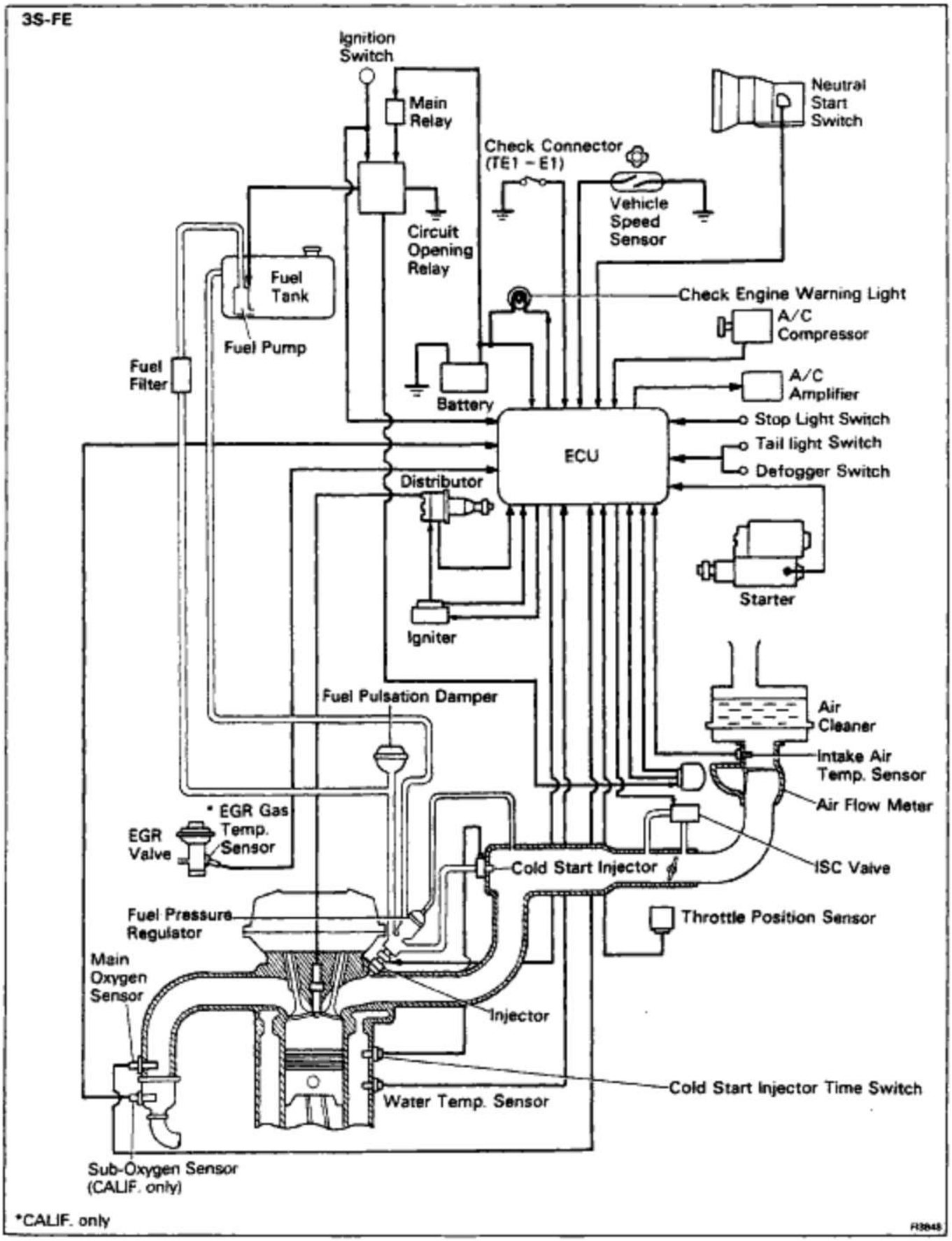
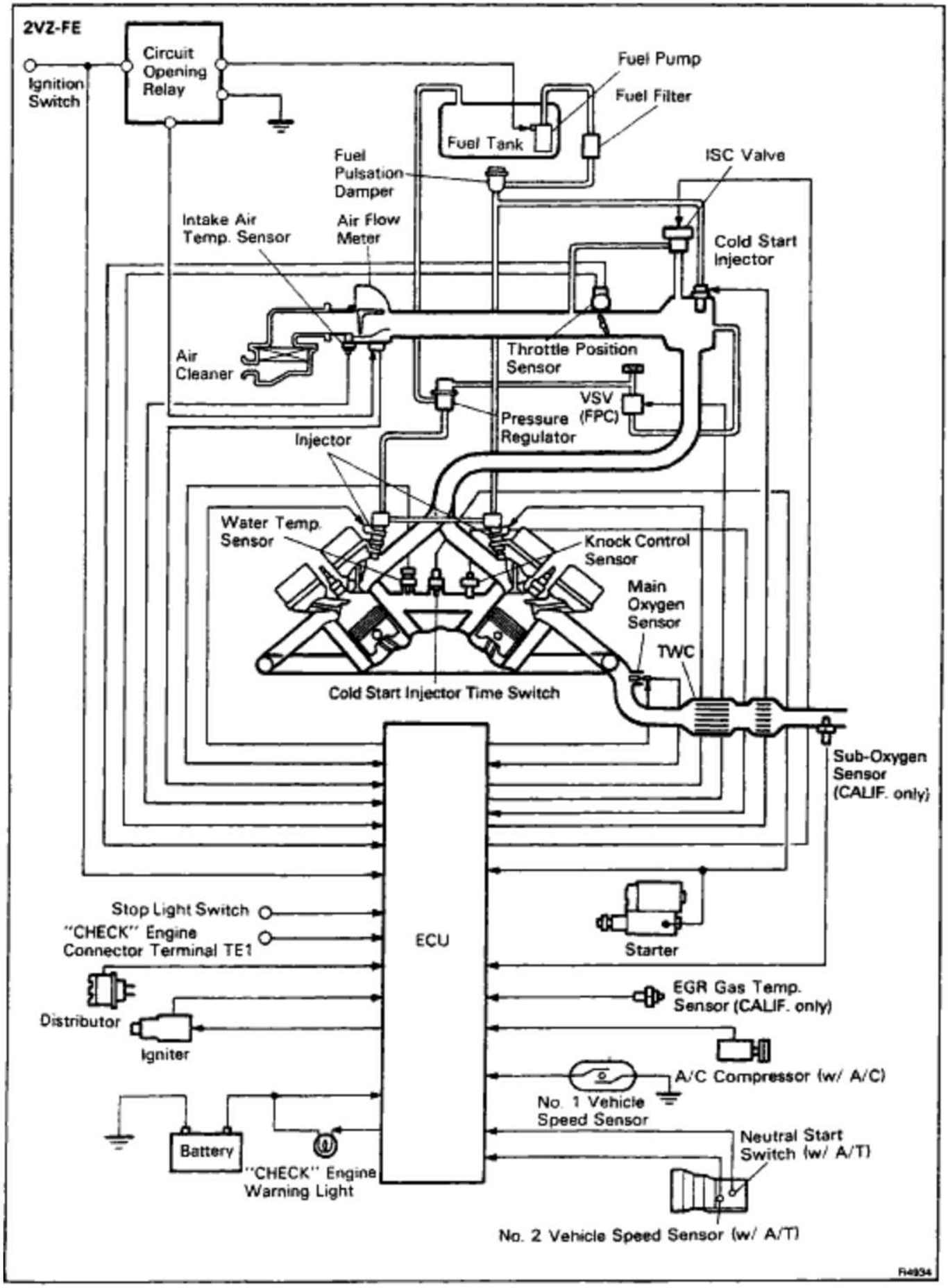
EFI SYSTEM

SYSTEM DESCRIPTION




2VZ-FE
Circuit Opening Relay
Ignition Switch
Fuel Pump
Fuel Filter
Fuel Tank
Fuel Pulsation Damper
ISC Valve
Intake Air Temp. Sensor
Air Flow Meter
Cold Start Injector
Air Cleaner
Throttle Position Sensor
VSV (FPC)
Pressure Regulator
Injector
Water Temp. Sensor
Knock Control Sensor
Main Oxygen Sensor
TWC
Cold Start Injector Time Switch
Sub-Oxygen Sensor (CALIF. only)
Stop Light Switch
"CHECK" Engine Connector Terminal TE1
ECU
Starter
Distributor
Igniter
EGR Gas Temp. Sensor (CALIF. only)
A/C Compressor (w/ A/C)
No. 1 Vehicle Speed Sensor
Battery
"CHECK" Engine Warning Light
Neutral Start Switch (w/ A/T)
No. 2 Vehicle Speed Sensor (w/ A/T)
FI4934

The ER system is composed of there 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 manifold in a 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 Camry 3S–FE and 2V1–FE engines are equipped with a Toyota Computer Control System (TCCS) which centrally controls the EFI, ESA, ISC, Diagnosis systems etc. by means of an Electronic Control Unit (ECU–formerly ER computer) employing a microcomputer.

By means of the ECU, the 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
   Intake air temperature
   Coolant temperature
   Engine rpm
   Acceleration/deceleration
   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 the 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 control the flow of air through the by–pass of the throttle valve and adjust idle speed to the target value. (See page FI–45,115 or 62, 117)

4. Diagnosis

   The ECU detects any malfunctions or abnormalities 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–25 or 27)

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.

PRECAUTIONS

1. Before working 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 open flame when working the fuel system.
3. Keep gasoline off rubber or leather parts.

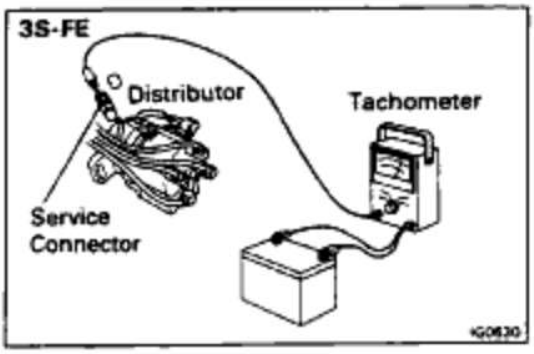
INSPECTION PRECAUTIONS

MAINTENANCE PRECAUTIONS

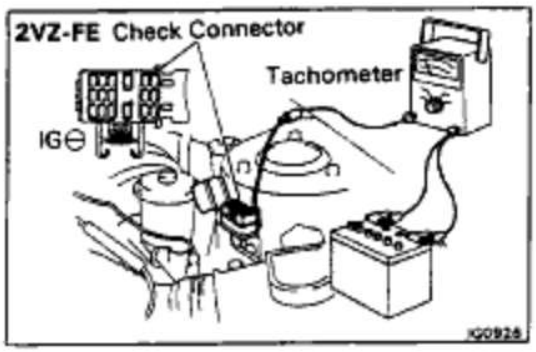
1. CHECK CORRECT ENGINE TUNE–UP
(See page EM–8)
2. PRECAUTIONS WHEN CONNECTING GAUGE

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

(b) (3S–FE)
Connect the test probe of a tachometer to the service connector of the distributor.



(c) (2VZ–FE)
Connect the test probe of a tachometer to the terminal IG – of the check connector.



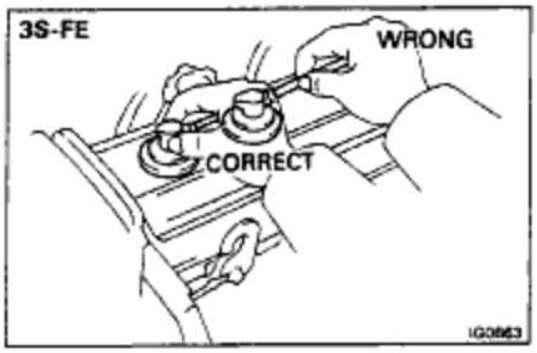
3. IN EVENT OF ENGINE MISFIRE FOLLOWING PRECAUTIONS SHOULD BE TAKEN

(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.

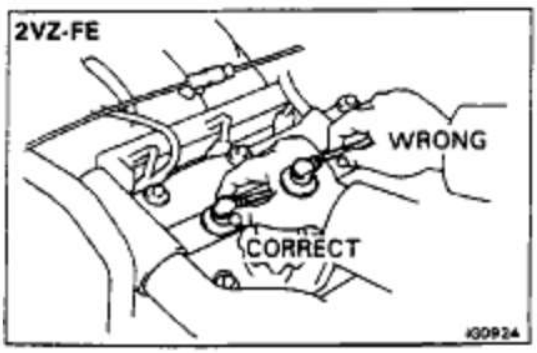
(d) When cleaning the engine compartment, be especially careful to protect the electrical system from water.



4. PRECAUTIONS WHEN HANDLING OXYGEN SENSOR(S)

(a) Do not allow the oxygen sensor to drop or hit against an object.

(b) Do not allow the sensor to come into contact with water.



PRECAUTIONS

1. Before working 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 open flame when working the fuel system.
3. Keep gasoline off rubber or leather parts.

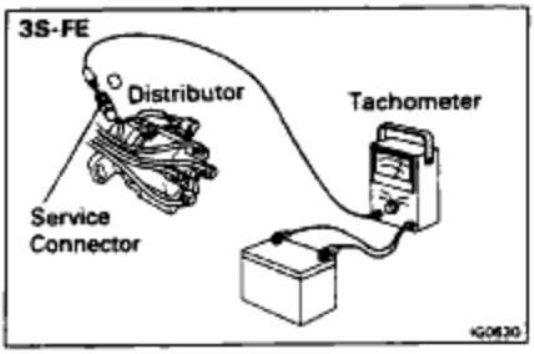
INSPECTION PRECAUTIONS

MAINTENANCE PRECAUTIONS

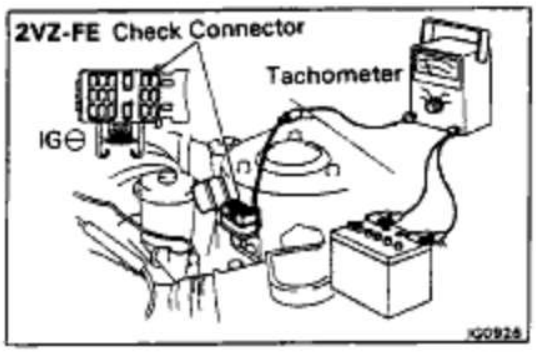
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(See page EM–8)
2. PRECAUTIONS WHEN CONNECTING GAUGE

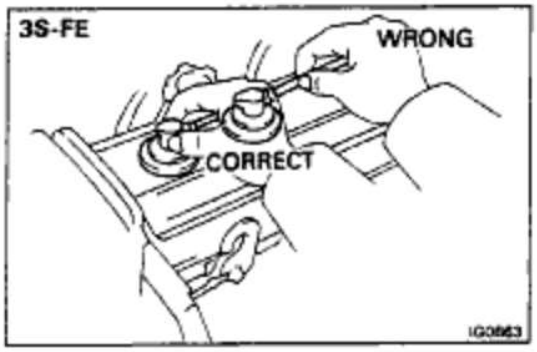
(a) Use the battery as the power source for the timing light, tachometer, etc.

(b) (3S–FE)
Connect the test probe of a tachometer to the service connector of the distributor.



(c) (2VZ–FE)
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.

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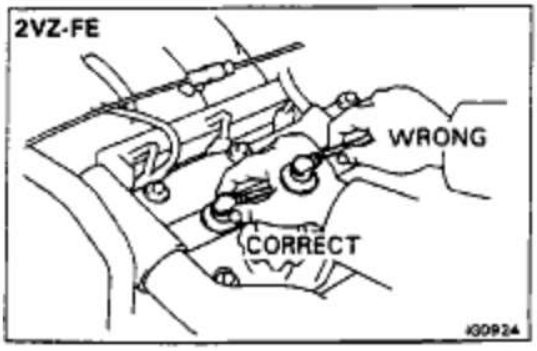
(c) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.

(d) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

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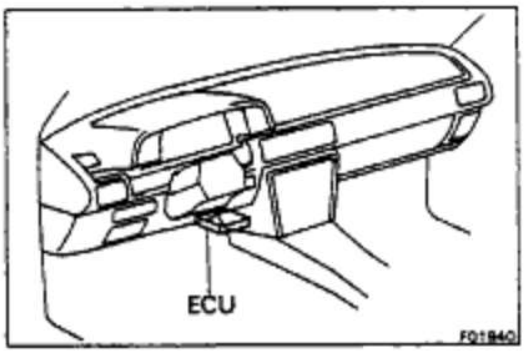


IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

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 affect upon ECU operation, especially if the antenna and feeder are installed nearby.

Therefore, observe the following precautions:

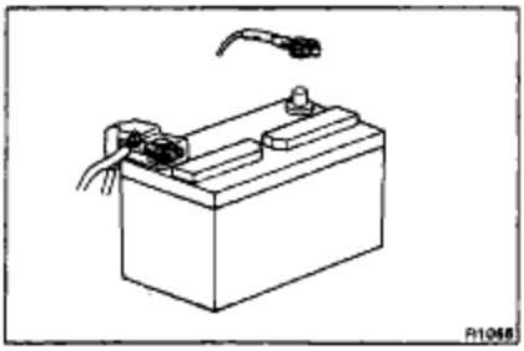


1. Install the antenna as far as possible from the ECU. The ECU is located under the radio so the antenna should be installed at the rear side of the vehicle.
2. Keep the antenna feeder as far away as possible from the ECU wires – at least 20 cm (7.87 in.) – and, especially, do not wind them together.
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.)

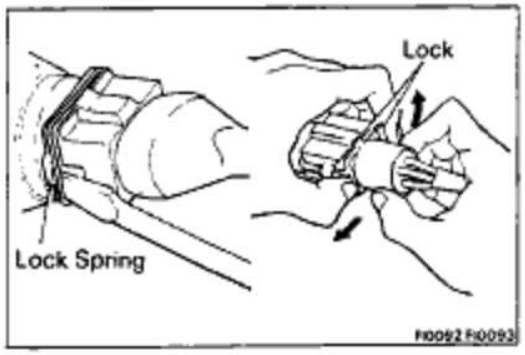
AIR INDUCTION SYSTEM

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

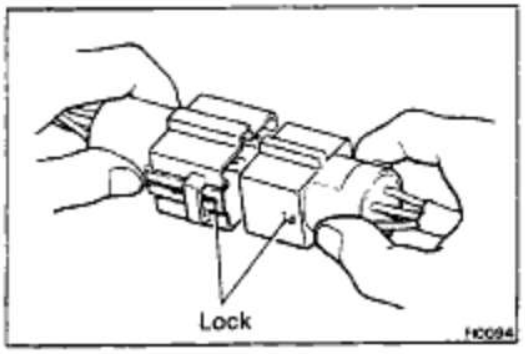
ELECTRONIC CONTROL SYSTEM



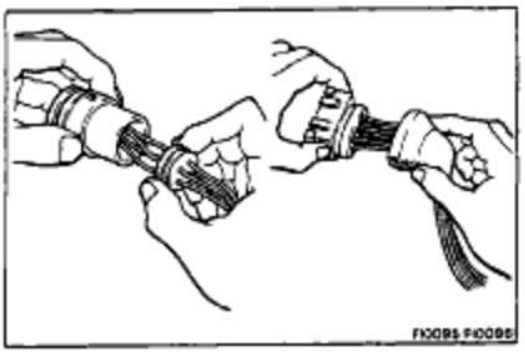
1. Before removing EFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the battery terminals.
2. When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.
3. Do not 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 ER parts and wiring connectors.
7. Parts should be replaced as an assembly.



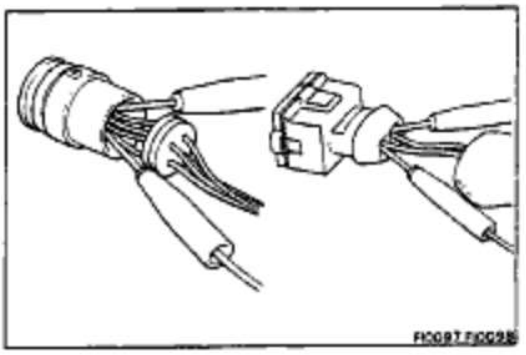
8. Care is required when pulling out and inserting wiring connectors.
(a) Release the lock and pull out the connector, pulling on the connectors.



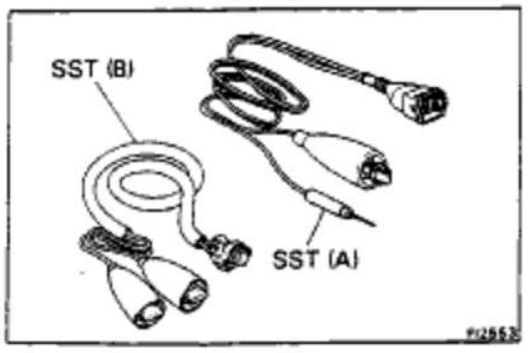
(b) Fully insert the connector and check that it is locked.



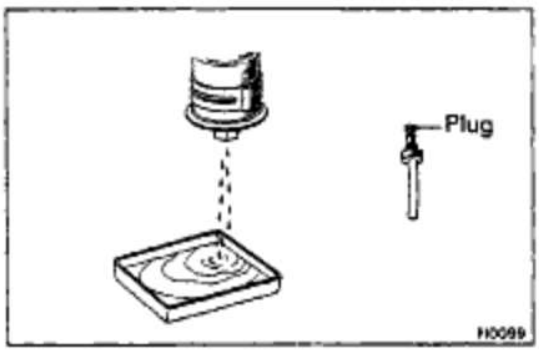
9. When inspecting a connector with a volt/ohmmeter.
(a) Carefully take out the water–proofing rubber if it is a water–proof type connector.



(b) Insert the 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.



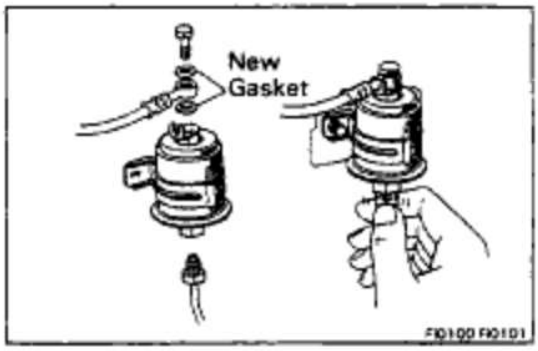
10. Use SST for inspection or test of the injector, cold start injector or its wiring connector.
SST 09842–30050 (A) and 09842–30070 (B)



FUEL SYSTEM

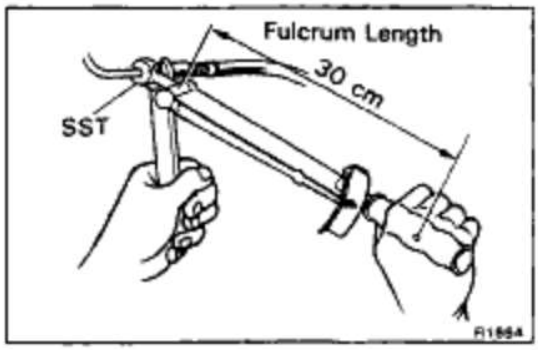
1. When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following procedure:

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



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

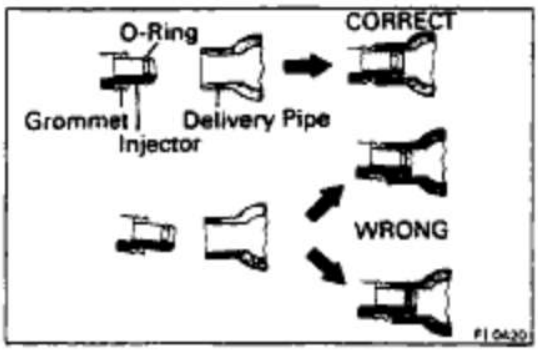
(a) Always use a new gasket.
(b) Tighten the union bolt by hand.
(c) Tighten the union bolt to the specified torque.
Torque: 300 kg–cm (22 ft–lb, 29 N–m)



(Flare Nut Type 3S–FE only)

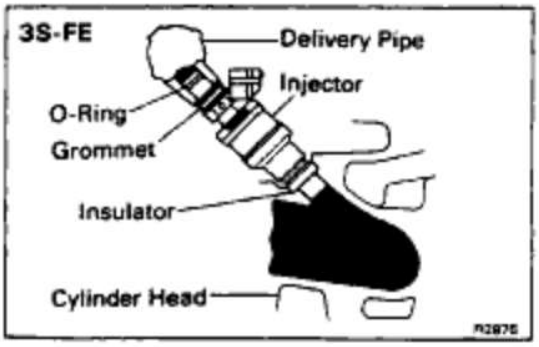
(a) Apply a light coat of engine oil to the flare and tighten the flare nut by hand.
(b) Using SST, tighten the flare nut to specified torque.
SST 09631–22020
Torque: 310 kg–cm (22 ft–ib, 30 N–m)

HINT: Use a torque wrench with a fulcrum length of 30 cm 0 1.81 in.).

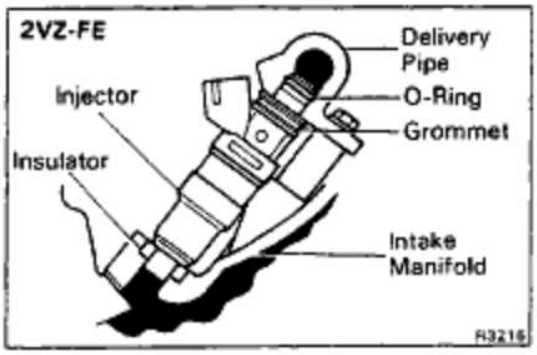


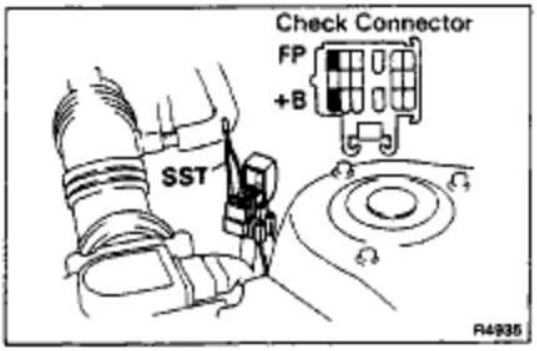
3. Observe the following precautions when removing and installing the injectors.

(a) Never reuse the 0–ring.
(b) When placing a new 0–ring on the injector, take care not to damage it in any way.
(c) Coat a new 0–ring with spindle oil or gasoline before installing never use engine, gear or brake oil.

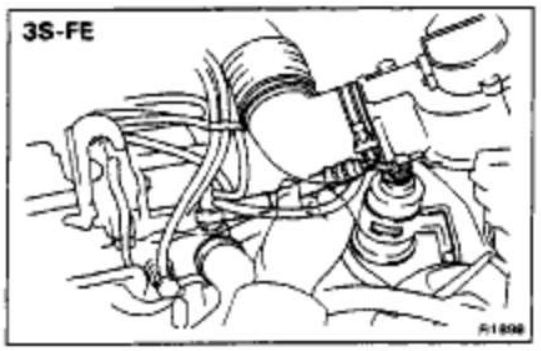


4. Install the injector to delivery pipe and intake manifold as shown in the figure.

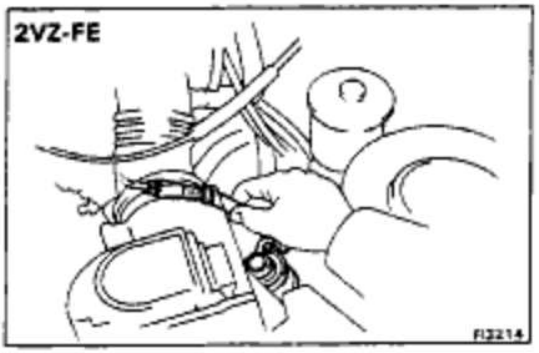




5. Check that there are no fuel leaks after performing any maintenance on the fuel system.
(a) with engine stopped, turn the ignition switch ON.
(b) Using SST, connect terminals +B and FP of the check connector.
SST 09843–18020



(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.



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

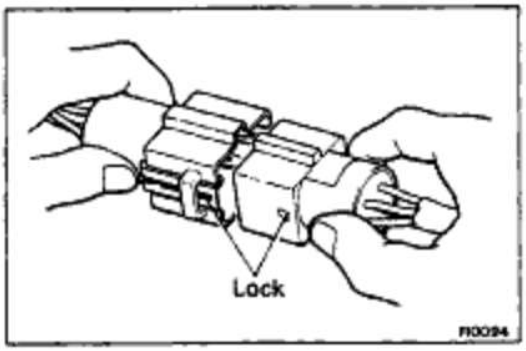
(e) Fuel supply
- Fuel leakage
- Fuel filter
- Fuel pump

(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

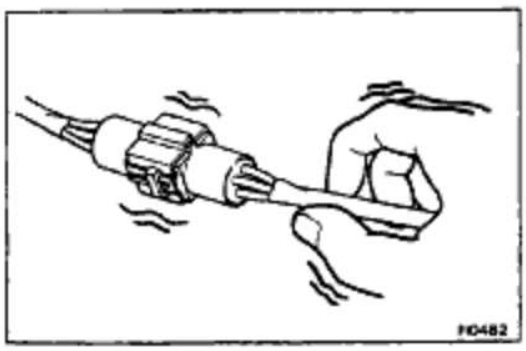
(g) Others
- Ignition timing (ESA system)
- dle speed (ISC system)
- etc.



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:

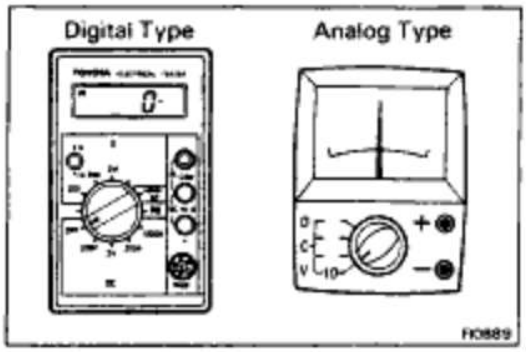
(a) Check to see that the terminals are not bent.

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



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

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



4. Use a volt/ohmmeter with high impedance (10 kΩN minimum) for troubleshooting of the electrical circuit. (See page FI–31)

TROUBLESHOOTING PROCEDURES

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

CHECK ELECTRIC SOURCE → BAD →
1. Battery
(1) Connection
(2) Gravity Drive belt Charging system
(3) Voltage

OK ↓

CHECK STARTING SYSTEM → BAD →
1. Ignition switch
2. Neutral start switch (A/T)
3. Clutch start switch (M/T)
4. Starter relay (M/T)
5. Starter
6. Wiring/Connection

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

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code. (See page FI–22)
→ Malfunction code(s) → Diagnostic code(s) (See page FI–25 or 27)

Normal code ↓

DOES ENGINE START WITH ACCELERATOR PEDAL DEPRESSED? → OK →
ISC system
(1) ISC valve
(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 hoses
5. EGR system EGR valve stays open

OK ↓

CHECK IGNITION SPARK
(See page IG–5 or 9) → BAD →
1. High–tension cords
2. Distributor
3. Ignition coil
4. Igniter

OK CONTINUED ON PAGE FI–12

OK CONTINUED FROM PAGE FI–11

CHECK SPARK PLUGS
Standard: 1.1 mm (0.043 in.)
HINT: Check compression pressure and valve clearance if necessary.

NO →
1. Spark plugs
2. Compression pressure
Minimum: 10.0 kg/cm2
(142 psi, 981 kPa)
at 250 rpm
3. Valve clearance
Standard:
3F–FE I N 0.19 – 0.29 mm
(0.007 – 0.011 in.)
EX 0.28 – 0.38 mm
(0.011 – 0.015 in.)
2VZ–FE IN 0.13 0.23 mm
(0–005 – 0.009 in.)
EX 0.27– 0.37 mm
(0.011 – 0.015 in.)

BAD All Plugs WET →
1. Injector(s) shorted or leaking
2. Injector wiring – short circuited
3. Cold start injector – leakage
(See page FI–78 or 81)
4. Cold start injector time switch
(See page FI–124)

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 filter can be felt. (See page FI–70)

BAD →
1. Fuel line – leakage – deformation
2. Fuse(s)
3. Fuel pump (See page FI–68)
4. Fuel filter
5. Fuel pressure regulator
(See page FI–84 or 86)

OK ↓

CHECK FUEL PUMP SWITCH IN AIR FLOW METER
Check continuity between terminals FC and E1 while measuring plate of air flow meter is open.

BAD →
Air flow meter (See page FI–104)

OK ↓

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

BAD →
Ignition timing – Adjust
(See page IG–17 or 21)

OK CONTINUED ON PAGE FI–13

OK CONTINUED FROM PAGE FI–12

CHECK EFI ELECTRONIC CIRCUIT USING
VOLT/OHMMETER
(See page FI–31)

BAD →
1. Wiring connection
2. Power to ECU
   (1) Fusible link(s)
   (2) Fuse(s)
   (3) ER main relay (See page FI–121)
3. Air flow meter (See page FI–104)
4. Water temp. sensor (See page FI–125)
5. Air temp. sensor (See page FI–104)
6. Injection signal circuit
   (1) Injector wiring
   (2) ECU (See page FI–130)

SYMPTOM – ENGINE OFTEN STALLS

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI–22)

Malfunction code(s) →
Diagnostic code(s) (See page FI–25 or 27)

Normal code ↓

CHECK FOR VACUUM LEAKS IN AIR INTAKE LINE

BAD →
1. Oil filler cap
2. Oil dipstick
3. Hose connections
4. PCV hoses
5. EGR system EGR valve stays open

OK ↓

CHECK FUEL SUPPLY TO INJECTOR
1. Fuel tank
2. Fuel pressure in fuel line
   (1) Short terminals +B and FP of the check connector.
   (2) Fuel pressure at fuel return hose of fuel filter can be felt. (See page FI–70)

BAD →
1. Fuel line leakage – deformation
2. Fuse(s)
3. Fuel pump (See page FI–68)
4. Fuel filter
5. Fuel pressure regulator
   (See page FI–86 or 88)

OK ↓

CHECK AIR FILTER

BAD → Element – Clean or replace

OK ↓

CHECK IDLE SPEED
Standard: 700 ± 50 rpm

BAD →
1. ISC system
   (1) Wiring connection(s)
   (2) ISC valve (See page FI–116 or 118)
   (3) ECU (test by substitution)
2. (3S–FE) –
Idle speed – Adjust (See page EM–19)

OK CONTINUED ON PAGE FI–14

OK CONTINUED FROM PAGE FI–13

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 21)

OK

CHECK SPARK PLUGS
Standard: 1.1 mm (0.043 in.)
HINT: Check compression pressure and valve clearance if necessary.

NO →
1. Spark plugs
2. Compression pressure
Minimum: 10.0 kg/cm 2 (142 psi, 981 kPa) at 250 rpm
3. Valve clearance
Standard:
3F–FE IN 0.19 – 0.29 mm (0.007 – 0.011 in.)
EX 0.28 – 0.38 mm (0.011 – 0.015 in.)
2VZ–FE IN 0.13 – 0.23 mm (0.005 – 0.009 in.)
EX 0.27– 0.37 mm (0.011 – 0.015 in.)

