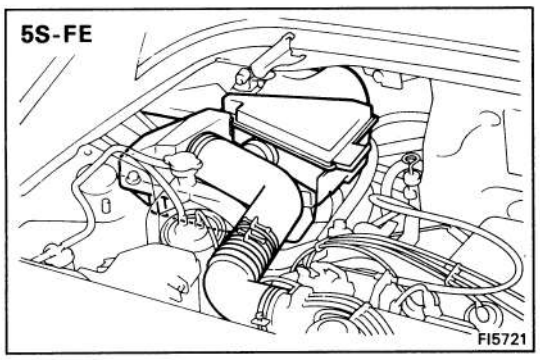
Therefore, observe the following precautions:



1. Install the antenna as far 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.)

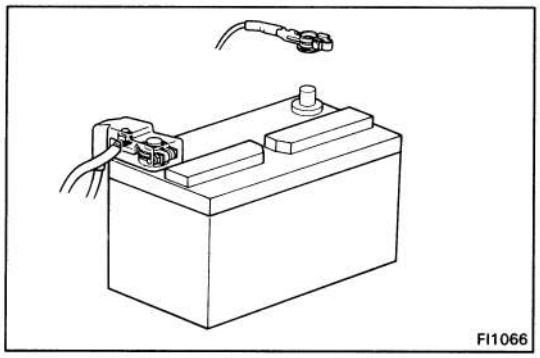
AIR INDUCTION SYSTEM





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.

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FI1066

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 diagnosis code before disconnecting the battery terminals.

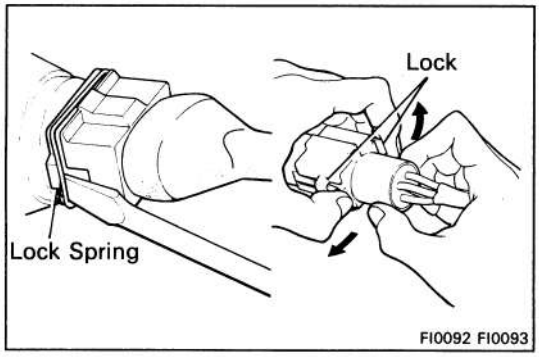
2. When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.

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.

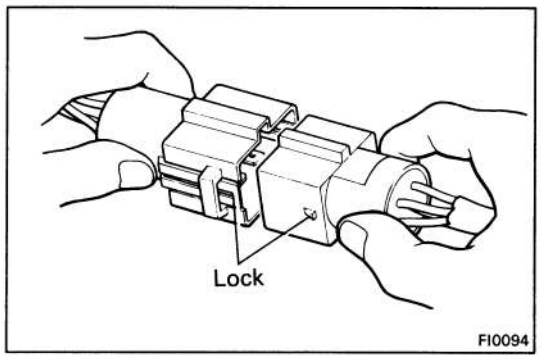
6. When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the EFI parts and wiring connectors.



FI0092 FI0093

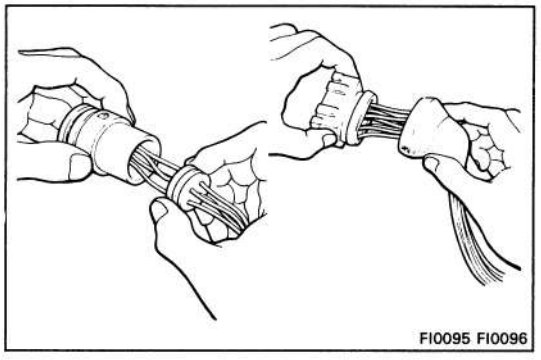
7. Parts should be replaced as an assembly.

8. Care is required when pulling out and inserting wiring connectors.
   (a) Release the lock and pull out the connector, pulling on the connectors.



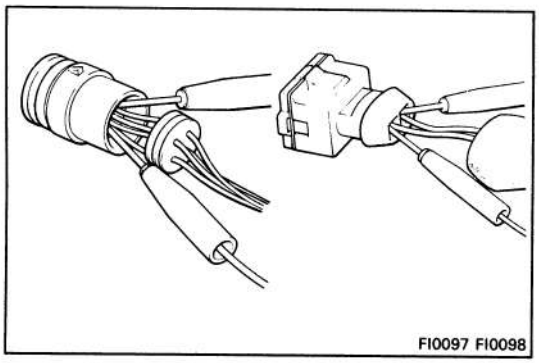
FI0094

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


FI0095 FI0096

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.

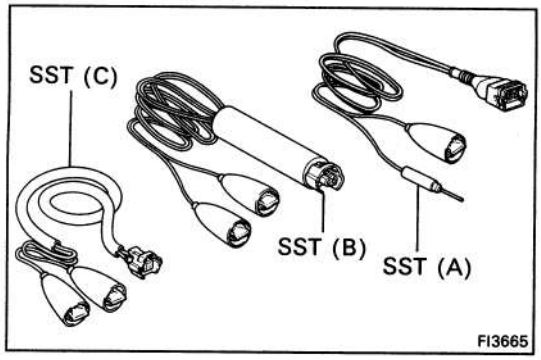
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FI0097 FI0098

(b) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.

(c) Do not apply unnecessary force to the terminal.

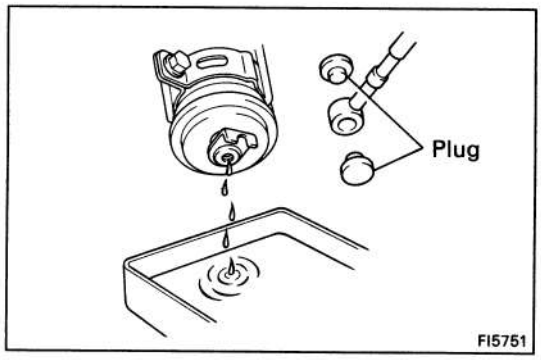
(d) After checking, install the water-proofing rubber on the connector securely.



FI3665

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

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



FI5751

FUEL SYSTEM

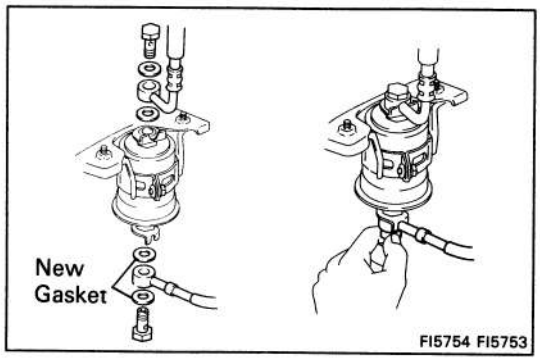
1. When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following procedures:

(a) Put a container under the connection.

(b) Slowly loosen the connection.

(c) Disconnect the connection.

(d) Plug the connection with a rubber plug.



FI5754 FI5753

2. When connecting the flare nut or union bolt on the high pressure pipe union, observe the following procedures:

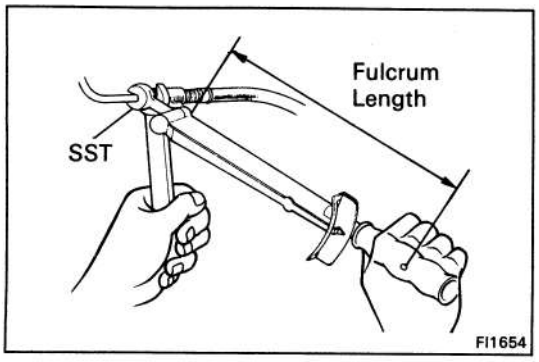
(Union Bolt Type)

(a) Always use a new gasket.

(b) Tighten the union bolt by hand.

(c) Tighten the union bolt to the specified torque.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



FI1654

(Flare Nut Type)

(a) Apply a light coat of engine oil to the flare nut and tighten the flare nut by hand.

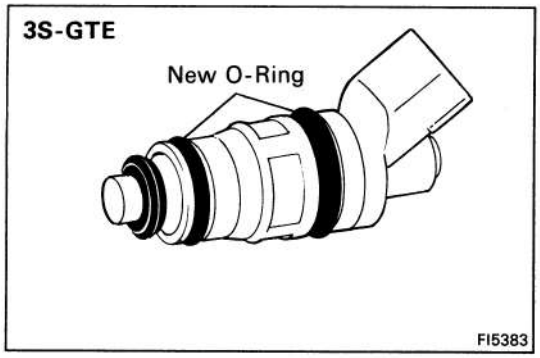
(b) Using SST, tighten the flare nut to specified torque.

SST 09631-22020

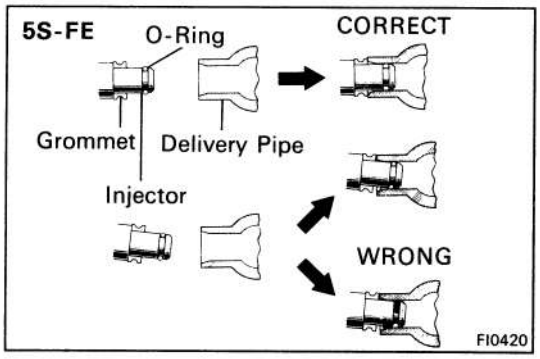
Torque: 310 kg-cm (22 ft-lb, 30 N·m)

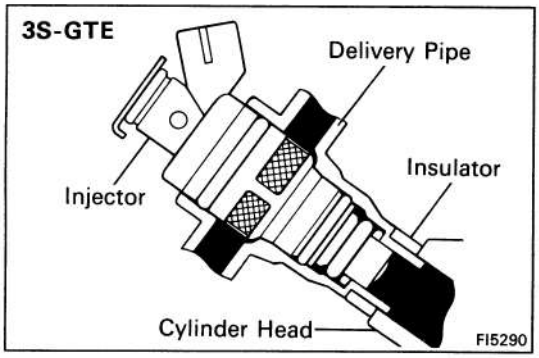
HINT: Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

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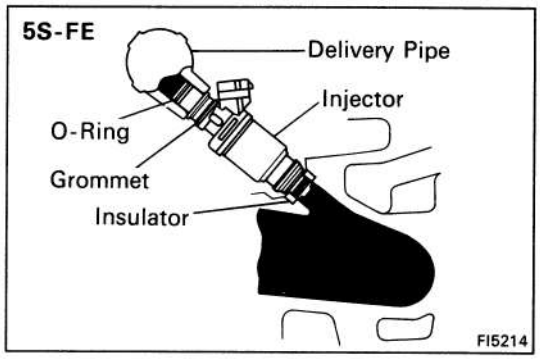


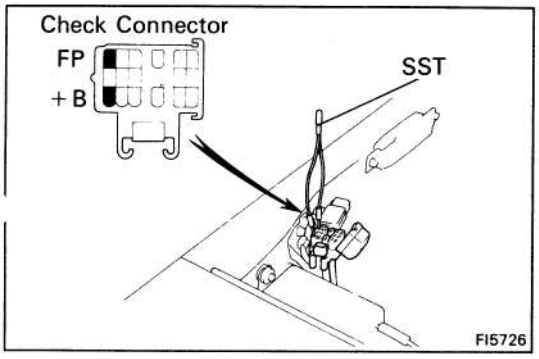
3. Observe the following precautions when removing and installing the injectors.
   (a) Never reuse the O-ring.
   (b) When placing a new O-ring on the injector, take care not to damage it in any way.
   (c) Coat a new O-ring with spindle oil or gasoline before installing – never use engine, gear or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





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



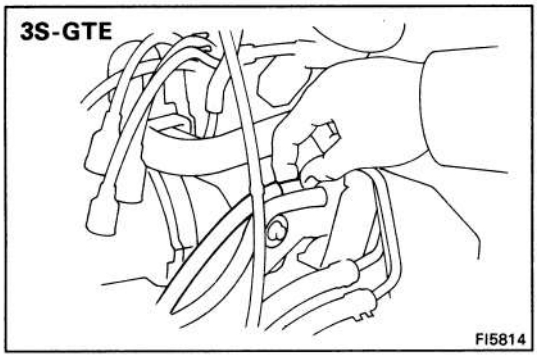


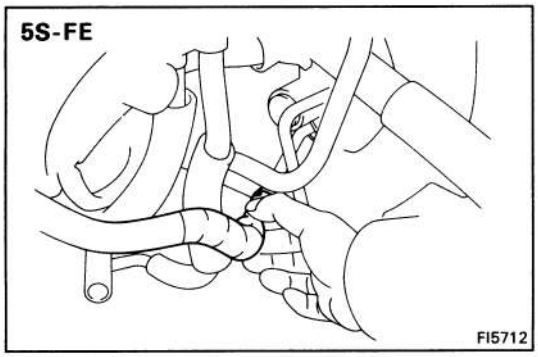
5. Check that there are no fuel leaks after performing any maintenance on the fuel system.
   (a) Using SST, connect terminals +B and FP of the check connector.

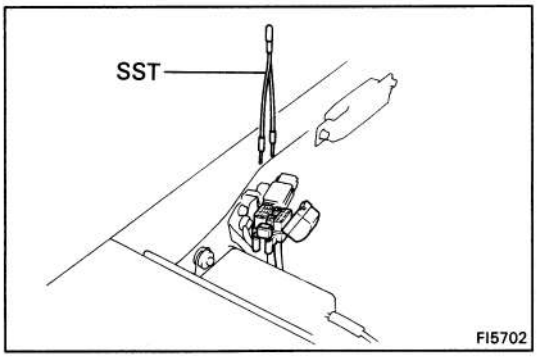
   SST 09843-18020

   (b) With engine stopped, turn the ignition switch ON.

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(c) When the fuel return hose is pinched, the pressure within high pressure line will rise to approx. 4 kg/cm^2 (57 psi, 392 kPa). 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.

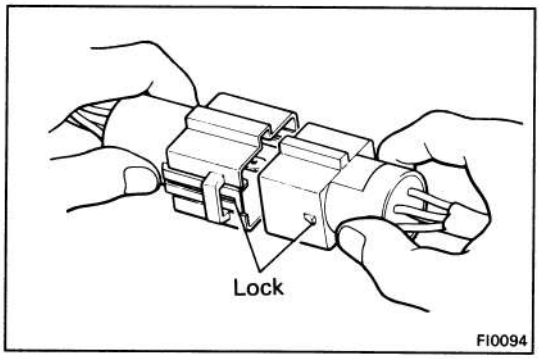
SST 09843-18020

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TROUBLESHOOTING

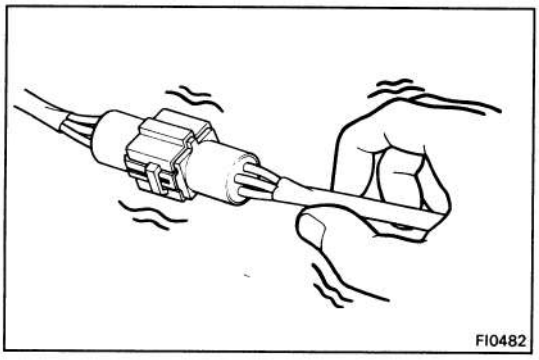
TROUBLESHOOTING HINTS

1. Engine troubles is 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.



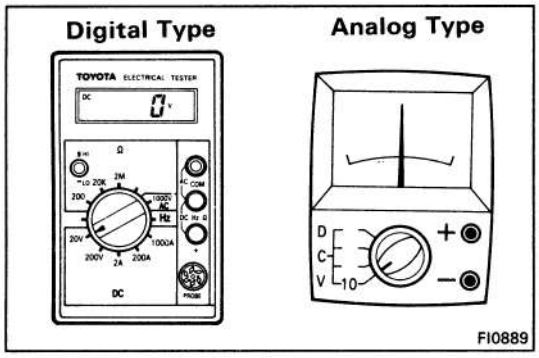
2. The most frequent cause of problems is simply a bad contact in wiring connectors. Always check that connections are secure.

   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.

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4. Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit. (See page FI-33)

TROUBLESHOOTING PROCEDURES

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

CHECK ELECTRONIC SOURCE → BAD →
1. Battery
   (1) Connections
   (2) Gravity – Drive belt – Charging system
   (3) Voltage

OK ↓

CHECK STARTING SYSTEM → BAD →
1. Ignition switch
2. (A/T) Neutral start switch
3. (M/T) Clutch start switch
4. (M/T) Starter relay (See page ST-18)
5. Starter (See page ST-3)
6. Wirings/Connections

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

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code. (See page FI-25) → Malfunction code (s) →
Diagnostic codes (See page FI-28 or 30)

Normal code ↓

DOES ENGINE START WITH ACCELERATOR PEDAL DEPRESSED? → OK →
ISC system
(1) ISC valve (See page FI-148 or 151)
(2) Wiring connection

NO ↓

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 CONTINUED ON PAGE FI-13

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OK CONTINUED FROM PAGE FI-12

CHECK IGNITION SPARK
(See page IG-5 or 10)

BAD →
1. High-tension cords
2. Distributor
3. Ignition coil
4. Igniter

OK

CHECK SPARK PLUGS
Standard:
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-6 or 11)
2. Compression pressure (See page EM-25)
   Minimum (at 250 rpm):
   3S-GTE 9.0 kg/cm² (128 psi, 883 kPa)
   5S-FE 10.0 kg/cm² (142 psi, 981 kPa)
3. Valve clearance (Cold)
   (See page EM-11 or 16)
   Standard:

3S-GTE	**IN**	**0.15 – 0.25 mm (0.006 – 0.010 in.)**
	EX	**0.20 – 0.30 mm (0.008 – 0.012 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.)**

BAD (All Plugs WET) →
1. Injectors – Shorted or leaking
2. Injector wiring – short circuited
3. Cold start injector – leakage
   (See page FI-99 or 102)
4. Cold start injector time switch
   (See page FI-158)

OK

CHECK FUEL SUPPLY TO INJECTOR
1. Fuel tank
2. Fuel pressure in fuel line
   (1) Connect terminals +B and FP or the check connector.
   (2) Fuel pressure at fuel hose of fuel filter can be felt.
   (See page FI-87)

BAD →
1. Fuel line – leakage – deformation
2. Fuses
3. Circuit opening relay
   (See page FI-157)
4. Fuel pump (See page FI-85)
5. Fuel filter
6. Fuel pressure regulator
   (See page FI-105 or 107)

OK

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

BAD →
Ignition timing – Adjust
(See page IG-17 or 22)

OK CONTINUED ON PAGE FI-14

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OK CONTINUED FROM PAGE FI-13

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →

1. Wiring connections
2. Power to ECU
   (1) Fusible links
   (2) Fuses
   (3) EFI main relay (See page FI-156)
3. (3S-GTE)
   Air flow meter (See page FI-131)
4. (5S-FE)
   Vacuum sensor (See page FI-170)
5. Water temp. sensor (See page FI-168)
6. Intake air temp. sensor
   (See page FI-131 or 169)
7. Injection signal circuit
   (1) Injector wiring
   (2) (3S-GTE)
   Solenoid resistor
   (See page FI-159)
   (3) ECU (See page FI-176)

SYMPTOM – ENGINE OFTEN STALLS

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

Malfunction code (s) →

Diagnostic codes
(See page FI-28 or 30)

Normal code

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 FUEL SUPPLY TO INJECTOR
1. Fuel tank
2. Fuel pressure in fuel line
   (1) Connect terminals +B and FP of the check connector.
   (2) Fuel pressure at fuel hose of fuel fuel filter can be felt.
   (See page FI-87)

BAD →

1. Fuel lines – leakage – deformation
2. Fuses
3. Fuel pump (See page FI-85)
4. Fuel filter
5. Fuel pressure regulator
   (See page FI-105 or 107)

OK

CHECK AIR FILTER

BAD →

Element – Clean or replace

OK CONTINUED ON PAGE FI-15

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OK CONTINUED FROM PAGE FI-14

CHECK IDLE SPEED
Standard:
3S-GTE 800 ± 50 rpm
5S-FE 750 ± 50 rpm USA M/T
700 ± 50 rpm USA A/T
850 ± 50 rpm CANADA M/T
750 ± 50 rpm CANADA A/T

BAD →
1. ISC system
(1) Wiring connection
(2) ISC valve (See page FI-148 or 151)
(3) ECU (test by substitution)
2. (5S-FE)
Idle speed – Adjust
(See page EM-20)

OK

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

NO →
Ignition timing – Adjust
(See page IG-17 or 22)

OK

CHECK SPARK PLUGS
Standard:
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-6 or 11)
2. Compression pressure (See page EM-25)
Minimum (at 250 prm):
3S-GTE 9.0 kg/cm² (128 psi, 883 kPa)
5S-FE 10.0 kg/cm² (142 psi, 981 kPa)
3. Valve clearance (Cold)
(See page EM-11 or 16)
Standard:
3S-GTE IN 0.15 – 0.25 mm (0.006 – 0.010 in.)
EX 0.20 – 0.30 mm (0.008 – 0.012 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

CHECK COLD START INJECTOR
(See page FI-99 or 102)

BAD →
1. Cold start injector
(See page FI-99 or 102)
2. Cold start injector time switch
(See page FI-158)

OK

CHECK FUEL PRESSURE
(See page FI-87)

BAD →
1. Fuel pump (See page FI-85)
2. Fuel filter
3. Fuel pressure regulator
(See page FI-105 or 107)

OK

CHECK INJECTORS
(See page FI-110 or 120)

BAD →
Injection condition

OK CONTINUED ON PAGE FI-16

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OK CONTINUED FROM PAGE FI-15

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →

1. Wiring connections
2. Power to ECU
   (1) Fusible links
   (2) Fuses
   (3) EFI main relay (See page FI-156)
3. (3S-GTE)
   Air flow meter (See page FI-131)
4. (5S-FE)
   Vacuum sensor (See page FI-170)
5. Water temp. sensor (See page FI-168)
6. Intake air temp. sensor
   (See page FI-169)
7. Injection signal circuit
   (1) Injector wiring
   (2) (3S-GTE)
   Solenoid resistor
   (See page FI-159)
   (3) ECU (See page FI-176)

SYMPTOM – ENGINE SOMETIMES STALLS

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

Malfunction code(s) →

Diagnostic codes
(See page FI-28 or 30)

Normal code

(3S-GTE)
CHECK AIR FLOW METER
(See page FI-131)

BAD →

Air flow meter

OK

CHECK WIRING CONNECTORS AND RELAYS
Check for signal change when the connector or relay is slightly tapped or wiggled.

BAD →

1. Connectors
2. EFI main relay (See page FI-156)
3. Circuit opening relay (See page FI-157)

SYMPTOM – ROUGH IDLING AND/MISSING

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

Malfunction code(s) →

Diagnostic codes
(See page FI-28 or 30)

Normal code

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 CONTINUED ON PAGE FI-17

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OK CONTINUED FROM PAGE FI-16

CHECK AIR FILTER → BAD → Element – Clean or replace

OK

CHECK IDLE SPEED
Standard:
3S-GTE 800 ± 50 rpm
5S-FE 750 ± 50 rpm USA M/T
700 ± 50 rpm USA A/T
850 ± 50 rpm CANADA M/T
750 ± 50 rpm CANADA A/T

→ BAD →
1. ISC system
   (1) Wiring connection
   (2) ISC valve (See page FI-148 or 151)
   (3) ECU (test by substitution)
2. (5S-FE)
   Idle speed – Adjust
   (See page EM-20)

OK

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

→ NO → Ignition timing – Adjust (See page IG-17 or 22)

OK

CHECK SPARK PLUGS
Standard:
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.

→ BAD →
1. Spark plugs (See page IG-6 or 11)
2. Compression pressure (See page EM-25)
   Minimum (at 250 rpm):
   3S-GTE 9.0 kg/cm² (128 psi, 883 kPa)
   5S-FE 10.0 kg/cm² (142 psi, 981 kPa)
3. Valve clearance (Cold)
   (See page EM-11 or 15)
   Standard:
   3S-GTE IN 0.15 – 0.25 mm (0.006 – 0.010 in.)
   EX 0.20 – 0.30 mm (0.008 – 0.012 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-22)
Check that T-VIS valve is closed.

→ BAD →
1. T-VIS VSV (See page FI-163)
2. Vacuum leaks

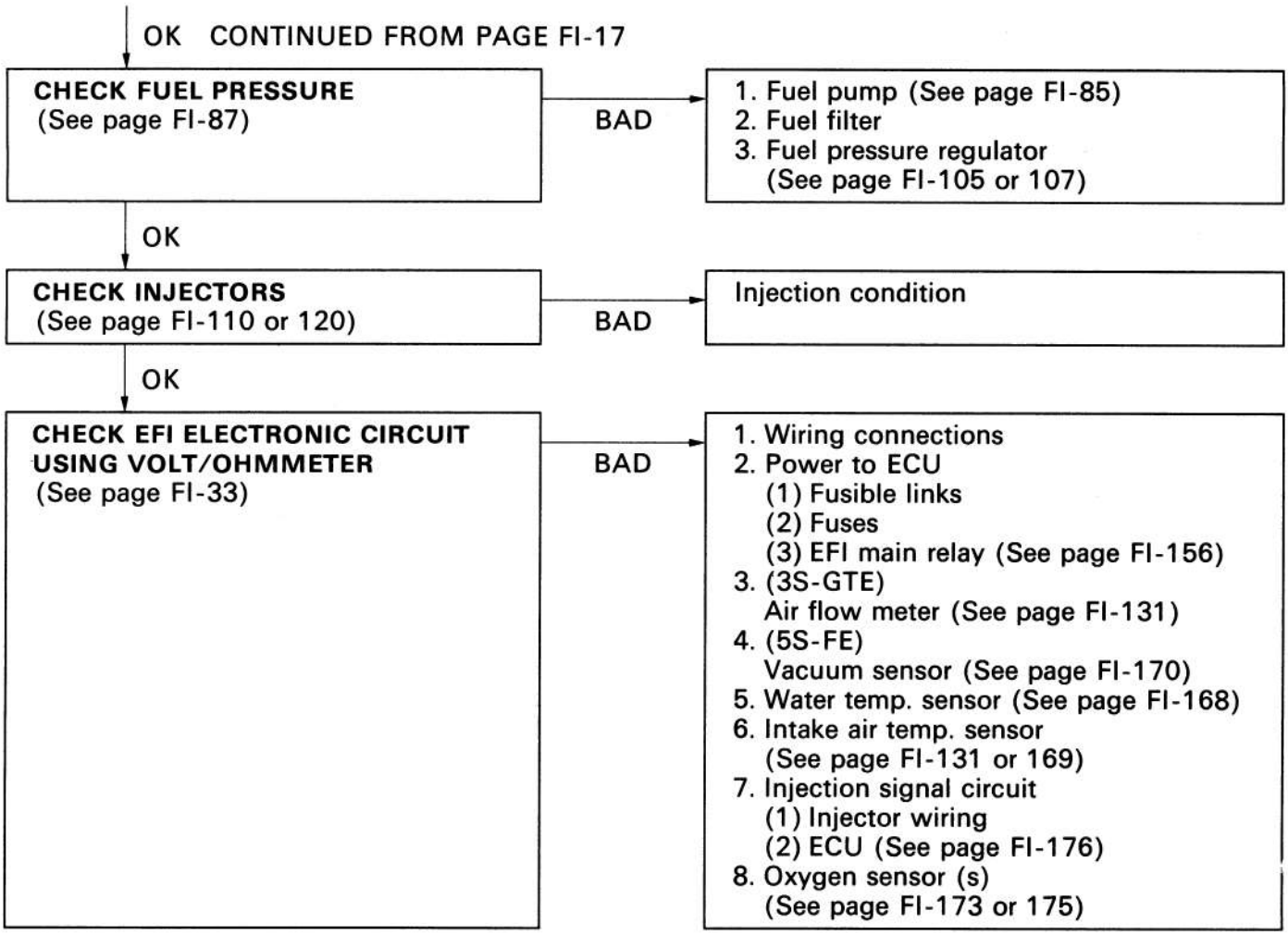
OK

CHECK COLD START INJECTOR
(See page FI-99 or 102)

→ BAD →
1. Cold start injector
   (See page FI-99 or 102)
2. Cold start injector time switch
   (See page FI-158)

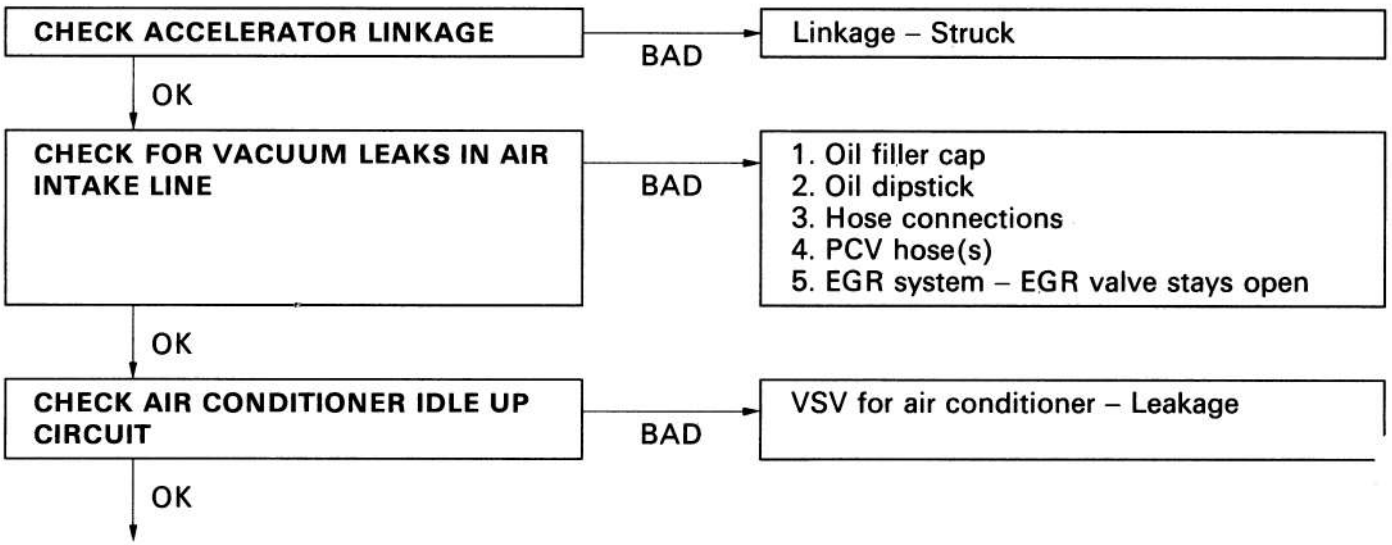
OK CONTINUED ON PAGE FI-18

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SYMPTOM – HIGH ENGINE SPEED (NO DROP)

HINT (5S-FE): Disconnecting the battery will cause the idling speed date in the ISC to be returned to the initial idling speed, causing the idling speed to rise above 750 rpm (USA M/T, CANADA A/T), 700 rpm (USA A/T), 850 rpm (CANADA M/T). Should this happen, either carry out a driving test, including stop-go several times at a speed above 10km/h, or start the engine, idle for 30 seconds and then turn the engine off repeatedly. By doing this, idle date will be stored in the ISC and the idle rpm will be at specified value.



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OK CONTINUED FROM PAGE FI-18

CHECK ISC SYSTEM

BAD →
1. Wiring connections
2. ISC valve (See page FI-148 or 151)
3. Air conditioner switch

OK ↓

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

Malfunction code(s) →
Diagnostic codes
(See page FI-28 or 30)

Normal code ↓

CHECK THROTTLE POSITION SENSOR
(See page FI-134 or 141)

BAD →
Throttle body

OK ↓

CHECK FUEL PRESSURE
(See page FI-72)

BAD →
Fuel pressure regulator – High pressure

OK ↓

CHECK COLD START INJECTOR
(See page FI-99 or 102)

BAD →
Cold start injector

OK ↓

CHECK INJECTORS
(See page FI-110 or 120)

BAD →
Injectors – Leakage, Injection quantity

OK ↓

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →
1. Wiring connections
2. Power to ECU
   (1) Fusible links
   (2) Fuses
   (3) EFI main relay (See page FI-156)
3. (3S-GTE)
   Air flow meter (See page FI-131)
4. (5S-FE)
   Vacuum sensor (See page FI-170)
5. Water temp. sensor (See page FI-168)
6. Intake air temp. sensor
   (See page FI-131 or 169)
7. Injection signal circuit
   (1) Injectors wiring
   (2) (3S-GTE)
      Solenoid resistor
      (Seepage FI-159)
   (3) ECU (See page FI-176)

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SYMPTOM – ENGINE BACKFIRES – Lean Fuel Mixture

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

→ Malfunction code(s) → Diagnostic codes (See pages FI-28 or 30)

↓ Normal code

CHECK FOR VACUUM LEAKS IN AIR INTAKE LINE

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

↓ OK

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

→ NO → Ignition timing – Adjust (see page IG-17 or 22)

↓ OK

CHECK IDLE SPEED
Standard:

3S-GTE	**800 ± 50 rpm**
5S-FE	**750 ± 50 rpm USA M/T**
	700 ± 50 rpm USA A/T
	850 ± 50 rpm CANADA M/T
	750 ± 50 rpm CANADA A/T

→ BAD →
1. ISC system
   (1) Wiring connections
   (2) ISC valve (See page FI-148 or 151)
   (3) ECU (test by substitution)
2. (5S-FE)
   Idle speed – Adjust
   (See page EM-20)

↓ OK

CHECK COLD START INJECTOR
(See page FI-99 or 102)

→ BAD →
1. Cold start injector
   (See page FI-99 or 102)
2. Cold start injector time switch
   (See page FI-158)

↓ OK

CHECK FUEL PRESSURE
(See page FI-87)

→ BAD →
1. Fuel pump (See page FL-85)
2. Fuel filter
3. Fuel pressure regulator
   (See page FI-105 or 107)

↓ OK

CHECK INJECTORS
(See page FI-110 or 120)

→ BAD → Injector – Clogged

↓ OK CONTINUED ON PAGE FI-21

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OK CONTINUED FROM PAGE FI-20

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →

1. Wiring connections
2. Power to ECU
   (1) Fusible links
   (2) Fuses
   (3) EFI main relay (See page FI-156)
3. (3S-GTE)
   Air flow meter (See page FI-131)
4. (5S-FE)
   Vacuum sensor (See page FI-170)
5. Water temp. sensor (See page FI-168)
6. Intake air temp. sensor
   (See page FI-131 or 169)
7. Throttle position sensor
   (See page FI-134 or 141)
8. injection signal circuit
   (1) Injector wiring
   (2) (3S-GTE)
      Solenoid resistor
      (See page FI-159)
   (3) ECU (See page FI-176)
9. Oxygen sensor(s)
   (See page FI-173 or 175)

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

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI-25)

Malfunction code(s) →

Diagnostic codes
(See pages FI-28 or 30)

Normal code ↓

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

NO →

Ignition timing – Adjust
(See page IG-17 or 22)

OK ↓

CHECK IDLE SPEED
Standard:

3S-GTE	**800 ± 50 rpm**
5S-FE	**750 ± 50 rpm USA M/T**
	700 ± 50 rpm USA A/T
	850 ± 50 rpm CANADA M/T
	750 ± 50 rpm CANADA A/T

BAD →

1. ISC system
   (1) Wiring connection
   (2) ISC valve (See page FI-148 or 151)
   (3) ECU (test by substitution)
2. (5S-FE)
   Idle speed – Adjust
   (See page EM-20)

OK ↓

CHECK COLD START INJECTOR
(See page FI-99 or 102)

BAD →

1. Cold start injector
   (See page FI-99 or 102)
2. Cold start injector time switch
   (See page FI-158)

OK CONTINUED ON PAGE FI-22

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OK CONTINUED FROM PAGE FI-21

CHECK FUEL PRESSURE
(See page FI-87)

BAD → Fuel pressure regulator
(See page FI-105 or 107)

OK

CHECK THROTTLE POSITION SENSOR
(See page FI-134 or 141)

BAD → Throttle body

OK

CHECK INJECTORS
(See page FI-110 or 120)

BAD → Injector – Leakage

OK

CHECK SPARK PLUGS
Standard:
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-6 or 11)
2. Compression pressure (See page EM-25)
   Minimum (at 250 rpm):
   3S-GTE 9.0 kg/cm² (128 psi, 883 kPa)
   5S-FE 10.0 kg/cm² (142 psi, 981 kPa)
3. Valve clearance (Cold)
   (See page EM-11 or 15)
   Standard:

3S-GTE	**IN**	**0.15 – 0.25 mm (0.006 – 0.010 in.)**
	EX	**0.20 – 0.30 mm (0.008 – 0.012 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.)**

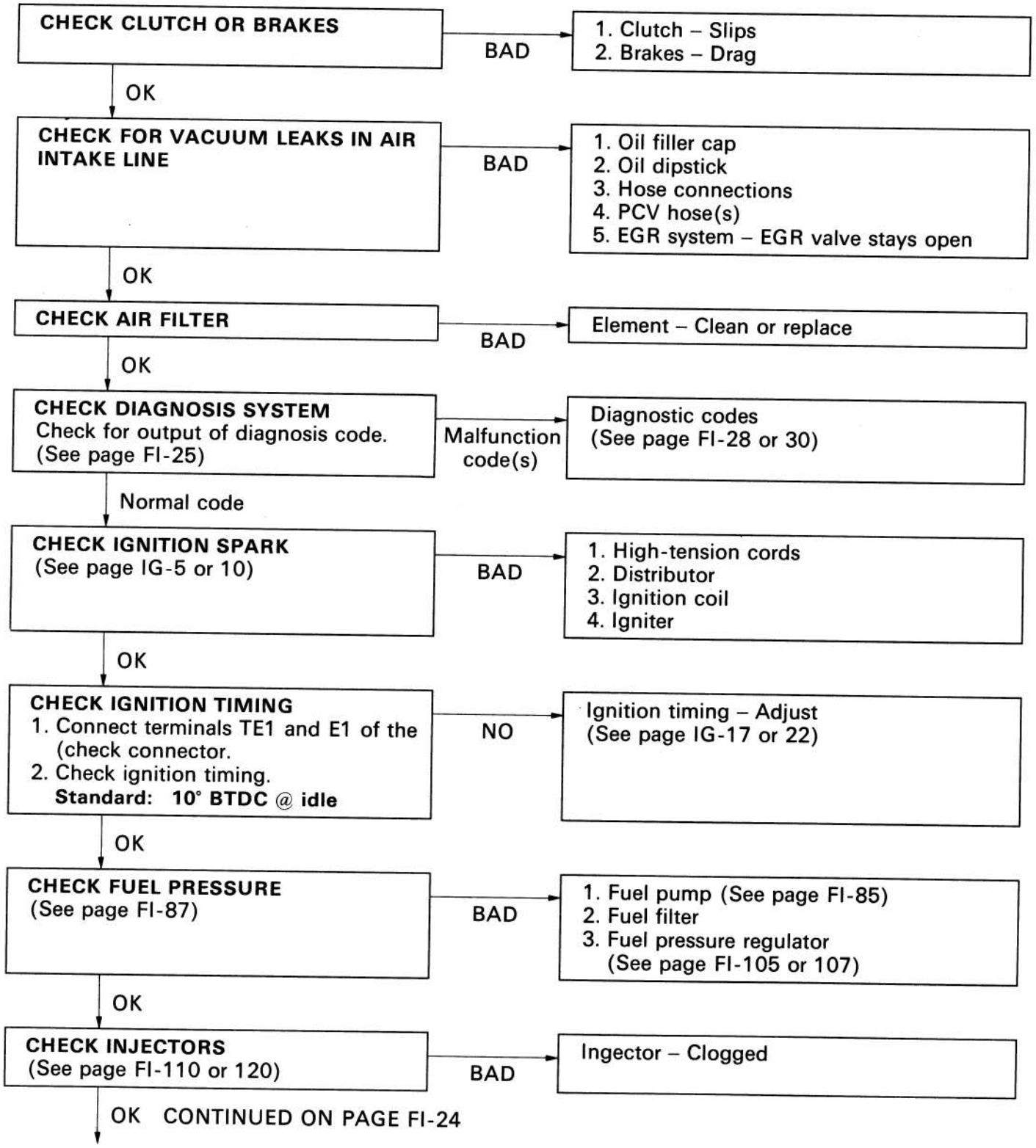
OK

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →
1. Throttle position sensor
   (See page FI-134 or 141)
2. Injection signal circuit
   (1) Injector wirings
   (2) Fuel cut RPM (See page FI-182)
   (3) (3S-GTE)
   Solenoid resistor
   (See page FI-159)
   (4) ECU (See page FI-176)
3. Oxygen sensor(s)
   (See page FI-173 or 175)

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SYMPTOM – ENGINE HESITATES AND/OR POOR ACCELERATION



CONTINUED ON PAGE FI-24

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OK CONTINUED FROM PAGE FI-23

CHECK SPARK PLUGS
Standard:
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-6 or 11)
2. Compression pressure (See page EM-25)
Minimum (at 250 rpm):
3S-GTE 9.0 kg/cm² (128 psi, 883 kPa)
5S-FE 10.0 kg/cm² (142 psi, 981 kPa)
3. Valve clearance (Cold)
(See page EM-11 or 15)
Standard:
3S-GTE IN 0.15 – 0.25 mm (0.006 – 0.010 in.)
EX 0.20 – 0.30 mm (0.008 – 0.012 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-22)
Check if air control valve is open with engine running at 4,200 rpm above.

BAD →
1. T-VIS VSV (See page FI-163)
2. Vacuum leaks

OK

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI-33)

BAD →
1. Wiring connections
2. Power to ECU
(1) Fusible links
(2) Fuses
(3) EFI main relay (See page FI-156)
3. (3S-GTE)
Air flow meter (See page FI-131)
4. (5S-FE)
Vacuum sensor (See page FI-170)
5. Water temp. sensor (See page FI-168)
6. Intake air temp. sensor
(See page FI-131 or 169)
7. Throttle position sensor
(See page FI-134 or 141)
8. Injection signal circuit
(1) Injector wiring
(2) (3S-GTE)
Solenoid resistor
(See page FI-159)
(3) ECU (See page FI-176)

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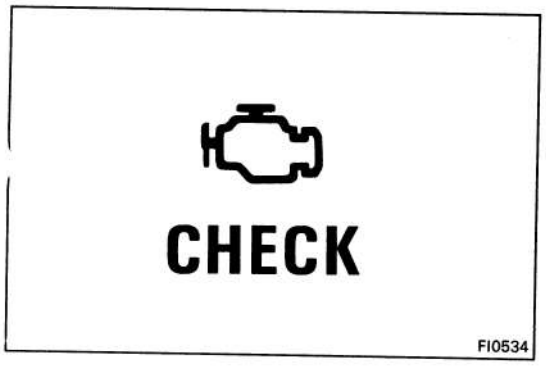
DIAGNOSIS SYSTEM

DESCRIPTION

The ECU contains a built-in, self-diagnosis system detects which troubles within the engine signal network and then flashed a warning on the "CHECK" engine warning light on the instrument panel flashes.

By analyzing various signals shown in the tables (See page 28 or 30) the ECU detects system malfunctions which are related to the various operating parameter sensors or actuator. The ECU stores the failure code associated with the detected failure until the diagnosis system is cleared by removing the EFI fuse with the ignition switch OFF.

A "CHECK" engine warning light on the instrument panel informs the driver that a malfunction has been detected. The light goes off automatically when the malfunction has been cleared.



"CHECK" ENGINE WARNING LIGHT CHECK

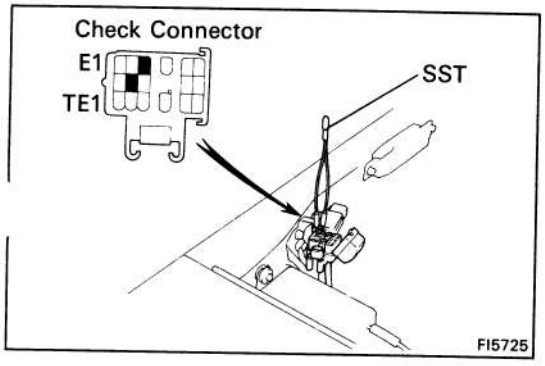
1. The "CHECK" engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
2. When the engine is started, the "CHECK" engine warning light should go off.

   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 follows:

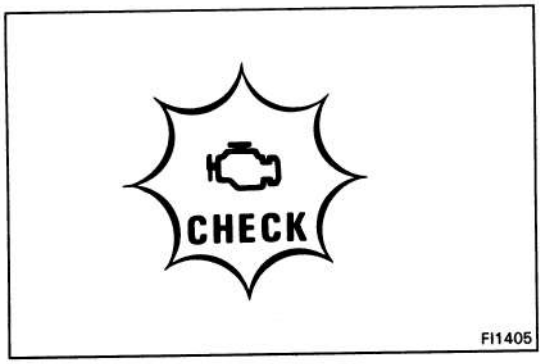
1. Initial conditions
   (a) Battery voltage 11 V or more
   (b) Throttle valve fully closed (throttle position sensor IDL points closed)
   (c) Transmission in neutral position
   (d) Accessories switched OFF
   (e) Engine at normal operating temperature



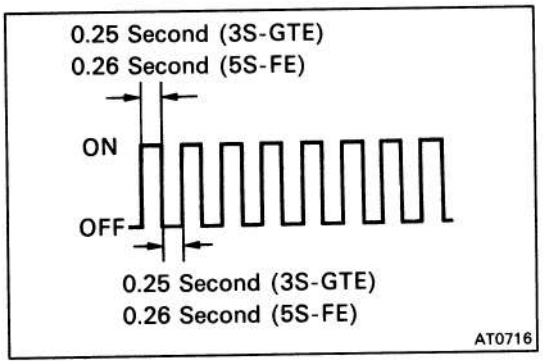
2. Turn the ignition switch to ON. Do not start the engine.
3. Using SST, connect terminals TE1 and E1 of the check connector.

   SST 09843-18020

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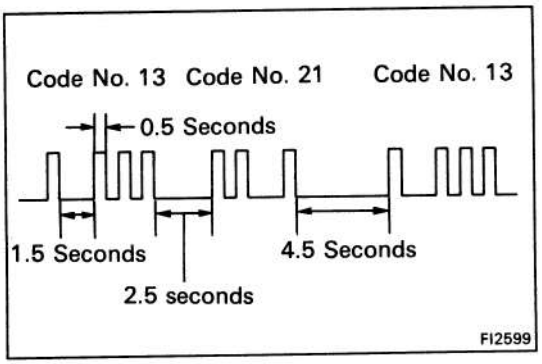
4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.



Diagnostic Codes (See page FI-28 or 30)

(a) Normal System Operation (no malfunction)

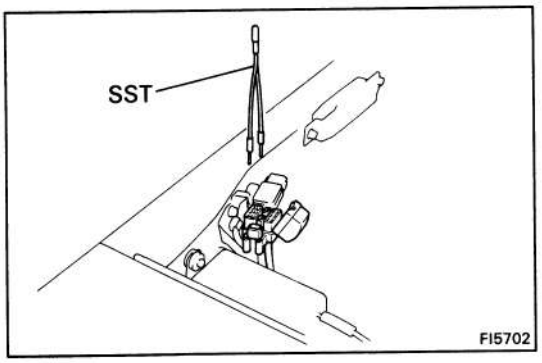
- The light will alternately blink ON and OFF 2 times per second.



(b) Malfunction Code Indication

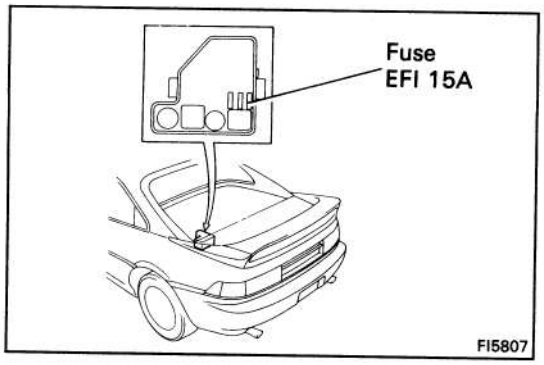
- In the event of a malfunction, the light will blink every 0.5 seconds. The first number of blinks will equal the first digit of a 2-digit diagnostic code and, after a 1.5 second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5 second pause between each.
- After all the codes have been signalled 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 shorted.

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



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

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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

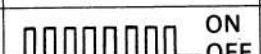
1. When 2 or more codes are indicated, the lowest number (code) will appear first.

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 instrument panel will go off but the diagnostic code(s) remain stored in ECU memory (except for code No.51 and No.53).

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DIAGNOSTIC CODES (3S-GTE)

Code No.	Number of Engine blinks	System	Diagnosis	Trouble area	See page
–	 ON OFF FI1401	Normal	This appears when none of the other codes are identified.	–	–
12	 FI1389	RPM Signal	No NE or G signal to ECU within 2 seconds after engine has been cranked.	• Distributor circuit • Distributor • Starter signal circuit • ECU	IG-4
13	 FI1390	PRM Signal	No NE signal to ECU when engine speed is above 1,000 rpm.	• Distributor ignition coil • Distributor • ECU	–
14	 FI1391	Ignition Signal	No IGF signal to ECU 8 – 11 times in succession.	• Igniter and ignition coil circuit • Igniter and ignition coil • ECU	FI-45
21	 FI1400	Oxygen Sensor Signal	During air-fuel ration feedback correction, voltage output from the oxygen sensor does not exceed a set value on the lean side and the rich side continuously for a certain period.	• Oxygen sensor circuit • Oxygen sensor • ECU	FI-50
		Oxygen Sensor Heater Circuit	Open or short circuit in oxygen sensor heater.	• Oxygen sensor heater circuit • Oxygen sensor heater • ECU	FI-50
22	 FI1392	Water Temp. Sensor Signal	Open or short circuit in water temp. sensor signal (THW).	• Water temp. sensor circuit • Water temp. sensor • ECU	FI-43
24	 FI1611	Intake Air Temp. Sensor Signal	Open or short circuit in intake air temp. sensor signal (THA).	• Intake air temp. sensor circuit • Intake air temp. sensor • ECU	FI-42
25	 FI2562	Air-fuel Ratio Lean Malfunction	• When air-fuel ratio feedback correction valve or adaptive control value continued at the upper (lean) or lower (rich) limit renewed for a certain period of time. • When air-fuel ration feedback correction value or adaptive control value feedback frequency is abnormally high during feedback condition. • Open or short circuit in oxygen sensor signal.	• Injector circuit • Injector • Oxygen sensor circuit • ECU • Fuel line pressure • Air flow meter • Air intake system • Ignition system	–
26	 FI2563	Air-fuel Ration Rich Malfunction		• Injector circuit • Injector • Fuel line pressure • Cold start injector • Air flow meter • ECU	–
31	 FI1394	Air-flow Meter Signal	Open circuit in VC signal or short circuit between VC and E2 when idle contacts are closed.	• Air flow meter circuit • Air flow meter • ECU	FI-40
32	 FI1395	Air-flow Meter Signal	Open circuit in E2 or short circuit between VC and VS.	• Air flow meter circuit • Air flow meter • ECU	FI-40

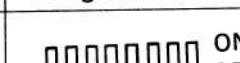
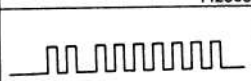
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DIAGNOSTIC CODES (3S-GTE) (Cont'd)

Code No.	Number of Engine blinks	System	Diagnosis	Trouble area	See page
34	 FI3047	Turbocharging Pressure Signal	Excessive turbocharging pressure.	● Turbocharger ● Turbocharging pressure sensor circuit ● Turbocharging pressure sensor ● ECU	–
35	 FI3048	Turbocharging Pressure Sensor Signal	Open or short circuit in turbocharging sensor pressure sensor signal (PIM).	● Turbocharging pressure sensor circuit ● Turbocharging pressure sensor ● ECU	FI-48
41	 FI1396	Throttle Position Sensor Signal	Open or short circuit in throttle position sensor signal (VTA).	● Throttle position sensor circuit ● Throttle position sensor ● ECU	FI-38
42	 FI1397	Vehicle Speed Sensor Signal	No SPD signal for 8 seconds when engine speed is between 2,500 rpm and 5,000 rpm and coolant temp. is below 80°C (176°F) except when racing the engine.	●Vehicle speed sensor circuit ● Vehicle speed sensor ● ECU	–
43	 FI1398	Starter Signal	No STA signal to ECU unit engine speed reaches 800 rpm with vehicle not moving.	● Ignition switch circuit ● Ignition switch ● ECU	FI-44
52	 FI1618	Knock Sensor Signal	Open or short circuit in knock sensor signal (KNK).	● Knock sensor circuit ● Knock sensor ● ECU	–
53	 FI1619	Knock Control Signal in ECU	Knock control in ECU faulty	● ECU	–
71	 FI2622	EGR Malfunction (CALIF. only)	EGR gas temp. below predetermined level for during EGR control.	● EGR system (EGR valve, EGR hose etc.) ● EGR gas temp. sensor circuit ● EGR gas temp. sensor ● EGR control VSV ● EGR control VSV circuit ● ECU	FI-51
51	 FI1399	Switch Condition Signal	No IDL signal or A/C signal to ECU, with the check terminals TE1 and E1 connected.	● A/C switch circuit ● A/C amplifire ● Throttle position sensor circuit ● Throttle position sensor ● Accelerator pedal and cable ● ECU	–

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DIAGNOSTIC CODES (5S-FE)

Code No.	Number of "CHECK" engine blinks	System	Diagnosis	Trouble area	See page
–	 ON OFF FI1401	Normal	This appears when none of the other codes are identified.	–	–
12	 FI1389	RPM Signal	No NE or G signal to ECU within several seconds after engine is cranked.	• Distributor circuit • Distributor • Starter signal circuit • ECU	IG-4
13	 FI1390	RPM Signal	No NE signal to ECU when the engine speed is above 1,000 rpm and within 50 msec. after engine is cranked.	• Distributor circuit • Distributor • ECU	–
14	 FI1391	Ignition Signal	No IGF signal to ECU 4 – 5 times in succession.	• Ignition circuit (+B, IGT, IGF) • Igniter • ECU	FI-62 or FI-79
21	 FI1609	Oxygen Sensor Signal	During air-fuel ratio feedback correction, voltage output from the oxygen sensor does not exceed a set value on the lean side and the rich side continuously for a certain period.	• Oxygen sensor circuit • Oxygen sensor • ECU	FI-66 or FI-83
22	 FI1392	Water temp. Sensor Signal	Open or short circuit in water temp. sensor signal (THW).	• Water temp. sensor circuit • Water temp. sensor • ECU	FI-60 or FI-77
24	 FI1611	Intake air Temp. Sensor Signal	Open or short circuit in intake air temp. sensor signal (THA).	• Intake air temp. sensor circuit • Intake air temp. sensor • ECU	FI-59 or FI-76
25	 FI2562	Air-fuel Ratio Lean Malfunction	• When FAF (Air fuel compensation ratio) is not removed for a certain period during feedback condition. • When marked variation is detected in engine revolutions for each cylinder during idle switch on and feedback condition. • Open or short circuit in oxygen sensor signal.	• Injector circuit • Injector • Oxygen sensor circuit • Oxygen sensor • ECU • Fuel line pressure • Vacuum sensor • Water temp. sensor • Ignition system • ECU	–
26	 FI2563	Air-fuel Ratio Rich Malfunction		• Injector circuit • Injector • Fuel line pressure • Cold start injector • Vacuum sensor • Water temp. sensor • ECU	–
*27	 FI3294	Sub-Oxygen Sensor Signal	Open or short circuit in sub-oxygen sensor signal (OX2).	• Sub-oxygen sensor circuit • Sub-oxygen sensor • ECU	FI-66 or FI-83
31	 FI1394	Vacuum Sensor Signal	Open or short circuit in vacuum sensor signal.	• Vacuum sensor circuit • Vacuum sensor • ECU	FI-57 or FI-74

* CALIF. only

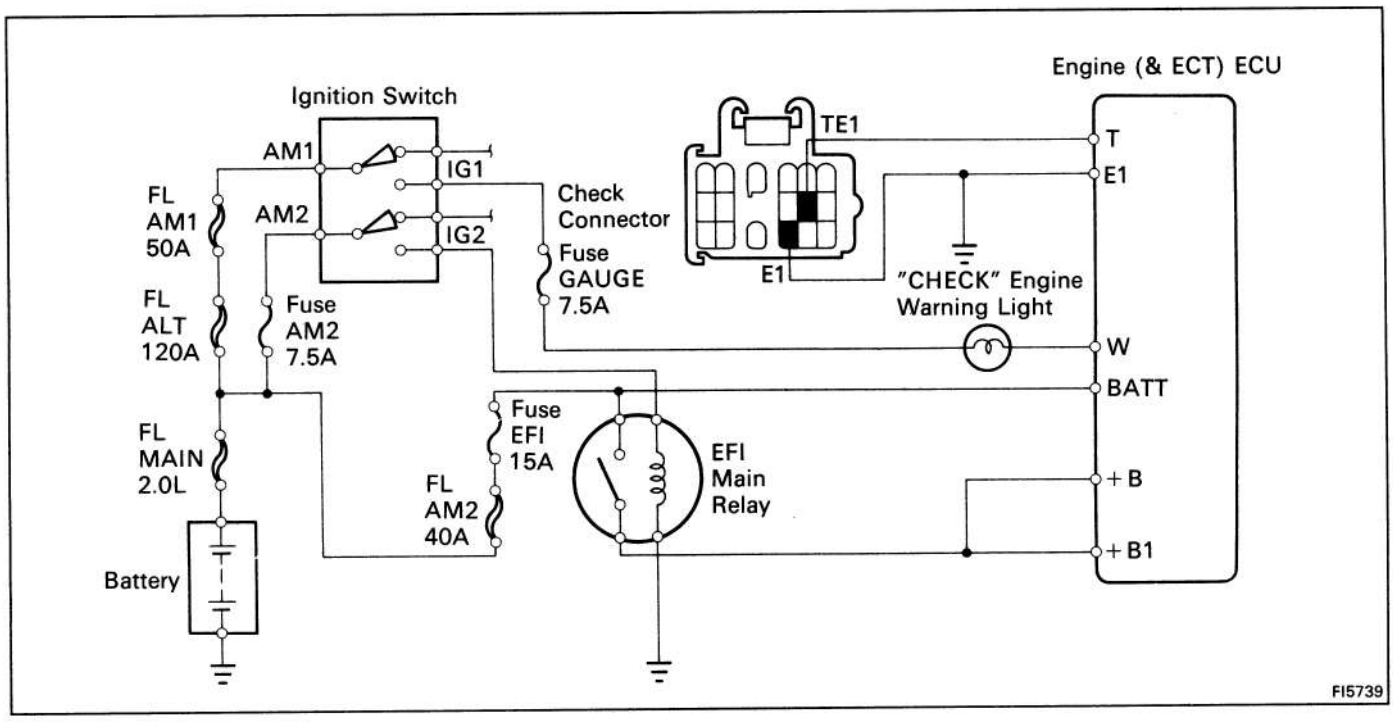
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DIAGNOSTIC CODES (5S-FE) (Cont'd)

Code No	Number of "CHECK" engine blinks	System	Diagnosis	Trouble area	See page
41	 FI1396	Throttle Position Sensor Signal	(M/T) IDL and PSW signals being output simultaneously for several seconds. (A/T) Open or short circuit in throttle position sensor signal (VTA).	● Throttle position sensor circuit ● Throttle position sensor ● ECU	FI-56 or FI-72
42	 FI1397	Vehicle Speed Sensor Signal	(M/T) No pulse is input from the speed sensor (SP1) bult into the meter during input of a 4-pulse signal from the vehicle speed sensor (SP2) on the transmission (A/T) No SPD signal for several seconds when engine speed is between 2,300 – 5,500 rpm and coolant temp. is below 80°C (176°F) except when racing the engine.	● Vehicle speed sensor circuit ● Vehicle speed sensor ● ECU	–
43	 FI1398	Starter Signal	No STA signal to ECU until engine speed reaches 800 rpm with vehicle not moving.	● IG switch circuit ● IG switch ● ECU	FI-61 or FI-78
71	 FI2622	EGR Malfunction	EGR gas temp. below 70°C during EGR operation.	● EGR system (EGR valve, EGR hose etc.) ● EGR gas temp. sensor circuit ● EGR gas temp. sensor ● BVSV for EGR ● BVSV for EGR circuit ● ECU	FI-67 or FI-84
51	 FI1399	Switch Condition Signal	No IDL signal, NSW signal and STA signal or A/C ON signal to ECU, when the check terminals TE1 and E1 connected with 3 seconds after engine has been cranking.	● A/C switch circuit ● A/C Amplifire ● Throttle position sensor circuit ● Throttle position sensor ● Neutral start switch circuit ● Neutral start switch ● Accelerator pedal and cable ● ECU	–

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INSPECTION OF DIAGNOSIS CIRCUIT



1.

Does "CHECK" engine warning light come on when ignition switch is at ON?
- YES → System Normal
- NO → Does "CHECK" engine warning light come on when ECU terminal W is grounded to the body.
  - YES → Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - NO → Check bulb, fuse and wiring between ECU and ignition switch.
    - BAD → Repair or replace.

2.

Does "CHECK" engine warning light go off when the engine is started?
- YES → System Normal
- NO → Check wiring between ECU and "CHECK" engine warning light.
  - BAD → Repair.
  - OK → Is there diagnostic code output when check connector terminal TE1 and E1 are short circuited?
    - NO → Try another ECU.
    - YES → Does "CHECK" engine warning light go out after repair according to malfunction code?
      - NO → Further repair required.
      - YES → System OK → Cancel out diagnostic code.

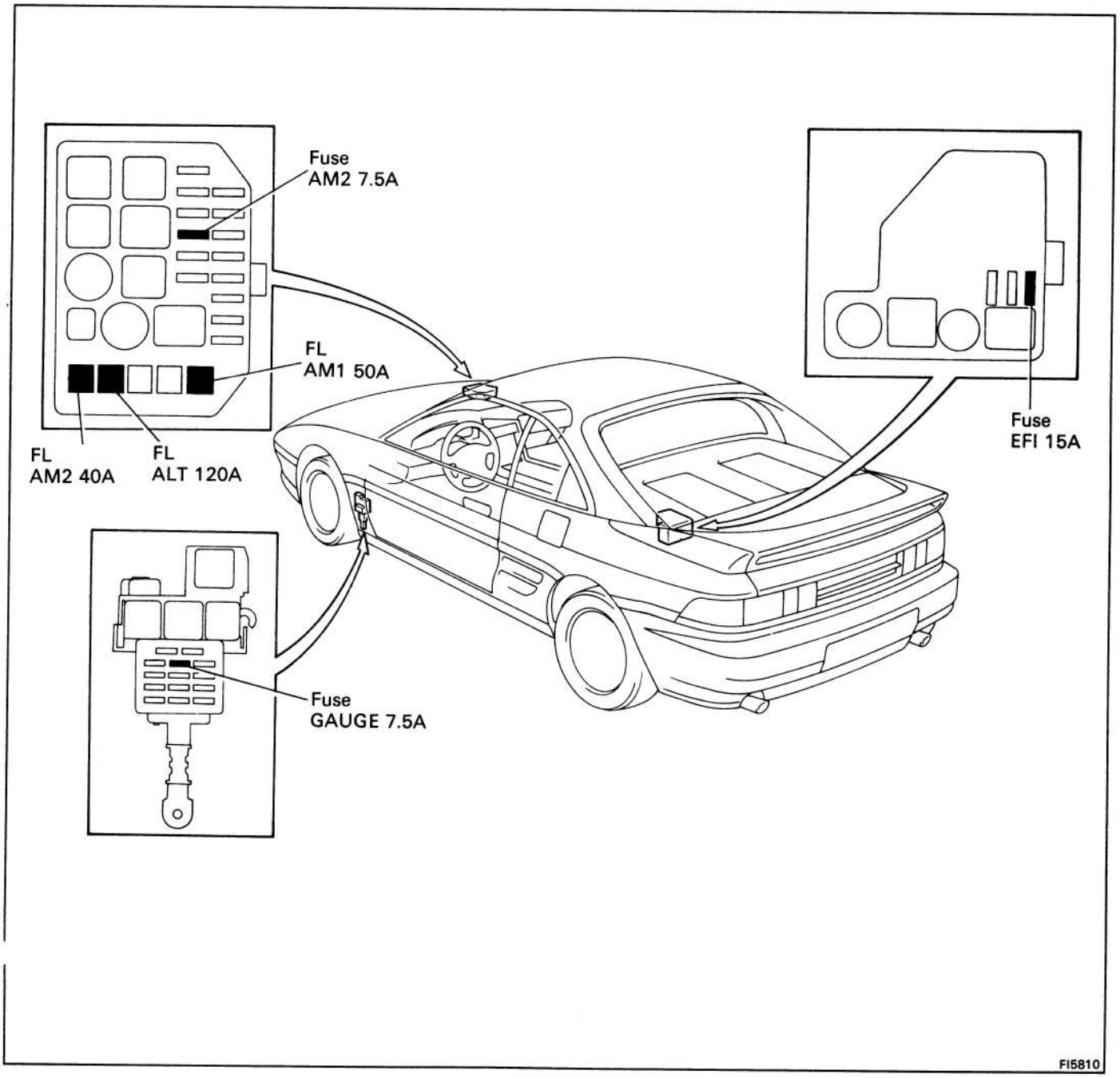
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TROUBLESHOOTING WITH VOLT/OHMMETER

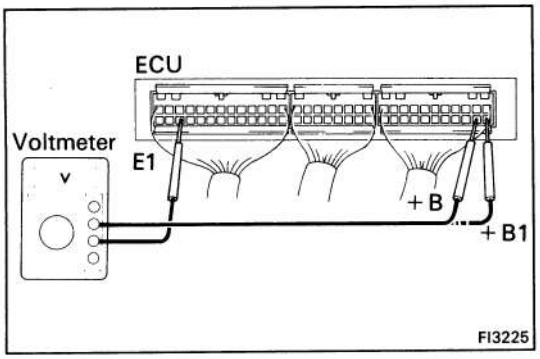
HINT:

- 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 in a components outside the computer or a short 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



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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.

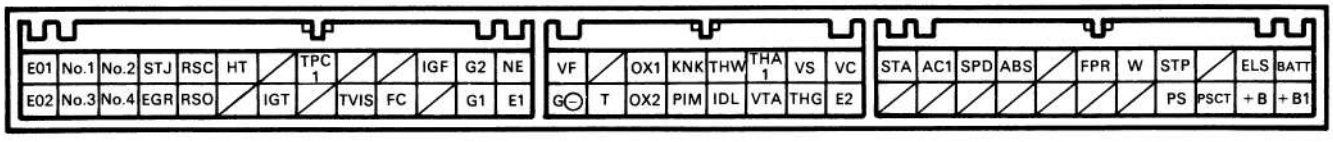
Using a voltmeter with high impedance (10 kΩ/V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of ECU

Symbol	Terminal	Symbol	Terminal	Symbol	Terminal
E01	POWER GROUND	G2	DISTRIBUTOR	AC1	A/C MAGNET SWITCH
E02	POWER GROUND	G1	DISTRIBUTOR		–
No. 1	INJECTOR (No. 1)	NE	DISTRIBUTOR	SPD	SPEED SENSOR
No. 3	INJECTOR (No. 3)	E1	ENGINE GROUND		–
No. 2	INJECTOR (No. 2)	VF	CHECK CONNECTOR	ABS	ABS ECU
No. 4	INJECTOR (No. 4)	G⊖	DISTRIBUTOR		–
STJ	COLD START INJECTOR		–		–
EGR	EGR VALVE	T	CHECK CONNECTOR		–
RSC	ISC VALVE	OX1	OXYGEN SENSOR (MAIN)	FPR	FUEL PUMP RELAY
RSO	ISC VALVE	OX2	SUB-OXYGEN SENSOR		–
HT	OXYGEN SENSOR HEATER	KNK	KNOCK SENSOR	W	WARNING LIGHT
	–	PIM	TURBOCHARGING PRESSURE SENSOR		–
	–	THW	WATER TEMP. SENSOR	STP	STOP LIGHT SWITCH
IGT	IGNITER	IDL	THROTTLE POSITION SENSOR	PS	POWER STEERING ECU
TPC1	TURBOCHARGING PRESSURE VSV	THA1	INTAKE AIR TEMP. SENSOR (AIR FLOW METER)		–
	–	VTA	THROTTLE POSITION SENSOR	PSCT	POWER STEERING ECU
	–	VS	AIR FLOW METER	ELS	HEADLIGHT SWITCH DEFOGGER SWITCH
TVIS	T-VIS VSV	THG	EGR GAS TEMP. SENSOR	+B1	EFI MAIN RELAY
	–	VC	SENSOR POWER SOURCE	BATT	BATTERY
FC	CIRCUIT OPENING RELAY	E2	SENSOR GROUND	+B	EFI MAIN RELAY
IGF	IGNITER	STA	STARTER SWITCH		
	–		–		

*CALIF. only

Engine ECU Terminals



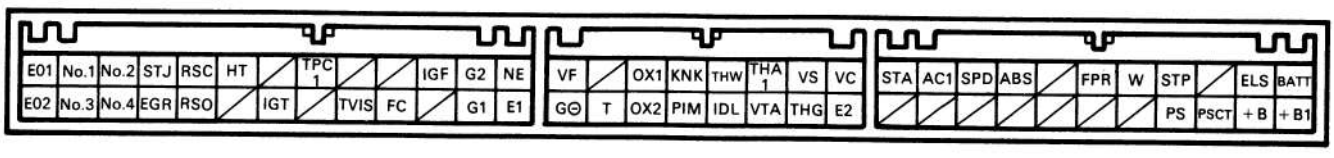
FI2796

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Voltage at ECU Wiring Connectors

No.	Terminal	Condition		STD voltage (V)	See page
1	+B, +B1 – E1	IG SW ON		10 – 14	FL-36
2	BATT – E1	–		10 – 14	FI-37
3	IDL – E2	IG SW ON	Throttle valve open	4 – 6	FI-38
	VC – E2		–	4 – 6	
	VTA – E2		Throttle valve fully closed	0.1 – 1.0	
			Throttle valve fully open	3.2 – 4.2	
4	VC – E2		–	4 – 6	FI-40
	VS – E2		Measuring plate fully closed	3.7 – 4.3	
			Measuring plate fully open	0.2 – 0.5	
		Idling (No load)		2.6 – 3.6	
		3,000 rpm (No load)		1.0 – 2.0	
5	No.1, No.2, No.3, No.4 – E01, E02	IG SW ON		10 – 14	FI-41
6	THA1 – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3	FI-42
7	THW – E2		Coolant temp. 80°C (176°F)	0.1 – 1.1	FI-43
8	STA – E1	Cranking		6 – 14	FI-44
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-45
10	RSC, RSO – E1	IG SW ON		8 – 14	FI-46
11	W – E1	No trouble (check engine warning light off) and engine running		10 – 14	FI-47
12	PIM – E2	IG SW ON		2.5 – 4.5	FI-48
	VC – E2			4 – 6	
13	AC1 – E1	IG SW ON	Air conditioning ON	8 – 14	FI-49

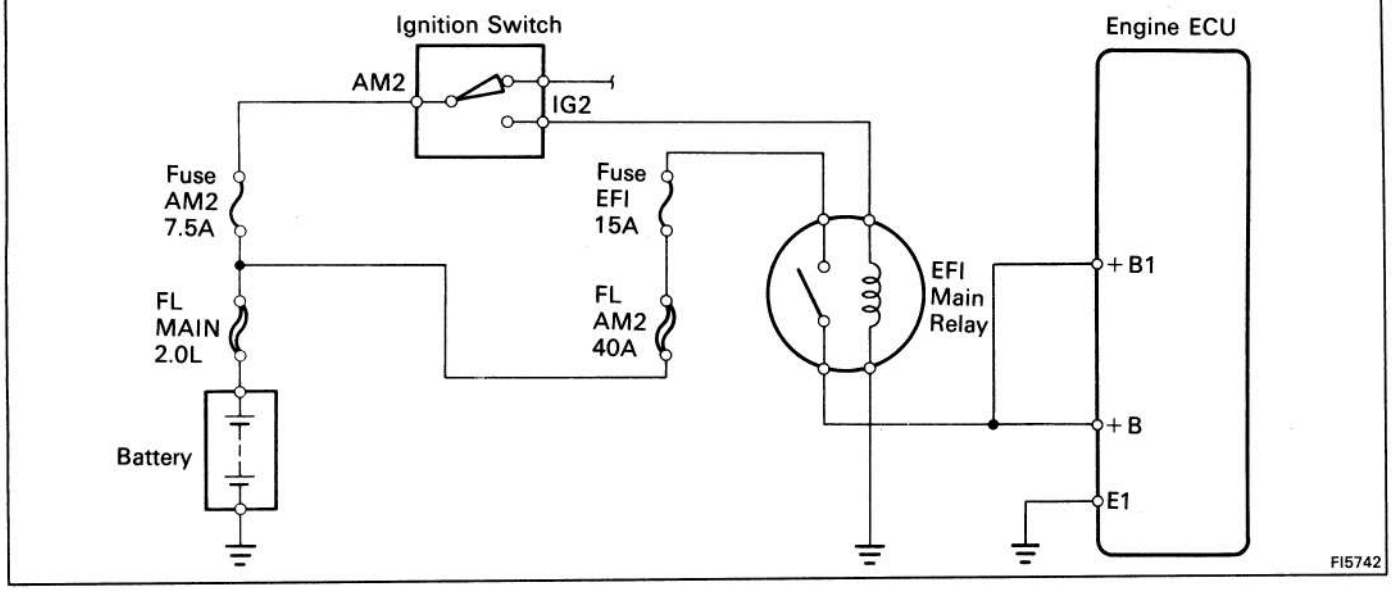
Engine ECU Terminals

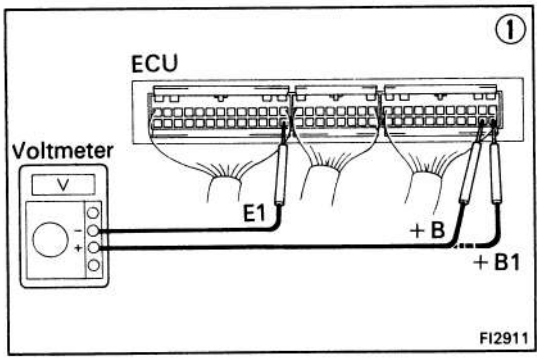


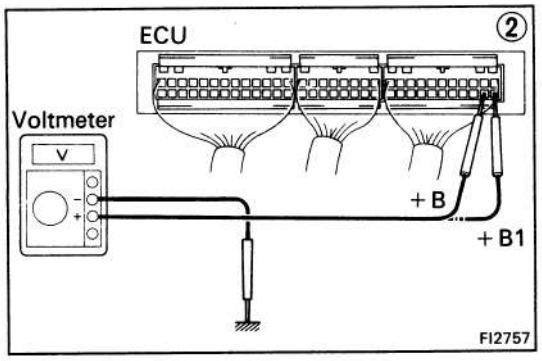
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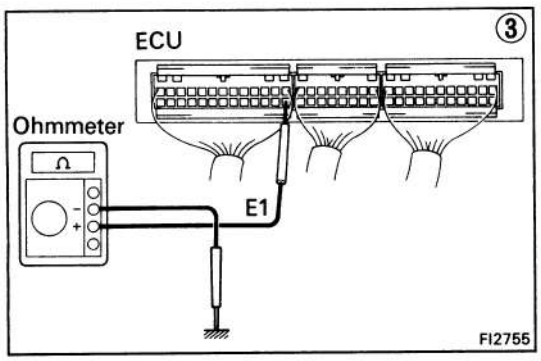
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No.	Terminals	Trouble	Condition	STD voltage
1	+B, +B1 – E1	No voltage	IG SW ON	10 – 14 V









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 → Try another ECU.

BAD → Repair or replace.

↓

Check fuses, fusible links and ignition switch. — BAD → Repair or replace.

↓ OK

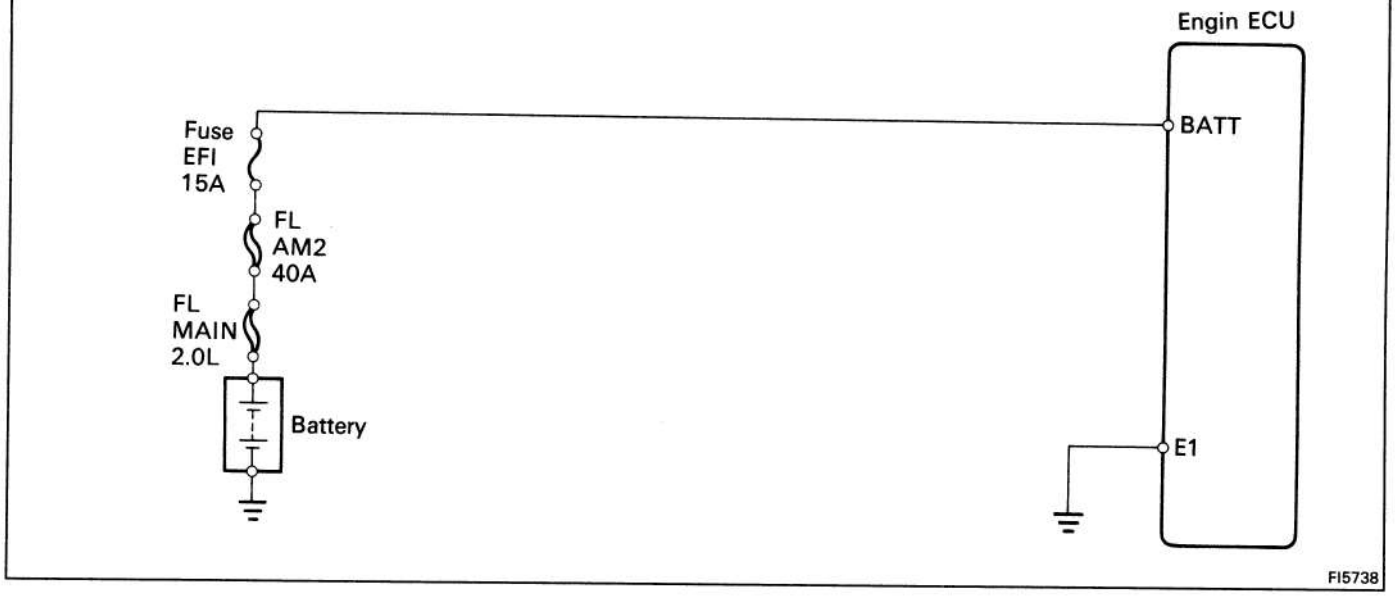
Check EFI main relay. (See page FI-156) — BAD → Replace.

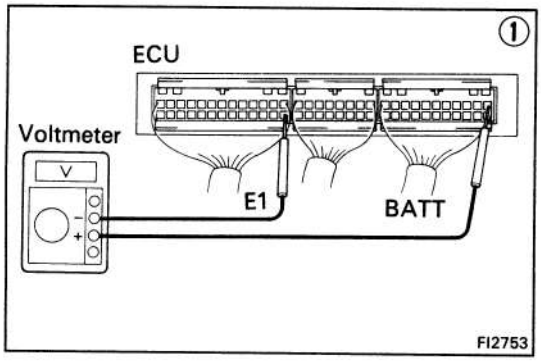
↓ OK

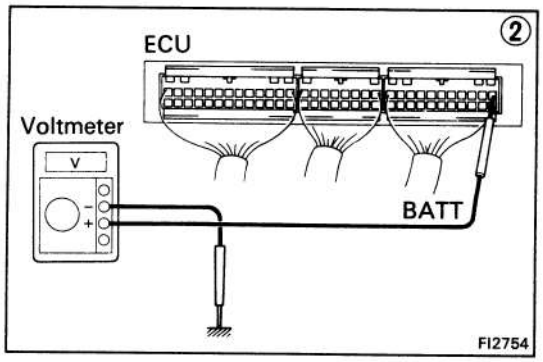
Check wiring between EFI main relay and battery. — BAD → Repair or replace.