OK

CHECK COLD START INJECTOR
(See page FI–78 or 81)

BAD →
1. Cold start injector (See page FI–78 or 81)
2. Cold start injector time switch (See page FI–124)

OK

CHECK FUEL PRESSURE
(See page FI–70)

BAD →
1. Fuel pump (See page FI–68)
2. Fuel filter
3. Fuel pressure regulator (See page FI–84 or 86)

OK

CHECK INJECTORS
(See page FI–88 or 93)

BAD → Injection condition

OK

CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI–31)

BAD →
1. Wiring connection
2. Power to ECU
(1) Fusible link(s)
(2) Fuse(s)
(3) ER main relay (See page FI–121)
3. Air flow meter (See page FI–104)
4. Water temp. sensor (See page FI–125)
5. Air temp. sensor (See page FI–104j
6. Injection signal circuit
(1) Injector wiring
(2) ECU (See page FI–130)

SYMPTOM – ENGINE SOMETIMES STALLS

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI–22)

→ Malfunction code(s) → Diagnostic code(s) (See page FI–25 or 27)

Normal code ↓

CHECK AIR FLOW METER
(See page FI–104)

→ BAD → Air flow meter

OK ↓

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

→ BAD →
1. Connector(s)
2. ER main relay (See page FI–121)
3. Circuit opening relay (See page FI–123)

SYMPTOM – ROUGH IDLING AND/OR MISSING

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI–22)

→ Malfunction code(s) → Diagnostic code(s) (See page FI–25 or 27)

Normal code ↓

CHECK FOR VACUUM LEAKS IN AIR INTAKE LINE

→ BAD →
1. Oil filler cap
2. Oil dipstick
3. Hose connections
4. PCV hoses
5. EGR system – EGR valve stays open

OK ↓

CHECK AIR FILTER

→ BAD → Element – Clean or replace

OK ↓

CHECK IDLE SPEED
Standard: 700 ± 50 rpm

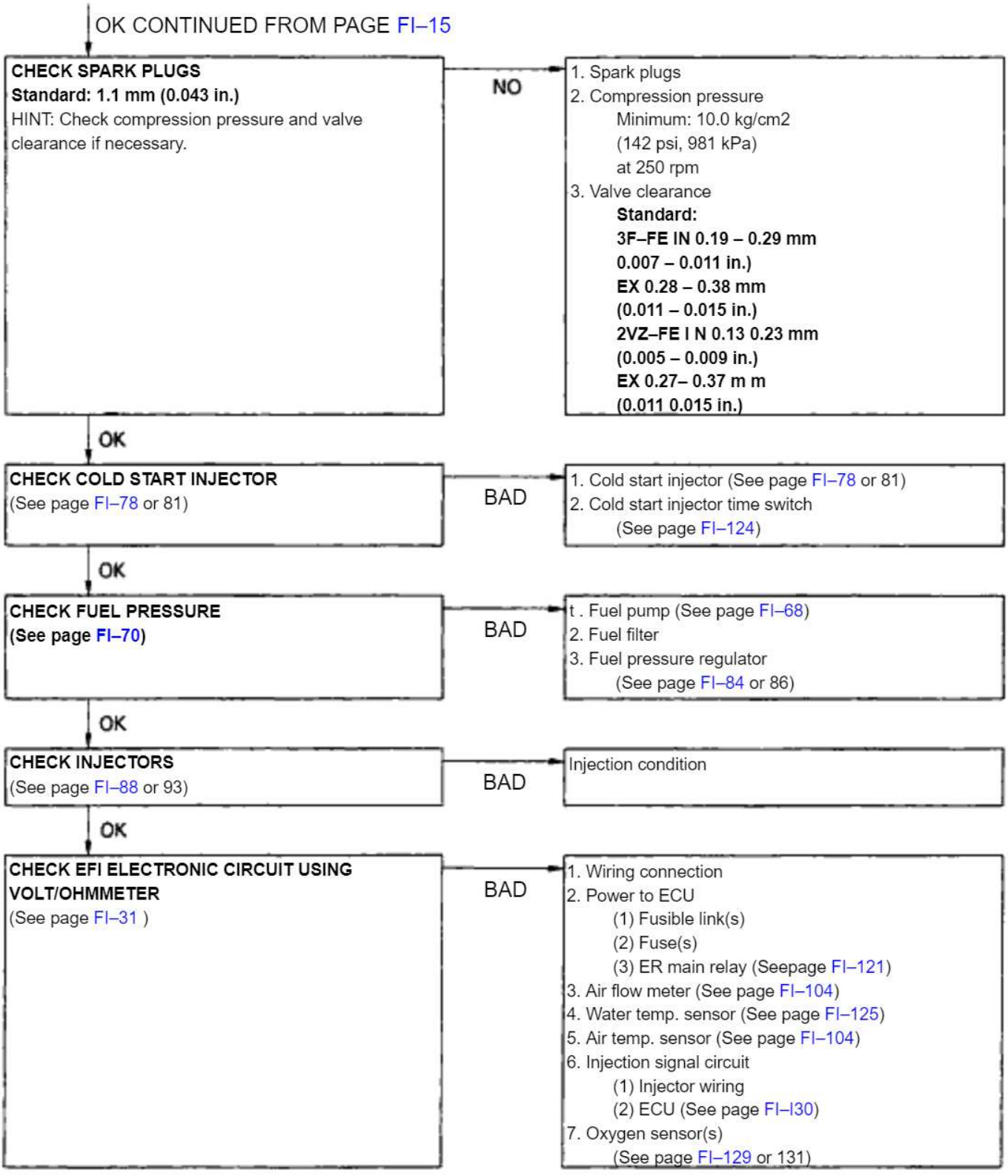
→ BAD →
1. ISC system
(1) Wiring connection(s)
(2) ISC valve (Seepage FI–116 or 118)
(3) ECU (test by substitution)
2. (3S–FE)
Idle speed – Adjust (See page EM–19)

OK ↓

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

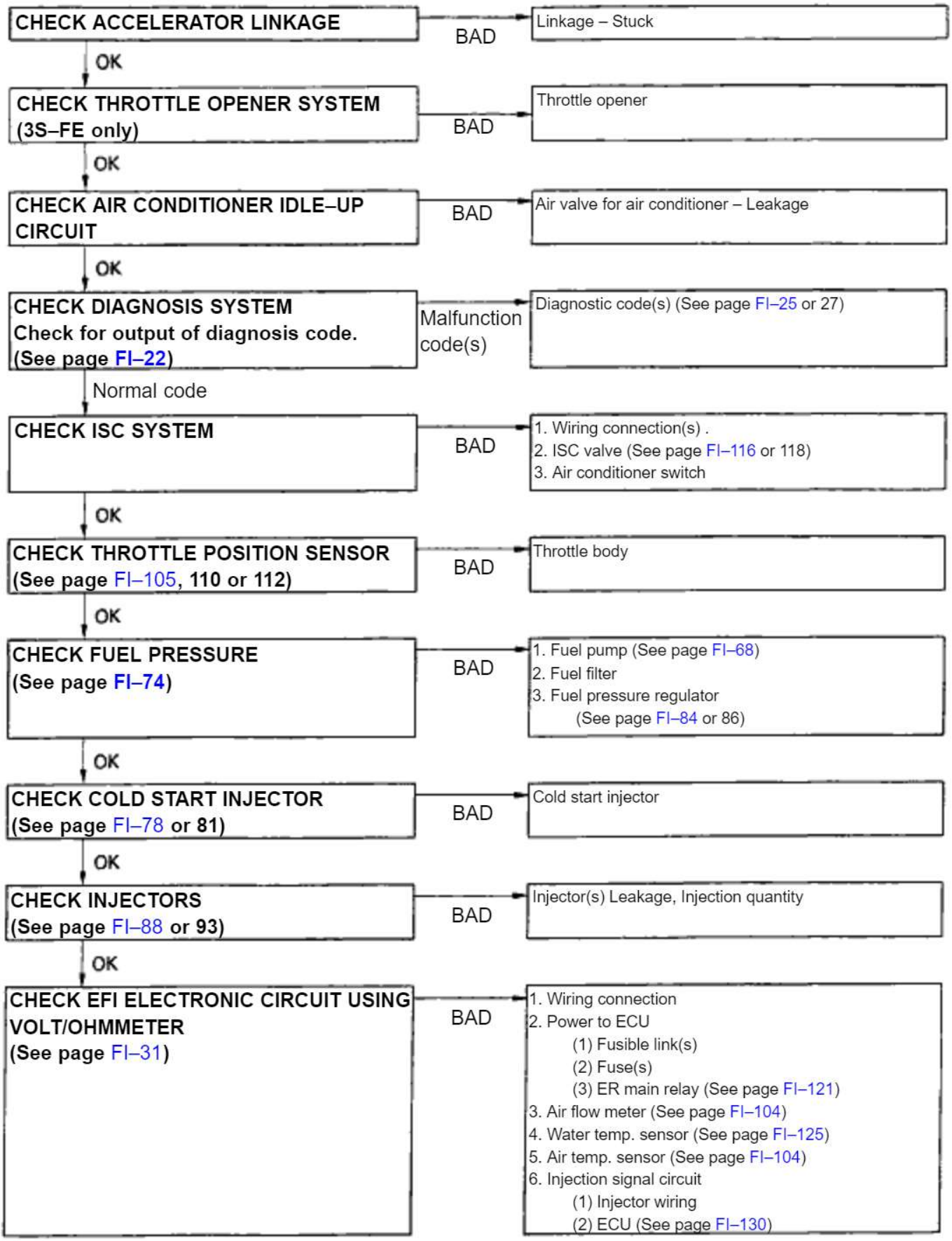
→ NO → Ignition timing Adjust
(See page IG–17 or 21)

OK CONTINUED 4N PAGE FI–16



SYMPTOM – HIGH ENGINE IDLE SPEED (NO DROP)

HINT (3S–FE): Disconnecting the battery will cause the idling speed data in the ISC to be returned to the initial idling speed, causing the idling speed to rise above 700 rpm. should this happen, either carry out a driving test, including stop–go several times at a speed above 10 km/h, or start the engine, idle for 30 seconds and then turn the engine off repeatedly. By doing this, idle data will be stored in the ISC and the idle rpm will be at specified value.


CHECK ACCELERATOR LINKAGE
BAD
Linkage – Stuck
OK
CHECK THROTTLE OPENER SYSTEM (3S–FE only)
BAD
Throttle opener
OK
CHECK AIR CONDITIONER IDLE–UP CIRCUIT
BAD
Air valve for air conditioner – Leakage
OK
CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI–22)
Malfunction code(s)
Diagnostic code(s) (See page FI–25 or 27)
Normal code
CHECK ISC SYSTEM
BAD
1. Wiring connection(s) .
2. ISC valve (See page FI–116 or 118)
3. Air conditioner switch
OK
CHECK THROTTLE POSITION SENSOR
(See page FI–105, 110 or 112)
BAD
Throttle body
OK
CHECK FUEL PRESSURE
(See page FI–74)
BAD
1. Fuel pump (See page FI–68)
2. Fuel filter
3. Fuel pressure regulator
(See page FI–84 or 86)
OK
CHECK COLD START INJECTOR
(See page FI–78 or 81)
BAD
Cold start injector
OK
CHECK INJECTORS
(See page FI–88 or 93)
BAD
Injector(s) Leakage, Injection quantity
OK
CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI–31)
BAD
1. Wiring connection
2. Power to ECU
(1) Fusible link(s)
(2) Fuse(s)
(3) ER main relay (See page FI–121)
3. Air flow meter (See page FI–104)
4. Water temp. sensor (See page FI–125)
5. Air temp. sensor (See page FI–104)
6. Injection signal circuit
(1) Injector wiring
(2) ECU (See page FI–130)

SYMPTOM – ENGINE BACKFIRES– Lean Fuel Mixture

CHECK DIAGNOSIS SYSTEM
Check for output of diagnosis code.
(See page FI–22)

Malfunction code(s) → Diagnostic code(s) (See page FI–25 or 27)

Normal code ↓

CHECK FOR VACUUM LEAKS IN AIR INTAKE LINE

BAD →
1. Oil filler cap
2. Oil dipstick
3. Hose connections
4. PCV hoses
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 21)

OK ↓

CHECK COLD START INJECTOR
(See page FI–78 or 81)

BAD →
1. Cold start injector (See page FI–78 or 81)
2. Cold start injector time switch (See page FI–124)

OK ↓

CHECK FUEL PRESSURE
(See page FI–70)

BAD →
1. Fuel pump (See page FI–68)
2. Fuel filter
3. Fuel pressure regulator (See page FI–84 or 86)

OK ↓

CHECK INJECTORS
(See page FI–88 or 93)

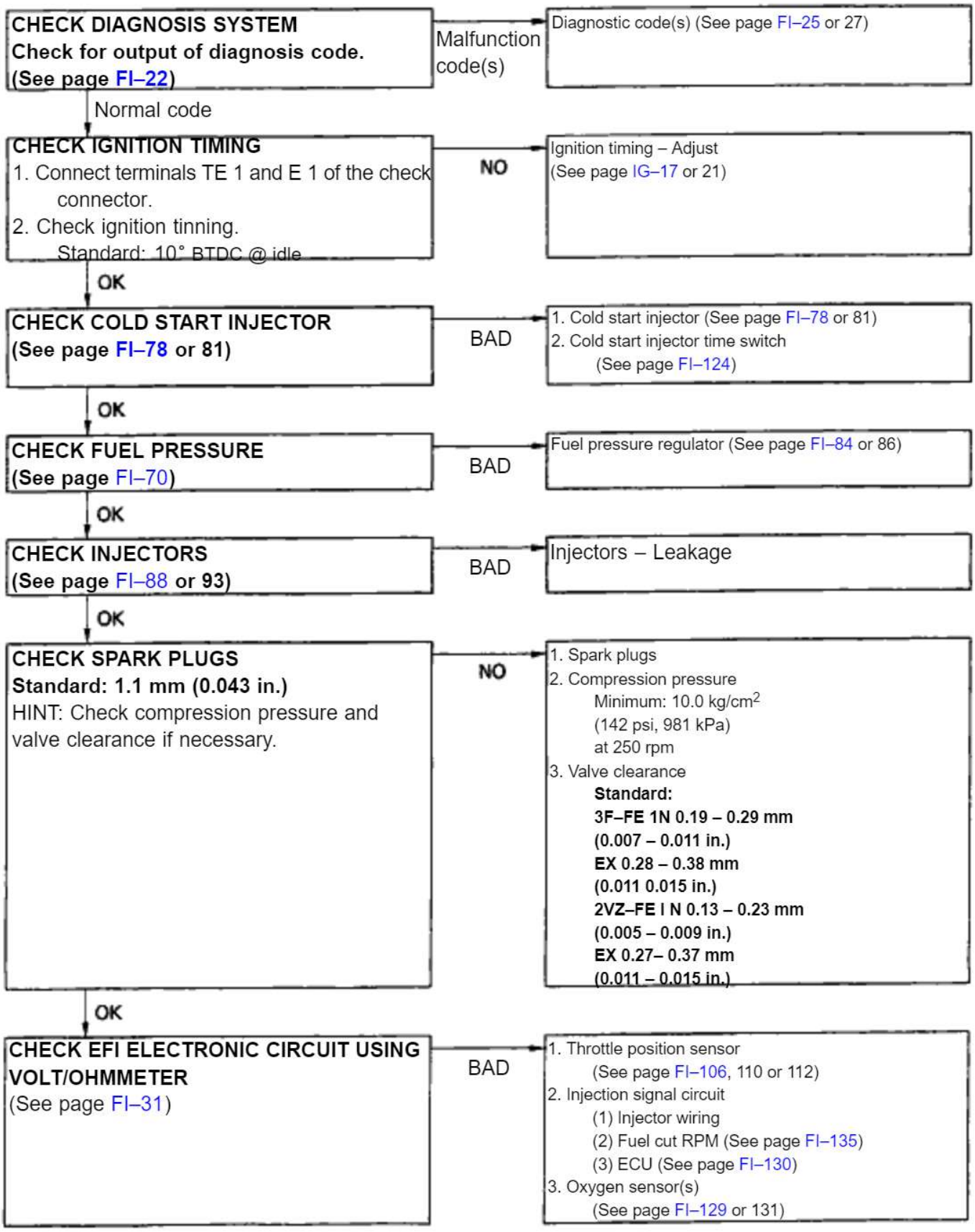
BAD → Injectors – Clogged

OK ↓

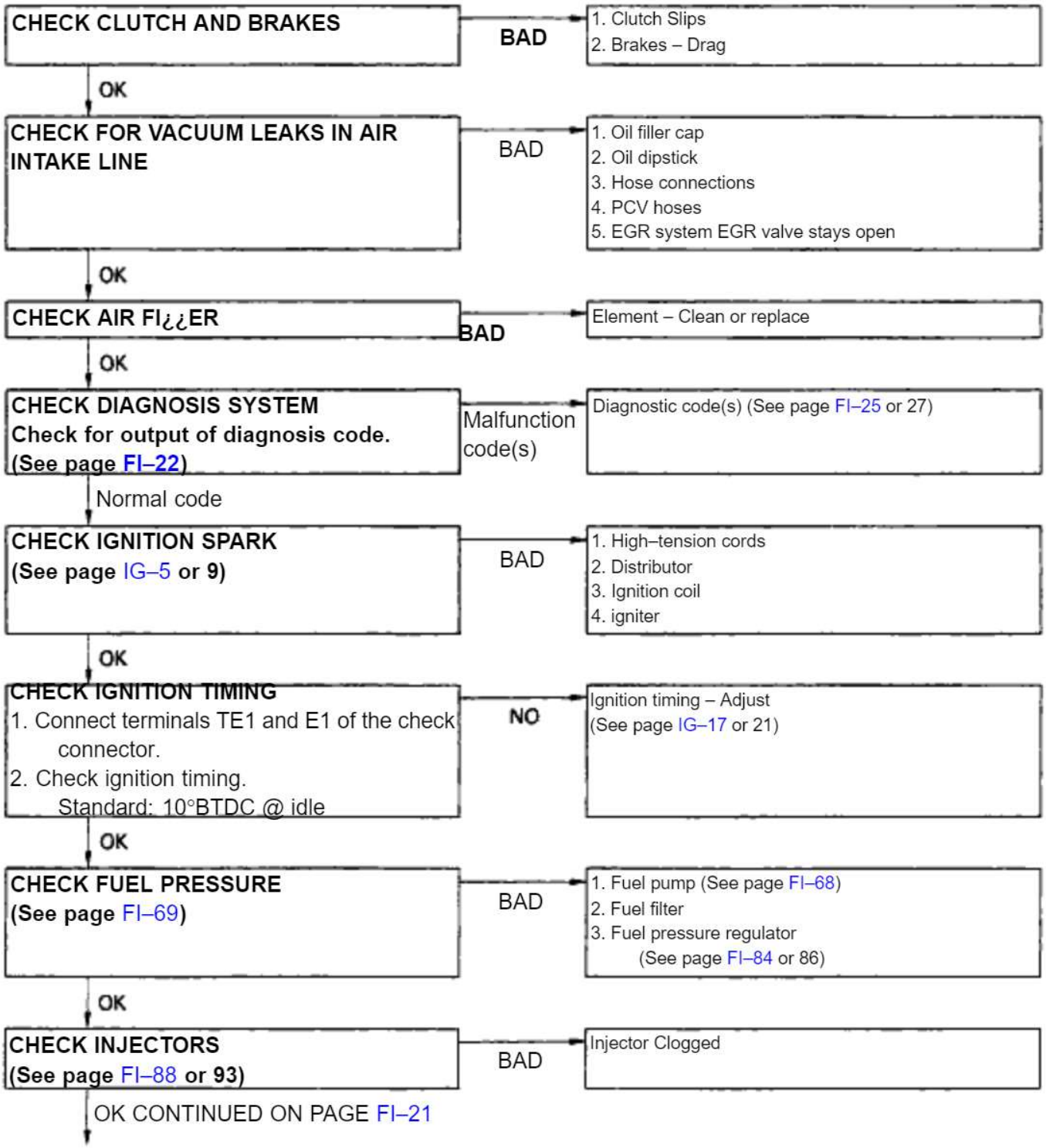
CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI–31)

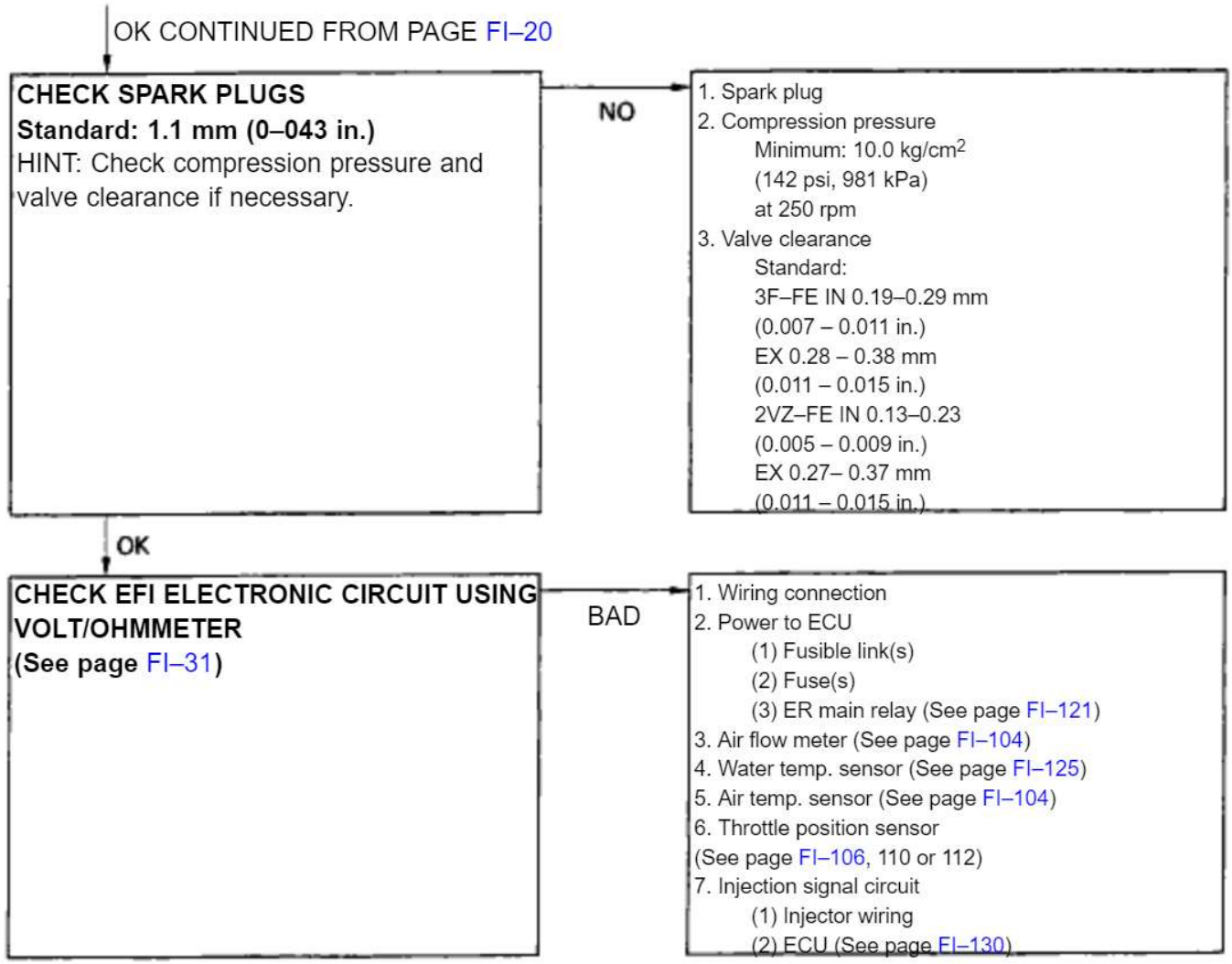
BAD →
1. Wiring connection
2. Power to ECU
   (1) Fusible link(s)
   (2) Fuse(s)
   (3) ER main relay (See page FI–121)
3. Air flow meter (See page FI–104)
4. Water temp. sensor (See page FI–125)
5. Air temp. sensor (See page FI–104)
6. Injection signal circuit
   (1) Injection wiring
   (2) ECU (See page FI–130)
7. Oxygen sensor(s)
   (Seepage FI–129 or 131)

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



SYMPTOM – ENGINE HESITATES AND/OR POOR ACCELERATION




OK CONTINUED FROM PAGE FI–20
CHECK SPARK PLUGS
Standard: 1.1 mm (0–043 in.)
HINT: Check compression pressure and valve clearance if necessary.
NO
1. Spark plug
2. Compression pressure
Minimum: 10.0 kg/cm2
(142 psi, 981 kPa)
at 250 rpm
3. Valve clearance
Standard:
3F–FE IN 0.19–0.29 mm
(0.007 – 0.011 in.)
EX 0.28 – 0.38 mm
(0.011 – 0.015 in.)
2VZ–FE IN 0.13–0.23
(0.005 – 0.009 in.)
EX 0.27– 0.37 mm
(0.011 – 0.015 in.)
OK
CHECK EFI ELECTRONIC CIRCUIT USING VOLT/OHMMETER
(See page FI–31)
BAD
1. Wiring connection
2. Power to ECU
(1) Fusible link(s)
(2) Fuse(s)
(3) ER main relay (See page FI–121)
3. Air flow meter (See page FI–104)
4. Water temp. sensor (See page FI–125)
5. Air temp. sensor (See page FI–104)
6. Throttle position sensor
(See page FI–106, 110 or 112)
7. Injection signal circuit
(1) Injector wiring
(2) ECU (See page FI–130)

DIAGNOSIS SYSTEM

DESCRIPTION

The ECU contains a built–in, self–diagnosis system which detects 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 pages FI–25 or 27) 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 oft automatically when the malfunction has been cleared.



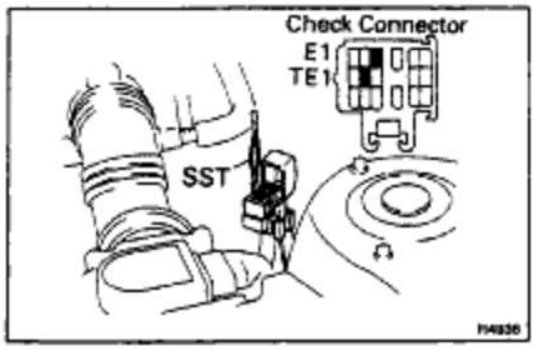
”CHECK” ENGINE WARNING LIGHT CHECK

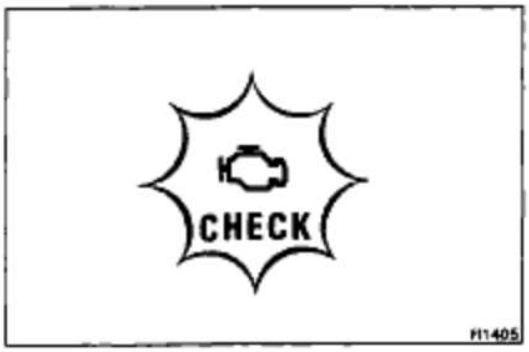
1. The ”CHECK” engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
2. When the engine is started, the ”CHECK” engine warning light should go off.
   If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

OUTPUT OF DIAGNOSTIC CODES

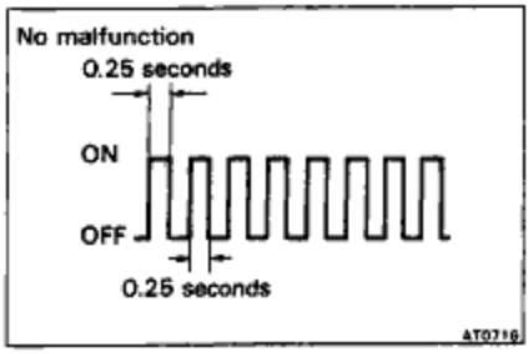
To obtain an output of diagnostic codes, proceed as follow:

1. Initial conditions
   (a) Battery voltage 11 V or more
   (b) Throttle valve fully closed (throttle position sensor IDL points closed)
   (e) 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

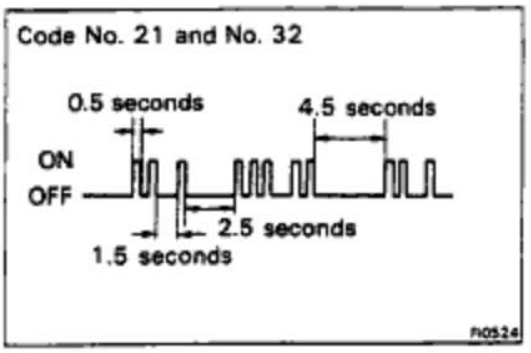




4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.

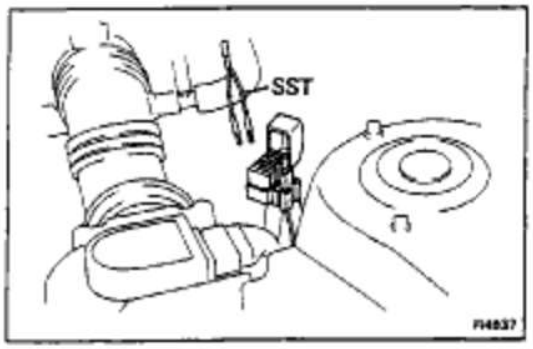


Diagnostic Codes (See page FI–25 or 27)
(a) Normal System Operation (no malfunction)
- The tight will alternately blink ON and OFF 2 times per second.

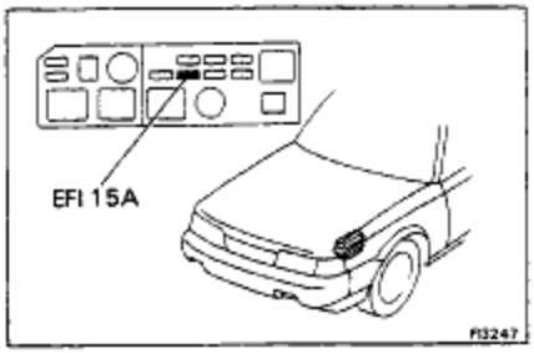


(b) Malfunction Code Indication
- In the event of a malfunction, the light will blink every 0.5 seconds. The first number of blinks will equal the first digit of a 2–digit diagnostic code and, after a 1.5 second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there 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



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 EFI fuse (15 A) 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 engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic code has been recorded.

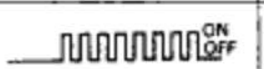
2. After cancellation, road test the vehicle to check that a normal code is now read on the "CHECK" engine warning light.

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

DIAGNOSIS INDICATION

1. (2VZ–FE)
   Including "normal", the ECU is programmed with the following 16 (Ex. CALIF.) or 18 (CALIF.) diagnostic codes.
2. When 2 or more codes are indicated, the lowest number (code) will appear first.
   However, no other code will appear along with code No.11.
3. All detected diagnostic codes, except code No.51, will be retained in memory by the ECU from the time of detection until cancelled out.
4. Once the malfunction is cleared, the "CHECK" engine warning light on the instrument panel will go oft but the diagnostic code(s) remain stored in ECU memory (except for code No.51).

DIAGNOSTIC CODES (3S–FE)

Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
—		Normal	This appears when none of the other codes (11 thru 71) are identified.		
12		RPM Signal	No NE or G signal to ECU within several seconds after engine is cracked.	• Distributor circuit • Distributor • Starter signal circuit • ECU	IG–4
13		RPM Signal	No NE signal to ECU when the engine speed is above 1,000 rpm.	• Distributor circuit • Distributor • ECU	
14		Ignition Signal	No IGF signal to ECU 4–5 times in succession.	• Ignition circuit (+B, IGT, IGF) • Igniter • ECU	FI–44
21		Main oxygen Sensor Signal	During air–fuel ratio feedback correction, voltage output from the main oxygen sensor does exceed a set valve on the lean side and the rich side continuously for a certain period.	• Main oxygen sensor circuit • Main oxygen sensor • ECU	FI–48
22		Water temp. Sensor Signal	Open or short circuit in water temp. sensor signal (TH1^).	• Water temp. sensor circuit • Water temp. sensor • ECU	FI–42
24		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–41
25		Air–fuel ratio Lean Malfunction	When air–fuel ratio feedback compensation valve or adaptive control value continues at the upper (lean) or (rich) limit renewed for a certain period of time.	• Injector circuit • Injector • Oxygen sensor circuit Oxygen sensor • ECU • Fuel line pressure • Air flow meter • Water temp. sensor • Ignition system	
26		Air–fuel ratio Rich Malfunction		• Injector circuit • Injector • Fuel line pressure Cold start injector • Air flow meter • Water temp. sensor • ECU	
*27		Sub–oxygen Sensor Signal	Open or short circuit i n sub–oxygen sensor signal (OX2)	• Sub–oxygen sensor circuit • Sub–oxygen sensor • ECU	F–48
31		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–39
32		Air flow Meter Signal	Open circuit in E2 or short circuit between VC and VS.	Same as 31, above.	FI–39

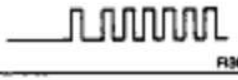
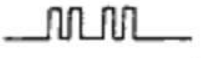
*CALIF. only

DIAGNOSTIC CODES (3S–FE) (Cont'd)

Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
41		Throttle Position Sensor Signal	(w/o ECT) IDL and PSW signals being output simultaneously for several seconds. (w/ ECT) Open or short circuit in throttle position sensor signal (VTA).	• Throttle position sensor circuit • Throttle position sensor • ECU	FI–36 or FI–37
42		Vehicle Speed Sensor Signal	No SPD signal for several seconds when engine speed is between 2,500 – 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		Starter Signal	No STA signal to ECU when vehicle stopped and engine running over 800 rpm.	• IG switch circuit • IG switch • ECU	FI–43
*71		EGR Malfunction	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 • BVSV for EG R • BVSV for EGR circuit • ECU	FI–49
51		Switch Condition Signal	A/C signal or no IDL signal to ECU, when engine is idling with check Terminals TE1 and E1 connected.	• A/C switch circuit • A/C amplifier • Throttle position sensor circuit • Throttle position sensor • Accelerator pedal and cable	

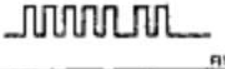
*CALIF. only

DIAGNOSTIC CODES (2VZ–FE)

Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
—		Normal	This appears when none of the other codes are identified.		
12		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		RPM Signal	No NE signal to ECU when the engine speed is above 1,000 rpm.	• Distributor circuit • Distributor • ECU	
14		Ignition Signal	No IGF signal to ECU FI–8 times in succession.	• Igniter and ignition coil circuit • Igniter and ignition coil • ECU	FI–62
16		ECT Control Signal	ECT control program faulty.	• ECU	
21		Main oxygen Sensor Signal	During air–fuel ratio feedback correction, voltage output from the main oxygen sensor does exceed a set value on the lean side and the rich side continuously for a certain period.	• Main oxygen sensor circuit • Main oxygen sensor • ECU	FI–66
		Main oxygen Sensor Heater Signal	Open or short circuit in main oxygen sensor heater signal (HT).	• Main oxygen heater circuit • Main oxygen sensor heater • ECU	
22		Water temp. Sensor Signal	Open or short circuit in water temp. sensor signal (THA).	• Water temp. sensor circuit • Water temp. sensor • ECU	FI–60
24		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
25		Air–fuel Ratio Lean Malfunction	(CALIF.) • When air–fuel ratio feedback correction value or adaptive control value continues at the upper (lean) or lower (rich) limit for a certain period of time or adaptive control value is not renewed for a certain period of time. • When feedback frequency of air–fuel ratio feedback correction or adaptive control is abnormally high during feedback condition. (Others) • Oxygen sensor outputs a lean signal continuously for several seconds during air–fuel ratio feedback correction. • Open circuit in oxygen sensor signal (OX).	• Water temp. sensor • Injector circuit • Injector • Fuel line pressure • Air flow meter • Air intake system • Oxygen sensor circuits • Oxygen sensors • Ignition system • ECU	
26		Air–fuel Ratio Rich Malfunction		Water temp. sensor • Injector circuit • Injector • Fuel line pressure • Air flow meter • Cold start injector • ECU	

*CALIF. only

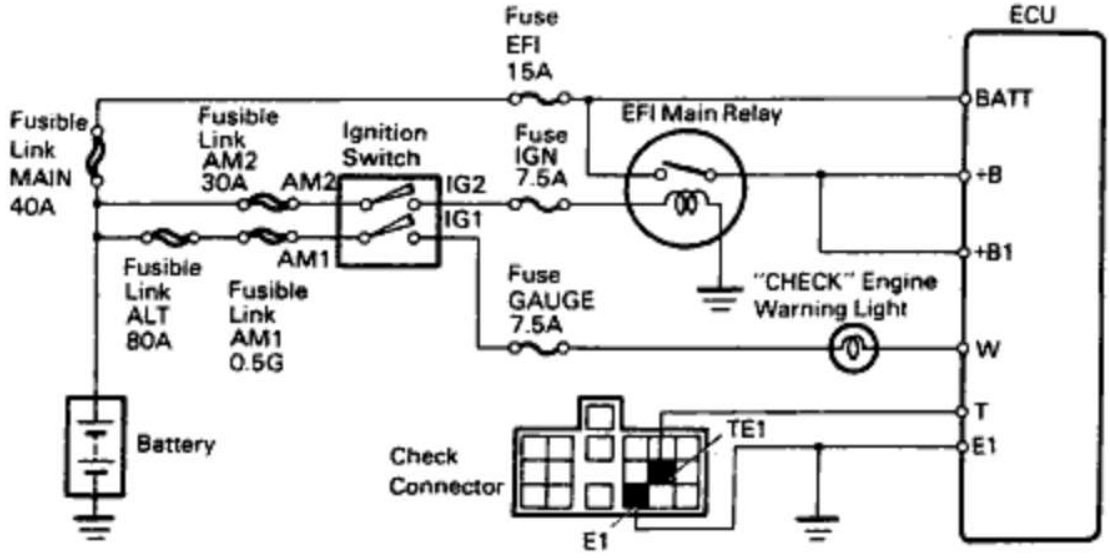
DIAGNOSTIC CODES (2VZ–FE) (Cont'd)

Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
*27		Sub–oxygen Sensor Signal	Open or short circuit in sub–oxygen sensor signal (OX2)	• Sub–oxygen sensor circuit • Sub–oxygen sensor • ECU	
31		Air flow Meter Signal	Open circuit in VC signal or short circuit between VS and E2 when idle contacts are closed.	• Air flow meter circuit • Air flow meter • ECU	FI–57
32		Air Flow Meter Signal	Open circuit i n E2 or short circuit between VC and VS.	• Air flow meter circuit • Air flow meter • ECU	FI–57
41		Throttle Position Sensor Signal	Open or short circuit in throttle position sensor signal (VTA).	• Throttle position sensor circuit • Throttle position sensor • ECU	FI–55
42		Vehicle Speed Sensor Signal	No SPI signal for 8 seconds when engine speed in between 2,500 rpm and 4,500 rpm and coolant temp. is below 80°V 07609 except when racing the engine.	• No. 1 vehicle speed sensor (Meter side) circuit • No. 1 vehicle speed sensor (Meter side) • ECU	
43		Starter Signal	No STA signal to ECU until engine speed reaches 800 rpm with vehicle not moving.	• Ignition switch circuit • Ignition switch • ECU	FI–61
52		Knock Sensor Signal	Open or short circuit in knock sensor signal (KNK).	• Knock sensor circuit • Knock sensor • ECU	
53		Knock Control Signal	Knock control program faulty.	• ECU	
*71		EG R System Malfunction	EGR gas temp. below predetermined level during EGR operation.	• EGR valve • EGR hose • EGR gas temp. sensor circuit • EGR gas temp. sensor • BVSV for EG R • BVSV circuit for EGR • ECU	FI–67
51		Switch Condition Signal	A/C signal, or no IDL signal or no NSW signal to ECU, with the check terminals TE1 and E1 shorted.	• A/C switch circuit • A/C switch • A/C amplifier • Throttle position sensor circuit • Throttle position sensor • Neutral position sensor • Neutral start switch circuit • Neutral start switch • Accelerator pedal and cable • ECU	

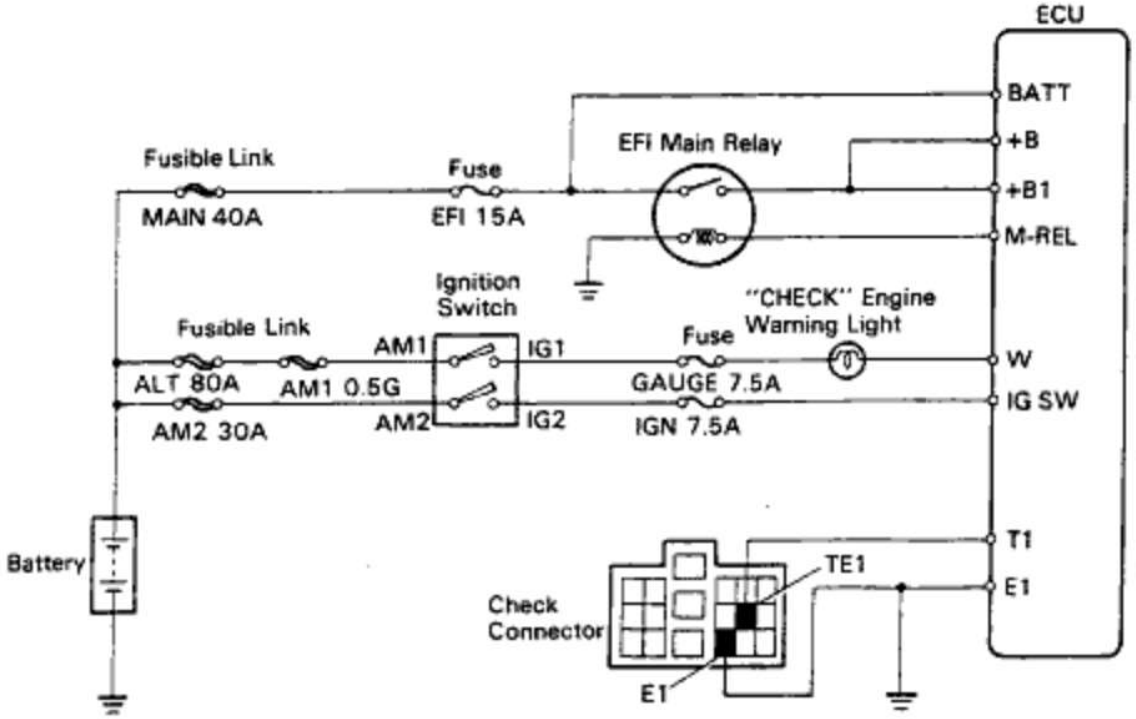
*CALIF. only

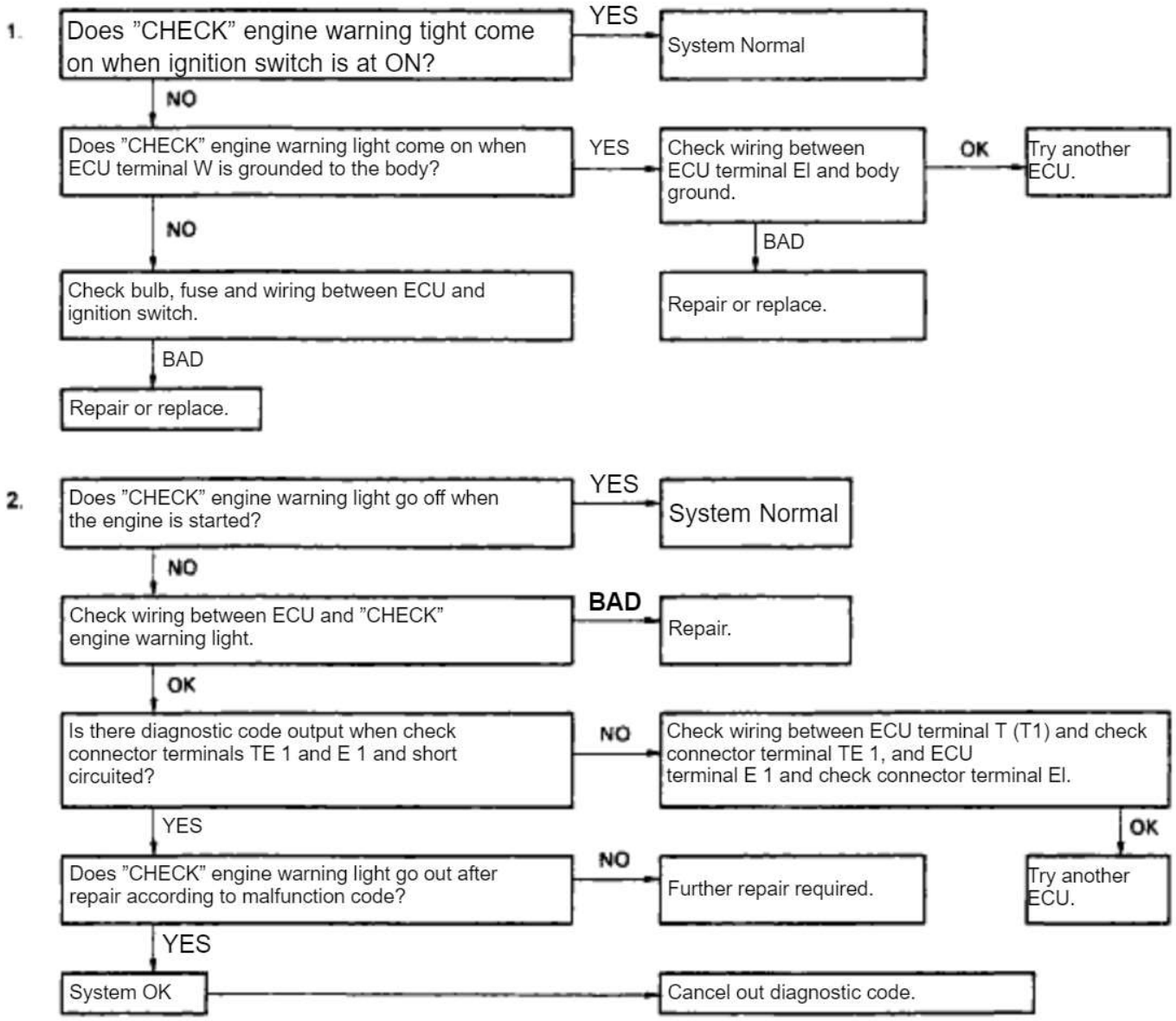
INSPECTION OF DIAGNOSIS CIRCUIT

3S-FE

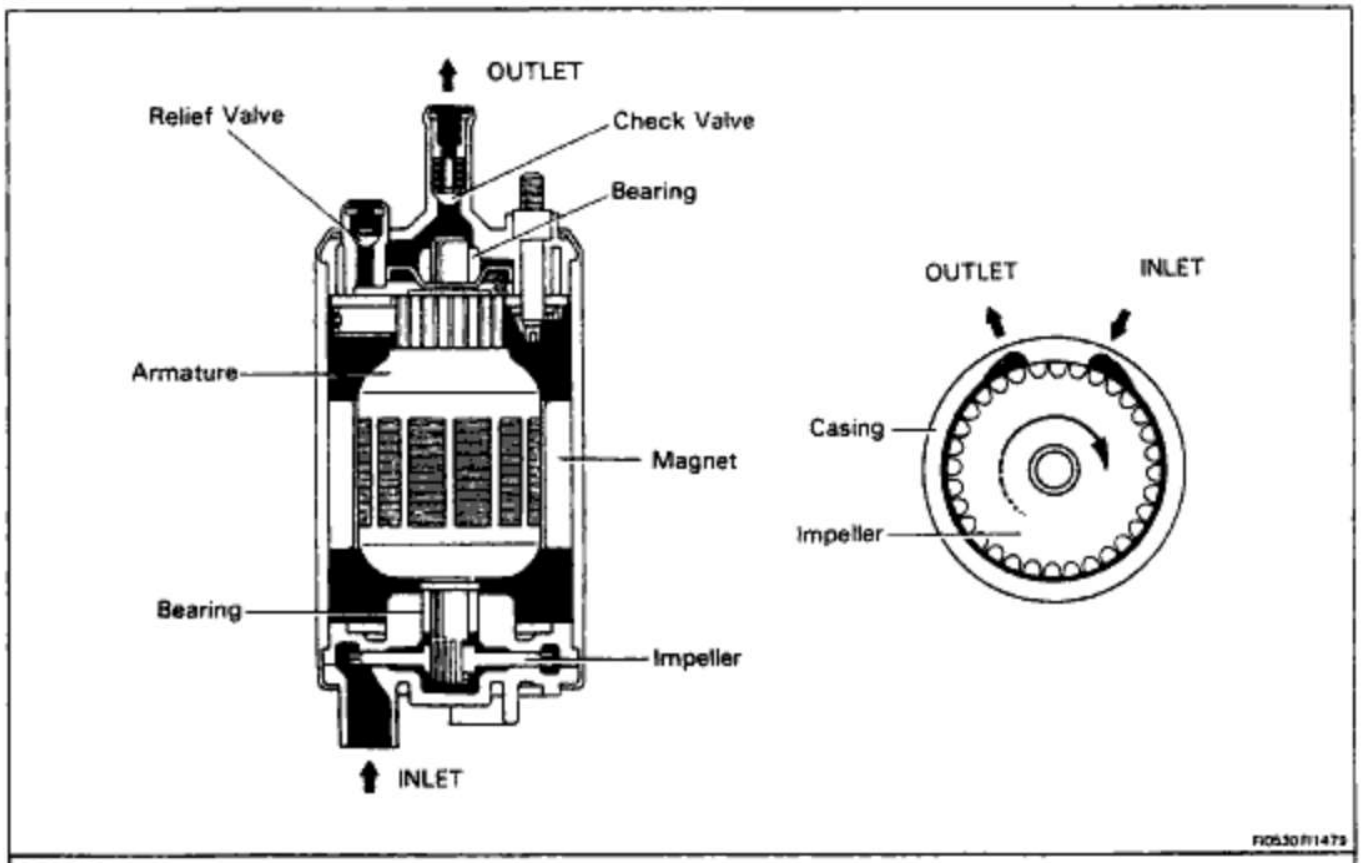


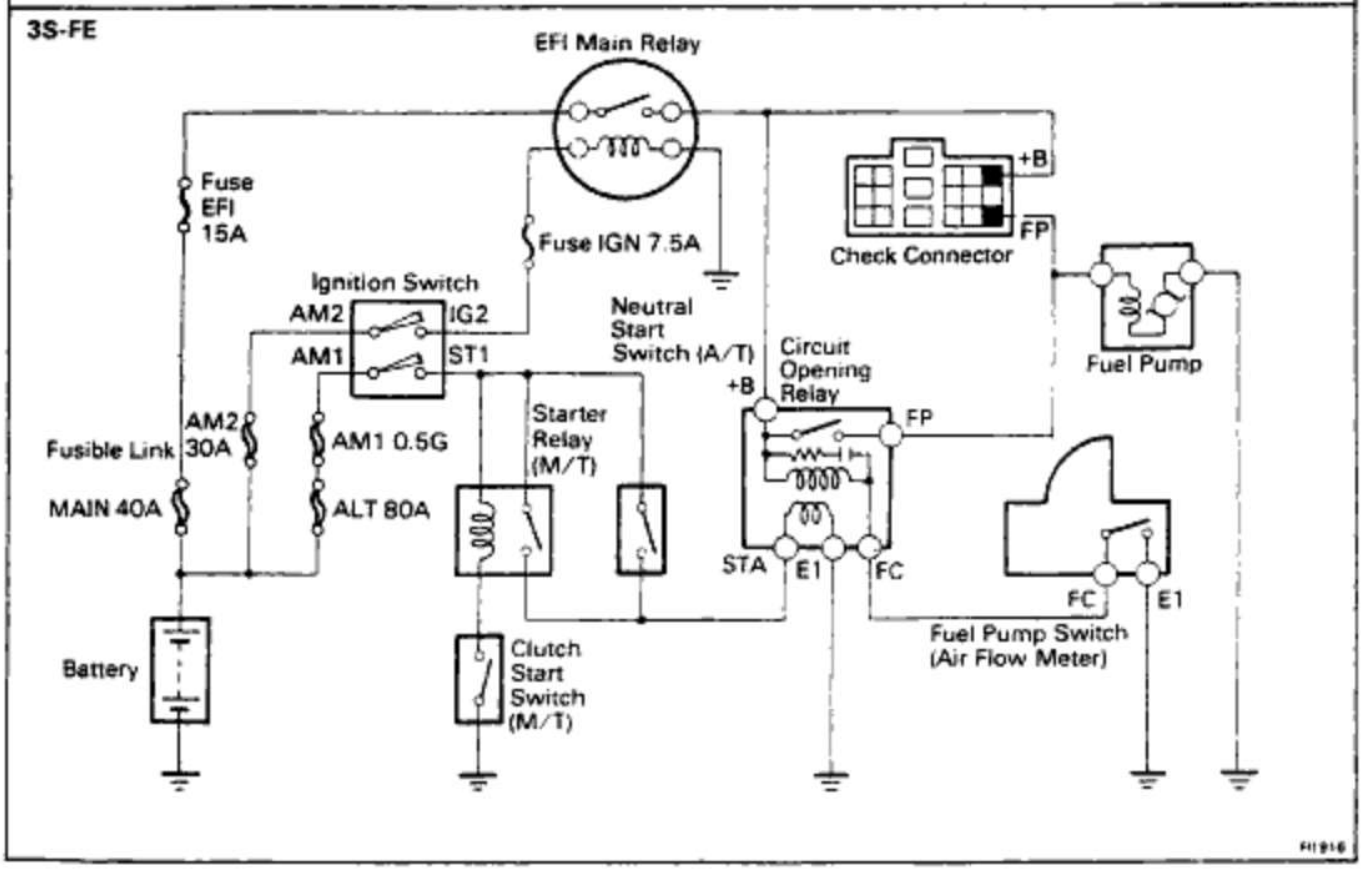
2VZ-FE

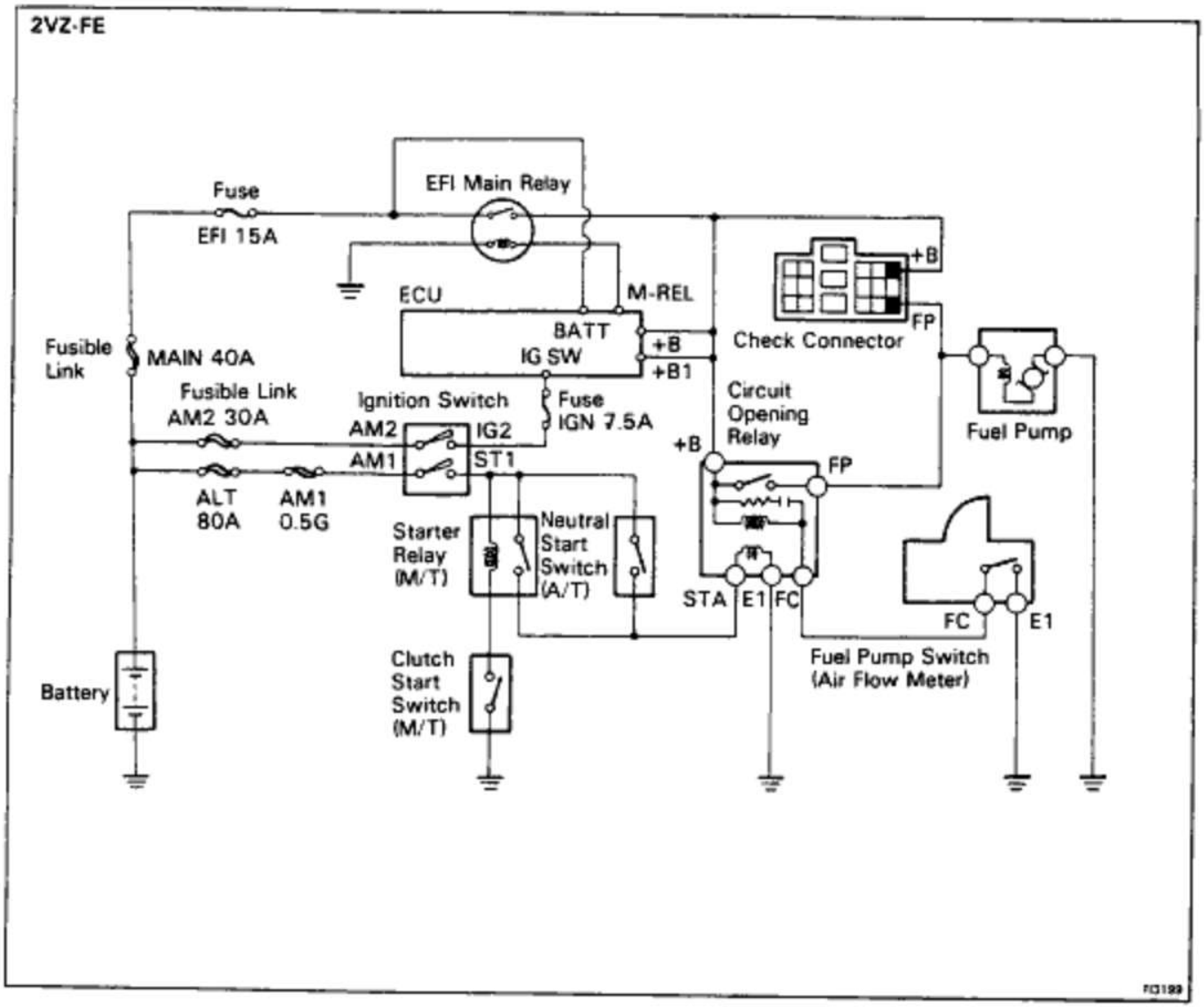


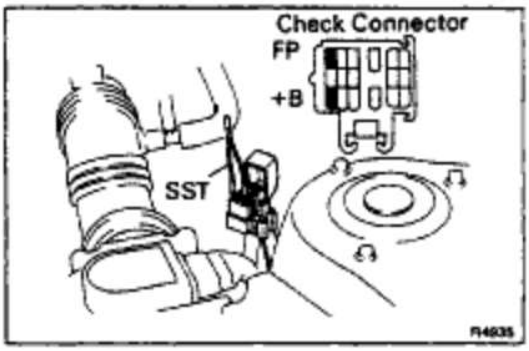

1.
Does "CHECK" engine warning tight come on when ignition switch is at ON?
YES
System Normal
NO
Does "CHECK" engine warning light come on when ECU terminal W is grounded to the body?
YES
Check wiring between ECU terminal EI and body ground.
OK
Try another ECU.
NO
BAD
Check bulb, fuse and wiring between ECU and ignition switch.
Repair or replace.
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 terminals TE 1 and E 1 and short circuited?
NO
Check wiring between ECU terminal T (T1) and check connector terminal TE 1, and ECU terminal E 1 and check connector terminal EI.
YES
OK
Does "CHECK" engine warning light go out after repair according to malfunction code?
NO
Further repair required.
Try another ECU.
YES
System OK
Cancel out diagnostic code.

FUEL SYSTEM
Fuel Pump






2VZ-FE
Fuse
EFI 15A
EFI Main Relay
ECU
M-REL
BATT
IG SW
+B
+B1
Fusible Link
MAIN 40A
Fusible Link
AM2 30A
Ignition Switch
AM2
IG2
AM1
ST1
Fuse
IGN 7.5A
ALT
80A
AM1
0.5G
Starter Relay (M/T)
Neutral Start Switch (A/T)
Clutch Start Switch (M/T)
Battery
Check Connector
+B
FP
Circuit Opening Relay
+B
FP
STA
E1
FC
Fuel Pump
FC
E1
Fuel Pump Switch (Air Flow Meter)



ON–VEHICLE INSPECTION

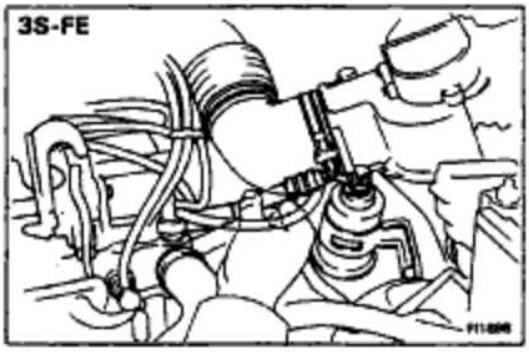
1. CHECK FUEL PUMP OPERATION

(a) Turn the ignition switch ON.

NOTICE: Do not start the engine.

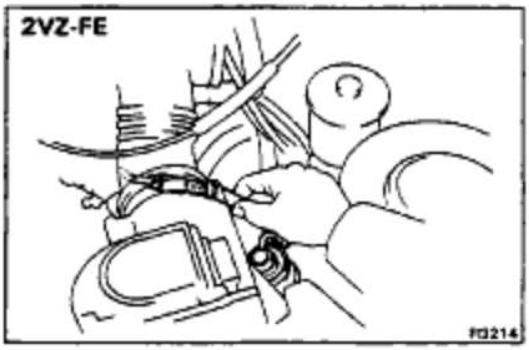
(b) Using SST, connect terminals +B and FP of the check connector.

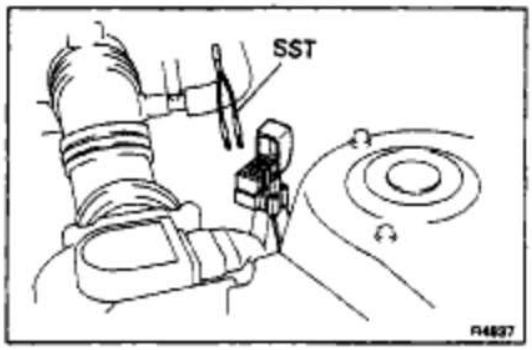
SST 09843–18020



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

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





(d) Remove SST.

SST 09843–18020

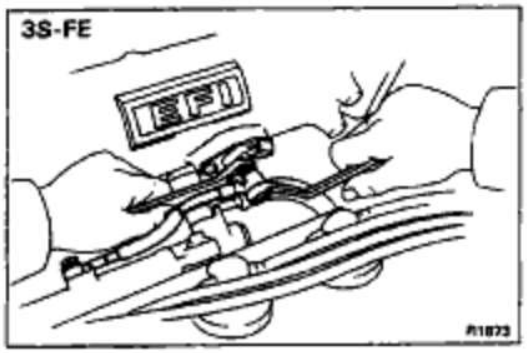
(e) Turn the ignition switch OFF.

If there is no pressure, check the following parts:

- Fusible links
- Fuses (ER 15 A, IGN 7.5 A)
- ER main relay
- Fuel pump
- ECU
- Wiring connections

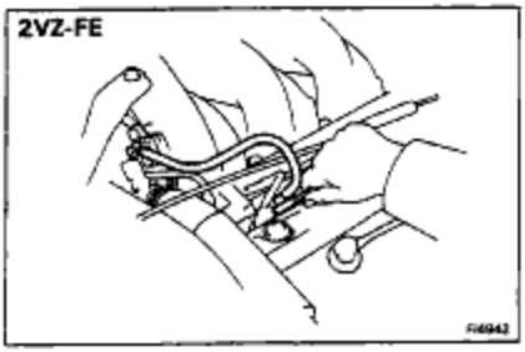
2. CHECK FUEL PRESSURE

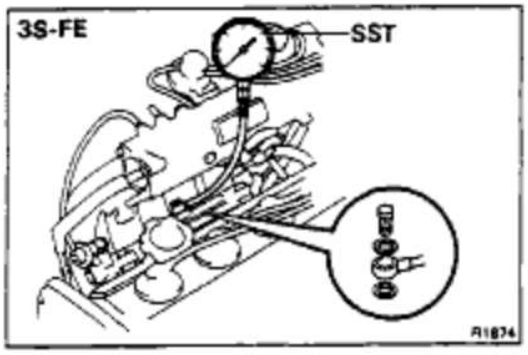
(a) Check the battery voltage is above 12 volts.
(b) Disconnect the cable from the negative (–) terminal of the battery.



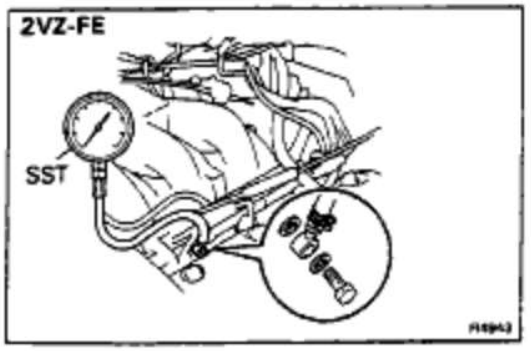
(c) Disconnect the cold start injector connector.
(d) Put a suitable container or shop towel under the cold start injector pipe (3S–FE) or tube (2VZ–FE).
(e) Remove the union bolt and two gaskets, and disconnect the cold start injector tube from the delivery pipe (3S–FE) or LH delivery pipe (2VZ–FE).

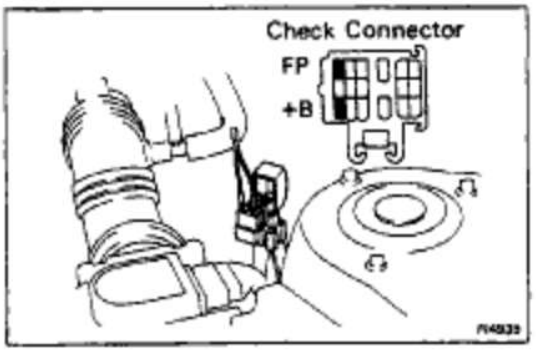
HINT: Slowly loosen the union bolt.



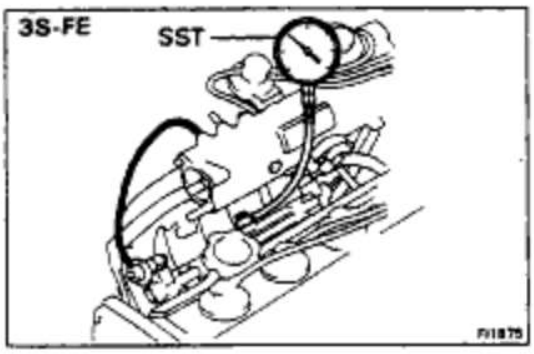


(f) Install SST (pressure gauge) to the delivery pipe (3S–FE) or LH delivery pipe (2VZ–FE) with new two gaskets and the union bolt.
SST 09268–45012
Torque: 3S–FE 180 kg–cm (13 ft–lb, 18 N–m)
2VZ–FE 200 kg–cm (14 ft–lb, 20 N –m)
(g) Wipe off any splattered gasoline.
(h) Reconnect the battery negative H cable.



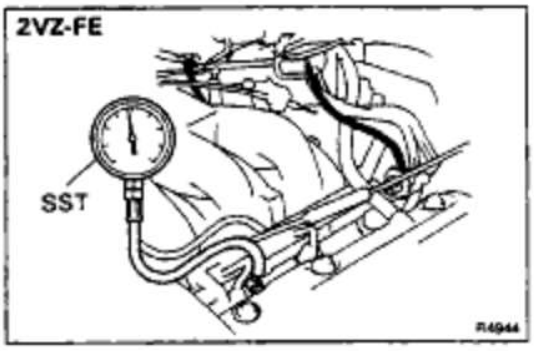


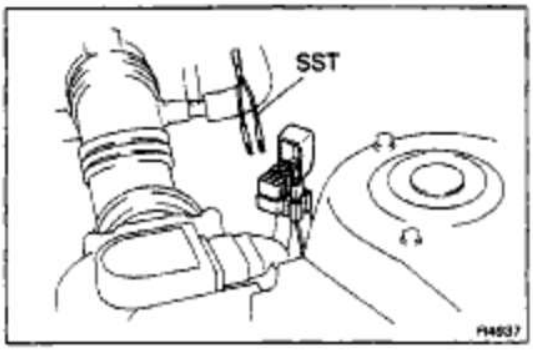
(i) Using SST, connect terminals +B and FP of the check connector.
SST 09843–18020



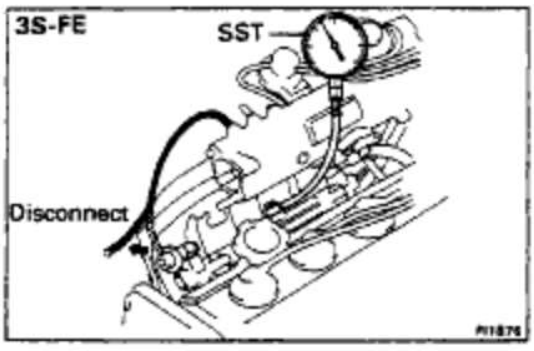
(j) Turn the ignition switch ON.
(k) Measure the fuel pressure.
Fuel pressure: 2.7 – 3.1 kg/cm^2
(38 – 44 pst, 265 – 304 kPa)
If pressure is high, replace the fuel pressure regulator.
If pressure is low, check the following parts:

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

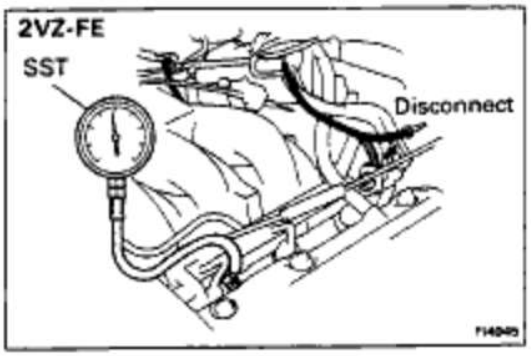


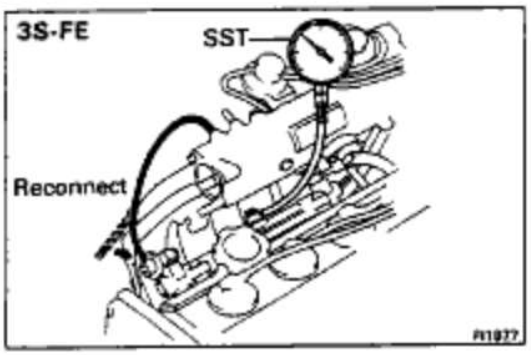


(l) Remove SST.
SST 09843–18020



(m) Start the engine. .
(n) Disconnect the vacuum sensing hose from the fuel pressure regulator, and plug the hose end.
(o) Measure the fuel pressure at idling.
Fuel pressure: 2.7 – 3.1 kg/cm^2
(38 – 44 psi, 265 – 304 kPa)

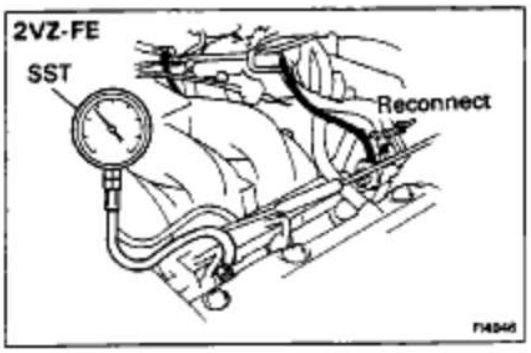


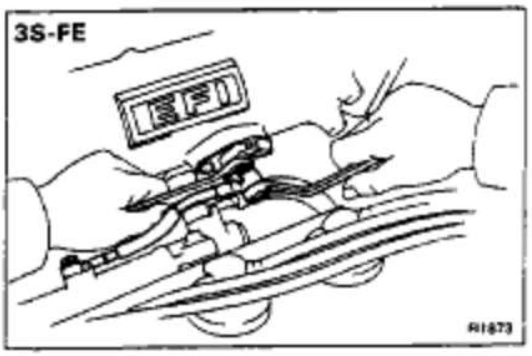


(p) Reconnect the vacuum sensing hose to the fuel pressure regulator.