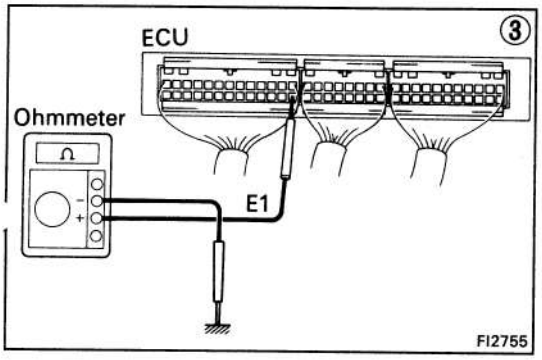
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No.	Terminals	Trouble	Condition	STD voltage
2	BATT – E1	No voltage	–	10 – 14 V









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.

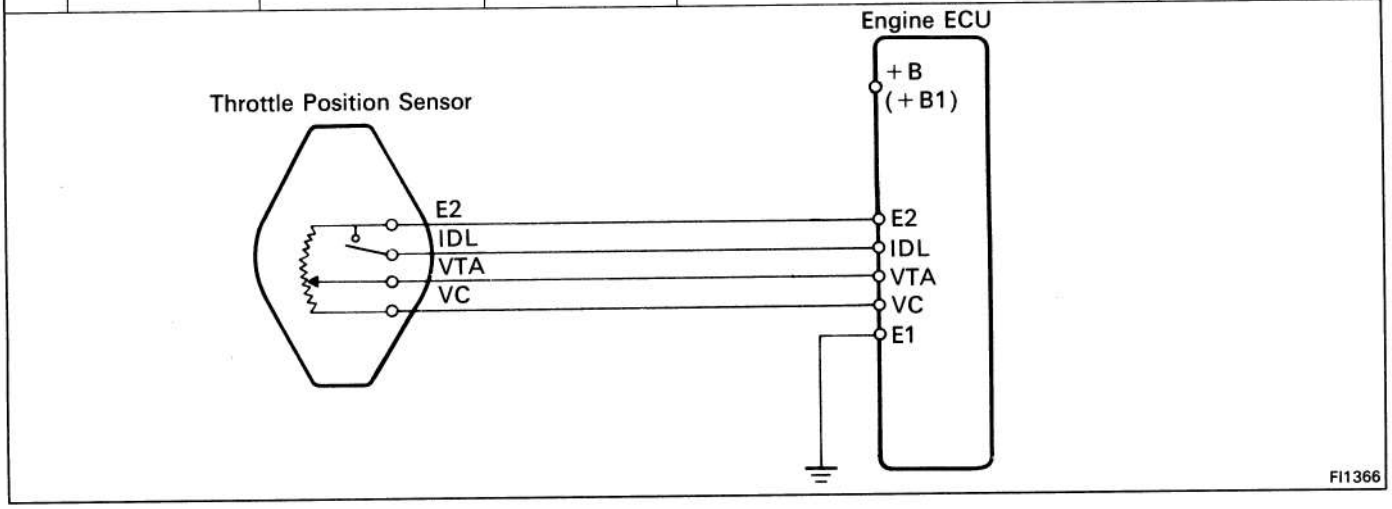
Check fuse and fusible links. BAD → Replace.

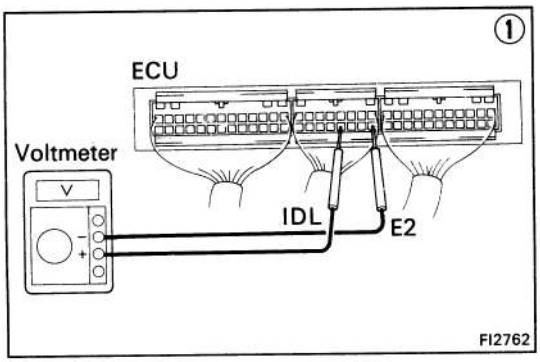
OK

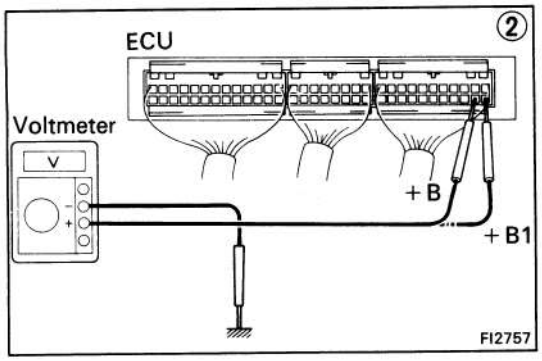
Check wiring between ECU terminal and battery. BAD → Repair or replace.

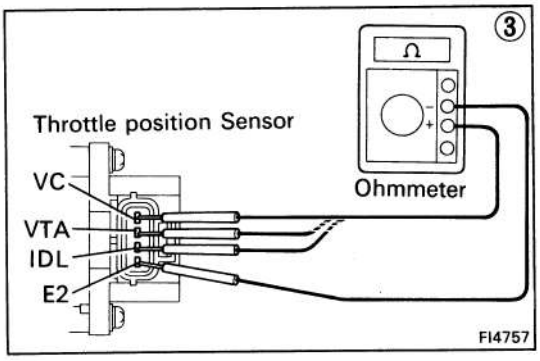
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No.	Terminals	Trouble	Condition		STD voltage
3	IDL – E2	No voltage	IG SW ON	Throttle valve open	8 – 14 V
	VC – E2			–	4 – 6 V
	VTA – E2			Throttle valve fully closed	0.7 – 1.0 V
				Throttle valve fully open	3.2 – 4.2 V









● **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 ECU terminal +B (+B1) and body ground. **(IG SW ON)**

NO

OK → Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Refer to No.1. (See page FI-36)

BAD → Repair or replace.

OK

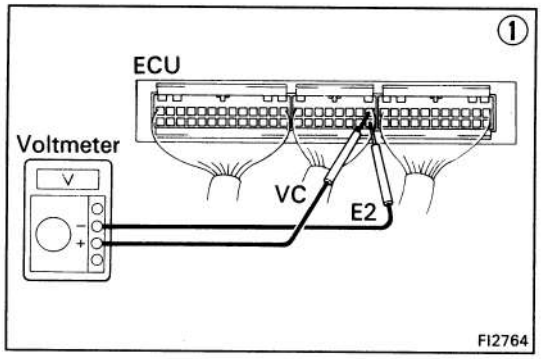
③ Check throttle position sensor. (See page FI-134)

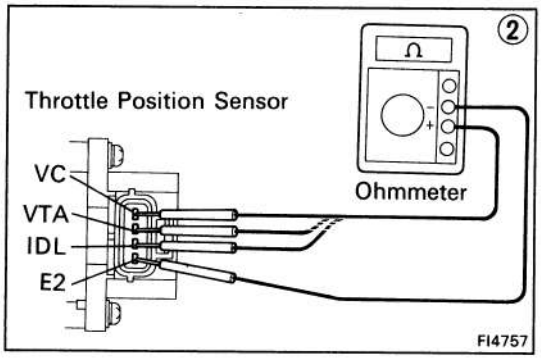
BAD → Repair or replace throttle position sensor.

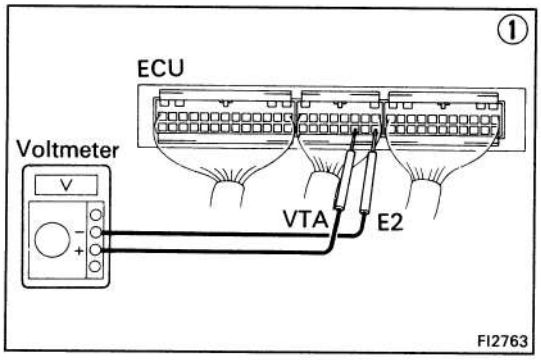
OK → Check wiring between ECU and throttle position sensor.

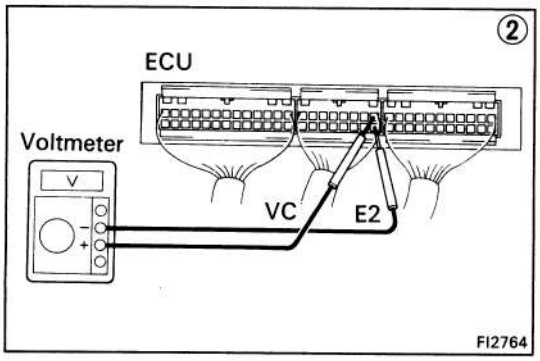
OK → Try another ECU.

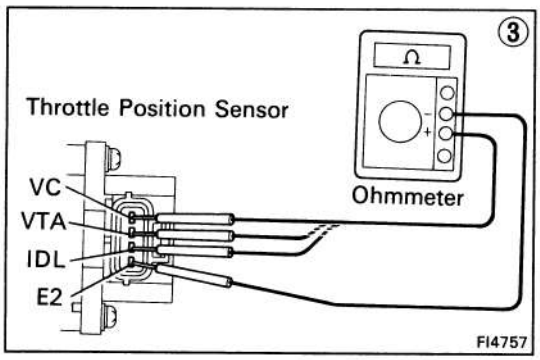
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● **VC – E2**

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 → ② Check throttle position sensor. (See page FI-134)

↓ BAD → Repair or replace.

↓ OK → Try another ECU.

NO → Refer to No.1. (See page FI-36)

OK → Check wiring between ECU and throttle position sensor.

↓ OK → Try another ECU.

BAD → 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 → Refer to VC – E2 trouble section.

↓ OK

OK →

③ Check throttle position sensor. (See page FI-134)

↓ OK

BAD → Repair or replace.

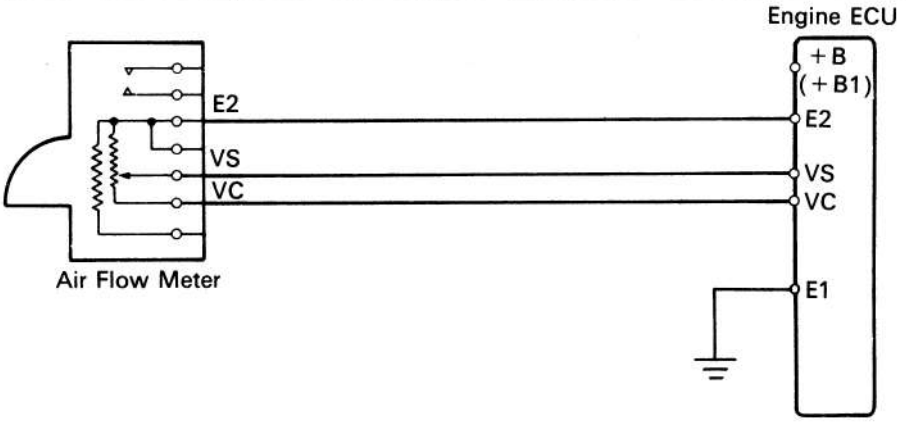
Check wiring between ECU and throttle position sensor.

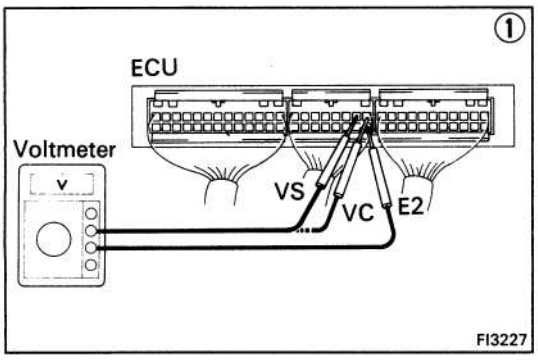
↓ OK → Try another ECU.

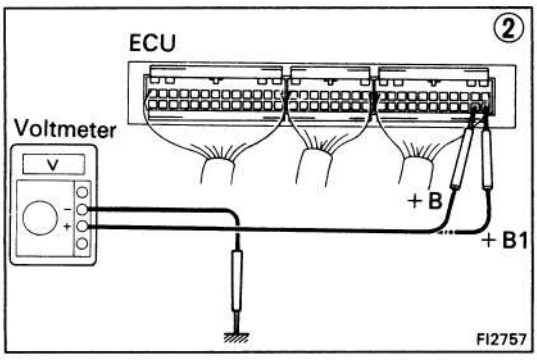
BAD → Repair or replace.

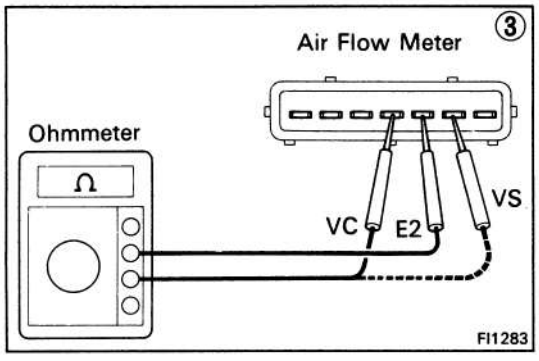
cardiagn.com

No.	Terminals	Trouble	Condition		STD voltage
4	VC – E2	No voltage	IG SW ON	–	4 – 6 V
	VS – E2			Measuring plate fully closed	3.7 – 4.3 V
				Measuring plate fully open	0.2 – 0.5 V
			Idling (No load)		2.6 – 3.6 V
			3,000 rpm (No load)		1.0 – 2.0 V









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 (+B1) and body ground. **(IG SW ON)**

OK → ↓

NO → Refer to No.1. (See page FI-36)

↓

Check wiring between ECU terminal E1 and body ground.

OK → ↓

BAD → Repair or replace.

↓

③ Check air flow meter. (See page FI-131)

BAD → Repair or replace air flow meter.

OK → ↓

Check wiring between ECU and air flow meter.

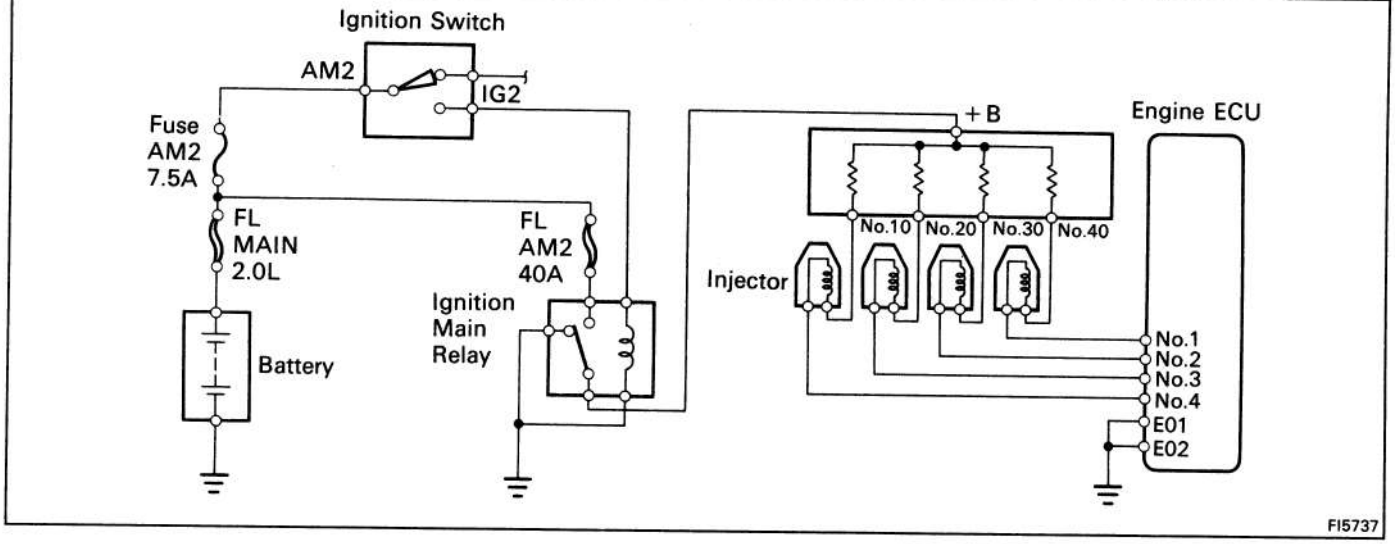
OK → ↓

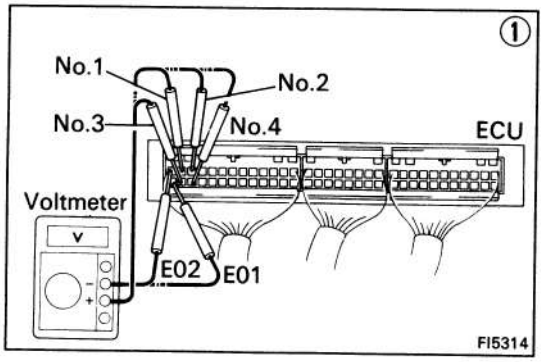
Try another ECU.

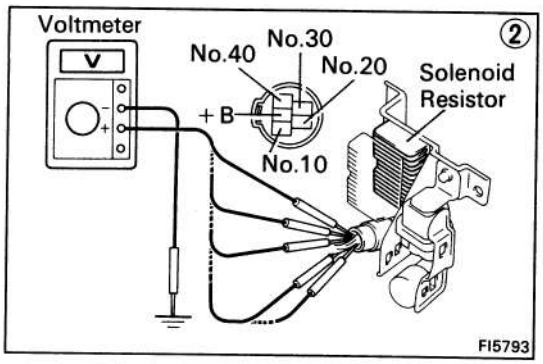
BAD → Repair or replace.

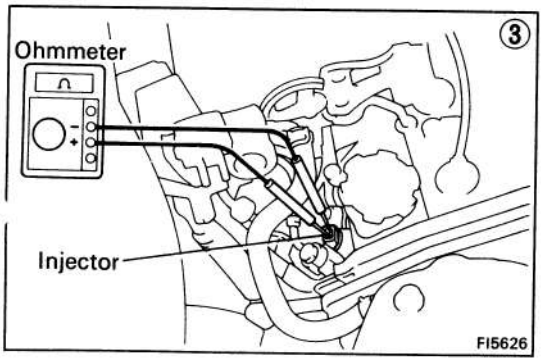
cardiagn.com

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









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)**

↓

② Check that there is specified voltage between solenoid resistor terminal +B and ground. **STD voltage: 10 – 14 V**

OK ↓ / NO → Check fuses, fusible links, wiring, ignition switch and ignition main relay. → BAD → Repair or replace.

↓

② Check that there is specified voltage between resistor terminals (No.10, No.20, No.30 or No.40) and body ground. **STD voltage: 10 – 14 V**

OK ↓ / NO → Replace resistor.

↓

③ Check resistance of each injector. **STD resistance: 2 – 4 Ω**

OK ↓ / BAD → Replace injector.

↓

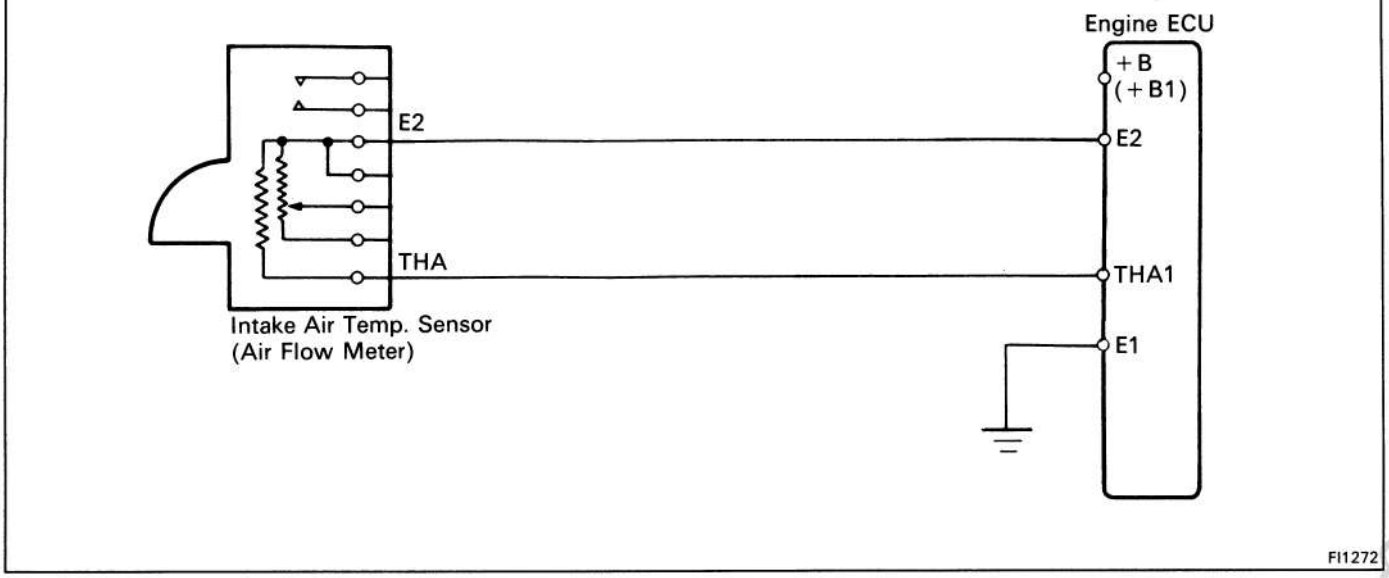
Check wiring between ECU and resistor. → BAD → Repair or replace wiring

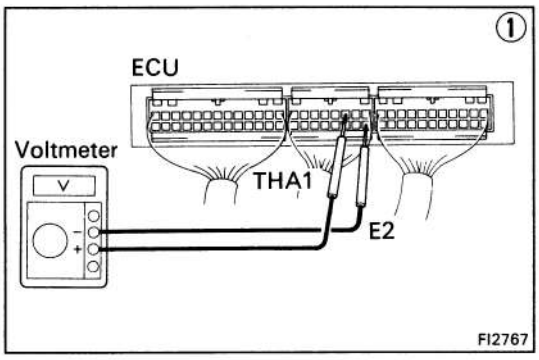
↓ OK

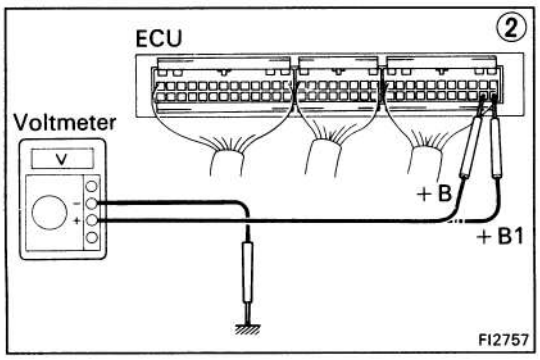
Try another ECU.

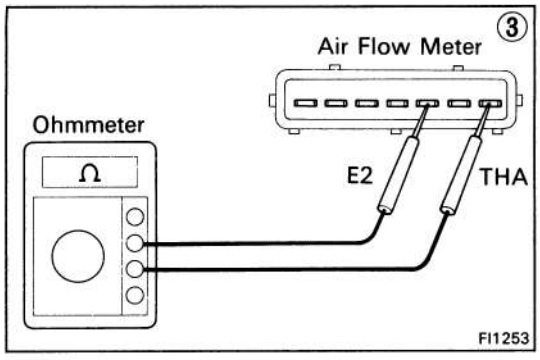
cardiagn.com

No.	Terminals	Trouble	Condition		STD voltage
6	THA1 – E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1 – 3 V









① There is no voltage between ECU terminal THA1 and E2. **(IG SW ON)**

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

OK → Check wiring between ECU terminal E1 and body ground.

NO → Refer No.1. (See page FI-36)

OK → ③ Check intake air temp. sensor. (See page FI-131)

BAD → Repair or replace.

BAD → Replace air flow meter.

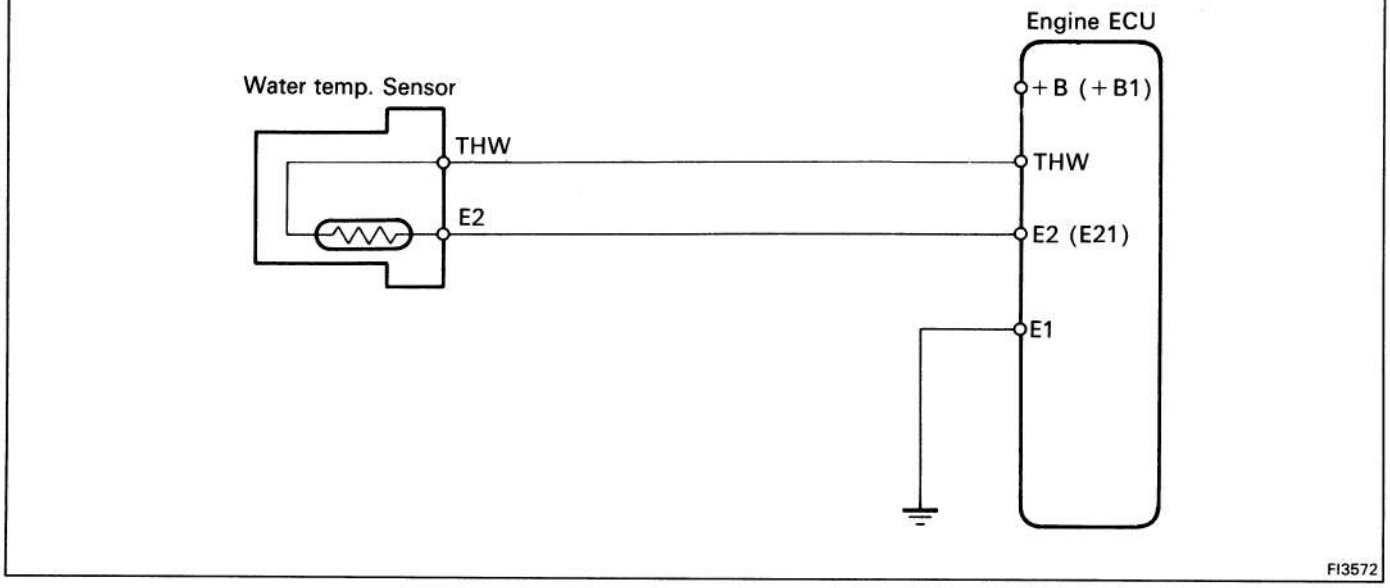
OK → Check wiring between ECU and air temp. sensor.

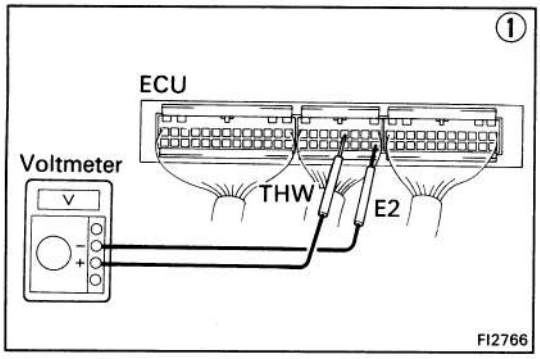
OK → Try another ECU.

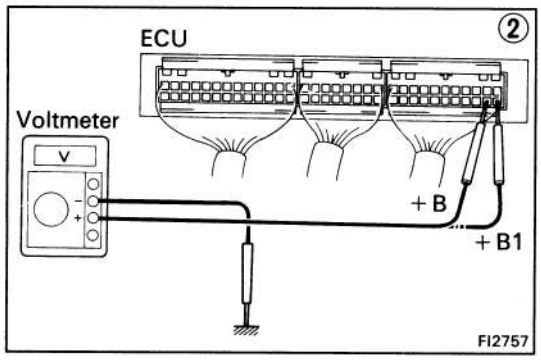
BAD → Repair or replace.

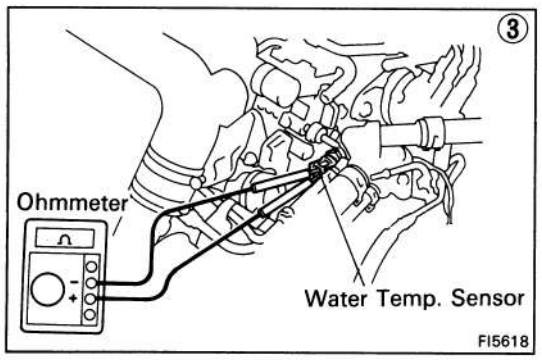
cardiagn.com

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









① There is no voltage between ECU terminal THW 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 No.1. (See page FI-36)

↓

Check wiring between ECU terminal E1 and body ground.

OK → ↓

BAD → Repair or replace.

↓

③ Check water temp. sensor. (See page FI-168)

BAD → Replace water temp. sensor.

OK → ↓

Check wiring between ECU and water temp. sensor.

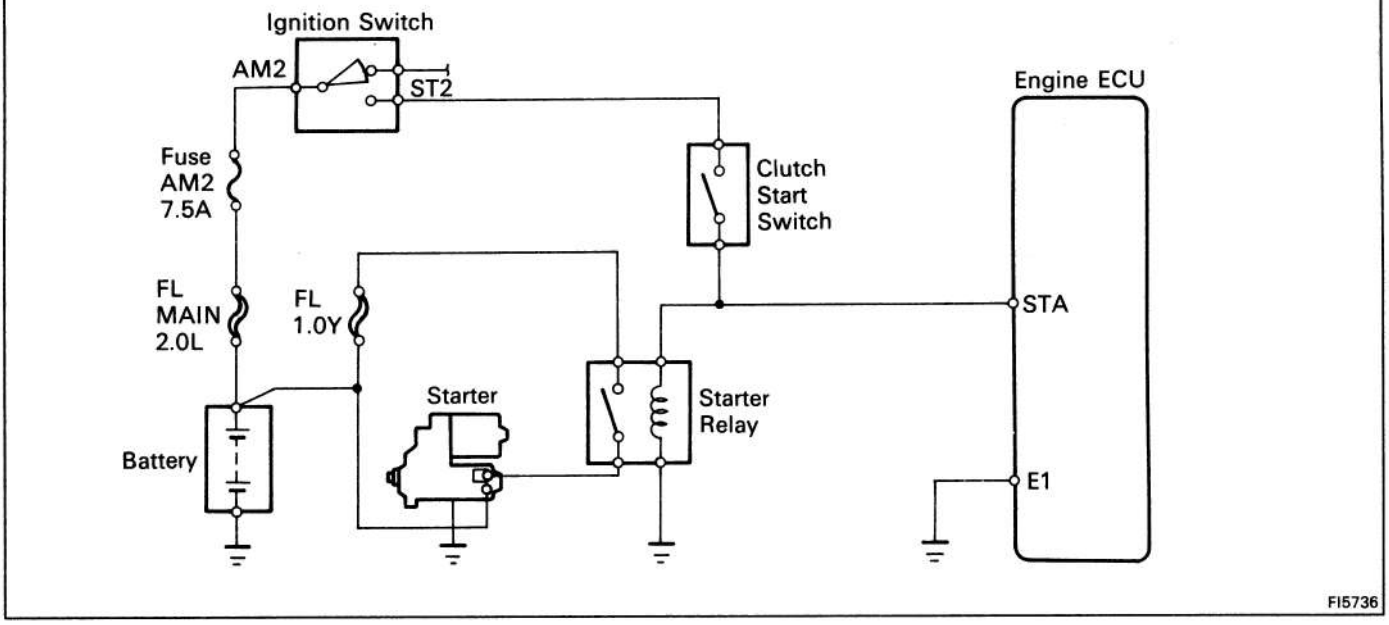
OK → ↓

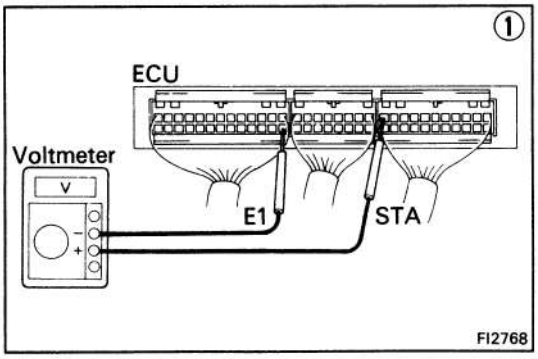
Try another ECU.

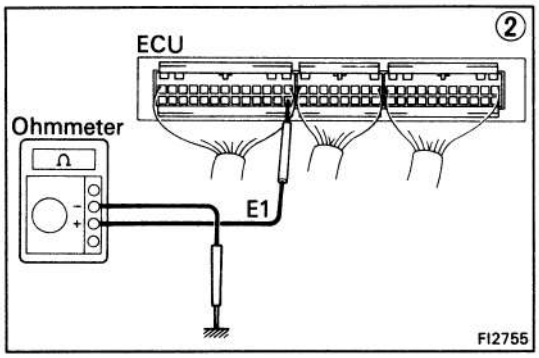
BAD → Repair or replace.

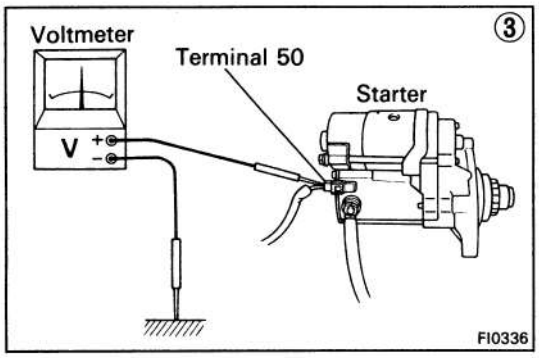
cardiagn.com

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







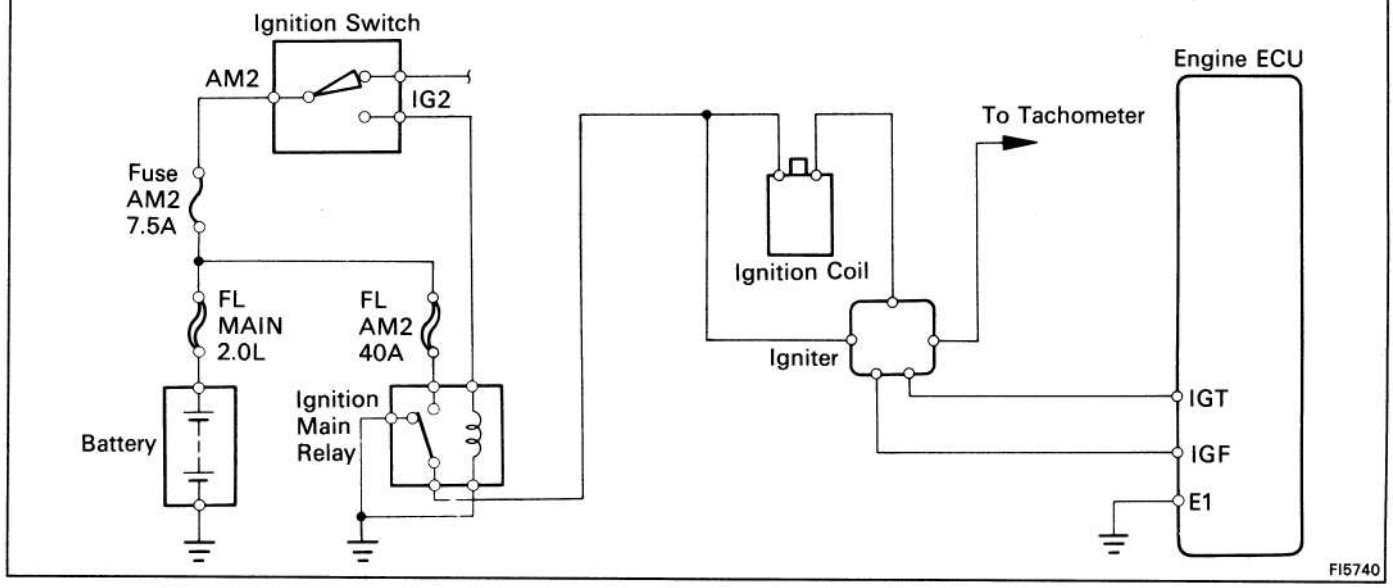


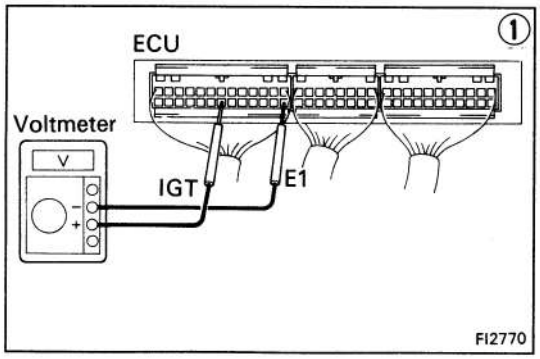
① There is no voltage between ECU terminals STA and E1. **(IG SW ON)**

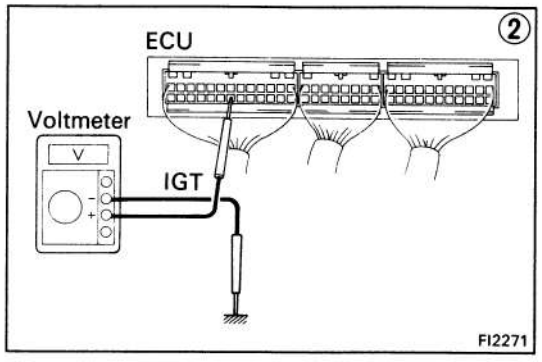
Check starter operation.
- OK → Check wiring between ECU terminals STA and ignition switch terminal ST2.
  - OK → ② Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.
- BAD → Check fuse, fusible links, battery, wiring, ignition switch, clutch start switch and starter relay.
  - BAD → Repair or replace.
  - OK → ③ Check that there is voltage at terminal 50 of starter. **(IG SW START) STD voltage: 6 – 14 V**
    - OK → Check starter.
    - NO → Check wiring between ignition switch terminal ST2 and starter terminal 50.

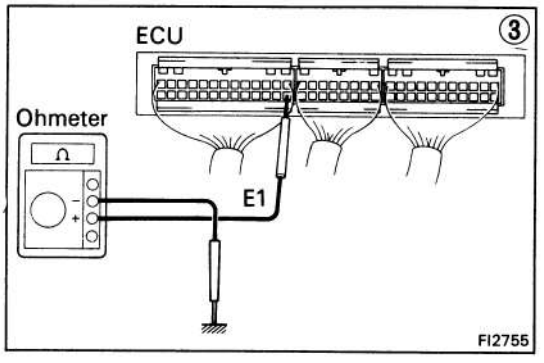
cardiagn.com

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









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.

③ BAD → Repair or Replace.

③ OK → Try another ECU.

↓

Check fuse, fusible links, ignition switch and ignition main relay.

BAD → Repair or replace.

↓ OK

Check distributor. (See page IG-9)

BAD → Repair or replace.

↓ OK

Check wiring between ECU and battery.

BAD → Repair or replace.

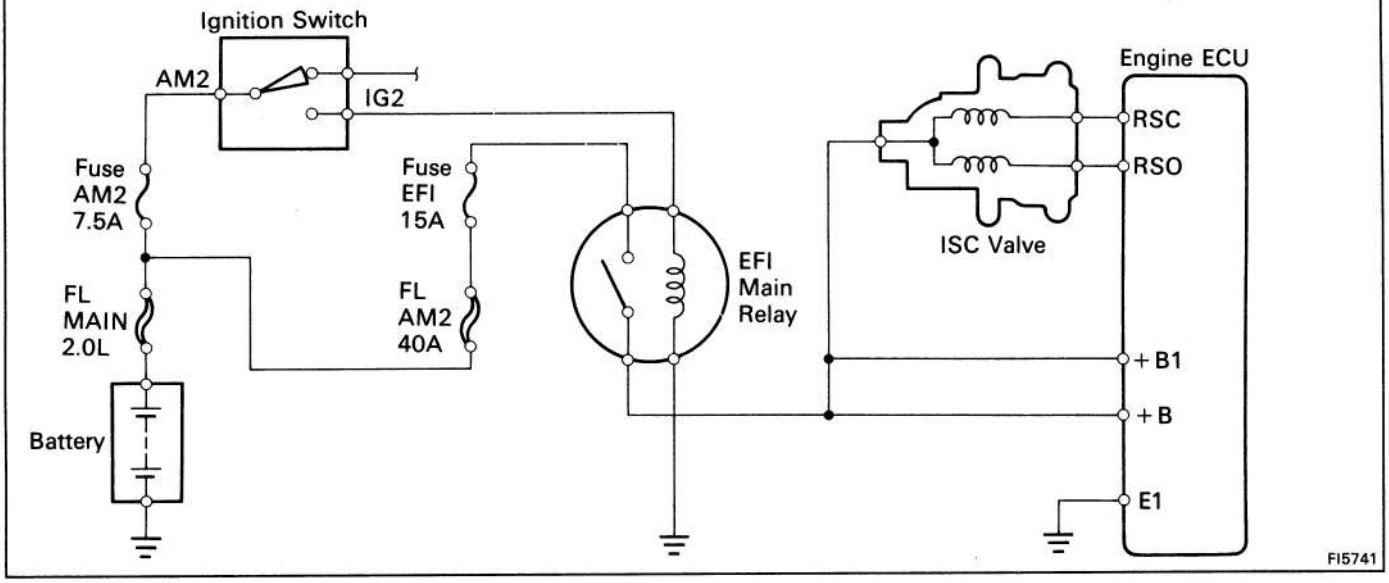
↓ OK

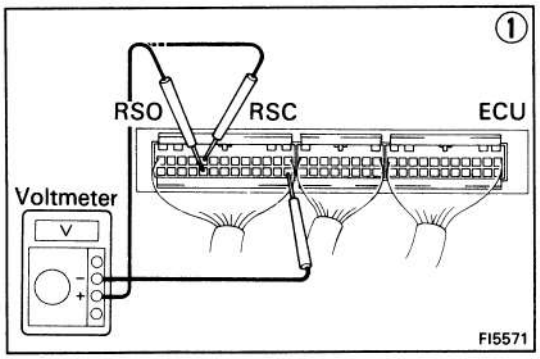
Check igniter. (See page IG-9)

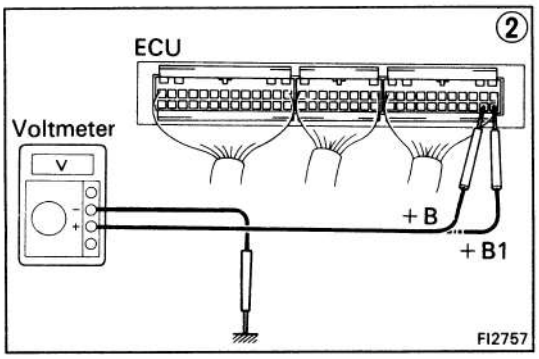
BAD → Repair or replace.

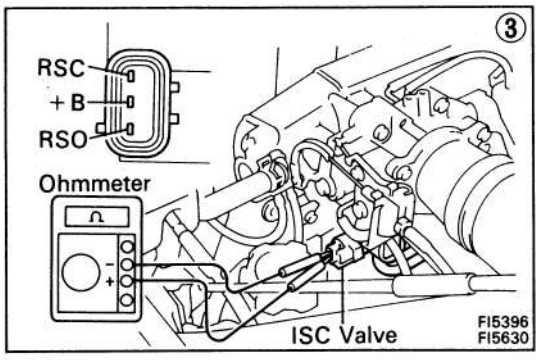
cardiagn.com

No.	Terminals	Trouble	Condition	STD voltage
10	RSC RSO – E1	No voltage	IG SW ON	8 – 14 V









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)**

ON ↓

NO → Refer to No.1. (See page FI-36)

↓

③ Check resistance between ISC valve terminals +B and RSC or RSO. **STD resistance: 17.7 – 23.9 Ω**

BAD → Replace ISC valve.

OK ↓

Check wiring between ECU and ISC valve.

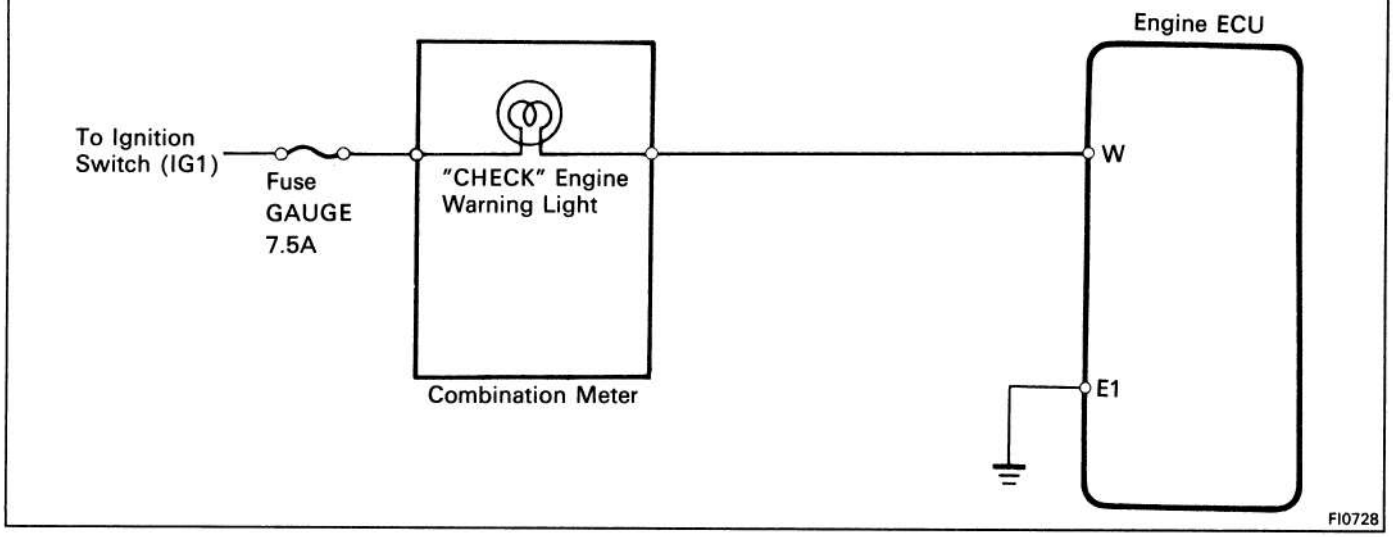
BAD → Repair or replace wiring.

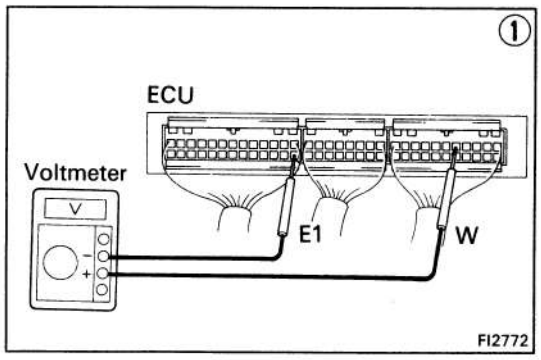
OK ↓

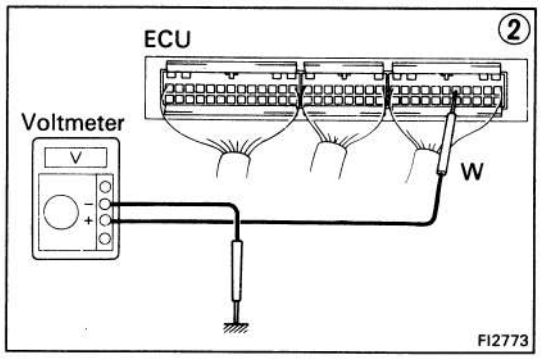
Try another ECU.

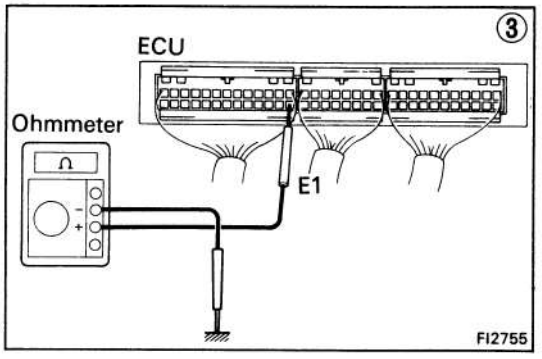
cardiagn.com

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









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 → Check fuse GAUGE (7.5A) and check engine warning light.

OK → ③ Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fuse GAUGE (7.5A) and check engine warning light.

OK → Check wiring between ECU terminal W and fuse.

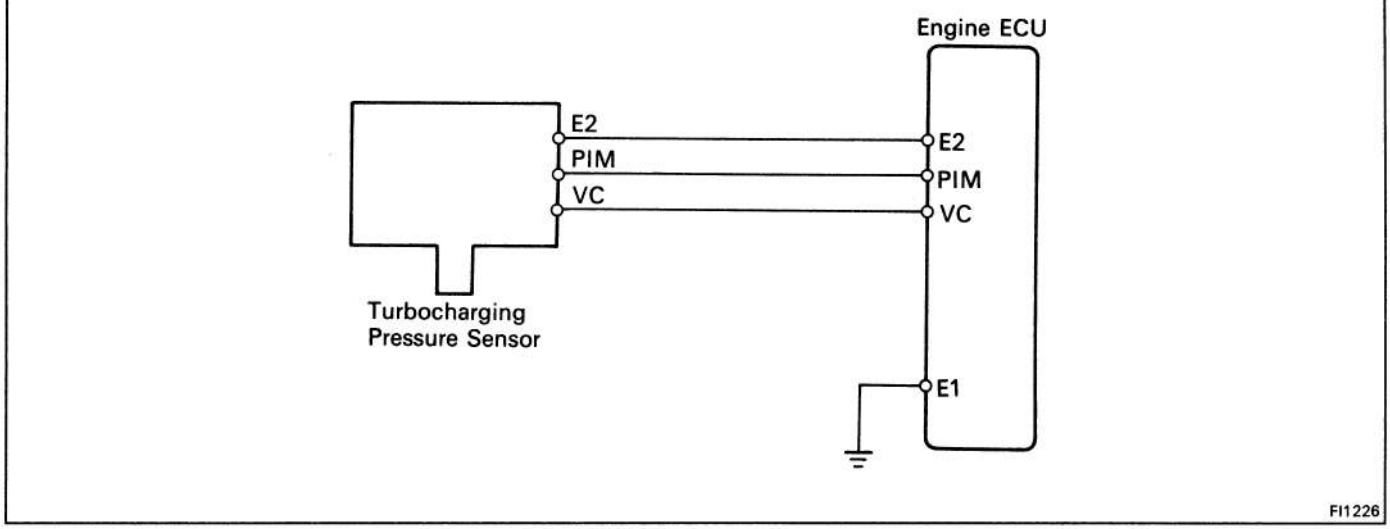
BAD → Repair or replace.

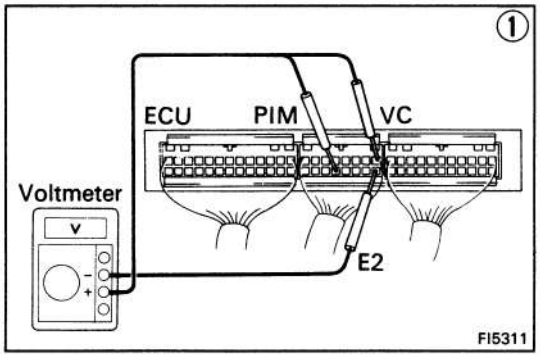
Fuse blows again → Check wiring between ECU terminal W and fuse.

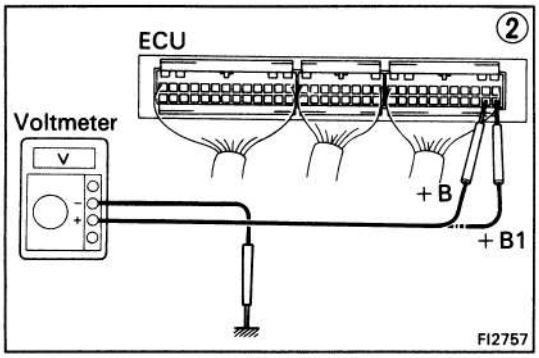
BAD → Repair or replace.

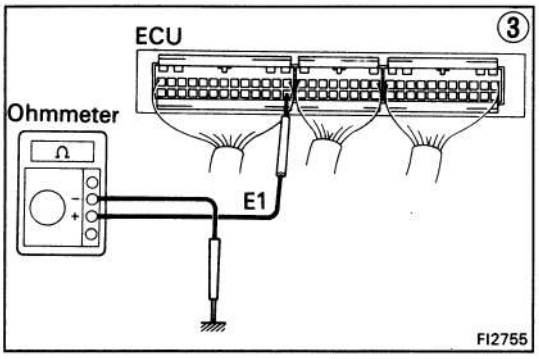
cardiagn.com

No.	Terminals	Trouble	Condition	STD voltage
12	PIM – E2	No voltage	IG SW ON	2.5 – 4.5 V
	VC – E2			4 – 6 V









● **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-36)

↓

③ Check wiring between ECU terminal E1 and body ground.

OK ↓ / BAD → Repair or replace.

Check turbocharging pressure sensor. (See page FI-171)

BAD ↓ / OK →

Replace turbocharging pressure sensor.

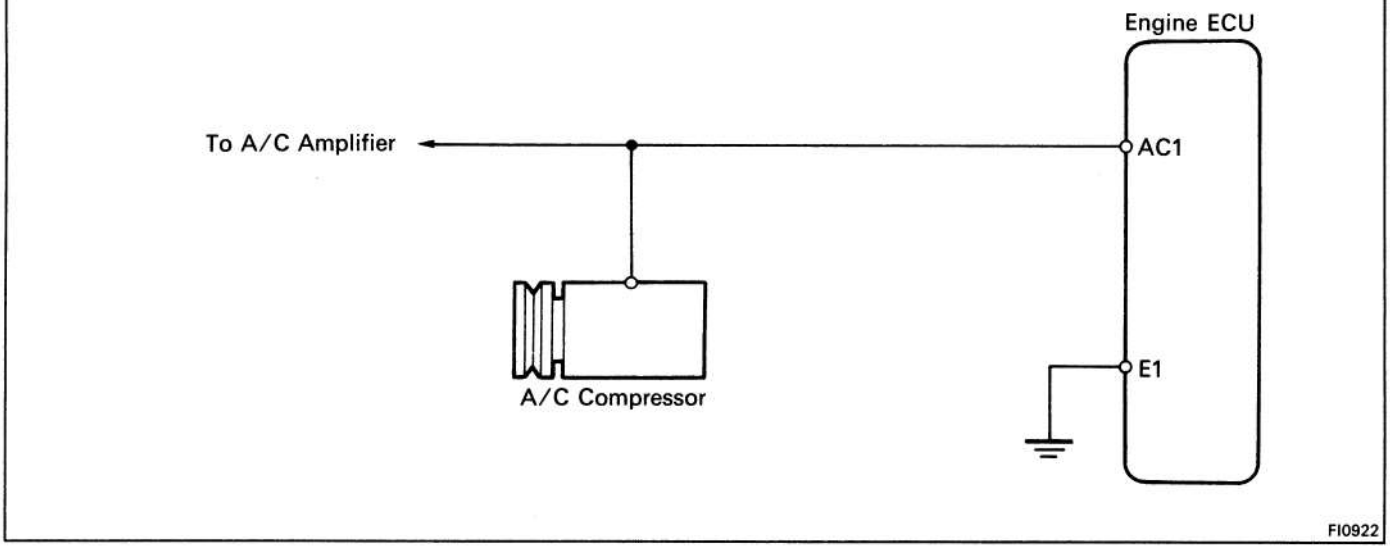
Check wiring between ECU and turbocharging pressure sensor.

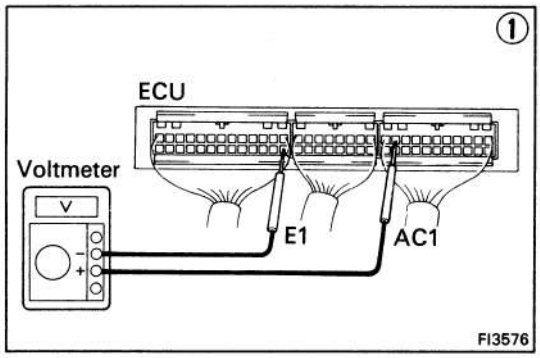
OK ↓ / BAD → Repair or replace.

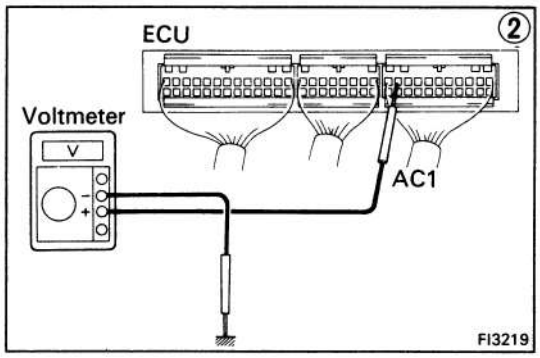
Try another ECU.

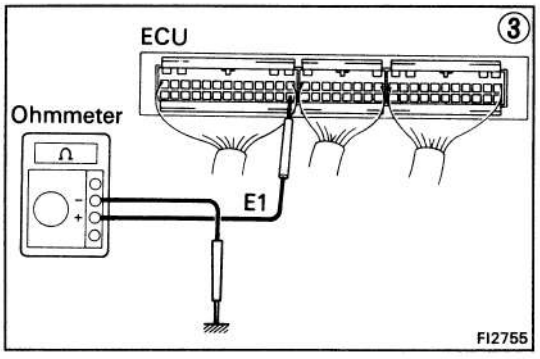
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No.	Terminal	Trouble	Condition	STD voltage
13	AC1 – E1	No voltage	Air conditioning ON	8 – 14 V









① There is no voltage between ECU terminals AC1 and E1. **(Air conditioning ON)**

② Check that there is voltage between ECU terminal AC1 and body ground.

NO

OK

③ Check wiring between ECU terminal E1 and body ground.

OK

Try another ECU.

BAD

Repair or replace.

Check compressor running.

OK

Check wiring between ECU terminal AC1 and amplifier.

BAD

Repair or replace.

BAD

Check that there is voltage between amplifier terminal and body ground.

BAD

Repair or replace.

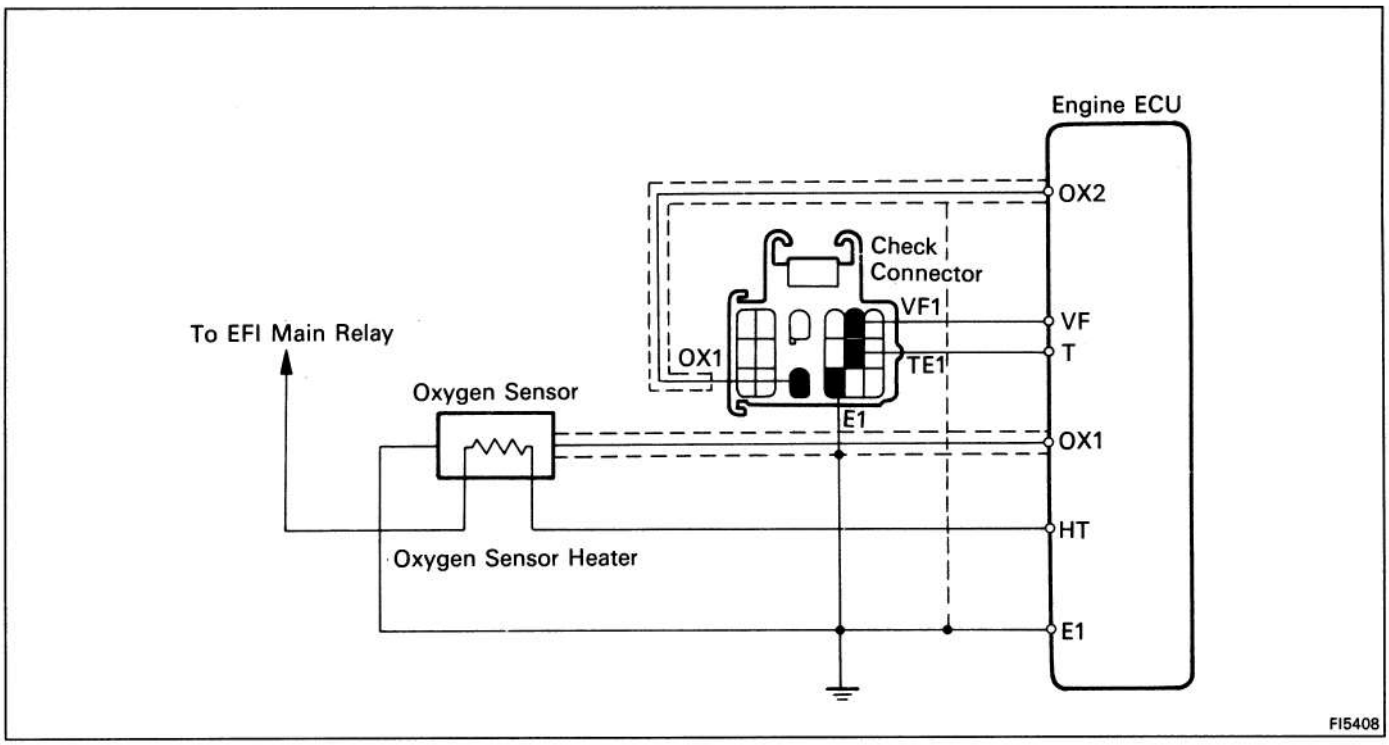
OK

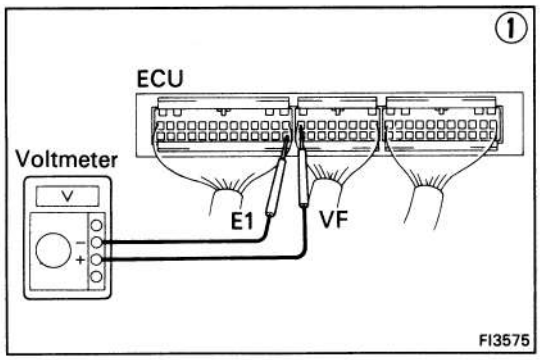
Check wiring between amplifier and ECU or compressor.

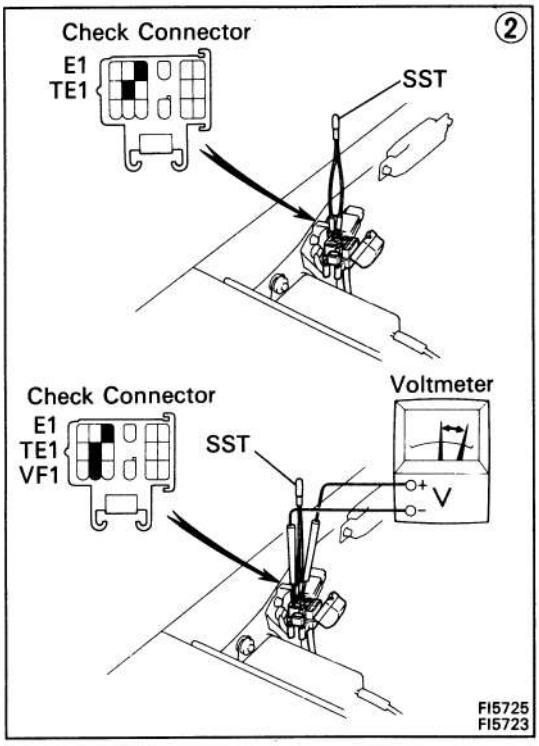
BAD

Repair or replace.

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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 → Try another ECU.
- BAD → Repair or replace.

Is air leaking into air induction system?
- BAD → Repair air leak.
- OK ↓

Check spark plugs. (See page IG-6)
- 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-87)
- BAD → Repair or replace.
- OK ↓

Check injectors. (See page FI-110)
- BAD → Repair or replace.
- OK ↓

* Check cold start injector. (See page FI-99)
- BAD → Repair or replace.
- OK ↓

Check air flow meter. (See page FI-131)
- BAD → Repair or replace.
- OK ↓

② Check operating of oxygen sensor. (See page FI-173)
- BAD → System normal
- BAD ↓

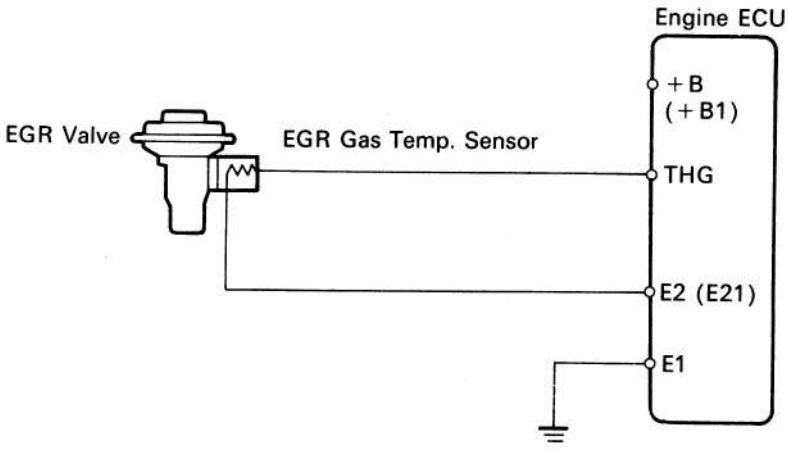
Check wiring between oxygen sensor and ECU.
- BAD → Repair wiring.
- OK ↓

Replace oxygen sensor.

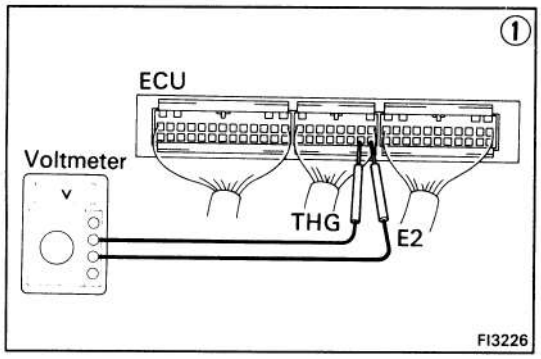
* Rich malfunction only

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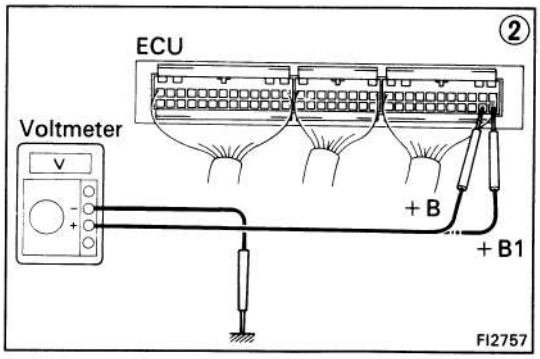
CALIF. only



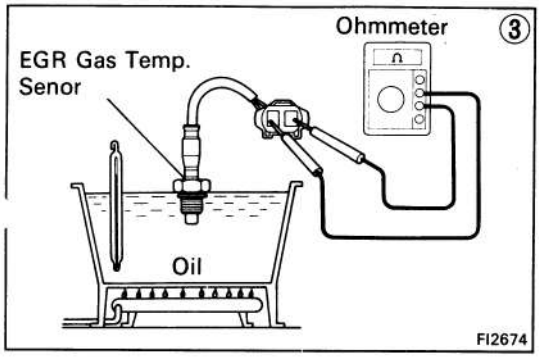
FI2680



FI3226



FI2757



FI2674

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-36)

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-172)

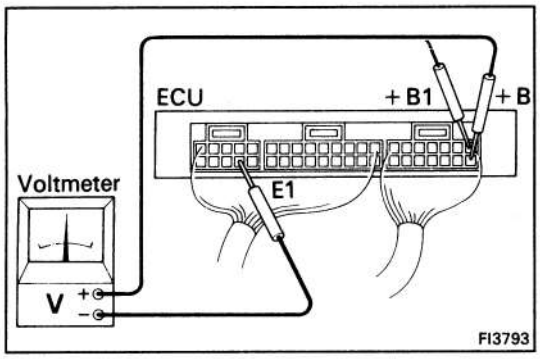
BAD → Replace EGR gas temp. sensor.

OK → Check wiring between ECU and EGR gas temp. sensor.

OK → Try another ECU.

BAD → Repair or replace

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

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.

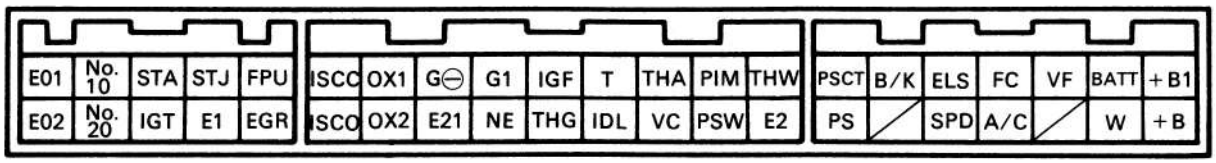
Using a voltmeter with high impedance (10 kΩ/V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of ECU

Symbol	Terminal	Symbol	Terminal	Symbol	Terminal
E01	POWER GROUND	G⊖	DISTRIBUTOR	PSCT	POWER STEERING ECU
E02	POWER GROUND	E21	SENSOR GROUND	PS	POWER STEERING ECU
No.10	INJECTOR	C1	DISTRIBUTOR	B/K	STOP LIGHT SWITCH
No.20	INJECTOR	NE	DISTRIBUTOR		–
STA	STARTER SWITCH	IGF	IGNITER	ELS	HEADLIGHT AND DEFOGGER
IGT	IGNITER	* THG	EGR GAS TEMP. SENSOR	SPD	SPEED SENSOR
STJ	COLD START INJECTOR	T	CHECK CONNECTOR	FC	CIRCUIT OPENING RELAY
E1	ENGINE GROUND	IDL	THROTTLE POSITION SENSOR	A/C	A/C COMPRESSOR
FPU	FUEL PRESSURE VSV	THA	INTAKE AIR TEMP. SENOR	VF	CHECK CONNECTOR
EGR	EGR VSV	VC	VACUUM SENSOR		–
ISCC	ISC VALVE	PIM	VACUUM SENSOR	BATT	BATTERY
ISCO	ISC VALVE	PSW	THROTTLE POSITION SENSOR	W	WARNING LIGHT
OX1	OXYGEN SENSOR (MAIN)	THW	WATER TEMP. SENSOR	+B1	EFI MAIN RELAY
* OX2	SUB-OXYGEN SENSOR	E2	SENSOR GROUND	+B	EFI MAIN RELAY

Engine ECU Terminals

* CALIF. only



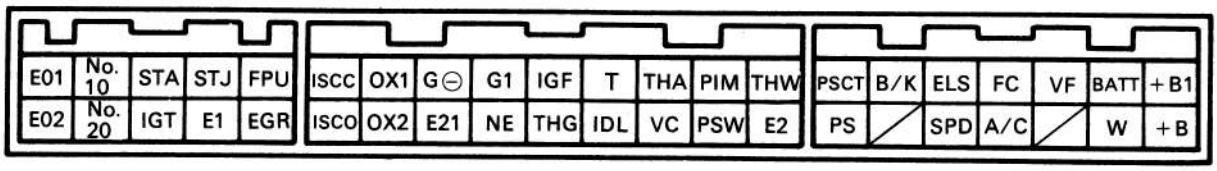
FI4065

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Voltage at ECU Wiring Connectors

No.	Terminals	Condition		STD voltage (V)	See page
1	+B, +B1 – E1	IG SW ON		10 – 14	FI-54
2	BATT – E1	–		10 – 14	FI-55
3	IDL – E1	IG SW ON	Throttle valve open	8 – 14	FI-56
	PSW – E1		Throttle valve fully closed (Throttle opener must be cancelled first)	4.5 – 5.5	
4	PIM – E2	IG SW ON		3.3 – 3.9	FI-57
	VC – E2			4.5 – 5.5	
5	No.10, No.20 – E01, E02			10 – 14	FI-58
6	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.7 – 3.1	FI-59
7	THW – E2		Coolant temp. 80°C (176°F)	0.3 – 0.8	FI-60
8	STA – E1	Cranking		6 – 14	FI-61
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-62
10	ISCC, ISCO – E1	IG SW ON		8 – 14	FI-63
11	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	FI-64
12	A/C– E1	IG SW ON	Air conditioning ON	8 – 14	FI-65

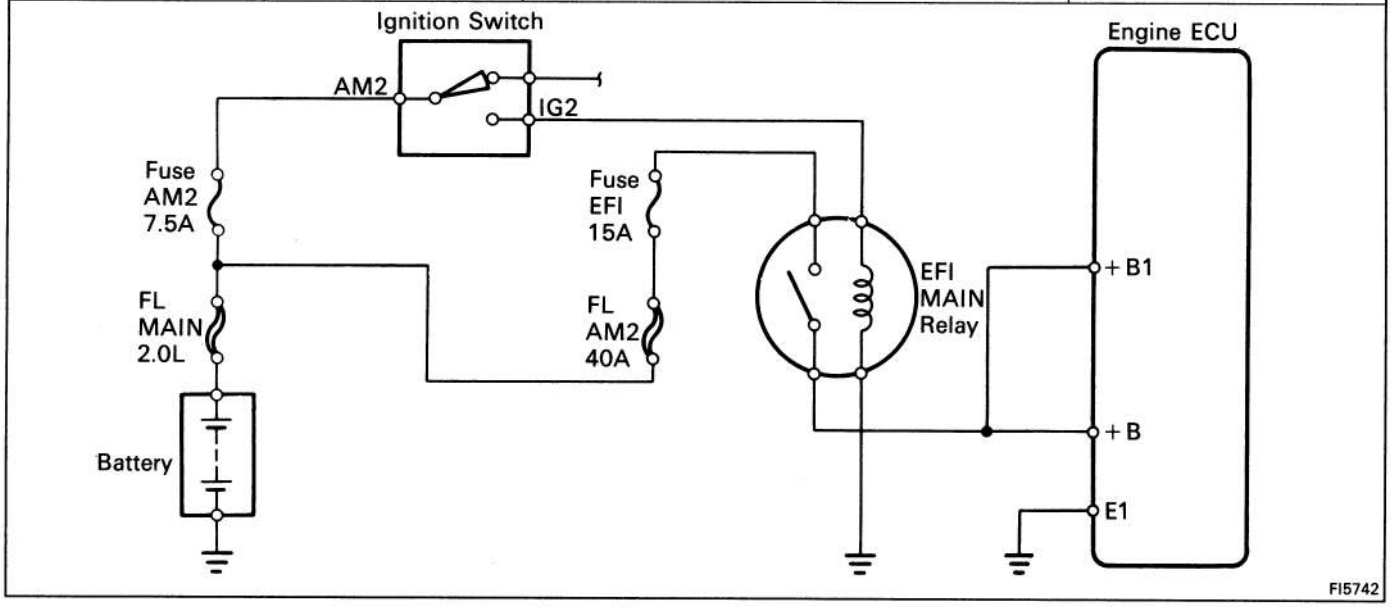
Engine ECU Terminals

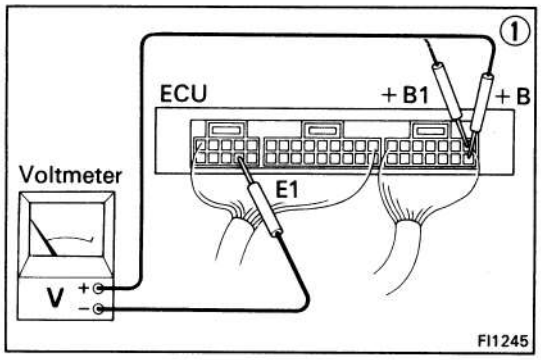


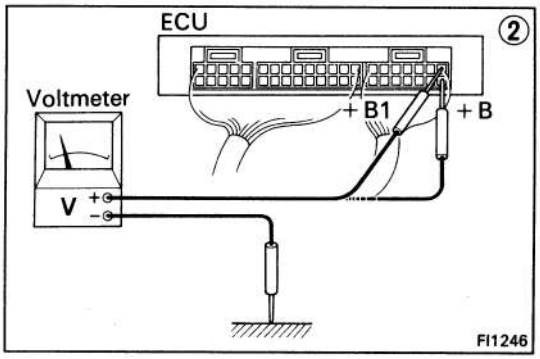
FI4065

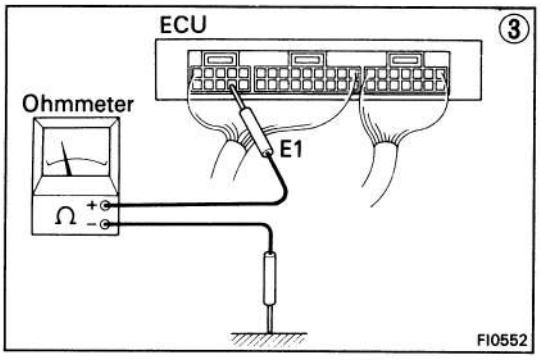
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No.	Terminals	Trouble	Condition	STD voltage
1	+B +B1 – E1	No voltage	IG SW ON	10 – 14 V









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 → Try another ECU.

BAD → Repair or replace.

↓

Check fuses, fusible links and ignition switch. → BAD → Repair or replace.

↓ OK

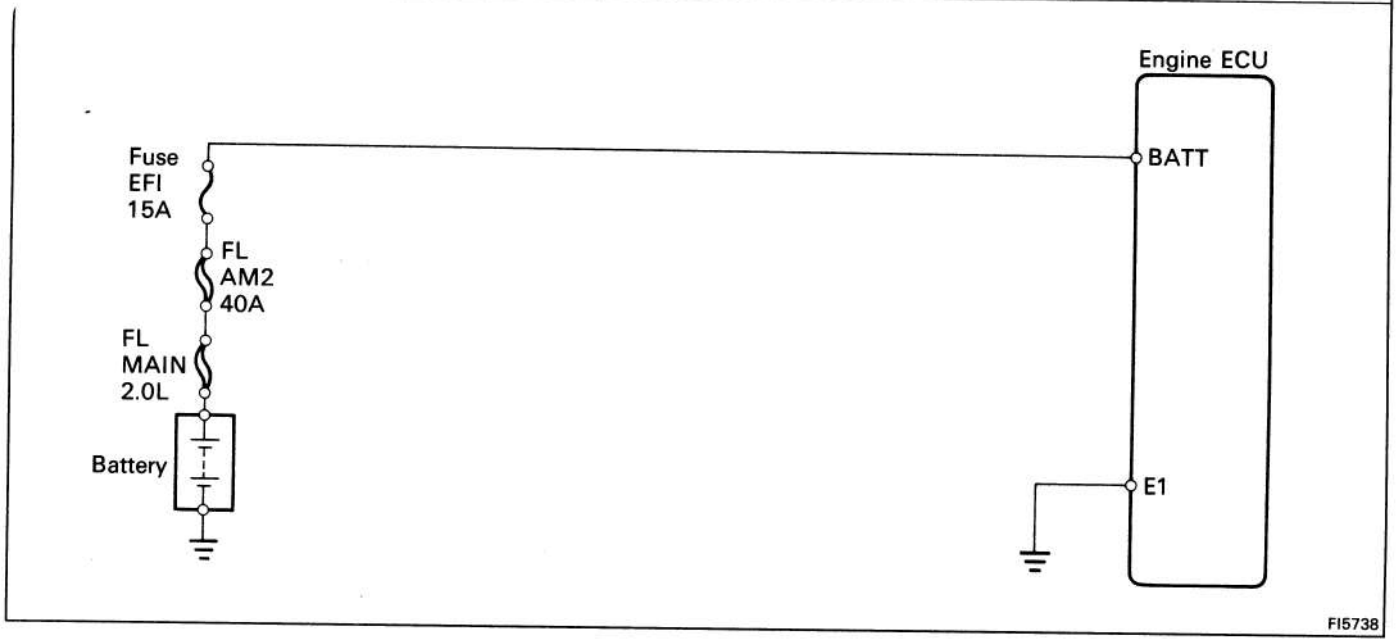
Check EFI main relay. (See page FI-156) → BAD → Replace.