(q) Measure the fuel pressure at idling.
Fuel pressure: 2.3 – 2.6 kg/cm^2
(33 – 37 psi, 226 – 265 kPa)
If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

(r) Stop the engine. Check that the fuel pressure remains 1.5 kg/cm^2 (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.





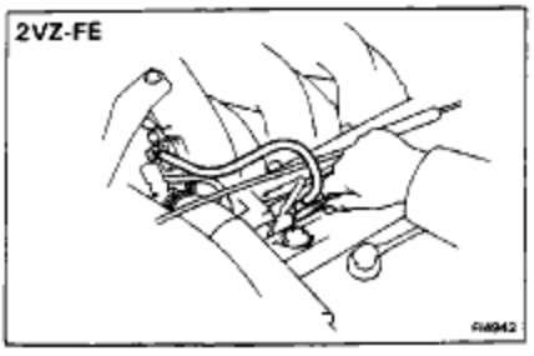
(s) After checking fuel pressure, disconnect the battery negative (–) cable and carefully remove the SST to prevent gasoline from splashing.
SST 09268–45012

(t) Install the cold start injector pipe (3S–FE) or tube (2VZ–FE) with two new gaskets and the. union bolt.
Torque: 3S–FE 180 kg–cm (113 ft–lb, 18 N–m)
2VZ–FE 204 kg–cm (14 ft–lb, 20 N–m)

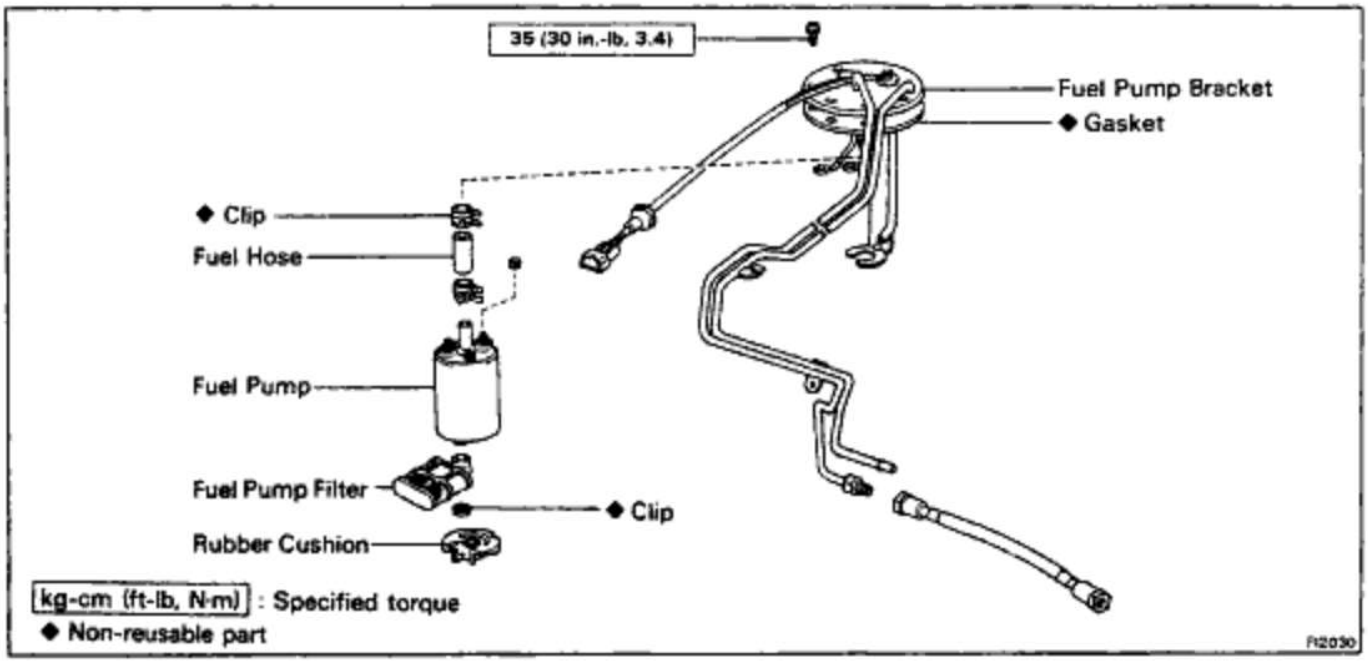
(u) Reconnect the cold start injector connector.

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

(w) Check for fuel leakage.



COMPONENTS (2WD)

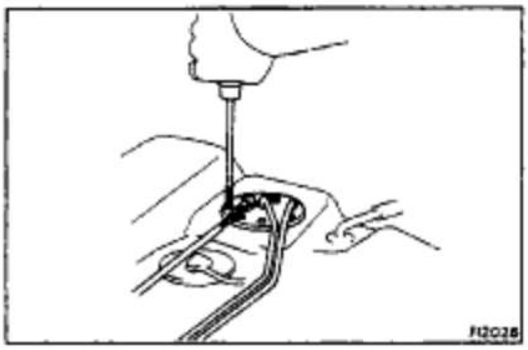


REMOVAL OF FUEL PUMP

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

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

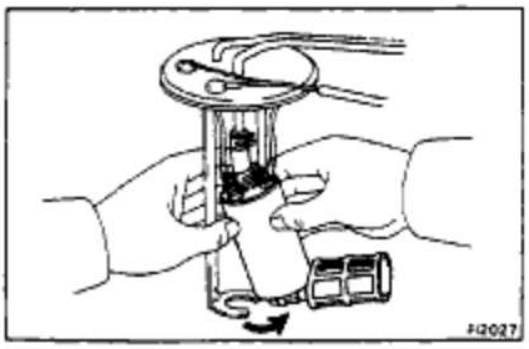
2. REMOVE FUEL TANK



3. REMOVE FUEL PUMP BRACKET FROM FUEL TANK

(a) Remove the bolt of the bracket.

(b) Remove the seven screws, pull out the pump bracket.

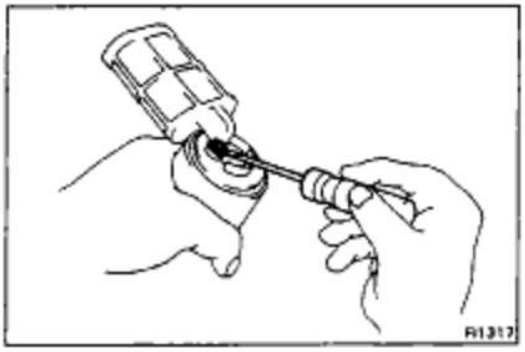


4. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

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

(b) Remove the two nuts, and disconnect the wires from the fuel pump.

(c) Disconnect the fuel hose from the fuel pump.



5. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

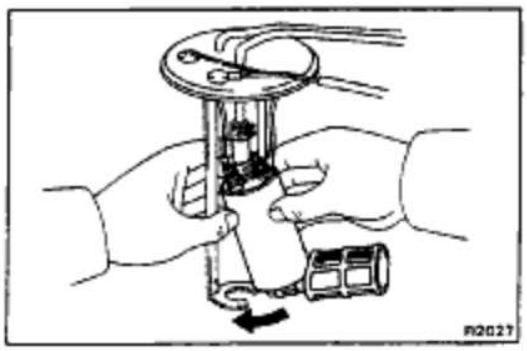
(a) Remove the rubber cushion.
(b) Using a small screwdriver, remove the clip.
(c) Pull out the pump filter.

INSTALLATION OF FUEL PUMP

(See page FI–74)

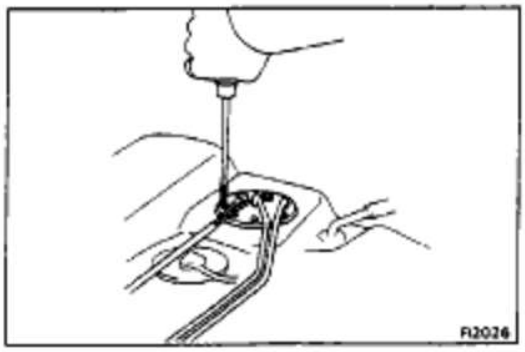
1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

(a) Install the pump filter with a new clip.
(b) Install the rubber cushion.



2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

(a) Connect the fuel hose to the outlet port of the fuel pump.
(b) Connect the wires to the fuel pump with the two nuts.
(e) Push the lower side of the fuel pump, and install the fuel pump.



3. INSTALL FUEL PUMP BRACKET TO FUEL TANK

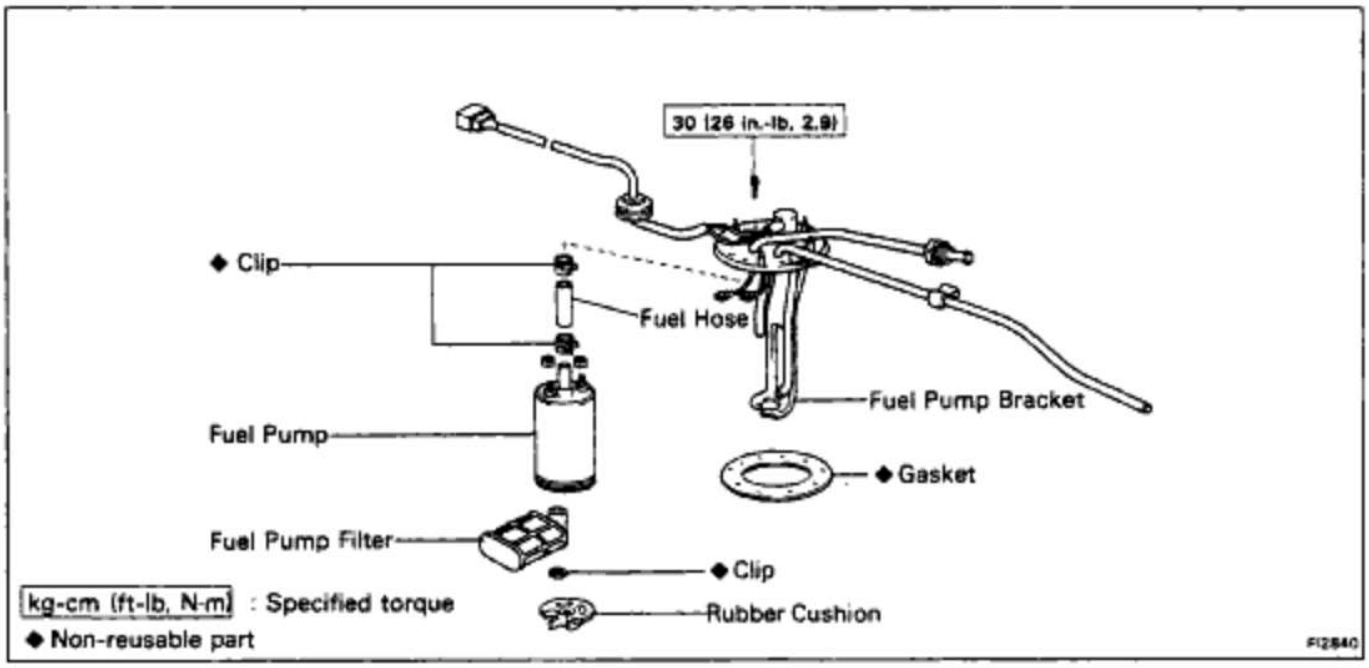
(a) Install a new gasket and the pump bracket with the seven screws.
Torque: 40 kg–cm (35 in.–lb, 3.9 N–m)
(b) Install the bolt of the bracket.

4. INSTALL FUEL TANK

When installing the fuel tank, refer to FI–65 for the installation position of the cushion and the tightening torque.

5. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

COMPONENTS (4WD)

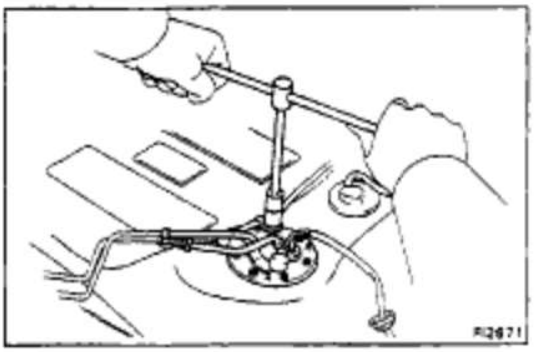


REMOVAL OF FUEL PUMP

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

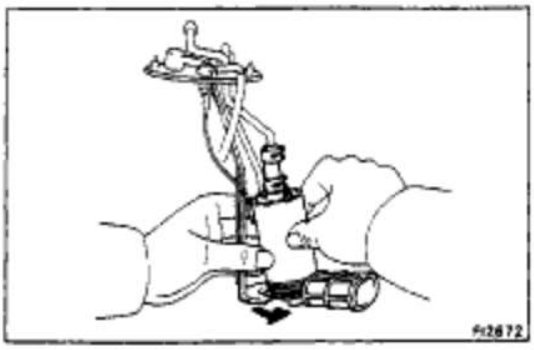
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. REMOVE FUEL TANK



3. REMOVE FUEL PUMP BRACKET FROM FUEL TANK

Remove the seven bolts, pull out the pump bracket.

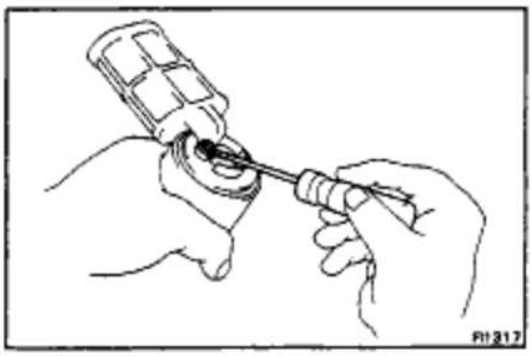


4. REMOVE FUEL PUMP–FROM FUEL PUMP BRACKET

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

(b) Remove the two nuts, and disconnect the wires from the fuel pump.

(c) Disconnect the fuel hose from the fuel pump.



5. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

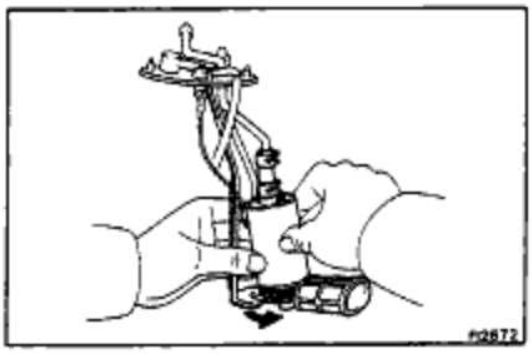
(a) Remove the rubber cushion.
(b) Using a small screwdriver, remove the clip.
(e) Pull out the pump filter.

INSTALLATION OF FUEL PUMP

(See page FI–76)

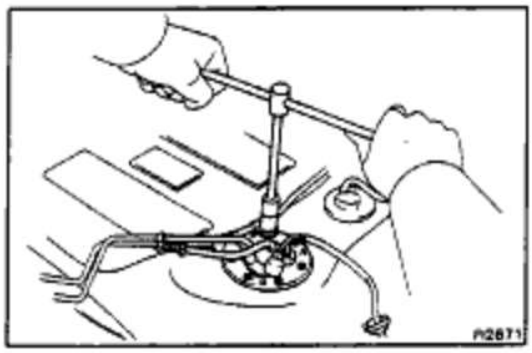
1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

(a) Install the pump filter with a new clip.
(b) Install the rubber cushion.



2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

(a) Connect the fuel hose to the outlet port of the fuel pump.
(b) Connect the wires to the fuel pump with the two nuts.
(c) Push the lower side of the fuel pump, and install the fuel pump.



3. INSTALL FUEL PUMP BRACKET TO FUEL TANK

Install a new gasket and the pump bracket with the seven bolts.

Torque: 30 kg–cm (26 in.–lb, 2.9 N–m)

4. INSTALL FUEL TANK

When installing the fuel tank, refer to FI–65 for the installation position of the cushion and the tightening torque.

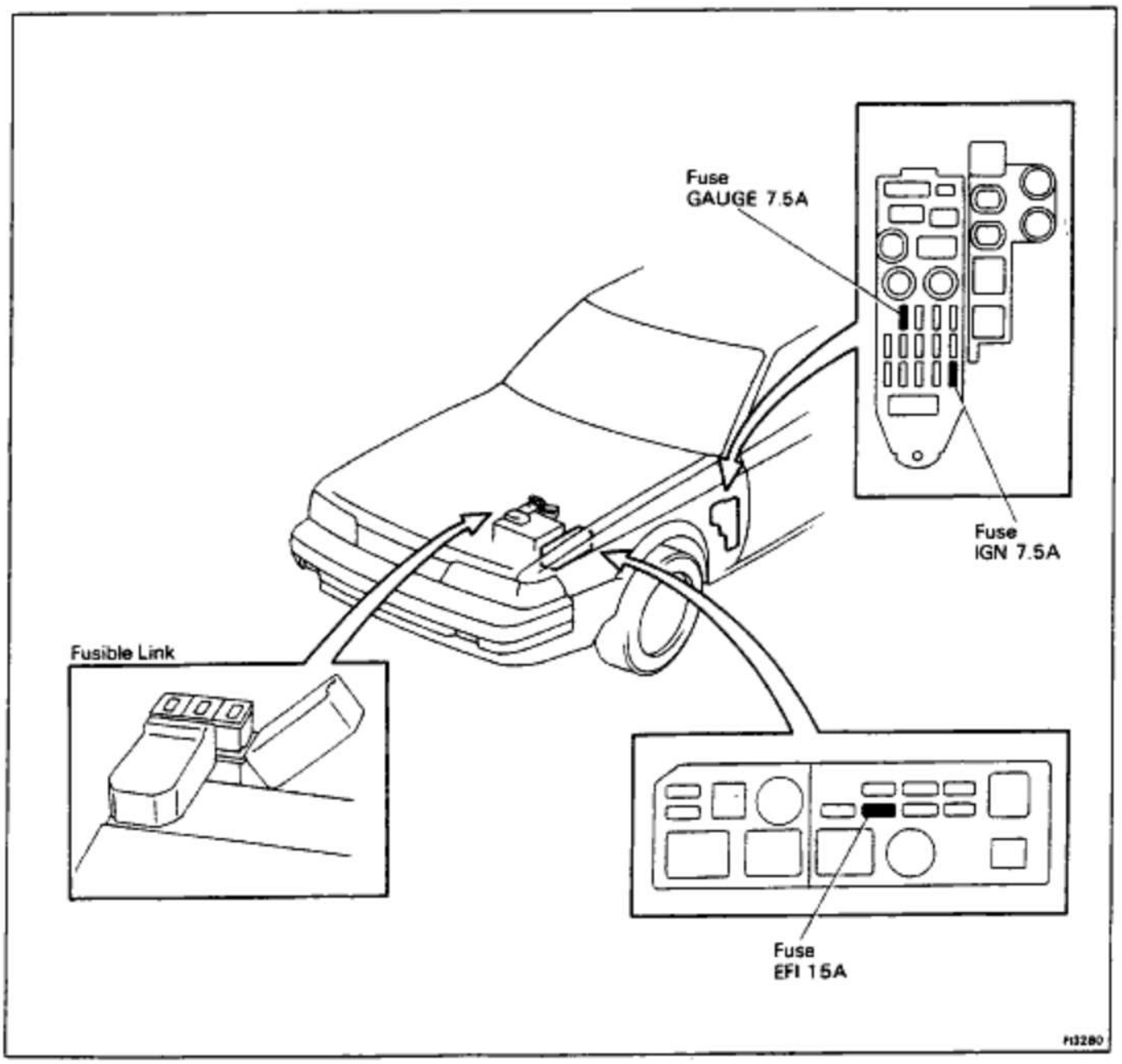
5. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

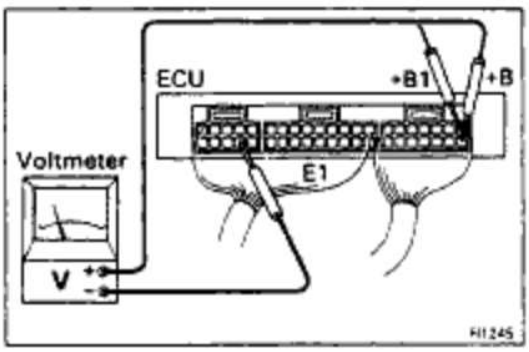
TROUBLESHOOTING WITH VOLT OHMMETER

HINT:

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

LOCATION OF FUSES AND FUSIBLE LINKS





EFI SYSTEM CHECK PROCEDURE (3S–FE)

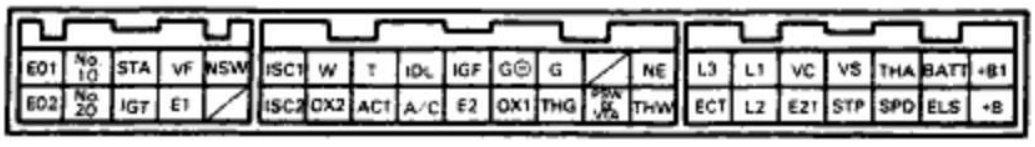
HINT:

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

Terminals of ECU

Symbol	Terminal name	Symbol	Terminal name	Symbol	Terminal name
E01	ENGINE GROUND	*4ACT	A/C AMPLIFIER	*2ECT	ECT ECU
E02	**ENGINE GROUND**	IDL	THROTTLE POSITION SENSOR	*2L1	ECT ECU
No. 10	INJECTOR	*4A/C	A/C MAGNET SWITCH	*2L2	ECT ECU
No. 20	INJECTOR	IGF	IGNITER	VC	AIR FLOW METER
STA	STARTER SWITCH	E2	SENSOR GROUND	E21	**SENSOR GROUND**
IGT	IGNITER	G⊖	DISTRIBUTOR	VS	AIR FLOW METER
VF	CHECK CONNECTOR	OX1	**OXYGEN SENSOR**	STP	STOP LIGHT SWITCH
E1	ENGINE GROUND	G	DISTRIBUTOR	THA	AIR FLOW METER
NSW	NEUTRAL START SWITCH	*3THG	EGR GAS TEMP. SENSOR	SPD	SPEED SENSOR
ISC1	ISC VALVE	*1PSW	THROTTLE POSITION SENSOR	BATT	BATTERY
ISC2	ISC VALVE	*2VTA	THROTTLE POSITION SENSOR	ELS	HEADLIGHT and DEFOGGER
W	WARNING LIGHT	NE	DISTRIBUTOR	+B1	MAIN RELAY
*3OX2	**SUB–OXYGEN SENSOR**	THW	WATER TEMP. SENSOR	+B	MAIN RELAY
T	CHECK CONNECTOR	*2L3	ECT ECU		

ECU Terminals

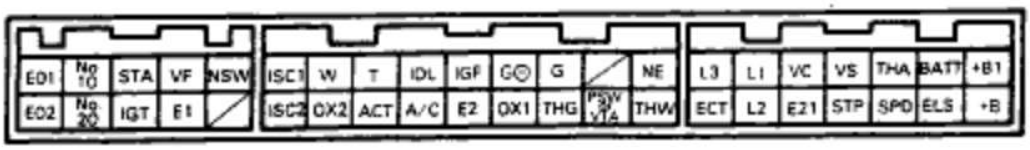


*1 w/o ECT
*2 w/ ECT
*3 CALIF. only
*5 w/ A/C

Voltage at ECU Wiring Connectors (3S–FE)

No.	Terminals	Condition		STD voltage (V)	See page
1	+B, +B1 — E1	IG SW ON		10 — 14	FI–34
2	BATT — E1	—		10 — 14	FI–35
*1 3	IDL — E1	IG SW ON	Throttle valve open	8 — 14	FI–36
	PSW — E1		Throttle valve fully closed	4 — 6	
*2 4	IDL — E2		Throttle valve open	8 — 14	FI–37
	VC — E2		—	4 — 6	
	VTA — E2		Throttle valve fully closed	0.1 — 1.0	
			Throttle valve open	4 — 6	
5	VC — E2			4 — 6	FI–39
	VS — E2		Measuring plate fully closed	4.0 — 5.5	
			Measuring plate fully open	0 — 1	
		Idling		2.0 — 4.0	
		3,000 rpm		1.0 — 2.0	
6	No.10 — E01, No.20 — E02	IG SW ON		10 — 14	FI–40
7	THA — E2	IG SW ON	Intake air temp. 20°C (68°F)	1 — 3	FI–41
8	THW — E2		Coolant temp. 80°C (176°F)	0.1 — 1.0	FI–42
9	STA — E1	Cranking		6 — 14	FI–43
10	IGT — E1	Cranking or idling		0.7 — 1.0	FI–44
11	ISC1, ISC2 — E1	IG SW ON		9 — 14	FI–45
12	W — E1	No trouble ("CHECK" engine warning light off) and engine running		10 — 14	FI–46
13	*3A/C — E1	IG SW ON	Air conditioning ON	8 — 14	FI–47

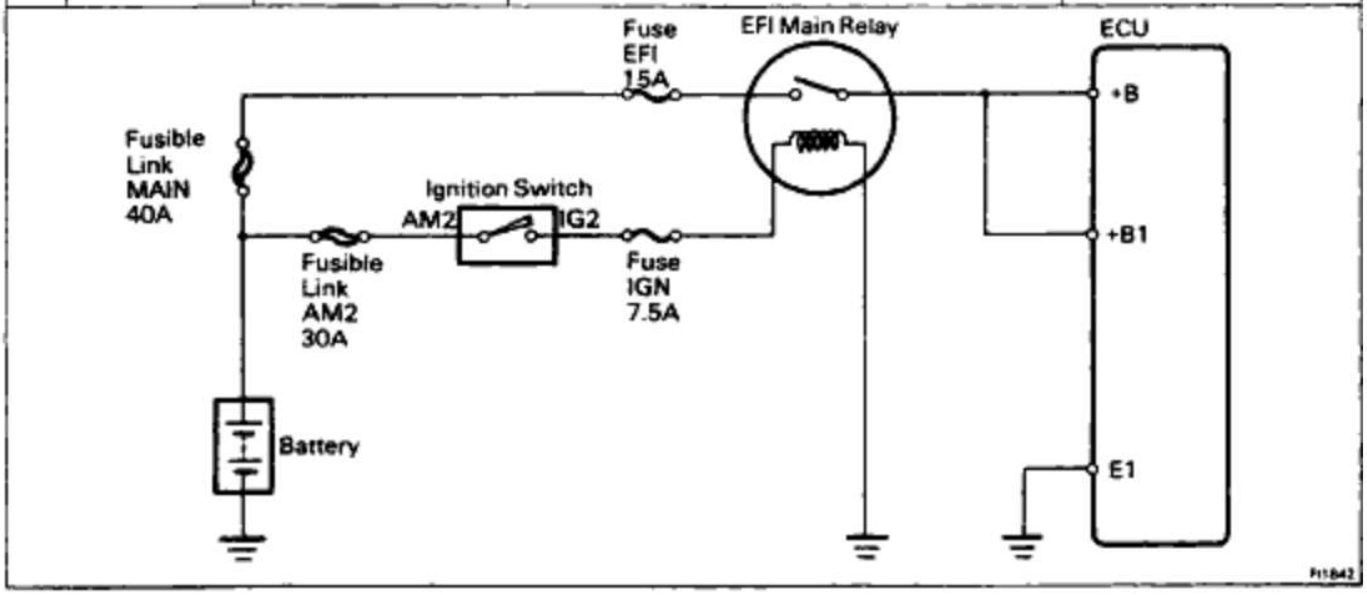
ECU Terminals

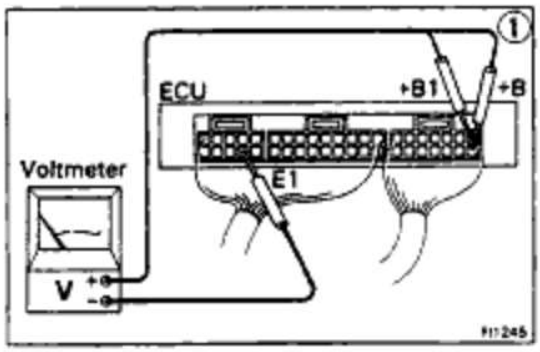


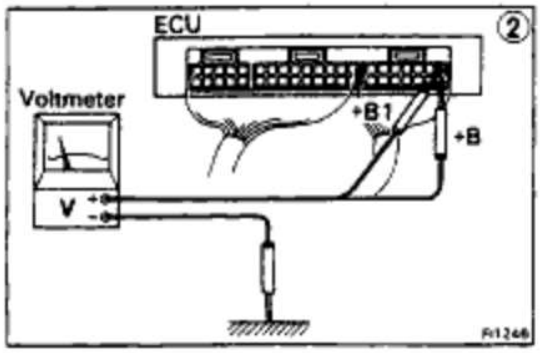
*1 w/o ECT
*2 w/ ECT
*3 w/ A/C

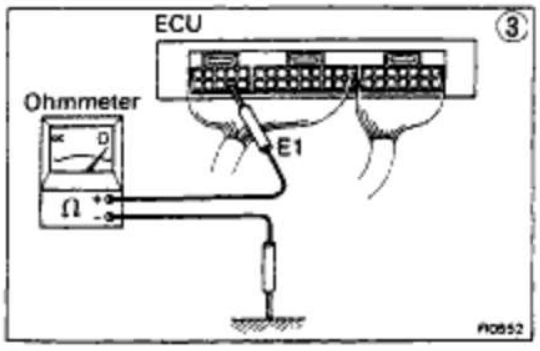
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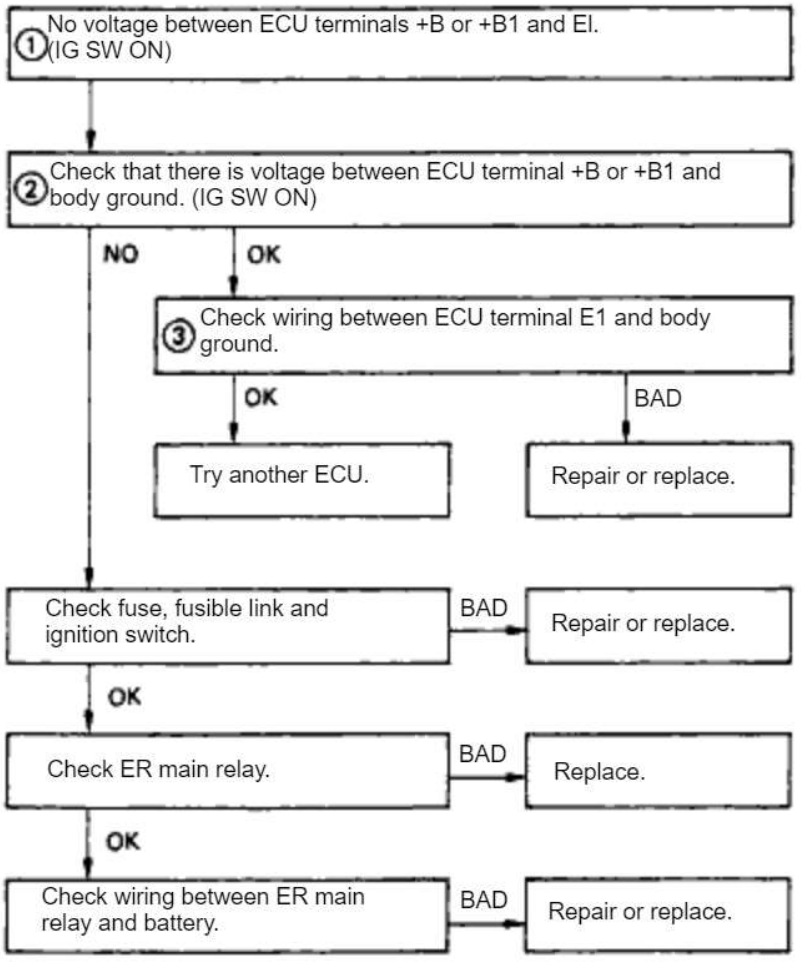
No.	Terminals	Trouble	Condition	STD voltage
1	+B, +B1 — E1	No voltage	Ignition SW ON	10 — 14 V



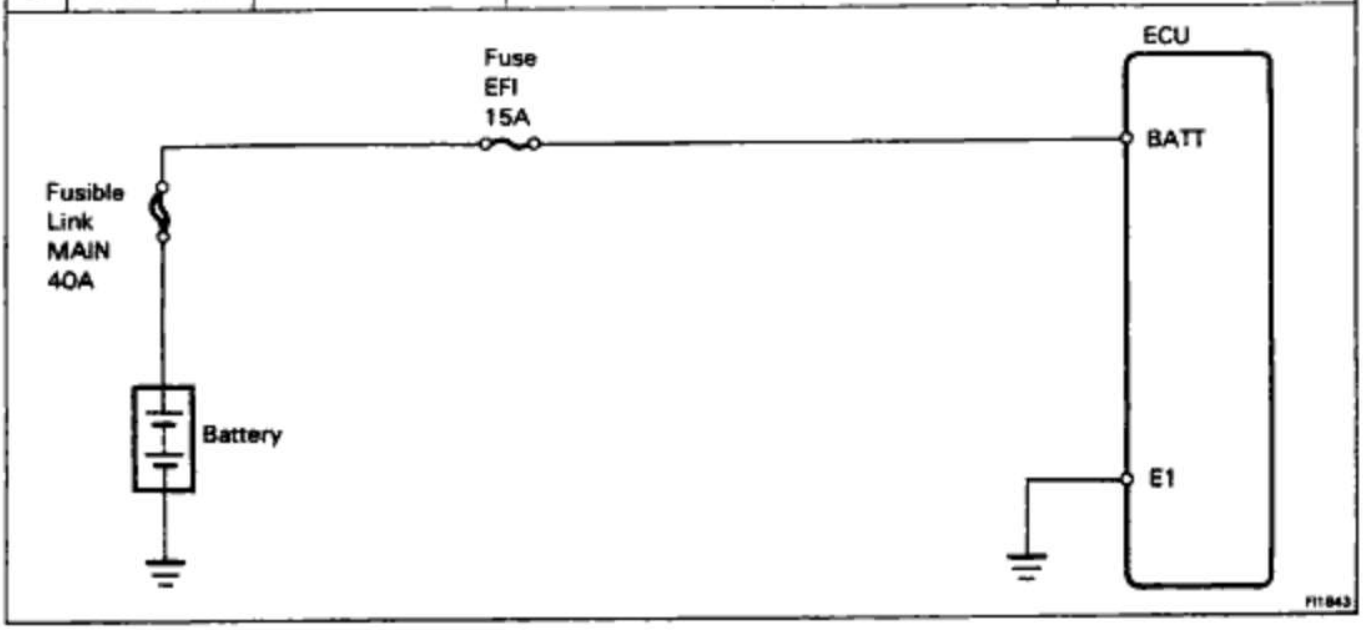


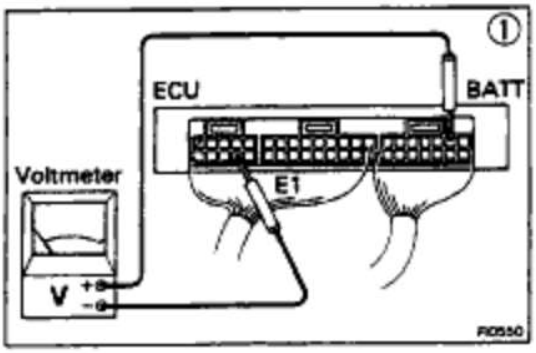


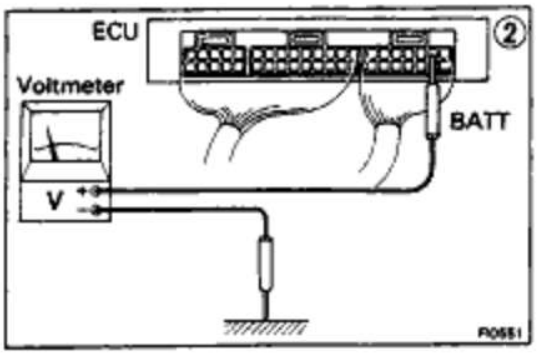


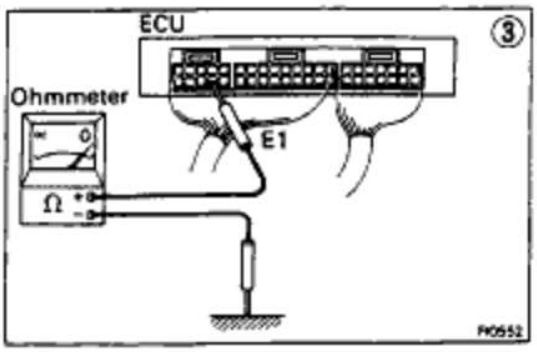


No.	Terminals	Trouble	Condition	STD voltage
2	BATT — E1	No voltage	—	10 — 14 V









① 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 EI and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fuse and fusible link.