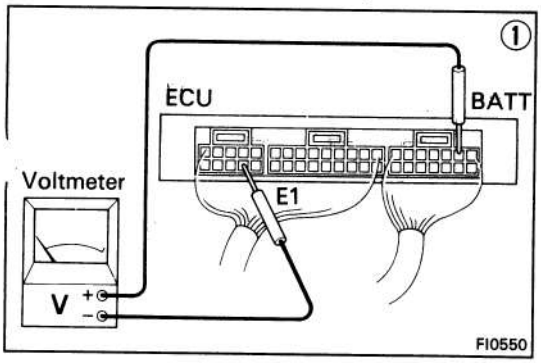
↓ OK

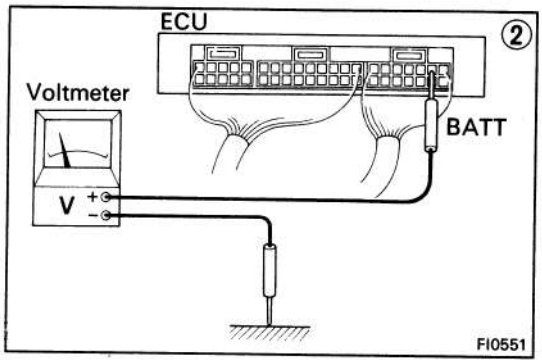
Check wiring between EFI main relay and battery. → BAD → Repair or replace.

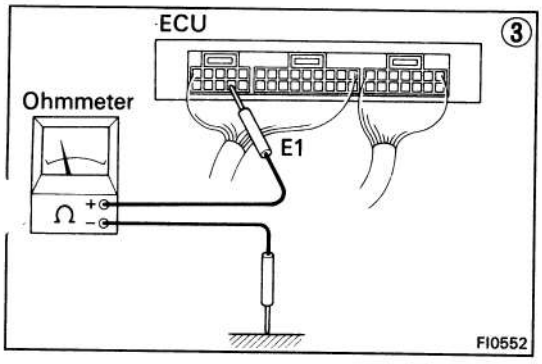
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No.	Terminals	Trouble	Condition	STD voltage
2	BATT – E1	No voltage	IG SW ON	10 – 14 V









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 links.

BAD → Replace.

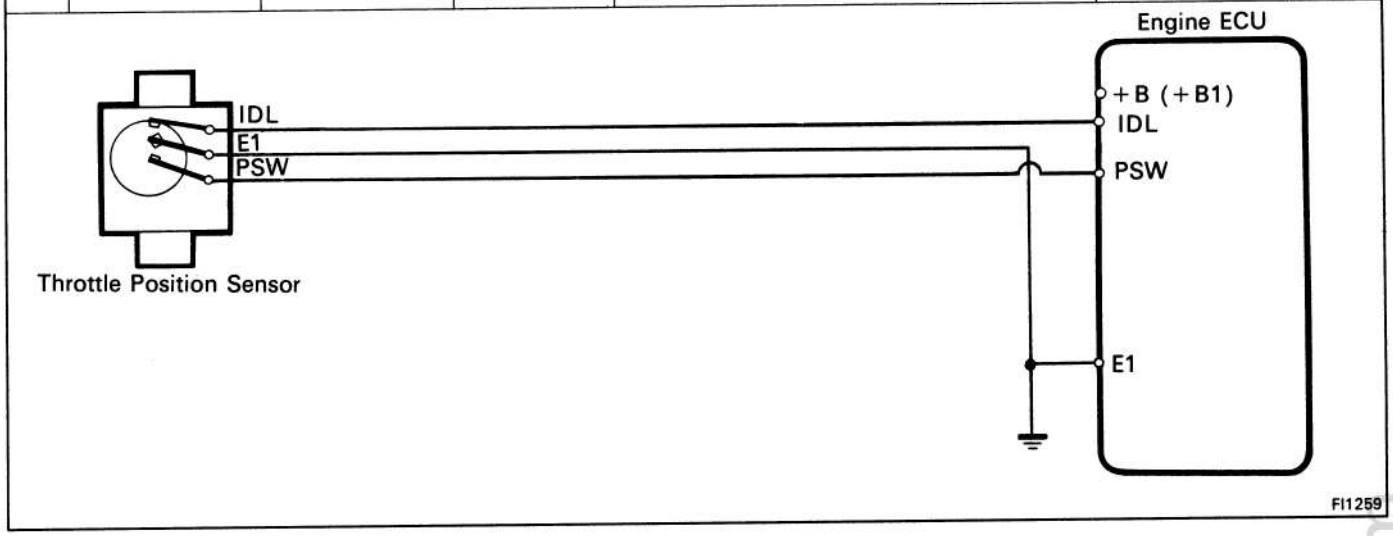
↓ OK

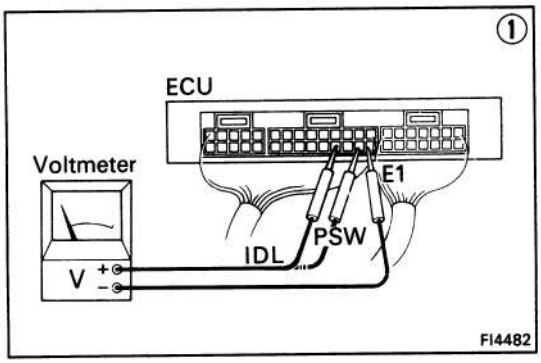
Check wiring between ECU terminal and battery.

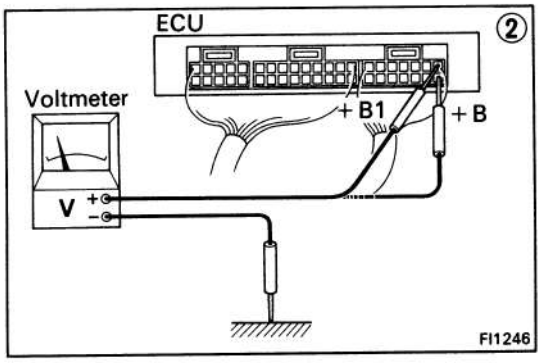
BAD → Repair or replace.

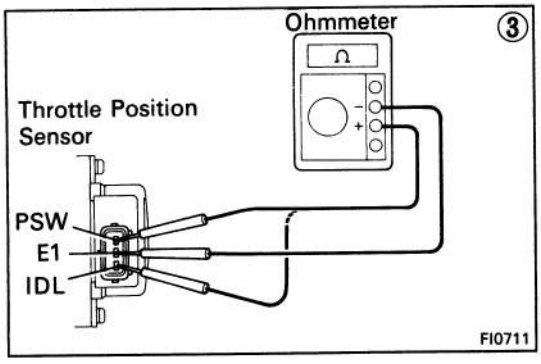
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No.	Terminals	Trouble	Condition		STD Voltage
3	IDL – E1	No voltage	IG SW ON	Throttle valve open	8 – 14 V
	PSW – E1			Throttle valve fully closed (Throttle opener must be cancelled first)	4 – 6 V









● **IDL – E1, PSW – E1**

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

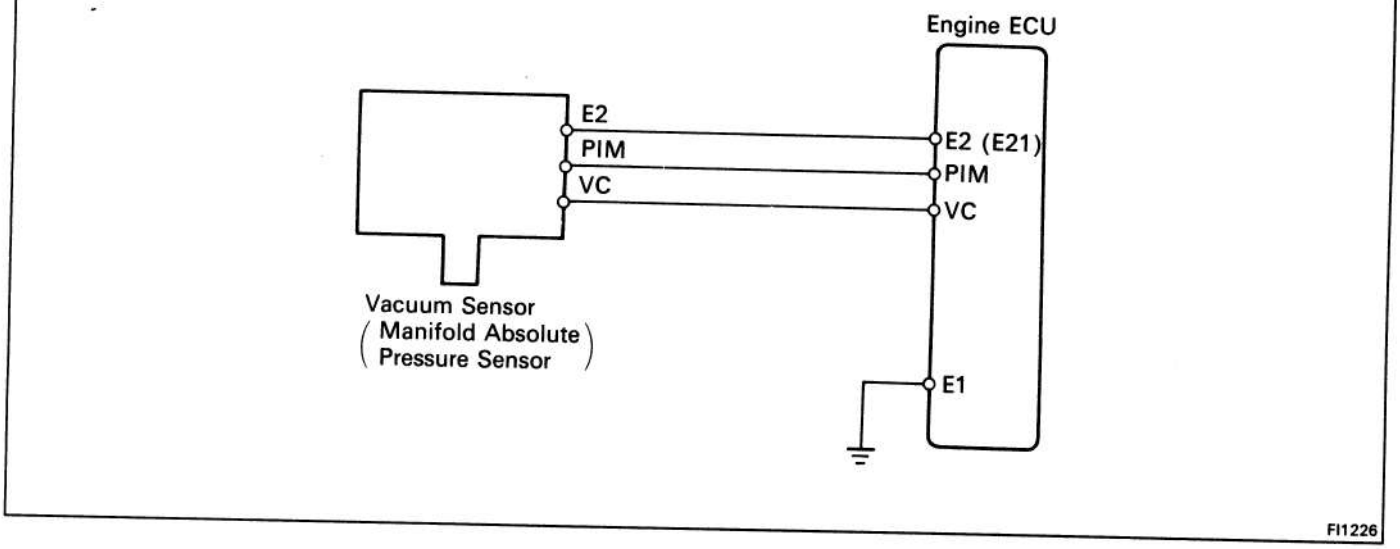
② Check that there is voltage between ECU terminal +B or +B1 and body ground. **(IG SW ON)**

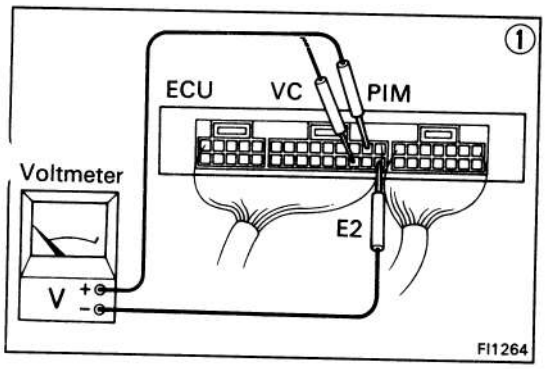
NO → Check wiring between ECU terminal E1 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

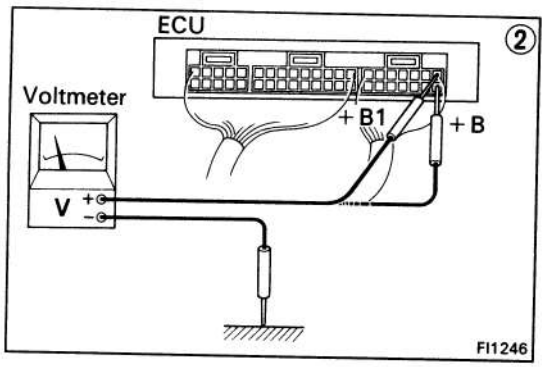
OK → Refer to No.1. (See page FI-54)
- BAD → Repair or replace.
- OK → ③ Check throttle position sensor. (See page FI-141)
  - BAD → Replace or repair throttle position sensor.
  - OK → Check wiring between ECU and throttle position sensor.
    - BAD → Repair or replace.
    - OK → Try another ECU.

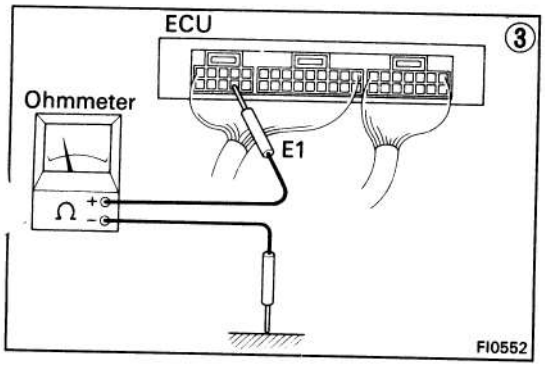
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No.	Terminals	Trouble	Condition	STD Voltage
4	PIM – E2	No voltage	IG SW ON	3.3 – 3.9 V
	VC – E2			4.5 – 5.5 V









● **PIM – E2, VC – E2**

① There is no voltage between ECU terminal 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-54)

③ Check wiring between ECU terminal E1 and body ground.

OK ↓

BAD → Repair or replace.

Check vacuum sensor. (See page FI-136)

BAD → Replace vacuum sensor.

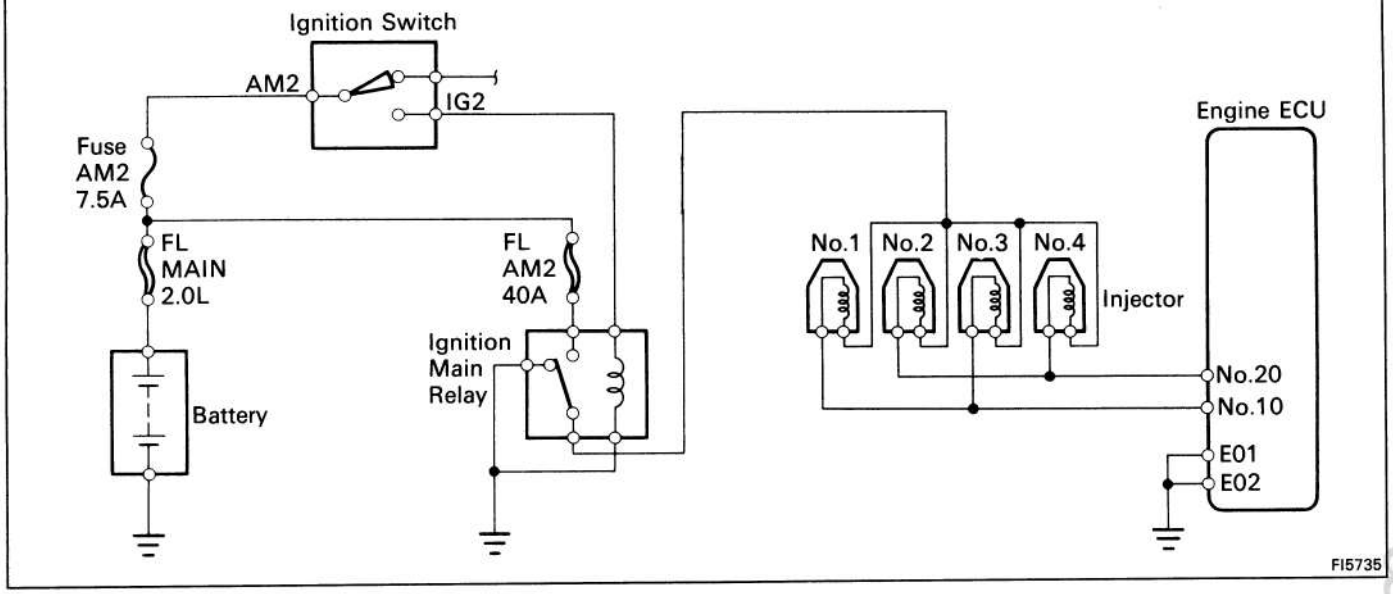
OK → Check wiring between ECU and vacuum sensor.

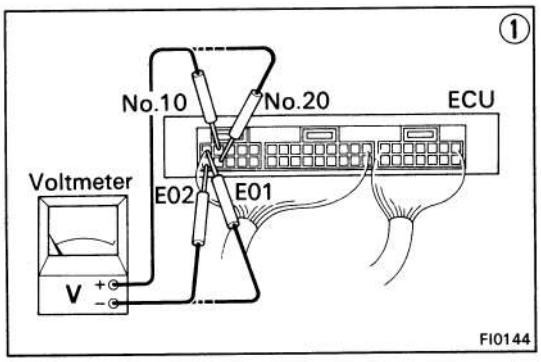
OK → Try another ECU.

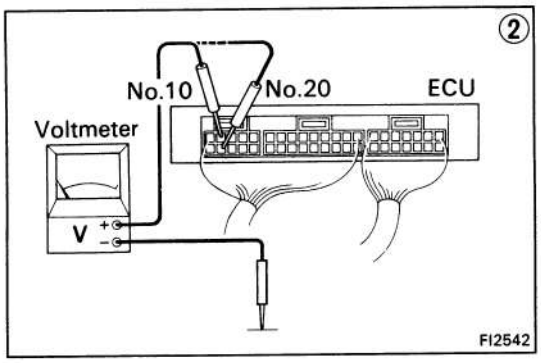
BAD → Repair or replace.

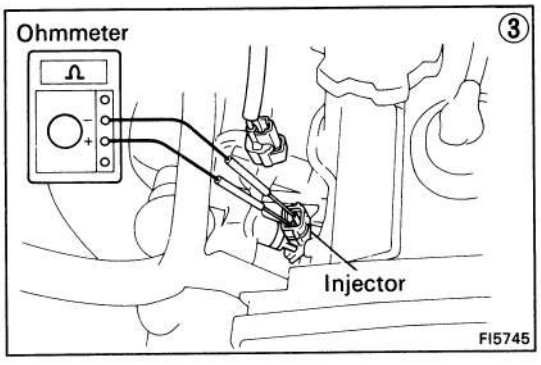
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No.	Terminals	Trouble	Condition	STD voltage
5	No.10 – E01 No.20 – E02	No voltage	IG SW ON	10 – 14 V









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 → Try another ECU.

BAD → Repair or replace.

↓

Check fuse, fusible links, ignition switch and ignition main relay.

BAD → Repair or Replace.

↓ OK

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

OK → ↓

BAD → Replace injector.

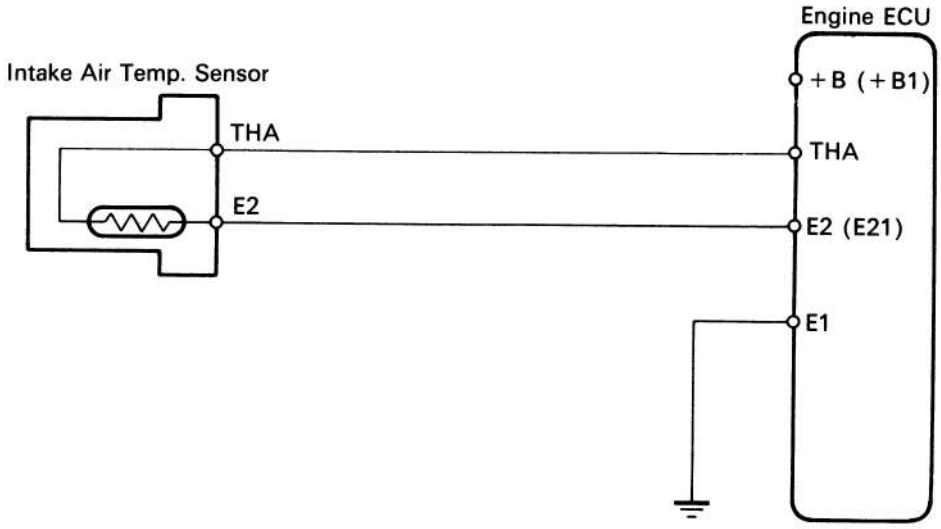
↓

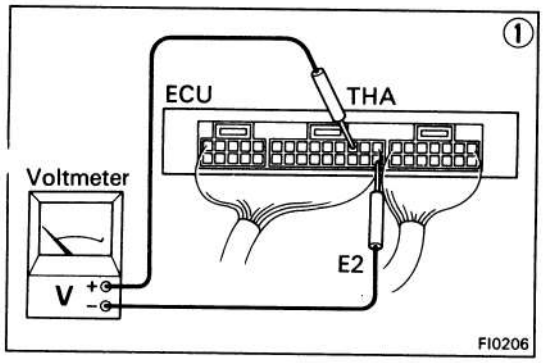
Check wiring between ECU terminal No.10 and/or No.20 and battery.

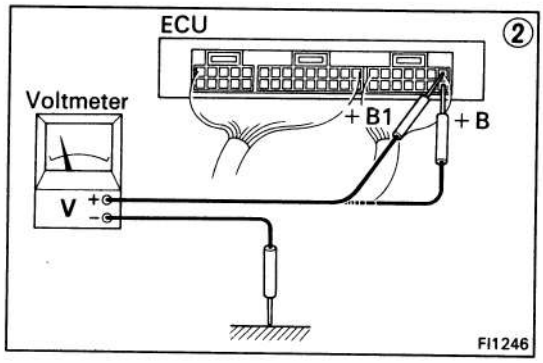
BAD → Repair or replace.

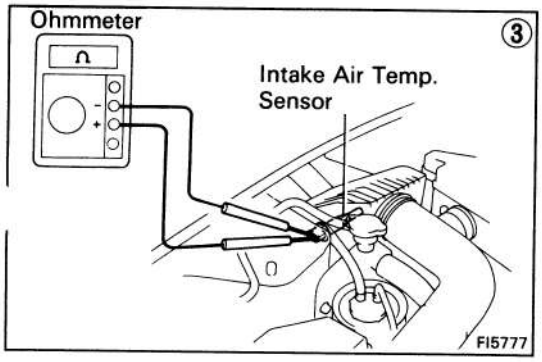
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No.	Terminals	Trouble	Condition		STD voltage
6	THA – E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1.7 – 3.1 V









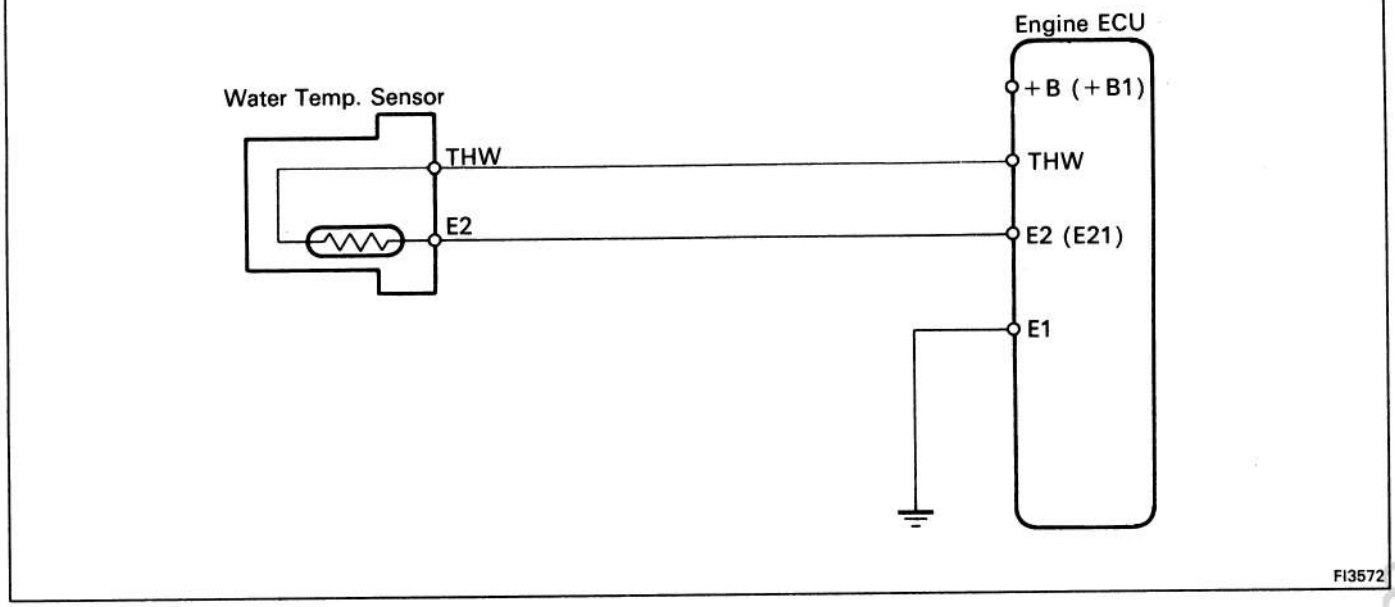
① There is no voltage between ECU terminals THA and E2. **(IG SW ON)**

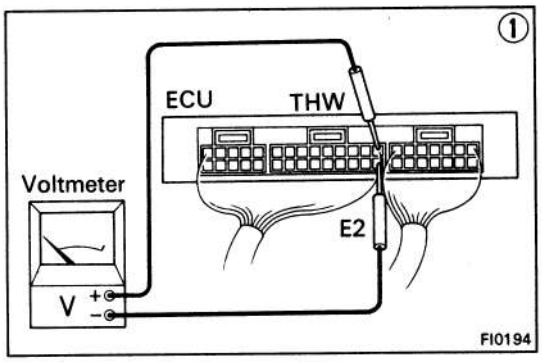
② Check that there is voltage between ECU terminal +B or +B1 and body ground. **(IG SW ON)**

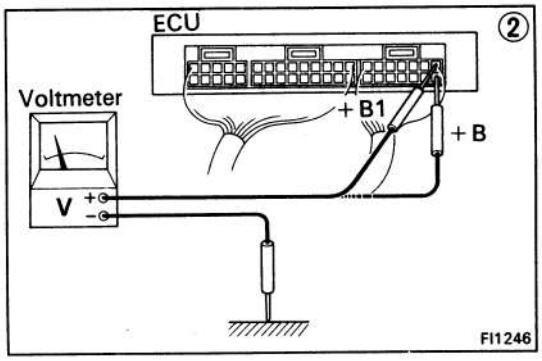
- OK → Check wiring between ECU terminal E1 and body ground.
  - OK → ③ Check intake air temp. sensor. (See page FI-169)
    - BAD → Replace intake air temp. sensor.
    - OK → Check wiring between ECU and intake air temp. sensor.
      - OK → Try another ECU.
      - BAD → Repair or replace.
  - BAD → Repair or replace.
- NO → Refer to No.1. (See page FI-54)

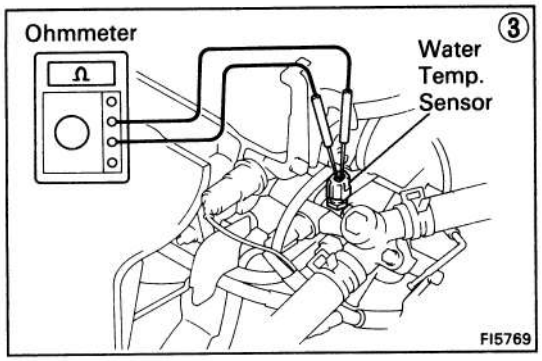
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No.	Terminals	Trouble	Condition		STD voltage
7	THW – E2	No voltage	IG SW ON	Coolant temperature 80°C (176°F)	0.3 – 0.8 V









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 → Check wiring between ECU terminal E1 and body ground.

NO → Refer to No.1. (See page FI-54)

OK → ③ Check water temp. sensor. (See page FI-168)

BAD → Replace water temp. sensor.

OK → Check wiring between ECU and water temp. sensor.

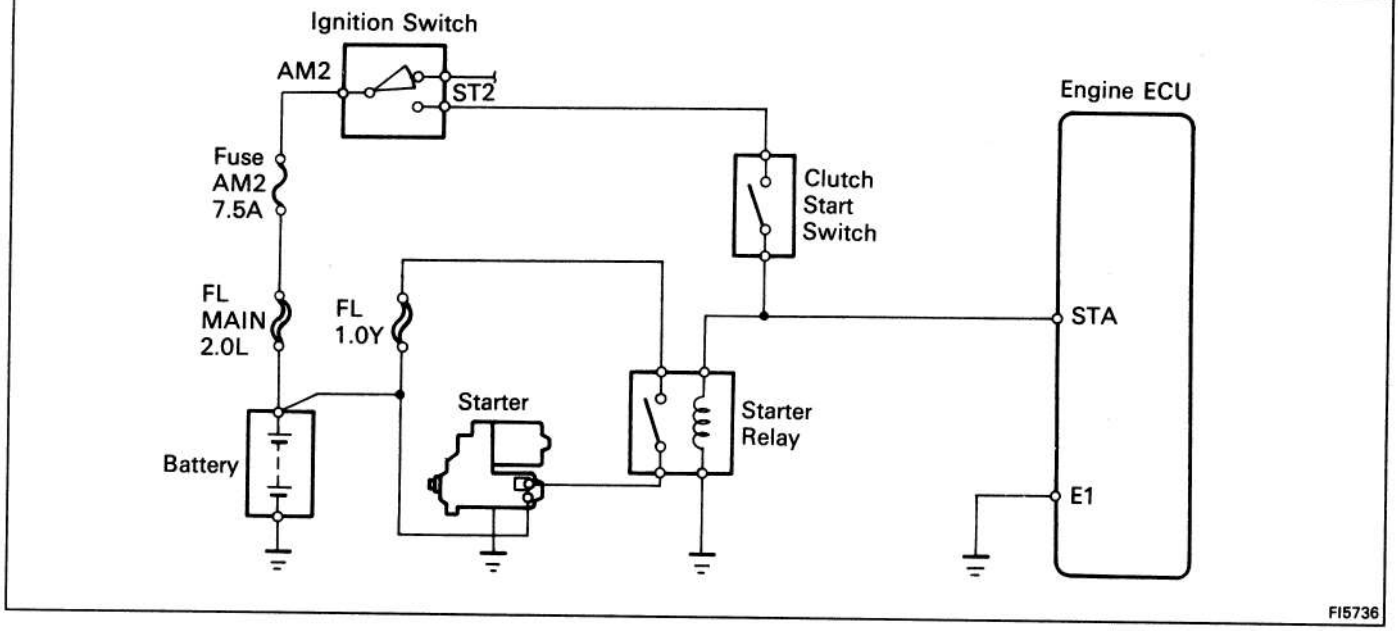
OK → Try another ECU.

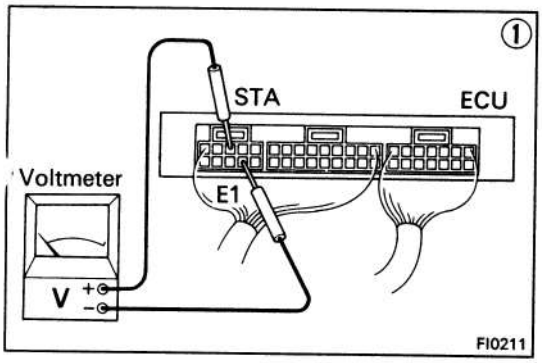
BAD → Repair or replace.

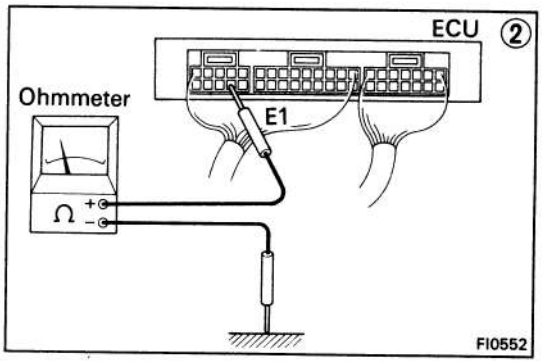
BAD → Repair or replace.

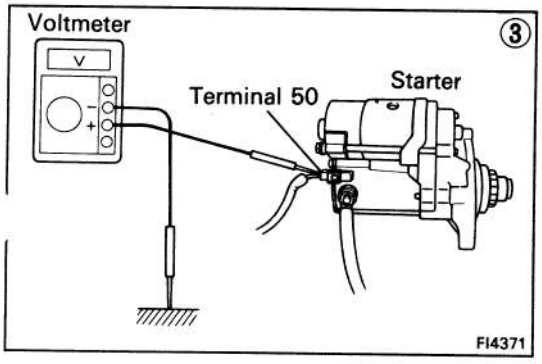
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No.	Terminals	Trouble	Condition	STD voltage
8	STA – E1	No voltage	Cranking	6 – 14 V







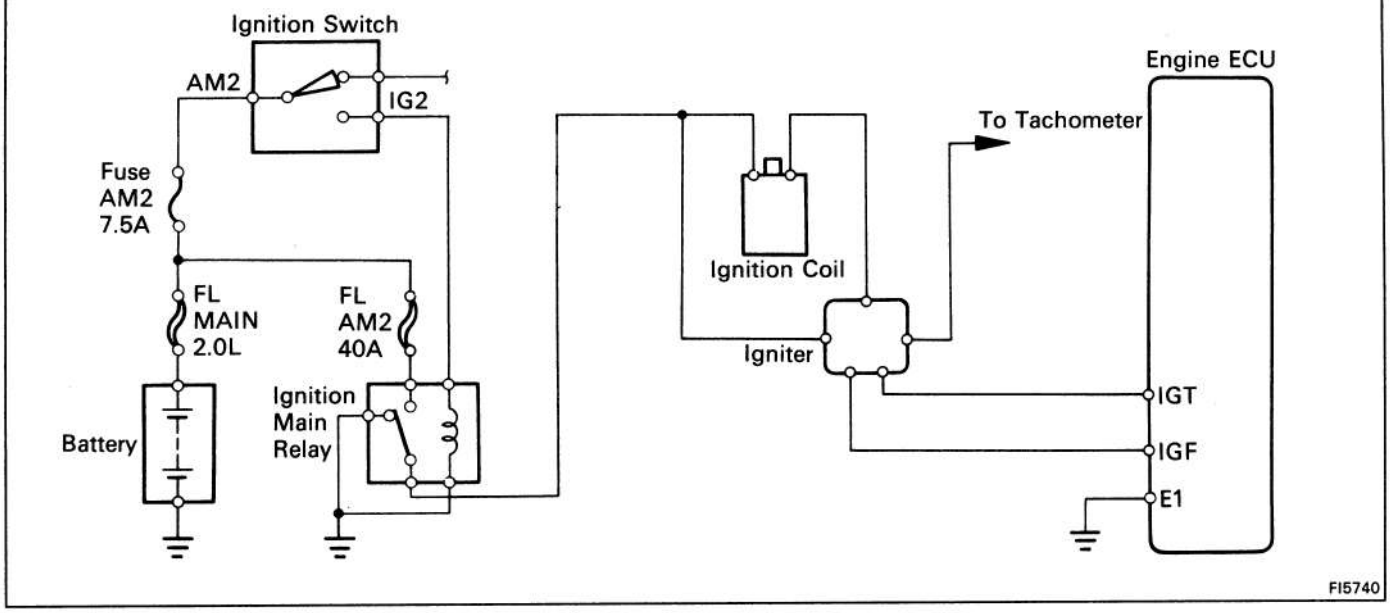


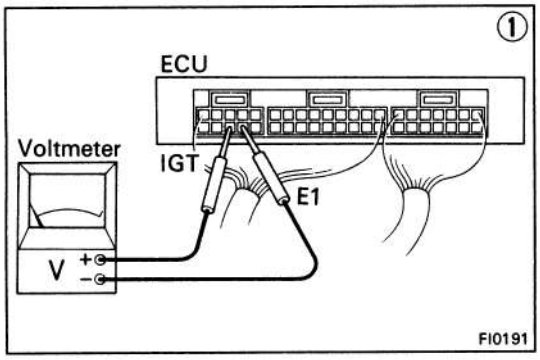
① There is no voltage between ECU terminals STA and E1. **(IG SW START)**

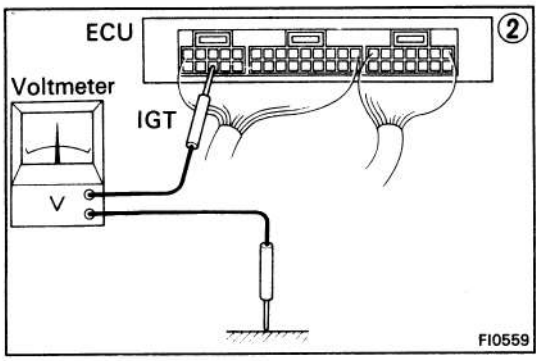
Check starter operation.
- OK → Check wiring between ECU terminal STA and ignition switch terminal ST2.
  - OK → ② Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.
- BAD → Check fuse, fusible links, battery, wiring, ignition switch, clutch start switch and starter relay.
  - BAD → Repair or replace.
  - OK → ③ Check that there is voltage at terminal 50 of starter. **(IG SW START)** **STD voltage: 6 – 14 V**
    - OK → Check starter.
    - NO → Check wiring between ignition switch terminal ST2 and starter terminal 50.

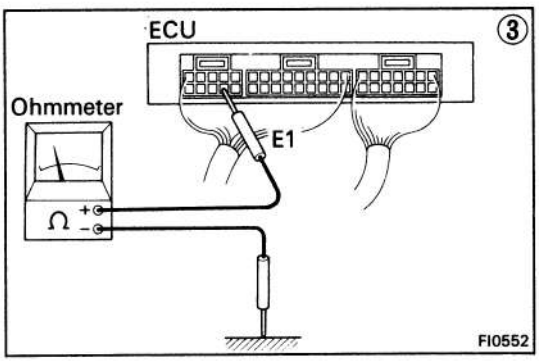
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No.	Terminals	Trouble	Condition	STD voltage
9	IGT – E1	No voltage	Idling	0.8 – 1.2 V









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 → ③ Check wiring between ECU terminal E1 and body ground. → BAD → Repair or Replace.

③ OK → Try another ECU.

② OK →

Check fuse, fusible links, ignition switch and ignition main relay. → BAD → Repair or replace.

OK →

Check distributor. (See page IG-13) → BAD → Repair or replace.

OK →

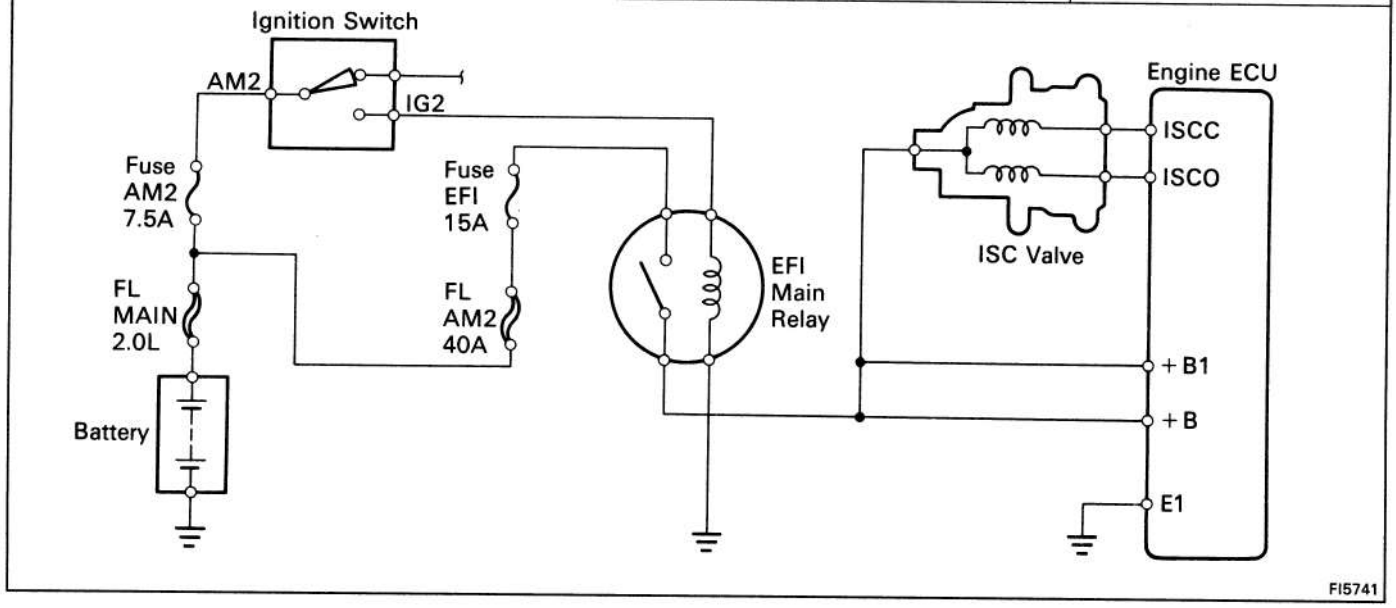
Check wiring between ECU and battery. → BAD → Repair or replace.

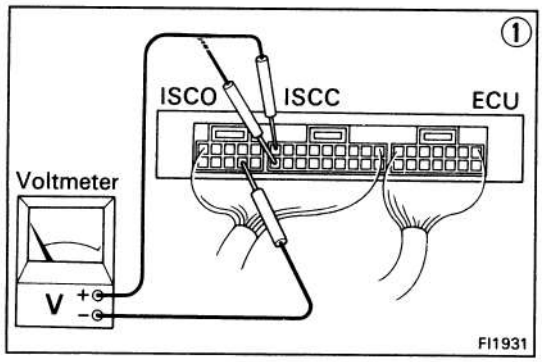
OK →

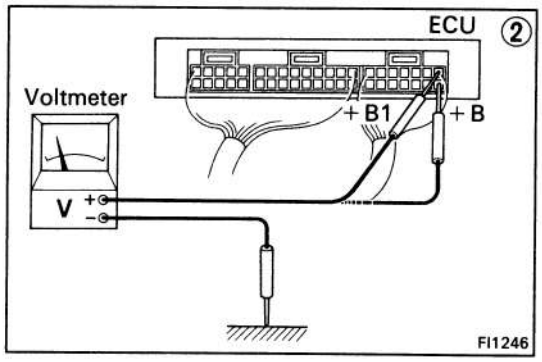
Check igniter. (See page IG-13) → BAD → Repair or replace.

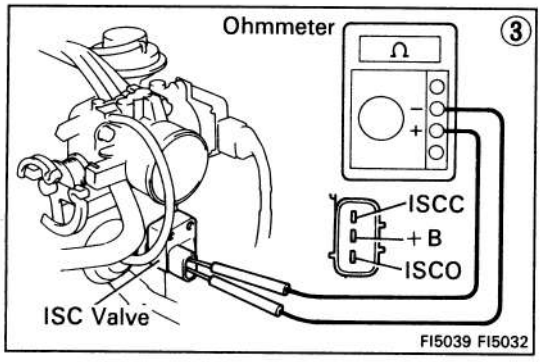
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No.	Terminals	Trouble	Condition	STD voltage
10	ISCC, ISCO – E1	No voltage	IG SW ON	8 – 1.2 V









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 +B1 and body ground. **(IG SW ON)**

OK ↓

NO → Refer to No.1. (See page FI-54)

↓

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.

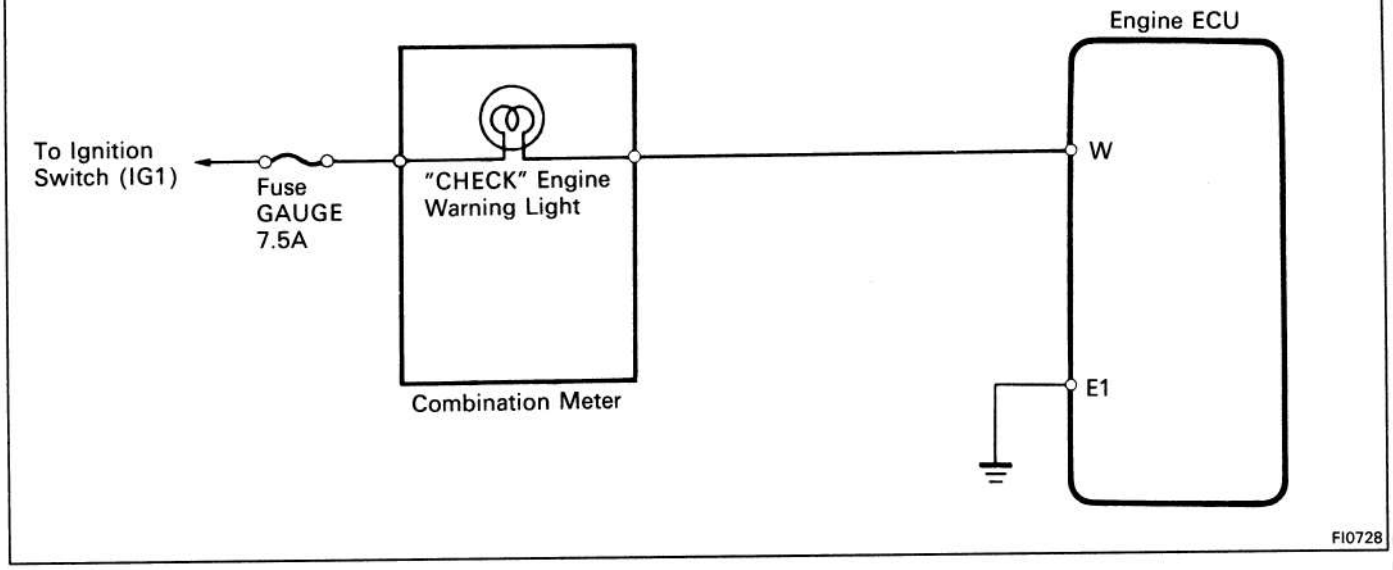
BAD → Repair or replace wiring.

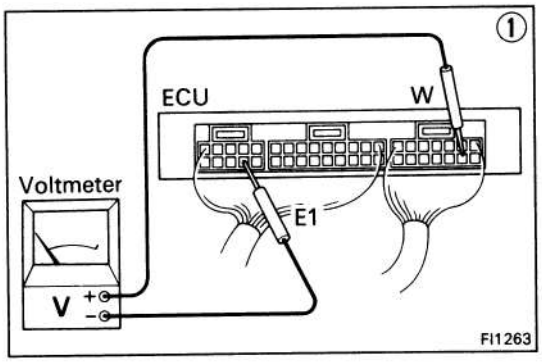
OK ↓

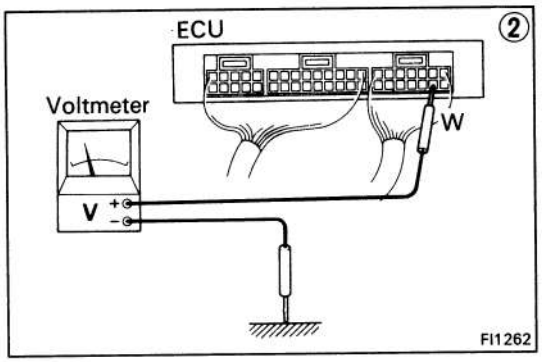
Try another ECU.

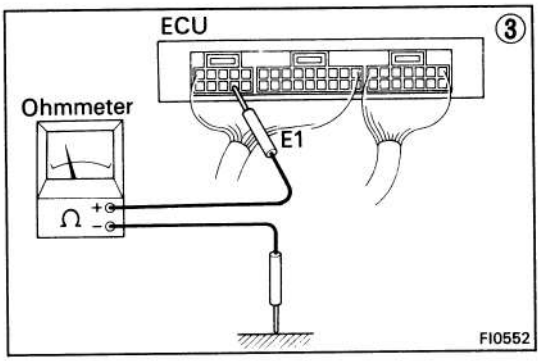
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No.	Terminals	Trouble	Condition	STD voltage
11	W – E1	No voltage	No troable ("CHECK warning light off) and engine running	10 – 14 V









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

OK → ③ Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fuse GAUGE (7.5A) and "CHECK" engine warning light.

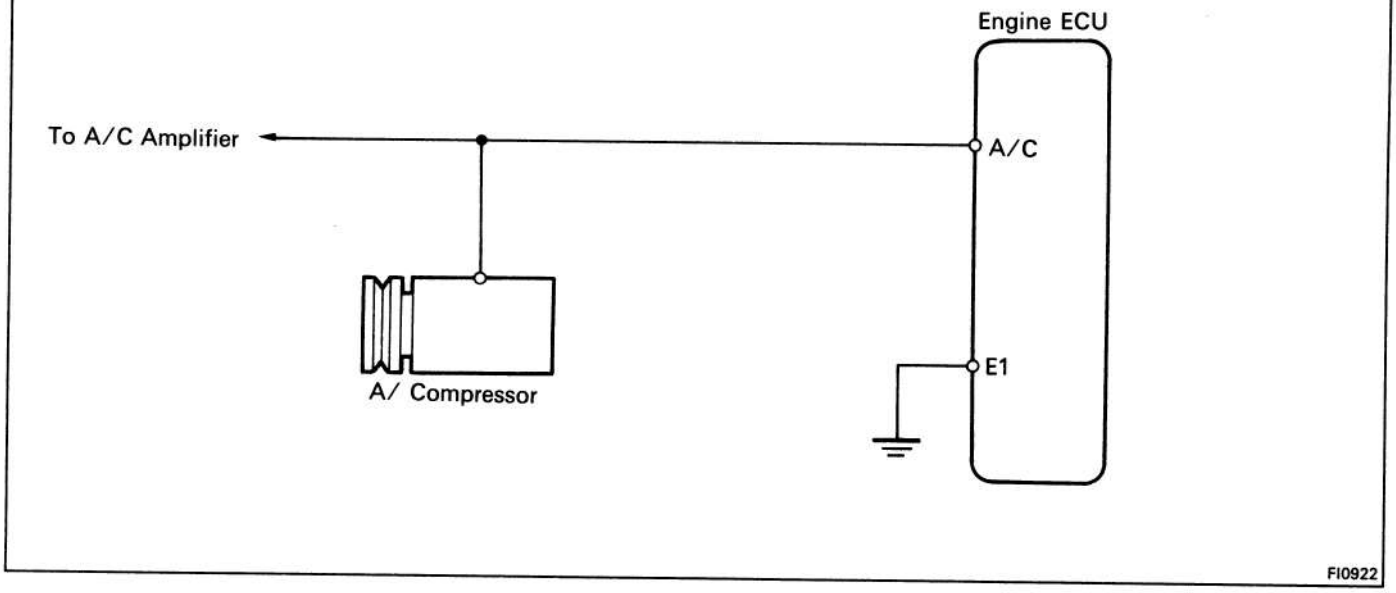
OK → BAD → Repair or replace.

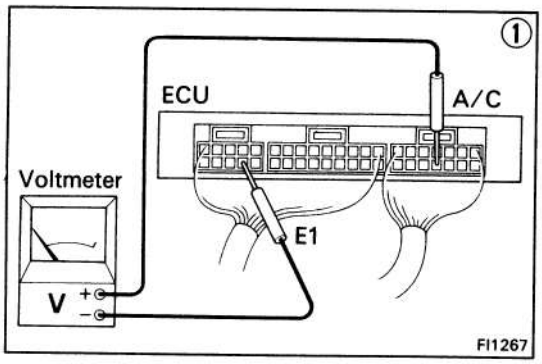
Fuse blows again

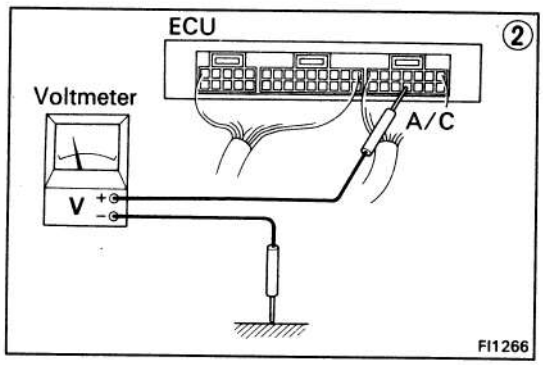
Check wiring between ECU terminal W and fuse. → BAD → Repair or replace.

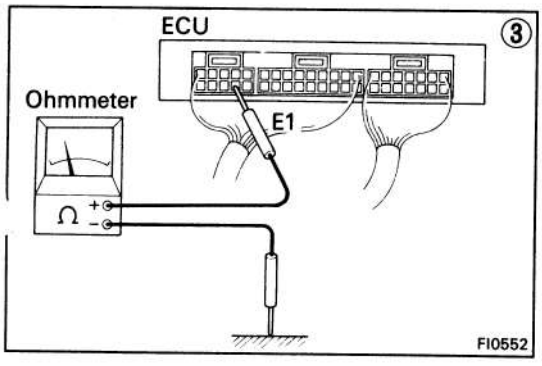
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No.	Terminals	Trouble	Condition	STD voltage
12	A/C – E1	No voltage	Air conditioning ON	8 – 14 V









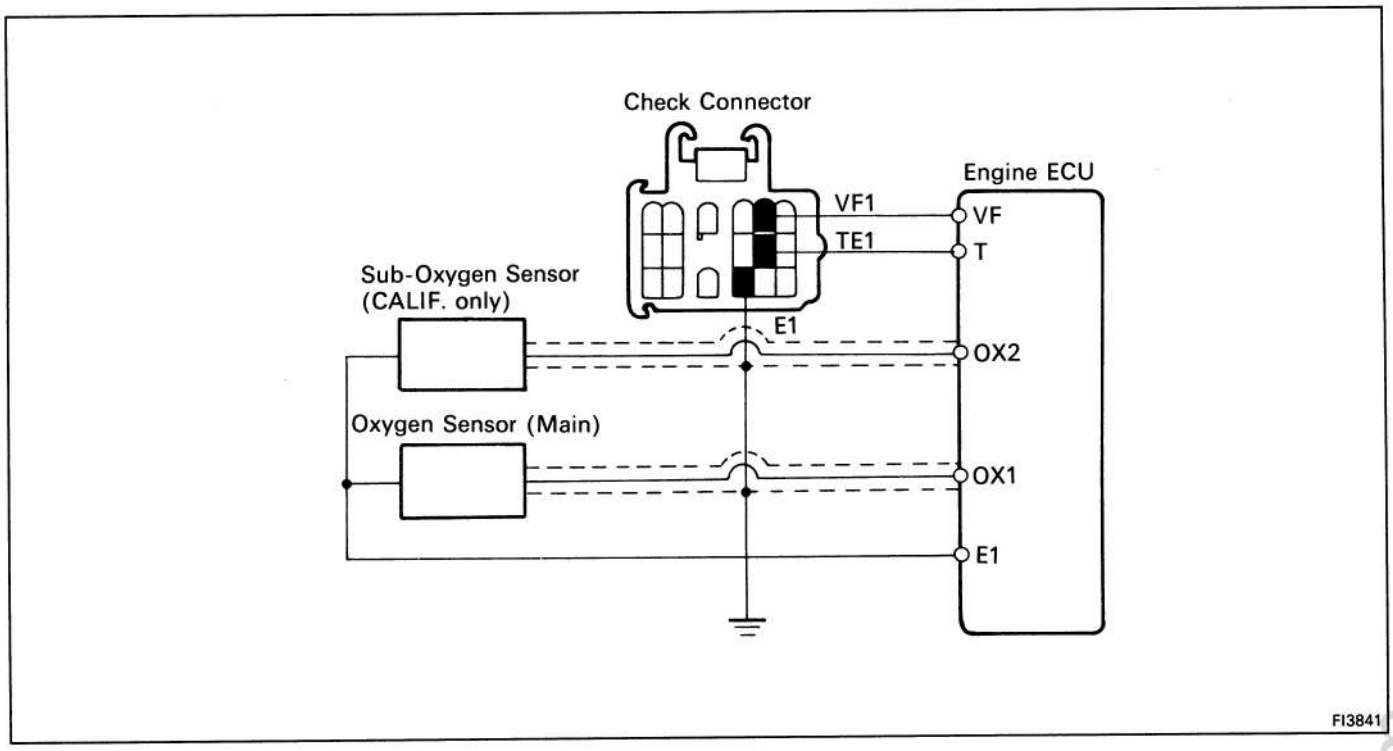
① There is no voltage between ECU terminals A/C and E1. **(Air conditioning ON)**

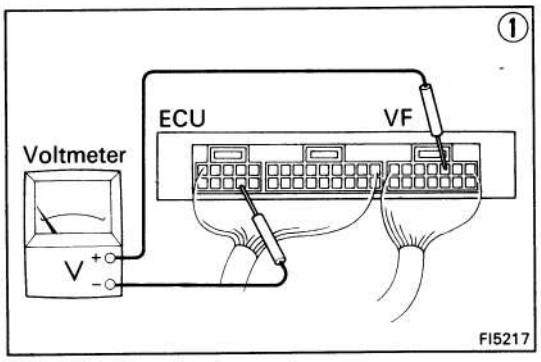
② Check that there is voltage between ECU terminal A/C and body ground.

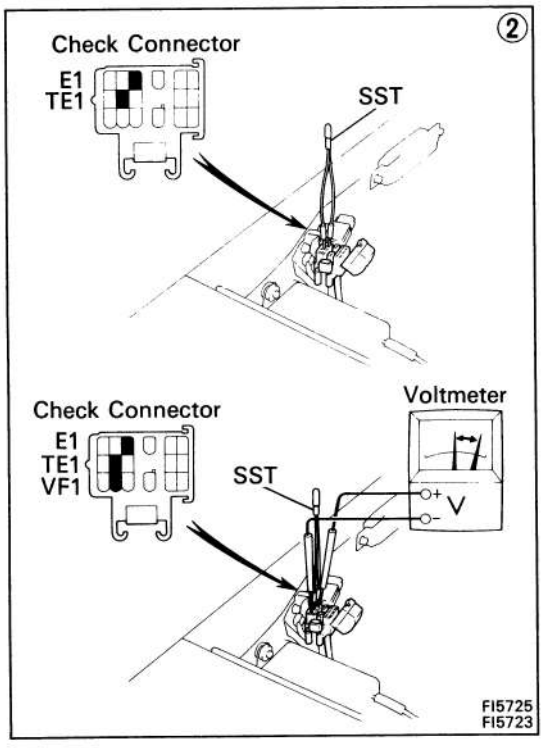
NO → ③ Check wiring between ECU terminal E1 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

OK → Check compressor running.
- OK → Check wiring between ECU terminal A/C and amplifier.
  - BAD → Repair or replace.
- BAD → Check that there is voltage between amplifier terminal and body ground.
  - BAD → Repair or replace.
  - OK → Check wiring between amplifier and ECU or compressor.
    - BAD → Repair or replace.

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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 → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.

Is air leaking into air induction system?
- BAD → Repair or replace.
- OK ↓

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-87)
- BAD → Repair or replace.
- OK ↓

Check injectors. (See page FI-120)
- BAD → Repair or replace.
- OK ↓

* Check cold start injector. (See page FI-102)
- BAD → Repair or replace.
- OK ↓

Check vacuum sensor. (See page FI-170)
- BAD → Repair or replace.
- OK ↓

② Check operation of oxygen sensors(s). (See page FI-173 and 175)
- OK → System normal
- BAD ↓

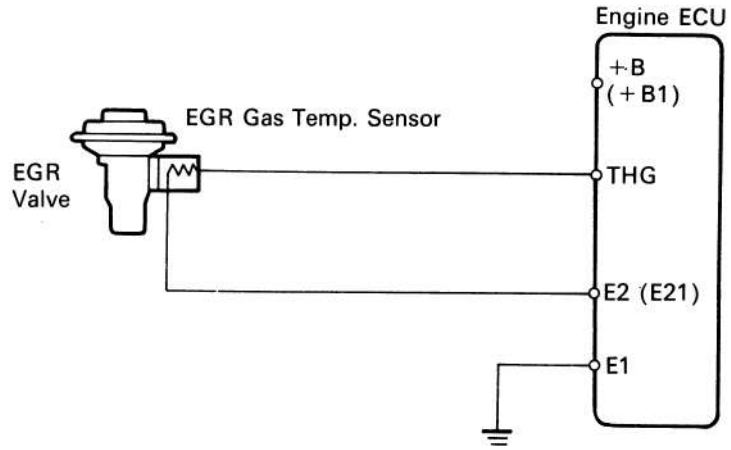
Check wiring between oxygen senor(s) and ECU.
- BAD → Repair wiring.
- OK ↓

Replace oxygen sensor(s).

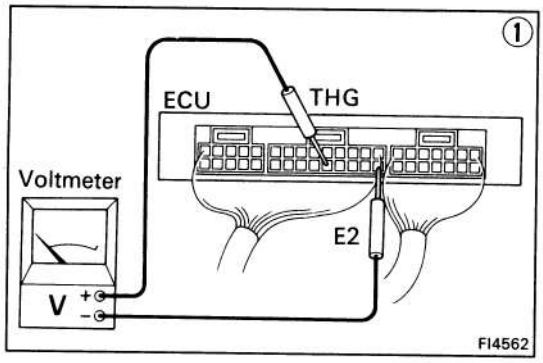
* Rich malfunction only

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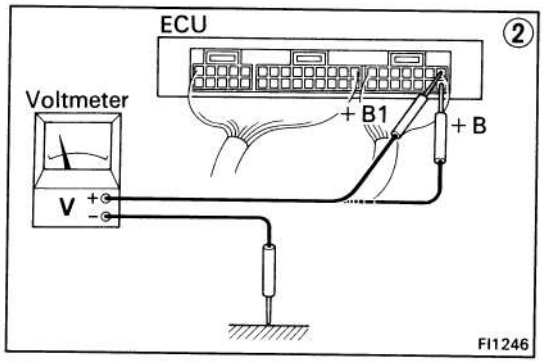
CALIF. only



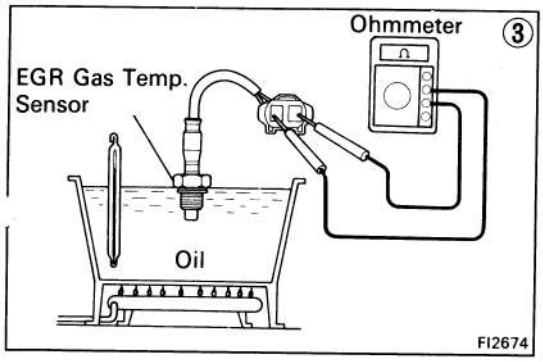
FI2680



FI4562



FI1246



FI2674

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-54)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

Repair or replace.

Check EGR system. (See page EC-24)

BAD

Repair or replace.

OK

③ Check EGR gas temp. sensor. (See page FI-172)

BAD

Replace EGR gas temp. sensor.

OK

Check wiring between ECU and EGR gas temp. sensor.

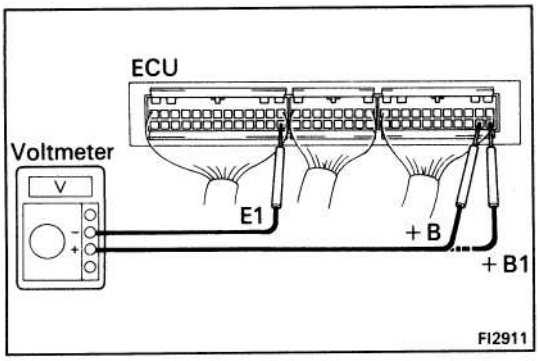
OK

Try another ECU.

BAD

Repair or replace.

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

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.

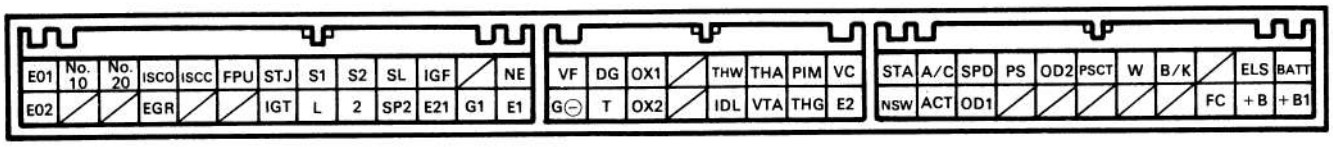
Using a voltmeter with high impedance (10 kΩ/V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of ECU

Symbol	Terminal	Symbol	Terminal	Symbol	Terminal
E01	POWER GROUND		–	A/C	A/C COMPRESSOR
E02	POWER GROUND	G1	DISTRIBUTOR	ACT	A/C AMPLIFIER
No.10	INJECTOR	NE	DISTRIBUTOR	SPD	SPEED SENSOR (for Meter)
	–	E1	ENGINE GROUND	OD1	CC ECU
No.20	INJECTOR	VF	CHECK CONNECTOR	PS	POWER STEERING ECU
	–	G⊖	DISTRIBUTOR		–
ISCO	ISC VALVE	DC	CHECK CONNECTOR	OD2	OD MAIN SWITCH
EGR	EGR VALVE	T	CHECK CONNECTOR		–
ISCC	ISC VALVE	OX1	OXYGEN SENSOR (MAIN)	PSCT	POWER STEERING ECU
	–	* OX2	SUB-OXYGEN SENSOR		–
FPU	FUEL PRESSURE VSV		–		–
	–		–		–
STJ	COLD START INJECTOR	THW	WATER TEMP. SENSOR	B/K	STOP LIGHT SWITCH
IGT	IGNITER	IDL	THROTTLE POSITION SENSOR		–
S1	ECT SOLENOID	THA	INTAKE AIR TEMP. SENSOR		–
L	NEUTRAL START SWITCH	VTA	THROTTLE POSITION SENSOR	FC	CIRCUIT OPENING RELAY
S2	ECT SOLENOID	PIM	VACUUM SENSOR	ELS	HEADLIGHT SWITCH DEFOGGER SWITCH
2	NEUTRAL START SWITCH	* THG	EGR GAS TEMP. SENSOR	+B1	EFI MAIN RELAY
SL	ECT SOLENOID	VC	VACUUM SENSOR	BATT	BATTERY
SP2	SPEED SENSOR (for ECT)	E2	SENSOR GROUND	+B	EFI MAIN RELAY
IGF	IGNITER	STA	STARTER SWITCH		
E21	SENSOR GROUND	NSW	NEUTRAL START SWITCH		

* CALIF. only

Engine & ECT ECU Terminals



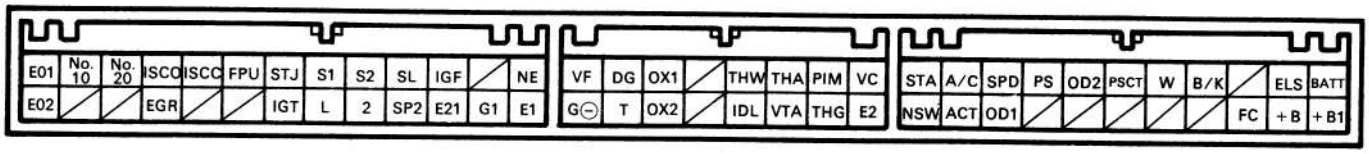
FI2796

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Voltage at ECU Wiring Connectors

No.	Terminals	Condition		STD voltage (V)	See page
1	+ B, + B1 – E1	IG SW ON		10 – 14	FI-70
2	BATT – E1	—		10 – 14	FI-71
3	IDL – E2	IG SW ON	Throttle valve open	8 – 14	FI-72
	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-74
	VC – E2			4.5 – 5.5	
5	No.10, No.20 – E01, E02			10 – 14	FI-75
6	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.7 – 3.1	FI-76
7	THW – E2		Coolant temp. 80°C (176°F)	0.3 – 0.8	FI-77
8	STA – E1	Cranking		6 – 14	FI-78
9	IGT – E1	Cranking or idling		0.8 – 1.2	FI-79
10	ISCC, ISCO – E1	IG SW ON		8 – 14	FI-80
11	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14	FI-81
12	A/C – E1	IG SW ON	Air conditioning ON	8 – 14	FI-82

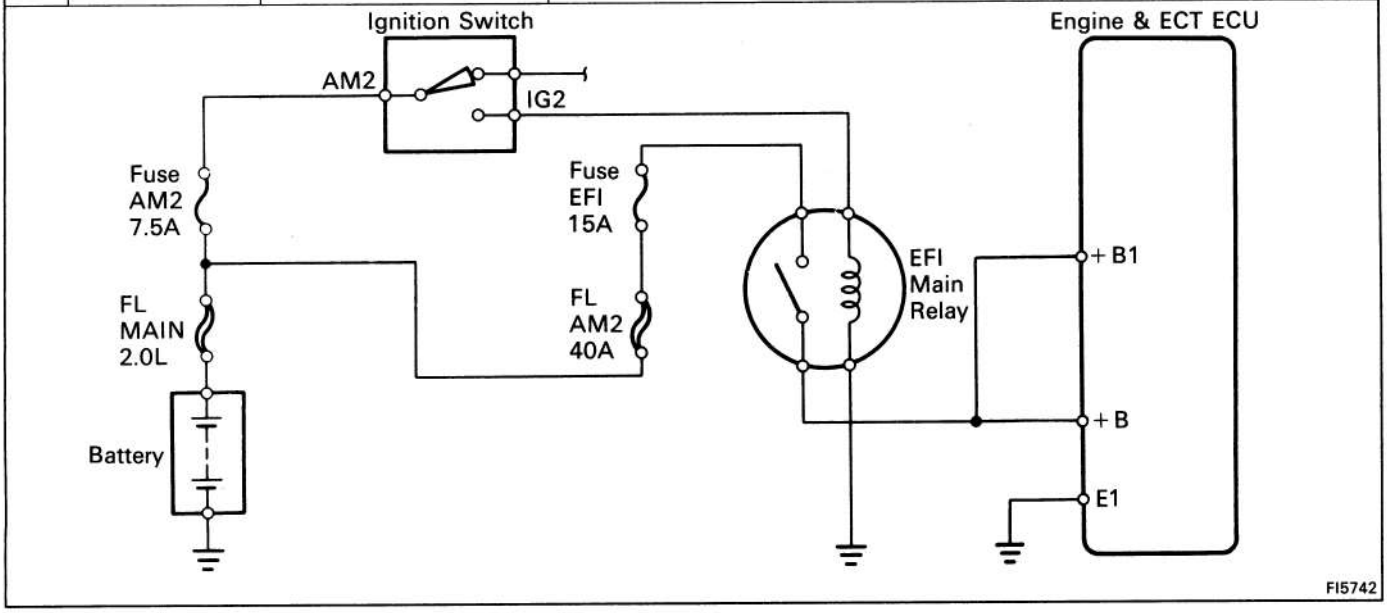
Engine & ECT ECU Terminals

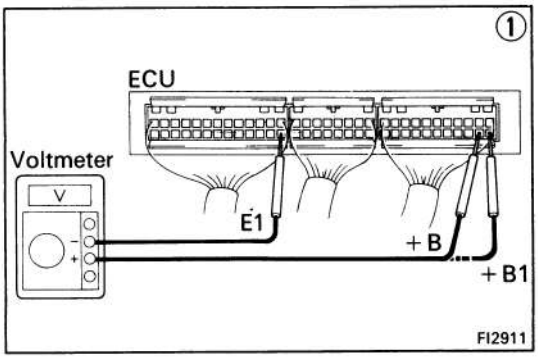


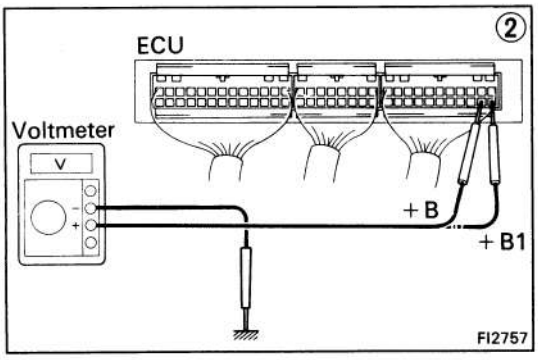
FI2796

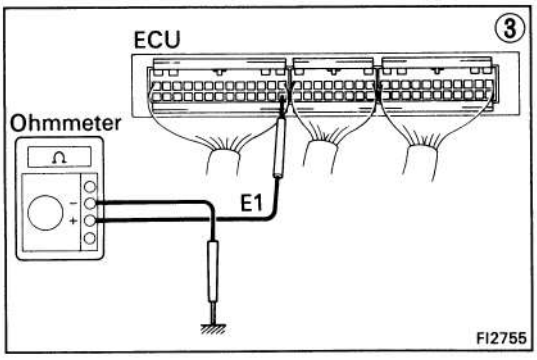
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No.	Terminals	Trouble	Condition	STD voltage
1	+B +B1 – E1	No voltage	IG SW ON	10 – 14V









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 → ③ Check wiring between ECU terminal E1 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

OK ↓

Check fuses, fusible links and ignition switch.
- BAD → Repair or replace.

OK ↓

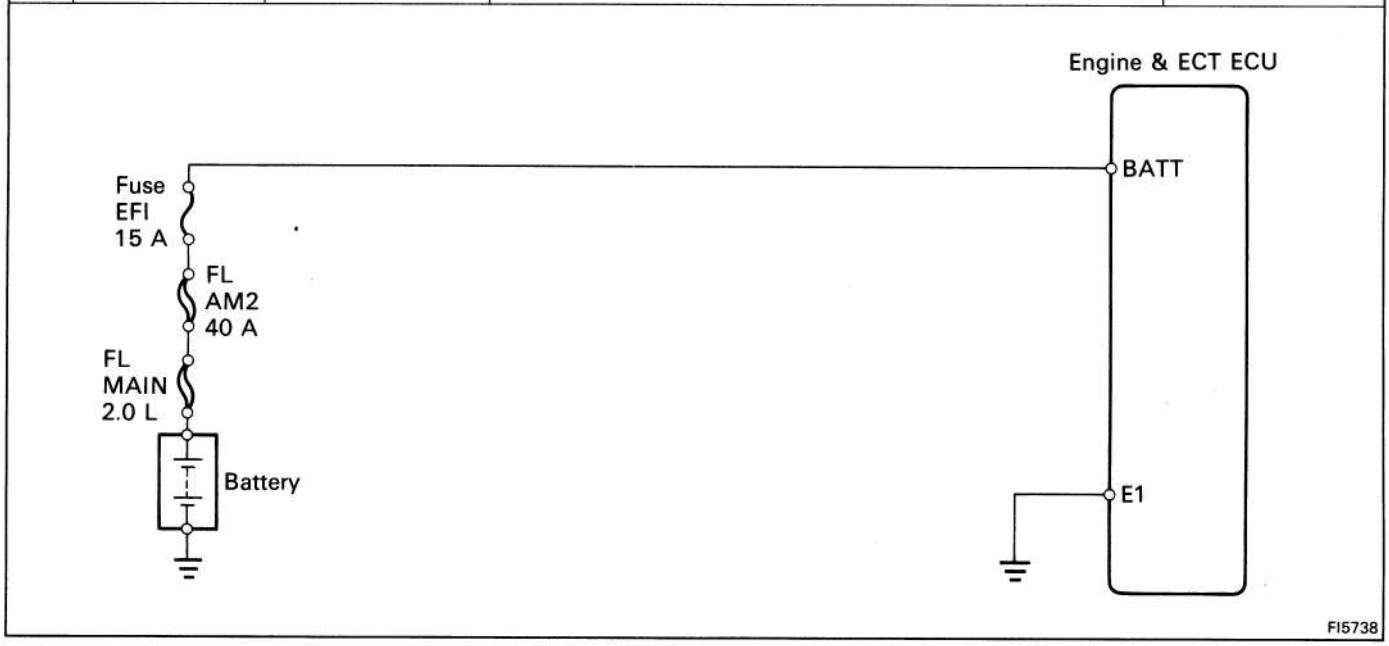
Check EFI main relay. (See page FI-156)
- BAD → Replace.

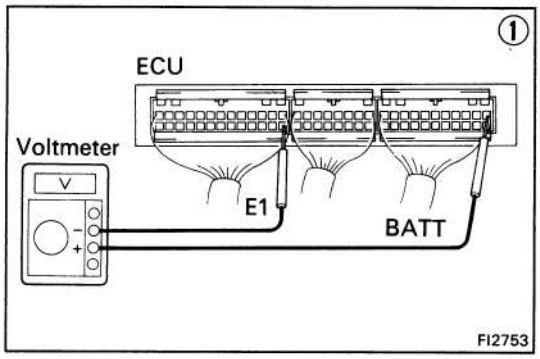
OK ↓

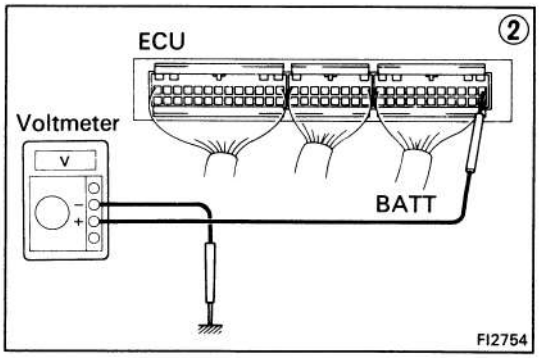
Check wiring between EFI main relay and battery.
- BAD → Repair or replace.

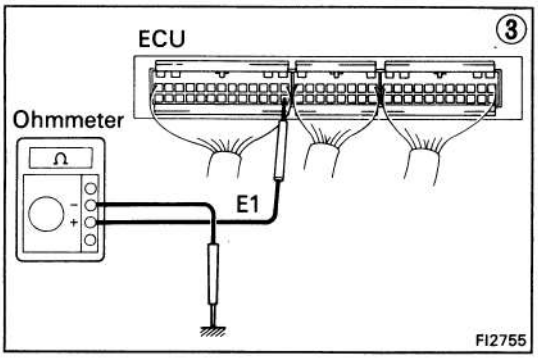
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No.	Terminals	Trouble	Condition	STD voltage
2	BATT – E1	No voltage	–	10 – 14 V









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.

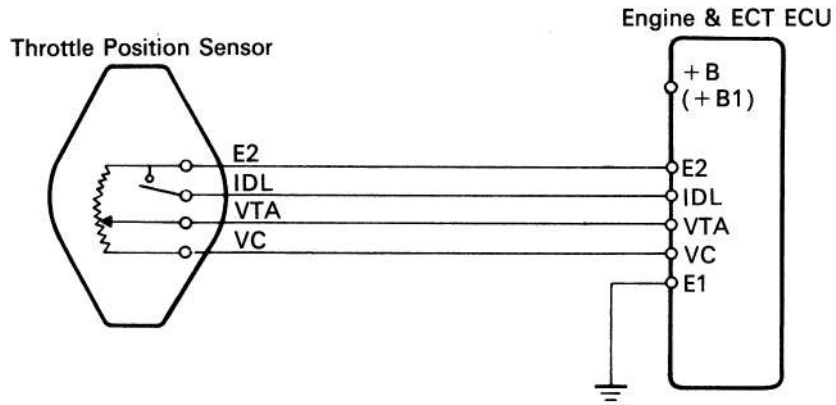
Check fuse and fusible links. BAD → Replace.

OK

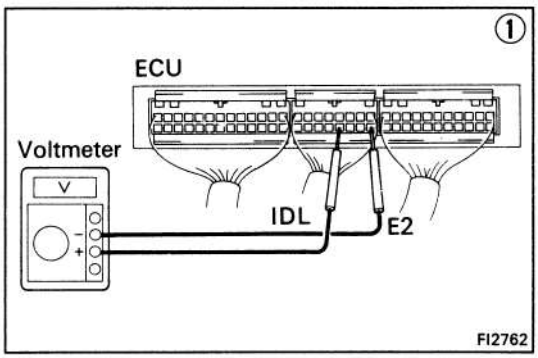
Check wiring between ECU terminal and battery. BAD → Repair or replace.

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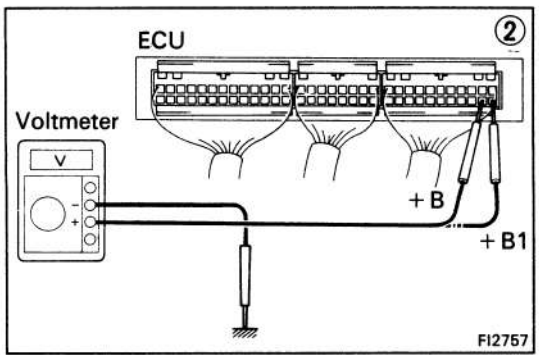
No.	Terminals	Trouble		Condition	STD Voltage
3	IDL – E2	No voltage	IG SW ON	Throttle valve open	8 – 14 V
	VC – E2			–	4.5 – 5.5 V
	VTA – E2			Throttle valve fully closed (Throttle opener must be cancelled first)	0.8 – 1.2 V
				Throttle valve fully open	3.2 – 4.2 V



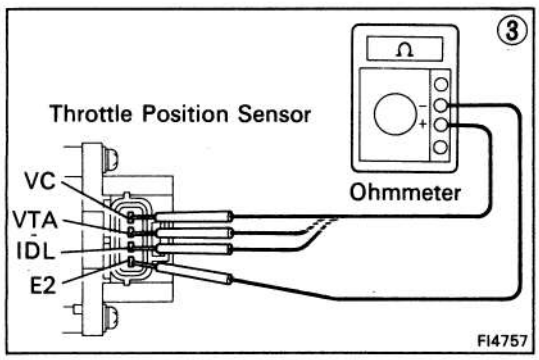
FI1366



FI2762



FI2757



FI4757

● **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

OK → Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

↓

Refer to No.1. (See page FI-70)

BAD → Repair or replace.

↓ OK

③ Check throttle position sensor. (See page FI-141)

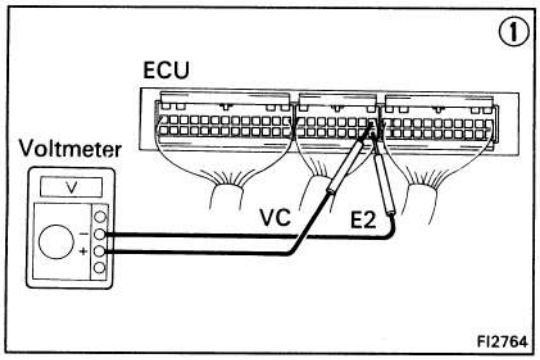
BAD → Repair or replace throttle position sensor.

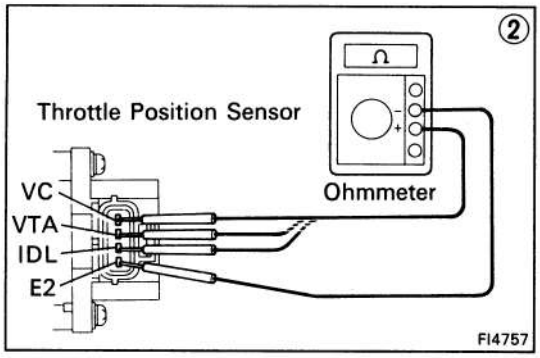
OK → Check wiring between ECU and throttle position sensor.

BAD → Repair or replace.

OK → Try another ECU.

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● **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 → ② Check throttle position sensor. (See page FI-141)

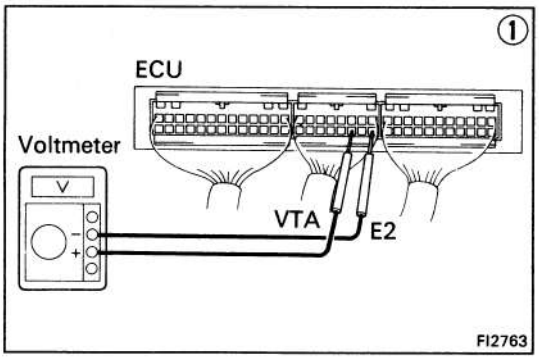
↓ BAD → Repair or replace.

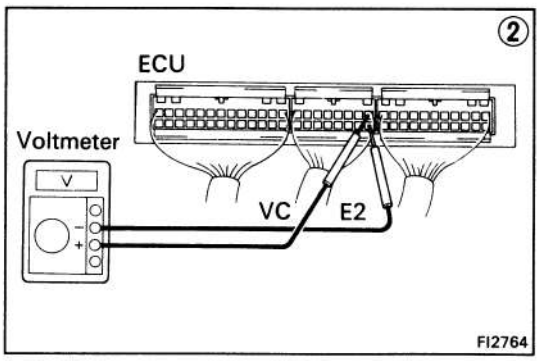
↓ OK → Check wiring between ECU and throttle position sensor.

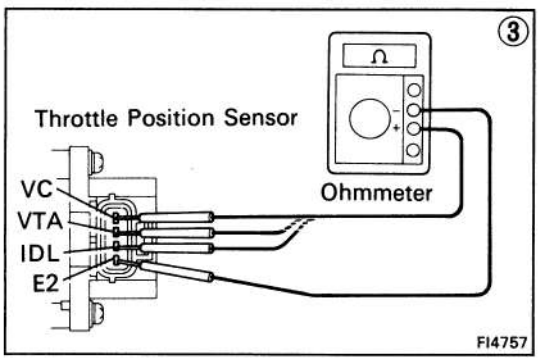
↓ OK → Try another ECU.

↓ BAD → Repair or replace wiring.

NO → Refer to No.1. (See page FI-70)







● **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 → Refer to VC – E2 trouble section.

↓ OK

OK → ↓

③ Check throttle position sensor. (See page FI-141)

↓ BAD → Repair or replace.

↓ OK

Check wiring between ECU and throttle position sensor.

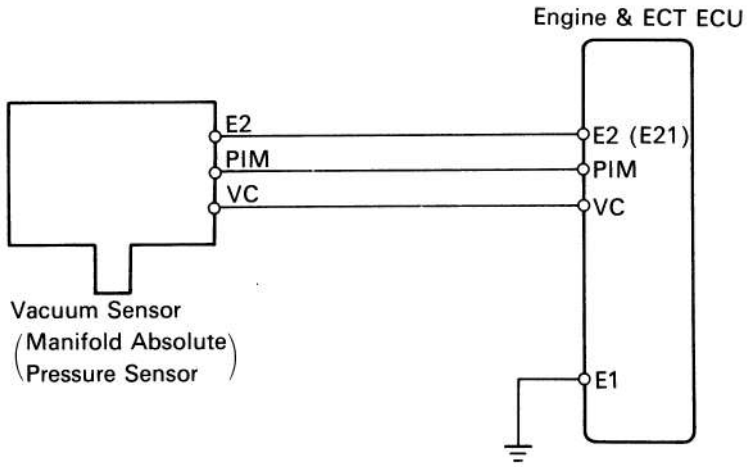
↓ BAD → Repair or replace.

↓ OK

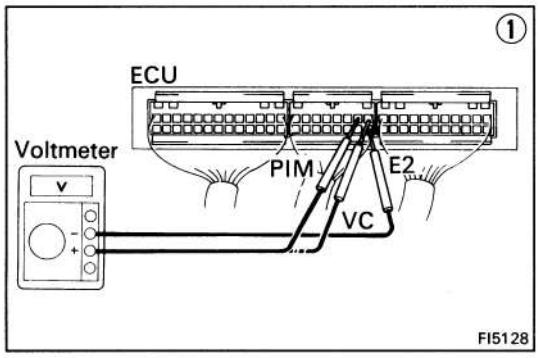
Try another ECU.

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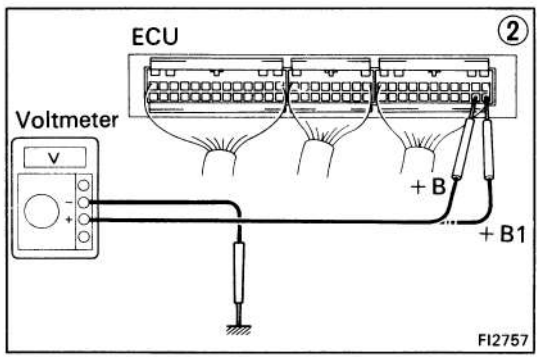
No.	Terminals	Trouble	Condition	STD voltage
4	PIM – E2	No voltage	IG SW ON	3.3 – 3.9 V
	VC – E2			4.5 – 5.5 V



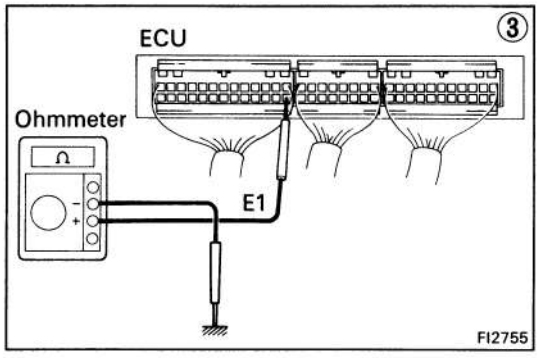
FI1226



FI5128



FI2757



FI2755

● **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-70)

↓

③ Check wiring between ECU terminal E1 and body ground.

OK ↓ / BAD → Repair or replace.

↓

Check vacuum sensor. (See page FI-170)

BAD ↓ / OK →

Replace vacuum sensor.

↓

Check wiring between ECU and vacuum sensor.

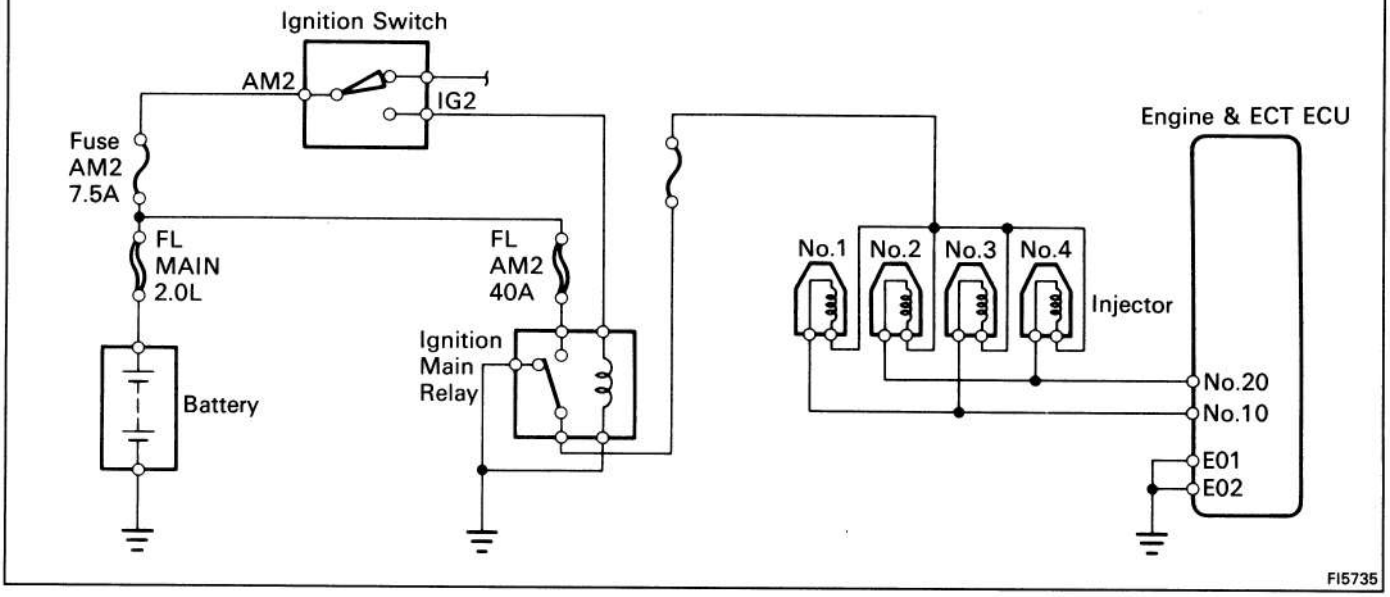
OK ↓ / BAD → Repair or replace.

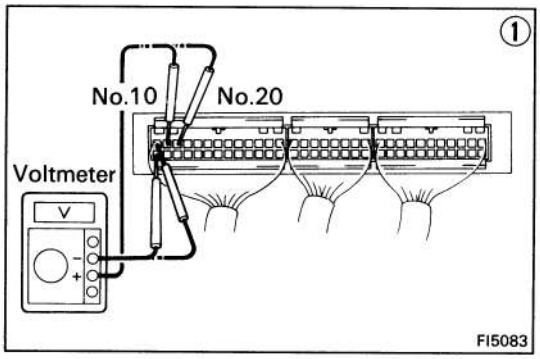
↓

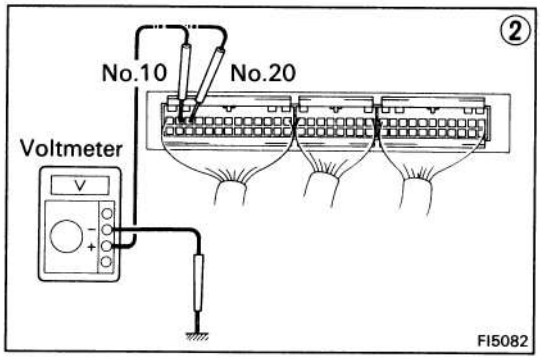
Try another ECU.

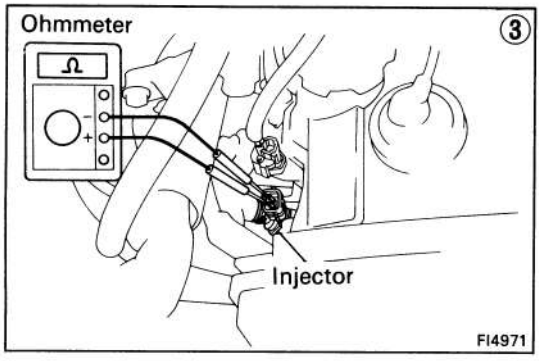
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No.	Terminals	Trouble	Condition	STD voltage
5	No.10 – E01 No.20 – E02	No voltage	IG SW ON	10 – 14 V









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

↓

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

NO → OK

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

OK → Try another ECU.

BAD → Repair or replace.

NO → Check fuse, fusible links, ignition switch and ignition relay.

BAD → Repair or replace.

OK

↓

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

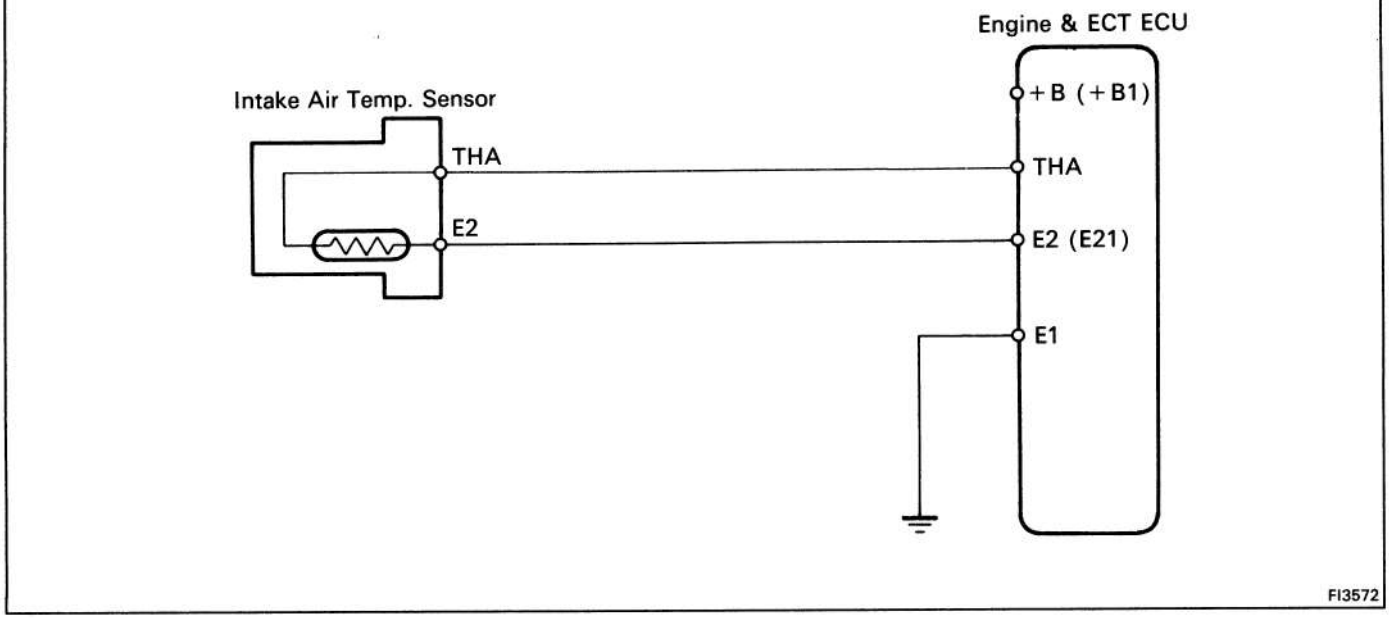
OK → Check wiring between ECU terminal No.10 and/or No.20 and battery.

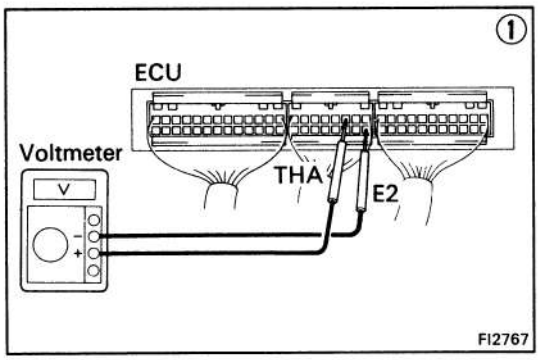
BAD → Repair or replace.

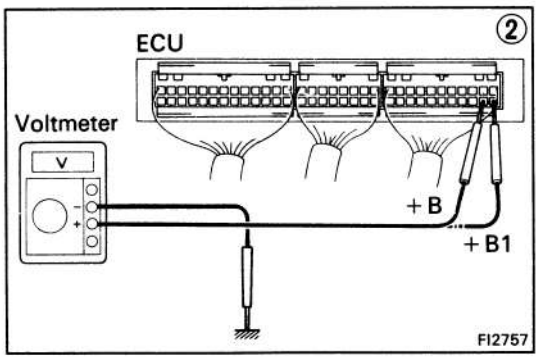
OK → Replace injector.

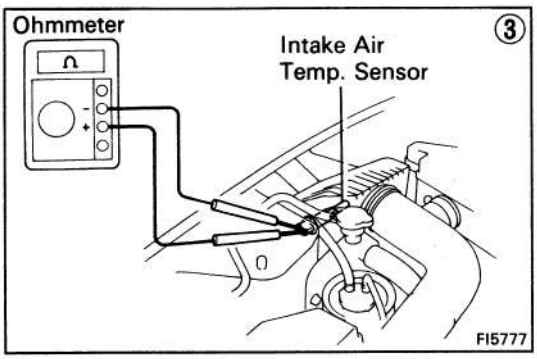
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No.	Terminals	Trouble	Condition		STD voltage
6	THA – E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1.7 – 3.1 V









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-70)

↓

Check wiring between ECU terminal E1 and body ground.

OK → ↓

BAD → Repair or replace.

↓

③ Check intake air temp. sensor. (See page FI-169)

BAD → Replace intake air temp. sensor.

OK → ↓

Check wiring between ECU and intake air temp. sensor.

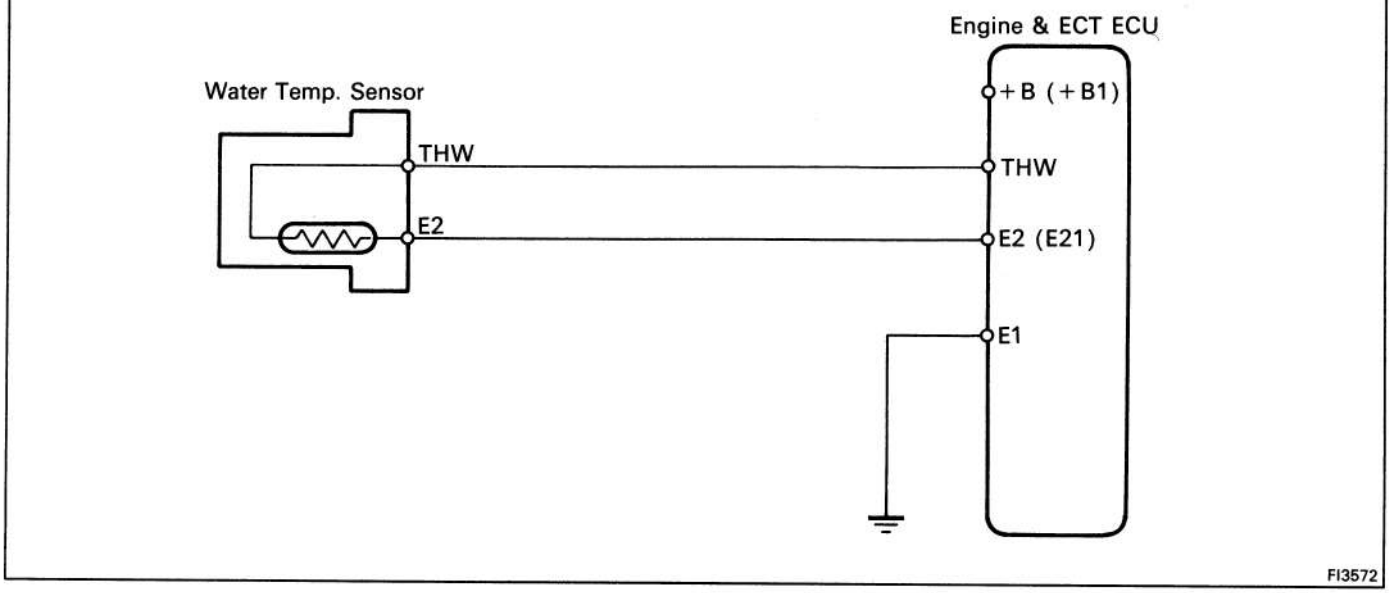
OK → ↓

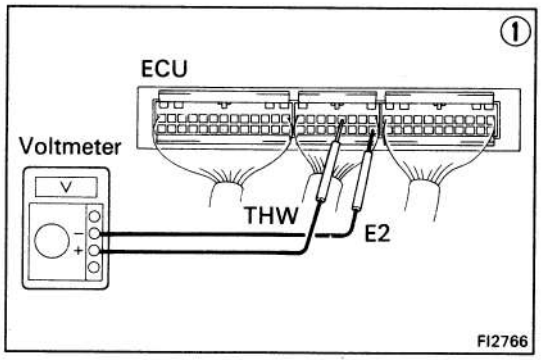
Try another ECU.

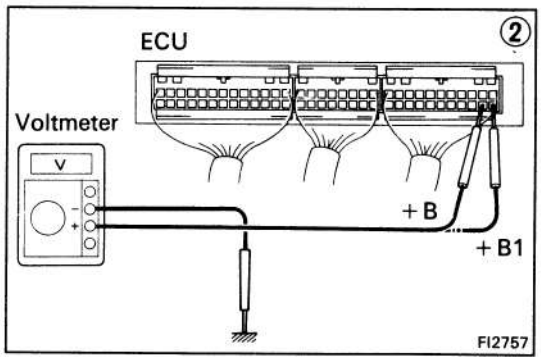
BAD → Repair or replace.

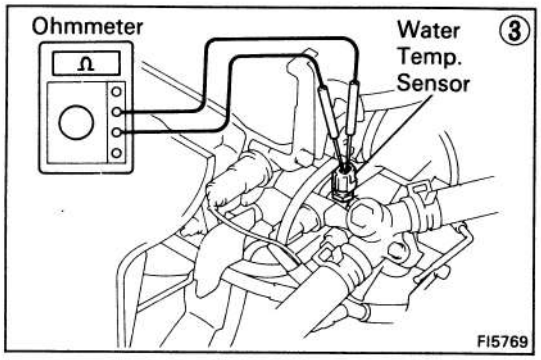
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No.	Terminals	Trouble	Condition		STD voltage
7	THW – E2	No voltage	IG SW ON	Coolant temperature 80°C (176°F)	0.3 – 0.8 V









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 → Check wiring between ECU terminal E1 and body ground.

NO → Refer to No.1. (See page FI-70)

OK → ③ Check water temp. sensor. (See page FI-168)

BAD → Repair or replace.

BAD → Replace water temp. sensor.

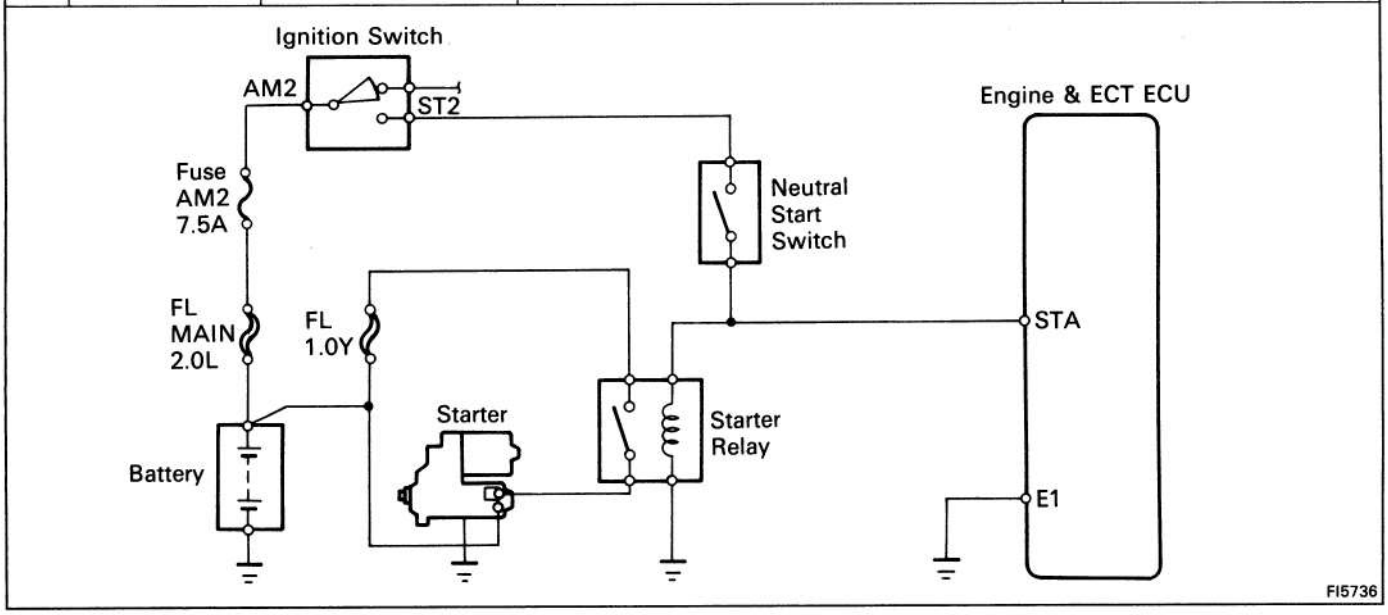
OK → Check wiring between ECU and water temp. sensor.

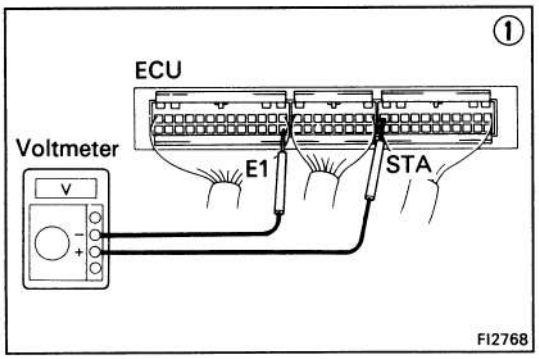
OK → Try another ECU.

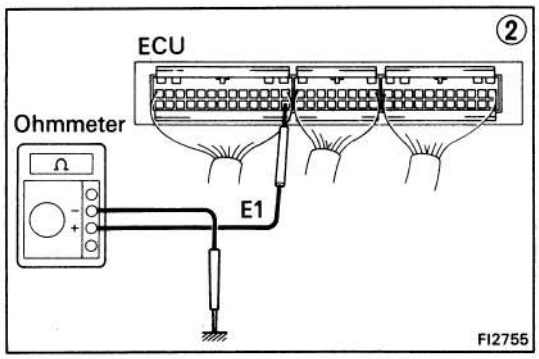
BAD → Repair or replace.

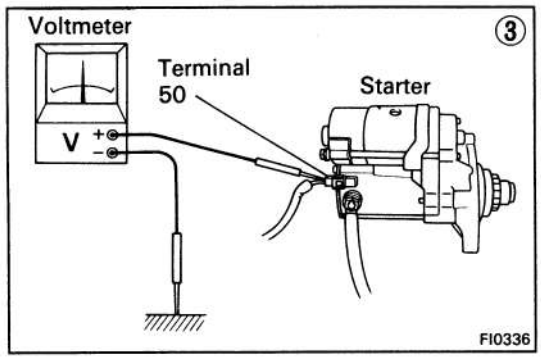
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No.	Terminals	Trouble	Condition	STD voltage
8	STA – E1	No voltage	Cranking	6 – 14 V







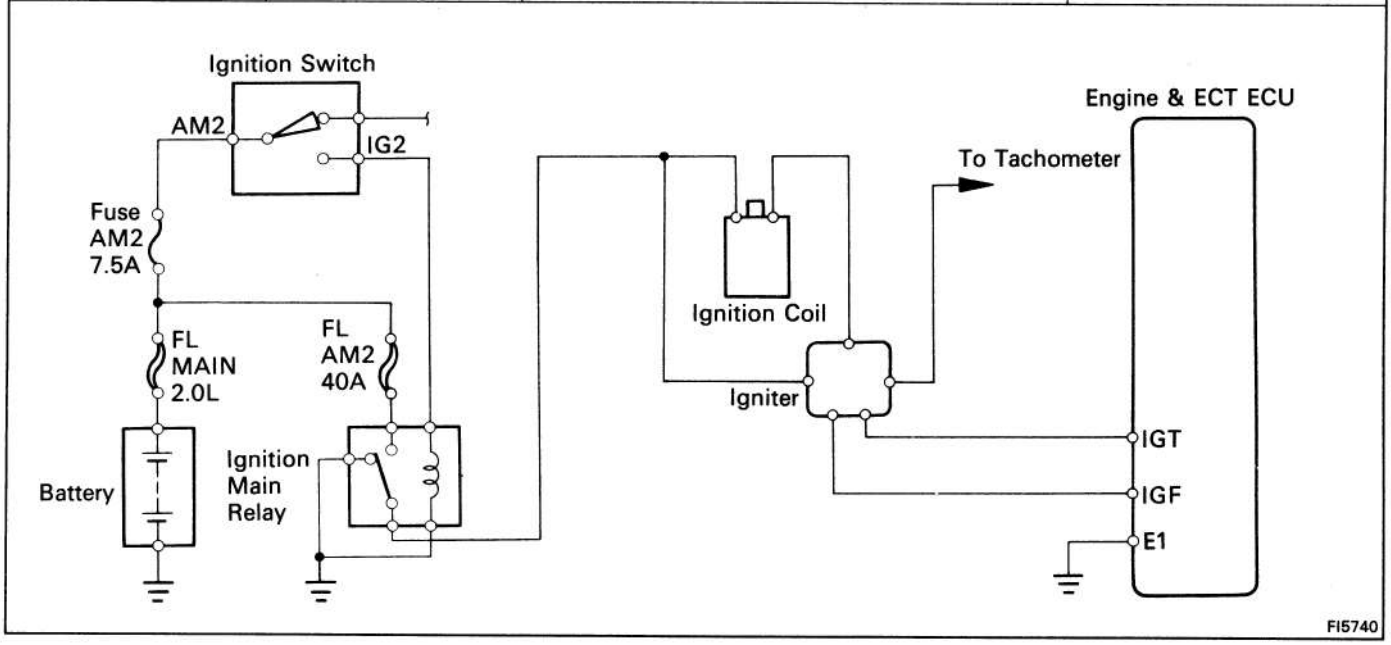


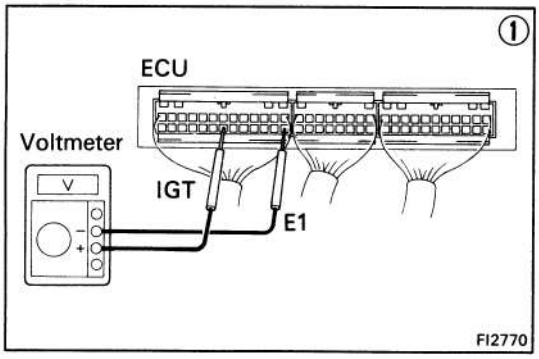
① There is no voltage between eCU terminals STA and E1. **(IG SW START)**

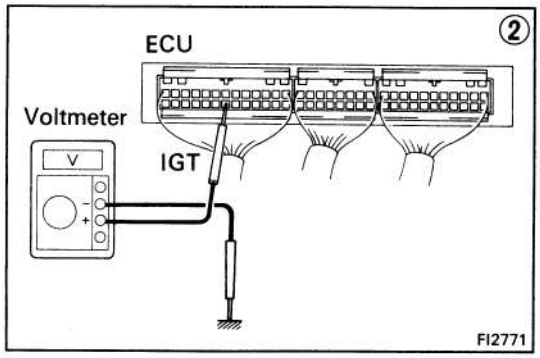
Check starter operation.
- OK → Check wiring between ECU terminal STA and ignition switch terminal ST2.
  - OK → ② Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.
- BAD → Check fuse, fusible links, battery, wiring, ignition switch, starter relay and neutral start switch.
  - BAD → Repair or replace.
  - OK → ③ Check that there is voltage at terminal 50 of starter. **(IG SW START) STD voltage: 6 – 14 V**
    - OK → Check starter.
    - NO → Check wiring between ignition switch terminal ST2 and starter terminal 50.

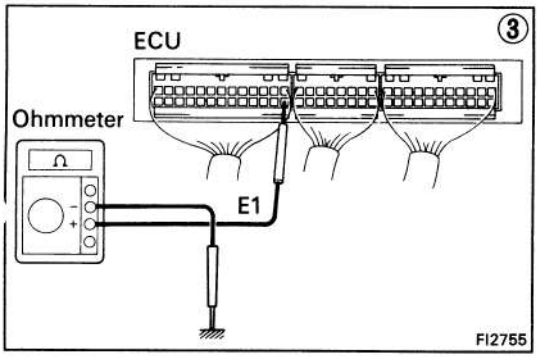
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No.	Terminals	Trouble	Condition	STD voltage
9	IGT – E1	No voltage	Idling	0.8 – 1.2 V









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 → ③ Check wiring between ECU terminal E1 and body ground. BAD → Repair or Replace.

③ OK → Try another ECU.

② OK → Check fuse, fusible links, ignition switch and ignition main relay. BAD → Repair or replace.

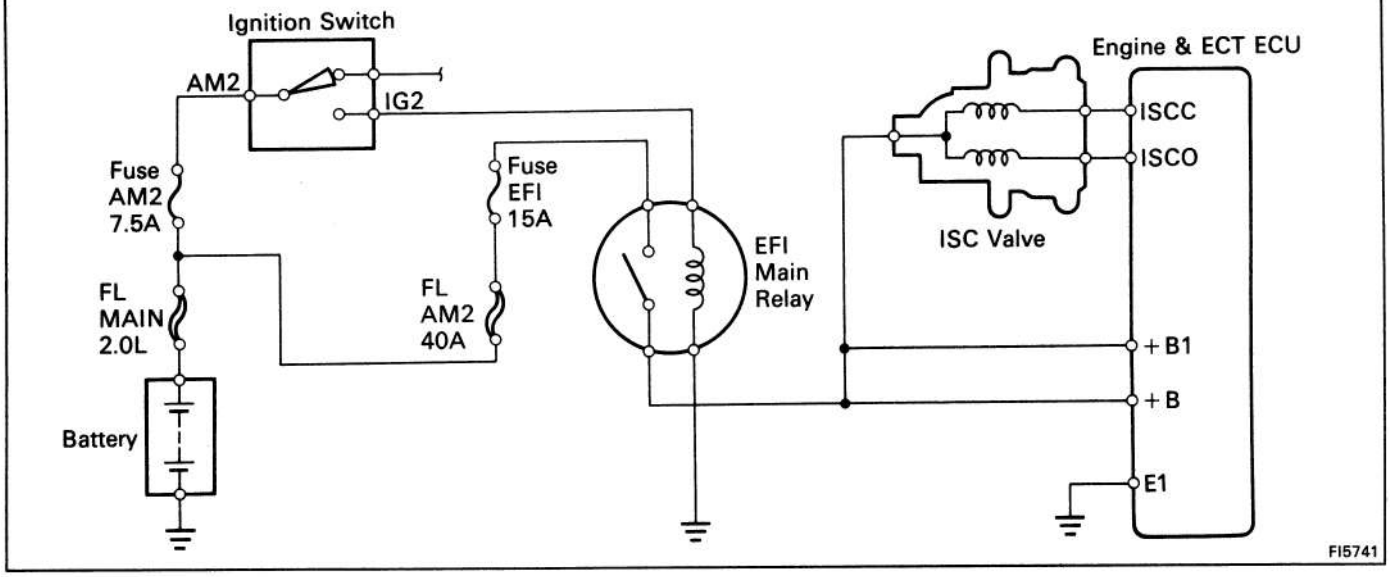
OK → Check distributor. (See page IG-13) BAD → Repair or replace.

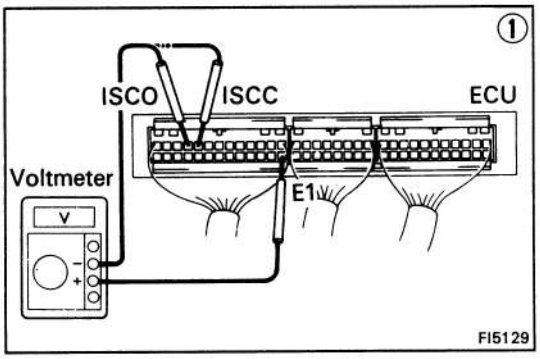
OK → Check wiring between ECU and battery. BAD → Repair or replace.

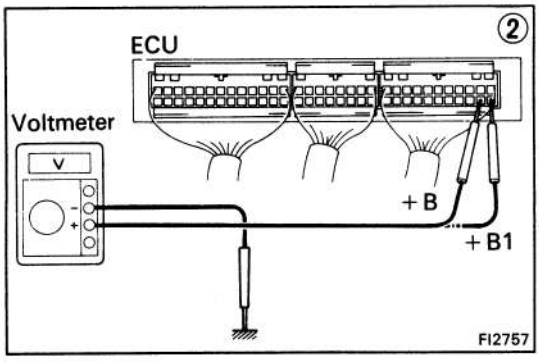
OK → Check igniter. (See page IG-13) BAD → Repair or replace.

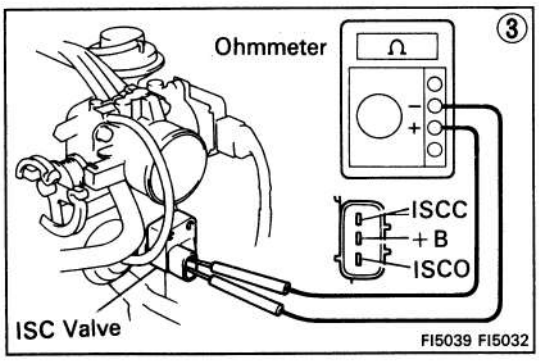
cardiagn.com

No.	Terminals	Trouble	Condition	STD voltage
10	ISCC – E1 ISCO	No voltage	IG SW ON	8 – 14 V









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 +B1 and body ground. **(IG SW ON)**

OK ↓

NO → Refer to No.1. (See page FI-70)

↓

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

BAD → Replace ISC valve.

OK ↓

Check wiring between ECU and ISC valve.

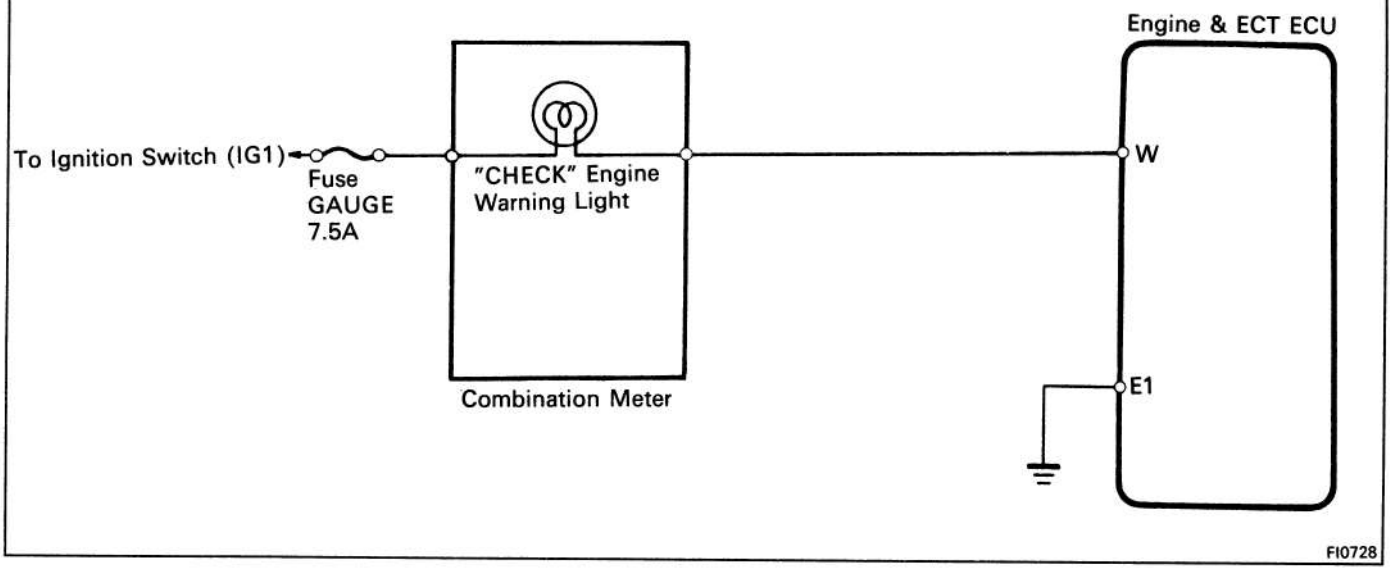
BAD → Repair or replace wiring.

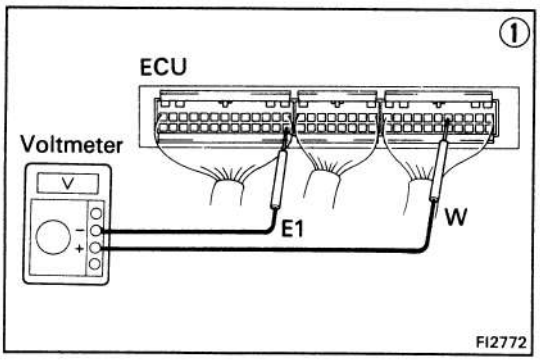
OK ↓

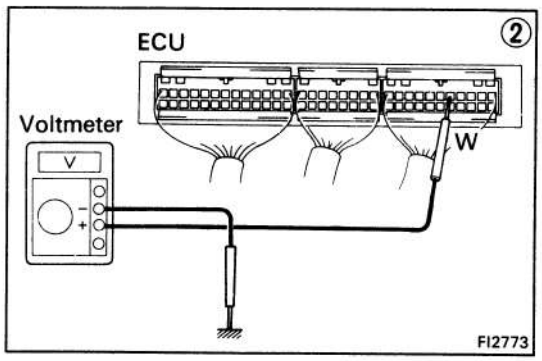
Try another ECU.

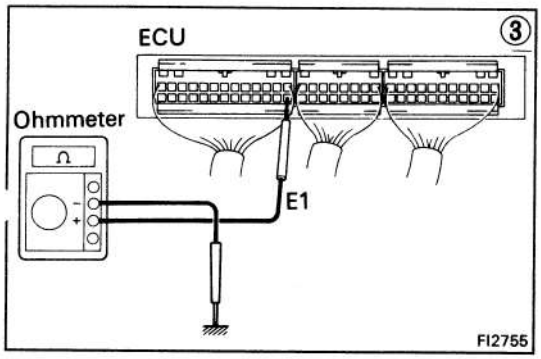
cardiagn.com

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









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 → Check fuse GAUGE (7.5A) and check engine warning light.

OK → ③ Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fuse GAUGE (7.5A) and check engine warning light.

OK → Check wiring between ECU terminal W and fuse.

BAD → Repair or replace.

Repair or replace.

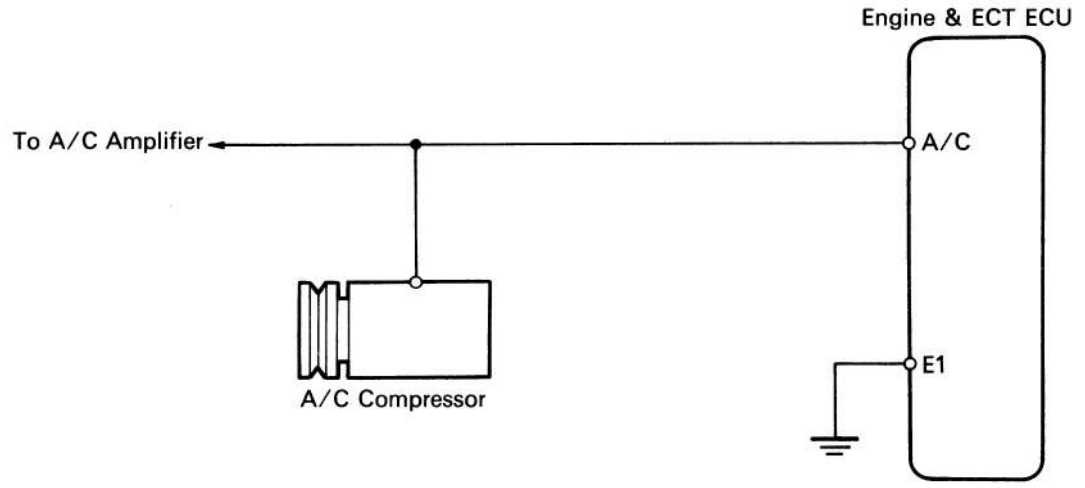
Fuse blows again.

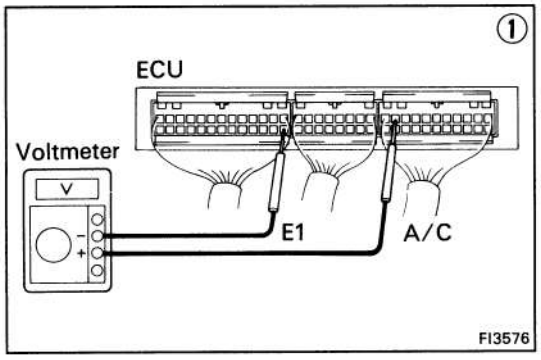
Check wiring between ECU terminal W and fuse.

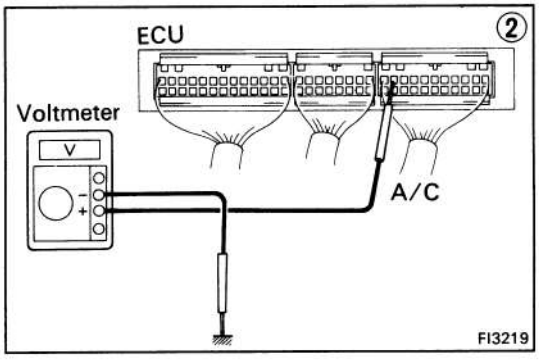
BAD → Repair or replace.

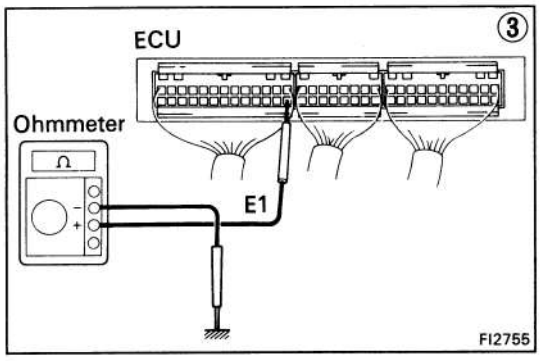
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No.	Terminals	Trouble	Condition	STD voltage
12	A/– E1	No voltage	Air conditioning ON	8 – 14 V









① There is no voltage between ECU terminal A/C and E1. **(Air conditioning ON)**

② Check that there is voltage between ECU terminal A/C and body Ground.

OK → ③ Check wiring between ECU terminal E1 and body ground.

③ OK → Try another ECU.

③ BAD → Repair or replace.

② OK → Check compressor running.

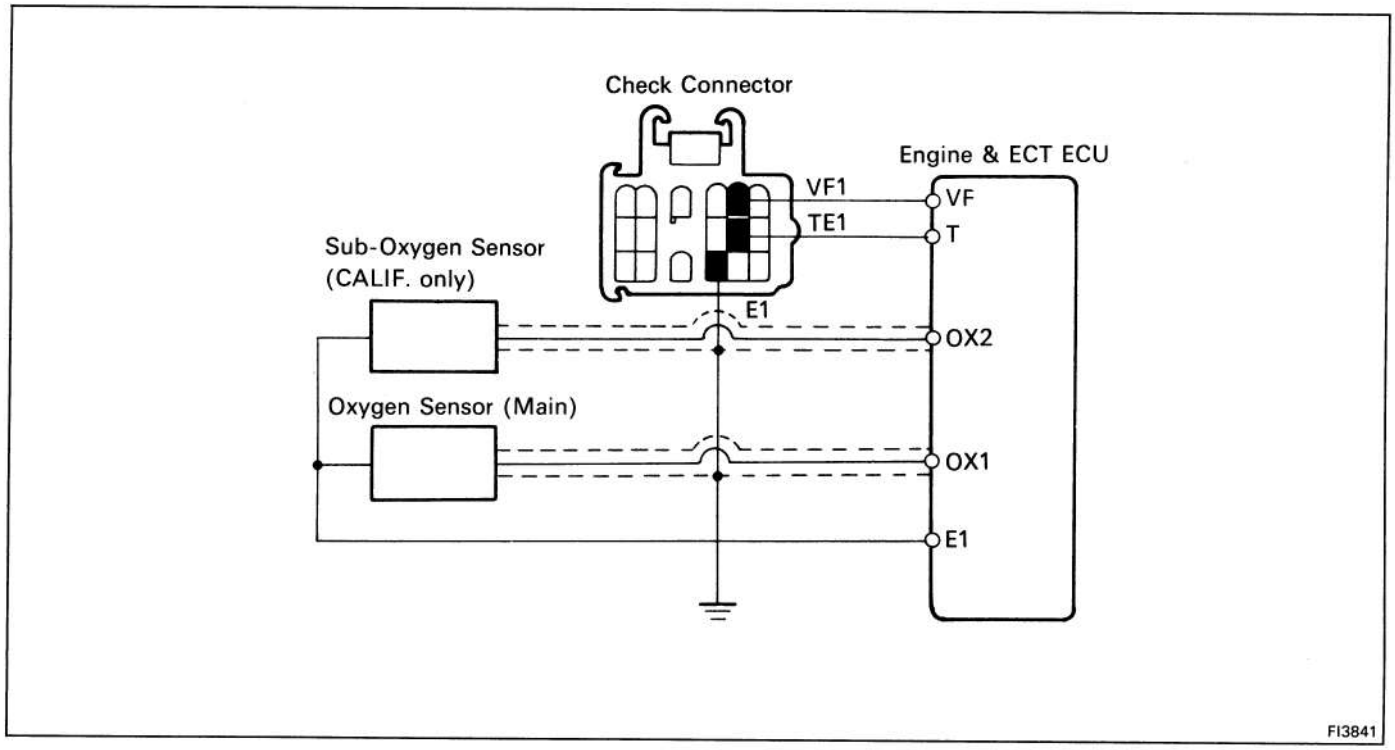
Check compressor running. BAD → Check wiring between ECU terminal A/C and amplifier.

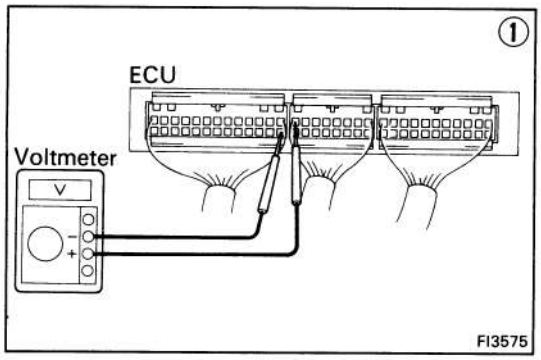
Check wiring between ECU terminal A/C and amplifier. BAD → Repair or replace.

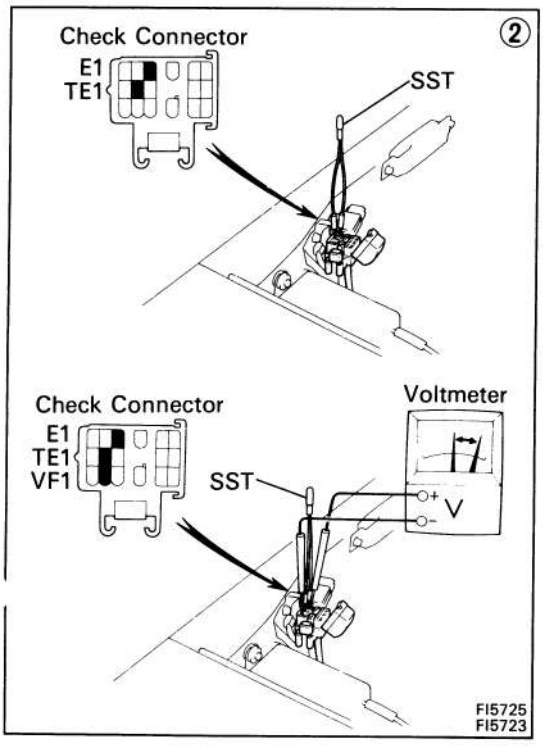
Check compressor running. BAD → Check that there is voltage between amplifier terminal and body ground. BAD → Repair or replace.

Check that there is voltage between amplifier terminal and body ground. OK → Check wiring between amplifier and ECU or compressor. BAD → Repair or replace.

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① There is no voltage between ECU terminal VF and E1.

Check that there is voltage between ECU terminal VF and body ground.
- OK → OK → Check wiring between ECU terminal E1 and body ground.
  - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.

Is air leaking into air induction system?
- BAD → Repair air leak.
- OK ↓

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-87)
- BAD → Repair or replace.
- OK ↓

Check injections. (See page FI-120)
- BAD → Repair or replace.
- OK ↓

* Check cold start injector. (See page FI-102)
- BAD → Repair or replace.
- OK ↓

Check vacuum sensor (See page FI-131)
- BAD → Repair or replace.
- OK ↓

② Check operation of oxygen sensor(s). (See pages FI-173 and 175)
- BAD → System normal
- BAD ↓

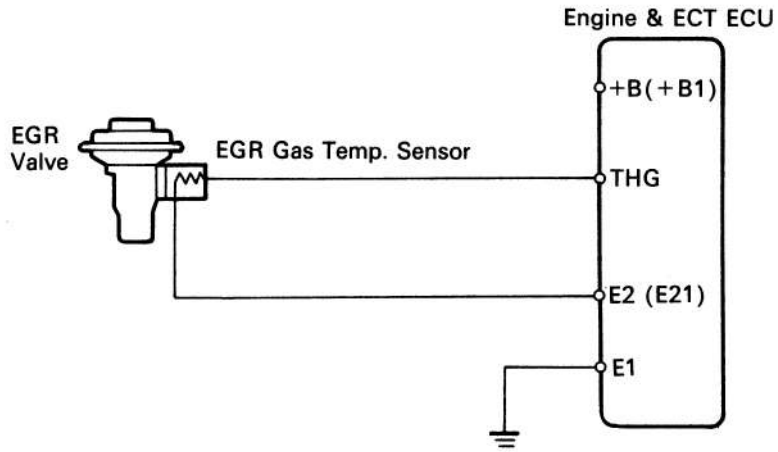
Check wiring between oxygen sensor(s) and ECU.
- BAD → Repair wiring.
- OK ↓

Replace oxygen sensor(s).

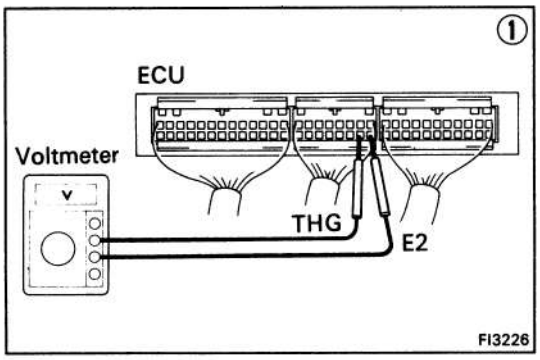
* Rich malfunction only

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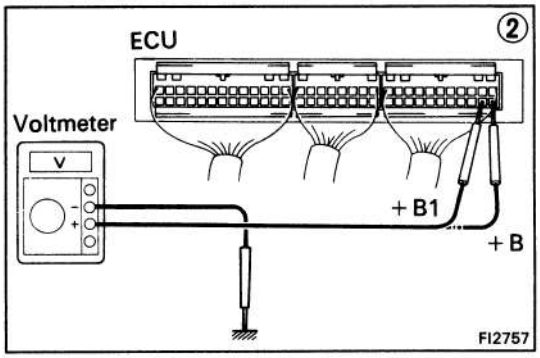
CALIF. only



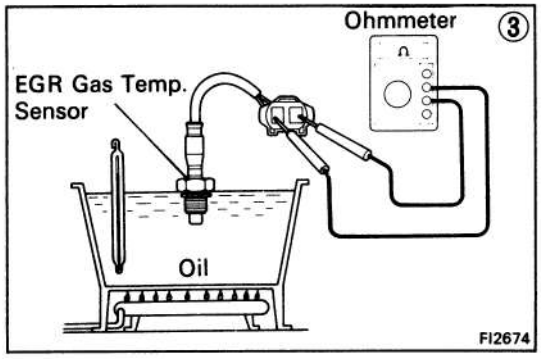
FI2680



FI3226



FI2757



FI2674

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-70)

↓

Check wiring between ECU terminal E1 and body ground.

OK ↓ / BAD → Repair or replace.

↓

Check EGR system. (See page EC-24)

BAD → Repair or replace.

OK ↓

↓

③ Check EGR gas temp. sensor. (See page FI-172)

BAD → Replace EGR gas temp. sensor.

OK → Check wiring between ECU and EGR gas temp. sensor.

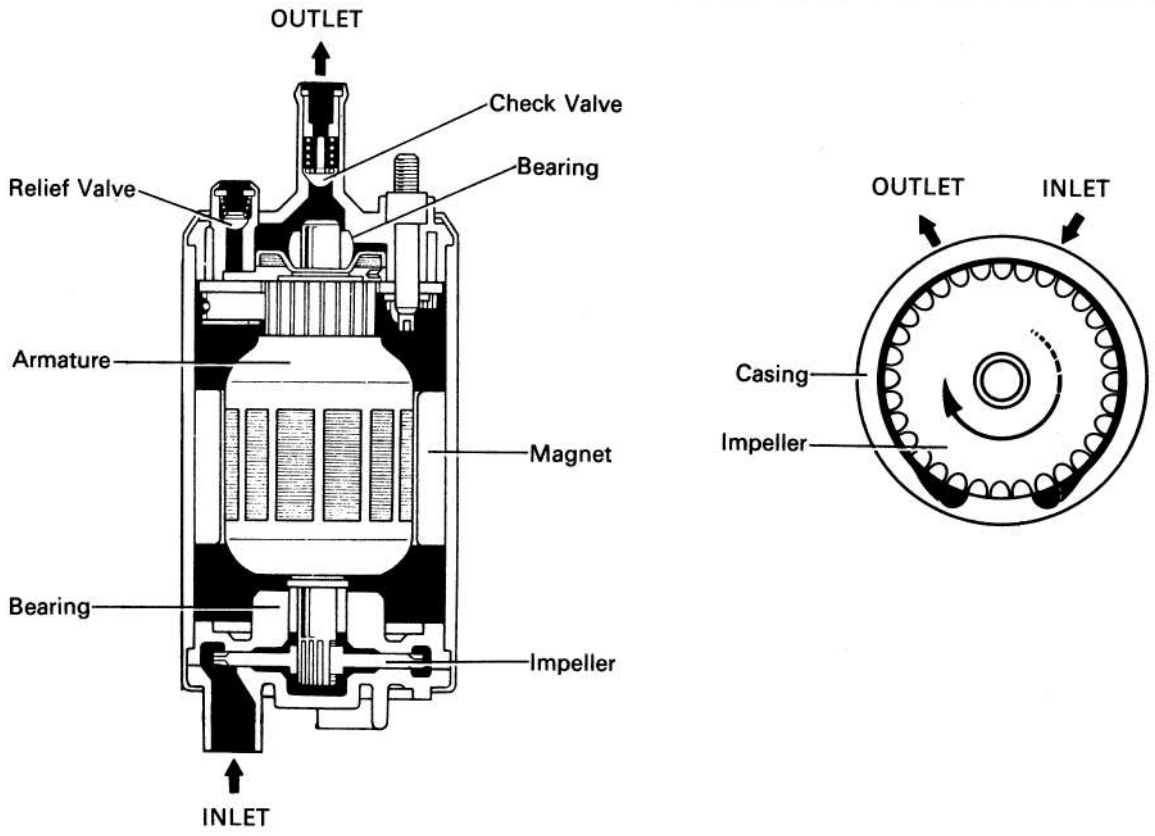
OK → Try another ECU.

BAD → Repair or replace.

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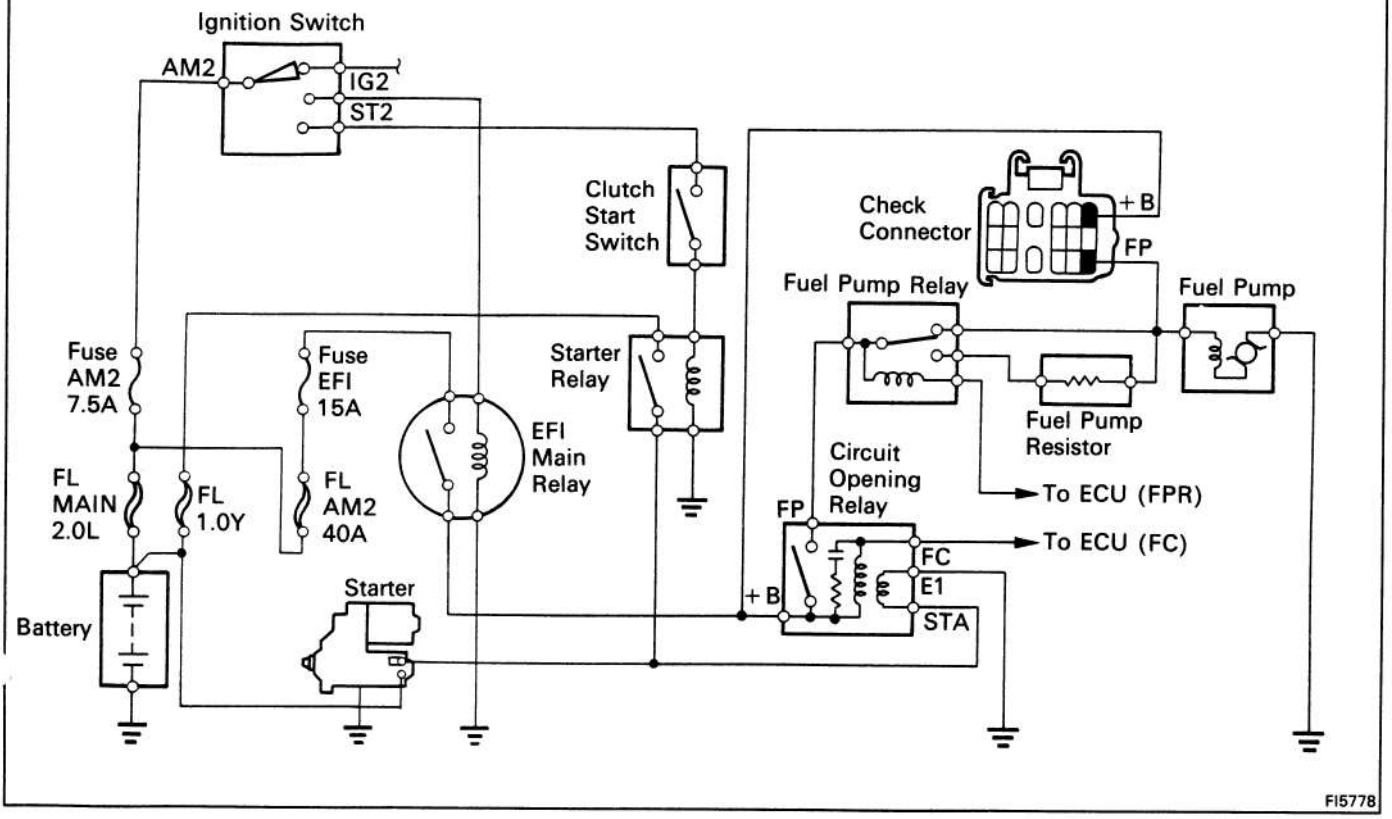
FUEL SYSTEM

Fuel Pump



FI0530 FI1479

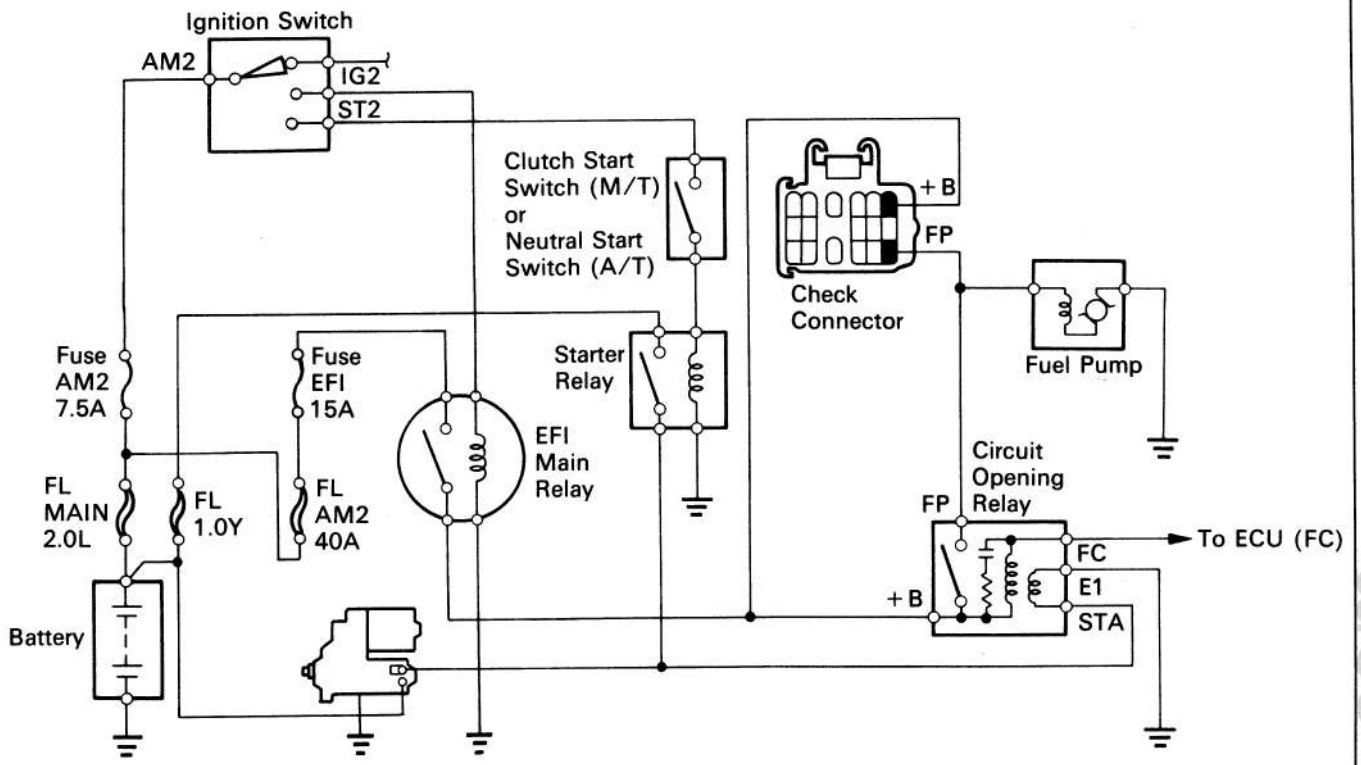
3S-GTE



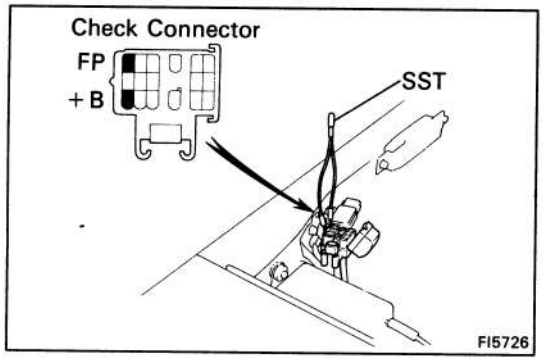
FI5778

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5S-FE



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ON-VEHICLE INSPECTION

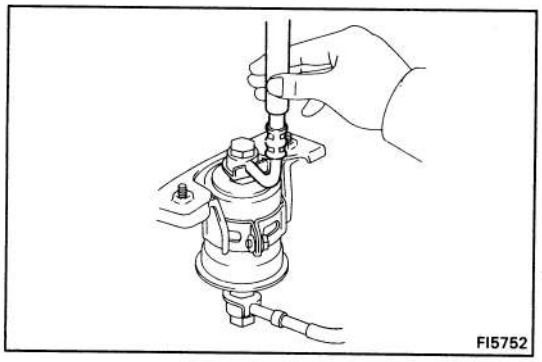
1. CHECK FUEL PUMP OPERATION

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

SST 09843-18020

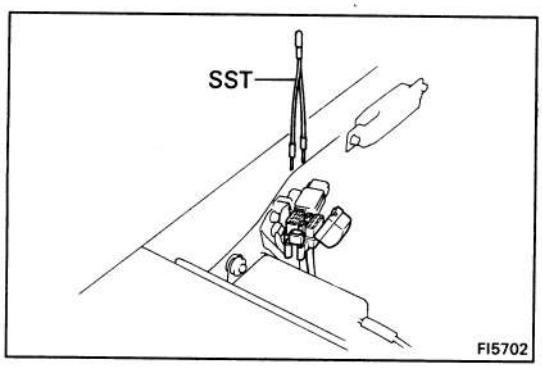
(b) Turn the ignition switch ON.

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 links
- Fuses (EFI 15A, AM2 7.5A, 1.0Y)
- EFI main relay
- Fuel pump
- Fuel pump relay (3S-GTE)
- Fuel pump resistor (3S-GTE)
- ECU
- Wiring connections

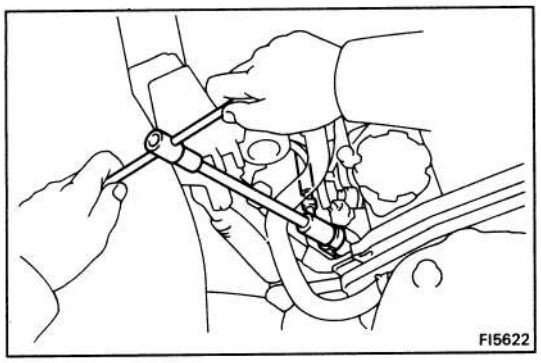
2. (3S-GTE)
CHECK FUEL PRESSURE

(a) Check the battery voltage above 12 volts.

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

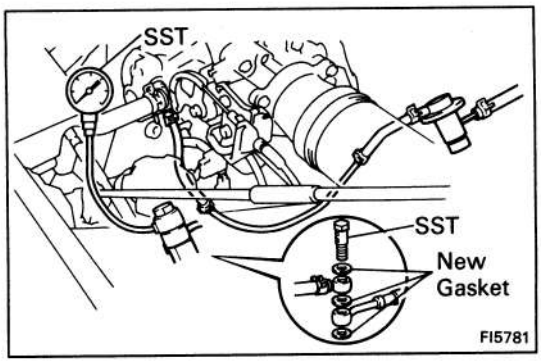
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

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

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

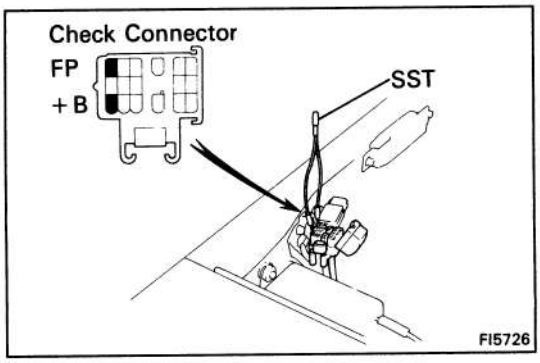


(d) Install SST (pressure gauge) to the delivery pipe with two new gaskets and the union bolt.

SST 09268-45012

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

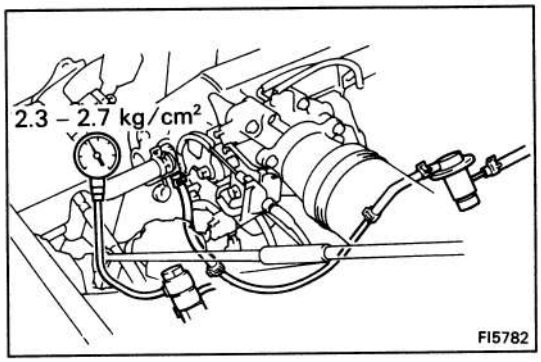
(e) Wipe off any splattered gasoline.



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

SST 09843-18020

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



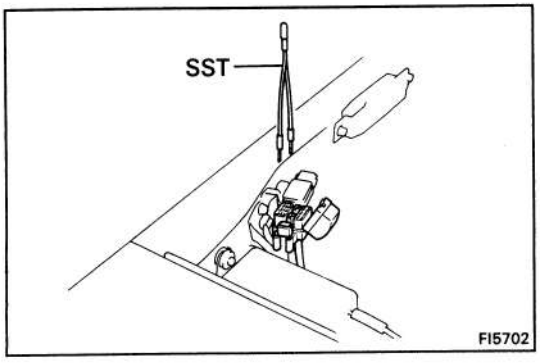
(h) Turn the ignition switch ON.

(i) Measure the fuel pressure.

Fuel pressure: 2.3 – 2.7 kg/cm² (33 – 38 psi, 226 – 265 kPa)

If pressure is high, replace the fuel pressure regulator.

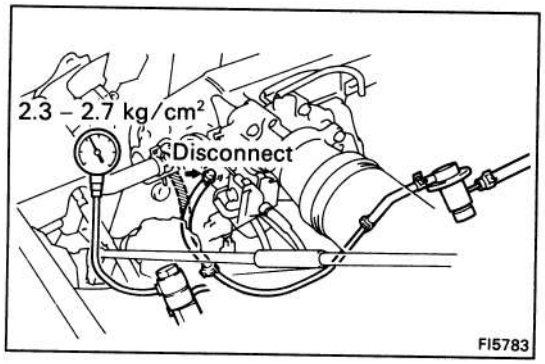
If pressure is low, check the following parts:
- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator



(j) Remove SST.

SST 09843-18020

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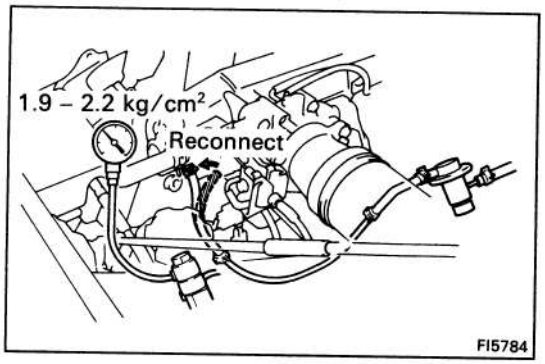


(k) Start the engine.

(l) Disconnect the vacuum sensing hose from the fuel pressure regulator, and plug the hose end.

(m) Measure the fuel pressure at idling.

Fuel pressure: 2.3 – 2.7 kg/cm² (33 – 38 psi, 226 – 265 kPa)



(n) Reconnect the vacuum sensing hose to the fuel pressure regulator and plug the hose end.

(o) Measure the fuel pressure at idling.

Fuel pressure: 1.9 – 2.2 kg/cm² (27 – 31 psi, 186 – 216 kPa)

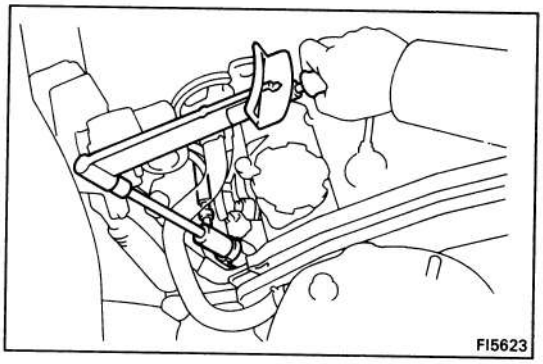
If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

(p) Stop the engine. Check that the fuel pressure remains 1.5 kg/cm² (21 psi, 147 kPa) or more for 5 minutes after the engine is turned off.

If pressure is not as specified, check the fuel pump, pressure regulator1and/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 gaskets and the union bolt.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

(s) Reconnect the cable to the negative (–) terminal of the battery.

(t) Check for fuel leakage. (See page FI-9)

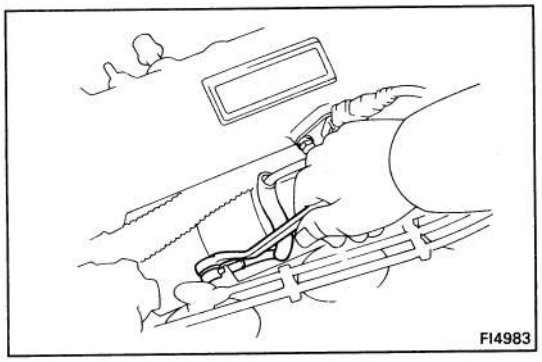
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3. **(5S-FE)**
CHECK FUEL PRESSURE

(a) Check the battery voltage above 12 volts.

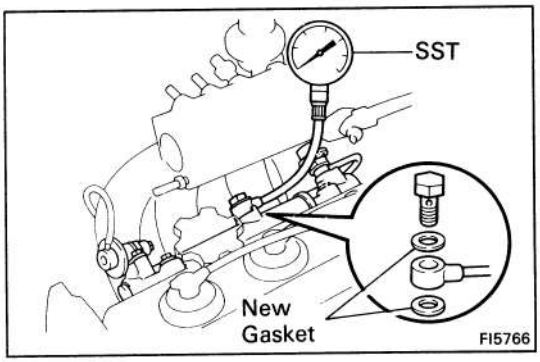
(b) Disconnect the cable from the negative (–) terminal of the battery.

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 cold start injector pipe from the delivery pipe.

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



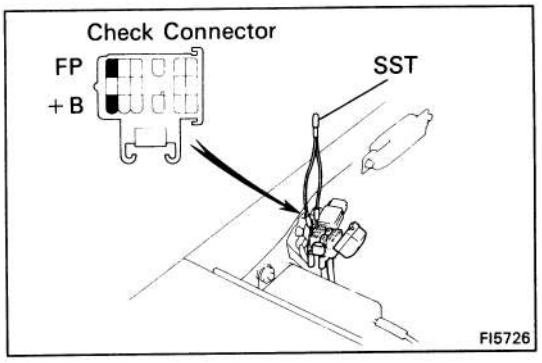
(d) Install SST (pressure gauge) to the delivery pipe with two new gaskets and the union bolt.

SST 09268-45012

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

(e) Wipe off any splattered gasoline.

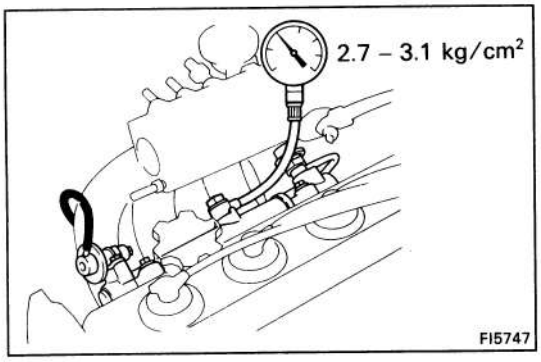
(f) Disconnect the cold start injector connector.



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

SST 09843-18020

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



(i) Turn the ignition switch ON.

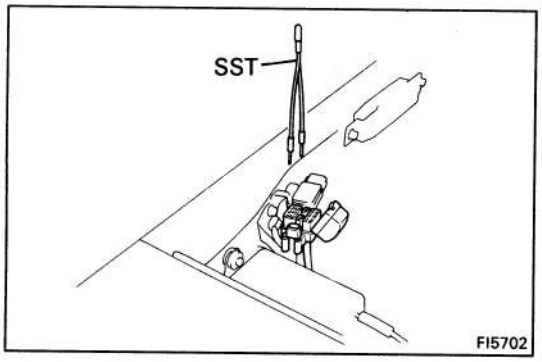
(j) Measure the fuel pressure.