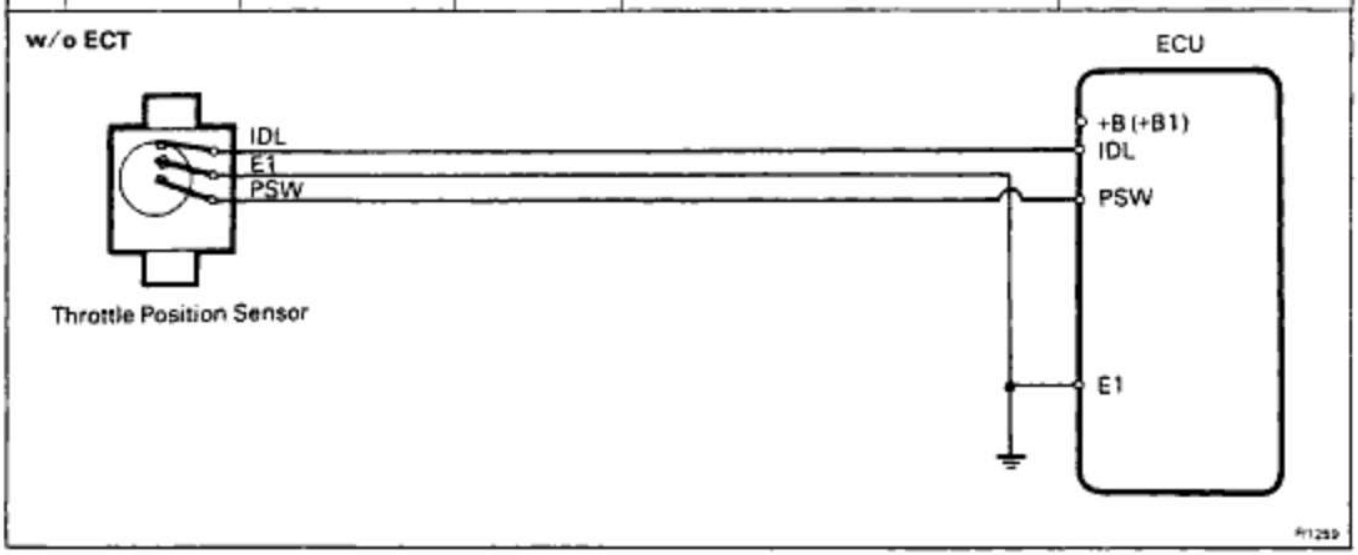
BAD → Replace.

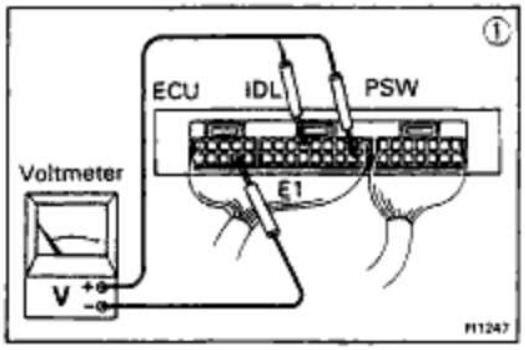
OK

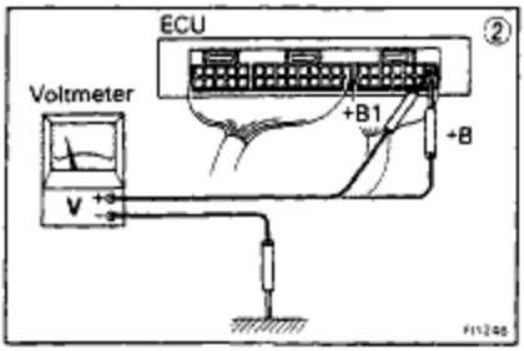
Check wiring between ECU terminal and battery.

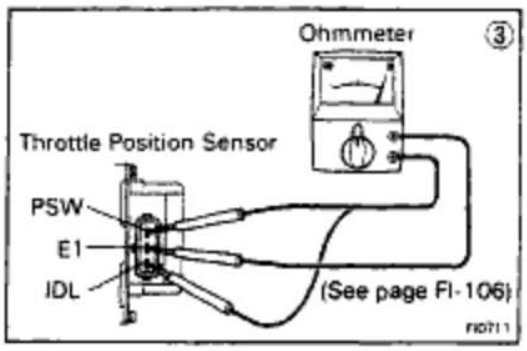
BAD → Repair or replace.

No.	Terminals	Trouble	Condition		STD voltage
3	IDL – E1	No voltage	IG SW ON	Throttle valve open	8 – 14 V
	PSW – E1			Throttle valve fully closed	4 – 6 V









① No voltage between ECU terminal 1D1. 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

OK

Check wiring between ECU terminal El and body ground.

BAD

Repair or replace.

Refer to No. 1. (See page FI–34)

BAD

Repair or replace.

OK

③ Check throttle position sensor. (See page FI–106)

BAD

OK

BAD

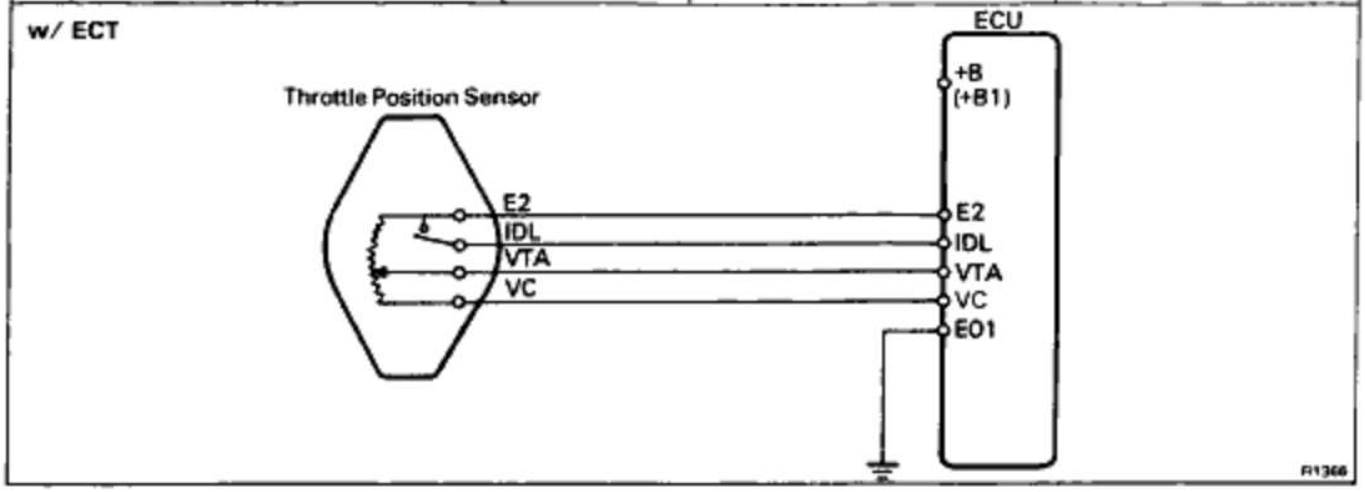
Replace or repair throttle position sensor.

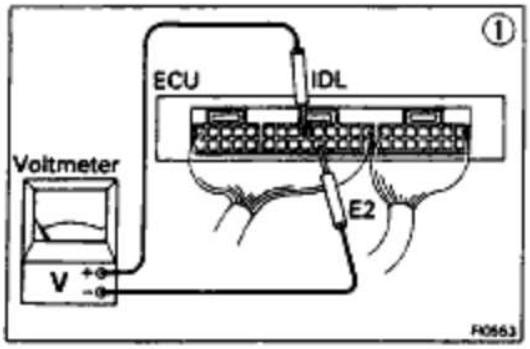
Check wiring between ECU and throttle position sensor.

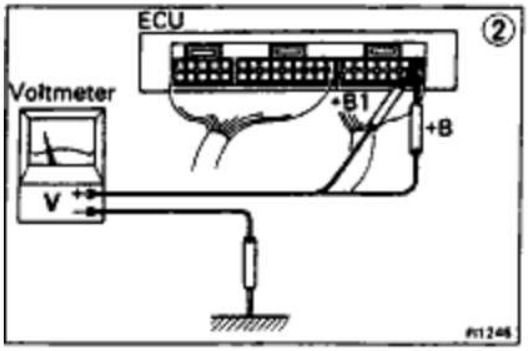
OK

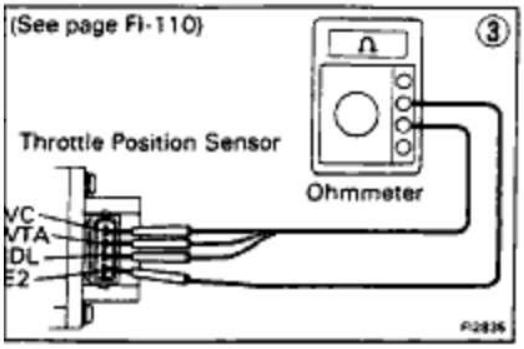
Try another ECU.

No.	Terminals	Trouble	Condition		STD voltage
4	IDL – E2	No voltage	IG SW ON	Throttle valve open	8 – 14V
	VC – E2			–	4 – 6 V
	VTA – E2			Throttle valve fully closed	0.1 – 1.0 V
				Throttle valve fully open	4 – 6









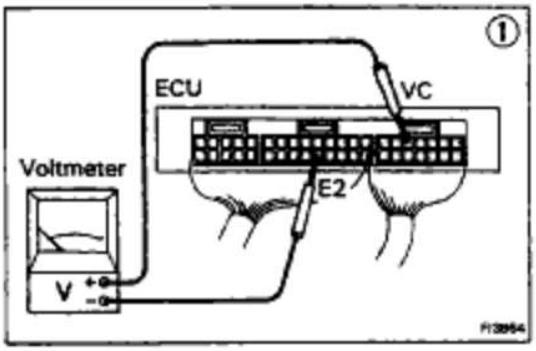
• IDL – E2

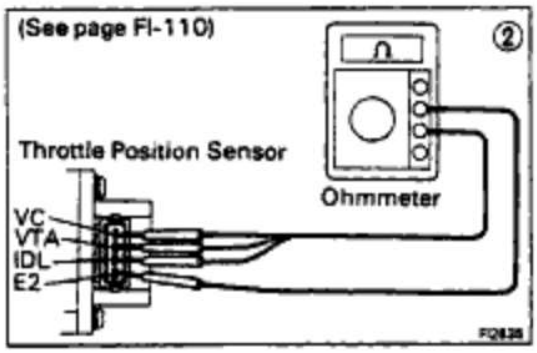
① No voltage between ECU terminals IDL and E2. OG SW ON) (Throttle valve open)

② Check that there is voltage between ECU terminal +B or +B1 and body ground. (IG SW 4111)

NO → Check wiring between ECU terminal El and body ground.
- OK → Refer to No. 1. (See page FI–34)
  - BAD → Repair or replace.
  - OK → ③ Check throttle position sensor. (See page FI–110)
    - BAD → Repair or replace throttle position sensor.
    - OK → Check wiring between ECU and throttle position sensor.
      - BAD → Repair or replace.
      - OK → Try another ECU.
- BAD → Repair or replace.

OK → Refer to No. 1. (See page FI–34)
- BAD → Repair or replace.
- OK → ③ Check throttle position sensor. (See page FI–110)
  - BAD → Repair or replace throttle position sensor.
  - OK → Check wiring between ECU and throttle position sensor.
    - BAD → Repair or replace.
    - OK → Try another ECU.





- **VC–E2**

① No voltage between ECU terminals VC and E2. (IG SW ON)

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

OK

② Check throttle position sensor. (See page FI–110)

BAD

Repair or replace.

OK

Try another ECU.

NO

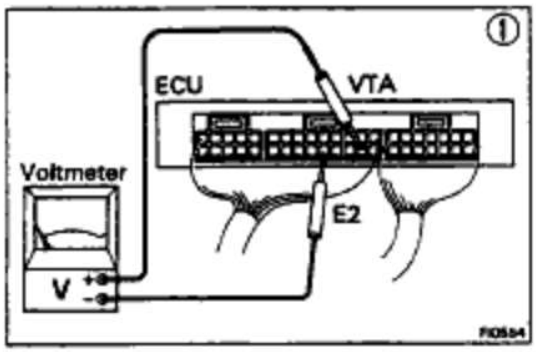
Refer to NO–1. (See page FI–34)

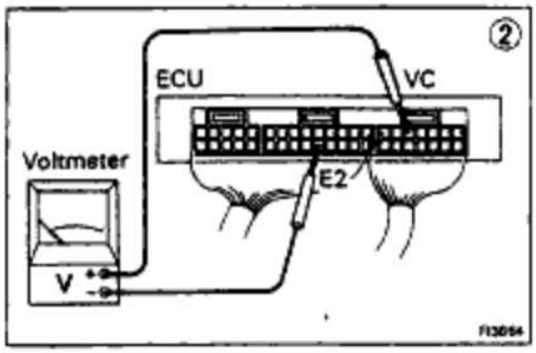
OK

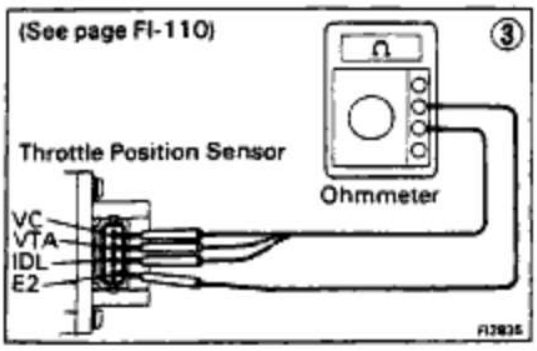
Check wiring between ECU and throttle position sensor.

BAD

Repair or replace wiring.







- **NTA – E2**

① No specified voltage at ECU terminals VTA and E2. (IG SW ON)

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

NO

Refer to VC–E2 trouble section

OK

OK

③ Check throttle position sensor (See page FI–110)

BAD

Repair or replace.

OK

Check wiring between ECU and throttle position sensor.

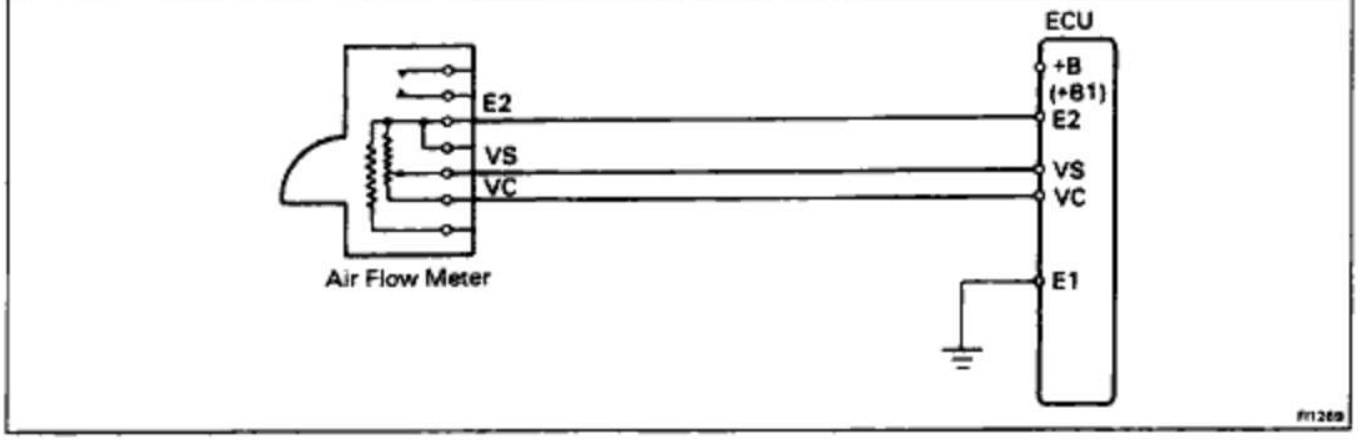
BAD

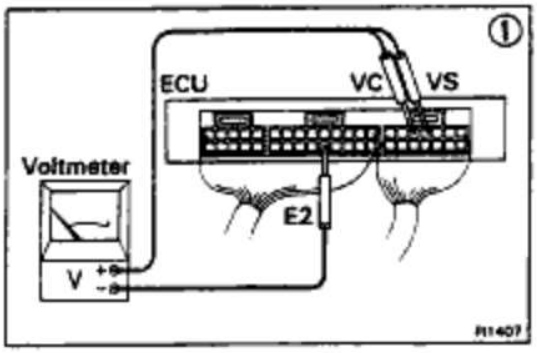
Repair or replace.

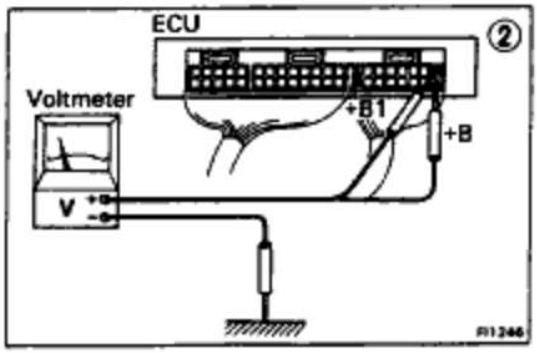
OK

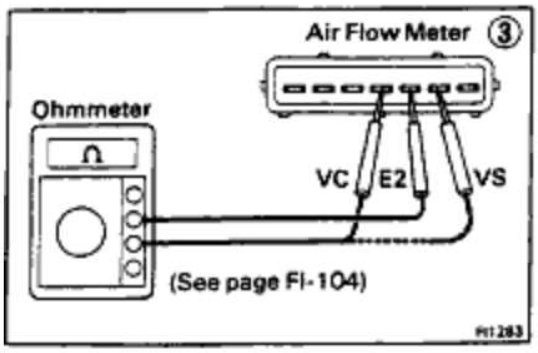
Try another ECU.

No.	Terminals	Trouble	Condition		STD voltage
5	VC — E2	N o voltage	IG SW ON	—	4 — 6 V
	VS — E2			Measuring plate fully closed	4.0 — 5.5 V
				Measuring plate fully open	0 — 1 V
			Idling		2.0 — 4.0 V
			3,000 rpm		1.0 — 2.0 V









① No specified voltage at ECU terminals VC or VS 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–34)

OK → ③ Check air flow meter. (See page FI–104)

BAD → Repair or replace.

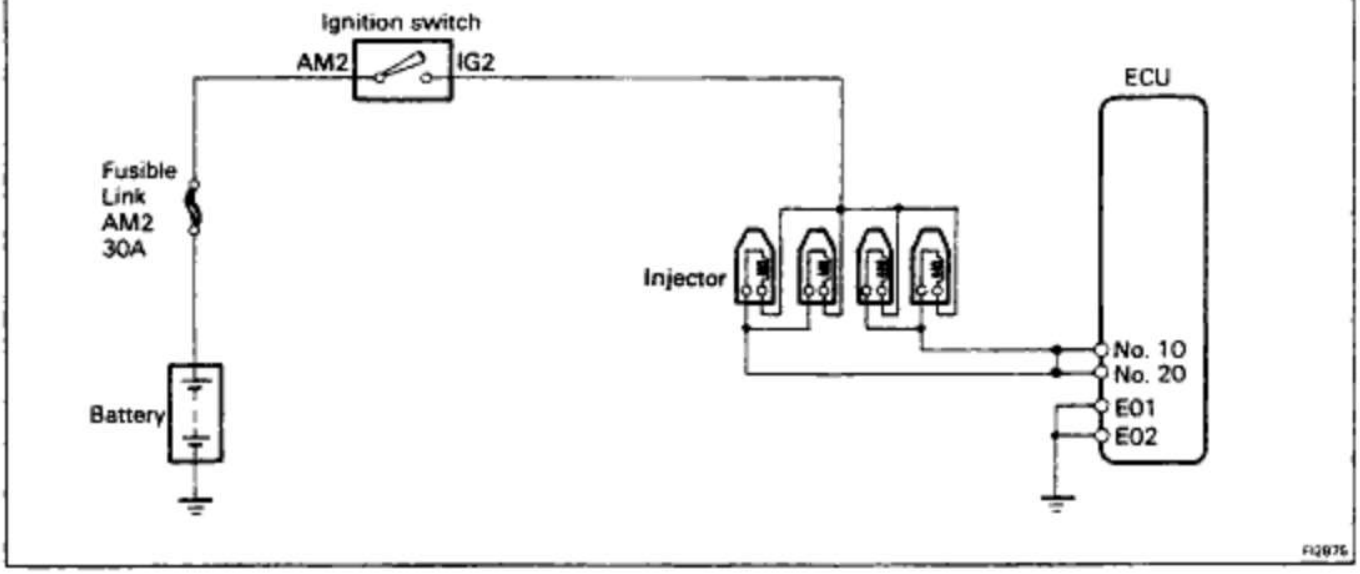
BAD → Replace air flow meter.

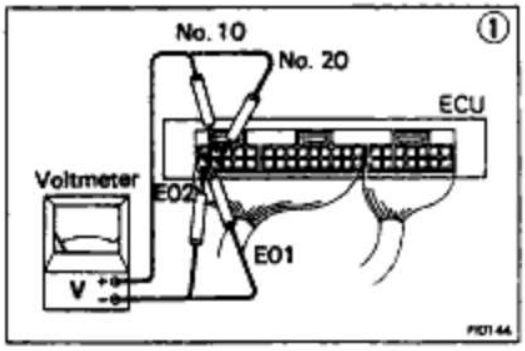
OK → Check wiring between ECU and air flow meter.

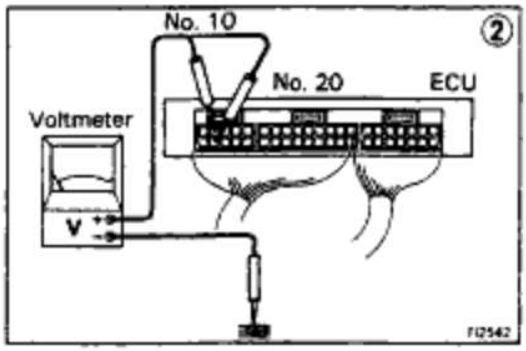
OK → Try another ECU.

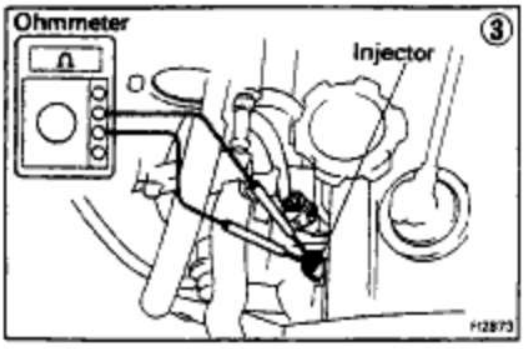
BAD → Repair or replace.

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









① 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

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 link and ignition switch.

BAD → Repair or replace.

OK

↓

③ Check resistance of magnetic coil in each injector. STD resistance: Approx. 13.8 11

OK

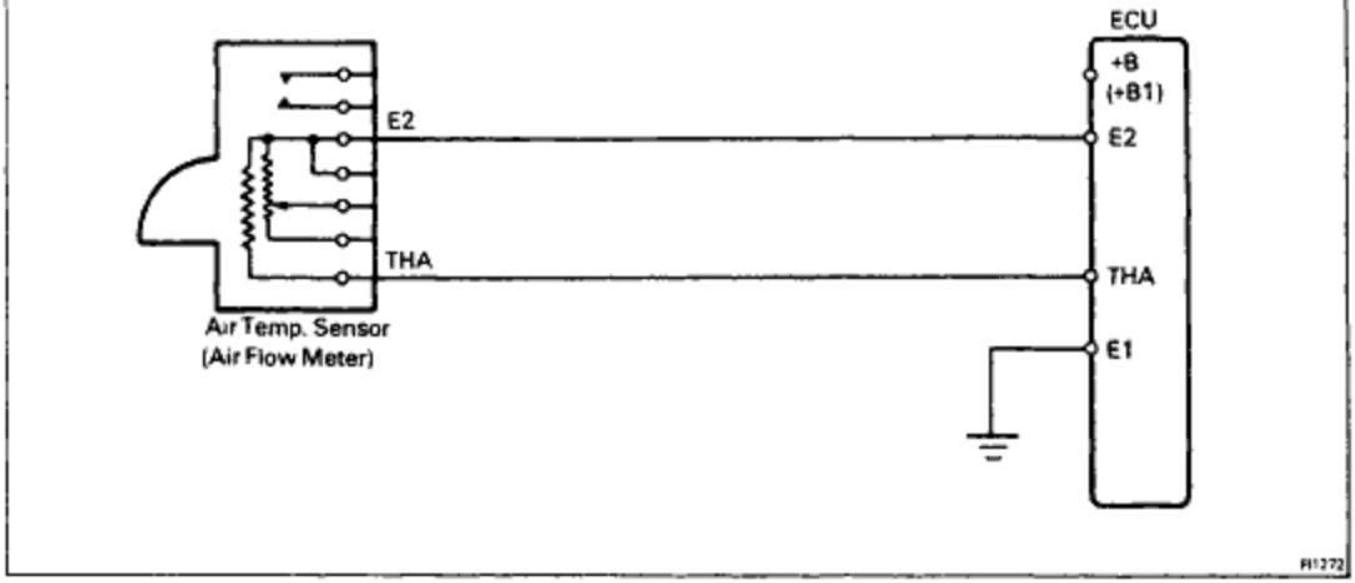
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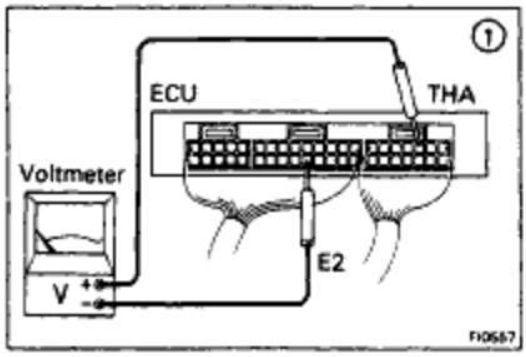
Check wiring between ECU terminal No. 10 and/or No. 20 and battery.

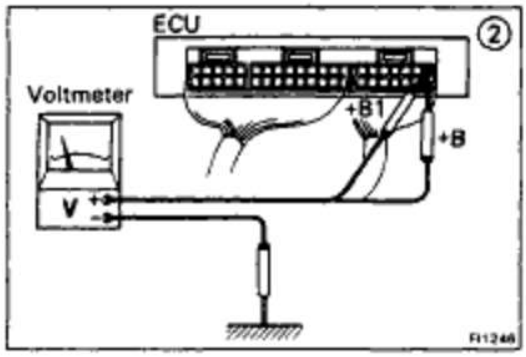
BAD → Repair or replace.

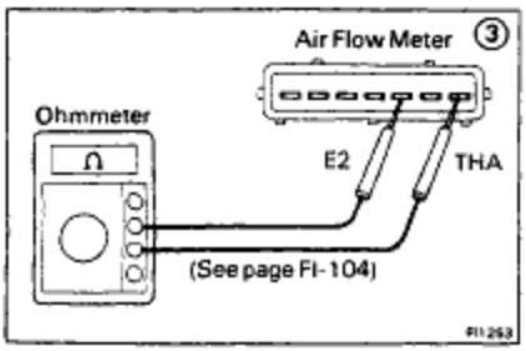
BAD → Replace injector.

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









① 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 4N)

OK

NO

Refer to No. 1. (See page FI–34)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

③ Check air temp. sensor. (See page FI–104)

Repair or replace.

BAD

OK

Replace air flow meter.

Check wiring between ECU and air temp. sensor.

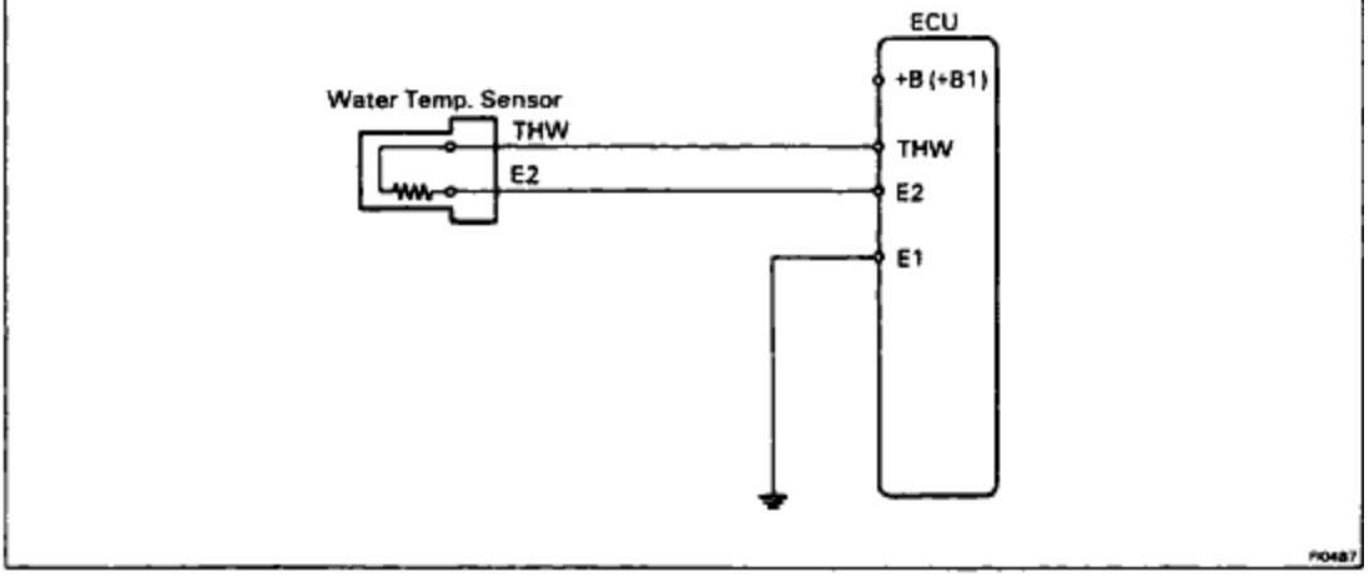
OK

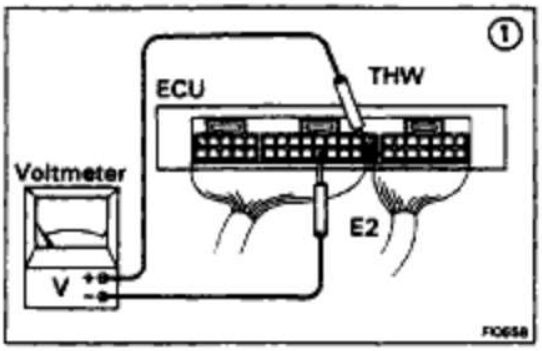
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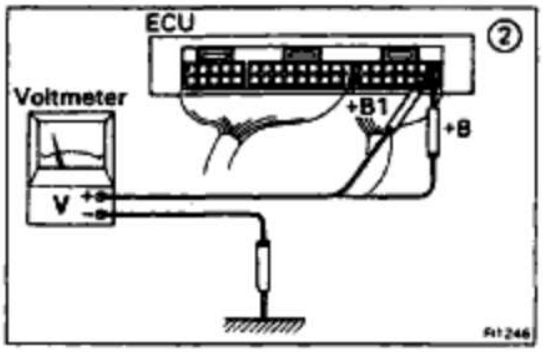
Try another ECU.