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

If pressure is high, replace the fuel pressure regulator.

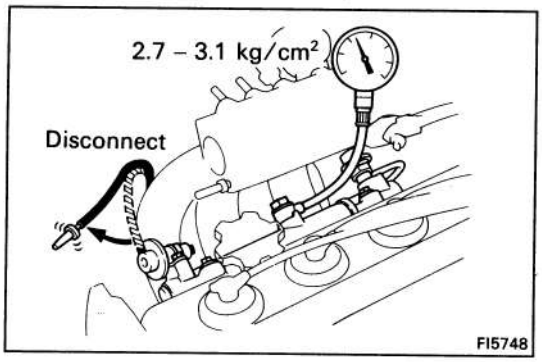
If pressure is low, check the following parts:
- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

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(k) Remove SST.

SST 09843-18020

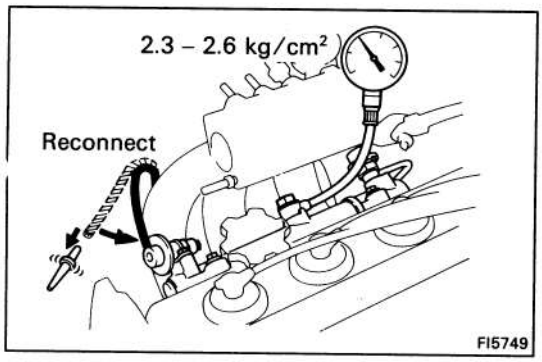


(l) Start the engine.

(m) Disconnect the vacuum sensing hose from the fuel pressure regulator.

(n) Measure the fuel pressure at idling.

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



(o) Reconnect the vacuum sensing hose to the fuel pressure regulator and plug the hose end.

(p) Measure the fuel pressure at idling.

Fuel pressure: 2.3 – 2.6 kg/cm² (33 – 37 psi, 226 – 255 kPa)

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

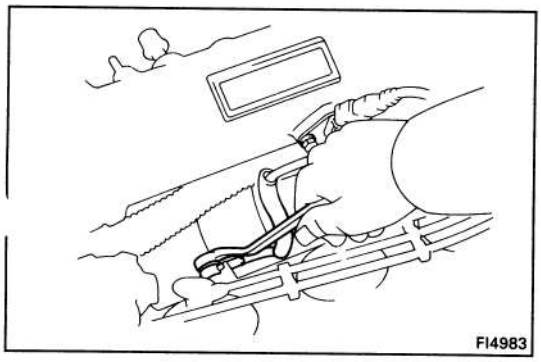
(q) Stop the engine. Check that the fuel pressure remains 1.5 kg/cm² (21 psi, 147 kPa) or more for 5 minutes after the engine is turned off.

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) Reconnect the cold start injector connector.



(t) Connect the cold start injector pipe with two new gaskets and the union bolt.

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

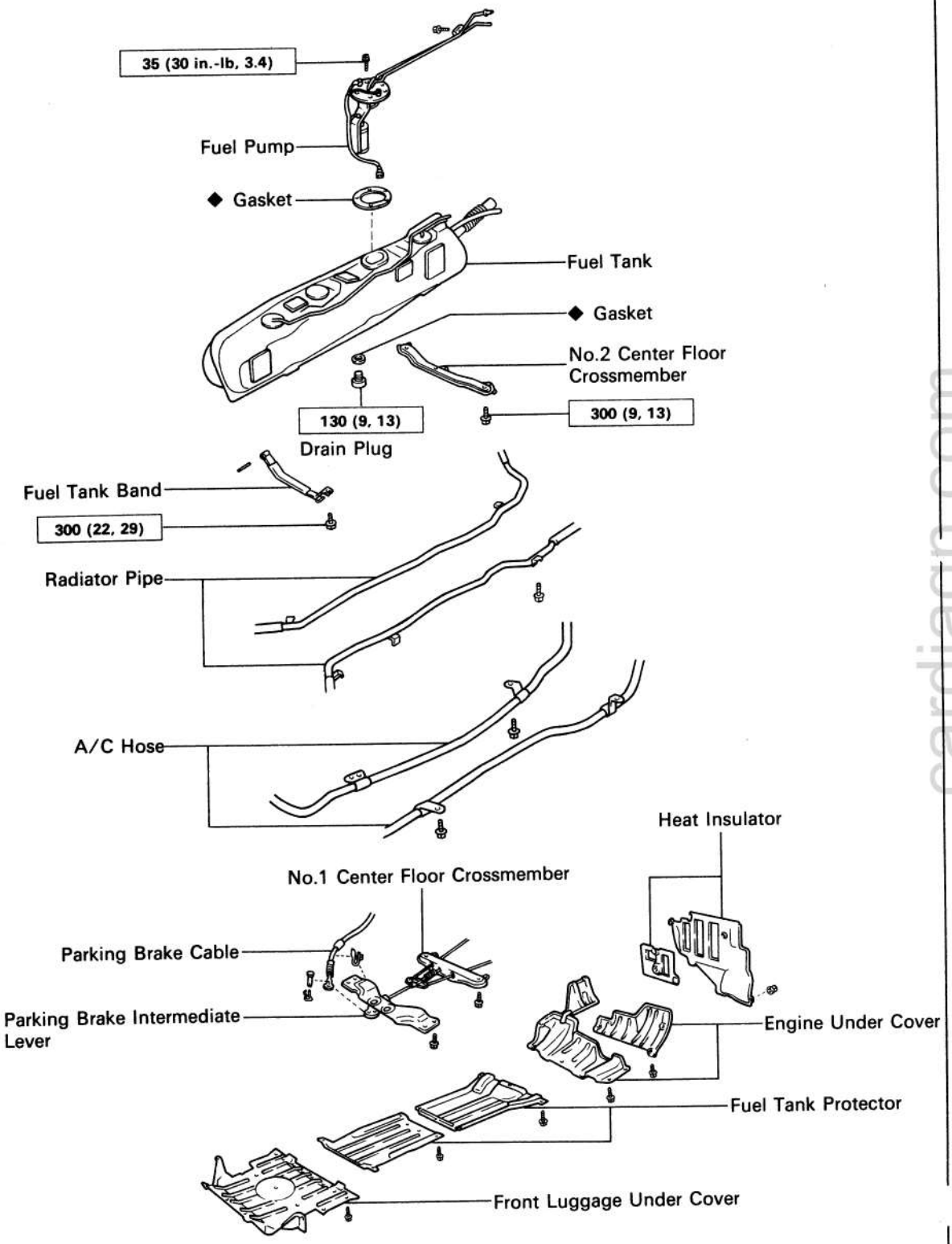
(u) Reconnect the cable to the negative (–) terminal of the battery.

(v) Check for fuel leakage. (See page FI-9)

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REMOVAL OF FUEL PUMP

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

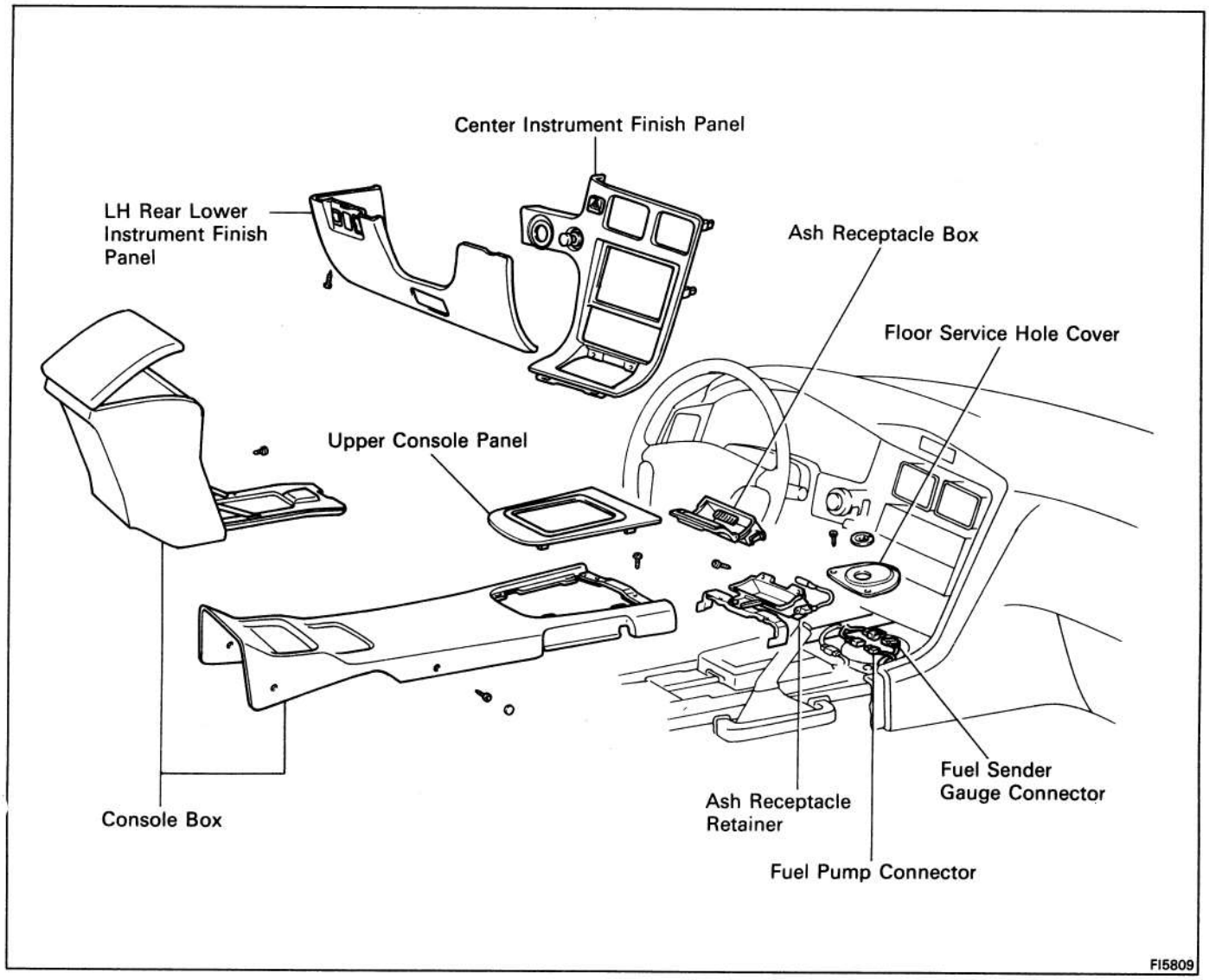


kg-cm (ft-lb, N·m) : Specified Torque

◆ Non-reusable part

FI5801

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1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

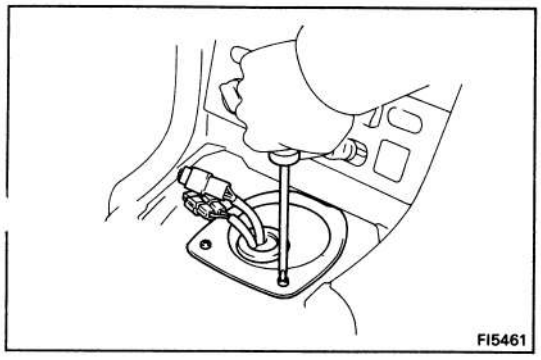
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DISCONNECT FUEL PUMP CONNECTOR AND FUEL SENDER GAUGE CONNECTOR

(a) Remove the following parts:
- Console boxes
- LH lower instrument finish panel
- Center instrument finish panel
- Ash receptacle box
- Ash receptacle retainer

(b) Disconnect the fuel pump connector and fuel sender gauge connector.

(c) Remove the two screws and floor service hole cover.



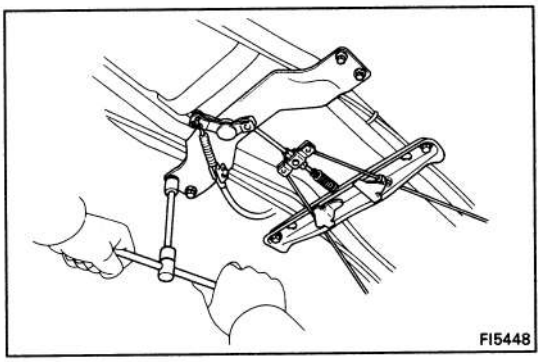
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3. **REMOVE ENGINE UNDER COVERS**

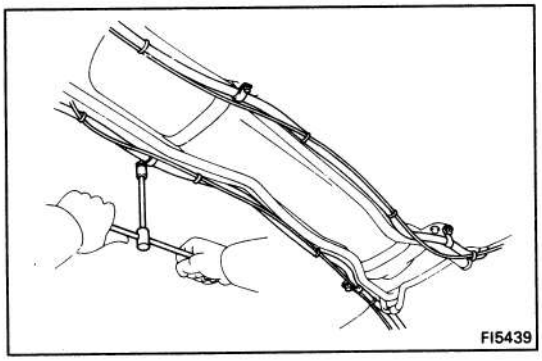
4. **REMOVE FRONT LUGGAGE UNDER COVER**

5. **REMOVE FUEL TANK PROTECTORS**

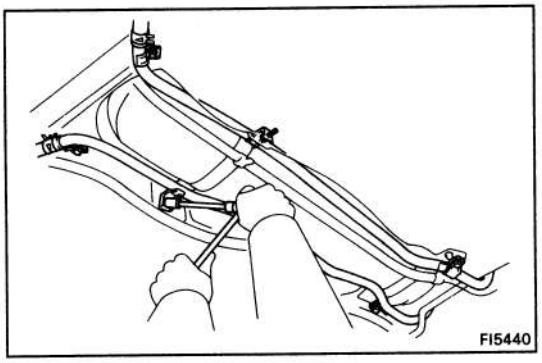
6. **DRAIN FUEL**



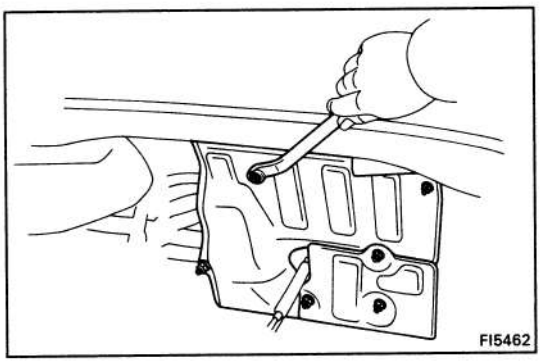
7. **REMOVE PARKING BRAKE INTERMEDIATE LEVER AND NO.1 CENTER FLOOR CROSSMEMBER**
   (a) Remove the four bolts and intermediate lever.
   (b) Remove the two bolts and crossmember.
   (c) Disconnect the parking brake cable from the intermediate lever.



8. **DISCONNECT A/C HOSES FROM BODY**
   Remove the four bolts, and disconnect the two A/C hoses from the body.

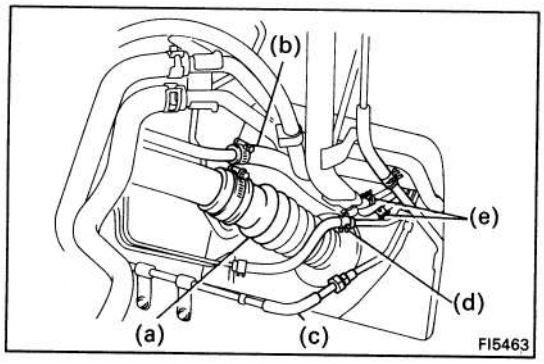


9. **DISCONNECT RADIATOR PIPES FROM BODY**
   Remove the six bolts, and disconnect the two radiator pipes from the body.



10. **REMOVE FUEL TANK HEAT INSULATORS**
    Remove the six nuts and two heat insulators.

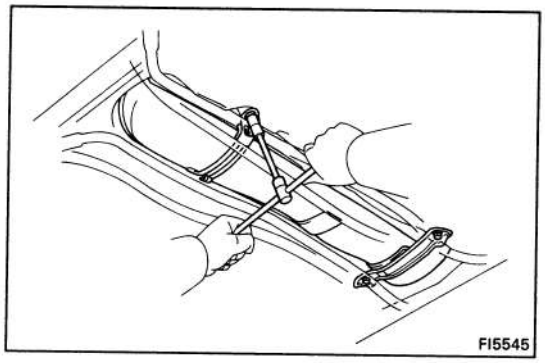
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11. DISCONNECT FUEL HOSES AND TUBE

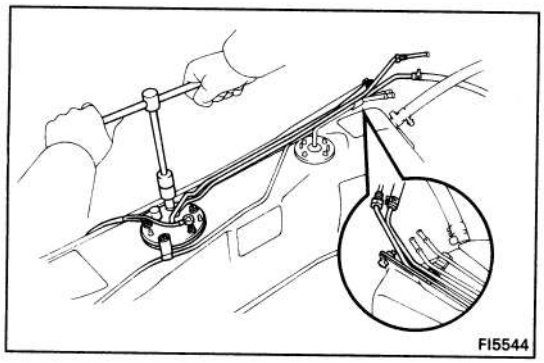
CAUTION: Remove the fuel filter cap to prevent the fuel from flowing out.

(a) Fuel inlet hose
(b) Fuel breather hose
(c) Fuel pump tube
(d) Fuel return hose
(e) Two fuel evaporative bent hoses



12. REMOVE FUEL TANK

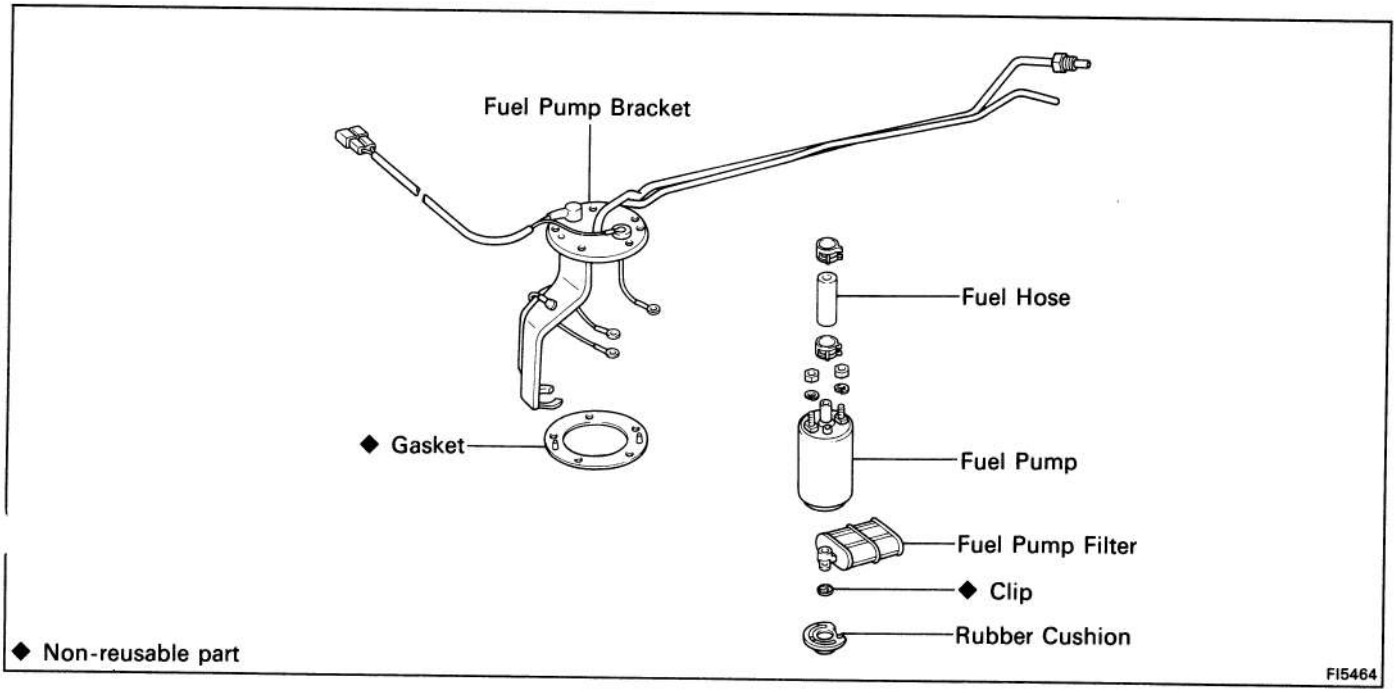
(a) Remove the bolt, pin and tank band.
(b) Remove the two bolts and No.2 center floor cross-member.
(c) Remove the fuel tank.



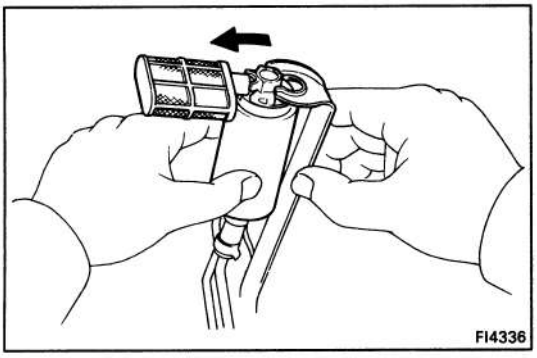
13. REMOVE FUEL PUMP FROM FUEL TANK

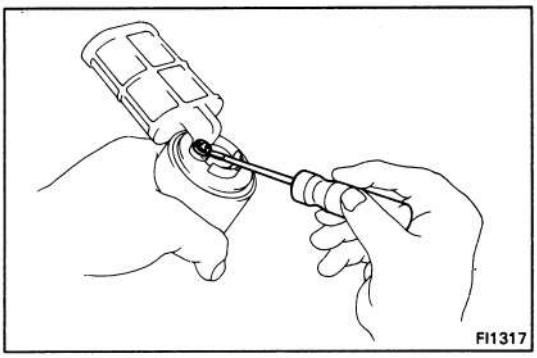
(a) Remove the bolt holding the fuel pump tube to the fuel tank.
(b) Remove the five bolts, and pull out the pump.
(c) Remove the gasket from the pump bracket.

COMPONENTS



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DISASSEMBLY OF FUEL PUMP

(See page FI-95)

1. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

(a) Pull out the lower side of the fuel pump from the pump bracket.

(b) Remove the rubber cushion from the fuel pump.

(c) Remove the nut and spring washers, and disconnect the lead wire from the fuel pump. Disconnect the three lead wires.

(d) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.

2. 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-95)

1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

Install the pump filter with a new clip.

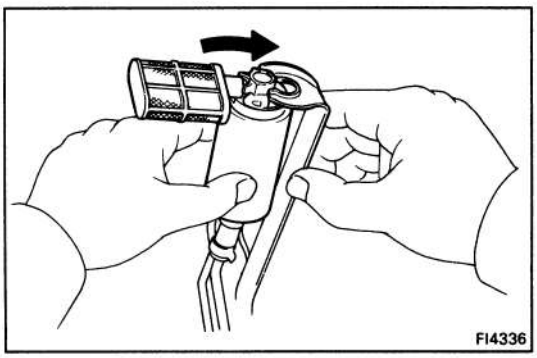
2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

(a) Connect the fuel hose to the outlet port of the fuel pump.

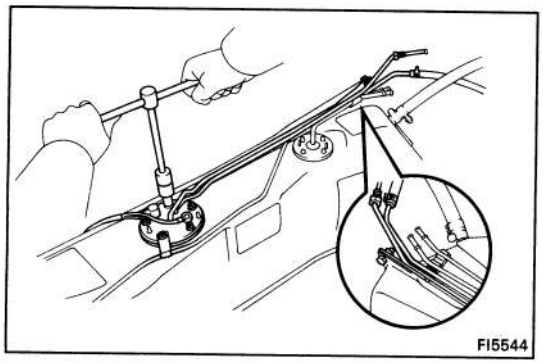
(b) Connect the lead wire to the fuel pump with the spring washer and nut. Connect the three lead wires

(c) Install the rubber cushion to the fuel pump.

(d) Install the fuel pump by pushing the lower side of the fuel pump.



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INSTALLATION OF FUEL PUMP

(See pages FI-92 and 93)

1. INSTALL FUEL PUMP TO FUEL TANK

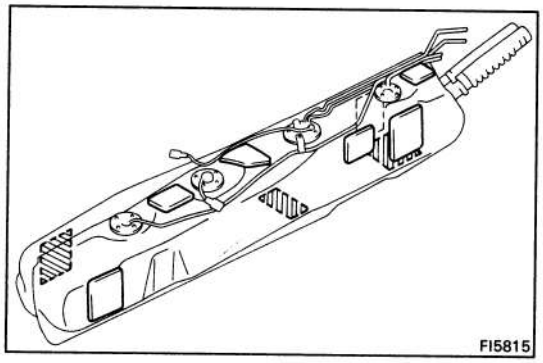
(a) Install a new gasket to the pump bracket.

(b) Insert the fuel pump bracket into the fuel tank.

(c) Install the five bolts holding the fuel pump bracket to the fuel tank.

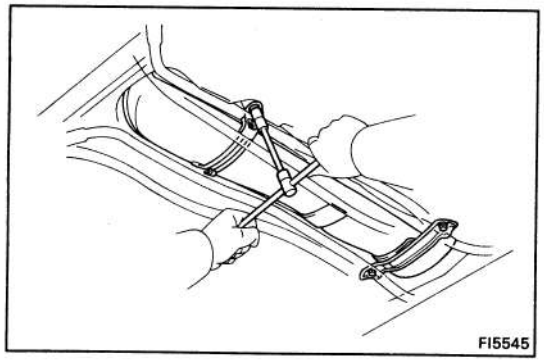
Torque: 35 kg-cm (35 in.-lb, 3.4 N·m)

(d) Install the bolt holding the fuel pump tube to the fuel tank.



2. INSTALL FUEL TANK

(a) Apply soapy water to the cushions on the fuel tank.



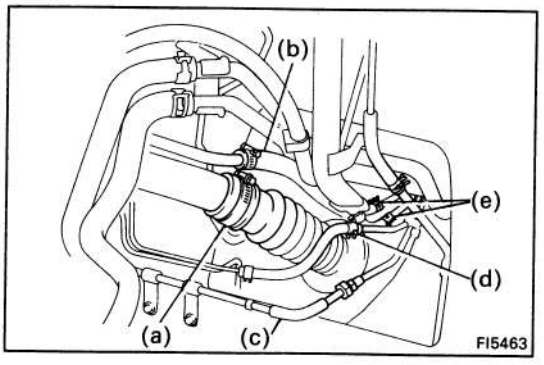
(b) Attach the fuel tank to the body.

(c) Install the fuel tank band with the pin and bolt.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

(d) Install the No.2 center floor crossmember with the two bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



3. CONNECT FUEL HOSES AND TUBE

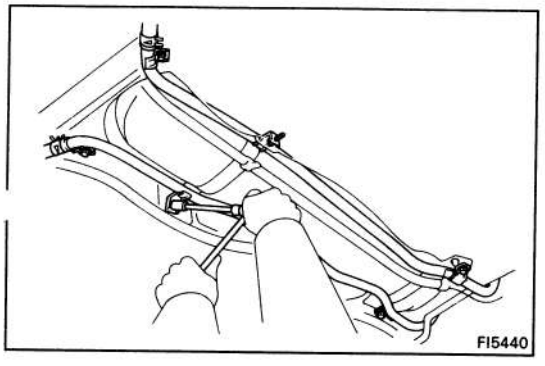
(a) Fuel inlet hose

(b) Fuel breather hose

(c) Fuel pump tube

(d) Fuel return hose

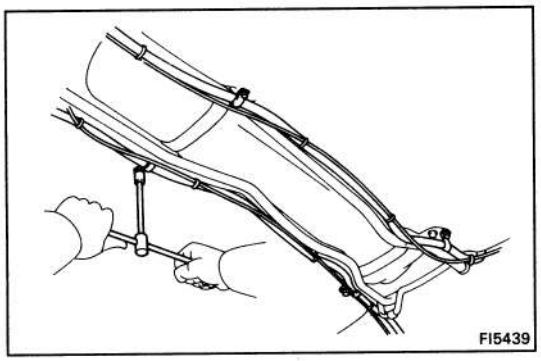
(e) Two fuel evaporative bent hoses



4. INSTALL RADIATOR PIPES TO BODY

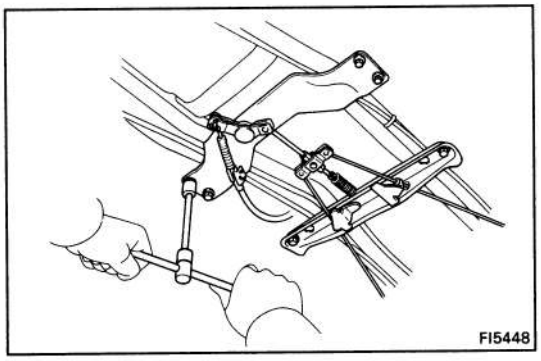
Install the two radiator pipes with the six bolts.

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5. INSTALL A/C HOSES TO BODY

Install the two A/C hoses with the four bolts.

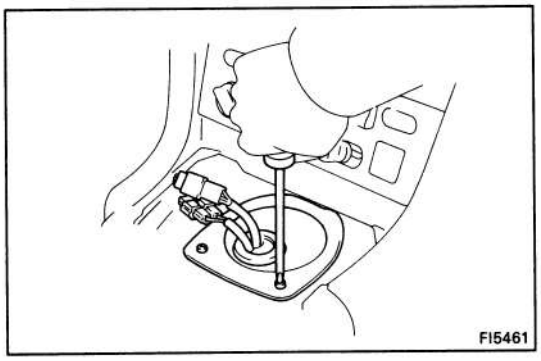


6. INSTALL PARKING BRAKE INTERMEDIATE LEVER AND NO.1 CENTER FLOOR CROSSMEMBER

(a) Connect the parking brake cable to the intermediate lever.

(b) Install the intermediate lever with the four bolts.

(c) Install the crossmember with the two bolts.



7. CONNECT FUEL PUMP CONNECTOR AND FUEL SENDER GAUGE CONNECTOR

(a) Install the floor service hole cover with the two screws.

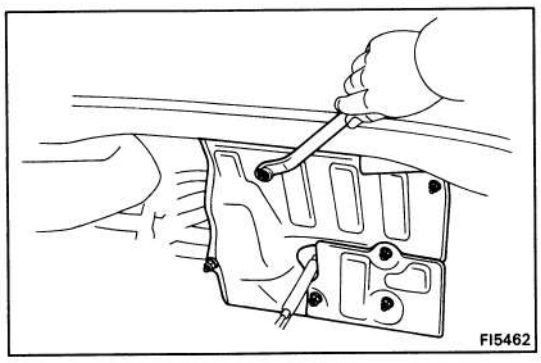
(b) Connect the fuel pump connector and fuel sender gauge connector.

(c) Install the following parts:

- Ash receptacle retainer
- Ash receptacle box
- Center instrument finish panel
- LH rear lower instrument finish panel
- Console boxes

8. FILL WITH FUEL

9. CHECK FOR FUEL LEAKAGE (See page FI-9)



10. INSTALL FUEL TANK HEAT INSULATORS

Remove the six nuts and two heat insulators.

11. INSTALL ENGINE UNDER COVERS

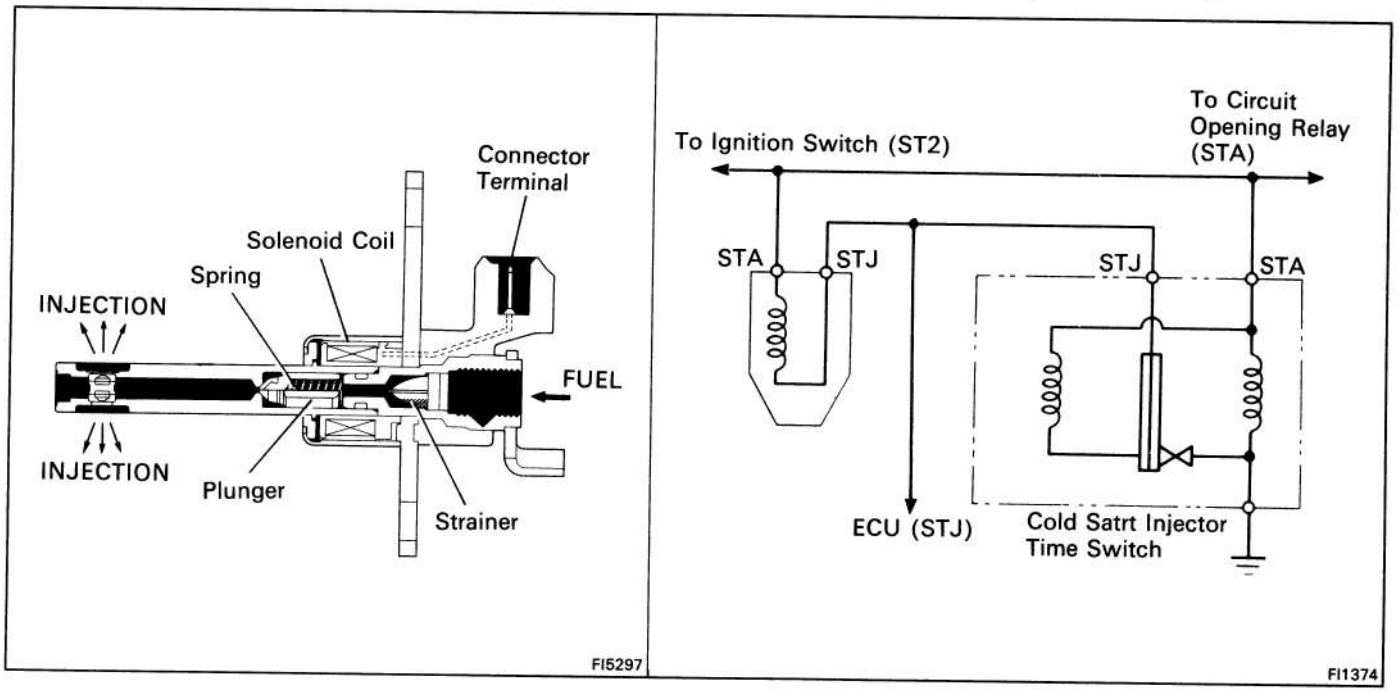
12. INSTALL FUEL TANK PROTECTORS

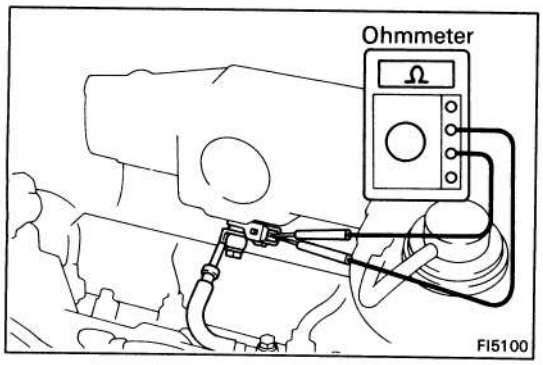
13. INSTALL FRONT LUGGAGE UNDER COVER

14. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

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Cold Start Injector (3S-GTE)





ON-VEHICLE INSPECTION

INSPECT RESISTANCE OF COLD START INJECTOR

(a) Remove the throttle body.
(See steps 1 to 8, 10 and 11 on pages FI-135 and 136)

(b) Disconnect the cold start injector connector.

(c) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 2 – 4 Ω

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

(d) Reconnect the cold start injector connector.

(e) Reinstall the throttle body.
(See steps 2, 3 and 5 to 12 on page FI-138 and 139)

REMOVAL OF COLD START INJECTOR

1. **REMOVE THROTTLE BODY**
(See steps 1 to 8, 10 and 11 on pages FI-135 and 136)

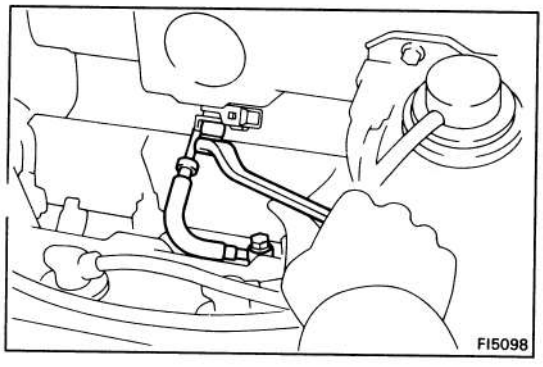
2. **DISCONNECT COLD START INJECTOR CONNECTOR**

3. **REMOVE COLD START INJECTOR PIPE**

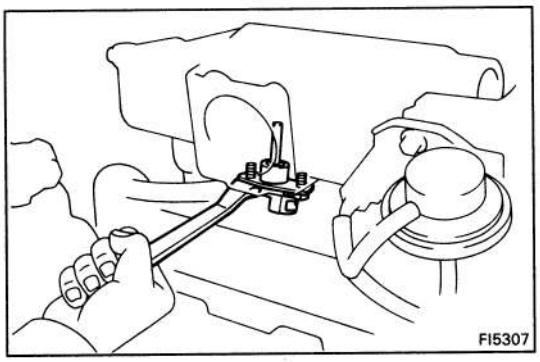
Remove the two union bolts and four gaskets and injector pipe.

HINT:

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



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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)

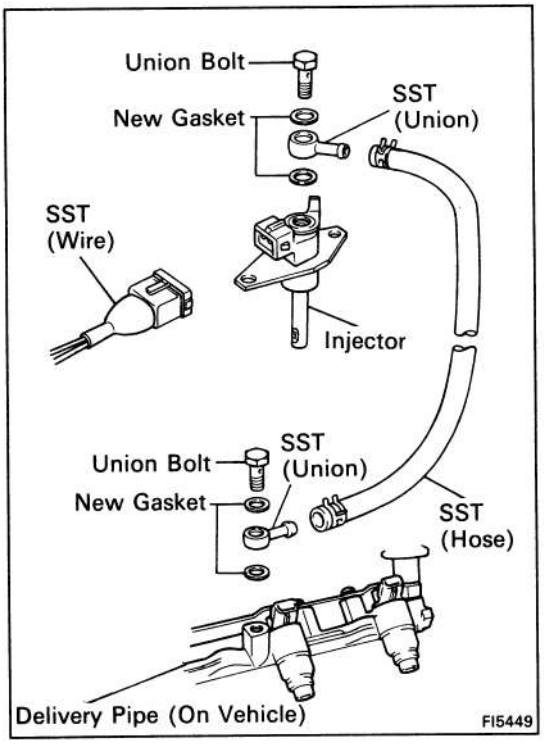
(b) Connect SST (hose) to the unions.

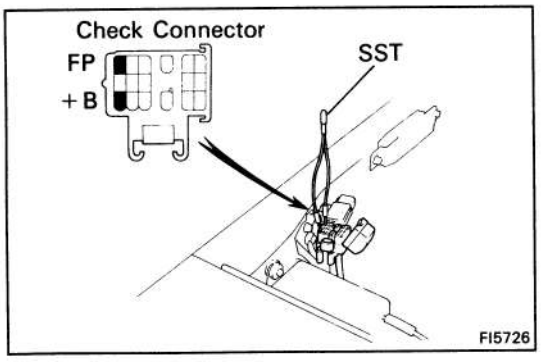
SST 09268-41045

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

SST 09842-30050

(d) Put a container under the injector.





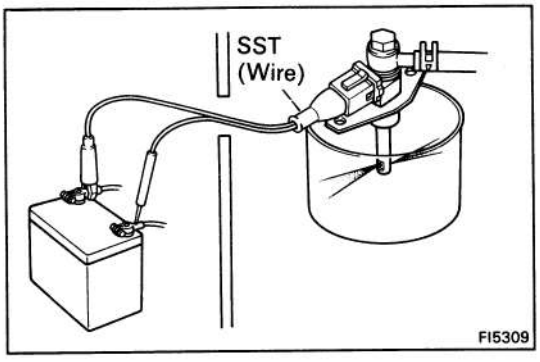
(e) Using SST, connect terminals +B and FP of the check connector.

SST 09843-18020

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

(g) Turn the ignition switch ON.

NOTICE: Do not start the engine.

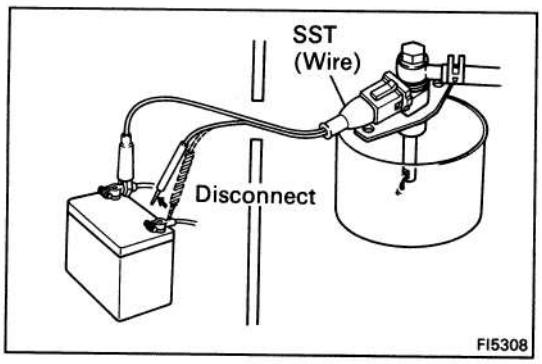


(h) Connect the test probes of the SST (wire) to the battery, and check that the fuel spray is as shown.

SST 09842-30050

NOTICE: Perform this check within the shortest possible time.

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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

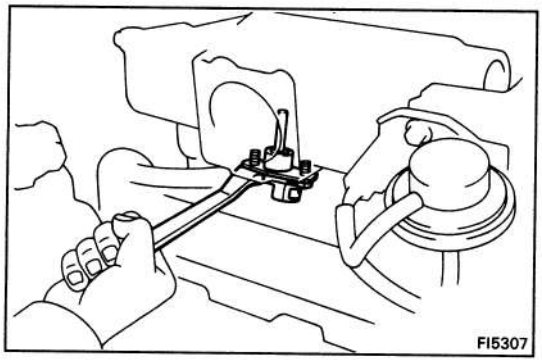
Fuel drop: One drop or less per minute

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

(c) Remove SST.

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

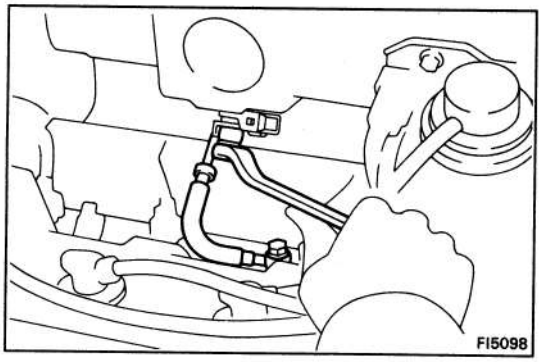
INSTALLATION OF COLD START INJECTOR



1. INSTALL COLD START INJECTOR

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

Torque: 60 kg-cm (52 in.-lb, 5.9 N·m)



2. INSTALL COLD START INJECTOR PIPE

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

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

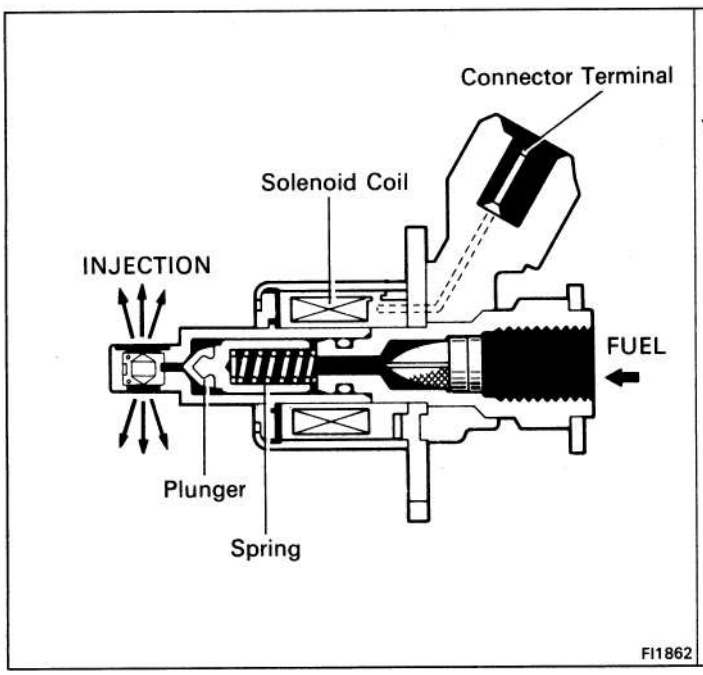
3. CONNECT COLD START INJECTOR CONNECTOR

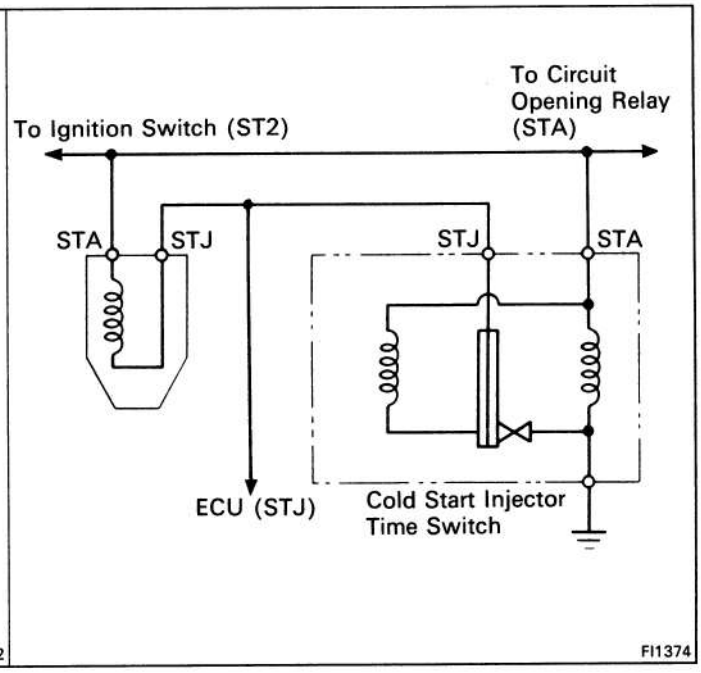
4. INSTALL THROTTLE BODY

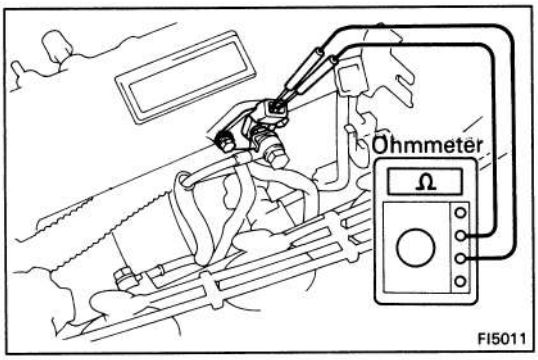
(See steps 2, 3 and 5 to 12 on pages FI-138 and 139)

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Cold Start Injector (5S-FE)







ON-VEHICLE INSPECTION

INSPECT RESISTANCE OF COLD START INJECTOR

(a) Disconnect the cold start injector connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 2 – 4 Ω

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

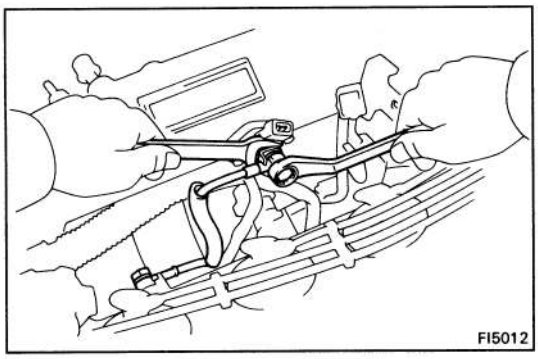
(c) Reconnect the cold start injector connector.

REMOVAL OF COLD START INJECTOR

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 COLD START INJECTOR CONNECTOR



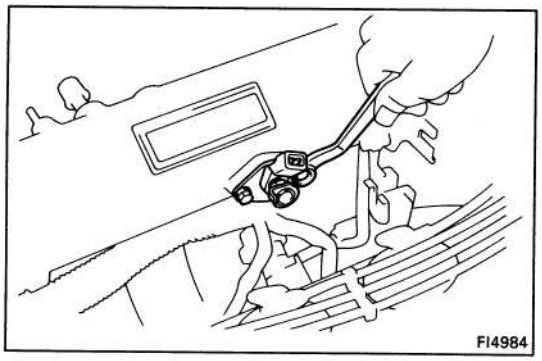
3. REMOVE COLD START INJECTOR PIPE

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

HINT:

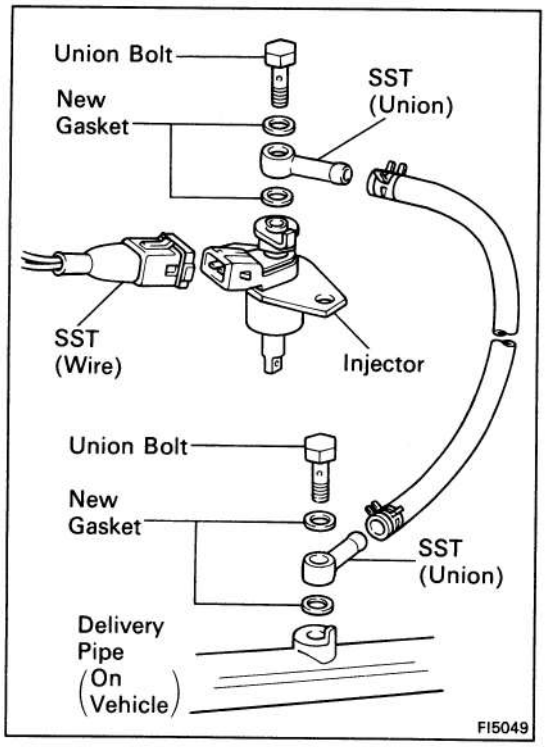
- Put a suitable container or shop towel under the injector pipe.
- Slowly loosen the union bolt.

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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 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)

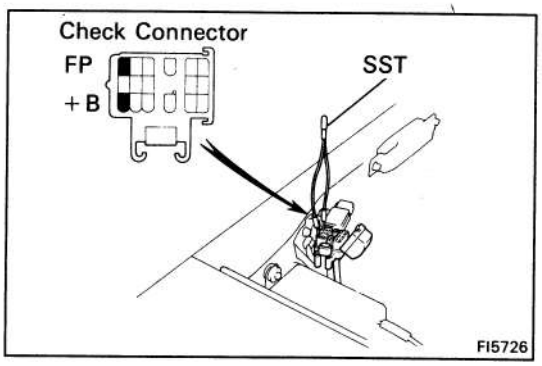
(b) Connect SST (hose) to the unions.

SST 09268-41045

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

SST 09842-30050

(d) Put a container under the injector.



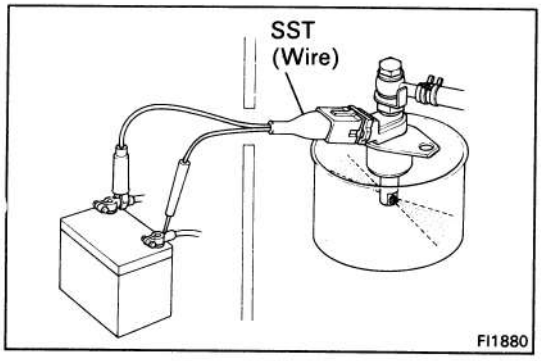
(e) Using SST, connect terminals +B and FP of the check connector.

SST 09843-18020

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

(g) Turn the ignition switch ON.

NOTICE: Do not start the engine.

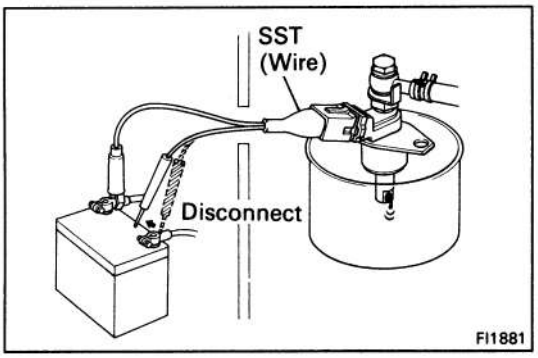


(h) Connect the test probes of the SST (wire) to the battery, and check that the fuel spray is as shown.

SST 09842-30050

NOTICE: Perform this check within the shortest possible time.

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2. INSPECT LEAKAGE

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

SST 09842-30050

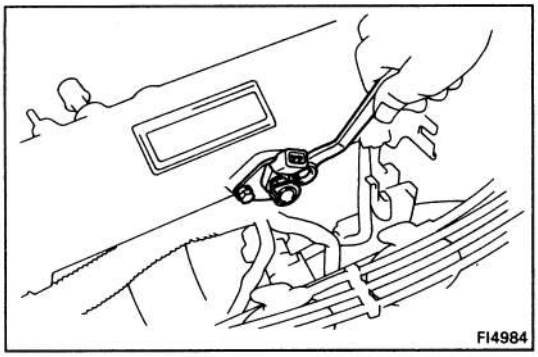
Fuel drop: One drop or less per minute

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

(c) Remove SST.

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

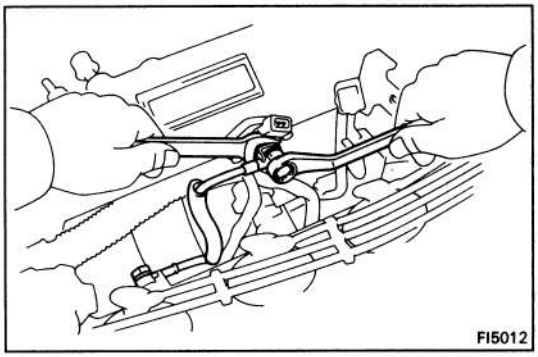
INSTALLATION OF COLD START INJECTOR



1. INSTALL COLD START INJECTOR

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

Torque: 95 kg-cm (82 in.-lb, 9.3 N·m)



2. INSTALL COLD START INJECTOR PIPE

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

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

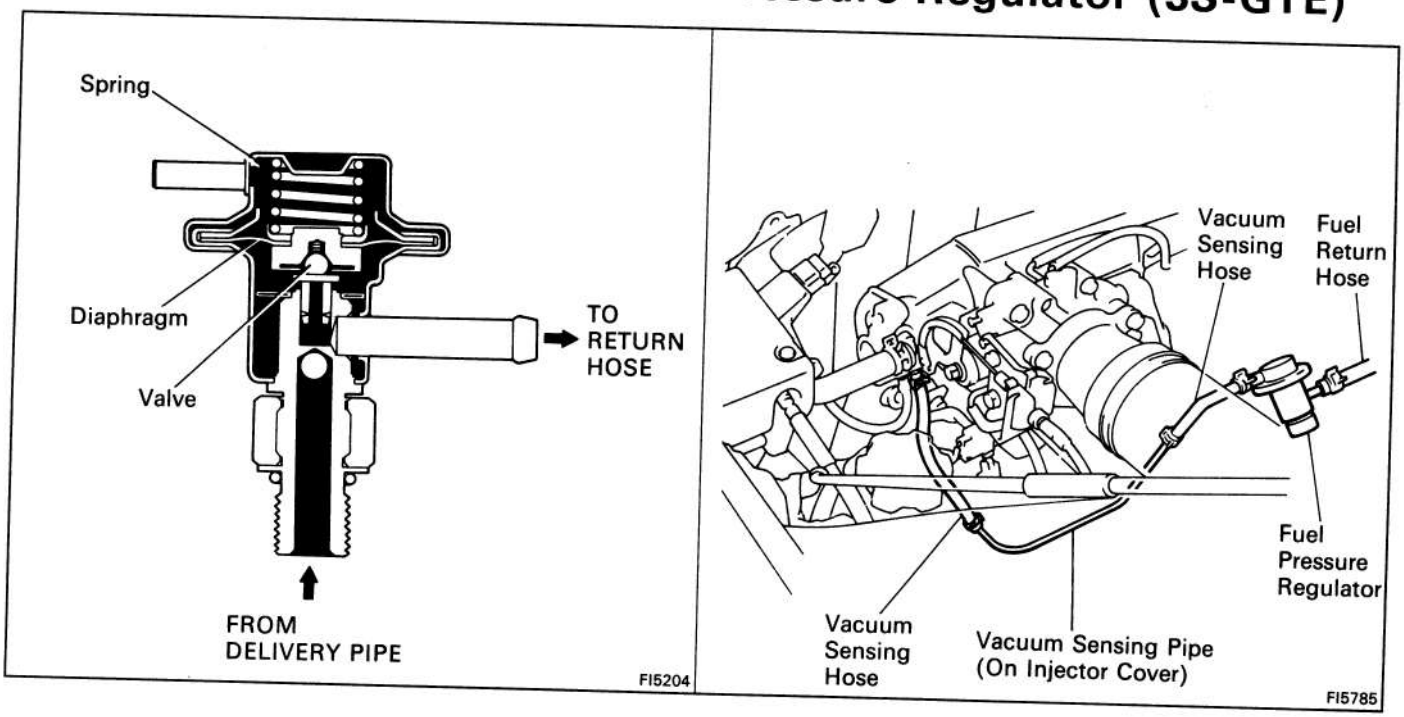
3. CONNECT COLD START INJECTOR CONNECTOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

5. CHECK FOR FUEL LEAKAGE (See page FI-9)

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Fuel Pressure Regulator (3S-GTE)

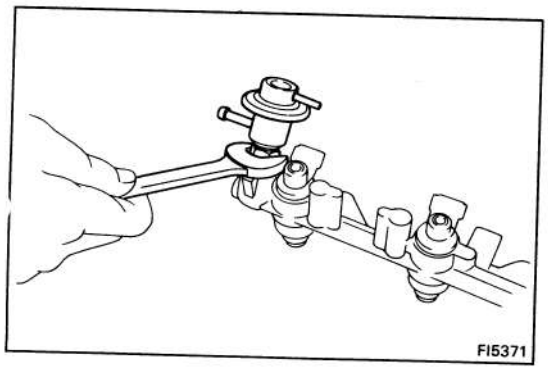


ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page FI-87)

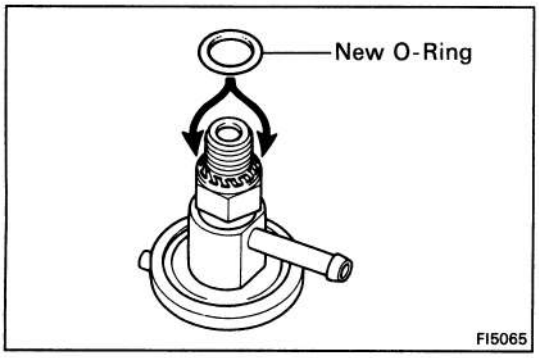
REMOVAL OF FUEL PRESSURE REGULATOR

1. **REMOVE THROTTLE BODY**
   (See steps 1 to 8, 10 and 11 on pages FI-135 and 136)
2. **REMOVE INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY**
   (See steps 2 to 15 on pages FI-111 and 112)
3. **REMOVE FUEL INLET HOSE FROM DELIVERY PIPE**
   (See step 16 on page FI-113)
4. **REMOVE INJECTOR COVER FROM DELIVERY PIPE**
   (See step 1 on page FI-115)



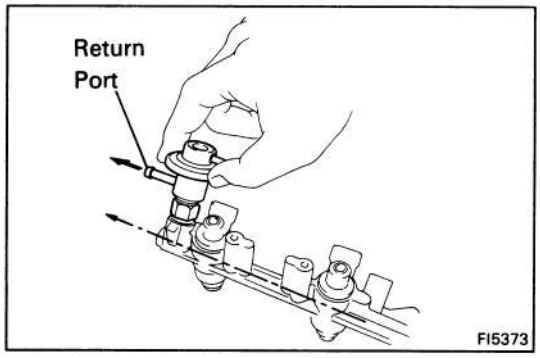
5. **REMOVE FUEL PRESSURE REGULATOR**
   (a) Loosen the lock nut, and remove the pressure regulator.
   (b) Remove the O-ring from the pressure regulator.

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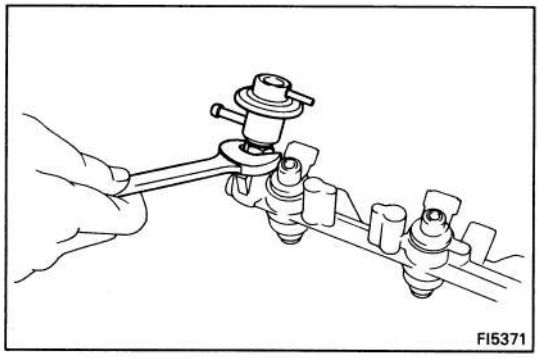


INSTALLATION OF FUEL PRESSURE REGULATOR

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 figure.

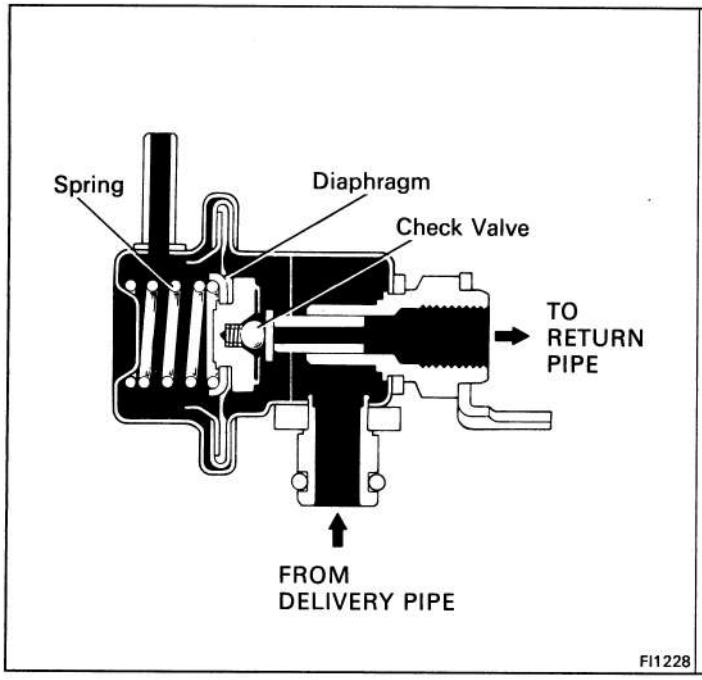


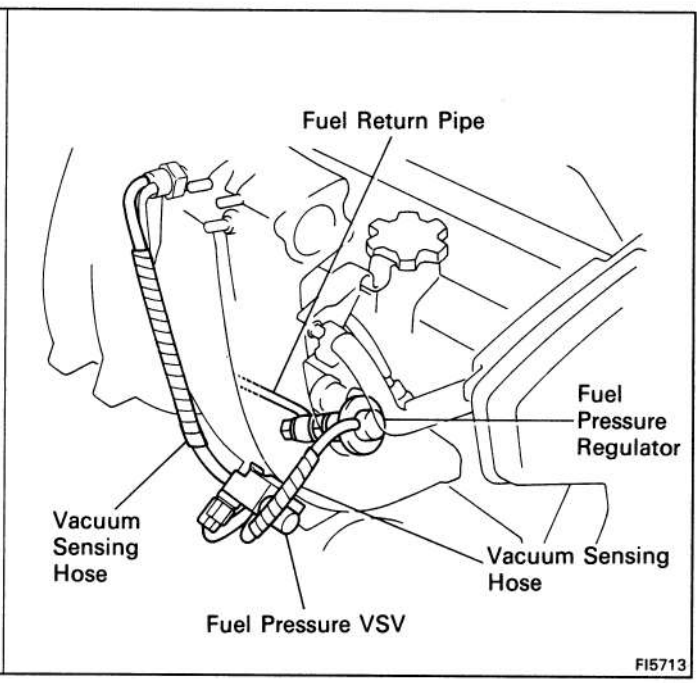
   (e) Tighten the lock nut.
   Torque: 300 kg-cm (22 ft-lb, 29 N·m)

2. **INSTALL INJECTOR COVER TO DELIVERY PIPE**
   (See step 4 on page FI-116)
3. **INSTALL FUEL INLET HOSE TO DELIVERY PIPE**
   (See step 1 on page FI-115)
4. **INSTALL INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY**
   (See steps 2 to 15 on pages FI-117 to 119)
5. **INSTALL THROTTLE BODY**
   (See steps 2, 3 and 5 to 12 on pages FI-138 and 139)

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Fuel Pressure Regulator (5S-FE)





ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page FI-90)

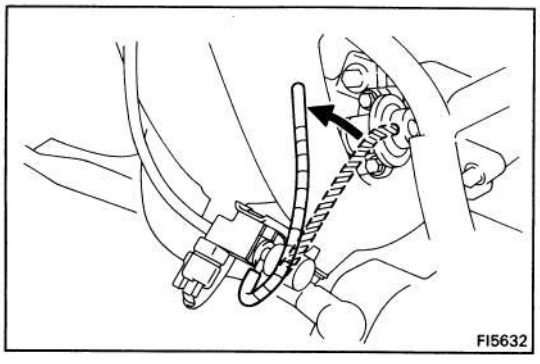
REMOVAL OF FUEL PRESSURE REGULATOR

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.

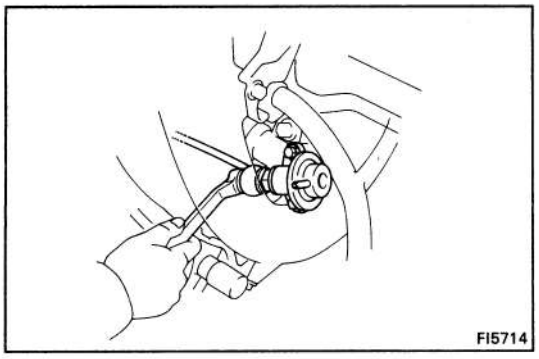
2. **REMOVE RH ENGINE HOOD SIDE PANEL**

3. **(w/ CRUISE CONTROL SYSTEM)**
   REMOVE CRUISE CONTROL ACTUATOR
   (See step 11 page EM-182)



4. **DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR**

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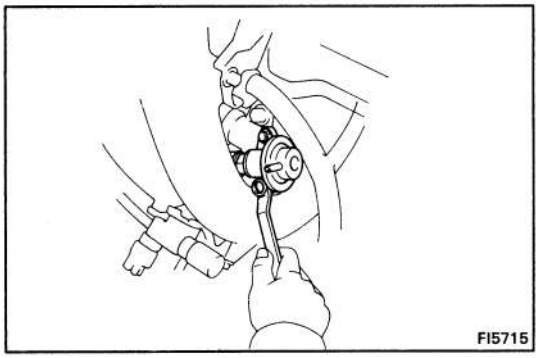


5. DISCONNECT FUEL RETURN PIPE FROM FUEL PRESSURE REGULATOR

Remove the union bolt and two gasket, 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.

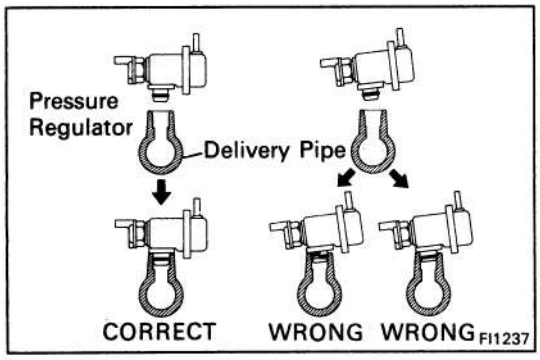


6. REMOVE FUEL PRESSURE REGULATOR

(a) Remove the two bolts, and pull out the pressure regulator.

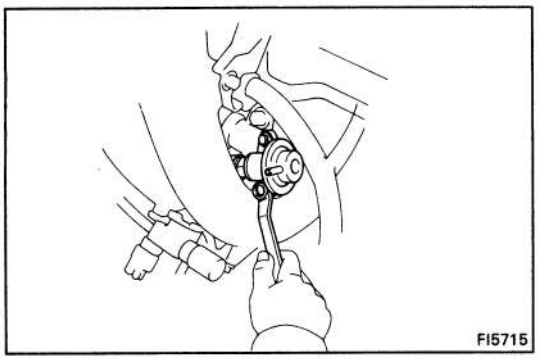
(b) Remove the O-ring from the pressure regulator.

INSTALLATION OF FUEL PRESSURE REGULATOR



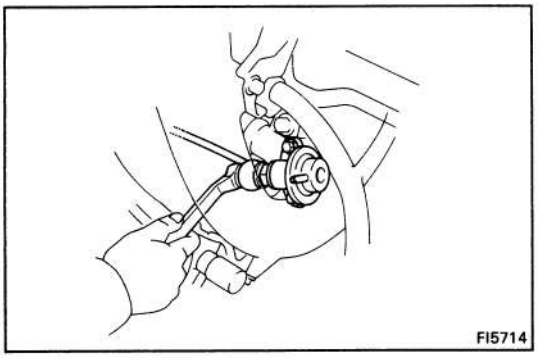
1. INSTALL FUEL PRESSURE REGULATOR

(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: 55 kg-cm (48 in.-lb, 5.4 N·m)

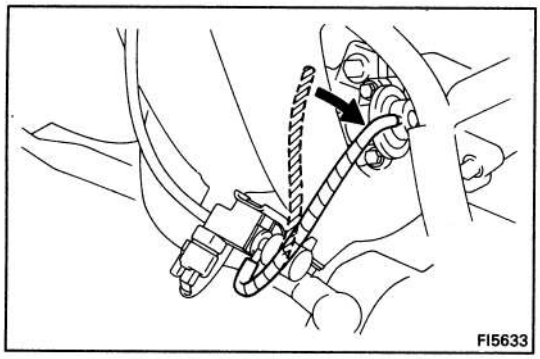


2. CONNECT FUEL RETURN PIPE TO FUEL PRESSURE REGULATOR

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

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

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3. **CONNECT VACUUM SENSING HOSE TO FUEL PRESSURE REGULATOR**

4. **(w/ CRUISE CONTROL SYSTEM) INSTALL CRUISE CONTROL ACTUATOR (See step 33 page EM-225)**

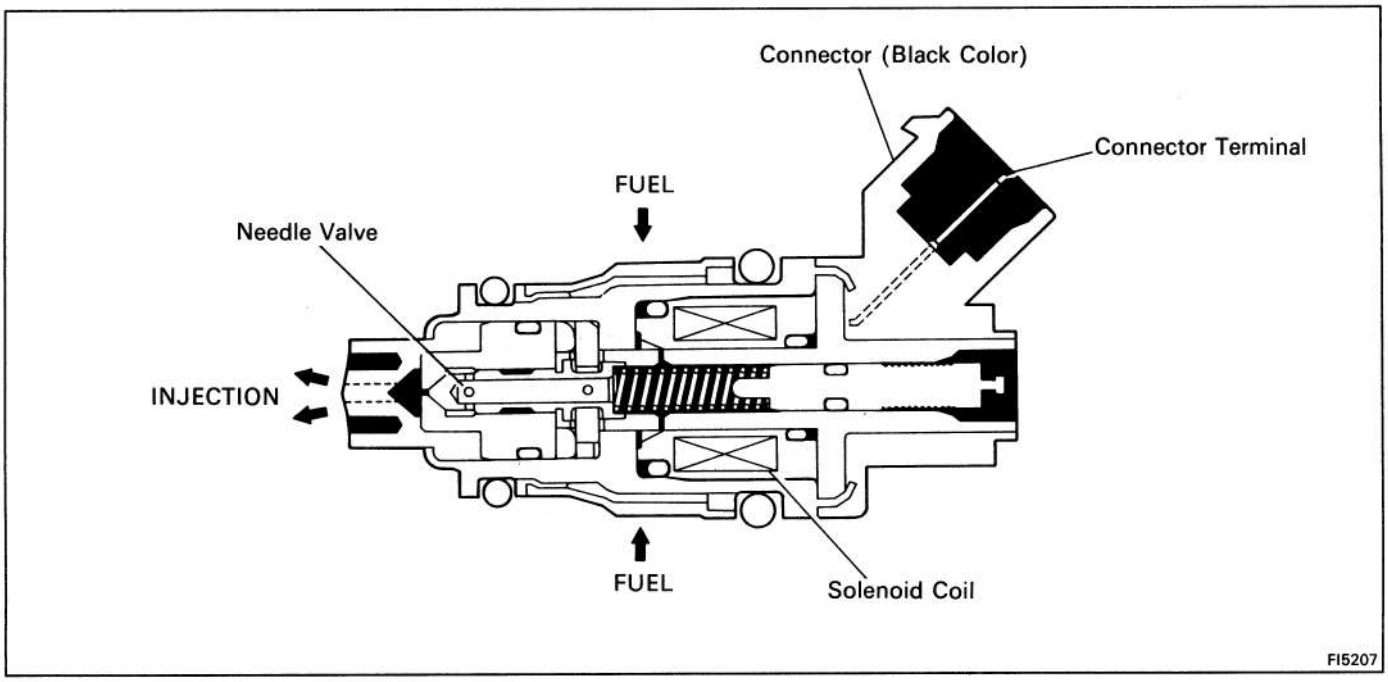
5. **INSTALL RH ENGINE HOOD SIDE PANEL**

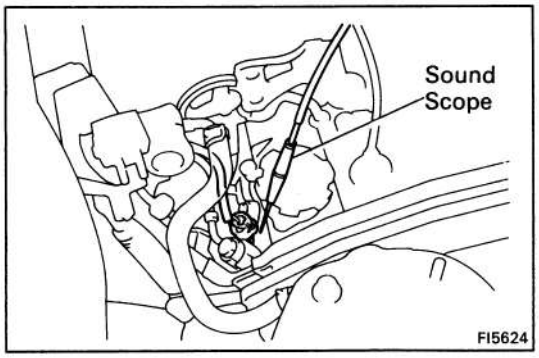
6. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

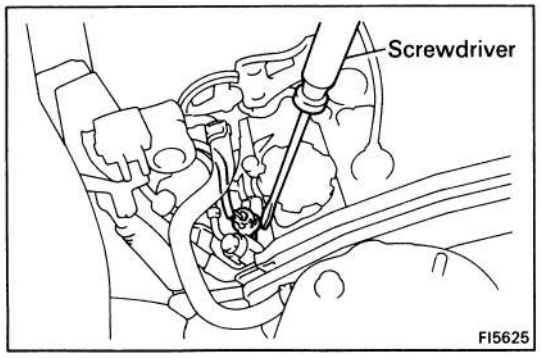
7. **CHECK FOR FUEL LEAKAGE (See page FI-9)**

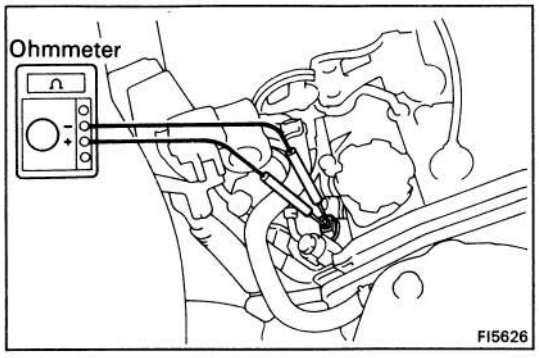
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Injectors (3S-GTE)









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 an unusual sound is heard, check the wiring connector, injector or injection signal from the ECU.

2. INSPECT INJECTOR RESISTANCE

(a) Remove the throttle body.
(See steps 1 to 8, 10 and 11 on pages FI-135 and 136)

(b) Disconnect the injector connector.

(c) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 2 – 4 Ω

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-138 and 139)

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REMOVAL OF INJECTORS

1. **REMOVE THROTTLE BODY**
   (See steps 1 to 8, 10 and 11 on pages FI-135 and 136)

2. **REMOVE LH ENGINE HOOD SIDE PANEL**

3. **REMOVE AIR CLEANER**
   (See step 9 on page EM-134)

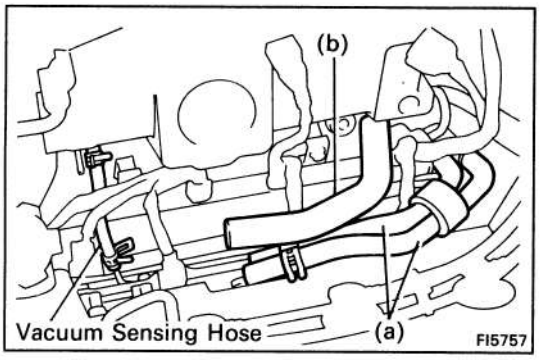
4. **REMOVE CHARCOAL CANISTER**
   (See steps 19 on page EM-136)

5. **REMOVE EGR VSV AND VACUUM MODULATOR**
   (See step 22 on page EM-66)

6. **REMOVE EGR VALVE AND PIPE**
   (See step 24 on page EM-66)

7. **REMOVE COLD START INJECTOR PIPE**
   (See step 3 on page FI-99)

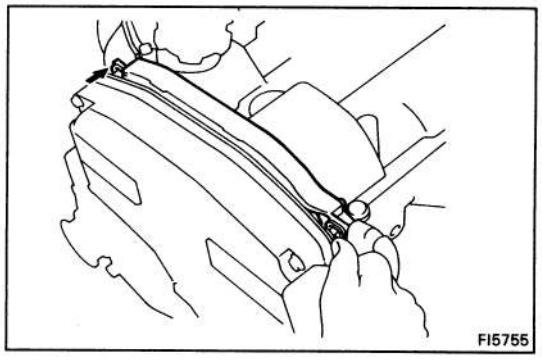
8. **REMOVE COLD START INJECTOR**
   (See steps 2 and 4 on page FI-100)



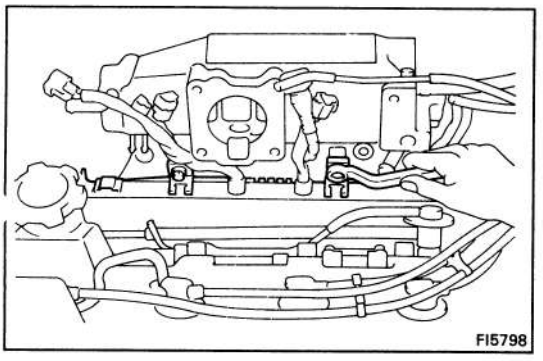
9. **REMOVE WATER BY-PASS HOSES AND AIR HOSE**
   (a) Two ISC water by-pass hoses from No.1 air tube
   (b) ISC air hose from No.1 air tube

10. **DISCONNECT VACUUM SENSING HOSE FROM VACUUM SENSING PIPE ON INJECTOR COVER**

11. **DISCONNECT INJECTOR CONNECTORS**

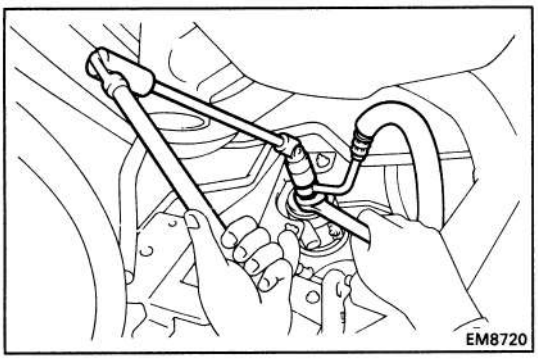


12. **DISCONNECT ENGINE WIRE**
   (a) Disconnect the two wire clamps from the mount bolts of the No.2 timing belt cover.



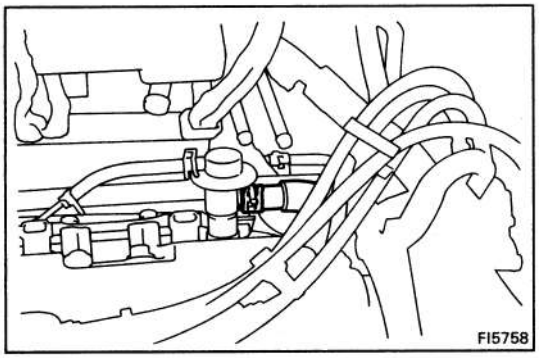
   (b) Disconnect the two wire clamps from the wire brackets on the intake manifold.