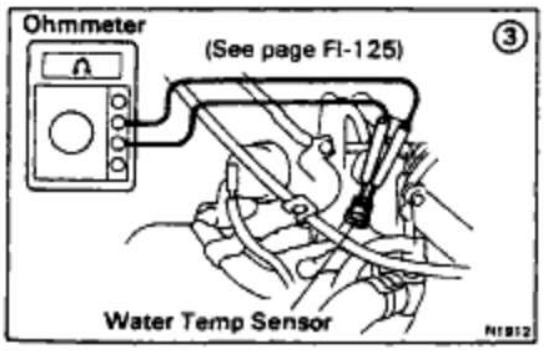
Repair or replace.

No.	Terminals	Trouble	Condition		STD voltage
8	THW — E2	No voltage	IG SW ON	Coolant temperature 80° (176°F)	0.1 — 1.0 V









① No voltage between ECU terminals THW and E2.
(IG SW ON)

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

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

NO → Refer to NO. 1. (See page FI–34)

OK → ③ Check water temp. sensor. (See page FI– 1 Z5)

BAD → Repair or replace.

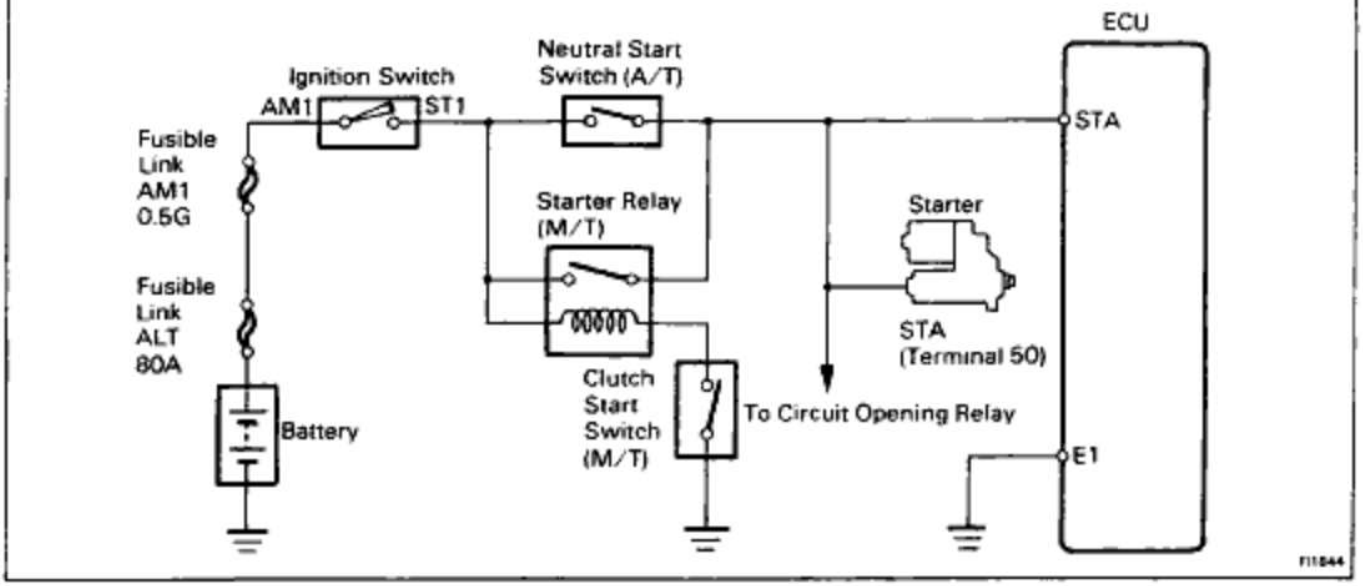
BAD → Replace water temp. sensor.

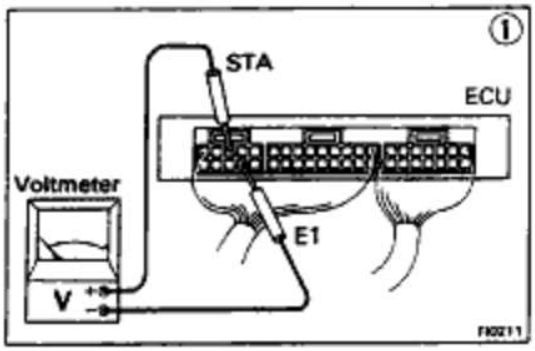
OK → Check wiring between ECU and water temp. sensor.

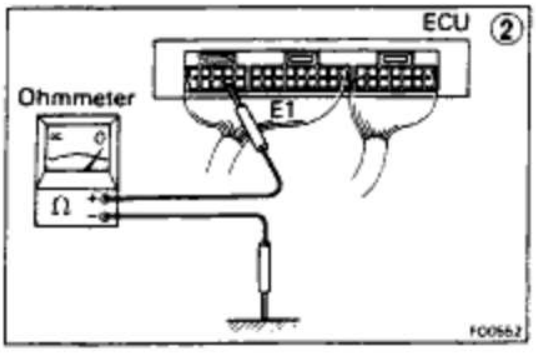
OK → Try another ECU.

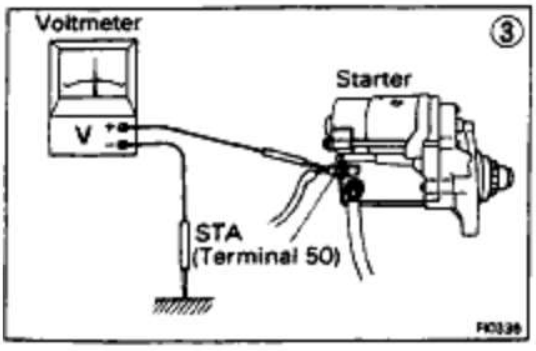
BAD → Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
9	STA — E1	No voltage	Cranking	6 — 14 V





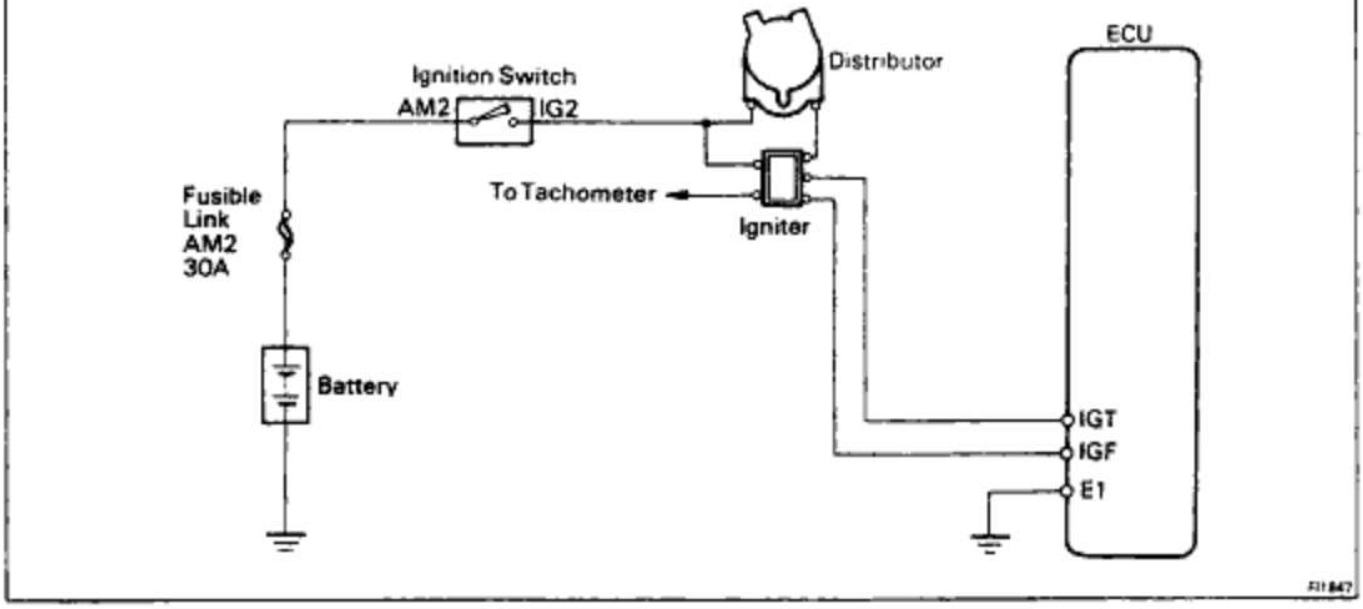


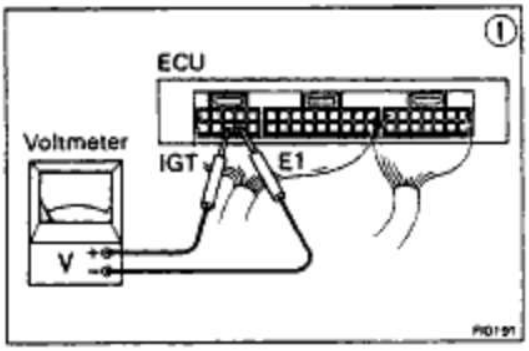


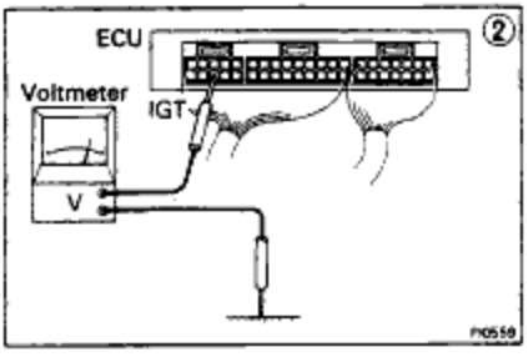
① No voltage between ECU terminals STA and E1. (IG SW START)

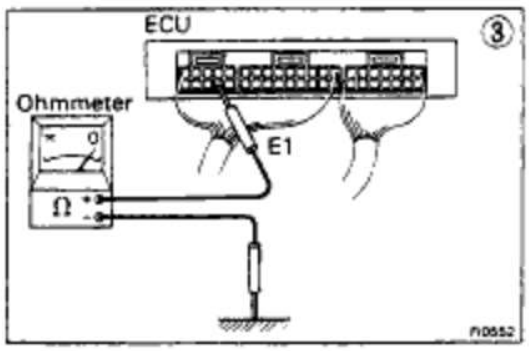
Check starter operation.
- OK → Check wiring between ECU terminal STA and ignition switch terminal ST1.
  - OK → ② Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.
- BAD → Check fusible link, battery, wiring, ignition switch clutch start switch, starter relay and neutral start switch..
  - BAD → Repair or replace.
  - OK → ③ Check that there is voltage at STA (50) terminal of starter. (IG SW START) STD voltage: 6 – 14 v
    - OK → Check starter.
    - NO → Check wiring between ignition switch terminal ST1 and starter terminal STA (50).

No.	Terminals	Trouble	Condition	STD voltage
10	IGT — E1	No voltage	Idling	0.7 — 1.0 V









① No voltage between ECU terminals IGT and EI. (idling)

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

NO

OK

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

OK

Try another ECU.

Check fusible link and ignition switch. — BAD → Repair or replace.

OK

Check distributor. (See page–IG–7) — BAD → Repair or replace.

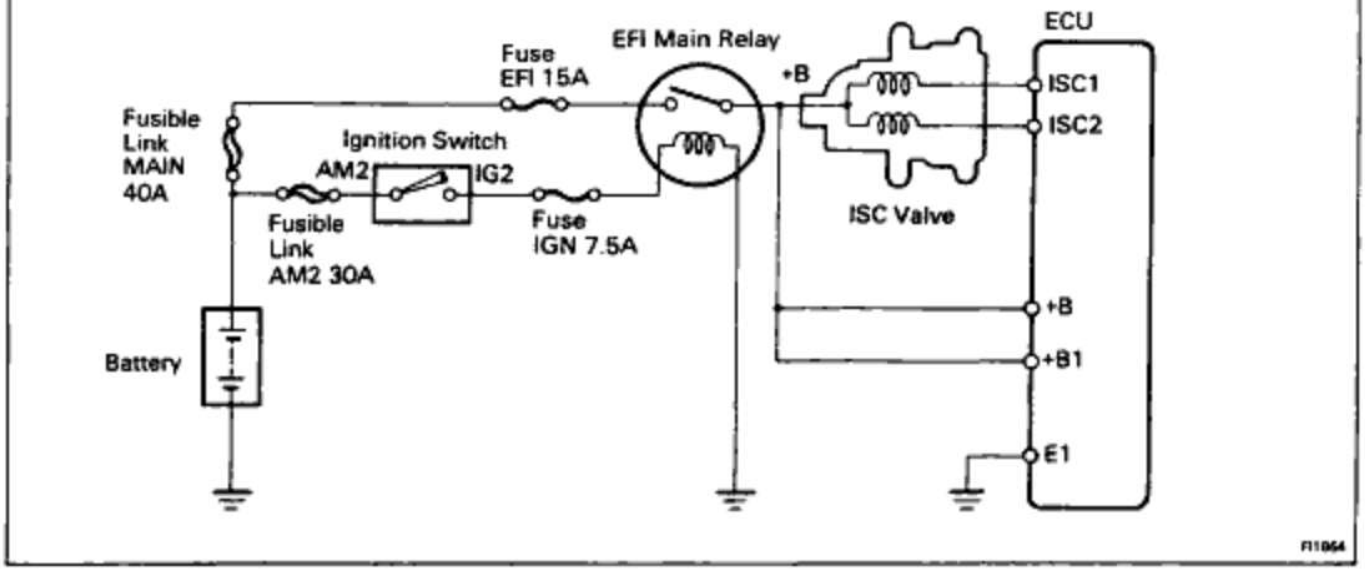
OK

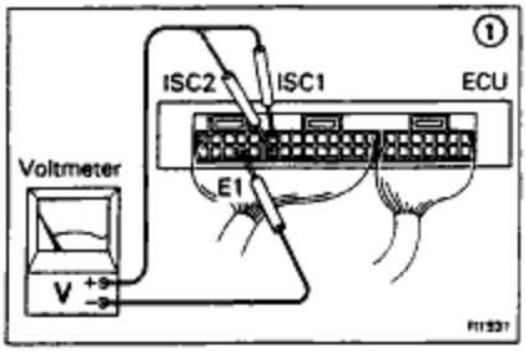
Check wiring between ECU and battery. — BAD → Repair or replace.

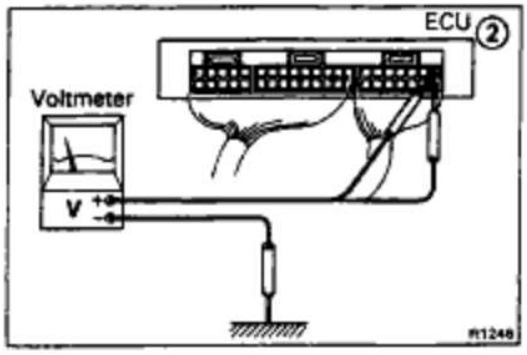
OK

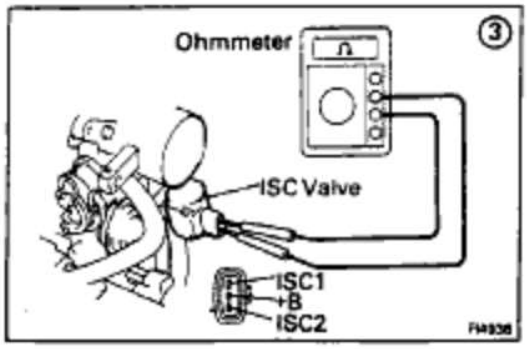
Check igniter. (See page IG–8) — BAD → Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
11	ISC1 ISC2 — E1	No voltage	IG SW ON	9 — 14 V









① There is no voltage between ECU terminals ISC1 or ISC2 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–34)

↓

③ Check resistance between ISC valve terminals +B and ISC1 or ISC2. STD resistance: 16.0 – 17.0Ω

BAD → Replace ISC valve.

OK ↓

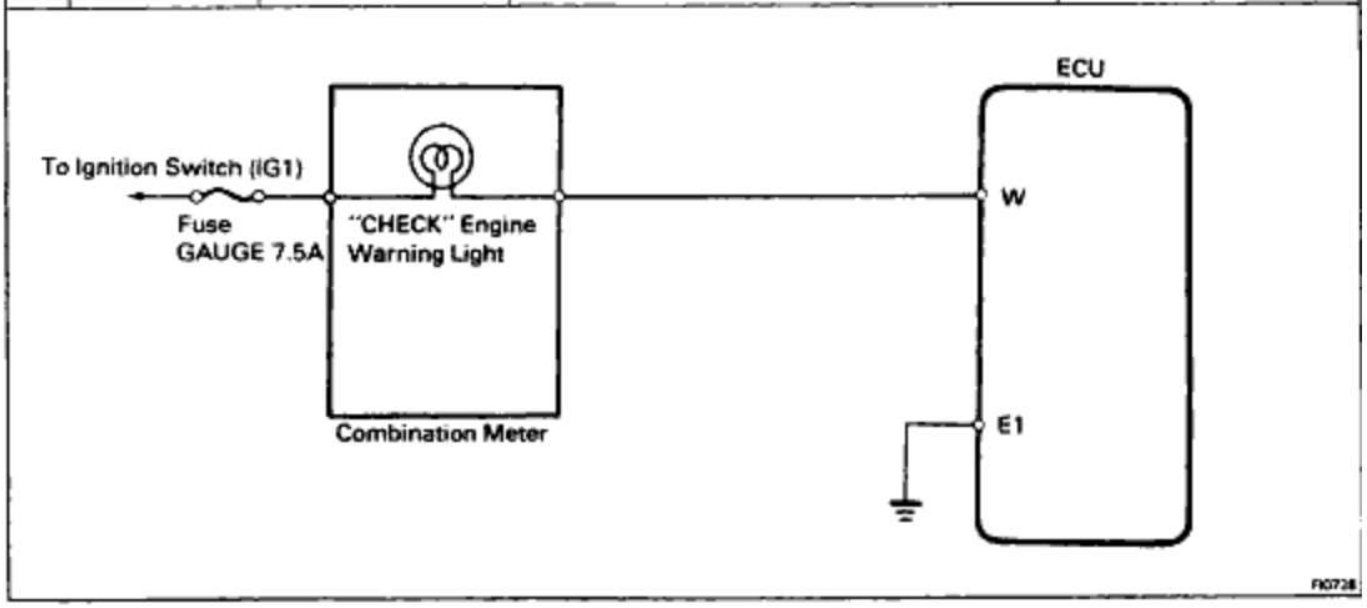
Check wiring between ECU and ISC valve.

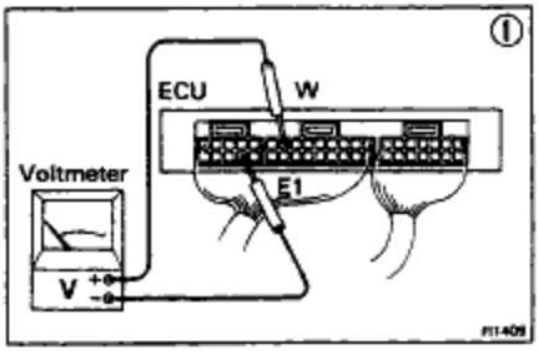
BAD → Repair or replace wiring.

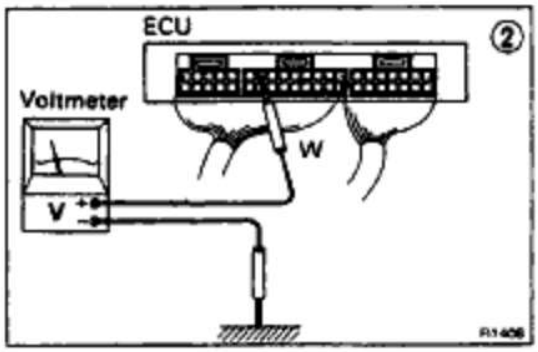
OK ↓

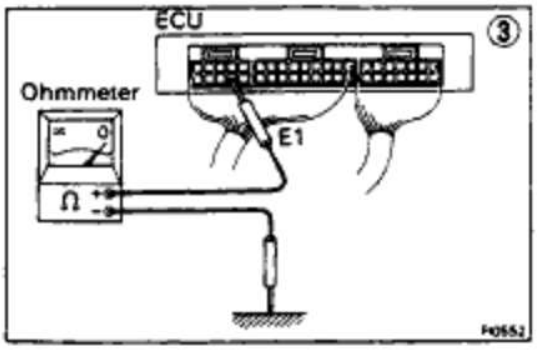
Try another ECU

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









① 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 EI and body ground.

OK → Try another ECU.

BAD → Repair or replace.

NO → Check GAUGE fuse 7.5 A and "CHECK" engine warning light.

OK → Check wiring between ECU terminal W and fuse.

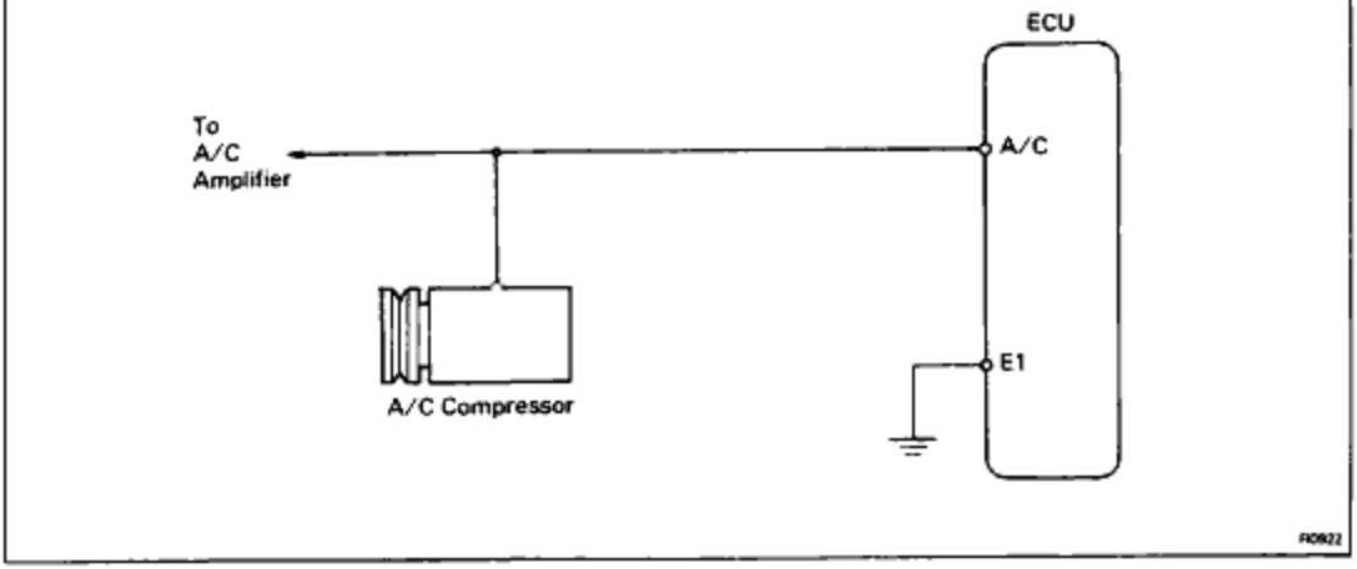
BAD → Repair or replace.

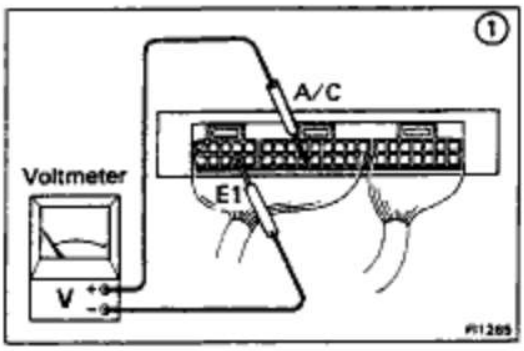
Fuse blows again → Check wiring between ECU terminal W and fuse.

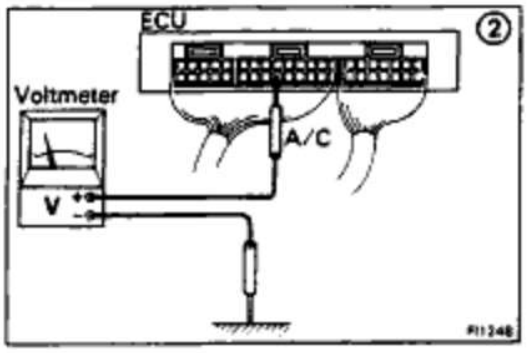
BAD → Repair or replace.

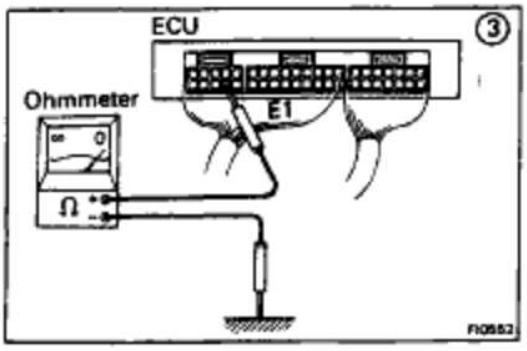
No.	Terminals	Trouble	Condition	STD voltage
13	A/C — E1	No voltage	Air conditioning O N	8— 14 V

w/ A/C









① No voltage between ECU terminals A/C and El . (Air conditioning ON)

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

NO

OK

③ Check wiring between ECU terminal El and body ground.

OK

Try another ECU.

BAD

Repair or replace.

Check compressor running.

OK

Check wiring between ECU terminal A/C and amplifier.

BAD

Repair or replace.

NO

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

BAD

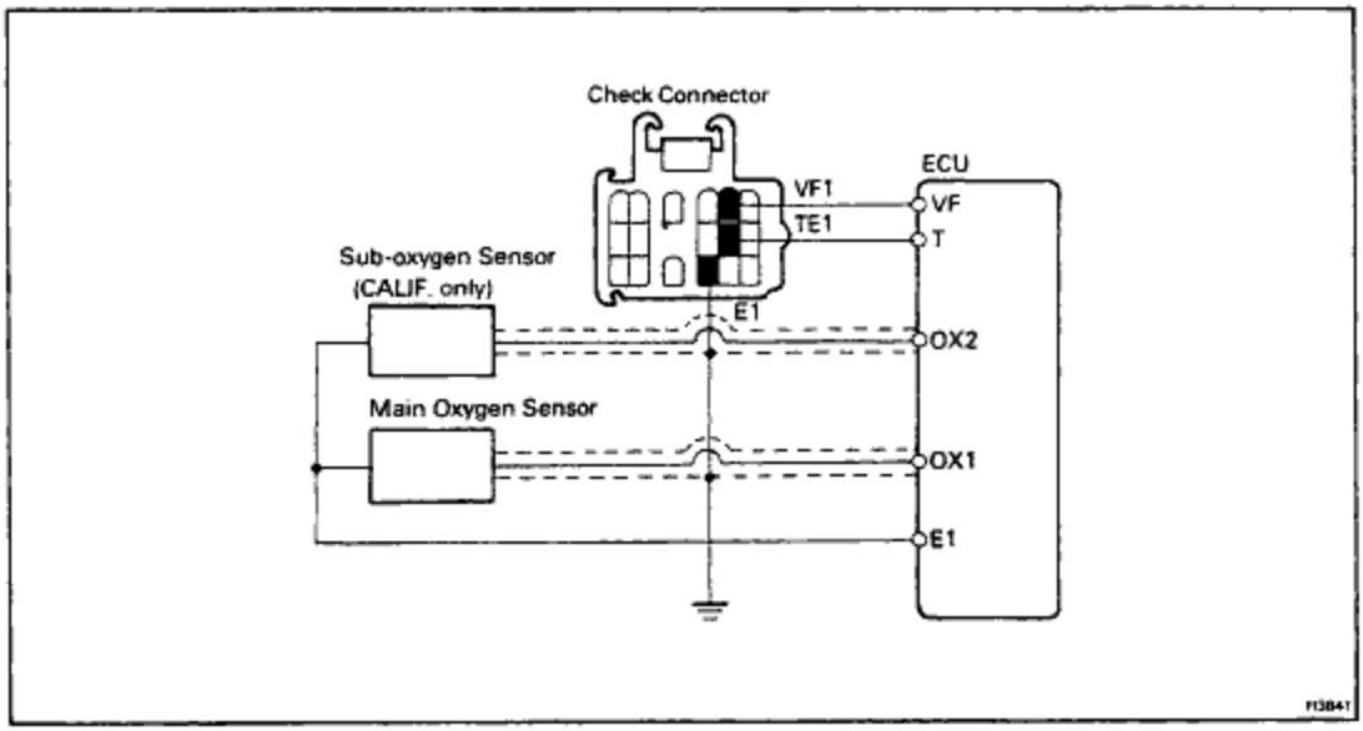
Repair or replace.

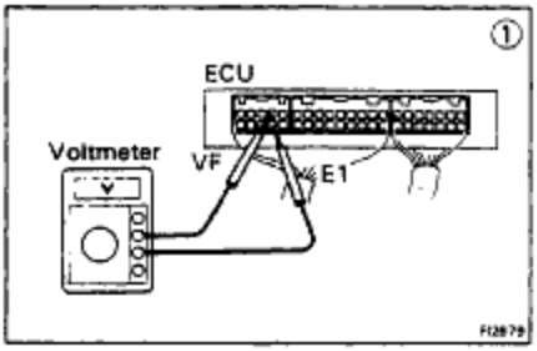
OK

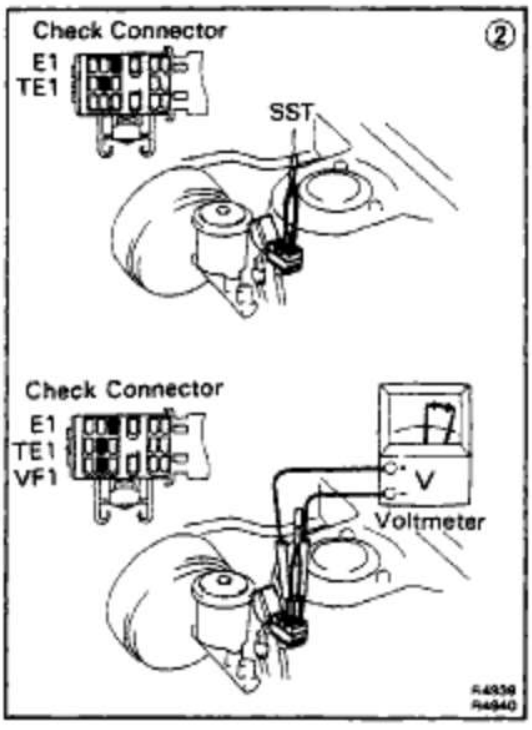
Check wiring between amplifier and ECU or compressor.

BAD

Repair or replace.







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

Check that there is specified 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.

Check for suction of air into exhaust system.
- BAD: Repair air suction.

OK → Check for air leak from air intake system.
- BAD: Repair air leak.

OK → Check spark plugs.
- BAD: Repair or replace.

OK → Check distributor and ignition system.
- BAD: Repair or replace.

OK → Check fuel pressure.
- BAD: Repair or replace.

OK → Check injectors.
- BAD: Repair or replace.

OK → Check cold start injector–.
- BAD: Repair or replace.

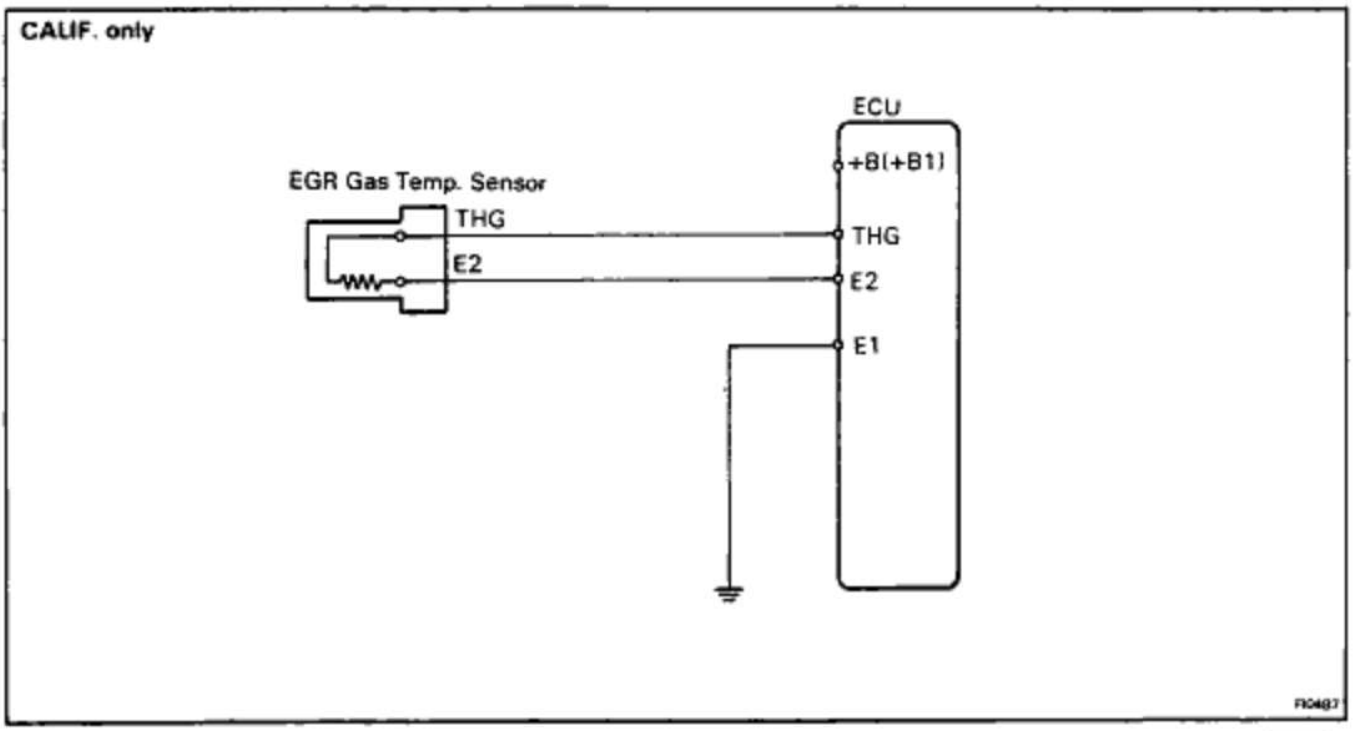
OK → Check air flow meter.
- BAD: Repair or replace.