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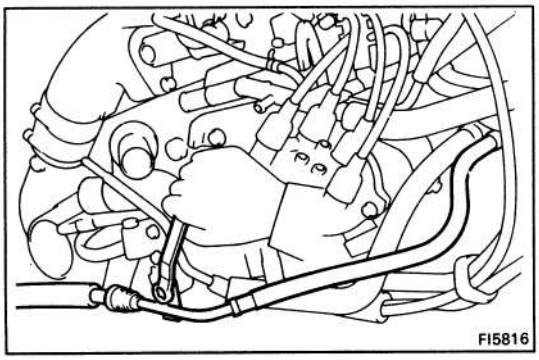


13. DISCONNECT FUEL INLET HOSE FROM FUEL FILTER

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

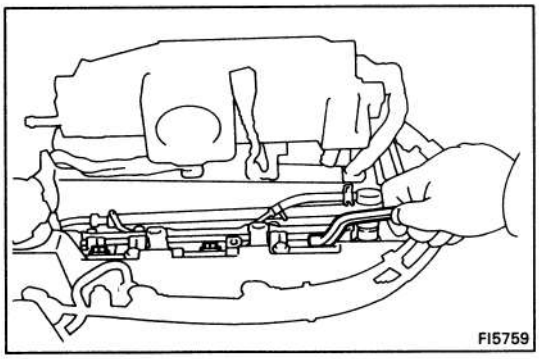


14. DISCONNECT FUEL RETURN HOSE FROM FUEL PRESSURE REGULATOR

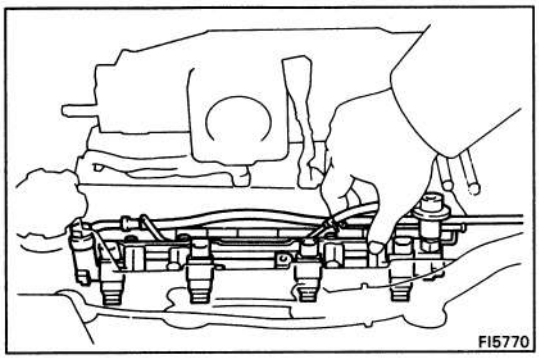


15. REMOVE INJECTOR, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY

(a) Remove the bolt holding the fuel inlet hose to the water outlet.



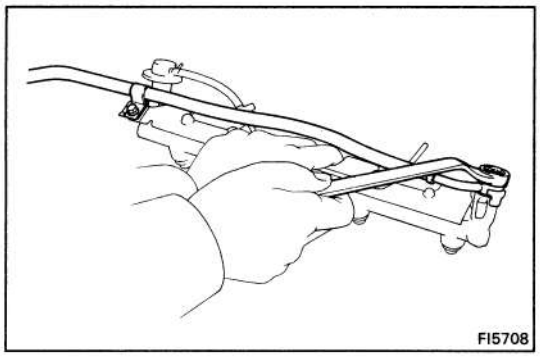
(b) Remove the three bolts holding the delivery pipe to the cylinder head.



(c) Remove the delivery pipe assembly.

(d) Remove the four insulators and three spacers.

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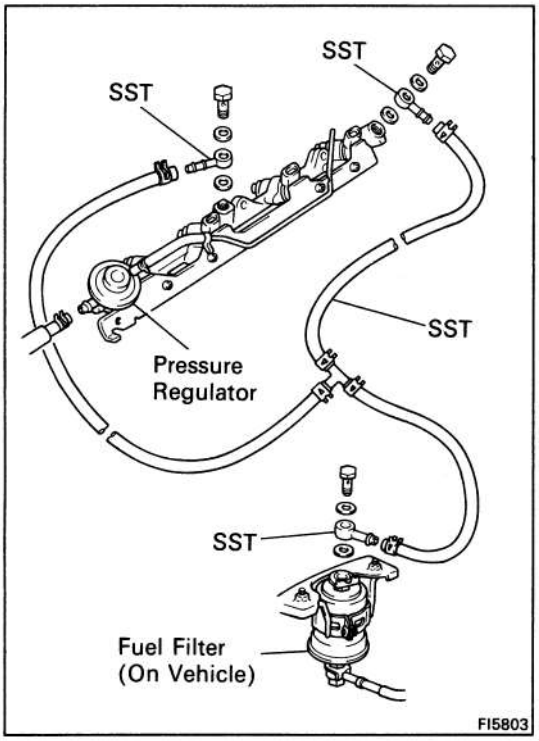
16. REMOVE FUEL INLET HOSE FROM DELIVERY PIPE

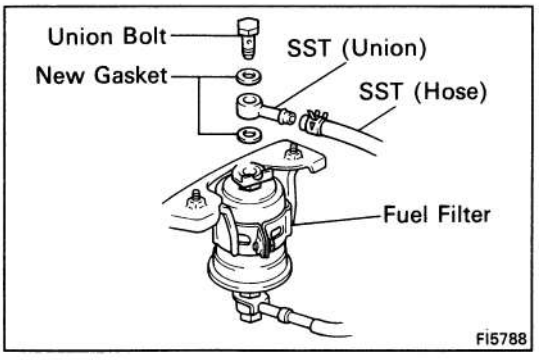
Remove the bolt, union bolt, two gaskets and inlet hose.

INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

CAUTION: Keep injector clear of sparks during the test.

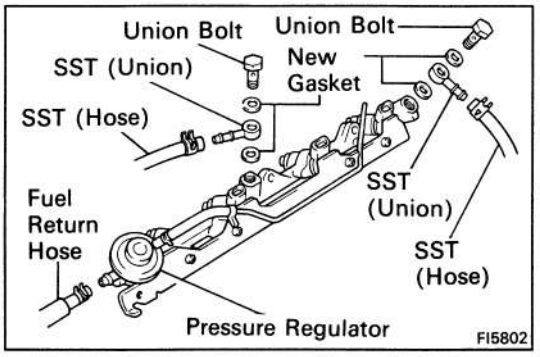




(a) Connect SST (union and hose) to the fuel filter outlet with two new gaskets and the union bolt.

SST 09268-41045 (90405-09015)

HINT: Use the vehicle's fuel filter.



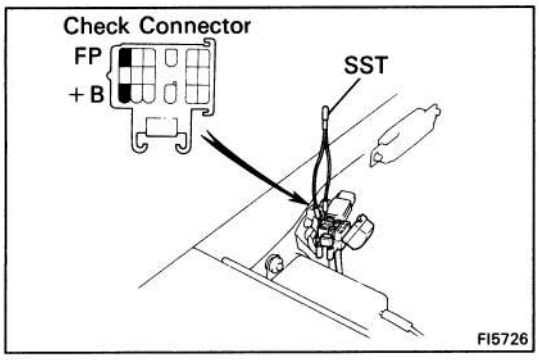
(b) Connect the fuel return hose to the fuel outlet of the pressure regulator on the delivery pipe.

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

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

(d) Put the injector into the graduated cylinder.

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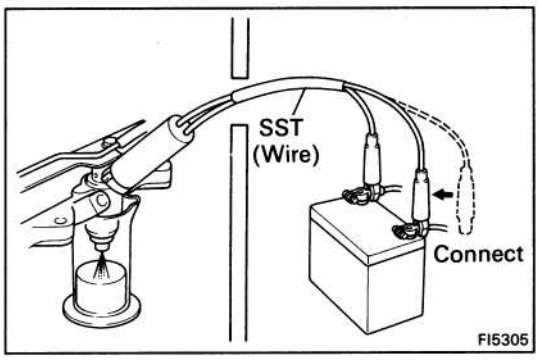
(e) Using SST, connect terminals +B and FP of the check connector.

SST 09843-18020

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

(g) Turn the ignition switch ON.

NOTICE: Do not start the engine.



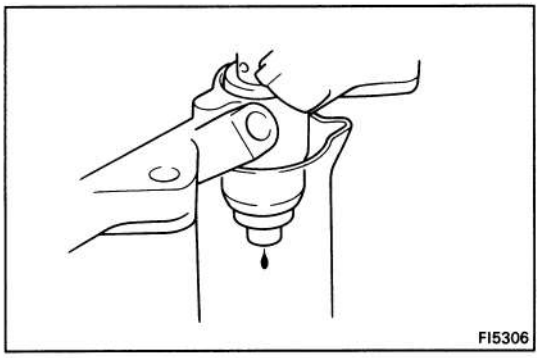
(h) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.

SST 09842-30060

Volume: 95 – 120 cc (5.8 – 7.3 cu in.) per 15 sec.

Difference between each injector:
5 cc (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

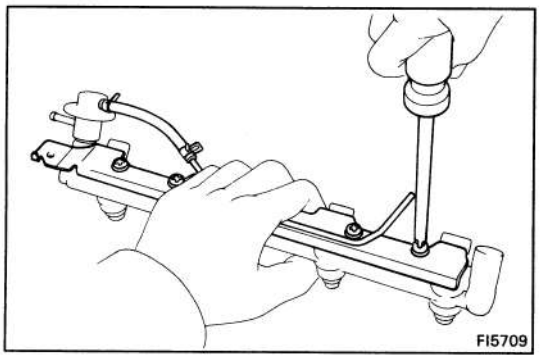
Fuel drop: One drop or less per minute

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

(c) Remove SST.

SST 09268-41045 and 09843-18020

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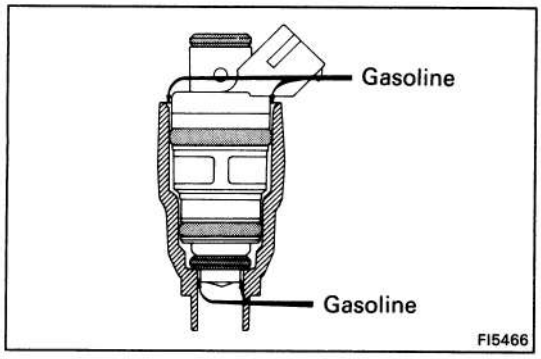
REPLACEMENT OF INJECTORS

1. REMOVE INJECTOR COVER

(a) Disconnect the vacuum sensing hose from the pressure regulator.

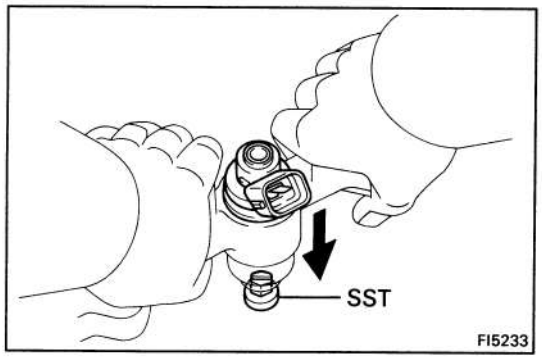
(b) Remove the four screws and injector cover.

(c) Remove the four insulators from the injectors.



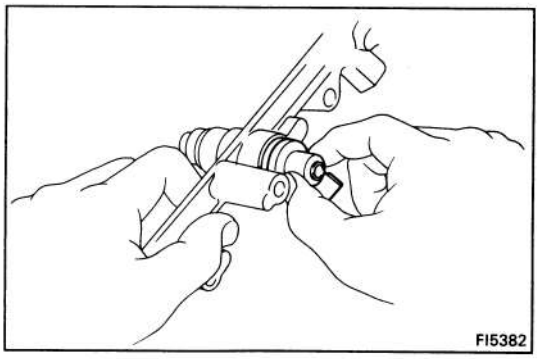
2. REMOVE INJECTORS

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



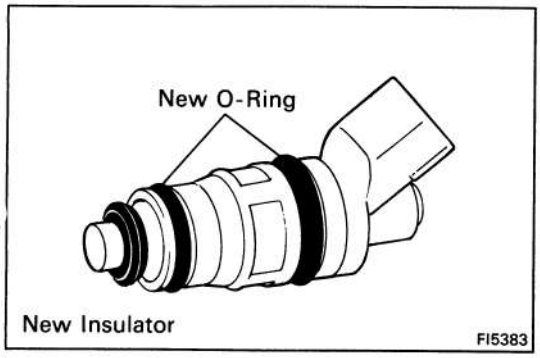
(b) Using SST, lift up the injector.

SST 09268-74010



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

(d) Remove the insulator and two O-rings from each injector.

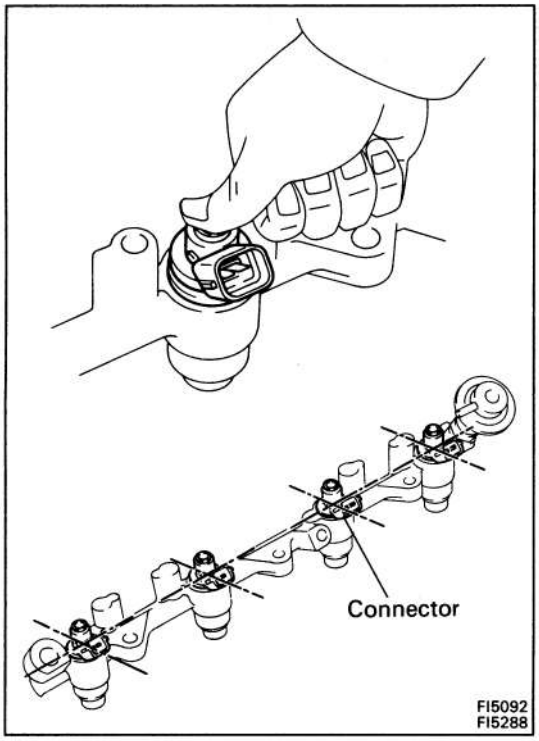


3. INSTALL INJECTORS

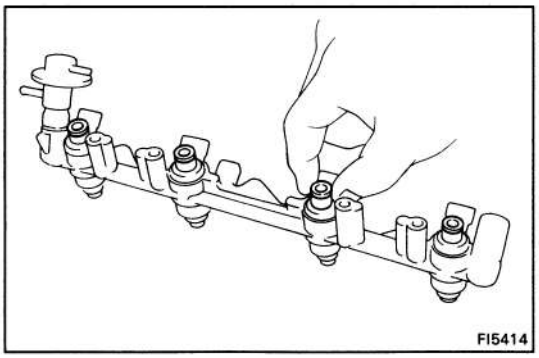
(a) Apply a light coat of gasoline to two new O-rings, and install them to the injector.

(b) Install new insulator and two O-rings to each injector.

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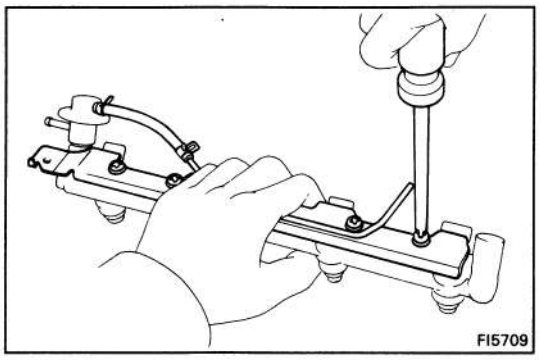


(c) Push in the four injectors so that the injector connectors are positioned as shown in the figure.



4. INSTALL INJECTOR COVER

(a) Place a new insulator on each injector.

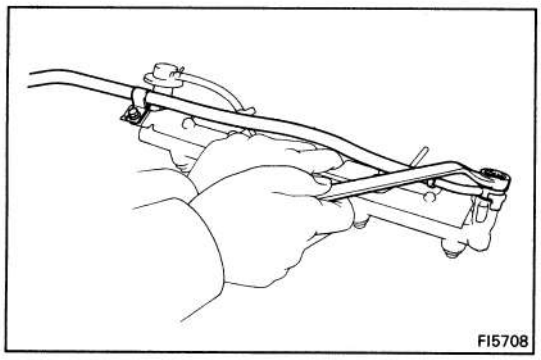


(b) Install the injector cover with the four screws.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

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

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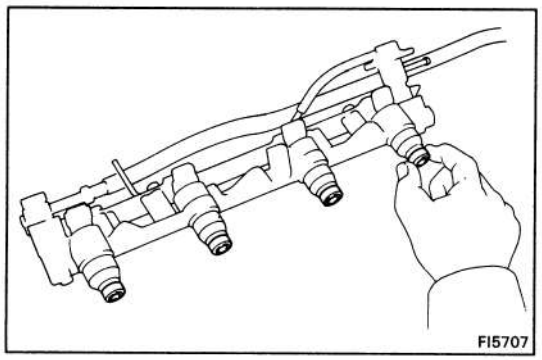
INSTALLATION OF INJECTORS

1. INSTALL FUEL INLET HOSE TO DELIVERY PIPE

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

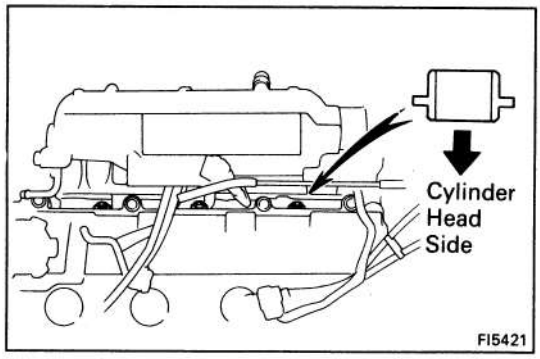
Torque:

Bolt	**80 kg-cm (69 in.-lb, 7.8 N·m)**
Union bolt	**300 kg-cm (22 ft-lb, 29 N·m)**

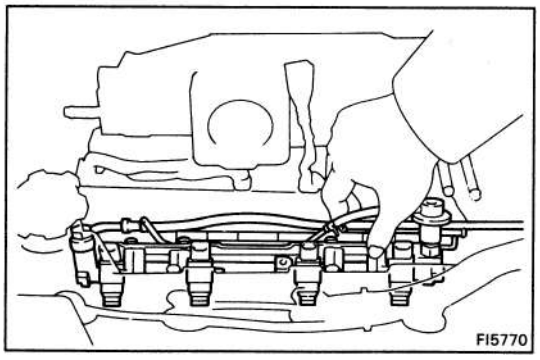


2. INSTALL INJECTORS, FUEL PRESSURE REGULATOR AND DELIVERY PIPE ASSEMBLY

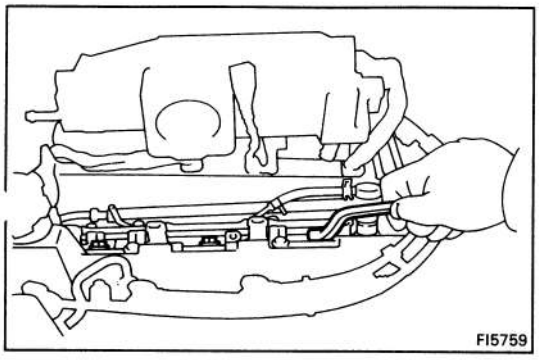
(a) Install a new insulator to each injector.



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



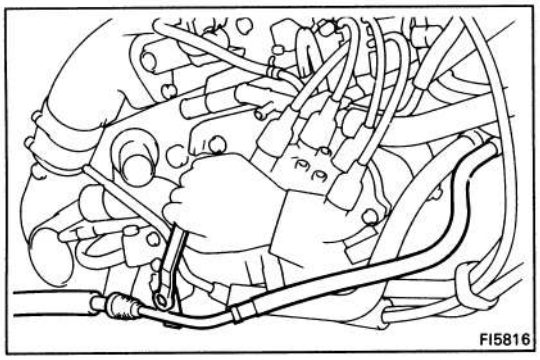
(c) Place the delivery pipe in position on the cylinder head.



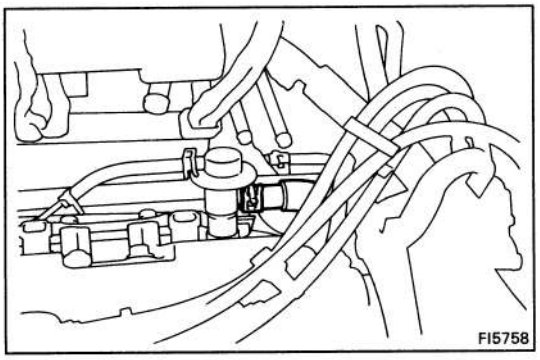
(d) Install the three bolts holding the delivery pipe to the cylinder head.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

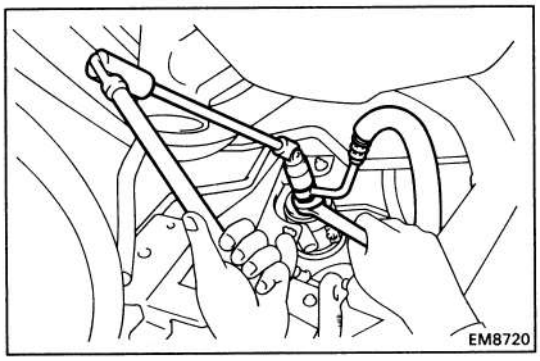
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(e) Install the bolt holding the fuel inlet hose to the water outlet.



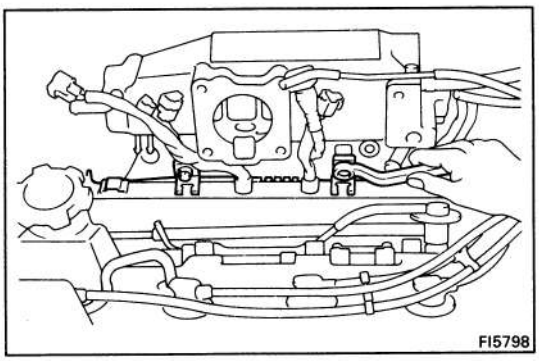
3. CONNECT FUEL RETURN HOSE TO FUEL PRESSURE REGULATOR



4. CONNECT FUEL INLET HOSE TO FUEL FILTER

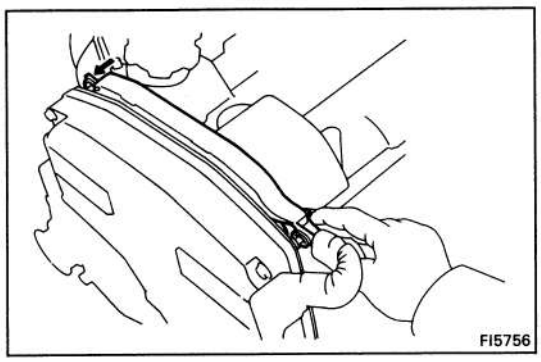
Install the inlet hose with two new gaskets and the union bolt.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



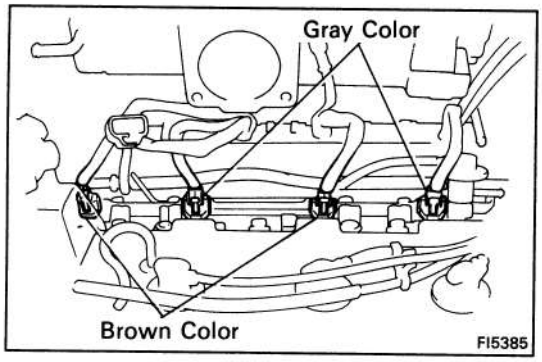
5. INSTALL ENGINE WIRE

(a) Install the two wire clamps to the intake manifold, with the two bolts.



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

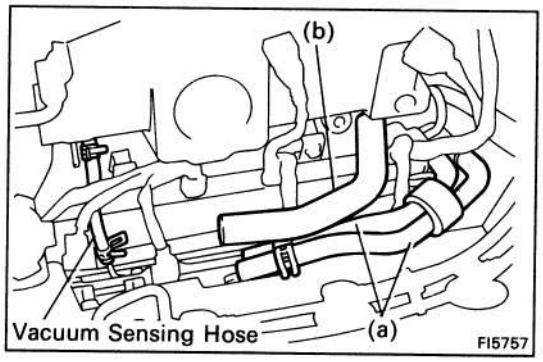
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6. **CONNECT INJECTOR CONNECTORS**

Connect the injector connectors as shown in the figure.

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



7. **INSTALL WATER BY-PASS HOSES AND AIR HOSE**
   (a) Two ISC water by-pass hoses from No.1 air tube
   (b) ISC air hose from No.1 air tube

8. **CONNECT VACUUM SENSING HOSE TO VACUUM SENSING PIPE ON INJECTOR COVER**

9. **INSTALL COLD START INJECTOR**
   (See steps 1 and 3 on page FI-101)

10. **INSTALL COLD START INJECTOR PIPE**
    (See step 2 on page FI-101)

11. **INSTALL EGR VALVE AND PIPE**
    (See step 18 on page EM-92)

12. **INSTALL EGR VSV AND VACUUM MODULATOR**
    (See step 20 on page EM-92)

13. **INSTALL CHARCOAL CANISTER**
    (See step 30 on page EM-177)

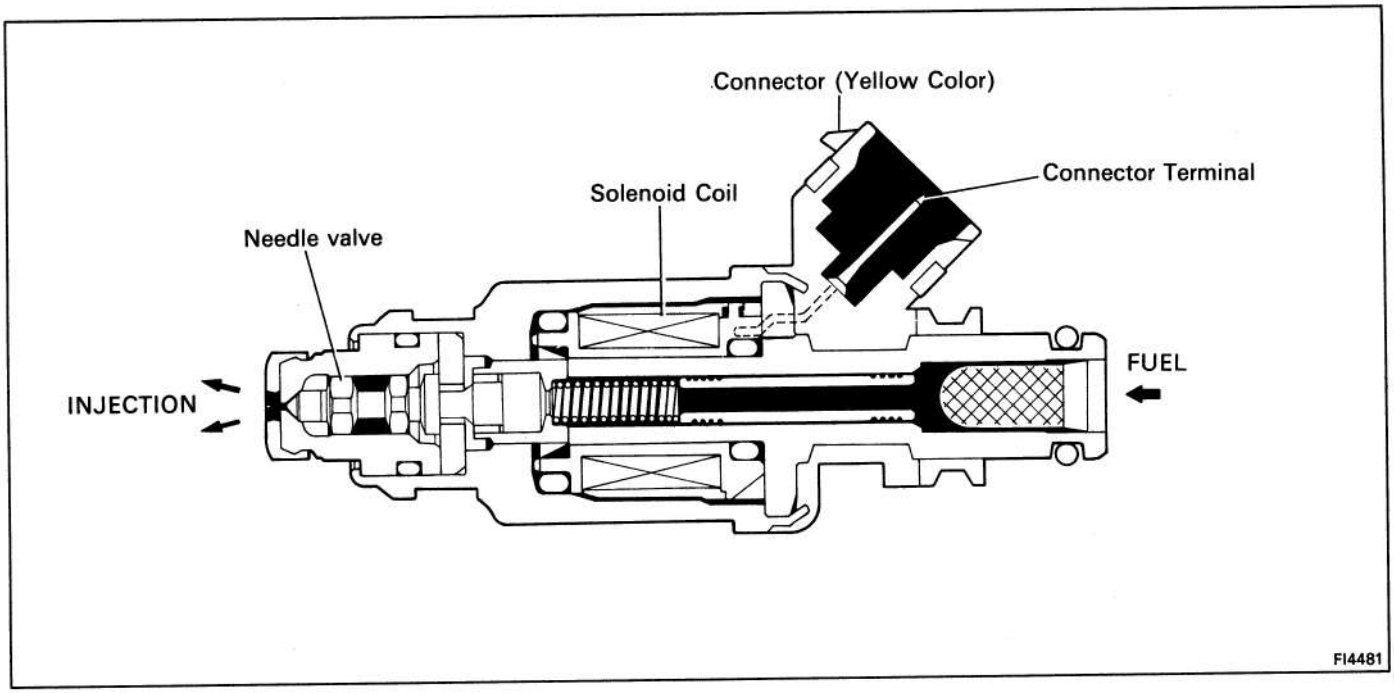
14. **INSTALL AIR CLEANER**
    (See step 40 on page EM-179)

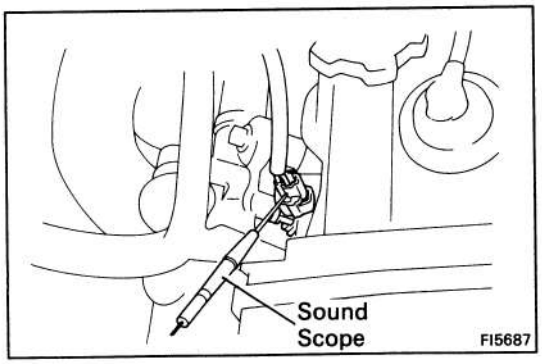
15. **INSTALL LH ENGINE HOOD SIDE PANEL**

16. **INSTALL THROTTLE BODY**
    (See steps 2, 3 and 5 to 12 on pages FI-138 and 139)

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Injectors (5S-FE)



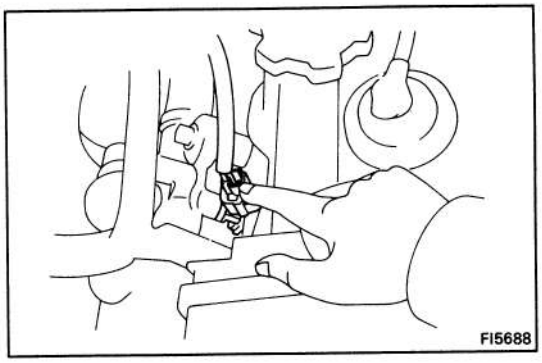


ON-VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

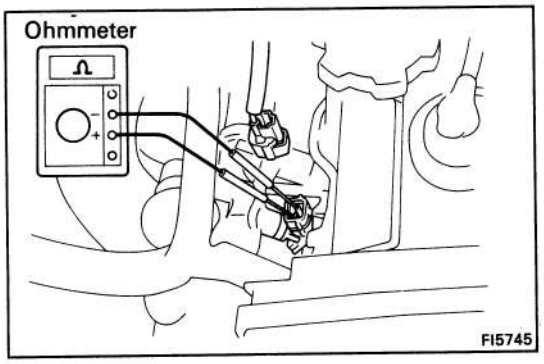
Check operation sound from each injector.

(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 an unusual sound is heard, check the wiring connector, injector or injection signal from the ECU.



2. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: Approx. 13.8 Ω

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

(c) Reconnect the injector connector.

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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.

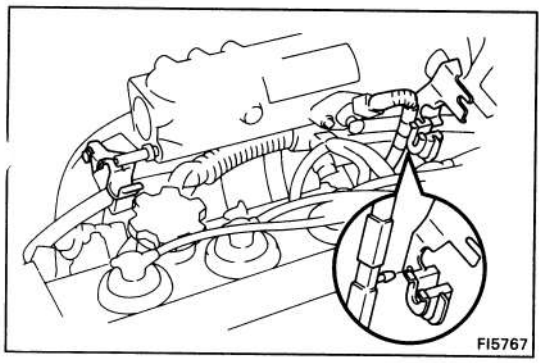
2. **REMOVE ENGINE HOOD SIDE PANELS**

3. **REMOVE AIR CLEANER**
   (See step 9 on page EM-182)

4. **(w/ CRUISE CONTROL SYSTEM)**
   REMOVE CRUISE CONTROL ACTUATOR
   (See step 11 on page EM-182)

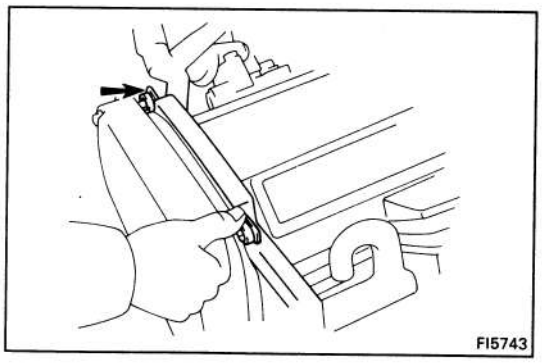
5. **REMOVE COLD START INJECTOR PIPE**
   (See step 3 on page FI-102)

6. **DISCONNECT BRAKE BOOTER VACUUM HOSE FROM INTAKE MANIFOLD**

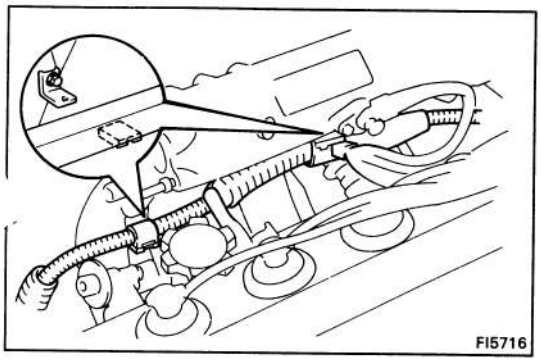


7. **REMOVE ACCELERATOR BRACKETS**
   (a) Remove the bolt and RH accelerator bracket.
   (b) Disconnect the clip of the engine wire from the LH accelerator bracket. Remove the two bolts and LH accelerator bracket.

8. **DISCONNECT INJECTOR CONNECTORS**

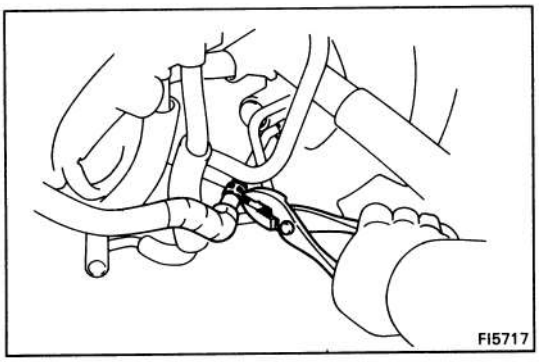


9. **DISCONNECT ENGINE WIRE**
   (a) Disconnect the two wire clamps from the mount bolts of the No.2 timing belt cover.

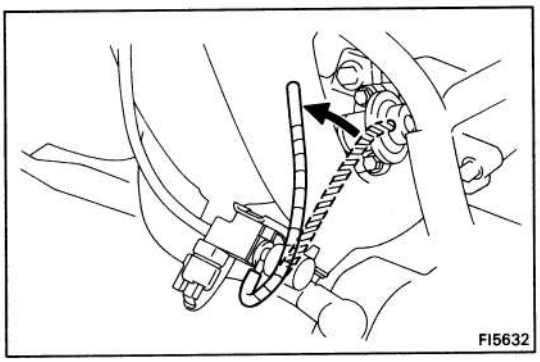


   (b) Disconnect the two wire clamps from the wire brackets on the intake manifold.

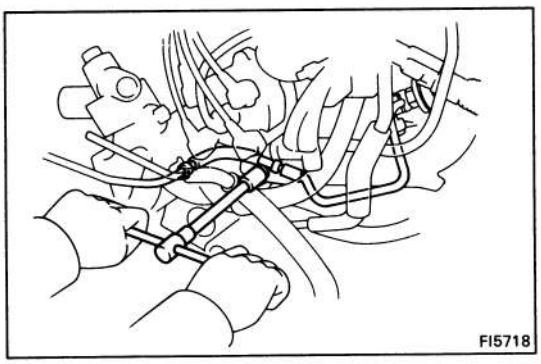
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10. DISCONNECT FUEL HOSE FROM RETURN PIPE

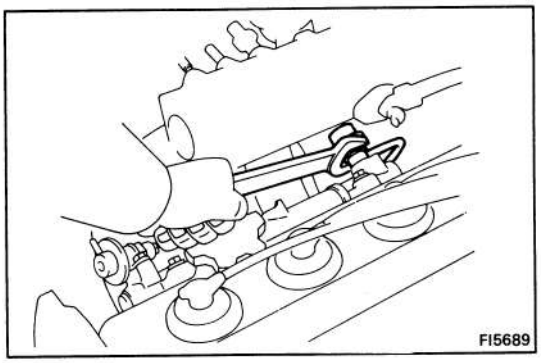


11. DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR

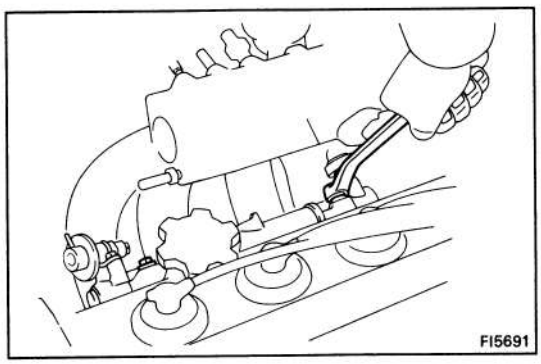


12. REMOVE DELIVERY PIPE AND INJECTORS

(a) Remove the bolt holding the fuel inlet hose to the cylinder head.

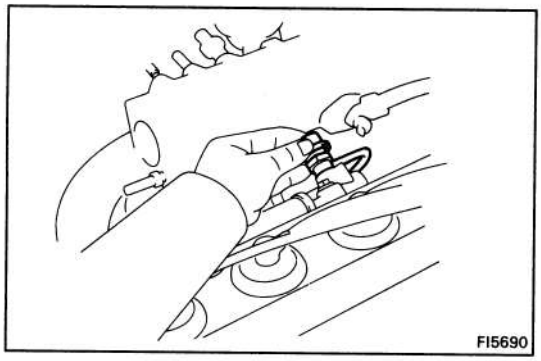


(b) Loosen the pulsation damper.

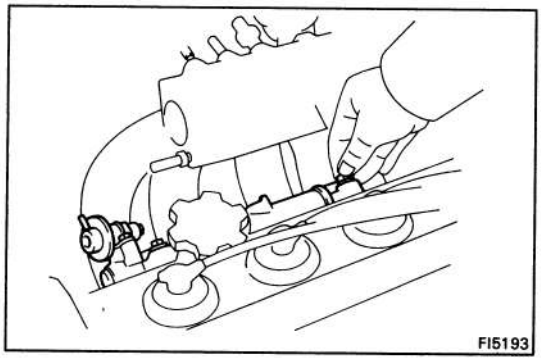


(c) Loosen the two bolts holding the delivery pipe to the cylinder head.

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(d) Remove the pulsation damper, and disconnect the fuel inlet hose from the delivery pipe.



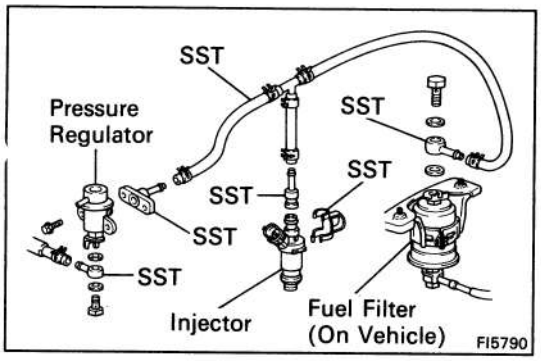
(e) Remove the two bolts and delivery pipe together with four injectors.

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

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

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

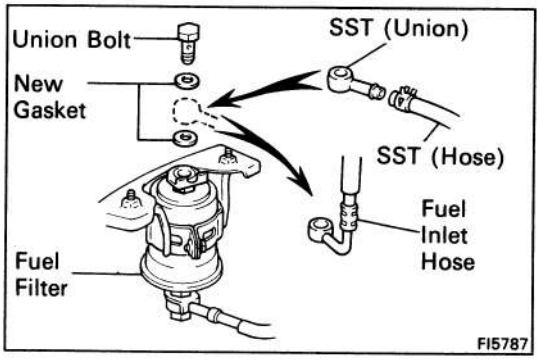
(h) Remove the O-ring and grommet from each injector.



INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

CAUTION: Keep injector clear of sparks during the test.

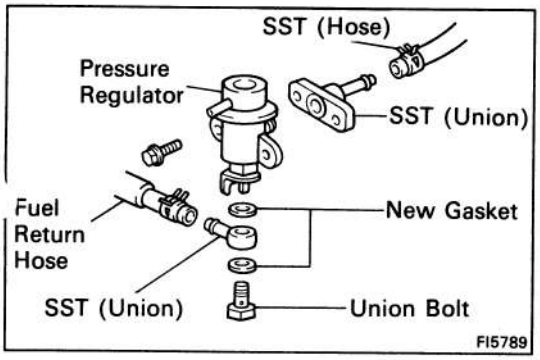


(a) Disconnect the fuel inlet hose from the fuel filter outlet.

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

SST 09268-41045 (90405-09015)

HINT: Use the vehicle's fuel filter.



(c) Remove the pressure regulator from the delivery pipe.

(d) Install a new O-ring to the fuel inlet of pressure regulator.

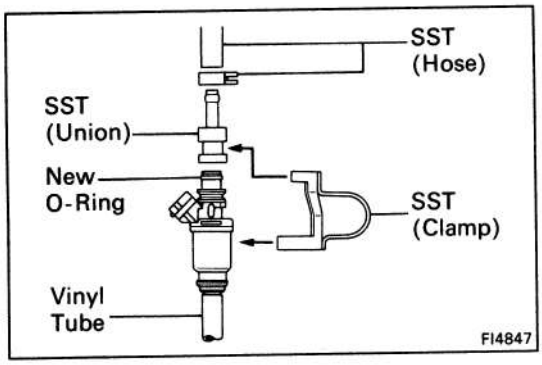
(e) Connect SST (hose) to the fuel inlet of the pressure regulator with SST (union) and the two bolts.

SST 09268-41045 (09268-41090)

(f) 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)

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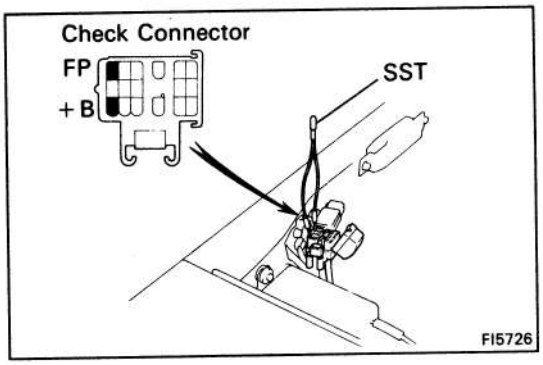
(g) Install the grommet and a new O-ring to the injector.

(h) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).

SST 09268-41045

(i) Put the injector into the graduated cylinder.

HINT: Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.



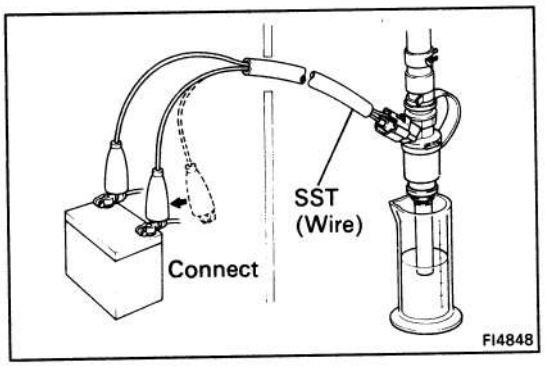
(j) Using SST, connect terminals +B and FP of the check connector.

SST 09843-18020

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

(l) Turn the ignition switch ON.

NOTICE: Do not start the engine.



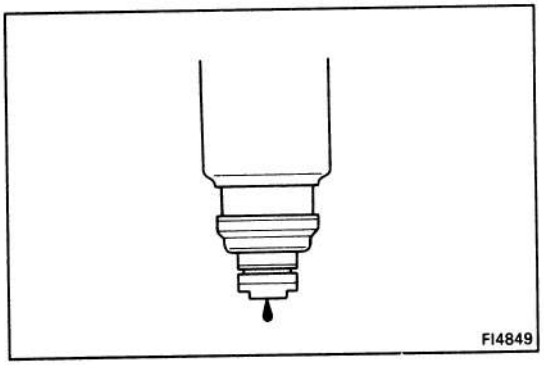
(m) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.

SST 09842-30070

Volume: 45 – 55 cc (2.7 – 3.4 cu in.) per 15 sec.

Difference between each injector:
5 cc (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

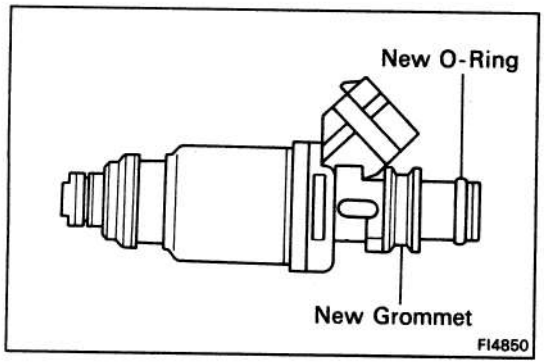
(b) Disconnect the battery negative (–) cable.

(c) Remove SST.

SST 09268-41045 and 09843-18020

(d) Reinstall the pressure regulator to the delivery pipe.

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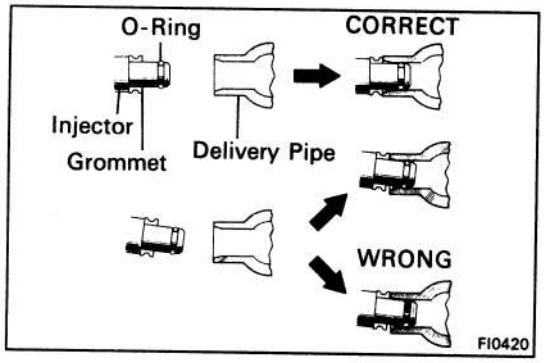


INSTALLATION OF INJECTORS

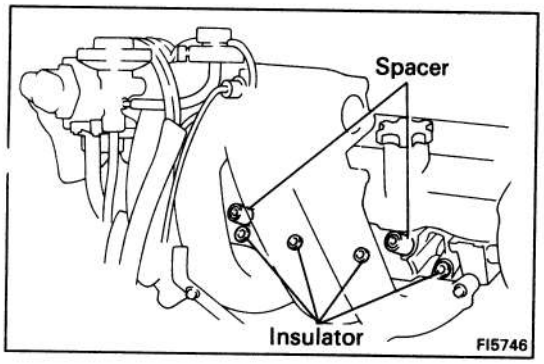
1. INSTALL INJECTORS AND DELIVERY PIPE

(a) Install a new grommet to the injector.

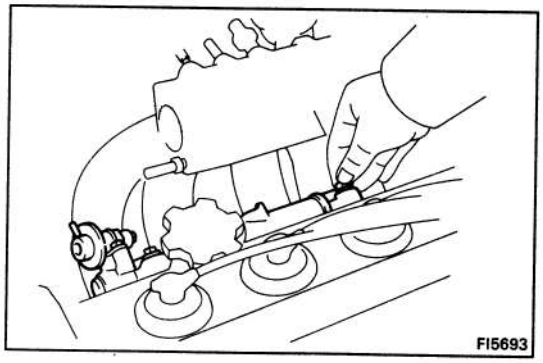
(b) Apply a light coat of gasoline to a new O-ring and install it to the injector.



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

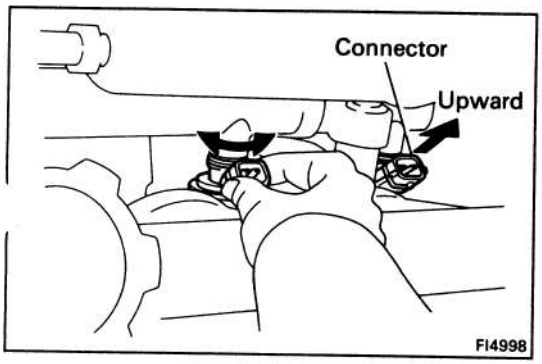


(d) Place four new insulators and the two spacers in position on the cylinder head.



(e) Place the four injectors together with the delivery pipe in position on the cylinder head.

(f) Temporarily install the two bolts holding the delivery pipe to the cylinder head.

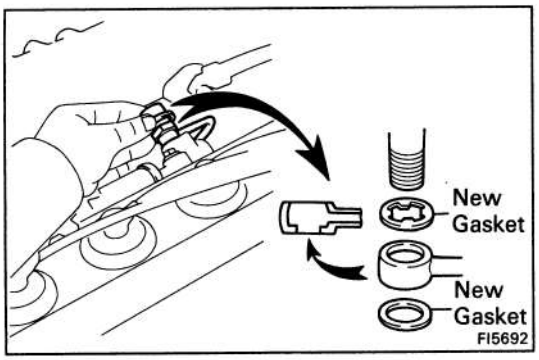


(g) Check that the injectors rotate smoothly.

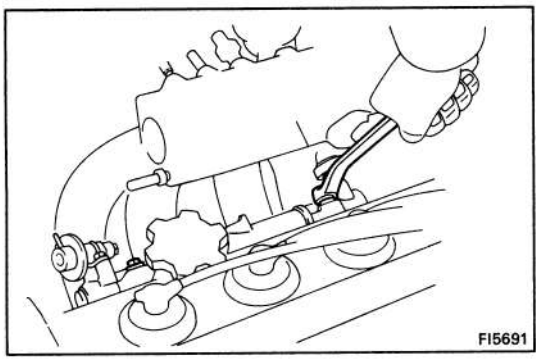
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.

(h) Position the injector connector upward.

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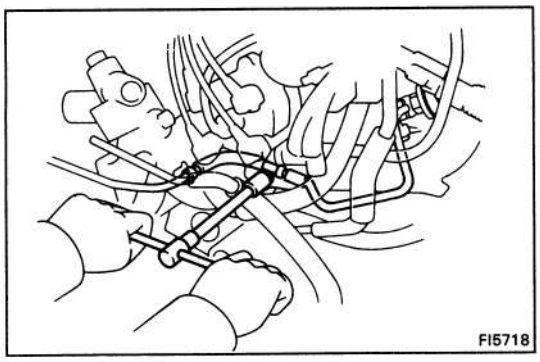


(i) Temporarily connect the fuel inlet hose to the delivery pipe with two new gaskets and the pulsation damper.

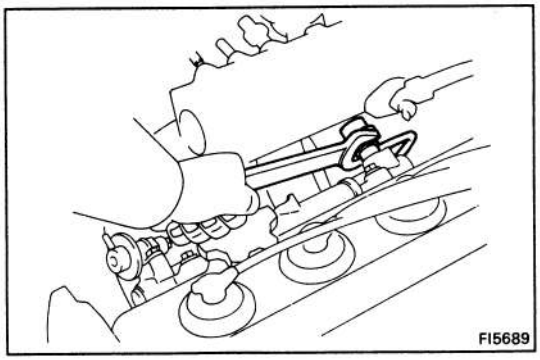


(j) Tighten the two bolts holding the delivery pipe to the cylinder head.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

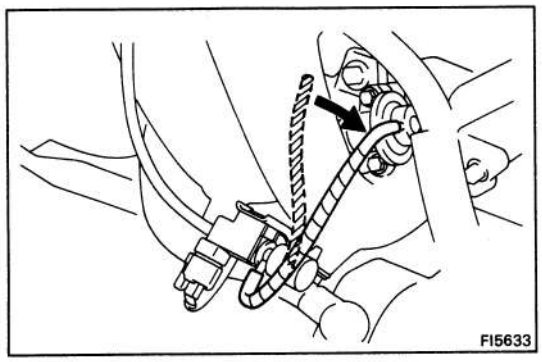


(k) Install the bolt holding the fuel inlet hose to the cylinder head.



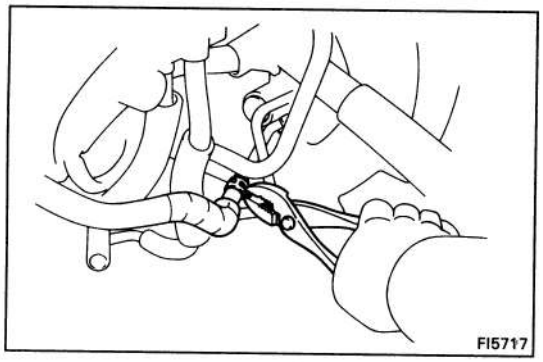
(l) Tighten the pulsation damper.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

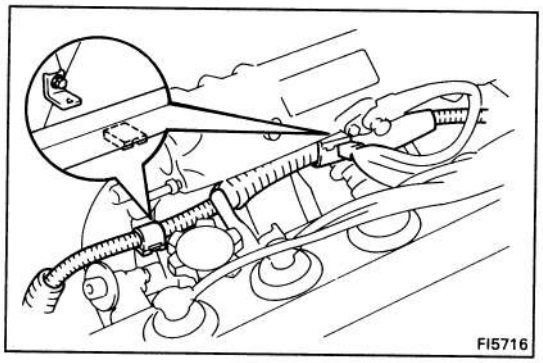


2. CONNECT VACUUM SENSING HOSE TO FUEL PRESSURE REGULATOR

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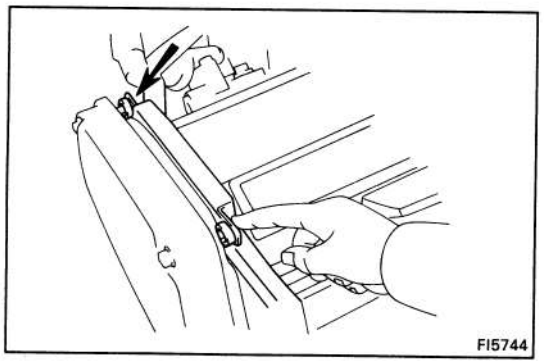


3. CONNECT FUEL RETURN HOSE TO RETURN PIPE

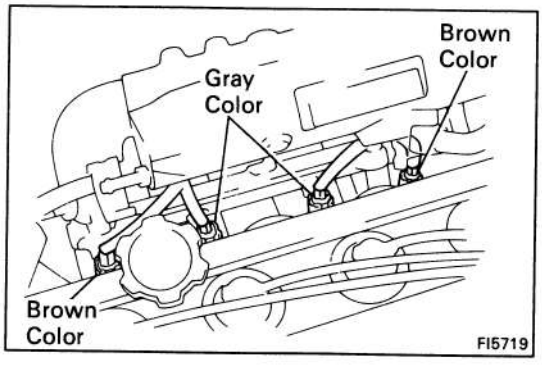


4. INSTALL ENGINE WIRE

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



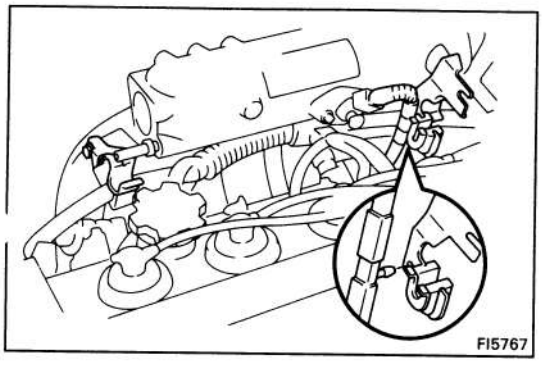
(b) Install the two wire clamps to the mount bolts of the No.2 timing belt cover.



5. CONNECT INJECTOR CONNECTORS

Connect the injector connectors as shown in the figure.

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



6. INSTALL ACCELERATOR BRACKETS

(a) Install the RH accelerator bracket with the bolt.

(b) Install the LH accelerator bracket with the two bolts. Connect the clip of the engine wire to the LH accelerator bracket.

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7. **CONNECT BRAKE BOOSTER VACUUM HOSE TO INTAKE MANIFOLD**

8. **INSTALL COLD START INJECTOR PIPE (See step 2 on page FI-104)**

9. **(w/ CRUISE CONTROL SYSTEM) INSTALL CRUISE CONTROL ACTUATOR (See step 33 on page EM-225)**

10. **INSTALL AIR CLEANER (See step 35 on page EM-226)**

11. **INSTALL ENGINE HOOD SIDE PANELS**

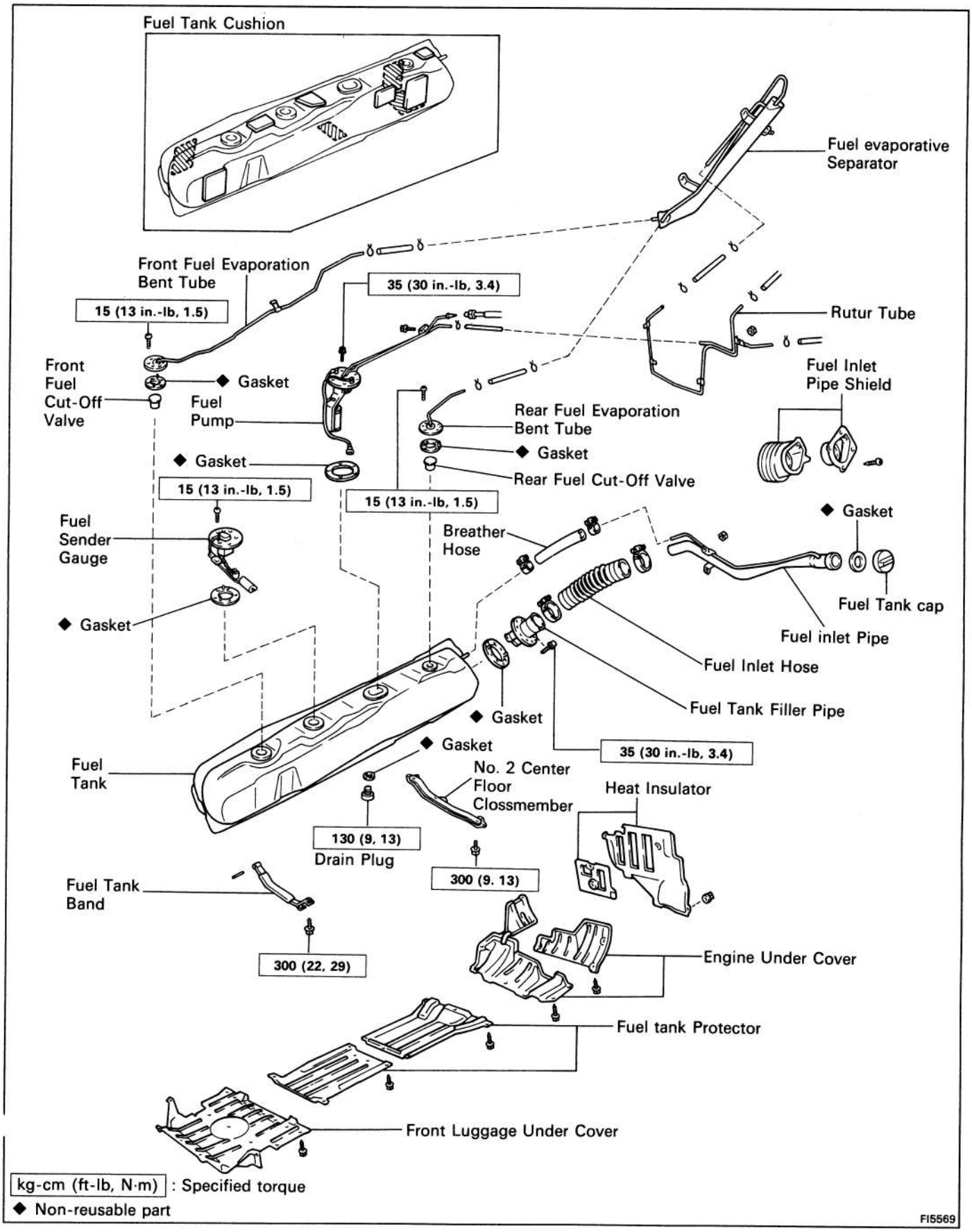
12. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

13. **CHECK FOR FUEL LEAKAGE (See page FI-9)**

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Fuel Tank and Lines

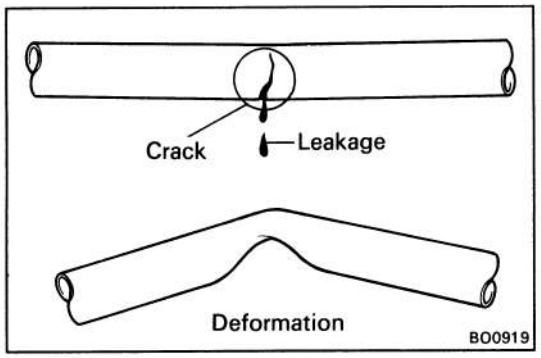
COMPONENTS



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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 f.

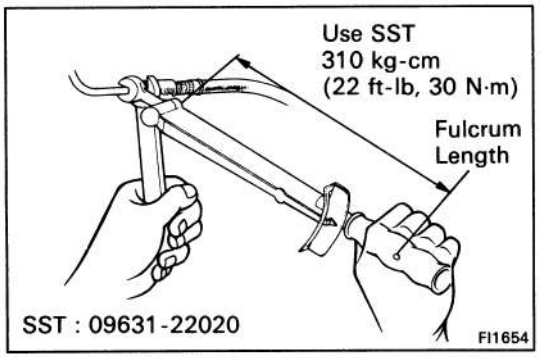
(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

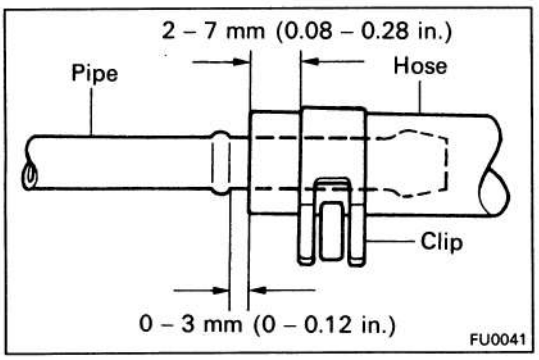
(c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.

(d) Check the filler neck for damage or fuel leakage.

(e) Hose and tube connections are as shown in the illustration.

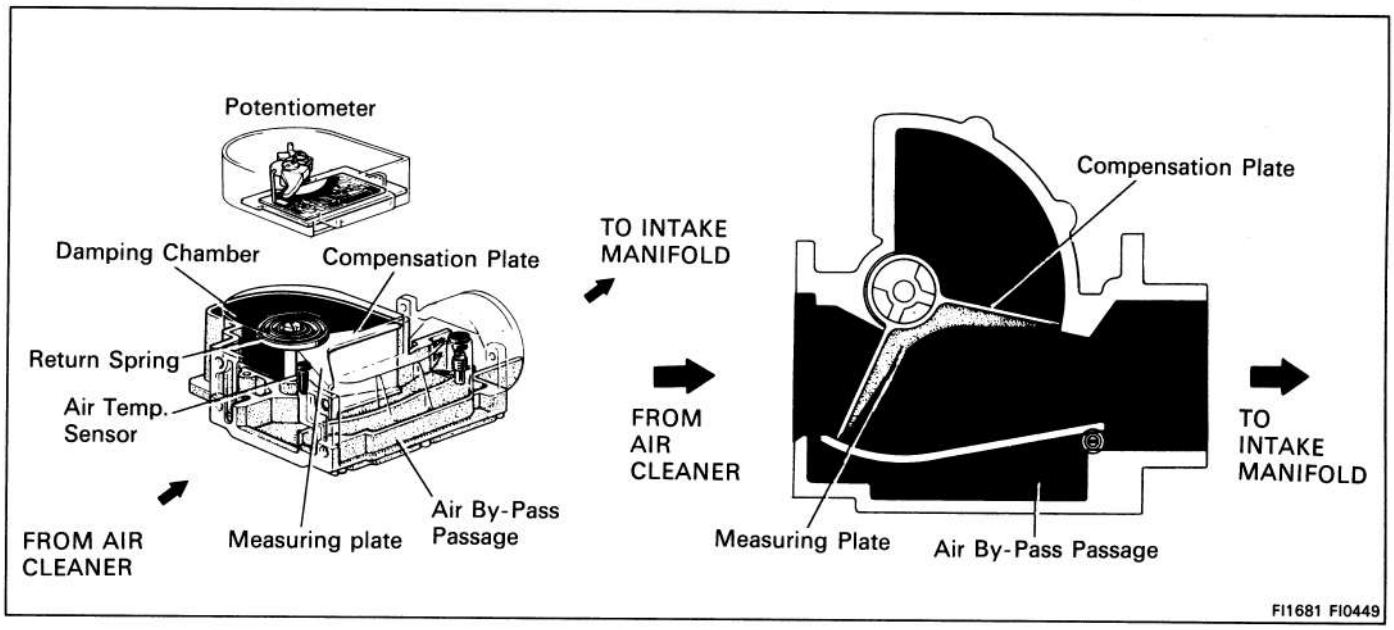
If a problem is found, repair or replace the parts as necessary.

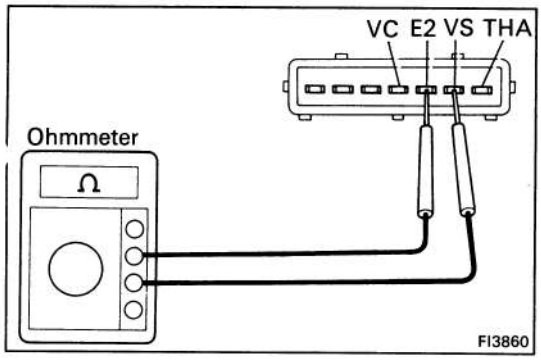


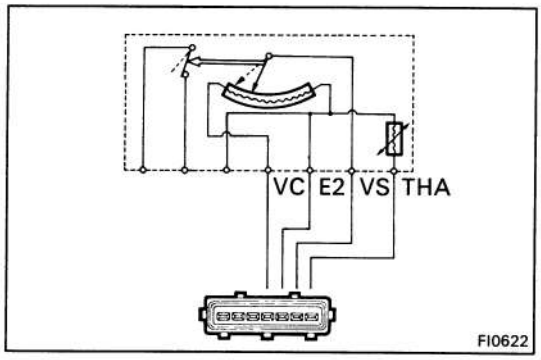


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AIR INDUCTION SYSTEM
Air Flow Meter (3S-GTE)







ON-VEHICLE INSPECTION

1. INSPECT RESISTANCE OF AIR FLOW METER

(a) Disconnect the air flow meter connector.

(b) Using an ohmmeter, measure the resistance between each terminals.

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

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

(c) Reconnect the air flow meter connector.

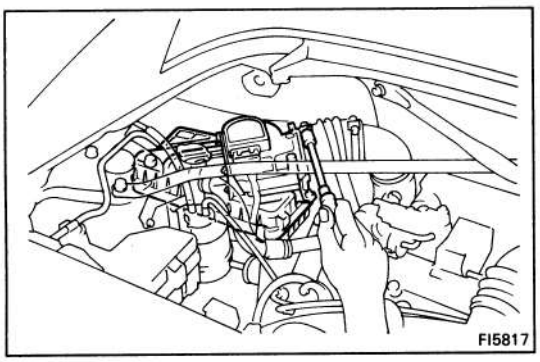
REMOVAL OF AIR FLOW METER

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. REMOVE LH ENGINE HOOD SIDE PANEL

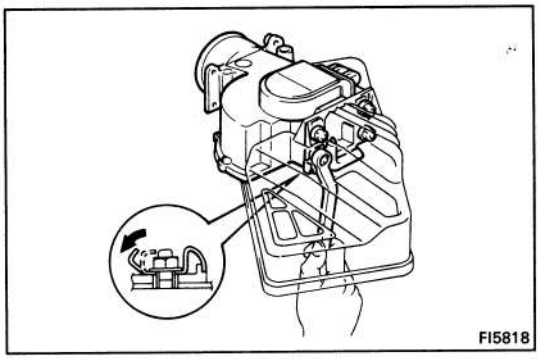
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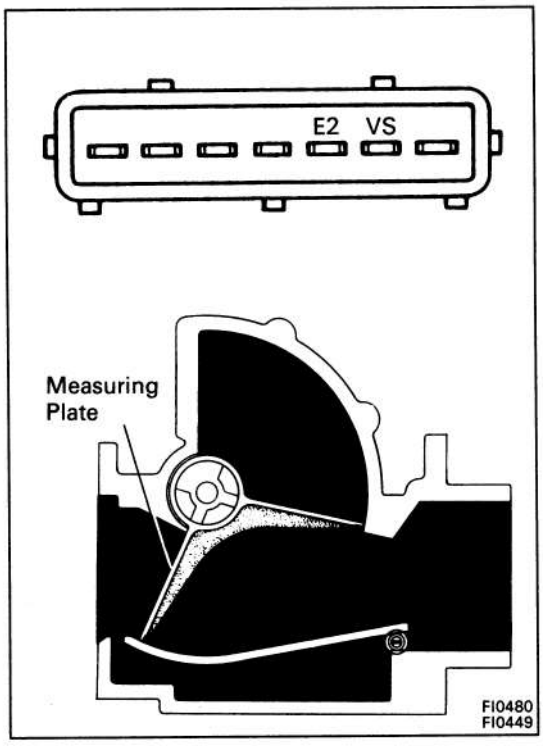
3. **DISCONNECT AIR FLOW METER CONNECTOR**

4. **DISCONNECT AIR CLEANER HOSE FROM AIR FLOW METER**

5. **REMOVE AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY**



6. **REMOVE AIR FLOW METER FROM AIR CLEANER CAP**
   (a) Pry off the lock plate.
   (b) Remove the bolt, four nuts, air flow meter and gasket.



INSPECTION OF AIR FLOW METER

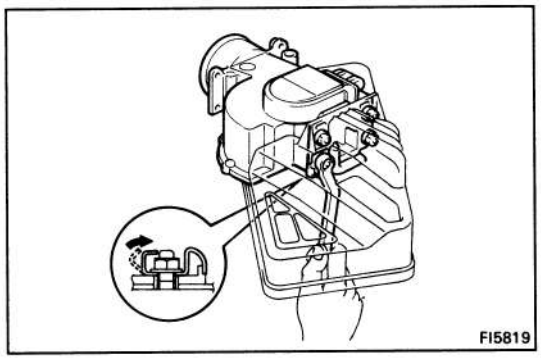
INSPECT AIR FLOW METER

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

Resistance: 200 – 600 Ω at fully closed
20 – 1,200 Ω at fully open

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

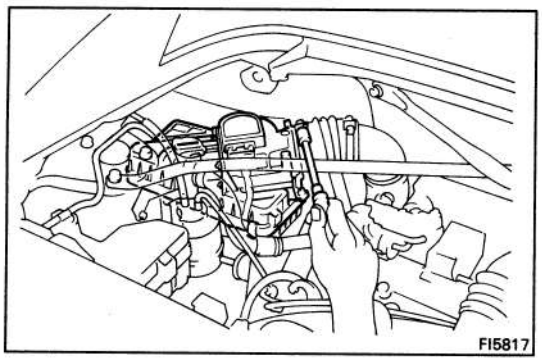
If the resistance is not as specifield, replace the air flow meter.



INSTALLATION OF AIR FLOW METER

1. **INSTALL AIR FLOW METER FROM AIR CLEANER CAP**
   (a) Install a new gasket and the air flow meter with the bolt and four nuts.
   (b) Pry the lock plate.

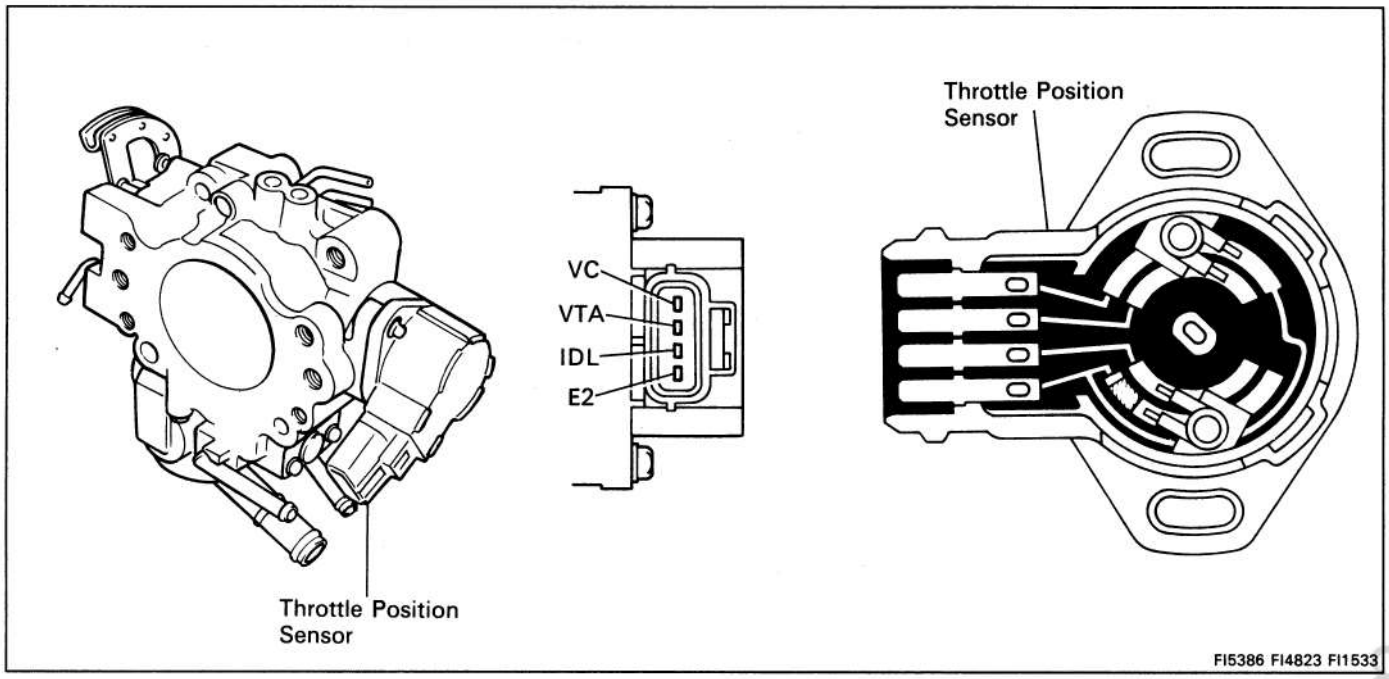
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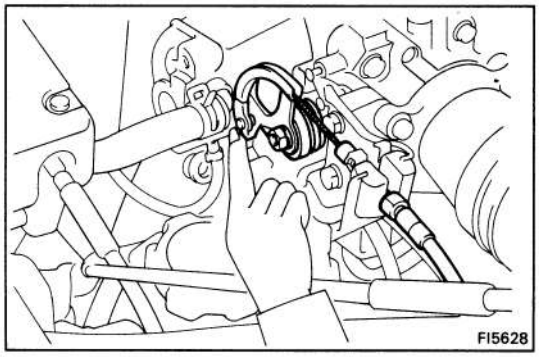


2. **INSTALL AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY**
3. **CONNECT AIR CLEANER HOSE TO AIR FLOW METER**
4. **CONNECT AIR FLOW METER CONNECTOR**
5. **INSTALL LH ENGINE HOOD SIDE PANEL**
6. **CONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**

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Throttle Body (3S-GTE)

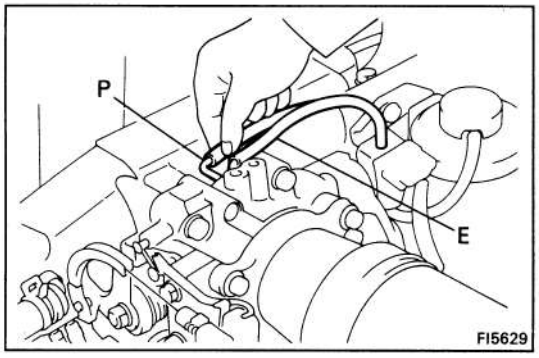




ON-VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

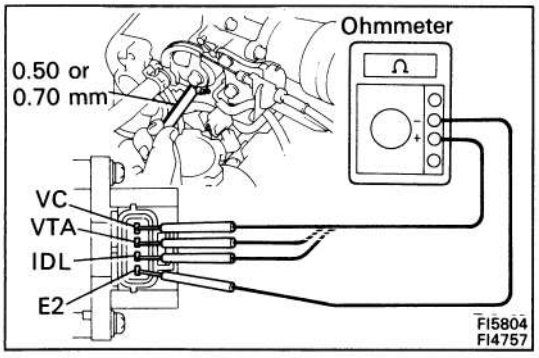
(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

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

Port No.	At idling	Other than idling
E	No vacuum	Vacuum
P	No vacuum	Vacuum



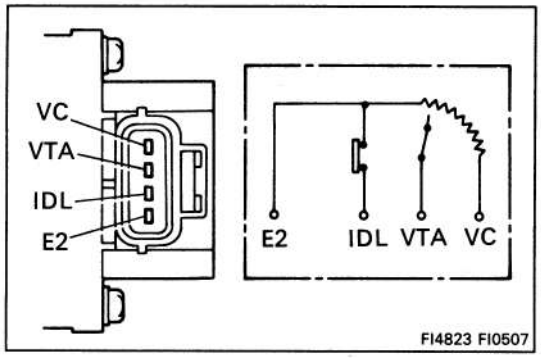
2. INSPECT THROTTLE POSITION SENSOR

(a) Disconnect the sensor connector.

(b) Insert a feeler gauge between the throttle stop screw and stop lever.

(c) Using an ohmmeter, measure the resistance between each terminal.

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Clearance between Lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA – E2	0.2 – 0.8 kΩ
0.50 mm (0.020 in.)	IDL – E2	2.3 kΩ or less
0.70 mm (0.028 in.)	IDL – E2	Infinity
Throttle valve fully opened	VTA – E2	3.3 – 10.3 kΩ
–	VC – E2	3 – 8.3 kΩ

(d) Reconnect the sensor connector.

REMOVAL OF THROTTLE BODY

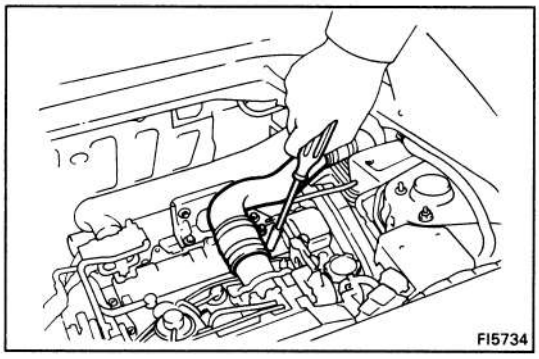
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

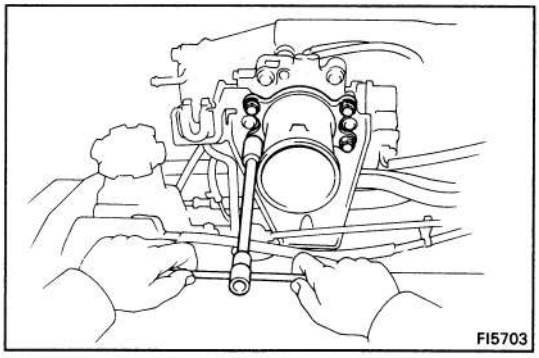
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT (See page CO-6)

3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

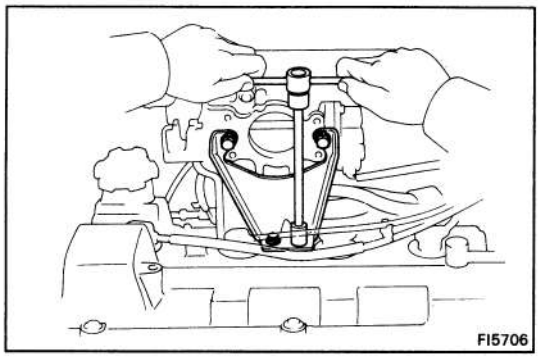
4. REMOVE NO.1 AIR INTAKE CONNECTOR





5. REMOVE INTAKE AIR CONNECTOR

Remove the four bolts and air connector.



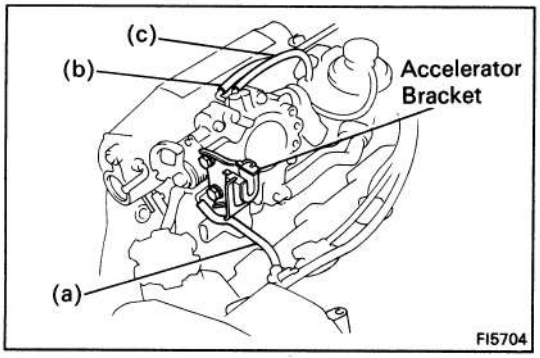
6. REMOVE INTAKE AIR CONNECTOR STAY

Remove the four bolts, air connector stay and two spacers.

7. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

8. DISCONNECT ISC VALVE CONNECTOR

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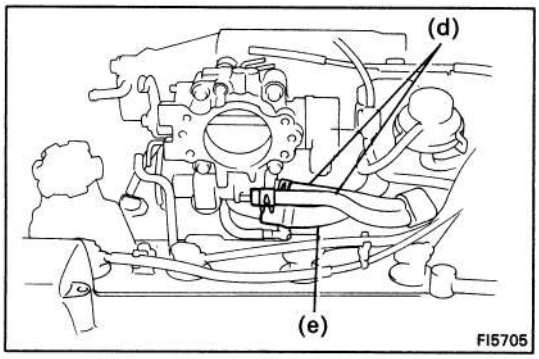
9. REMOVE ACCELERATOR BRACKET

10. DISCONNECT HOSES FROM THROTTLE BODY

(a) PCV hose from cylinder head cover

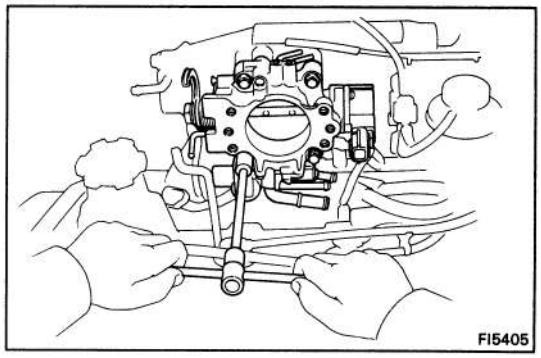
(b) Vacuum hose (from throttle body P port) from vacuum pipe

(c) Vacuum hose (from throttle body E port) from EGR VSV



(d) Two water by-pass hoses from No.1 air tube

(e) Air hose from No.1 air tube

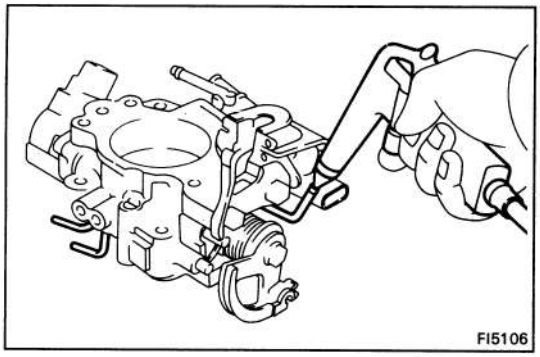


11. REMOVE THROTTLE BODY

Remove the four bolts, throttle body and gasket.

12. IF NECESSARY, REMOVE ISC VALVE FROM THROTTLE BODY (See step 2 on page FI-149)

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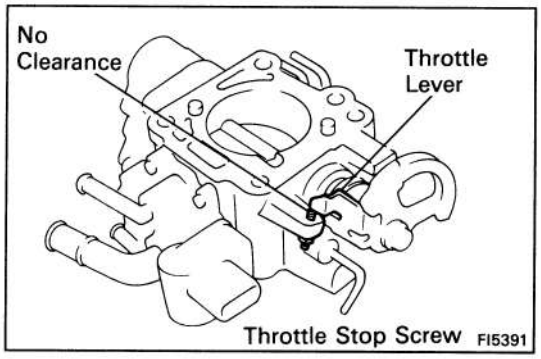
INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

(a) Using a soft brush and carburetor cleaner, clean the cast parts.

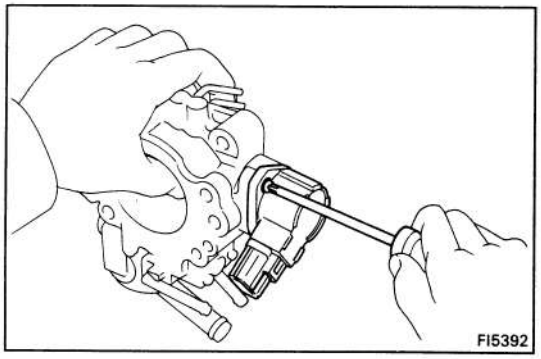
(b) Using compressed air, clean all the passages and apertures.

NOTICE: To prevent deterioration, do not clean the throttle position sensor.



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.

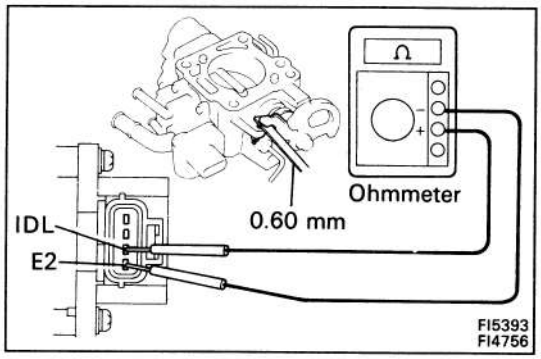


3. INSPECT THROTTLE POSITION SENSOR

(See step 2 on page FI-71)

4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

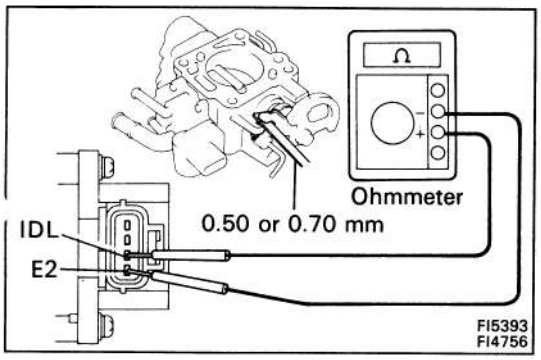
(a) Loosen the two set screws of the sensor.



(b) Insert a 0.60 mm (0.024 in.) feeler 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.

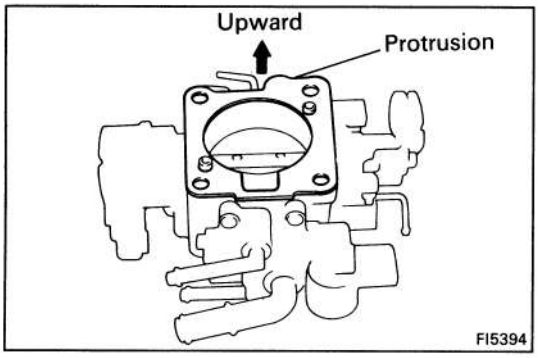
(d) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



(e) Recheck the continuity between terminals IDL and E2.

Clearance between lever and stop screw	Continuity (IDL-E2)
0.50 mm (0.020 in.)	Continuity
0.70 mm (0.028 in.)	No continuity

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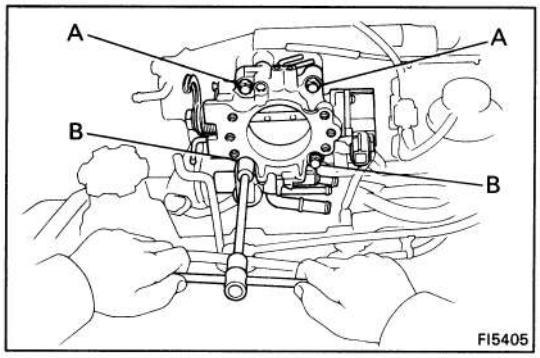


INSTALLATION OF THROTTLE BODY

1. **INSTALL ISC VALVE TO THROTTLE BODY**
(See step 1 on page FI-150)

2. **INSTALL THROTTLE BODY**

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

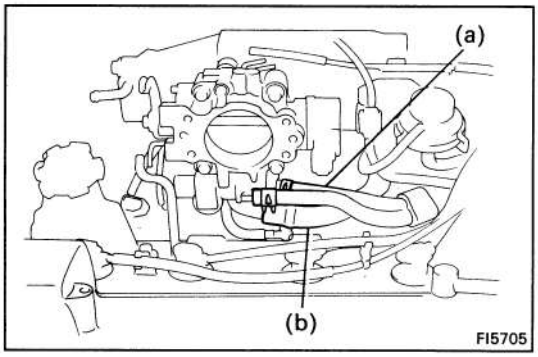


(b) Install the throttle body with the four bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

HINT: Each bolt is indicated in the figure.

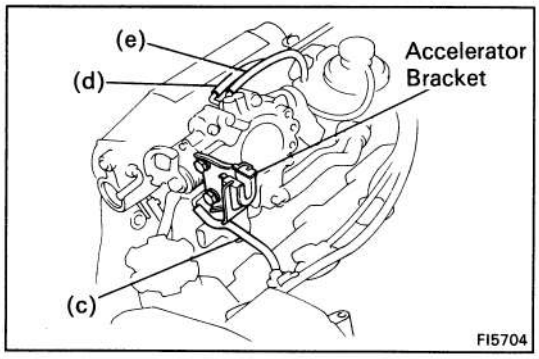
Bolt length: A 45 mm (1.77 in.)
B 70 mm (2.76 in.)



3. **CONNECT HOSES TO THROTTLE BODY**

(a) Two water by-pass hoses from No.1 air tube

(b) Air hose from No.1 air tube



(c) PCV hose from cylinder head cover

(d) Vacuum hose (from throttle body P port) from vacuum pipe

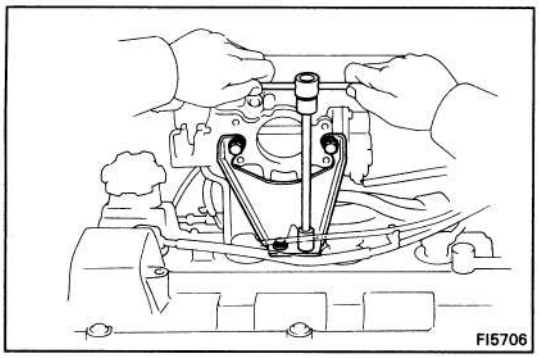
(e) Vacuum hose (from throttle body E port) from EGR VSV

4. **INSTALL ACCELERATOR BRACKET**

5. **CONNECT ISC VALVE CONNECTOR**

6. **CONNECT THROTTLE POSITION SENSOR CONNECTOR**

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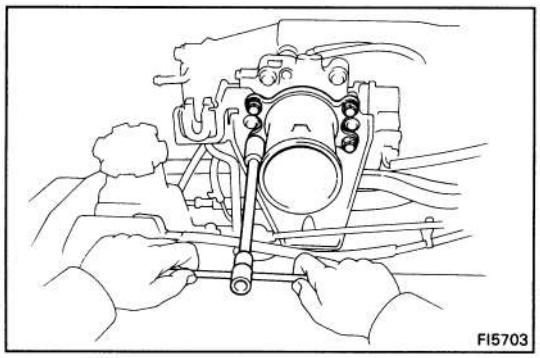


7. INSTALL INTAKE AIR CONNECTOR STAY

Install the two spacers and air connector stay with four bolts.

Torque:

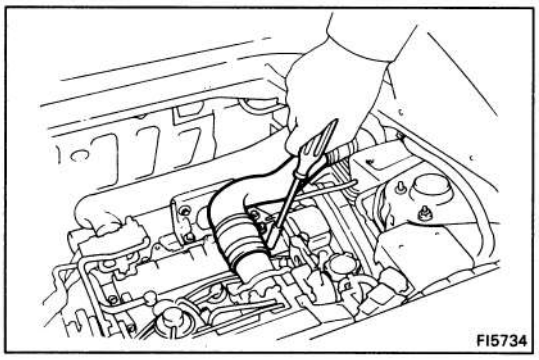
10 mm head bolt 80 kg-cm (69 in.-lb, 7.8 N·m)
12 mm head bolt 195 kg-cm (14 ft-lb, 19 N·m)



8. INSTALL INTAKE AIR CONNECTOR

Install the air connector with the four bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



9. INSTALL NO.1 AIR INTAKE CONNECTOR

10. CONNECT ACCELERATOR CABLE, AND ADJUST IT

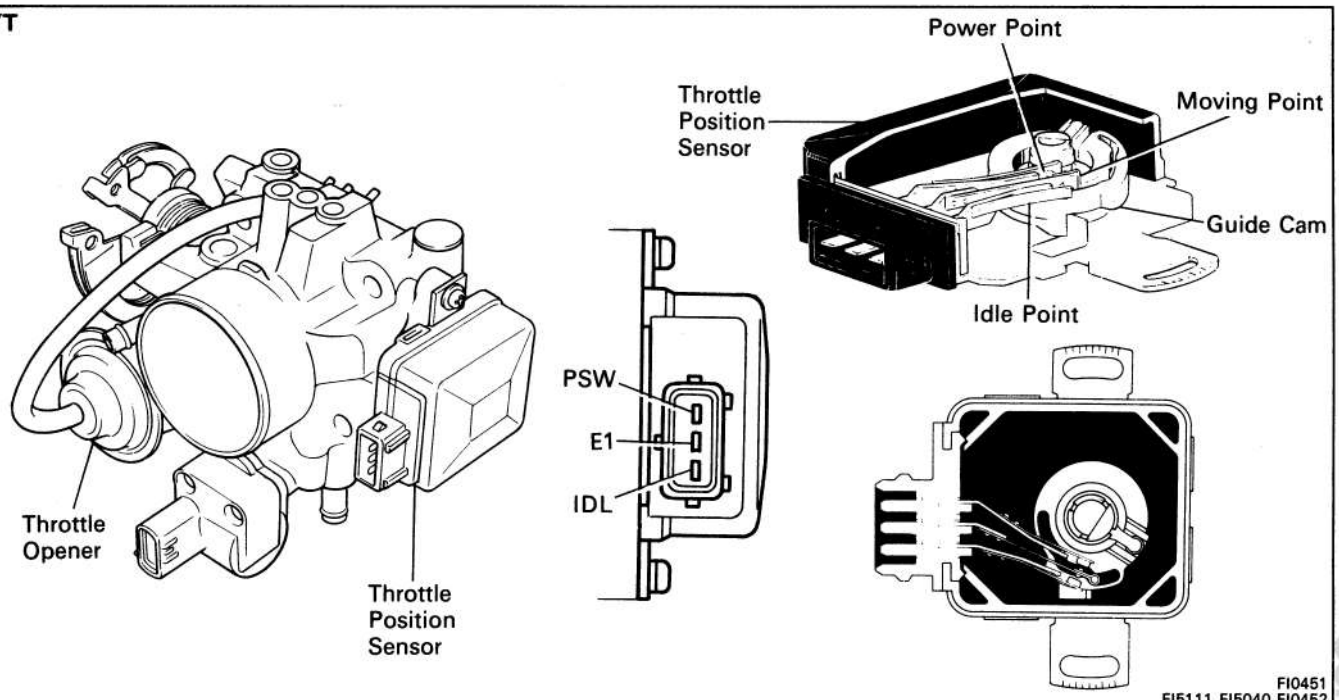
11. FILL WITH ENGINE COOLANT (See page CO-7)

12. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

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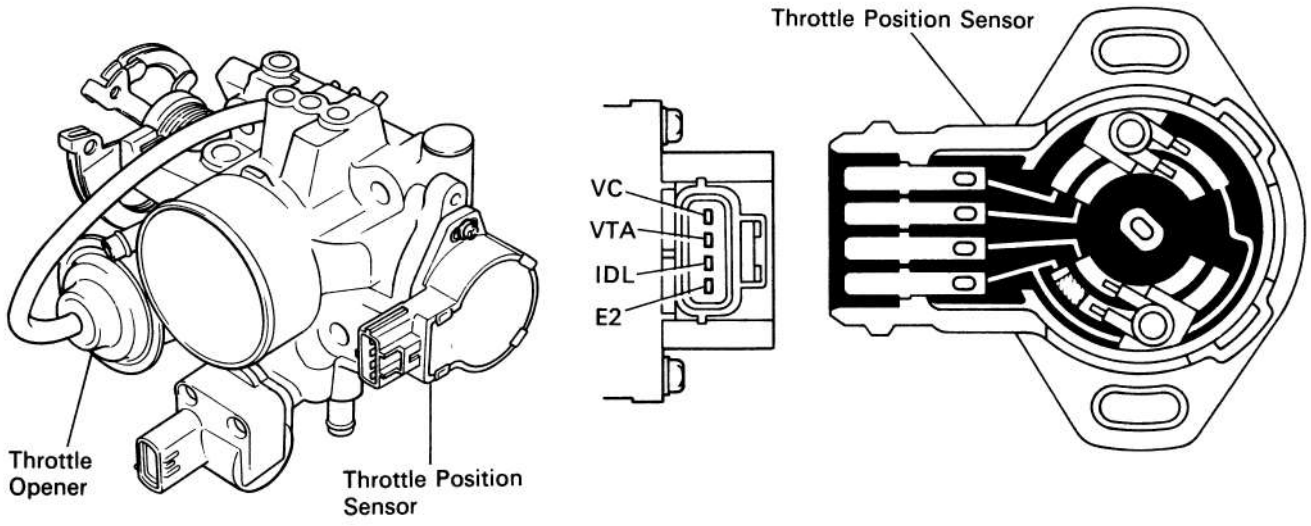
Throttle Body (5S-FE)

M/T

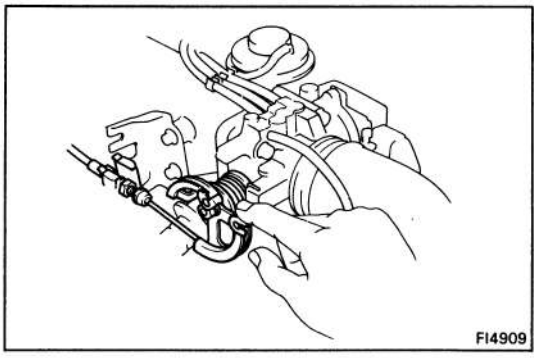


FI0451
FI5111 FI5040 FI0452

A/T



FI5112 FI4823 FI1533



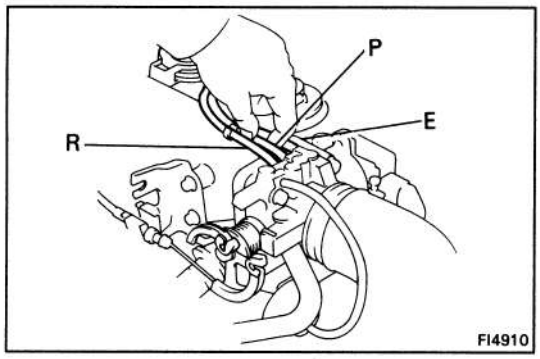
FI4909

ON-VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

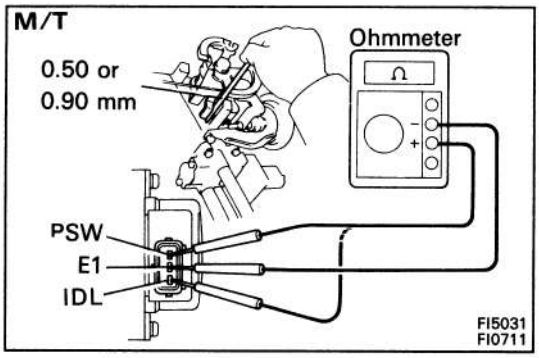
(a) Check that the throttle linkage moves smoothly.

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(b) Check the vacuum at each port.
- Start the engine.
- Check the vacuum with your finger.

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



2. (M/T)
INSPECT THROTTLE POSITION SENSOR

(a) Apply vacuum to the throttle opener.

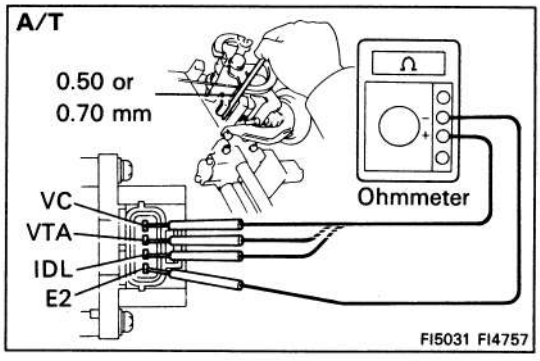
(b) Disconnect the sensor connector.

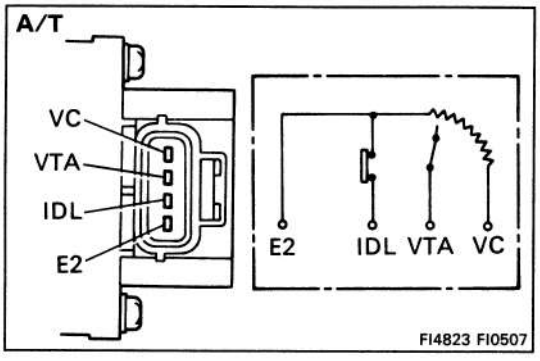
(c) Insert a feeler gauge between the throttle stop screw and stop lever.

(d) Using an ohmmeter, measure the resistance between each terminal.

Clearance between lever and stop screw	Continuity between terminals	
	IDL – E1	PSW – E1
0.50 mm (0.020 in.)	Continuity	No continuity
0.90 mm (0.035 in.)	No continuity	No continuity
Throttle valve fully opened	No continuity	Continuity

(e) Reconnect the sensor connector.





3. (A/T)
INSPECT THROTTLE POSITION SENSOR

(a) Apply vacuum to the throttle opener.

(b) Disconnect the sensor connector.

(c) Insert a feeler 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 – 0.8 kΩ
0.50 mm (0.020 in.)	IDL – E2	2.3 kΩ or less
0.70 mm (0.028 in.)	IDL – E2	Infinity
Throttle valve fully opened	VTA – E2	3.3 – 10 kΩ
–	VC – E2	3 – 7 kΩ

(e) Reconnect the sensor connector.

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4. INSPECT THROTTLE OPENER

A. Warm up engine

Allow the engine to warm up to normal operating temperature.

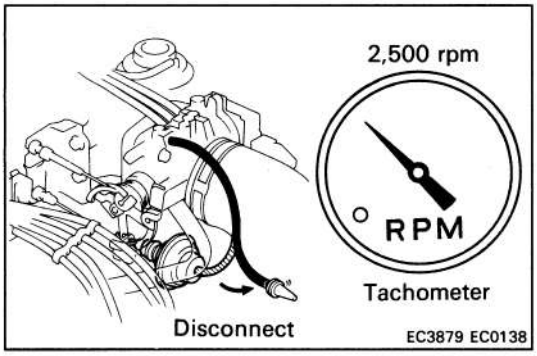
B. Check idle speed

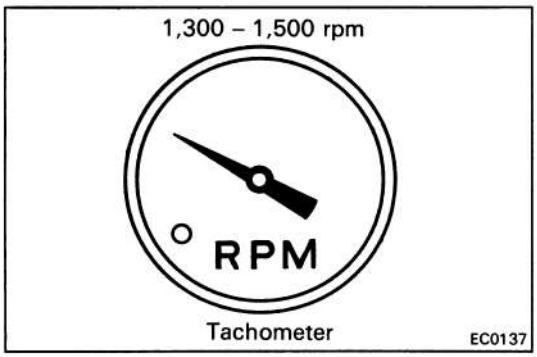
Idle speed: 700 ± 50 rpm USA M/T
700 ± 50 rpm USA A/T
850 ± 50 rpm CANADA M/T
750 ± 50 rpm CANADA A/T

C. Check and adjust throttle opener setting speed

(a) Disconnect the vacuum hose from the throttle opener, and plug the hose end.

(b) Maintain the engine at 2,500 rpm.

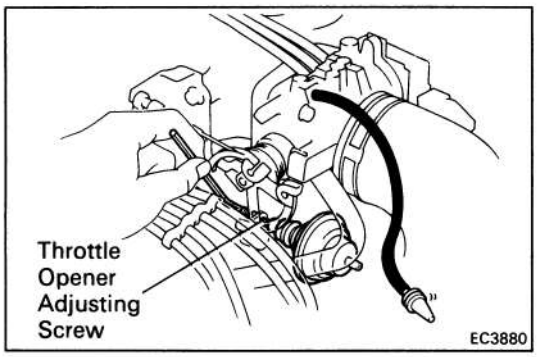




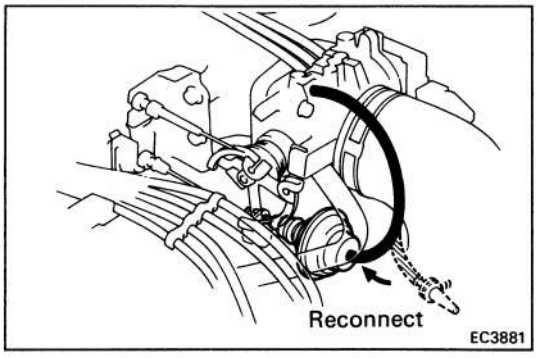
(c) Release the throttle valve.

(d) Check that the throttle opener is set.

Throttle opener setting speed:
1,300 – 1,500 rpm (w/ Cooling fan OFF)



(e) Using a hexagon wrench, adjust the throttle opener setting by turning the throttle opener adjusting screw.



(f) Reconnect the vacuum hose to the throttle opener.

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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. **REMOVE LH ENGINE HOOD SIDE PANEL**

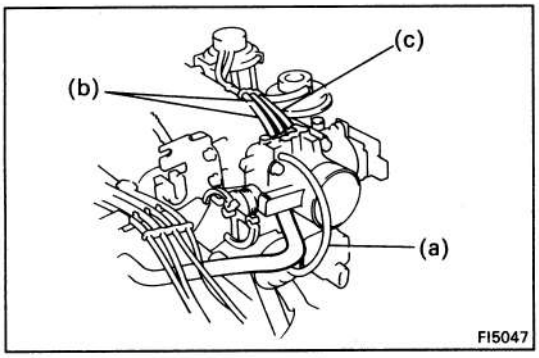
3. **DRAIN ENGINE COOLANT (See page CO-6)**

4. **(A/T)**
   DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

5. **DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE**

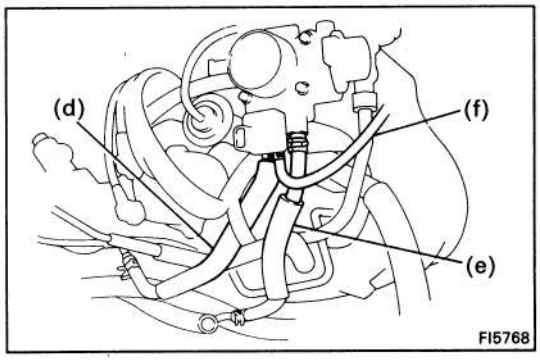
6. **REMOVE AIR CLEANER**
   (See step 9 on page EM-182)

7. **DISCONNECT THROTTLE POSITION SENSOR CONNECTOR**

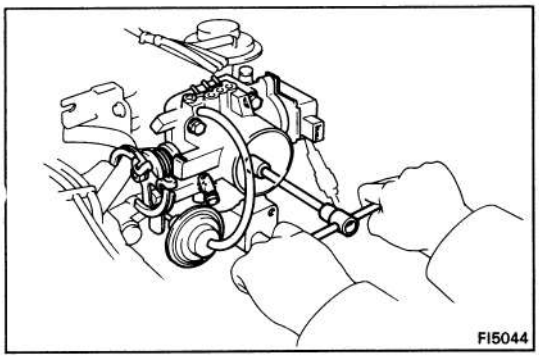


8. **DISCONNECT ISC VALVE CONNECTOR**

9. **DISCONNECT HOSES FROM THROTTLE BODY**
   (a) PCV hose
   (b) Two vacuum hoses from EGR vacuum modulator
   (c) Vacuum hose from EVAP VSV



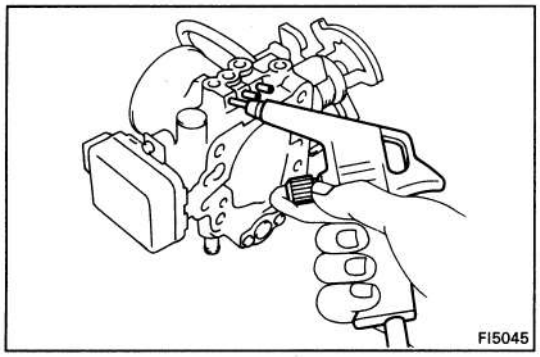
   (d) Water by-pass hose from water outlet
   (e) Water by-pass hose from water by-pass pipe
   (f) Air hose from A/C VSV



10. **REMOVE THROTTLE BODY**
    Remove the four bolts, throttle body and gasket.

11. **IF NECESSARY, REMOVE ISC VALVE FROM THROTTLE BODY**
    (See step 2 on page FI-152)

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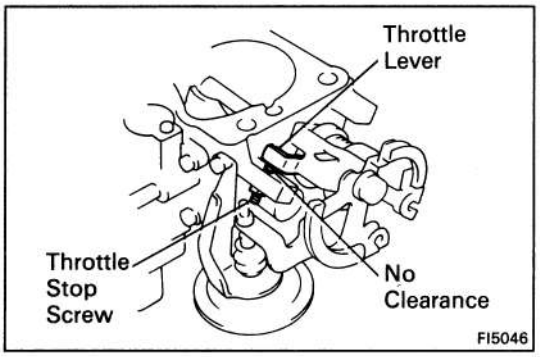
INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

(a) Using a soft brush and carburetor cleaner, clean the cast parts.

(b) Using compressed air, clean all the passages and apertures.

NOTICE: To prevent deterioration, do not clean the throttle position sensor.



2. INSPECT THROTTLE VALVE

(a) Apply vacuum hose to the throttle opener.

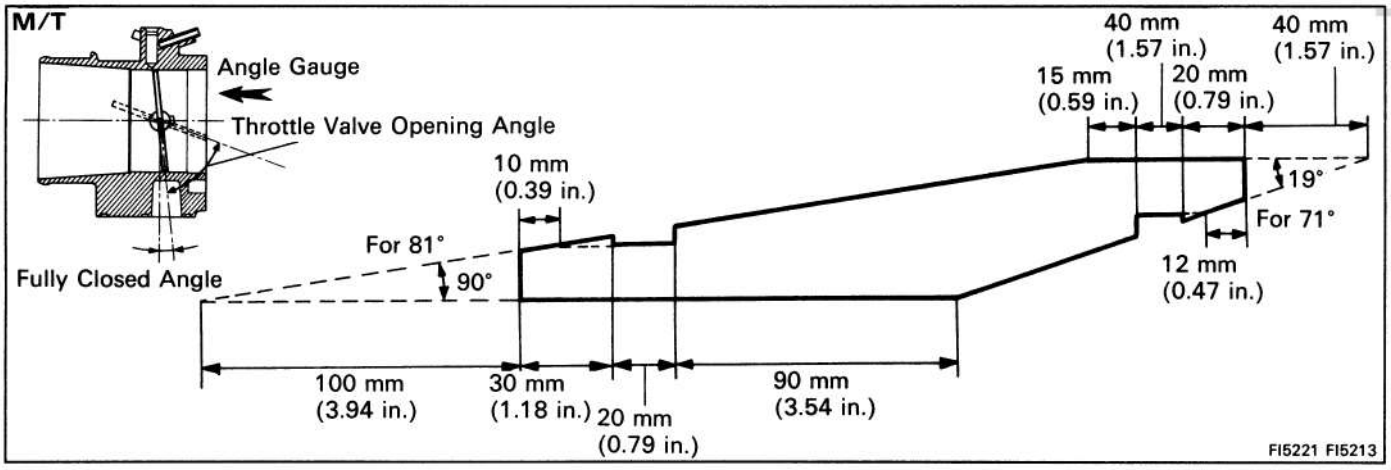
(b) Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.

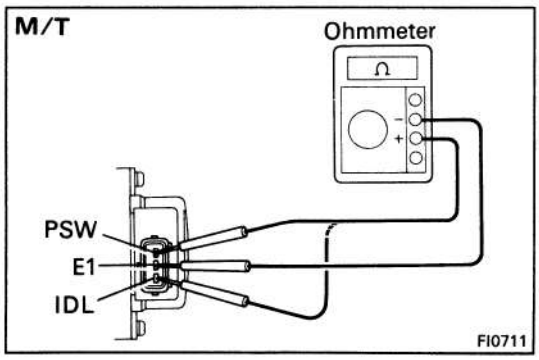
3. (M/T) INSPECT THROTTLE POSITION SENSOR

(a) Make an angle gauge as shown in the figure.

(b) Apply vacuum hose to the throttle opener.

(c) Set the throttle valve opening to 71° or 81° from the vertical position (incl. throttle valve fully closed angle 6°).

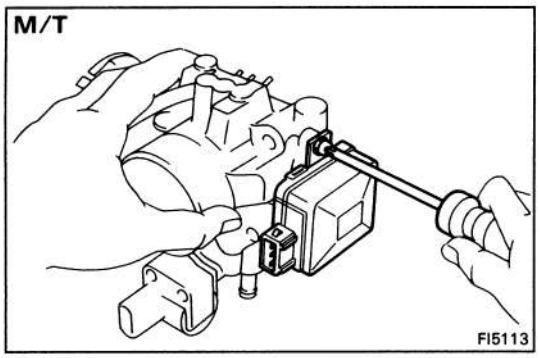




(d) Using an ohmmeter, check the continuity between each terminal.

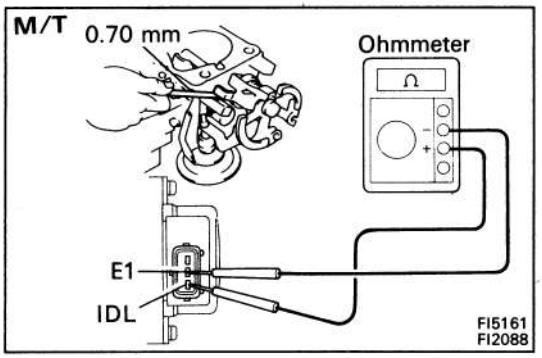
Throttle valve opening angle	Continuity	
	IDL – E1	PSW – E1
71° from vertical	No continuity	No continuity
81° from vertical	No continuity	Continuity
Less than 7.5° from vertical	Continuity	No continuity

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4. (M/T)
IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

(a) Loosen the two set screws of the sensor.

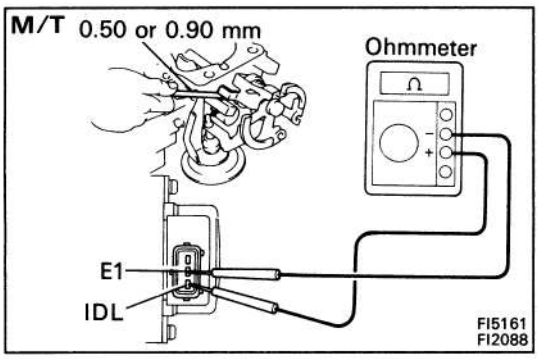


(b) Apply vacuum hose to the throttle opener.

(c) Insert a 0.70 mm (0.028 in.) feeler gauge, between the throttle stop screw and stop lever.

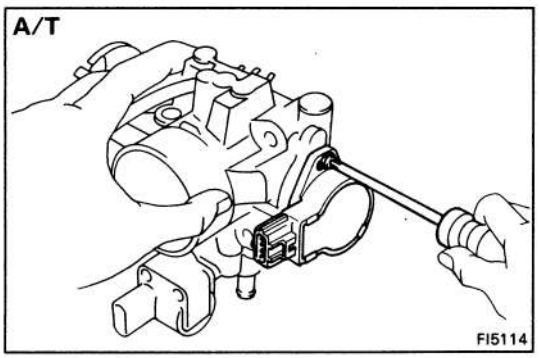
(d) Connect the test probe of an ohmmeter to the terminals IDL and E1 of the sensor.

(e) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



(f) Recheck the continuity between terminals IDL and E1.

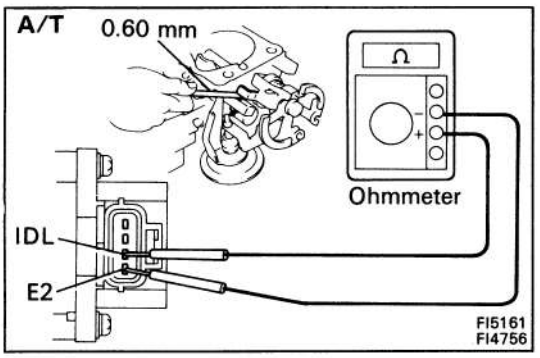
Clearance between lever and stop screw	Continuity (IDL – E1)
0.50 mm (0.020 in.)	Continuity
0.90 mm (0.035 in.)	No continuity



5. (A/T)
INSPECT THROTTLE POSITION SENSOR
(See step 3 on page FI-141)

6. (A/T)
IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

(a) Loosen the two set screws of the sensor.



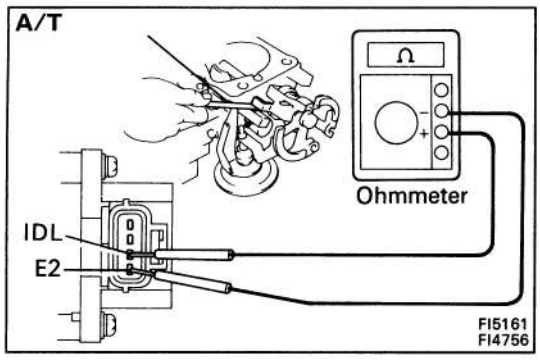
(b) Apply vacuum hose to the throttle opener.

(c) Insert a 0.60 mm (0.024 in.) feeler gauge, between the throttle stop screw and stop lever.

(d) Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.

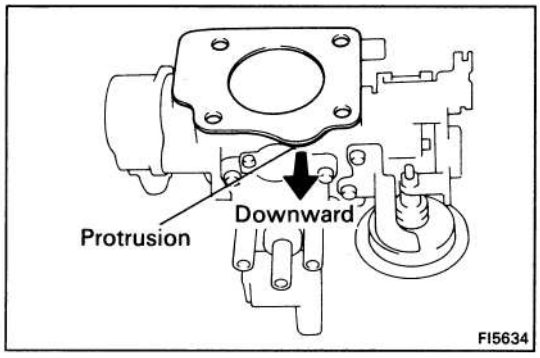
(e) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.

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(f) 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

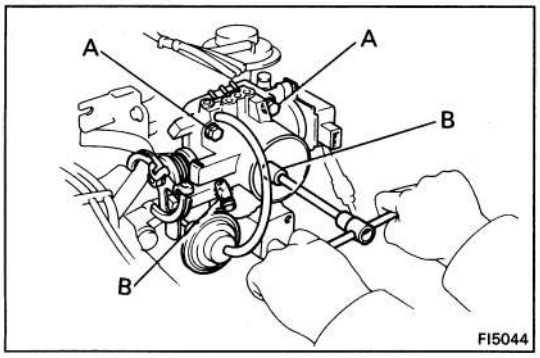


INSTALLATION OF THROTTLE BODY

1. INSTALL ISC VALVE TO THROTTLE BODY
(See step 1 on page FI-153)

2. INSTALL THROTTLE BODY

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

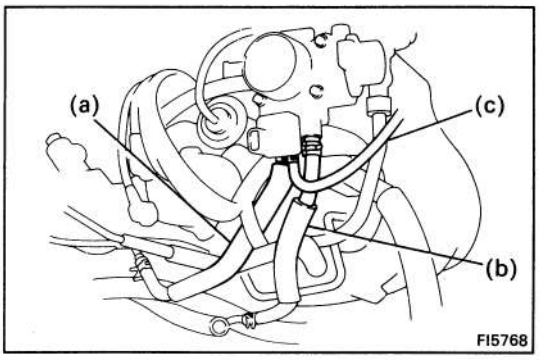


(b) Install the throttle body with the four bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N!.!m)

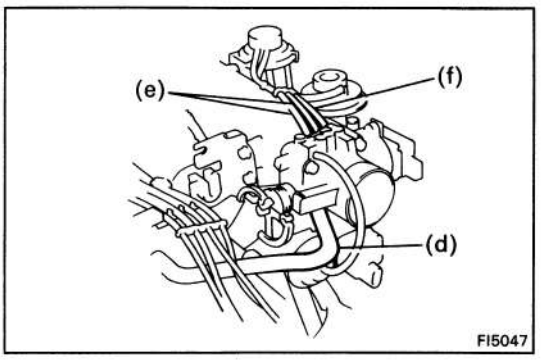
HINT: Each bolt is indicated in the figure.

Bolt length: A 45 mm (1.77 in.)
B 55 mm (2.17 in.)



3. CONNECT HOSES TO THROTTLE BODY

(a) Water by-pass hose from water outlet
(b) Water by-pass hose from water by-pass pipe
(c) Air hose from A/C VSV



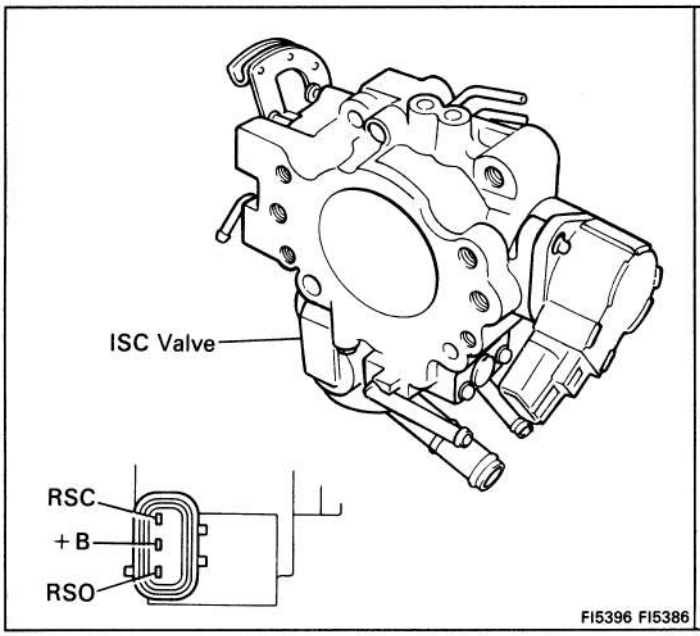
(d) PCV hose
(e) Two vacuum hoses from EGR vacuum modulator
(f) Vacuum hose from EGR VSV

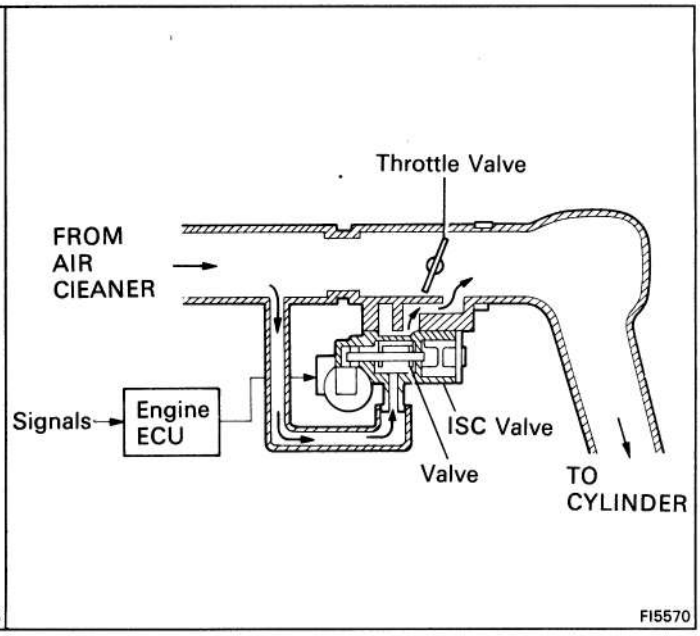
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4. **CONNECT ISC VALVE CONNECTOR**
5. **CONNECT THROTTLE POSITION SENSOR CONNECTOR**
6. **INSTALL AIR CLEANER**
   (See step 35 on page EM-226)
7. **CONNECT ACCELERATOR CABLE, AND ADJUST IT**
8. **(A/T)**
   CONNECT THROTTLE CABLE, AND ADJUST IT
9. **FILL WITH ENGINE COOLANT (See page CO-7)**
10. **INSTALL LH ENGINE HOOD SIDE PANEL**
11. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

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Idle Speed Control (ISC) Valve (3S-GTE)



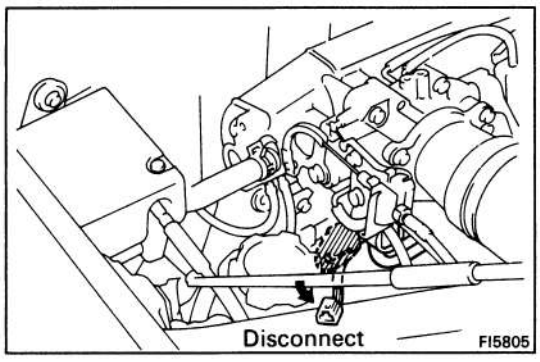


ON-VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

(a) Initial conditions:

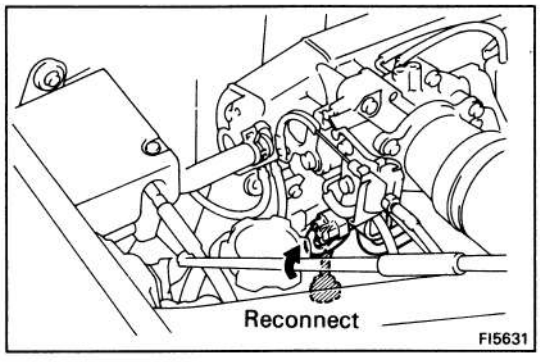
- Engine at normal operating temperature
- Idle speed set correctly



(b) Disconnect the ISC valve connector.

(c) Check the engine rpm.

Engine rpm: 1,000 rpm or more



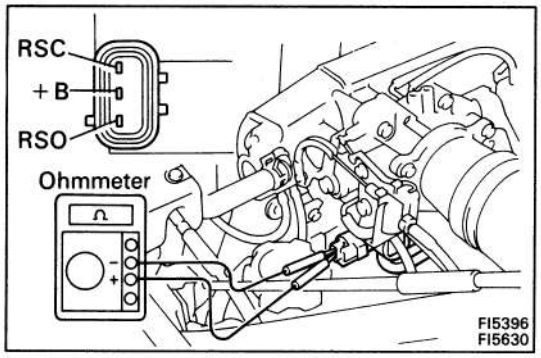
(d) Reconnect the ISC valve connector.

(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.

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2. INSPECT ISC VALVE RESISTANCE

(a) Disconnect the ISC valve connector.

(b) Using an ohmmeter, measure the resistance between terminal + B and other terminals (RSC, RSO).

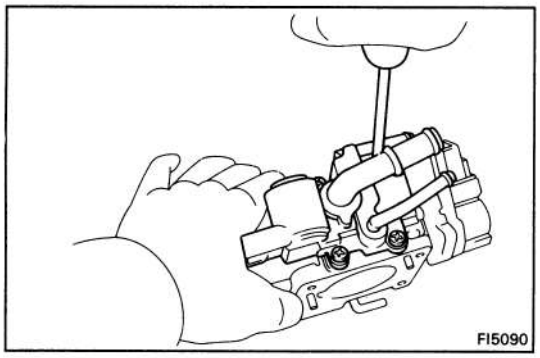
Resistance: 17.7 – 23.9 Ω

If resistance is not as specified, replace the ISC valve.

(c) Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

1. REMOVE THROTTLE BODY
(See steps 1 to 11 on pages FI-135 and 136)



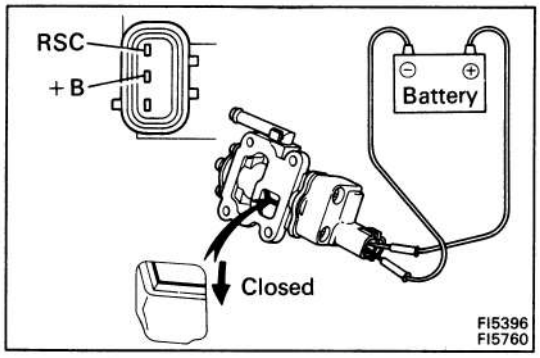
2. REMOVE ISC VALVE

Remove the four screws, ISC valve and gasket.

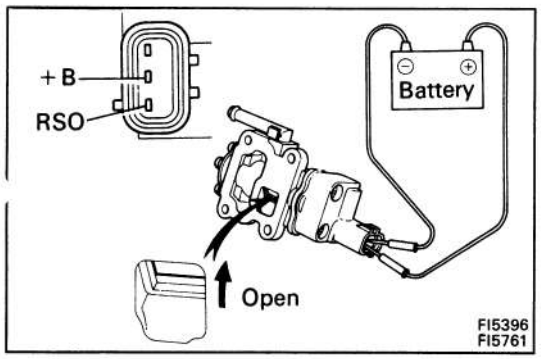
INSPECTION OF ISC VALVE

INSPECT ISC VALVE OPERATION

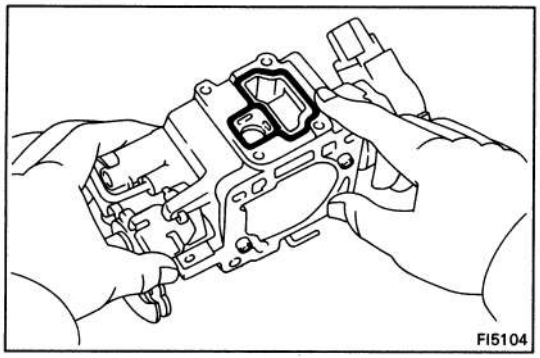
(a) Connect the positive (+) lead from the battery to terminal + B and negative (–) lead to terminal RSC, and check that the valve is closed.



(b) Connect the positive (+) lead from the battery to terminal + B and negative (–) lead to terminal RSO, and check that the valve is open.



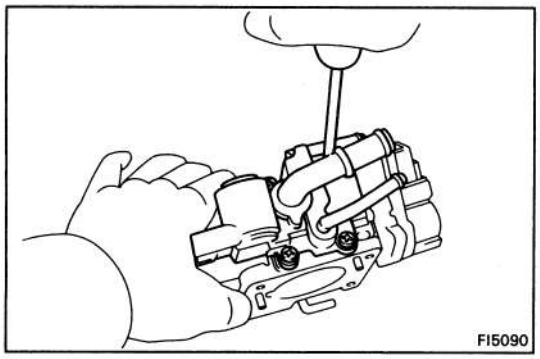
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INSTALLATION OF ISC VALVE

1. INSTALL ISC VALVE

(a) Place a new gasket on the throttle body.



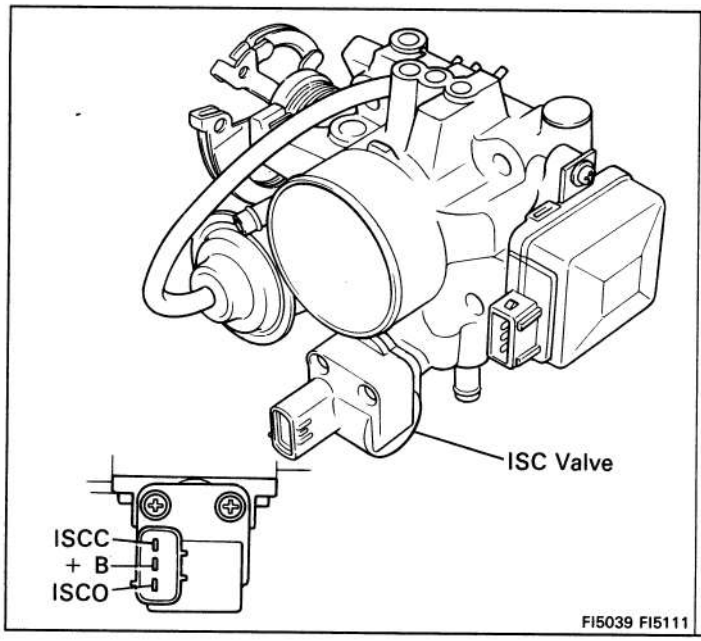
(b) Install the ISC valve with the four screws.

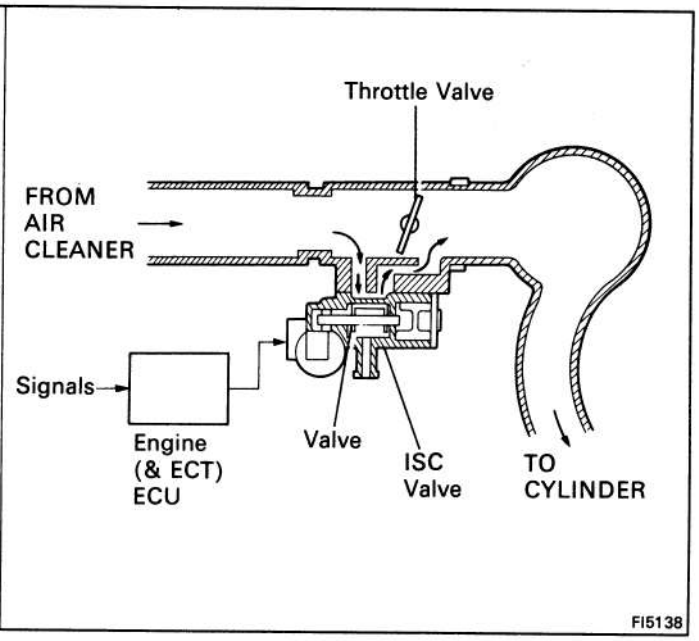
2. INSTALL THROTTLE BODY

(See steps 2 to 12 on pages FI-138 and 139)

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Idle Speed Control (ISC) Valve (5S-FE)



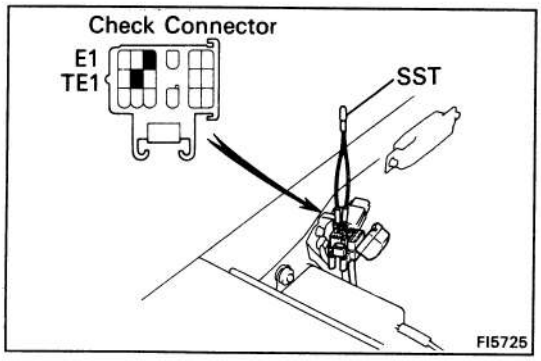


ON-VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

(a) Initial conditions:

- Engine at normal operating temperature
- Idle speed set correctly
- Transmission in neutral range

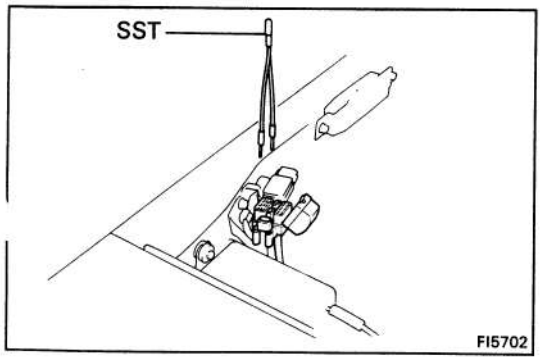


(b) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843-18020

(c) After engine rpm are kept at 1,000 – 1,300 rpm for 5 seconds, check that they return to idle speed.

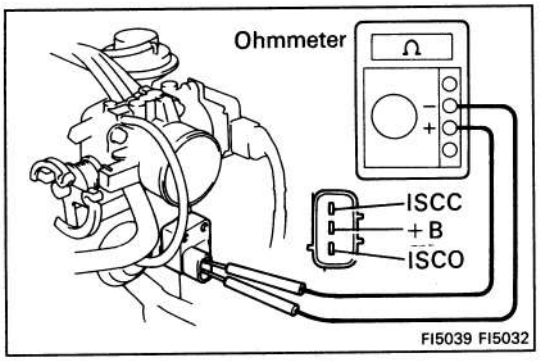
If the rpm operation is not as specified, check the ISC valve, wiring and ECU.



(d) Remove SST.

SST 09843-18020

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2. INSPECT ISC VALVE RESISTANCE

(a) Disconnect the ISC valve connector.

(b) Using an ohmmeter, measure the resistance between terminal +B and other terminals (ISCC, ISCO).

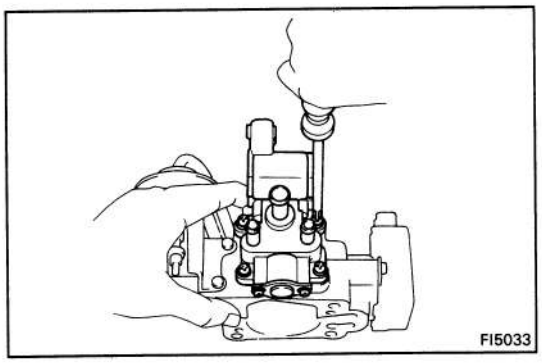
Resistance: 19.3 – 22.3 Ω

If resistance is not as specified, replace the ISC valve.

(c) Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

1. REMOVE THROTTLE BODY
(See steps 1 to 10 on page FI-143)



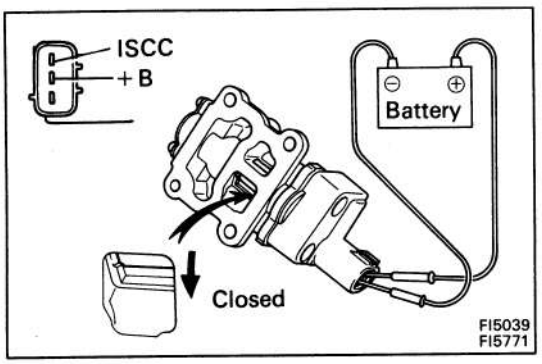
2. REMOVE ISC VALVE

Remove the four screws, ISC valve and gasket.

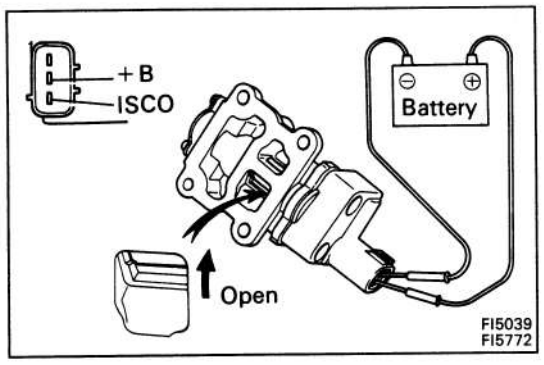
INSPECTION OF ISC VALVE

INSPECT ISC VALVE OPERATION

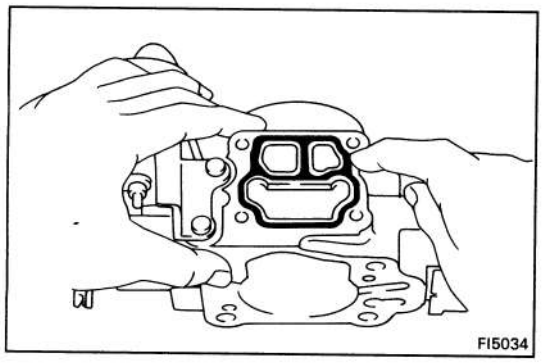
(a) Connect the positive (+) lead from the battery to terminal +B and negative (–) lead to terminal ISCC, and check that the valve is closed.

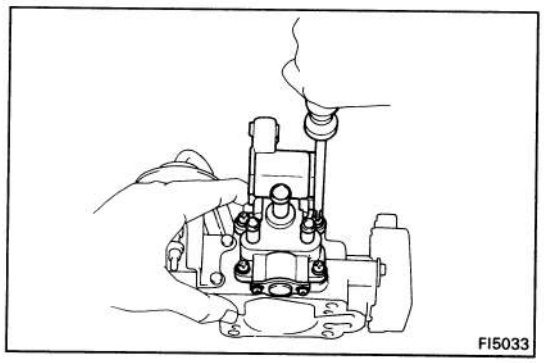


(b) Connect the positive (+) lead from the battery to terminal +B and negative (–) lead to terminal ISCO, and check that the valve is open.



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INSTALLATION OF ISC VALVE

1. **INSTALL ISC VALVE**
   (a) Place a new gasket on the throttle body.

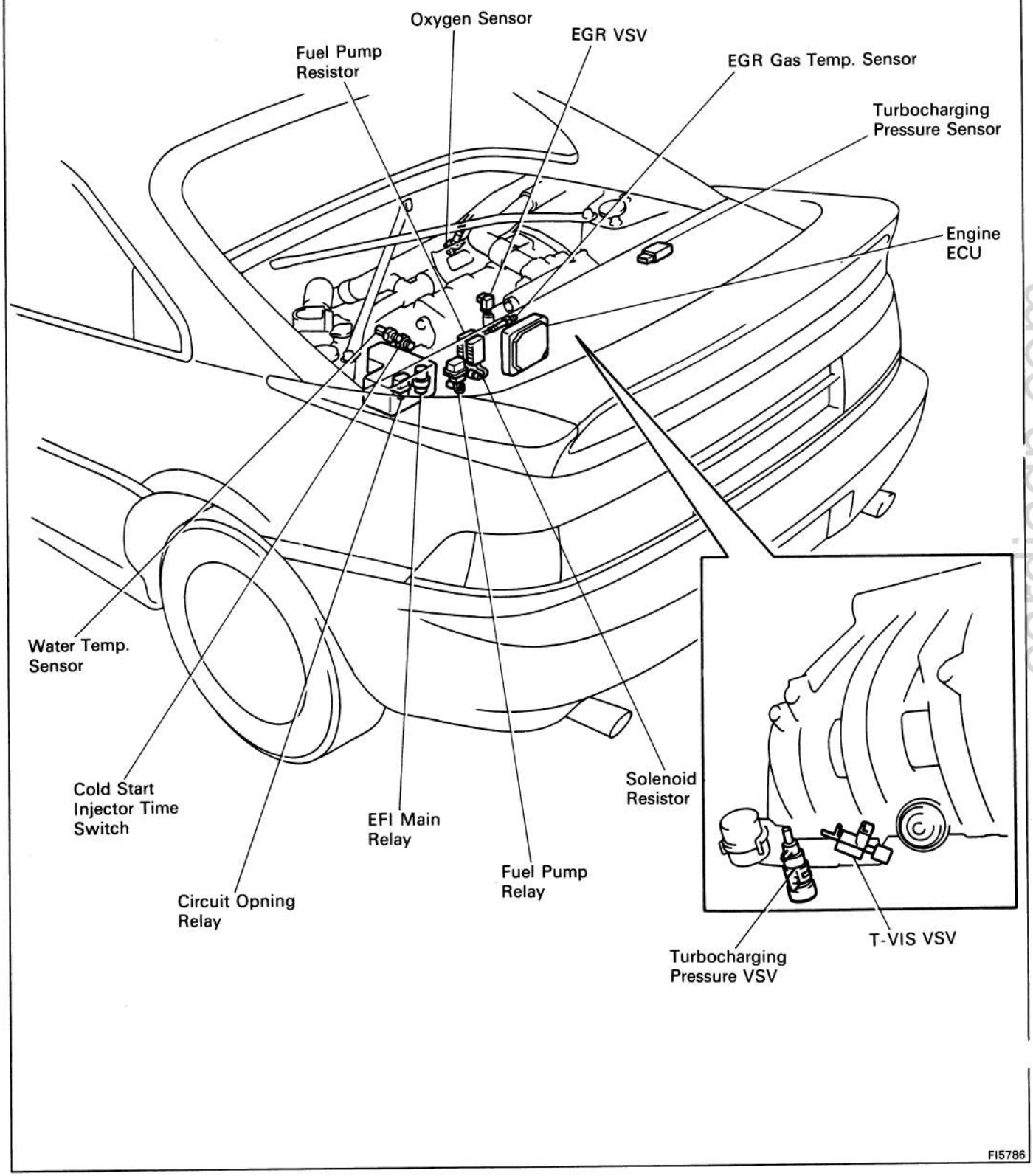
   (b) Install the ISC valve with the four screws.

2. **INSTALL THROTTLE BODY**
   (See steps 2 to 11 on pages FI-146 and 147)

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ELECTRONIC CONTROL SYSTEM
Location of Electronic Control Parts

3S-GTE

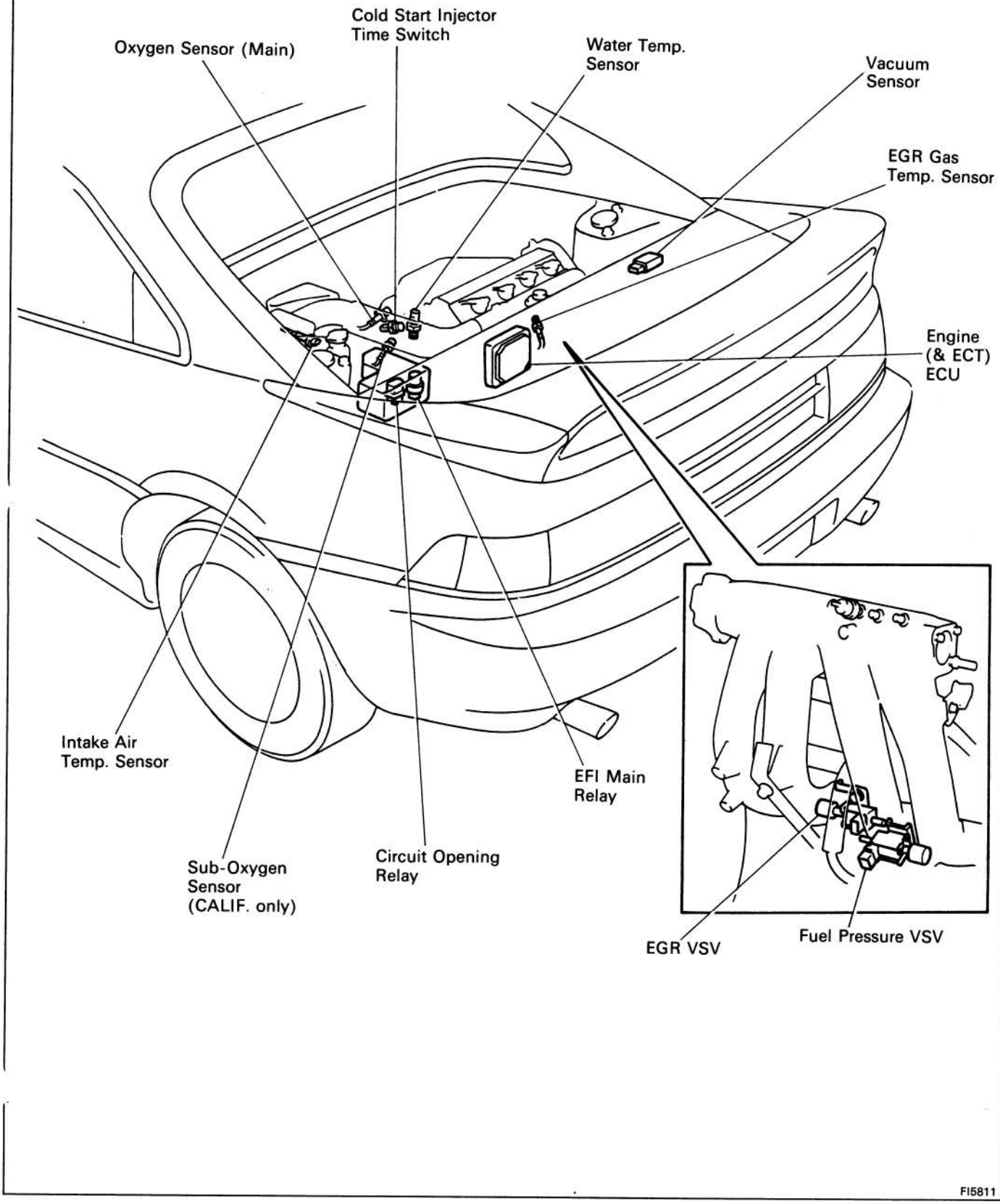


FI5786

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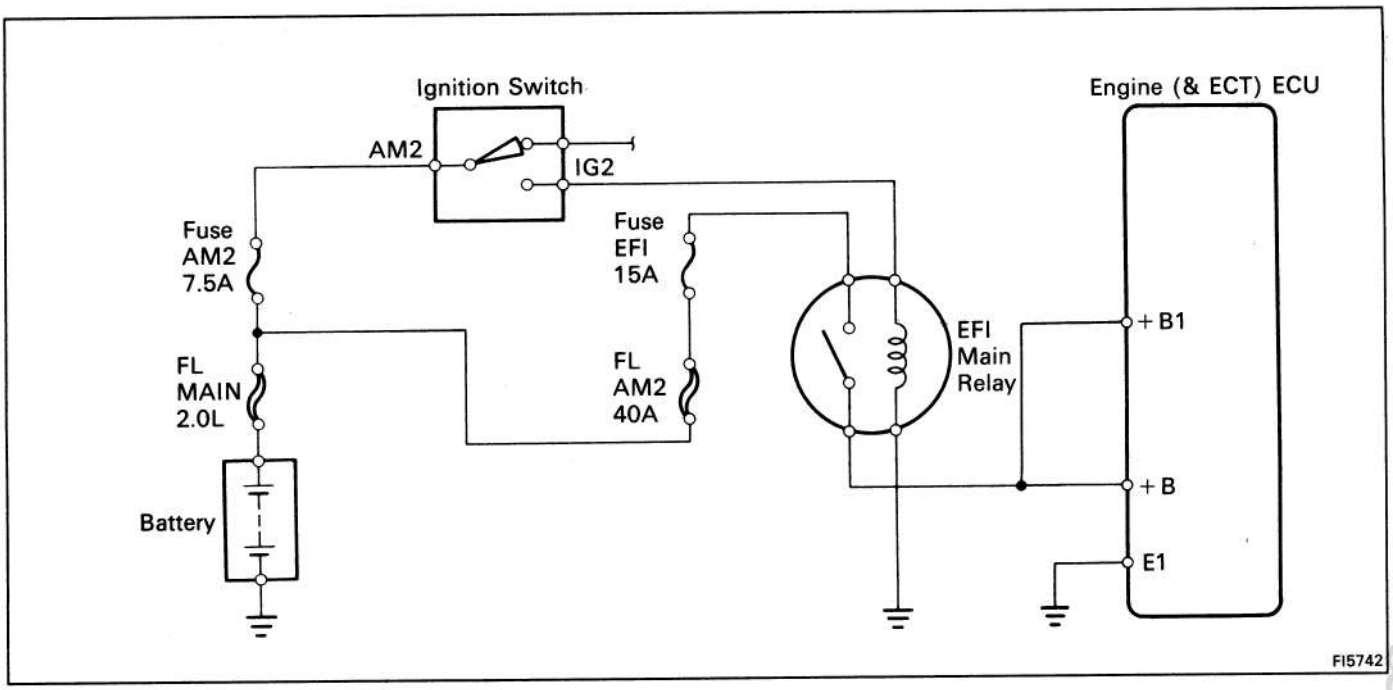
Location of Electronic Control Parts (Cont'd)

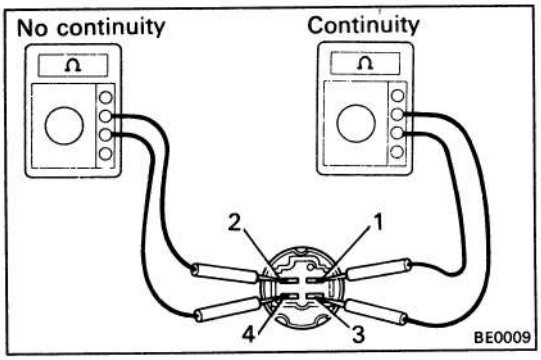
5S-FE

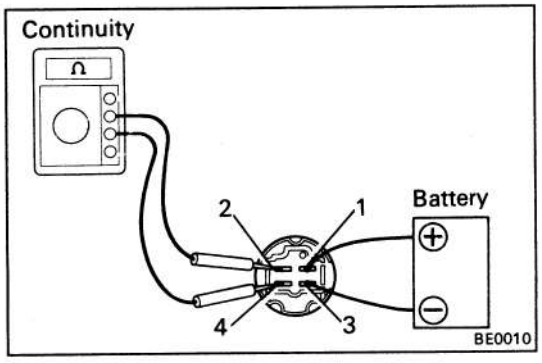


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EFI Main Relay







INSPECTION OF EFI MAIN RELAY

1. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

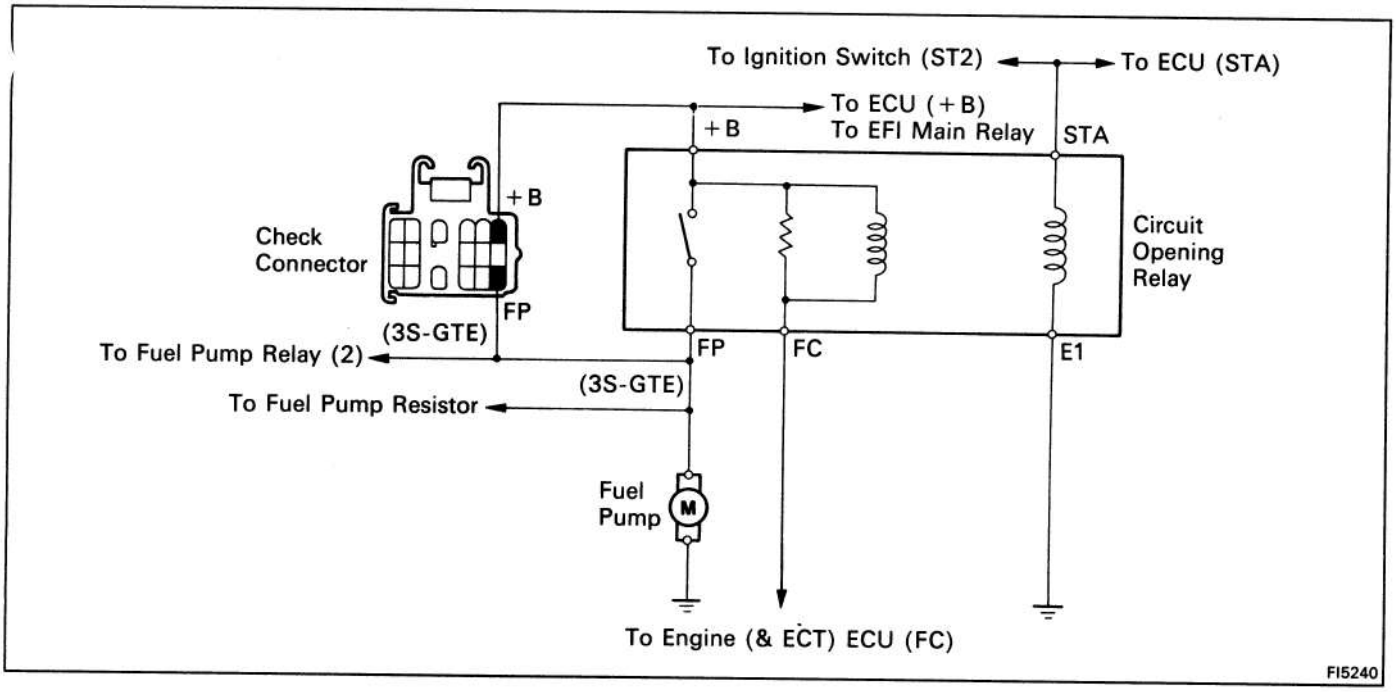
(a) Apply battery voltage across terminals 1 and 3.

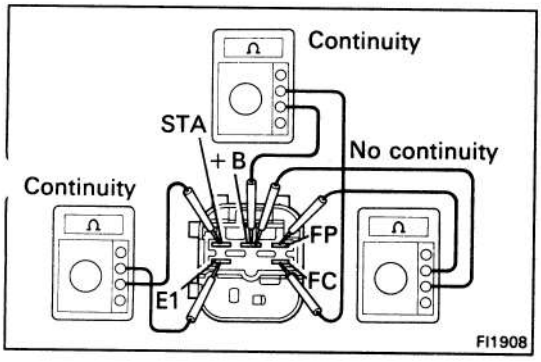
(b) Using an ohmmeter, check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

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Circuit Opening Relay





INSPECTION OF CIRCUIT OPENING RELAY

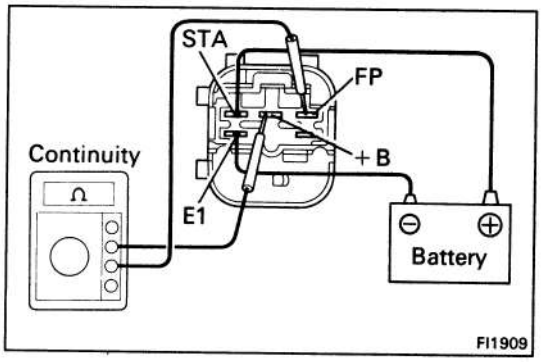
1. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals STA and E1.

(b) Check that there is continuity between terminals +B and FC.

(c) Check that there is no continuity between terminals +B and FP.

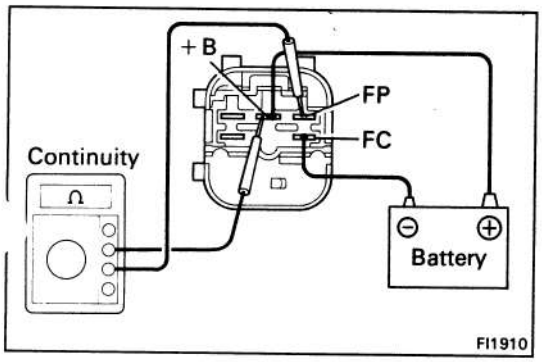
If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals STA and E1.

(b) Using an ohmmeter, check that there is continuity between terminals +B and FP.



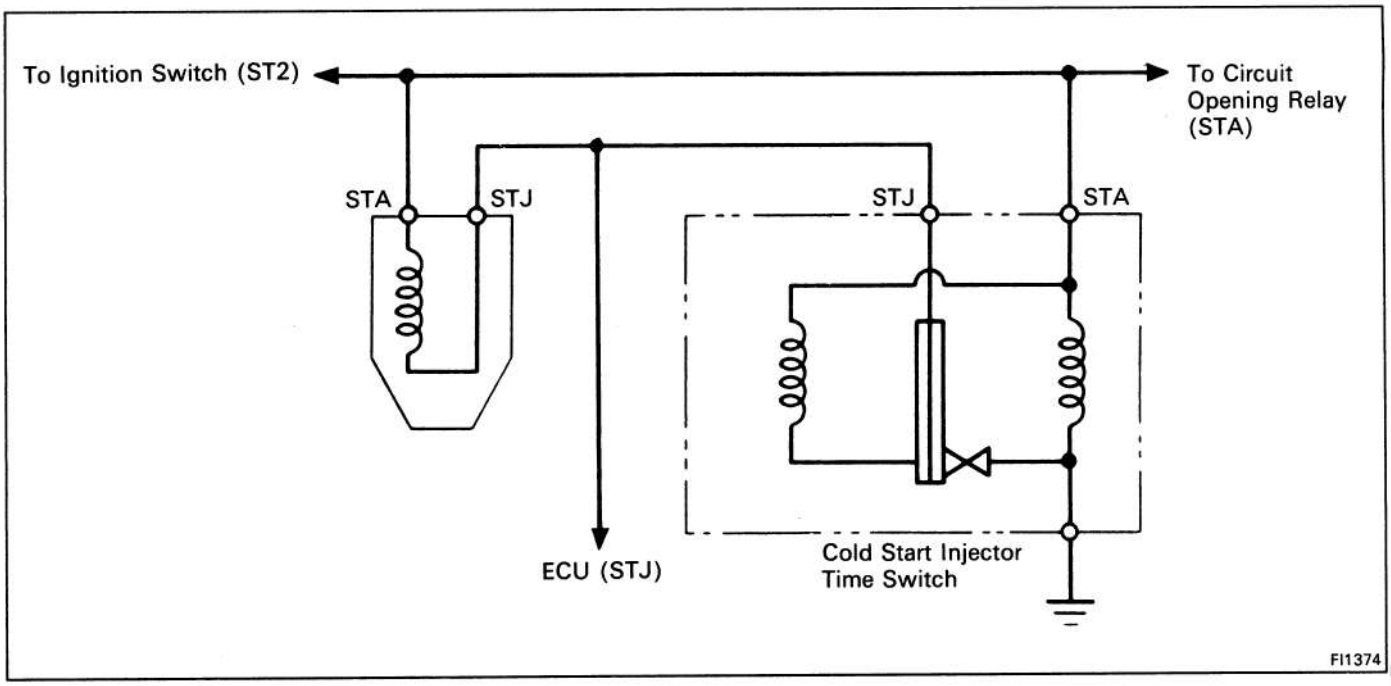
(c) Apply battery voltage across terminals +B and FC.

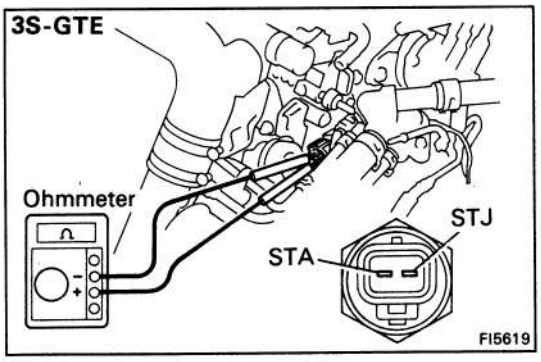
(d) Check that there is continuity between terminals +B and FP.