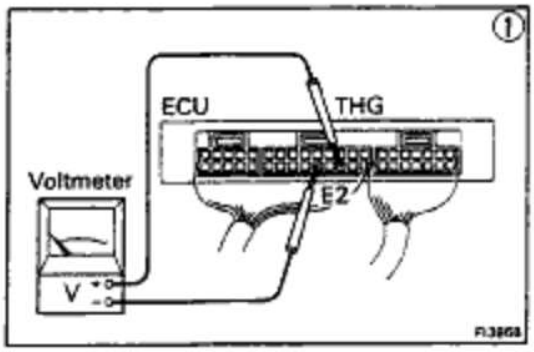
OK → ② Check operation of oxygen sensors.
- OK: System normal.

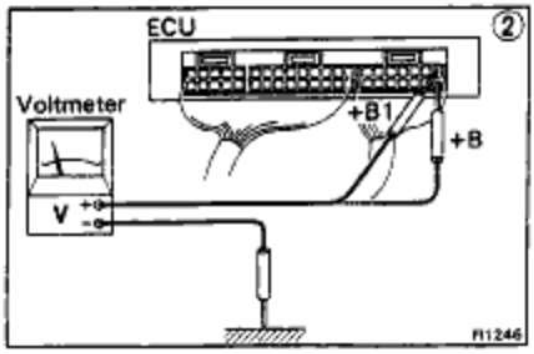
BAD → Check wiring between oxygen sensors and ECU connectors.
- BAD: Repair wiring.

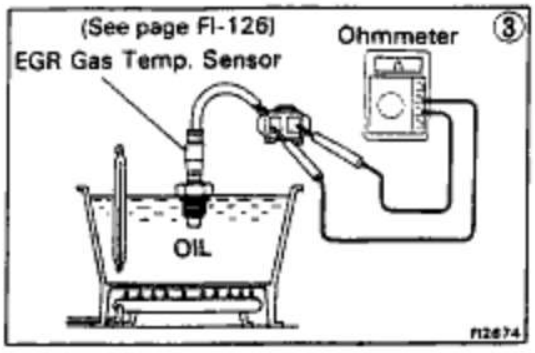
OK → Replace oxygen sensors.

* Rich malfunction only









① No voltage between ECU terminals THG and E2. (IG SW ON)

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

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

NO → Refer to No. 1. *(See page FI–34)

Check wiring between ECU terminal E1 and body ground.

OK → Check EGR system.

BAD → Repair or replace.

Check EGR system.

BAD → Repair or replace.

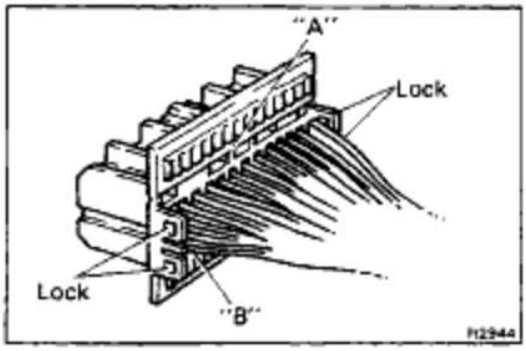
OK → ③ Check EGR gas temp. sensor. (See page FI–126)

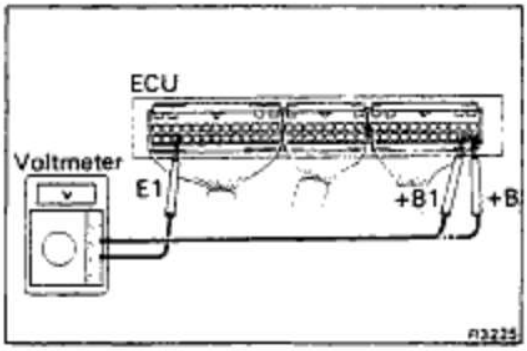
BAD → Replace EGR gas temp. sensor.

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

OK → Try another ECU.

BAD → Repair or replace.





EFI SYSTEM CHECK PROCEDURE (2VZ–FE)

PREPARATION

(a) Disconnect the connectors from the ECU.

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

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

(e) Reconnect the connectors to the ECU.

HINT:

- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is in "ON" position.

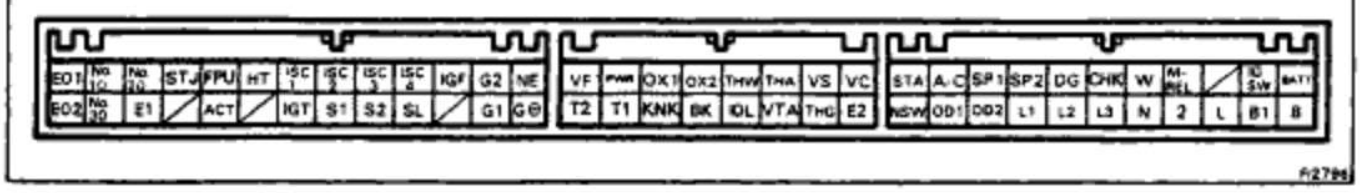
Using a voltmeter with high impedance (10 kΩ/V minimum), measure the voltage at each terminal of the wiring connectors.

Terminals of ECU

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	G2	DISTRIBUTOR	A/C	A/C COMPRESSOR
EO2	POWER GROUND	G1	DISTRIBUTOR	*1OD 1	CRUISE CONTROL COMPUTER
No. 10	INJECTOR (No. 1 and 6i	NE	DISTRIBUTOR	SP1	No. 1 SPEED SENSOR (Meter side)
No. 30	INJECTOR (No. 4 and 5)	G⊖	DISTRIBUTOR	*1OD2	OD MAIN SWITCH
No. 20	INJECTOR (No. 2 and 3)	VF	CHECK CONNECTOR	*1SP2	No. 2 SPEED SENSOR (AIT side)
E1	COMPUTER GROUND	T2	CHECK CONNECTOR	L1	TEMS ECU
S TJ	COLD START INJECTOR	*1PWR	PATTERN SELECT SWITCH	*1 DG	CHECK CONNECTOR
	—	T1	CHECK CONNECTOR	L2	TEMS ECU
EPU	FUEL PRESSURE CONTROL VSV	OX1	OXYGEN SENSOR	*2 CHK	SUB–OXYGEN SENSOR
ACT	A/C AMPLIFIER	KNK	KNOCK CONTROL SENSOR	L3	TEMS ECU
HT	OXYGEN SENSOR HEATER	*2OX2	SUB–OXYGEN SENSOR	W	WARNING LIGHT
	—	*1BK	BRAKE SWITCH	*1 N	SIFT POSITION SWITCH
ISC1	ISC MOTOR NO. 1 COIL	THW	WATER TEMP. SENSOR	M–REL	EFI MAIN RELAY (COIL)
IGT	IGNITER	1Ø L	THROTTLE POSITION SENSOR	*1 2	SIFT POSITION SWITCH.
1SC2	ISC MOTOR NO. 2 COIL	THA	AIR TEMP. SENSOR	*1R	SIFT POSITION SWITCH
1S1	ECT SOLENOID	VTA	THROTTLE POSITION SENSOR	*1 L	SIFT POSITION SWITCH
ISC3	ISC MOTOR NO. 3 COIL	VS	AIR FLOW METER	IG SW	IGNITION SWITCH
*1S2	ECT SOLENOID	*2THG	EGR GAS TEMP. SENSOR	B1	EFt MAIN RELAY
ISC4	ISC MOTOR NO. 4 COIL	VC	AIR FLOW METER THROTTLE POSITION SENSOR	BATT	BATTERY
*1SL	ECT SOLENOID	E2	SENSOR GROUND	B	EFI MAIN RELAY
IGF	IGNITER	STA	STARTER SWITCH		
	—	*2NSW	NEUTRAL START SWITCH		

* 1 w/ ECT
*2 CALIF. only

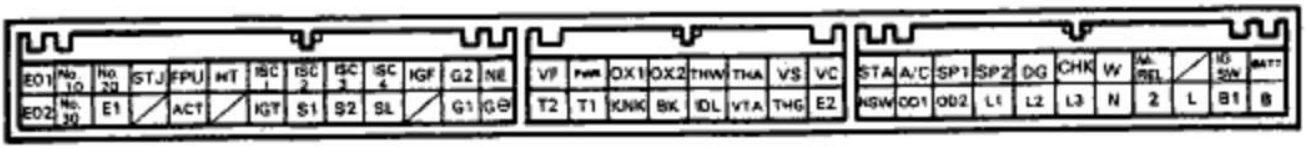
ECU Terminals



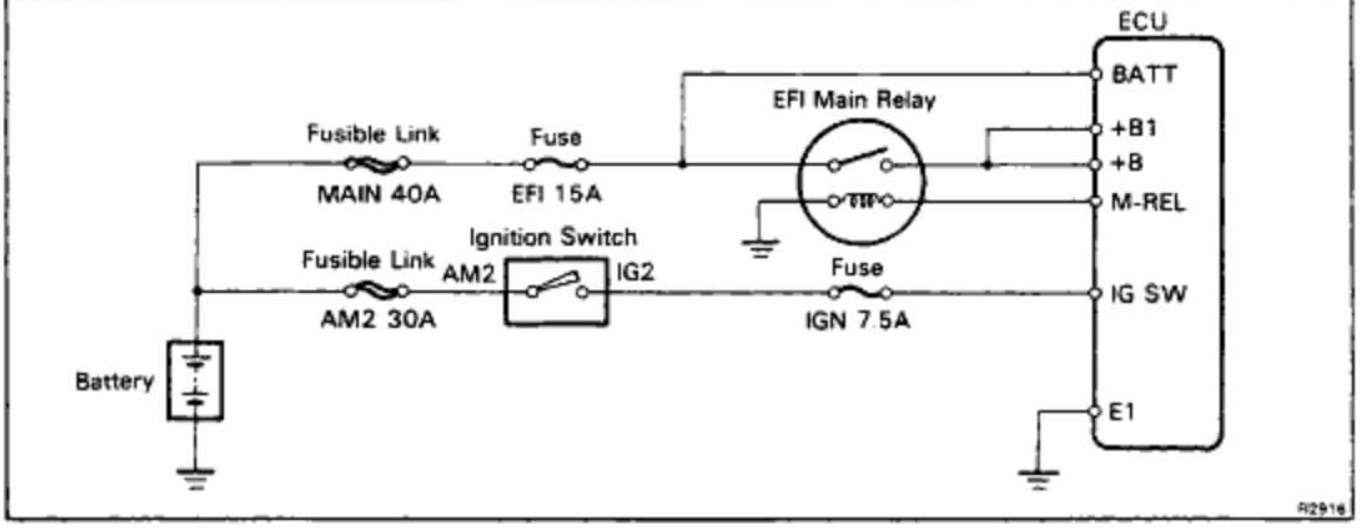
Voltage at ECU Wiring Connectors

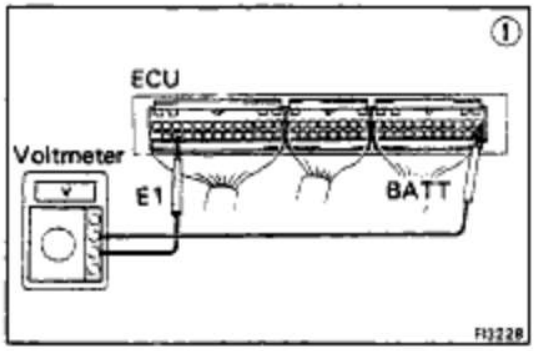
No.	Terminals	Condition		STD voltage (V)	See page
1	BATT — E1			10 — 14	FI–52
	IG SW — E1	IG SW ON			
	M-REL — E1				
	+B, +B1 — E1				
2	IDL — E2	IG SW ON	Throttle valve open	4 — 6	FI–55
	VC — E2			4 — 6	
	VTA — E2		Throttle valve fully closed	0.1 — 1.0	
			Throttle valve open	3.2 — 4.2	
3	VC — E2			4 — 6	FI–57
	VS — E2		Measuring plate fully closed	3.7 — 4.3	
			Measuring plate fully open	0.2 — 0.5	
		Idling		1.6 — 4.1	
		3,000 rpm		1.0 — 2.0	
4	No.10, No.20, No.30 — E01, E02	IG SW ON		10 — 14	FI–58
5	THA — E2	IG SW ON	Intake air temp. 20°C (68°F)	1 — 3	FI–59
6	THW — E2		Coolant temp. 80°C (176°F)	0.1 — 1.0	FI–60
7	STA — E1	Cranking		6 — 14	FI–61
8	IGT — E1	Cranking or idling		0.7 — 1.0	FI–62
9	ISC1, ISC2, ISC3, ISC4 — E1	IG SW ON		9 — 14	FI–63
10	W — E1	No trouble ("CHECK" engine warning light off) and engine running		10 — 14	FI–64
*11	A/C — E1	1G SW ON	Air conditioning ON	8 — 14	FI–65

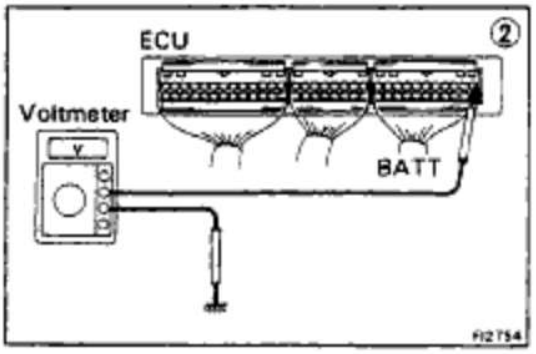
ECU Terminals * w/ A/C

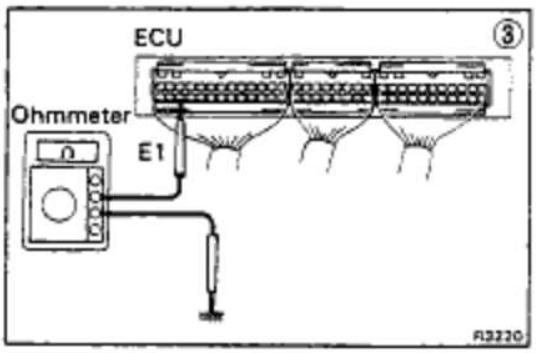


No.	Terminals	Trouble	Condition	STD voltage
1	BATT – E1 IG SW – E1 M-REL – E1 +B (+B1) – E1	No voltage	IG SW ON	10 – 14 V

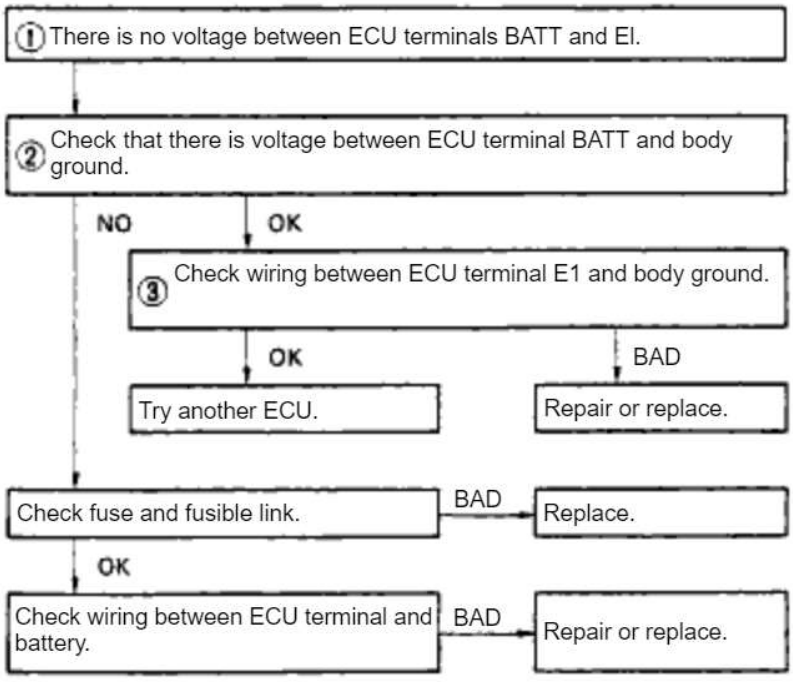


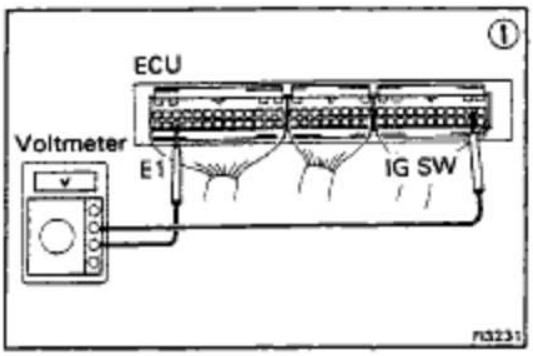


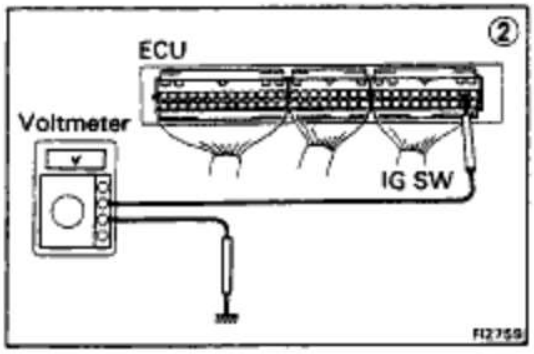




- **BATT – E1**







- **IG SW – E1**

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

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

NO

OK

Check wiring between ECU terminal E t and body ground.

OK

BAD

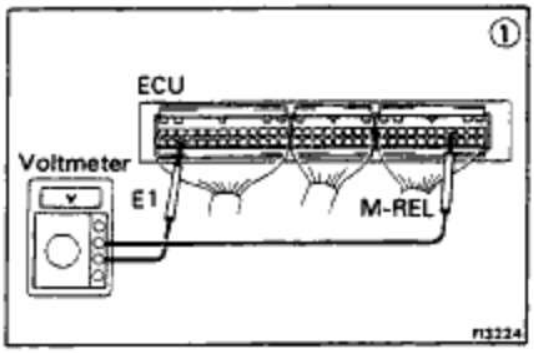
Try another ECU.

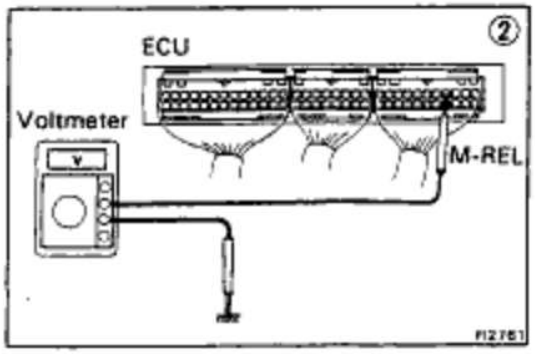
Repair or replace.

Check fuse, fusible link and ignition switch.

BAD

Repair or replace.





- **M–REL – E1**

① There is no voltage between ECU terminals M–REL and El. (IG SW ON)

② Check that there is voltage between ECU terminal M–REL and body ground. (IG SW ON)

NO

OK

Check wiring between ECU terminal E 1 and body ground.

OK

BAD

Try another ECU.

Repair or replace.

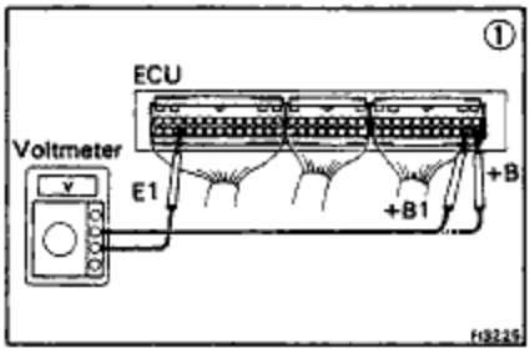
Check EFI main relay and wiring harness. (See page F!–121)

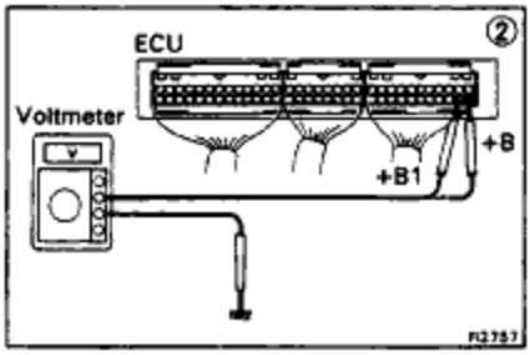
BAD

Replace.

OK

Try another ECU.





- **+B(+B1)–E1**

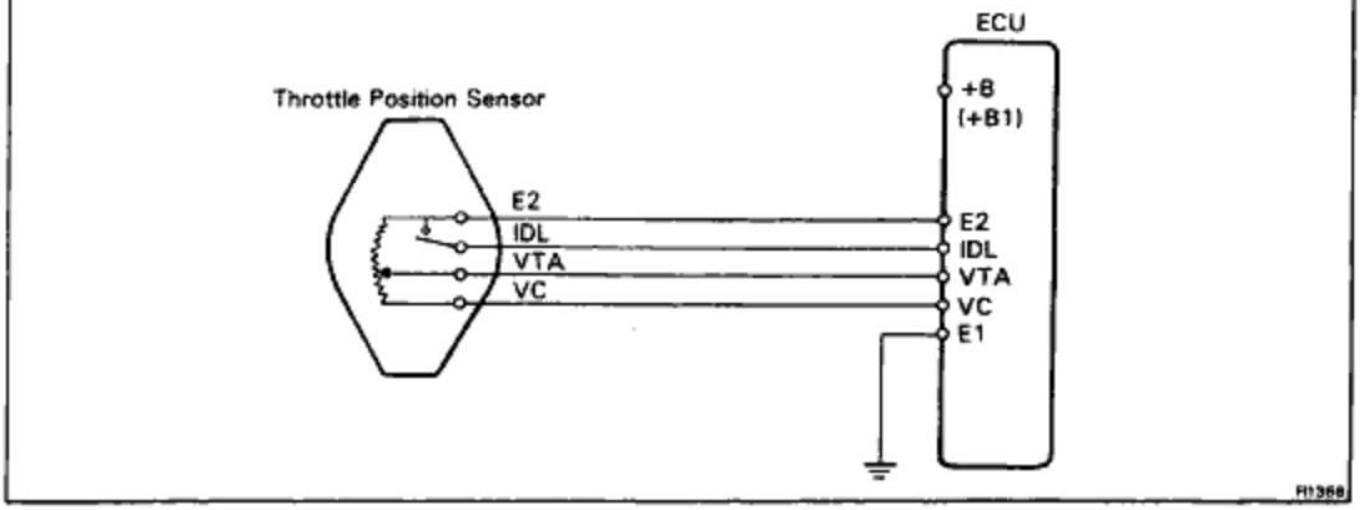
① There is no voltage between ECU terminals +B (+B1) and E1. (IG SW ON)

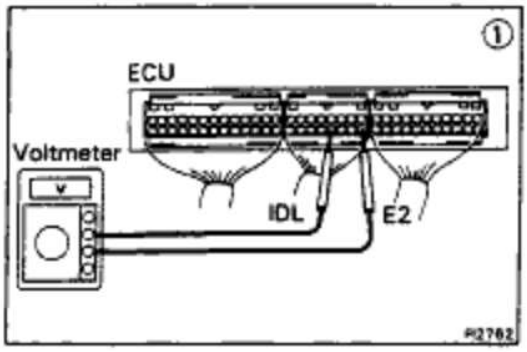
② Check that there is voltage between ECU terminal +B (+B1) and body ground. (IG SW ON)

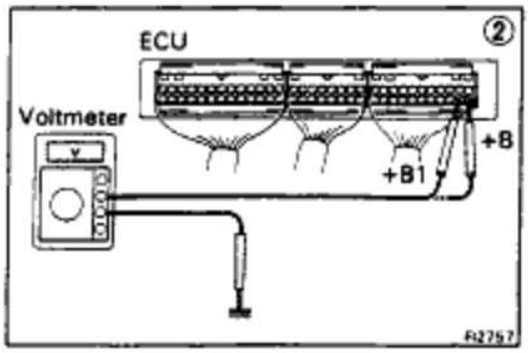
NO → Check fuse, fusible link and wiring harness.
- BAD → Repair or replace.
- OK → Check EFI main relay. (See page FI–121)
  - BAD → Replace.
  - OK → Refer to M–REL – E1 trouble section.

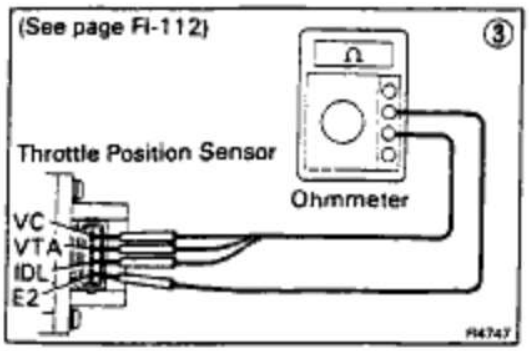
OK → Check wiring between ECU terminal E1 and body ground. .
- OK → Try another ECU.
- BAD → Repair or replace.

No.	Terminals	Trouble	Condition		STD voltage
2	IDL – E2	No voltage	IG SW ON	Throttle valve open	4 – 6 V
	VC – E2				4 – 6 V
	VTA – E2			Throttle valve fully closed	0.1 – 1.0 V
				Throttle valve fully open	3.2 – 4.2 V









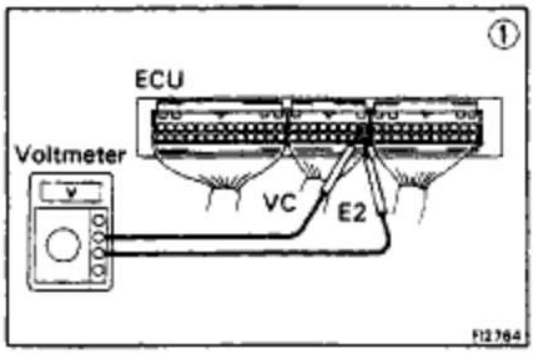
- **IDL – E2**

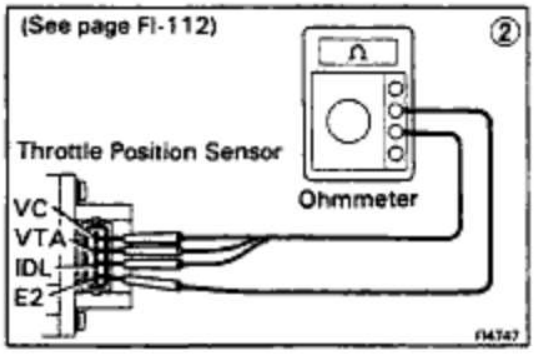
① There is no voltage between ECU terminals IDL and E2. (IG SW ON) (Throttle valve open)

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

NO → Check wiring between ECU terminal E 1 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

OK → Refer to No. 1. (See page FI–51)
- BAD → Repair or replace.
- OK → ③ Check throttle position sensor. (See page FI–112)
  - BAD → Repair or replace throttle position sensor.
  - OK → Check wiring between ECU and throttle position sensor.
    - BAD → Repair or replace.
    - OK → Try another ECU.





- **VC – E2**

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

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

OK → ② Check throttle position sensor. (See page FI–112)

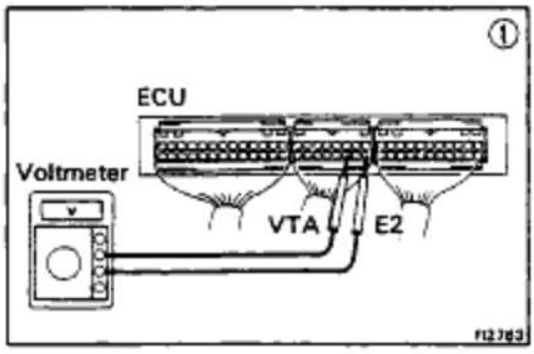
NO → Refer to No. 1. (See page FI–51)

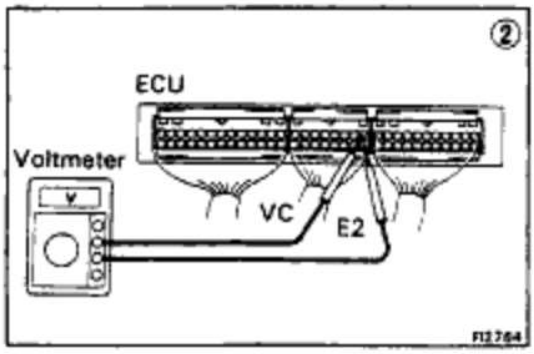
② BAD → Repair or replace.

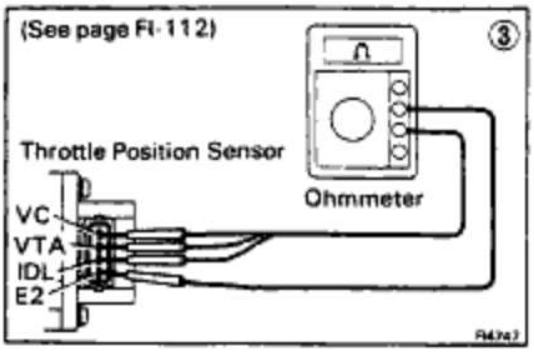
② OK → Check wiring between ECU and throttle position sensor.

Check wiring between ECU and throttle position sensor: OK → Try another ECU.

Check wiring between ECU and throttle position sensor: BAD → Repair or replace wiring.







- **VTA – E2**

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

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

NO → Refer to VC – E2 trouble section.

OK → ③ Check throttle position sensor. (See page FI–112)

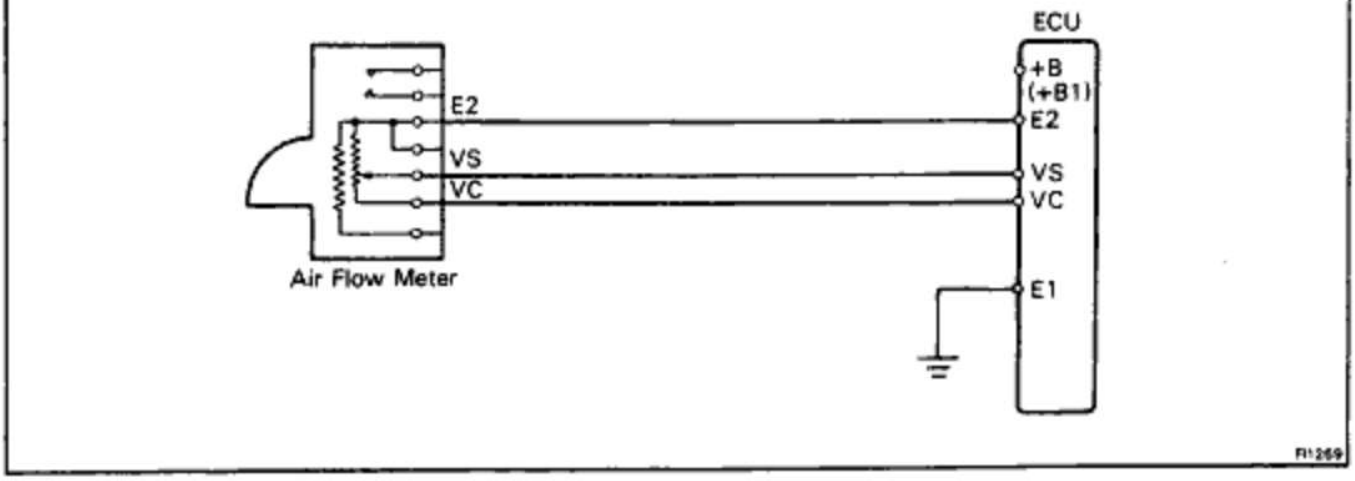
③ BAD → Repair or replace.

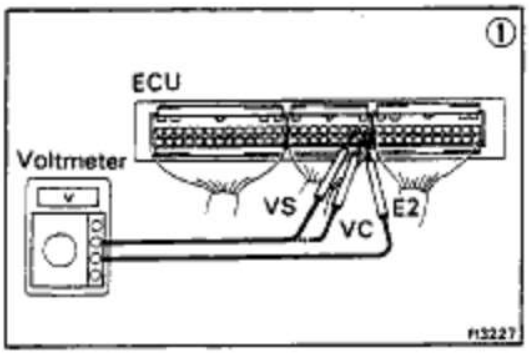
③ OK → Check wiring between ECU and throttle position sensor.

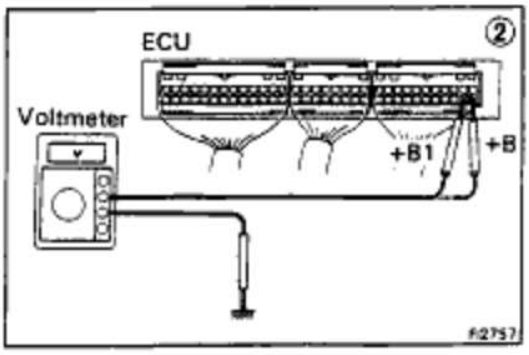
Check wiring between ECU and throttle position sensor: BAD → Repair or replace.

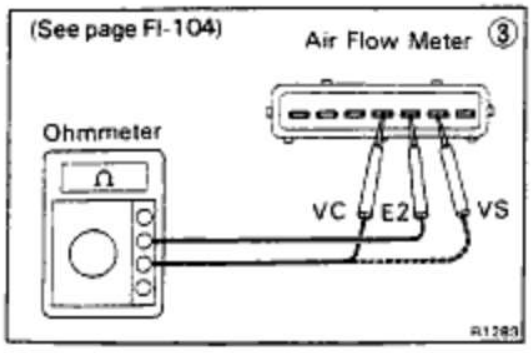
Check wiring between ECU and throttle position sensor: OK → Try another ECU.

No.	Terminals	Trouble	Condition		STD voltage
3	VC – E2	No voltage	IG SW ON		4 – 6 V
	VS – E2			Measuring plate fully closed	3.7 – 4.3 V
	VS – E2			Measuring plate fully open	0.2 – 0.5 V
	VS – E2		Idling		1.6 – 4.1 V
	VS – E2		3,000 rpm		1.0 – 2.0 V









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

↓

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

¿ OK → ↓

NO → Refer to No. 1. (See page FI–52)

↓

Check wiring between ECU terminal E 1 and body ground.

OK → ↓

BAD → Repair or replace.

↓

③ Check air flow meter. (See page FI–104)

BAD → Replace air flow meter.