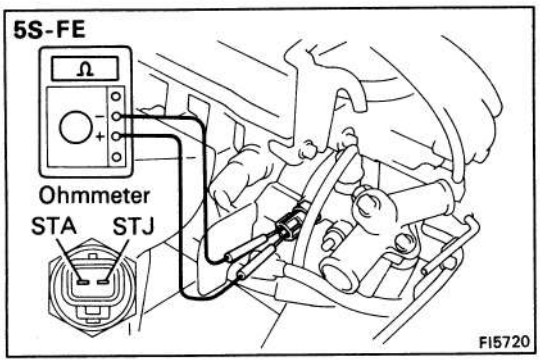
If operation is not as specified, replace the relay.

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Cold Start Injector Time Switch







INSPECTION OF COLD START INJECTOR TIME SWITCH

INSPECT COLD START INJECTOR TIME SWITCH

Using an ohmmeter, measure the resistance between each terminal.

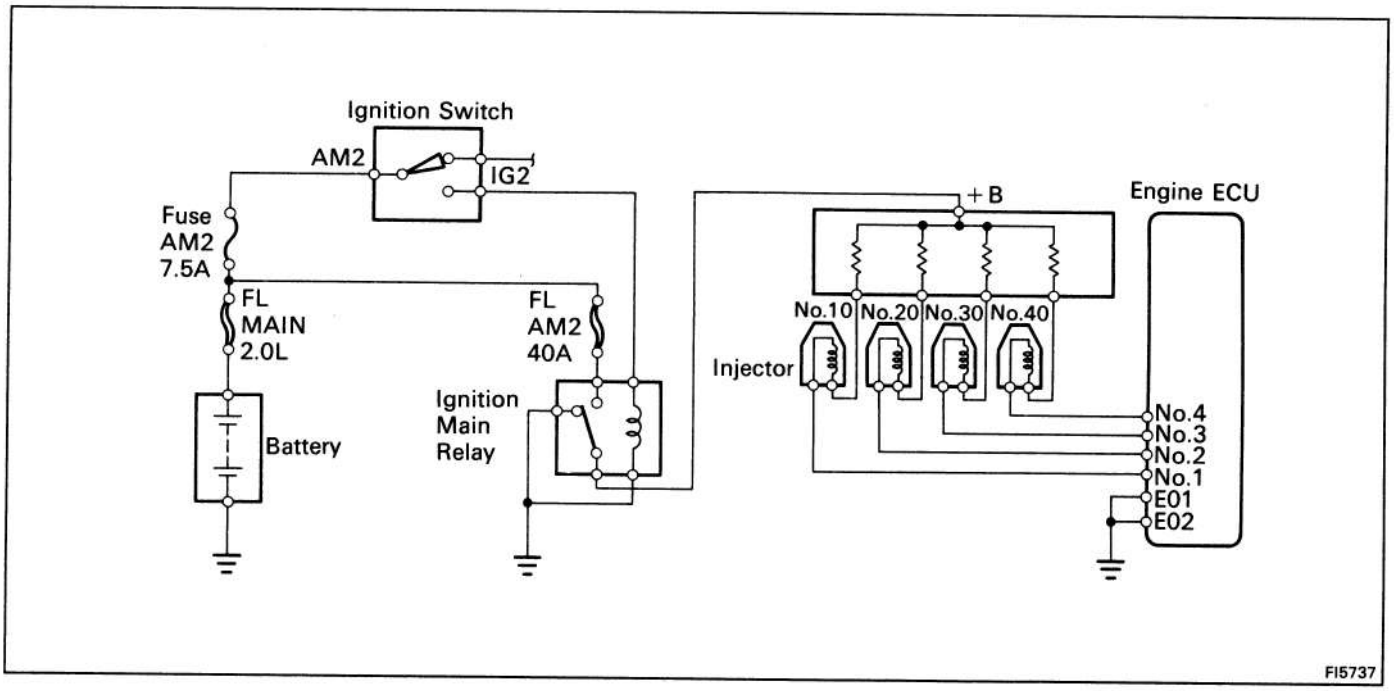
Resistance:

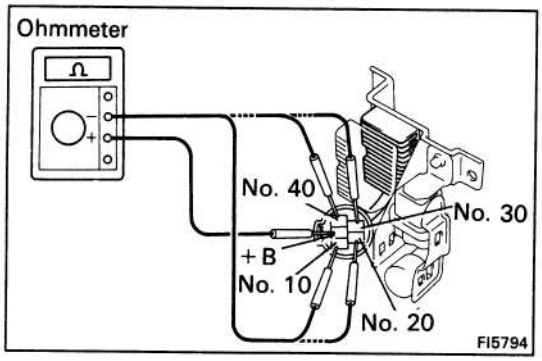
3S-GTE		
	STA – STJ	**30 – 50 Ω**
		below 10°C (50°F)
		70 – 90 Ω
		above 25°C (77°F)
	STA – Ground	**30 – 90 Ω**
5S-FE		
	STA – STJ	**20 – 40 Ω**
		below 30°C (86°F)
		40 – 60 Ω
		above 40°C (104°F)
	STA – Ground	**20 – 80 Ω**

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

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Solenoid Resistor (3S-GTE)





INSPECTION OF SOLENOID RESISTOR

INSPECT SOLENOID RESISTOR

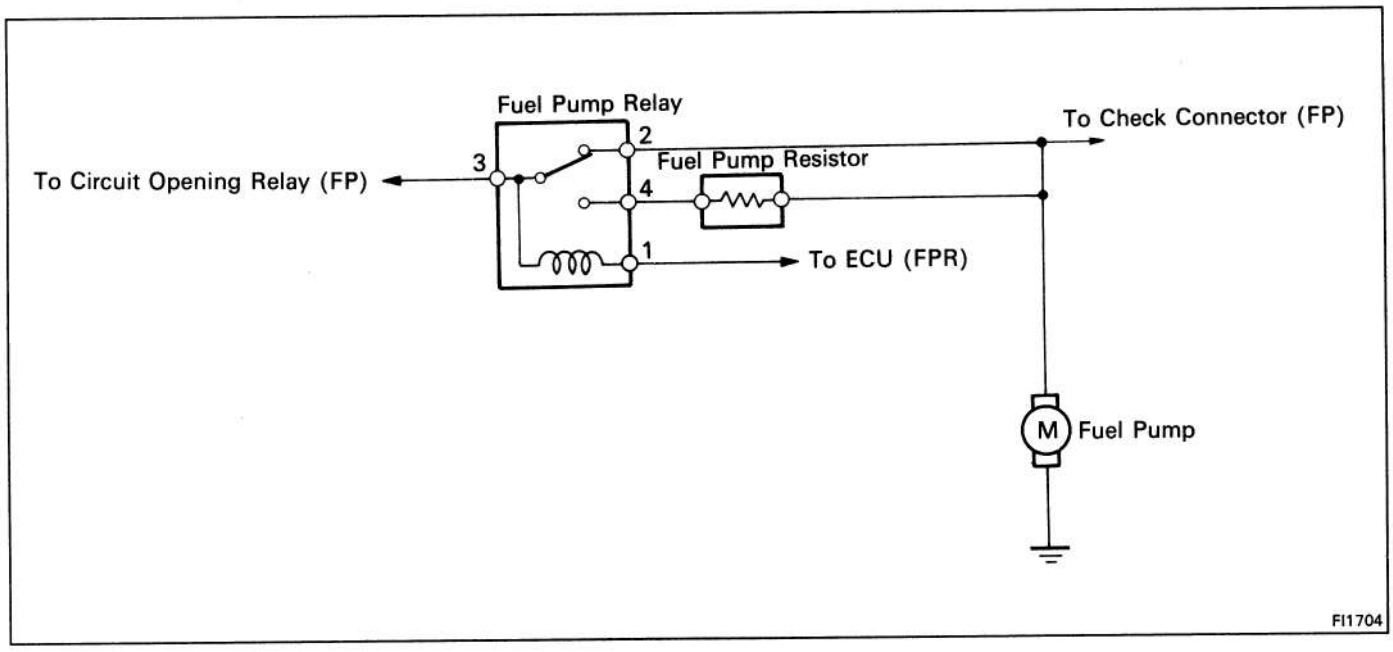
Using an ohmmeter, measure the resistance between terminal +B and other terminals.

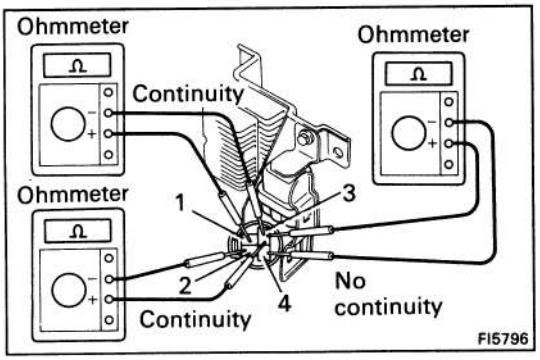
Resistance: 4 – 6 Ω

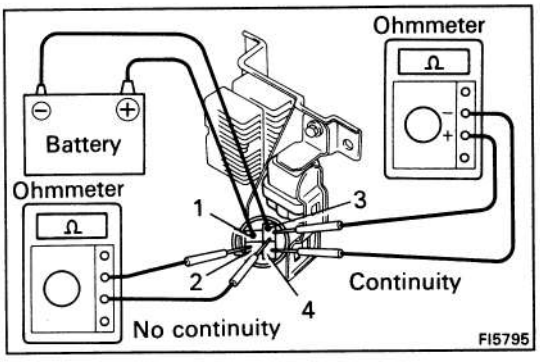
If the resistance is not as specified, replace the resistor.

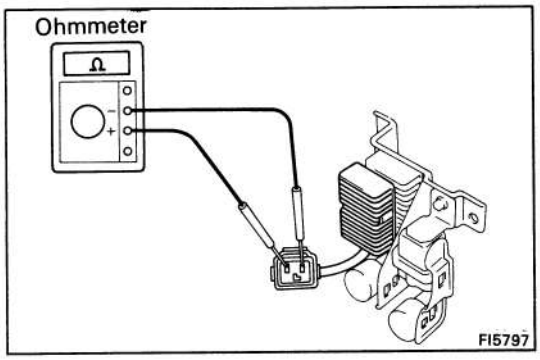
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Fuel Pump Relay and Resistor (3S-GTE)









INSPECTION OF FUEL PUMP RELAY AND RESISTOR

1. INSPECT FUEL PUMP RELAY

A. Inspect relay continuity

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is continuity between terminals 2 and 3.

(c) Check that there is no continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.

B. Inspect relay operation

(a) Apply battery voltage across terminals 1 and 3.

(b) Using an ohmmeter, check that there is no continuity between terminals 2 and 3.

(c) Check that there is continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.

2. INSPECT FUEL PUMP RESISTOR

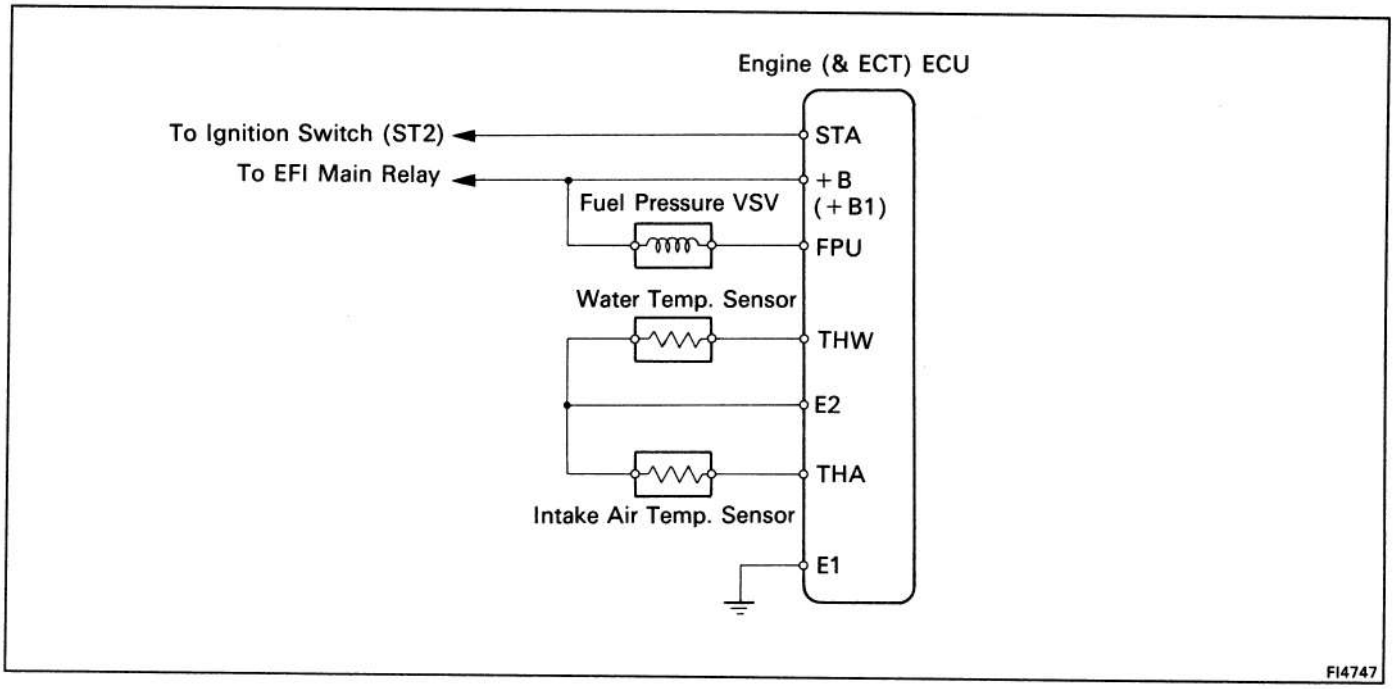
Using an ohmmeter, measure the resistance between the terminals.

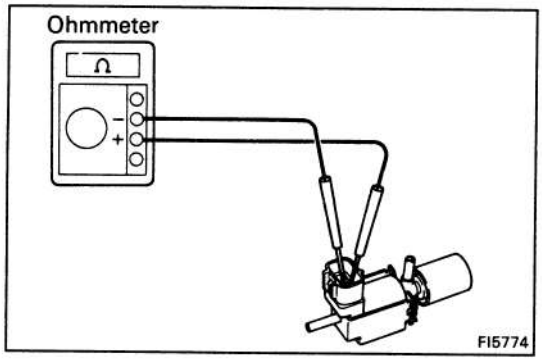
Resistance: Approx. 0.73 Ω

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

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Fuel Pressure VSV (5S-FE)





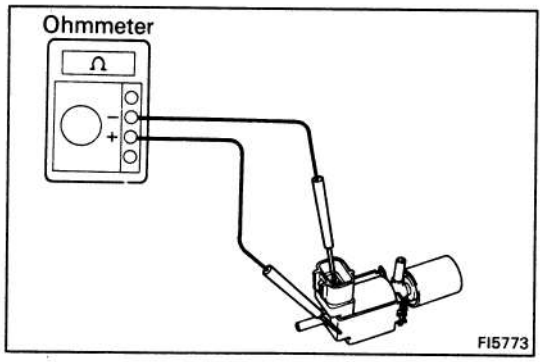
INSPECTION OF FUEL PRESSURE VSV

1. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 33 – 39 Ω

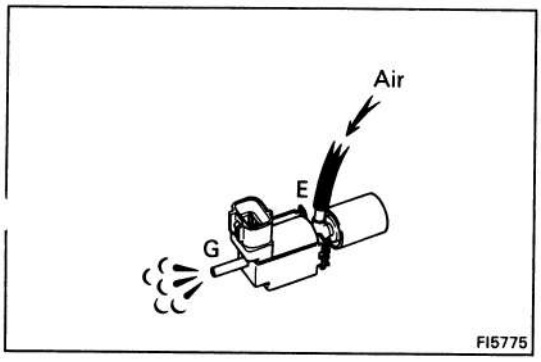
If there is no continuity, replace the VSV.



2. INSPECT VSV FOR GROUND

Using an ohmmeter, check that there is no continuity between each terminal and the body.

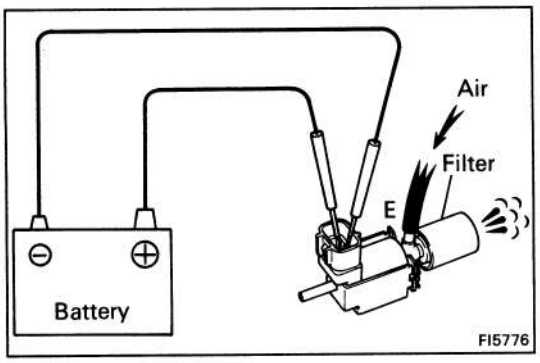
If there is continuity, replace the VSV.



3. INSPECT VSV OPERATION

(a) Check that air flows from ports E to G.

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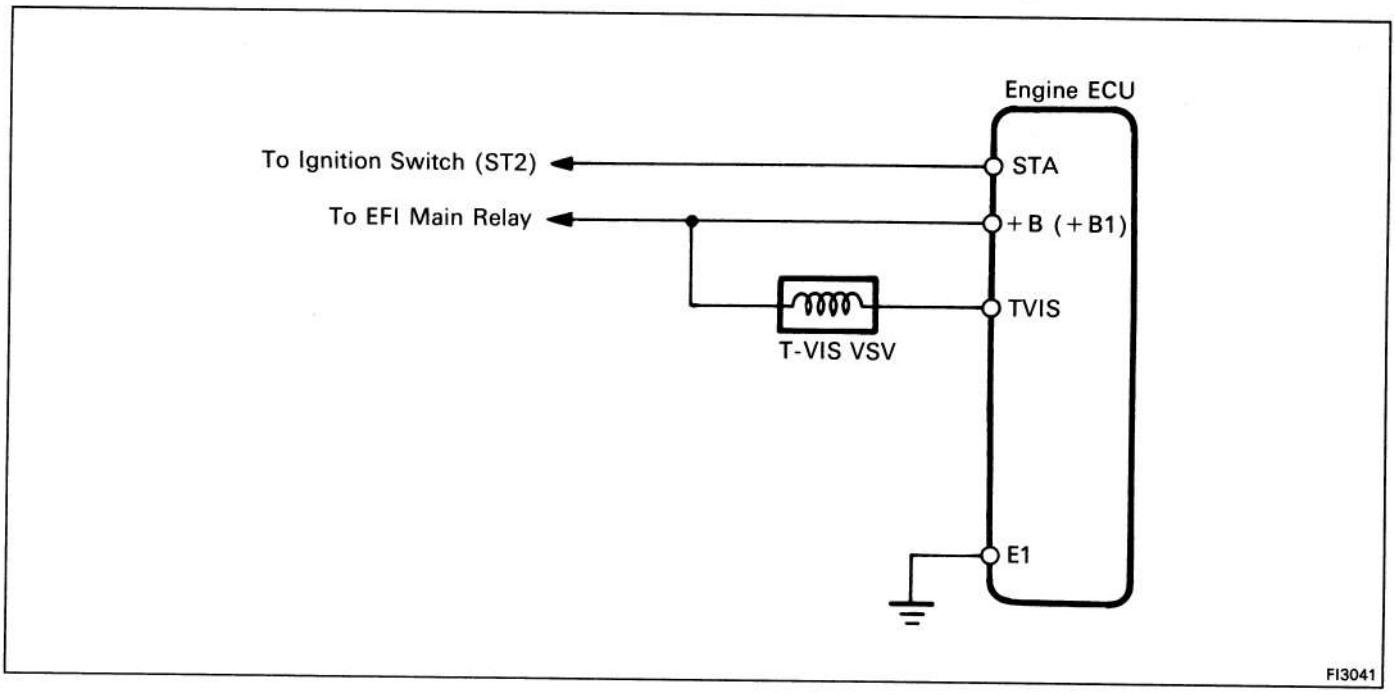
(b) Apply battery voltage across the terminals.

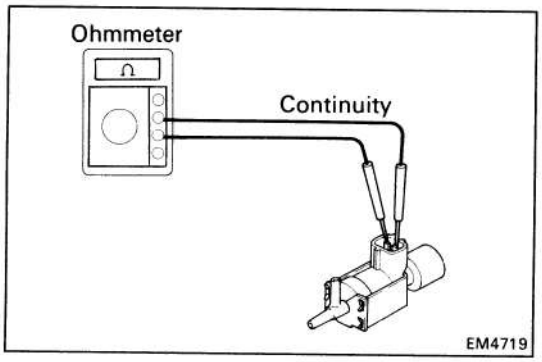
(c) Check that air flows from ports E to the filter.

If operation is not as specified, replace the VSV.

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T-VIS VSV (3S-GTE)





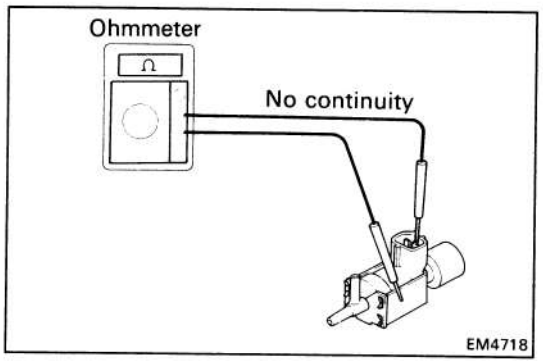
INSPECTION OF T-VIS VSV

1. **INSPECT VSV FOR OPEN CIRCUIT**

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 33 – 39 Ω

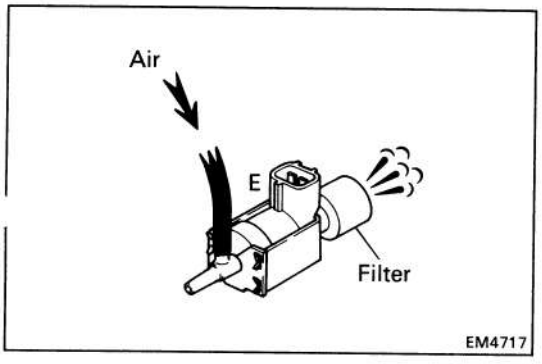
If there is no continuity, replace the VSV.



2. **INSPECT VSV FOR GROUND**

Using an ohmmeter, check that there is no continuity between each terminal and the body.

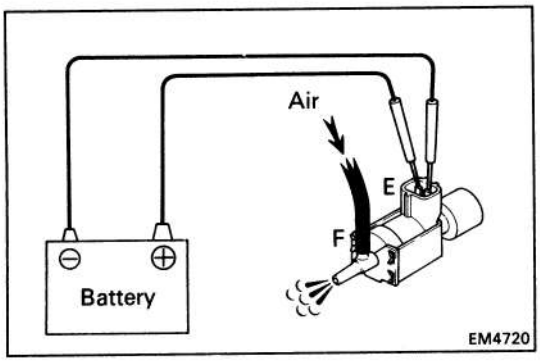
If there is continuity, replace the VSV.



3. **INSPECT VSV OPERATION**

(a) Check that air flows from port E to the filter.

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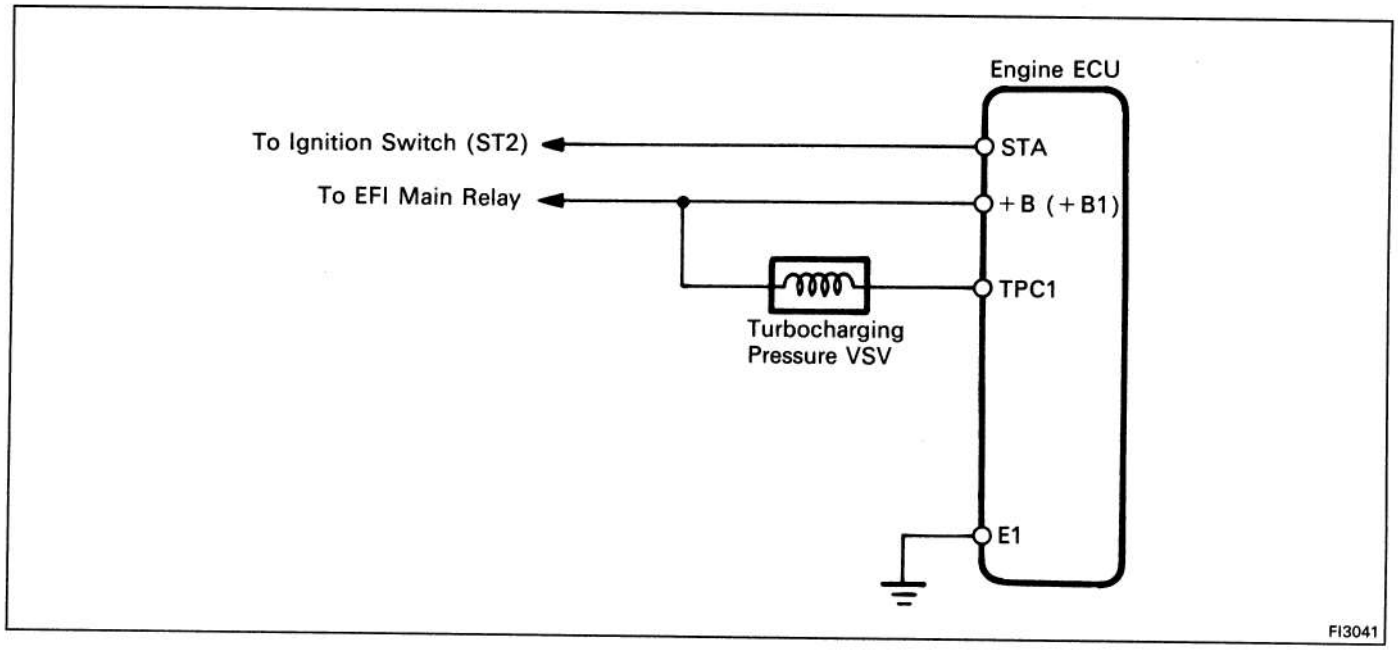


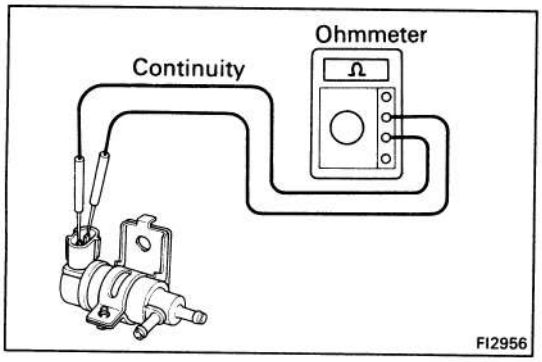
(b) Apply battery voltage across the terminals.
(c) Check that air flows from ports E to F.

If operation is not as specified, replace the VSV.

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Turbocharging Pressure VSV (3S-GTE)





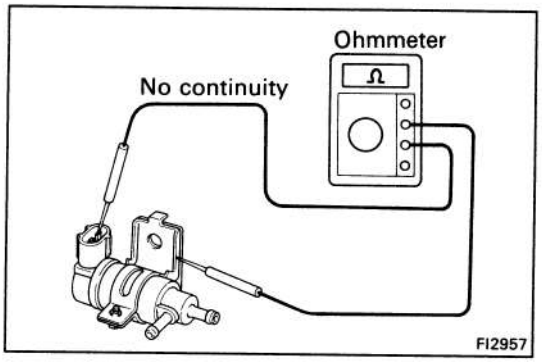
INSPECTION OF TURBOCHARGING PRESSURE VSV

1. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 24 – 30 Ω

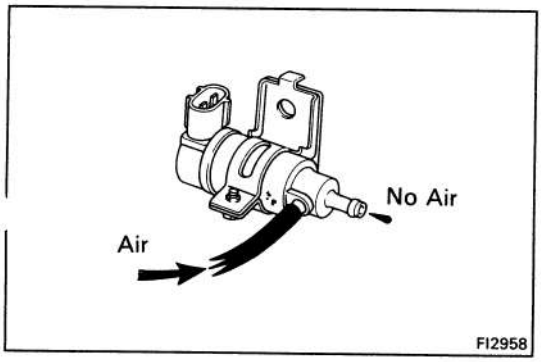
If there is no continuity, replace the VSV.



2. INSPECT VSV FOR GROUND

Using an ohmmeter, check that there is no continuity between each terminal and the body.

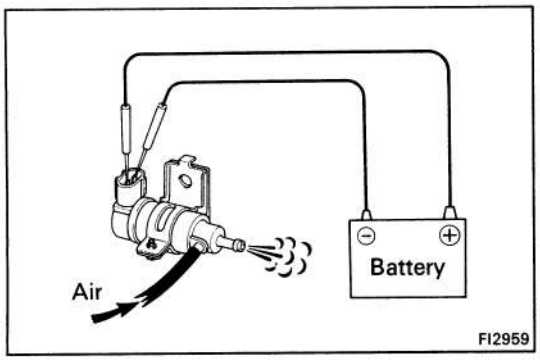
If there is continuity, replace the VSV.



3. INSPECT VSV OPERATION

(a) Check that air does not flow from ports E to F.

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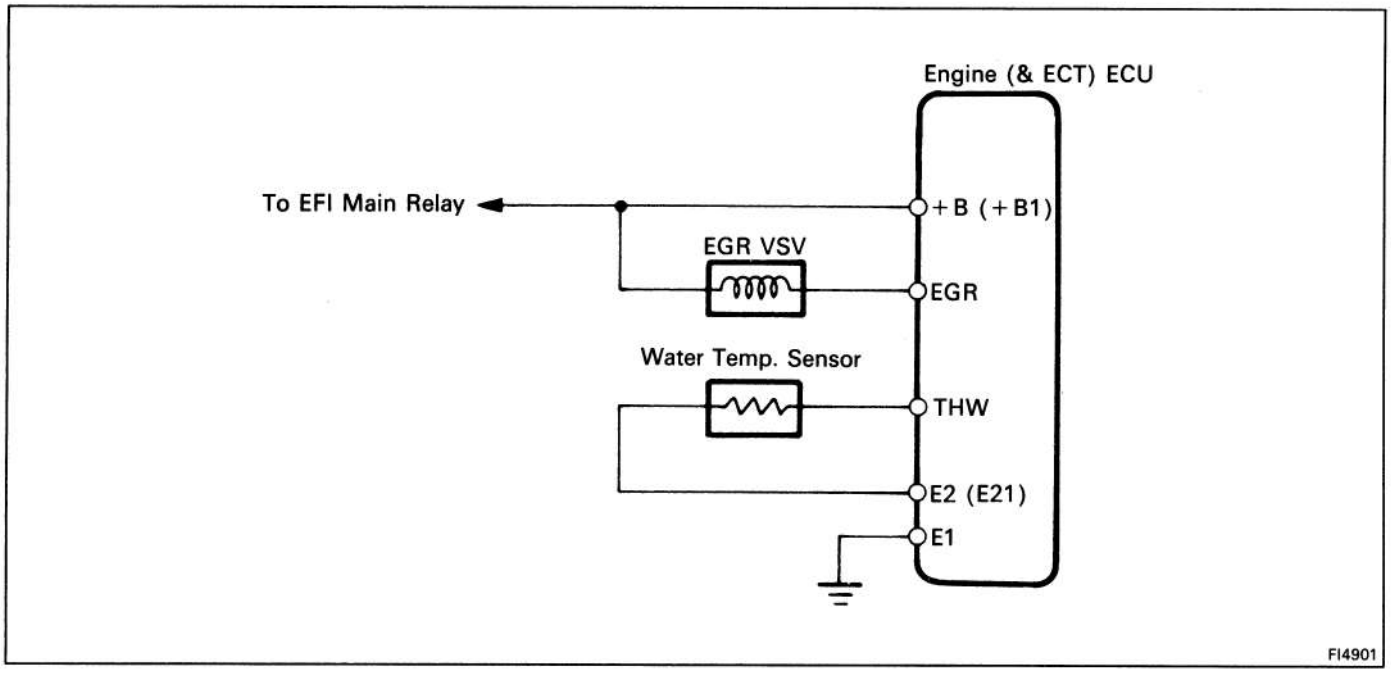


(b) Apply battery voltage across the terminals.
(c) Check that air flows from ports E to F.

If operation is not as specified, replace the VSV.

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EGR VSV

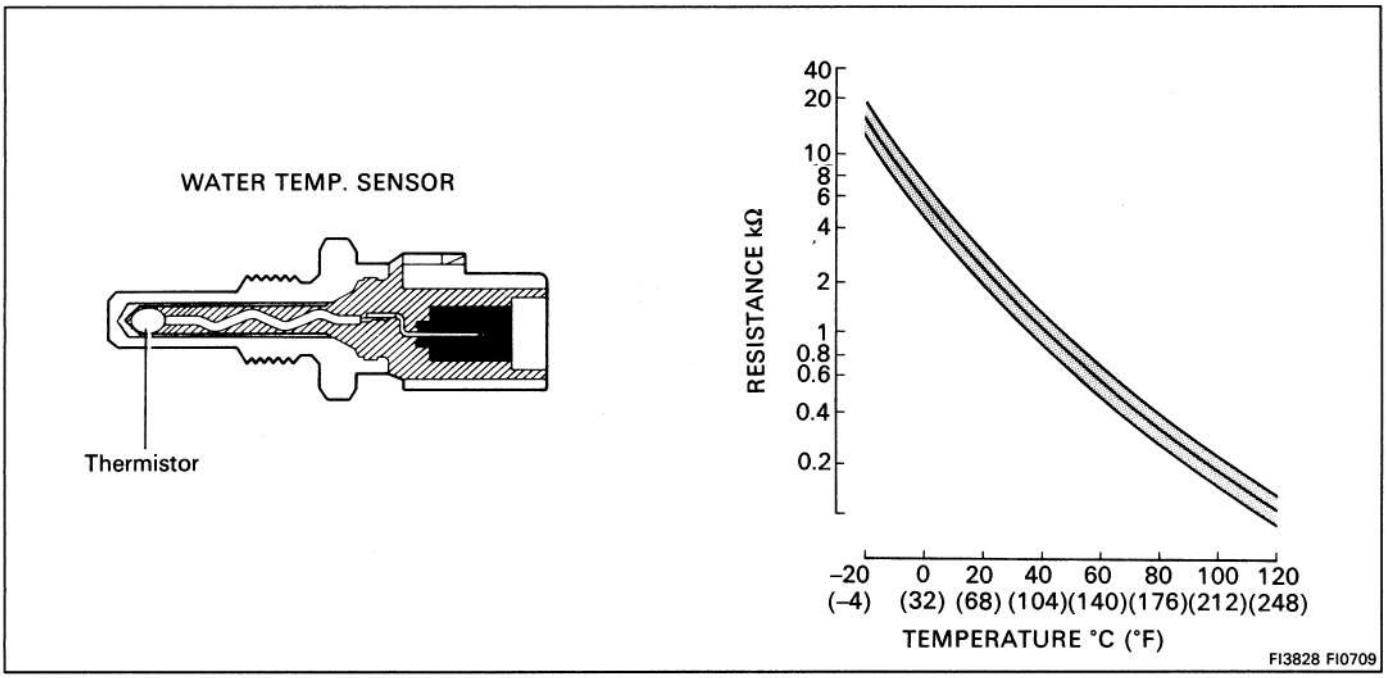


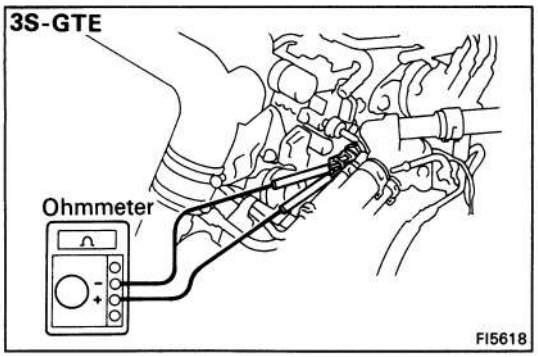
INSPECTION OF EGR VSV

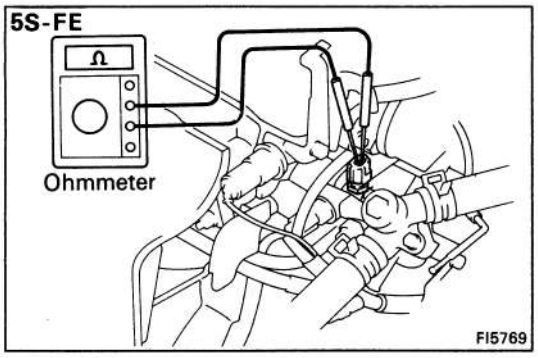
3S-GTE (See page EC-10)
5S-FE (See page EC-24)

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Water Temperature Sensor







INSPECTION OF WATER TEMPERATURE SENSOR

INSPECT WATER TEMPERATURE SENSOR

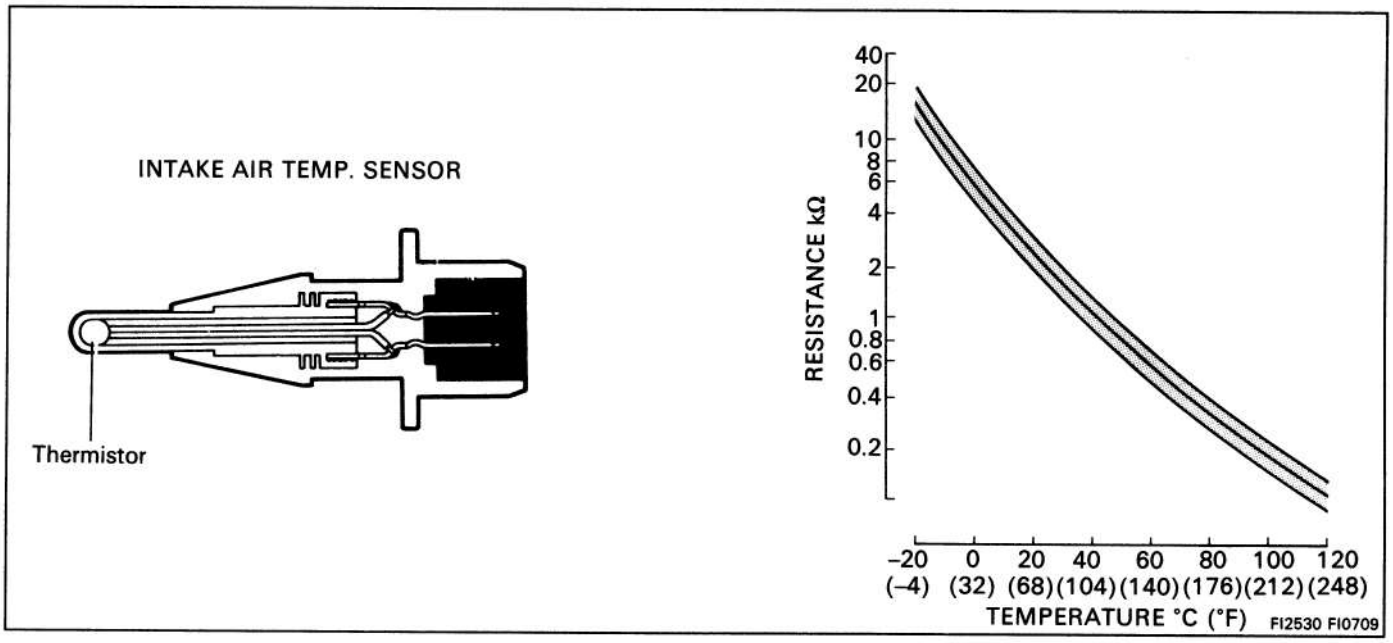
Using an ohmmeter, measure the resistance between the terminals.

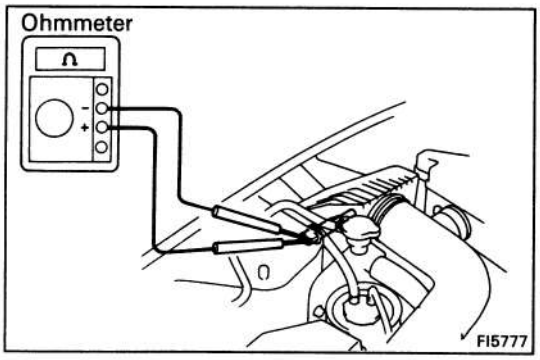
Resistance: Refer to the chart above

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

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Intake Air Temperature Sensor (5S-FE)





INSPECTION OF INTAKE AIR TEMPERATURE SENSOR

INSPECT RESISTANCE OF INTAKE AIR TEMPERATURE SENSOR

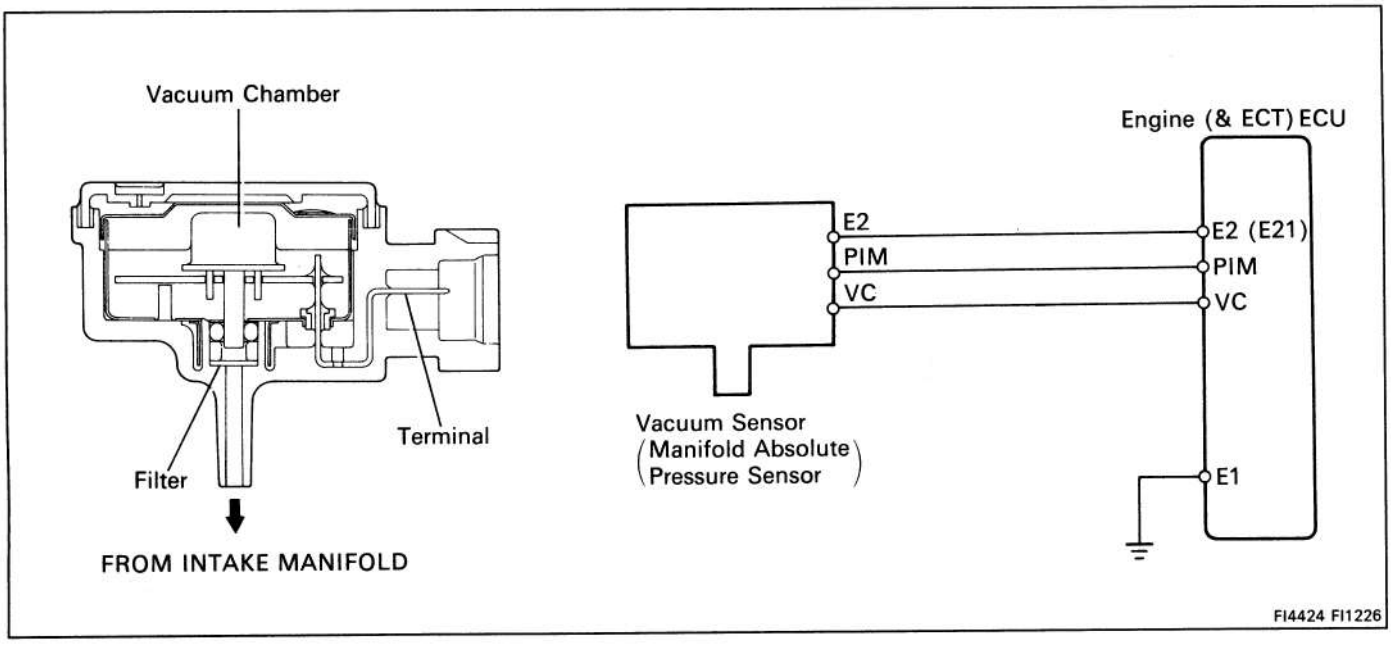
Using an ohmmeter, measure the resistance between the terminals.

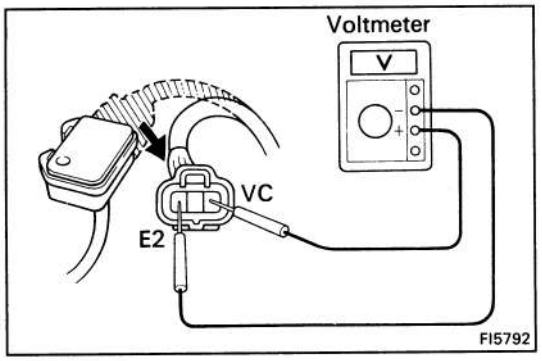
Resistance: Refer to the chart above

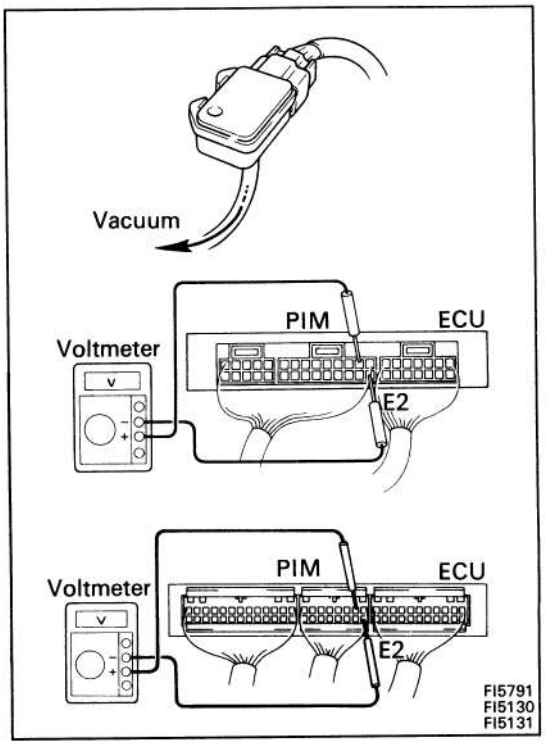
If the resistance is not as specified, replace the sensor.

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Vacuum Sensor (Manifold Absolute Pressure Sensor) (5S-FE)







INSPECTION OF VACUUM SENSOR

1. INSPECT POWER SOURCE VOLTAGE OF VACUUM SENSOR

(a) Disconnect the vacuum sensor connector.

(b) Turn the ignition switch ON.

(c) Using a voltmeter, measure the voltage between terminals VC and E2.

Voltage: 4.5 – 5.5 V

(d) Disconnect the vacuum sensor connector.

2. INSPECT POWER OUTPUT OF VACUUM SENSOR

(a) Turn the ignition switch ON.

(b) Disconnect the vacuum hose of the intake manifold (chamber) side.

(c) Connect a voltmeter to terminals PIM and E2 of the ECU, and measure and record the output voltage under ambient atmospheric pressure.

(d) Apply vacuum to the vacuum sensor in 100 mmHg (3.94 in.Hg, 13.3 kPa) segments to 500 mmHg (19.69 in.Hg, 66.7 kPa).

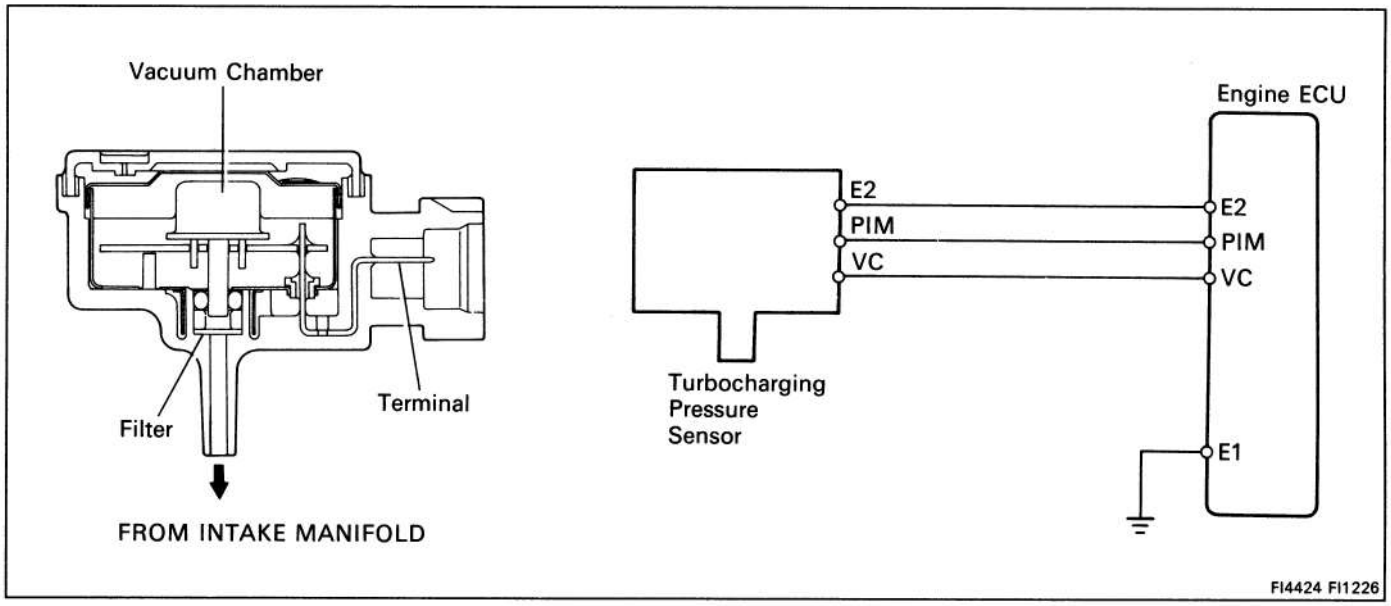
(e) Measure voltage drop from step (c) above for each segment.

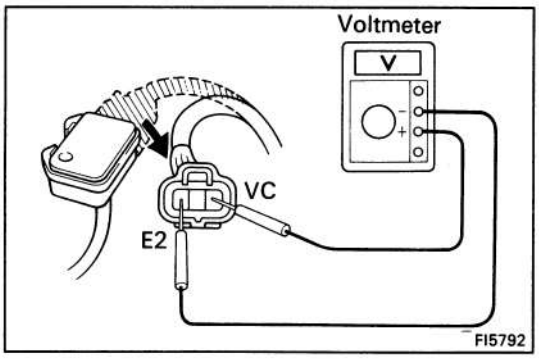
Voltage drop

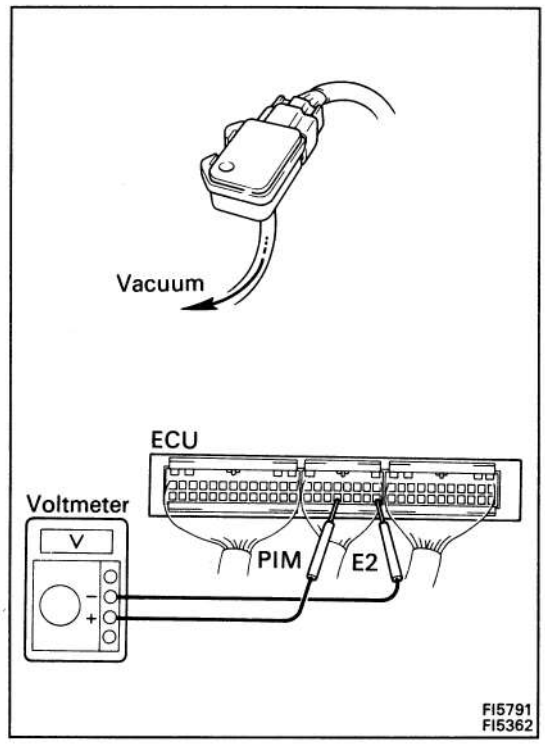
Applied Vacuum mmHg in.Hg. kPa	100 3.94 13.3	200 7.87 26.7	300 11.81 40.0	400 15.75 53.3	500 19.69 66.7
Voltage drop V	0.3 – 0.5	0.7 – 0.9	1.1 – 1.3	1.5 – 1.7	1.9 – 2.1

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Turbocharging Pressure Sensor (3S-GTE)







INSPECTION OF TURBOCHARGING PRESSURE SENSOR

1. INSPECT POWER SOURCE VOLTAGE OF TURBOCHARGING PRESSURE SENSOR

(a) Disconnect the pressure sensor connector.

(b) Turn the ignition switch ON.

(c) Using a voltmeter, measure the voltage between terminals VC and E2.

Voltage: 4.5 – 5.5 V

(d) Reconnect the pressure sensor connector.

2. INSPECT POWER OUTPUT OF TURBOCHARGING PRESSURE SENSOR

(a) Turn the ignition switch ON.

(b) Disconnect the vacuum hose of the intake manifold (chamber) side.

(c) Connect a voltmeter to terminals PIM and E2 of the ECU, and measure and record the output voltage under ambient atmospheric pressure.

(d) Apply vacuum to the pressure sensor in 100 mmHg (3.94 in.Hg, 13.3 kPa) segments to 500 mmHg (19.69 in.Hg, 66.7 kPa).

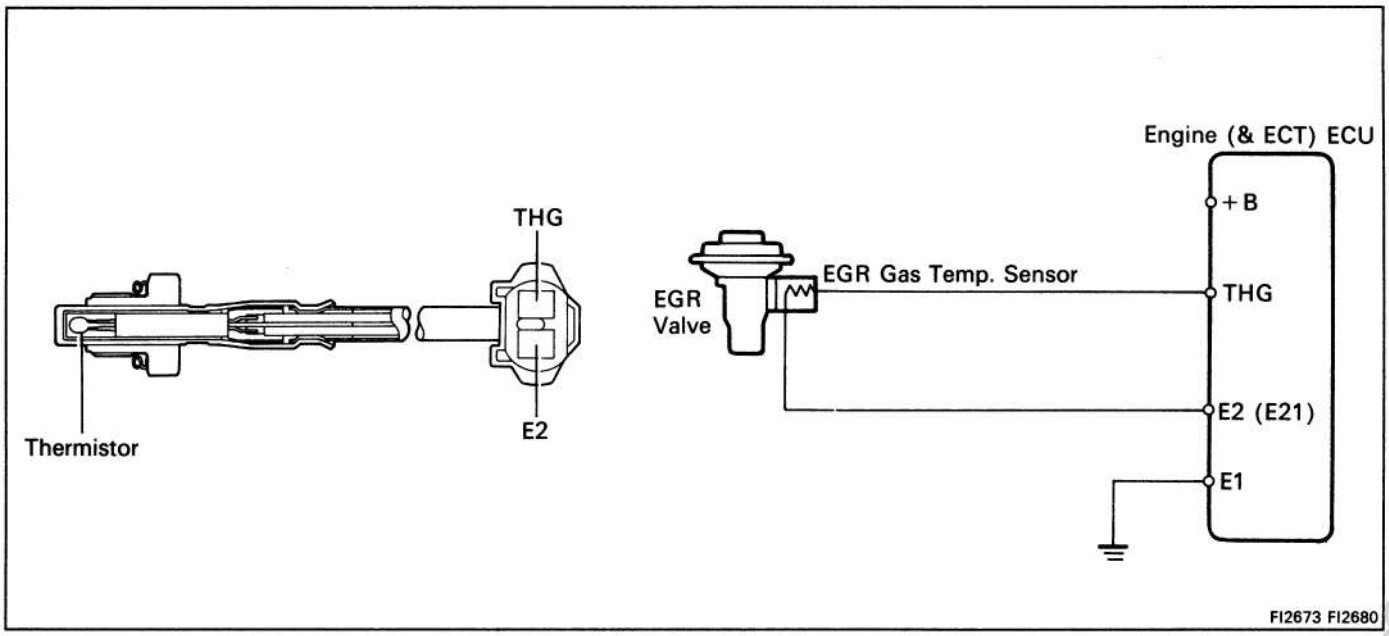
(e) Measure voltage drop from step (c) above for each segment.

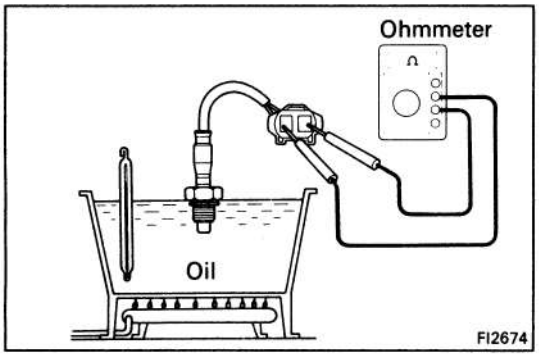
Voltage drop

Applied Vacuum mmHg in.Hg. kPa	100 3.94 13.3	200 7.87 26.7	300 11.81 40.0	400 15.75 53.3	500 19.69 66.7
Voltage drop V	0.15 – 0.35	0.4 – 0.6	0.65 – 0.85	0.9 – 1.1	1.15 – 1.35

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EGR Gas Temperature Sensor (3S-GTE and 5S-FE (CALIF. only))





INSPECTION OF EGR GAS TEMPERATURE SENSOR

INSPECT EGR GAS TEMPERATURE SENSOR

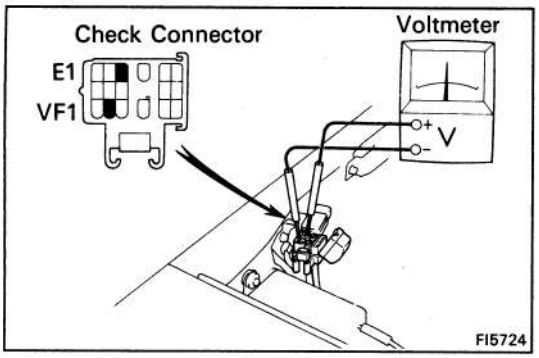
Using an ohmmeter, measure the resistance between the terminals.

Resistance:

69.40 – 88.50 kΩ at 50°C (112°F)
11.89 – 14.37 kΩ at 100°C (212°F)
2.79 – 3.59 kΩ at 150°C (302°F)

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

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Oxygen Sensor (Main)

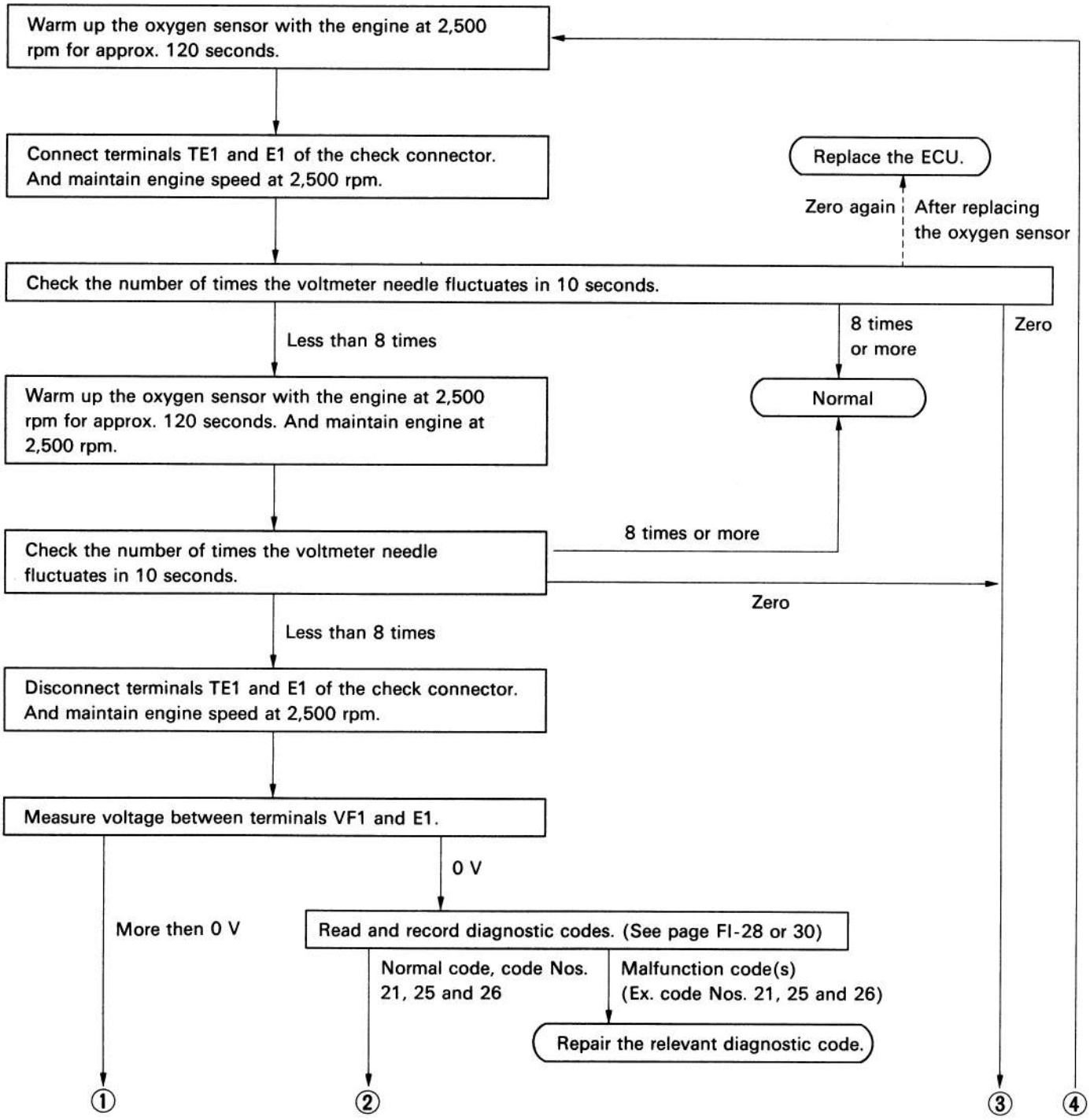
INSPECTION OF OXYGEN SENSOR

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. INSPECT FEEDBACK VOLTAGE

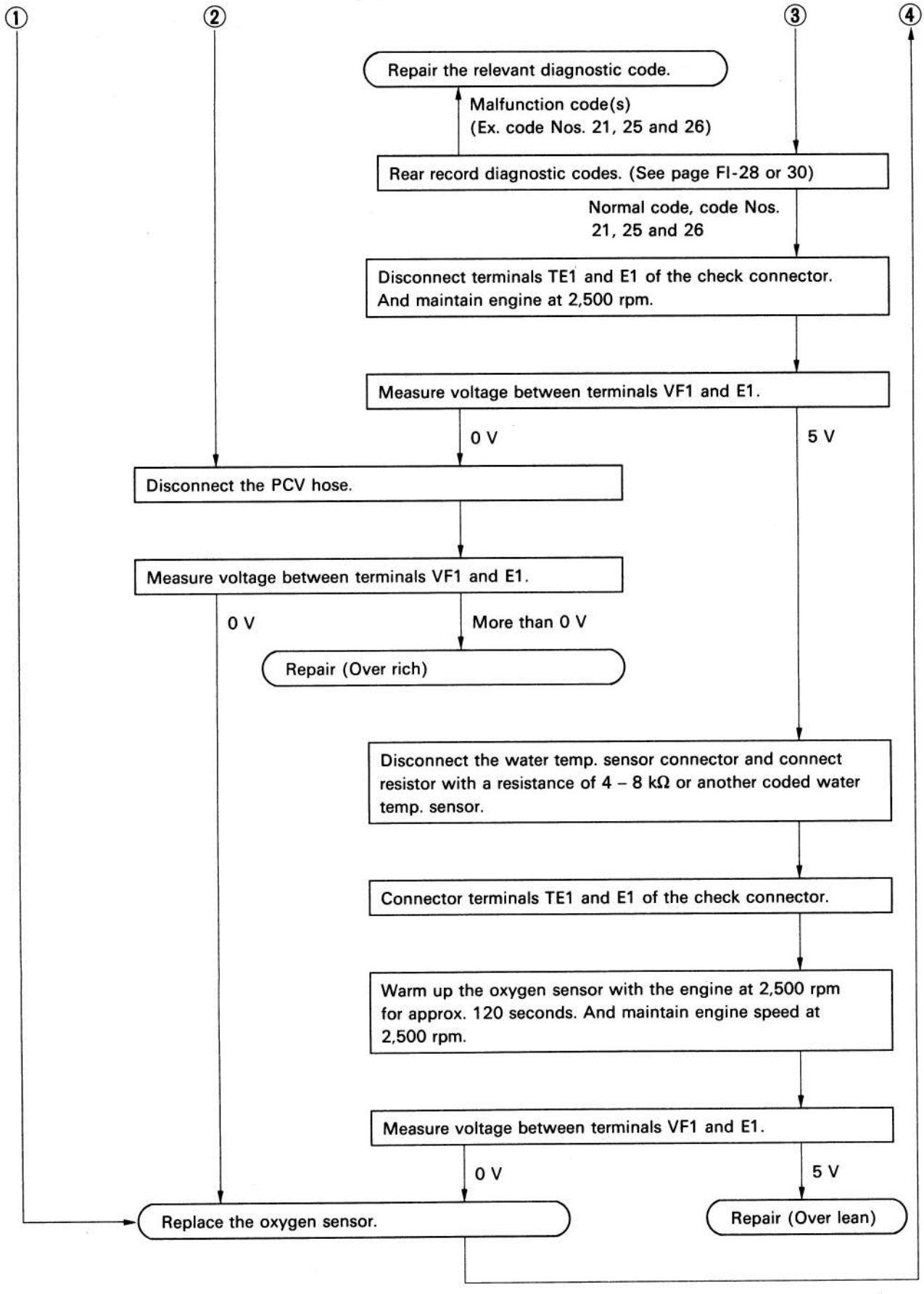
Connect the positive (+) probe of a voltmeter to terminal VF1 of the check connector, and negative (–) probe to terminal E1. Perform the test as follows:



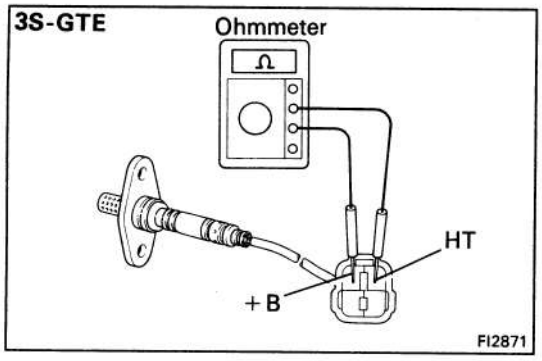
CONTINUED ON PAGE FI-174

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3. (3S-GTE)
INSPECT HEATER RESISTANCE OF OXYGEN SENSOR

Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 5.1 – 6,3 kΩ 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.

(a) Cancel diagnostic code. (See page FI-26)

(b) Warm up the engine until it reaches normal operating temperature.

(c) (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.

(d) Following the conditions in step (c), press fully on the accelerator pedal for 2 seconds or more.

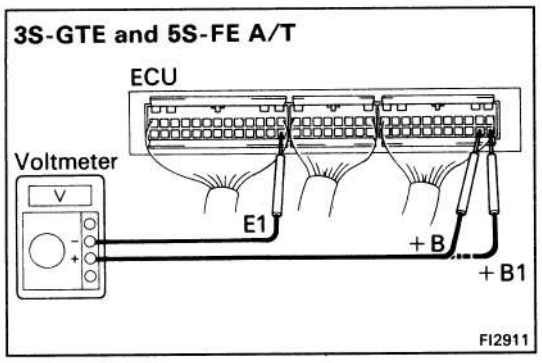
HINT: Do not exceed 100 km/h (62 mph), or diagnostic code will be cancelled.

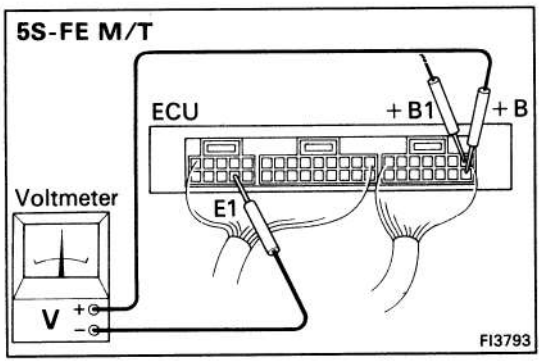
(e) Stop the vehicle and turn the ignition switch to OFF.

(f) Carry out steps (b), (c) and (d) again to test acceleration.

If code No. 27 reappears again, check the sub-oxygen sensor circuit. If the circuit is normal, replace the sub-oxygen sensor.

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Electronic Controlled 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. 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.

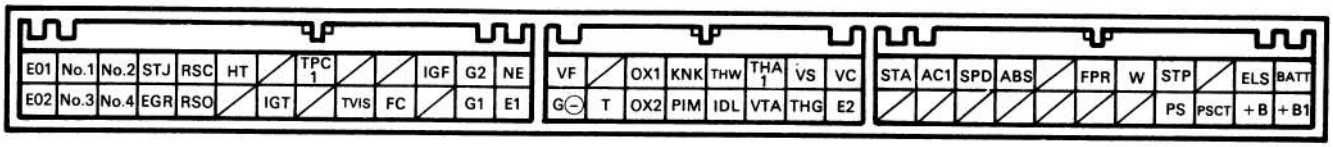
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Voltage at ECU Wiring Connectors (3S-GTE)

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	4 – 6
VTA – E2		Throttle valve fully closed	0.1 – 1.0
		Throttle valve fully open	3.2 – 4.2
VC – E2		–	4 – 6
VS – E2		Measuring plate fully closed	3.7 – 4.3
		Measuring plate fully open	0.2 – 0.5
	Idling (No load)		2.6 – 3.6
	3,000 rpm (No load)		1.0 – 2.0
No. 1, No. 2 _ E01, No. 3 E02, No. 4	IG SW ON		10 – 14
THA1 – 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 connector connected	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
AC1– E1	IG SW ON	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
T– 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/ Regulator Gasoline *2 w/ Premium Gasoline



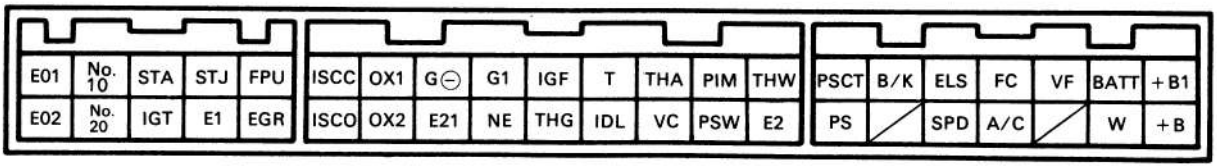
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Voltage at ECU Wiring Connectors (5S-FE M/T)

Terminals	Condition		STD voltage (V)
+B, +B1 – E1	IG SW ON		10 – 14
BATT – E1	–		10 – 14
IDL – E1	IG SW ON	Throttle valve open	8 – 14
PSW – E1		Throttle valve fully closed (Throttle opener must be cancelled first)	4.5 – 5.5
PIM – E2	IG SW ON		3.3 – 3.9
VC – E2			4.5 – 5.5
No.10, No.20 – E01, E02			10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.7 – 3.1
THW – E2		Coolant temp. 80°C (176°F)	0.3 – 0.8
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		0.8 – 1.2
ISCC, ISCO – E1	IG SW ON		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
T – E1		Check connector TE1 – E1 not connected	10 – 14
		Check connector TE1 – E1 connected	1 or less
B/K – E1	Stop light SW ON (Brake pedal depressed)		10 – 14

Engine ECU Terminals



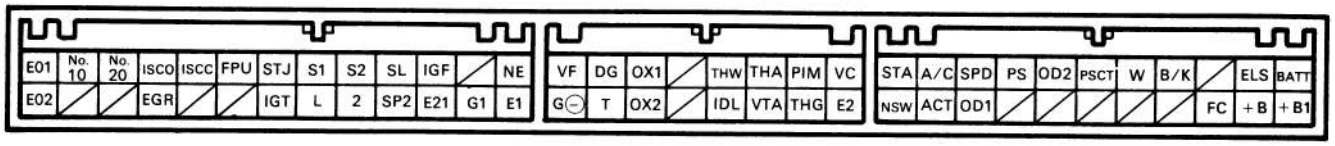
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Voltage at ECU Wiring Connectors (5S-FE A/T)

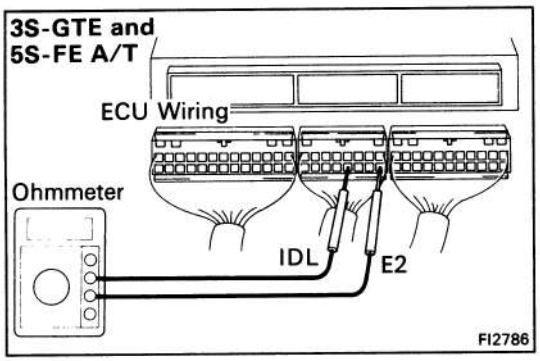
Terminals	Condition		STD voltage (V)
+B, +B1 – E1	IG SW ON		10 – 14
BATT – E1	–		10 – 14
IDL – E2	IG SW ON	Throttle valve open	8 – 14
VTA – E2	IG SW ON	Throttle valve fully closed (Throttle opener must be cancelled first)	0.8 – 1.2
	IG SW ON	Throttle valve fully open	3.2 – 4.2
PIM – E2	IG SW ON		3.3 – 3.9
VC– E2	IG SW ON		4.5 – 5.5
No.10 – E01, No.20 – E02	IG SW ON		10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.7 – 3.1
THW – E2	IG SW ON	Coolant temp. 80°C (176°F)	0.3 – 0.8
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		0.8 – 1.2
ISCC, ISCO – E1	IG SW ON		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	IG SW ON	Air conditioning ON	4.5 – 5.5
T – E1	IG SW ON	Check connector TE1 – E1 not connected	10 – 14
	IG SW ON	Check connector TE1 – E1 connected	1 or less
NSW – E1	IG SW ON	Neutral start switch P or N range	0 – 2
	IG SW ON	Ex. neutral start switch P or N range	6 – 14
B/K – E1	Stop light SW ON (Brake Pedal depressed)		10 – 14

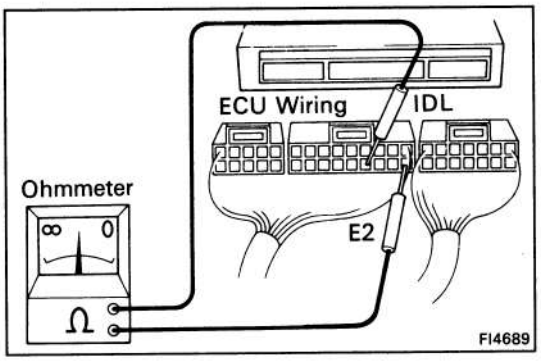
Engine & ECT ECU Terminals



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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.**

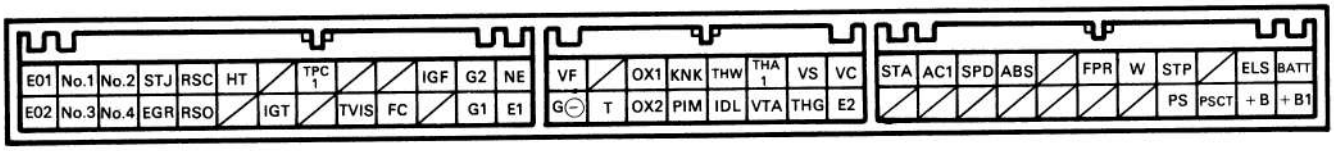
Check the resistance between each terminal of the wiring connectors.

- Disconnect the connectors from the ECU.
- Measure the resistance at each terminal.

Resistance of ECU Wiring Connectors (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	3,500 – 10,000
	Throttle valve fully closed	200 – 800
VC – E2	–	200 – 400
VS – E2	Measuring plate fully closed	200 – 600
	Measuring plate fully open	20 – 1,200
THA1 – 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⊖	–	140 – 180
NE – G⊖	–	180 – 220
RSC, RSO – +B, +B1	–	17.7 – 23.9

Engine ECU Terminals



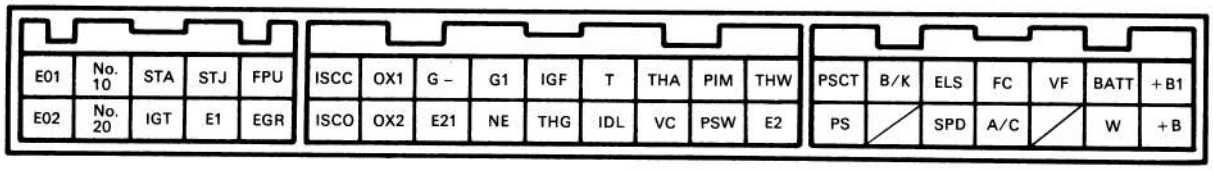
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Resistance of ECU Wiring Connectors (5S-FE M/T)

Terminals	Condition	STD resistance (Ω)
IDL – E1	Throttle valve open	Infinity
	Throttle valve fully closed (Throttle opener must be cancelled first)	0
PSW – E1	Throttle valve fully open	0
	Throttle valve fully closed (Throttle opener must be cancelled first)	Infinity
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G1, NE – G⊖	–	170 – 210
ISCC, ISCO – +B, +B1	–	19.3 – 22.3

Engine ECU Terminals

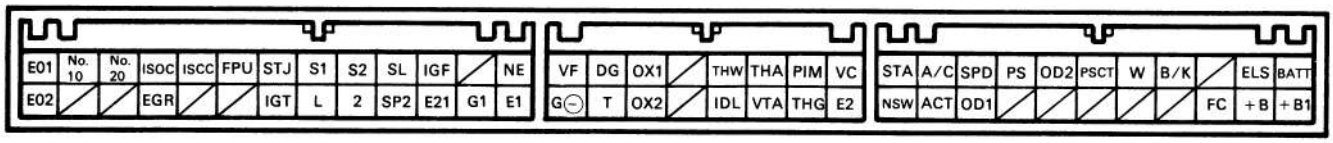


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Resistance of ECU Wiring Connectors (5S-FE A/T)

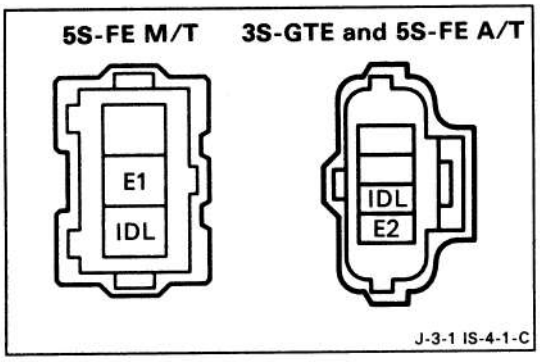
Terminals	Condition	STD resistance (Ω)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed (Throttle opener must be cancelled first)	2,300 or less
VTA – E2	Throttle valve fully open	2,300 – 10,000
	Throttle valve fully closed (Throttle opener must be cancelled first)	200 – 800
VC – E2	–	3,000 – 7,000
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G1, NE – G⊖	–	170 – 210
ISCC, ISCO – +B, +B1	–	19.3 – 22.3

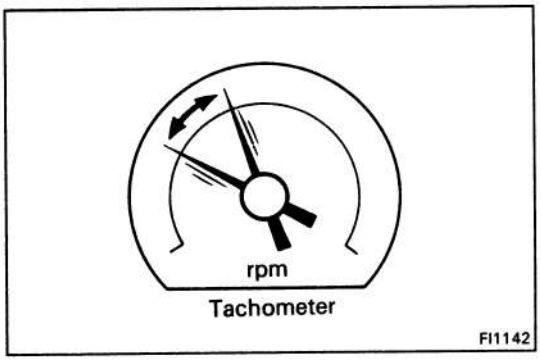
Engine & ECT ECU Terminals



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Fuel Cut RPM

INSPECTION OF FUEL CUT RPM

1. **WARM UP ENGINE**

   Allow the engine to warm up to normal operating temperature.

2. **INSPECT FUEL CUT RPM**

   (a) Disconnect the connector from the throttle position sensor.

   (b) Connect terminals IDL and E1 (5S-FE M/T) or E2 (3S-GTE and 5S-FE A/T) of the wiring connector.

   (c) Gradually raise the engine rpm and check that there is fluctuation between the fuel cut and fuel return points.

   HINT:
   - The vehicle should be stopped.
   - Measure with the A/C OFF.

Fuel cut rpm:	**3S-GTE**	**2,000 rpm**
	5S-FE	**1,600 rpm**
Fuel return rpm:	**3S-GTE**	**1,600 rpm**
	5S-FE	**1,500 rpm**

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