OK → ↓

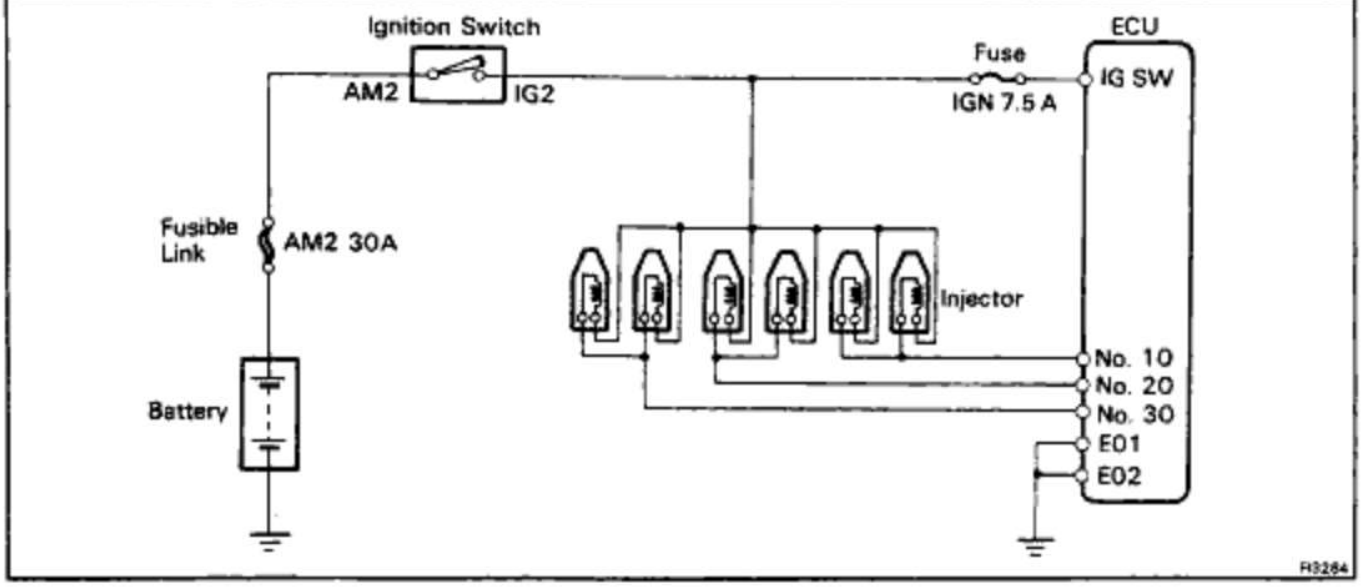
Check wiring between ECU and air flow meter.

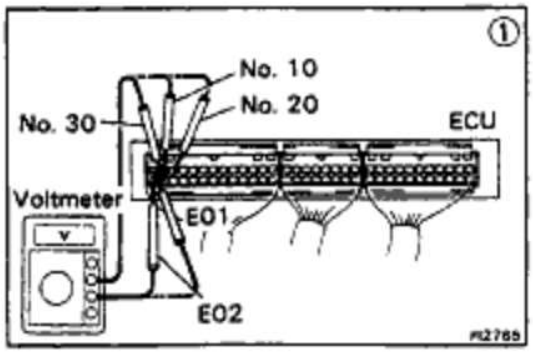
OK → ↓

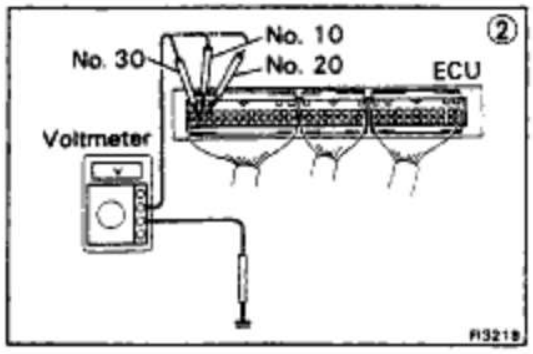
Try another ECU.

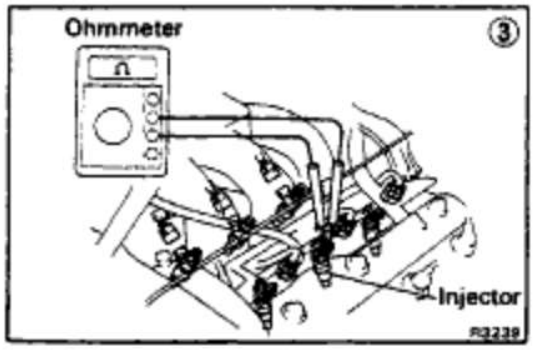
BAD → Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
4	No. 10 E01 No. 20 – No. 30 E02	No voltage	IG SW ON	10 – 14 V









① There is no voltage between ECU terminal No. 10, No. 20 and/or No. 30 and E41 and/or E02. (IG SW ON)

↓

② Check that there is voltage between ECU terminal No. 10, No. 20 or No. 30 and body ground.

NO → Check wiring between ECU terminal E01 and/or E02 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

OK → Check fusible link and ignition switch.
- BAD → Repair or replace.

OK

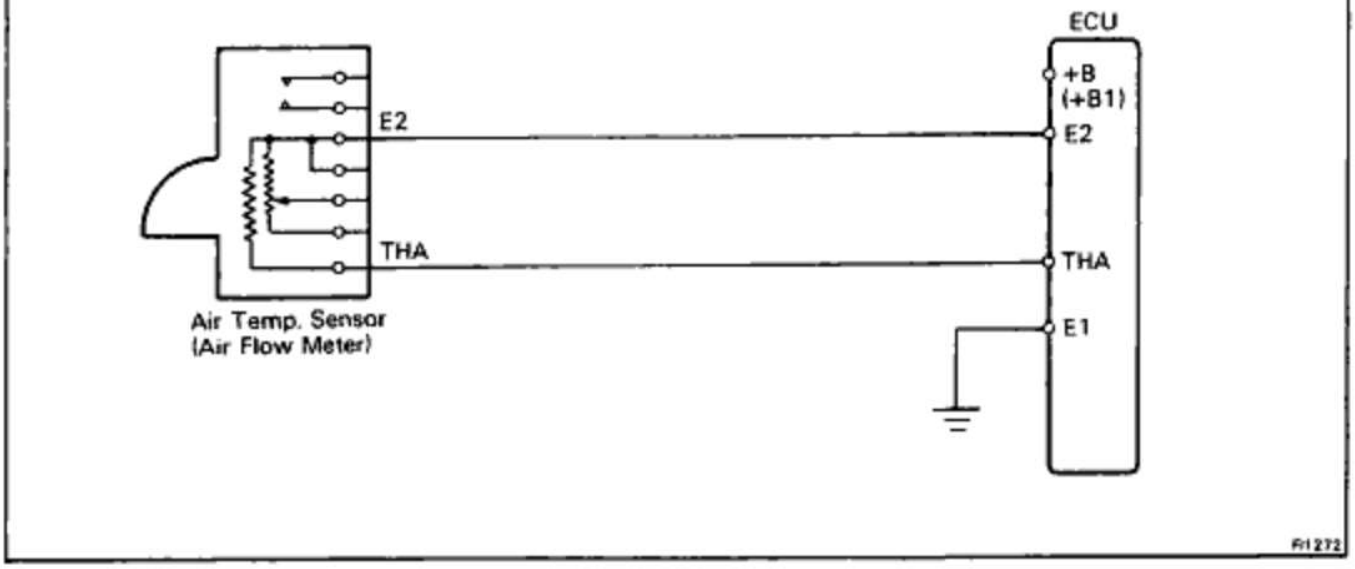
↓

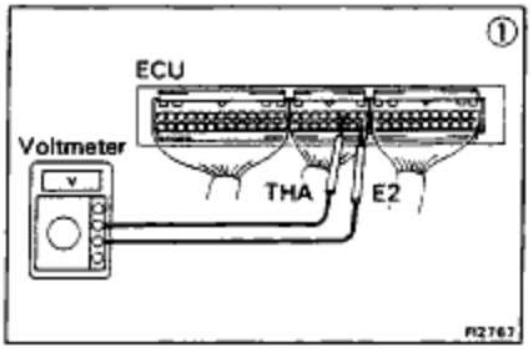
③ Check resistance of magnetic coil in each injector.
STD resistance: Approx. 13.8Ω

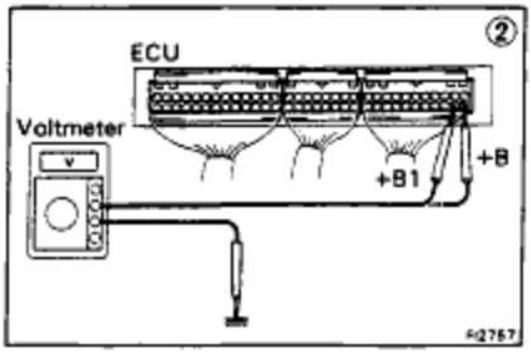
OK → Check wiring between ECU terminal No. 10, No. 20 and/or No. 30 and battery.
- BAD → Repair or replace.

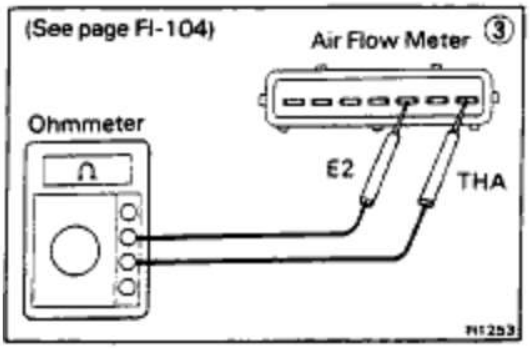
BAD → Replace injector.

No.	Terminals	Trouble	Condition		STD voltage
5	THA – E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1 – 3 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 (+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–52)

Check wiring between ECU terminal E1 and body ground.

OK → ③ Check air temp. sensor. (See page FI–104)

BAD → Repair or replace.

③ Check air temp. sensor. (See page FI–104)

BAD → Replace air flow meter.

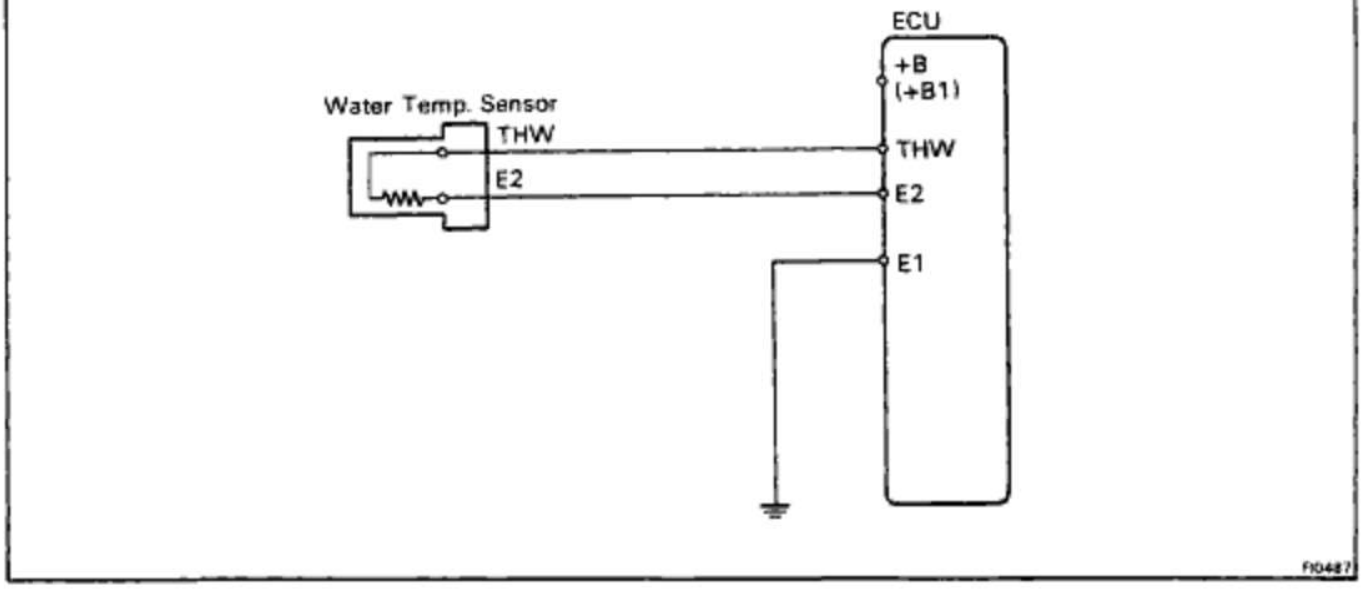
OK → Check wiring between ECU and air temp. sensor.

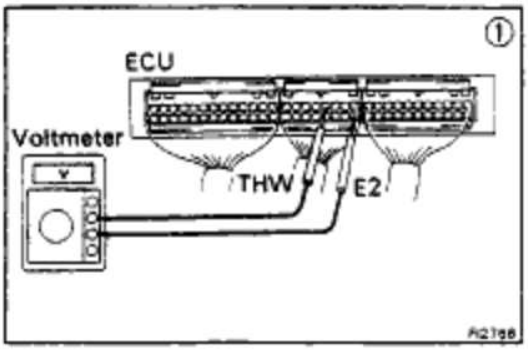
Check wiring between ECU and air temp. sensor.

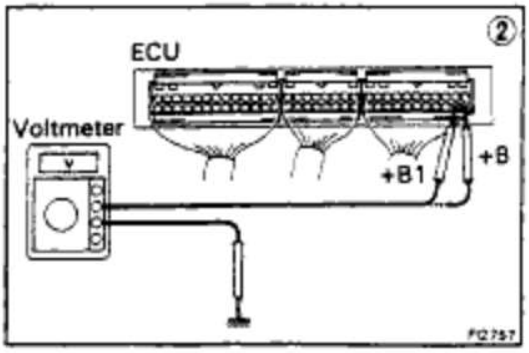
OK → Try another ECU.

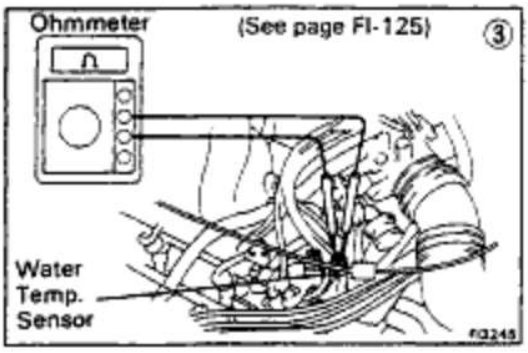
BAD → Repair or replace.

No.	Terminals	Trouble	Condition		STD voltage
6	THW – E2	No voltage	IG SW ON	Coolant temperature 80°C (176°F)	0.1 – 1.0 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 (+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–52)

Check wiring between ECU terminal E1 and body ground.

OK → ③ Check water temp. sensor. (See page FI–125)

BAD → Repair or replace.

③ Check water temp. sensor. (See page FI–125)

BAD → Replace water temp. sensor.

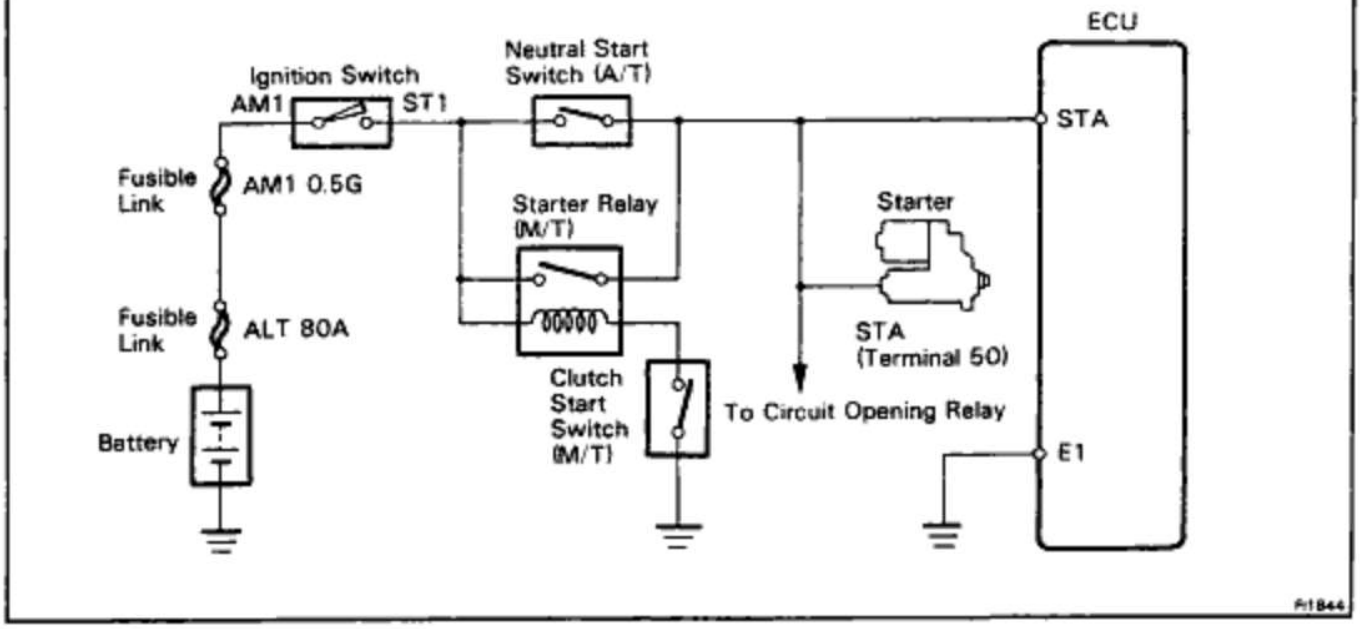
OK → Check wiring between ECU and water temp. sensor.

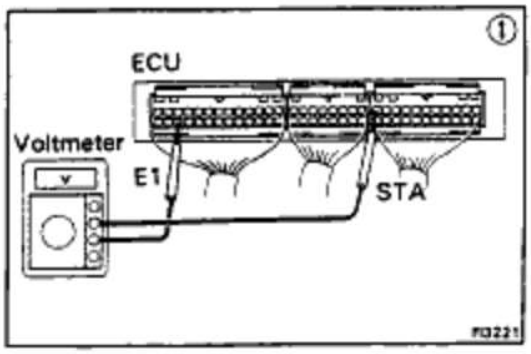
Check wiring between ECU and water temp. sensor.

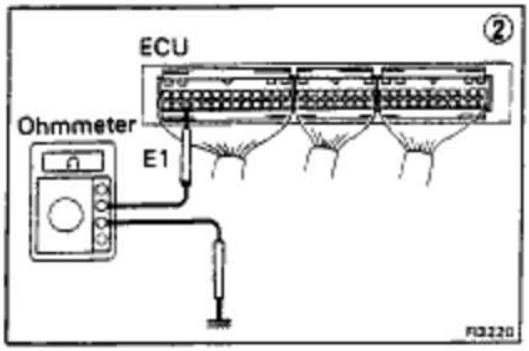
OK → Try another ECU.

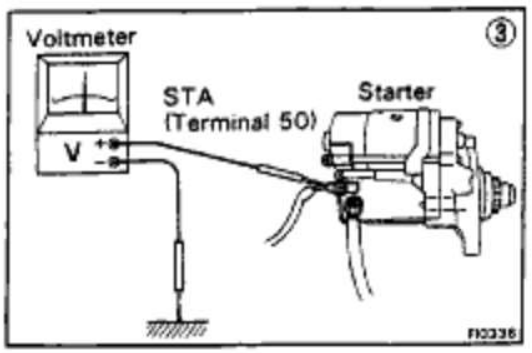
BAD → Repair or replace.

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









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

Check starter operation. — OK → Check wiring between ECU terminal STA and ignition switch terminal ST1 .

BAD

OK → BAD → Repair or replace.

② Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fusible links, battery, wiring, ignition switch and neutral start switch. . — BAD → Repair or replace.

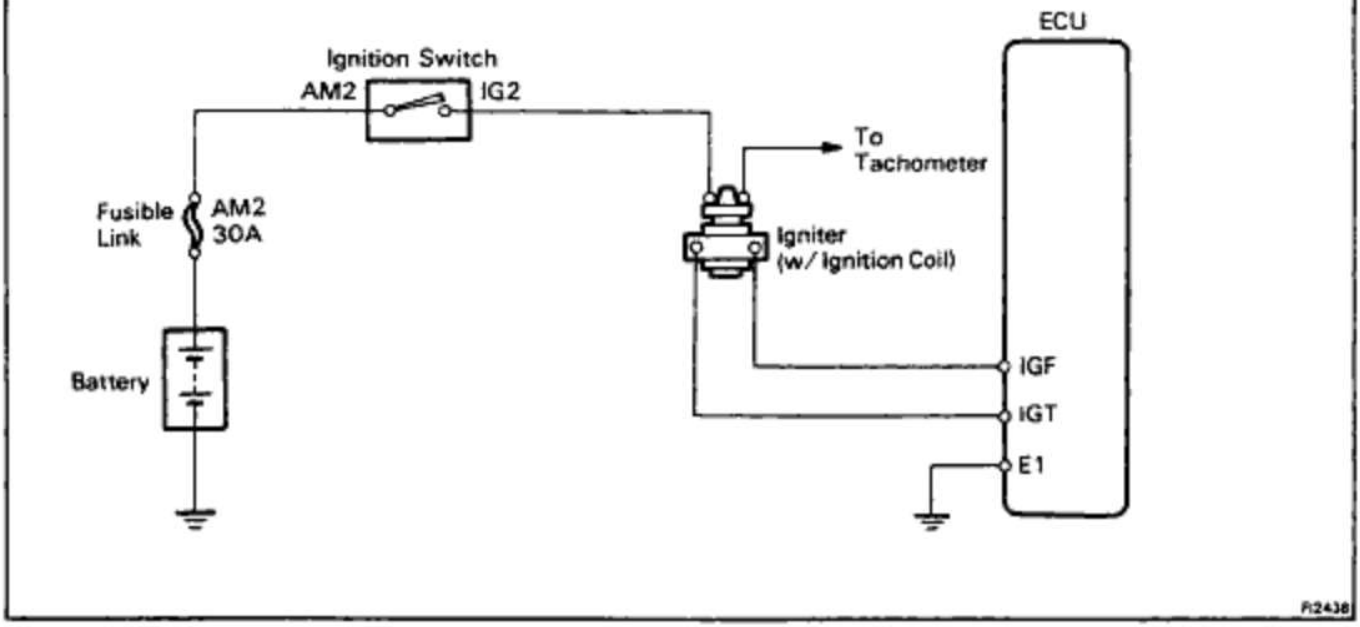
OK

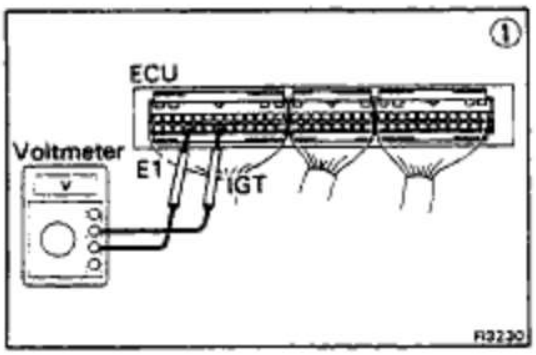
③ Check that there is voltage at STA (50) terminal of starter. (IG SW START) STD voltage: 6 – 14 V

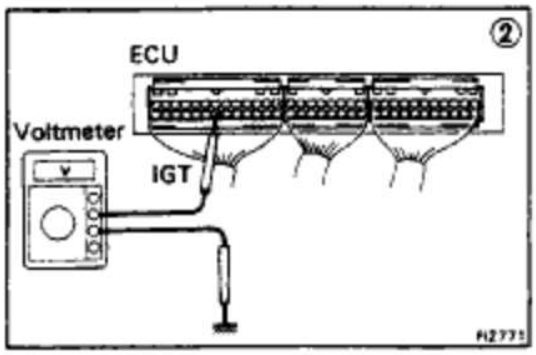
OK → Check starter.

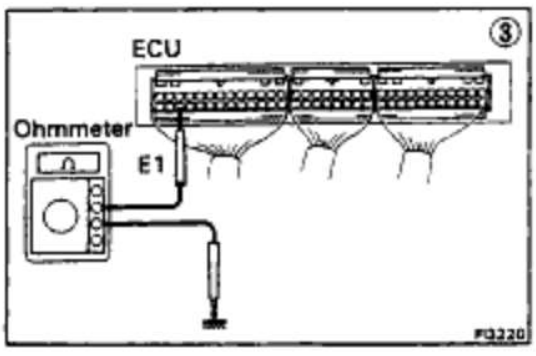
NO → Check wiring between ignition switch terminal ST1 and starter terminal STA (50)

No.	Terminals	Trouble	Condition	STD voltage
8	IGT – E1	No voltage	Idling	0.7 – 1.0 V









① There is no voltage between ECU terminals IGT and EI. (idling)

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

NO

OK

③ Check wiring between ECU terminal E 1 and body ground. — BAD → Repair or replace.

OK

Try another ECU.

Check fusible link and ignition switch. — BAD → Repair or replace.

OK

Check distributor. (See page IG–8) — BAD → Repair or replace.

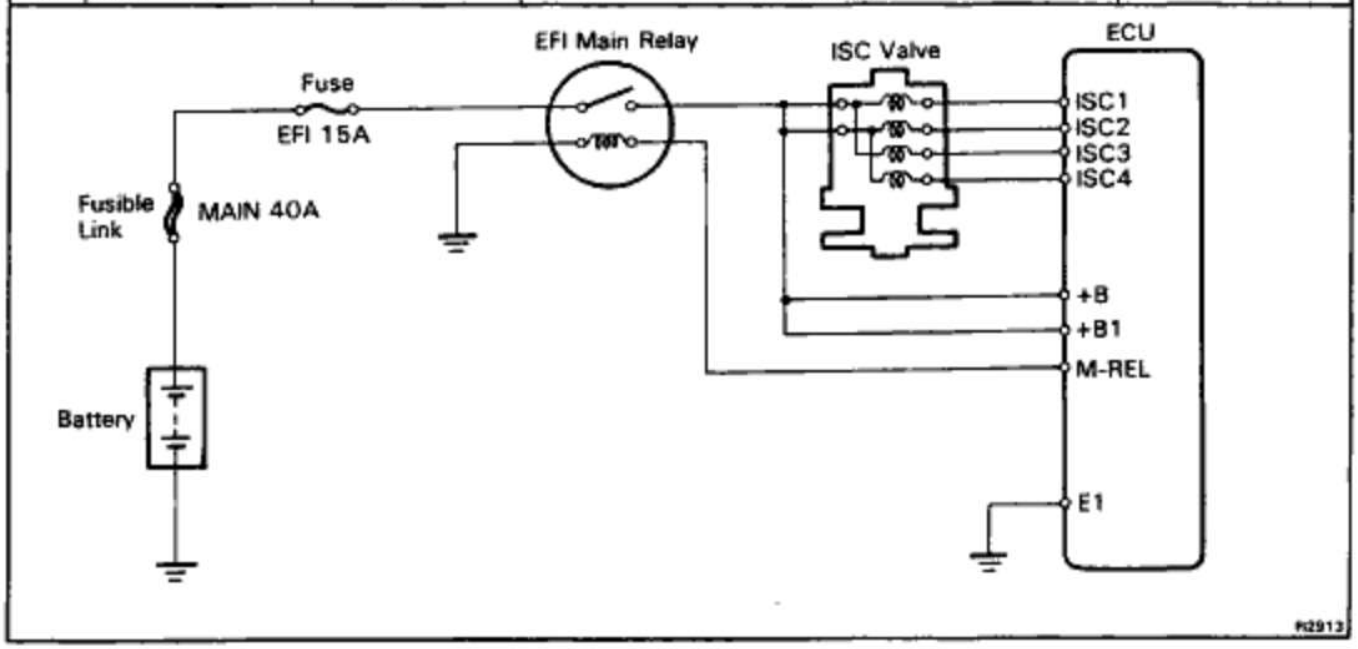
OK

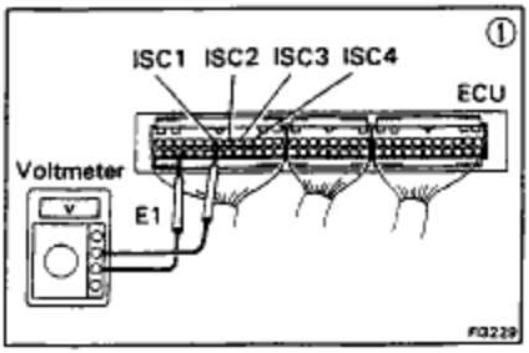
Check wiring between ECU and battery. — BAD → Repair or replace.

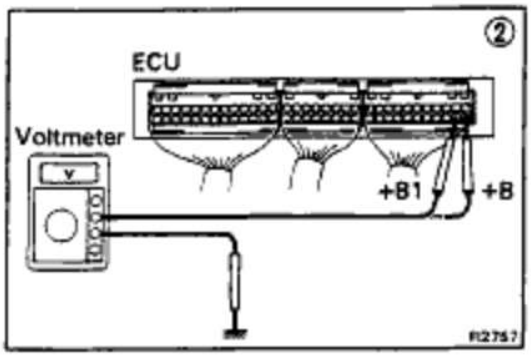
OK

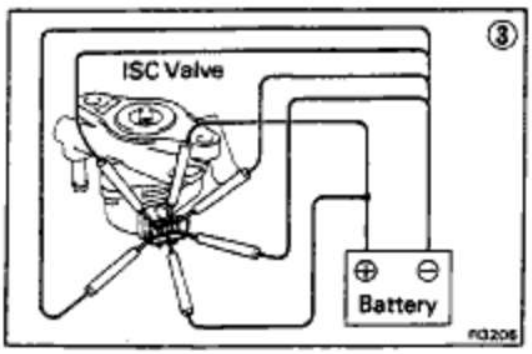
Check igniter. — BAD → Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
9	ISC1~ISC4 – E1	No voltage	IG SW ON	9 – 14 V









① There is no voltage between ECU terminals ISC 1 – ISC4 and E1 . (IG SW ON)

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

OK

NO

Refer to No. 1. (See page FI–52)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

③ Check ISC valve. (See page FI–118)

Repair or replace.

BAD

OK

Replace ISC valve.

Check wiring between ECU and EFI main relay.

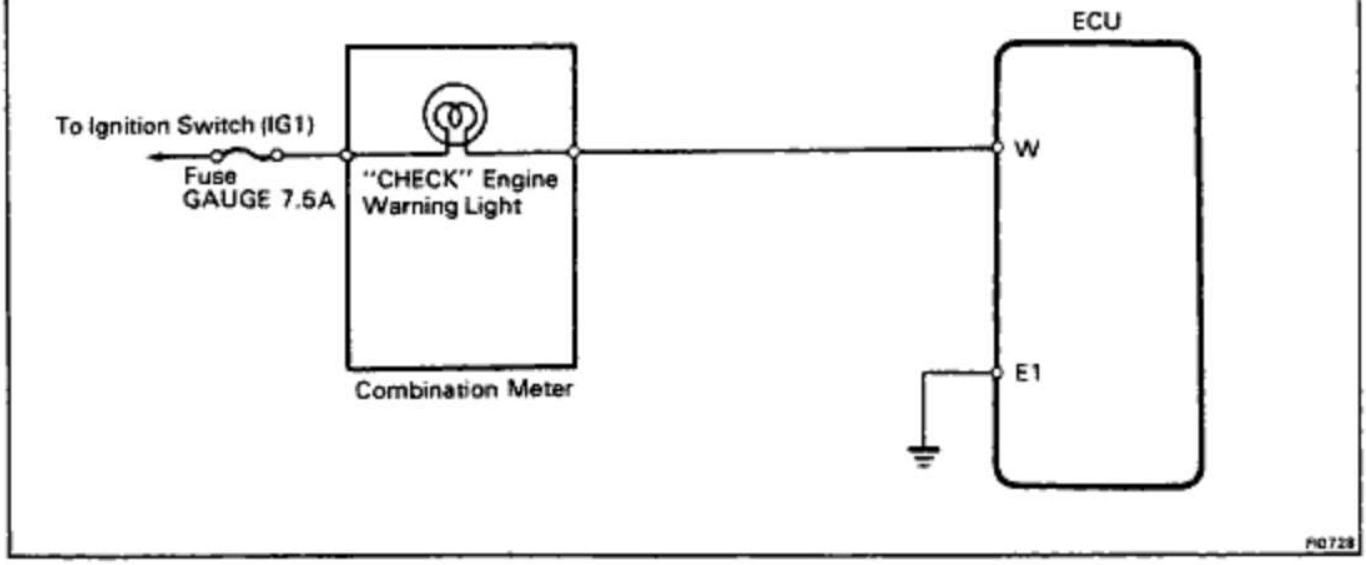
OK

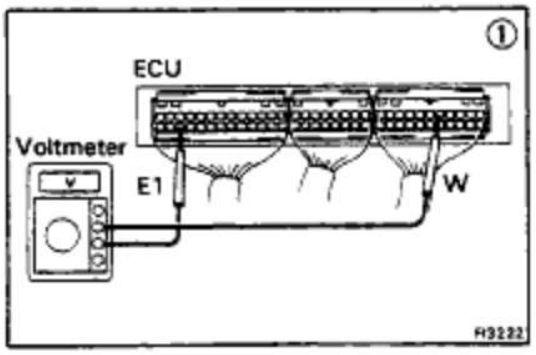
BAD

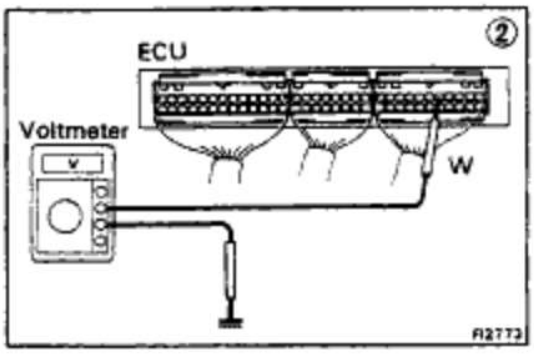
Try another ECU. ..

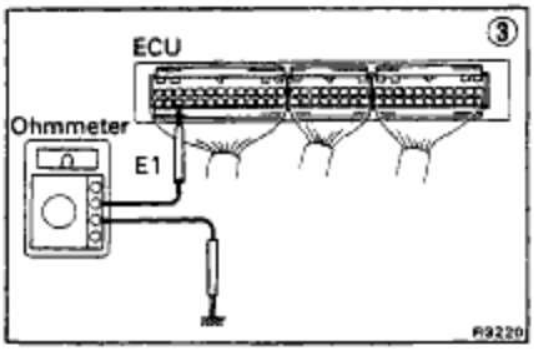
Repair or replace.

No.	Terminals	Trouble	Condition	STD voltage
10	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

OK

③ Check wiring between ECU terminal E 1 and body ground. '

OK

BAD

Try another ECU.

Repair or replace.

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

OK

BAD

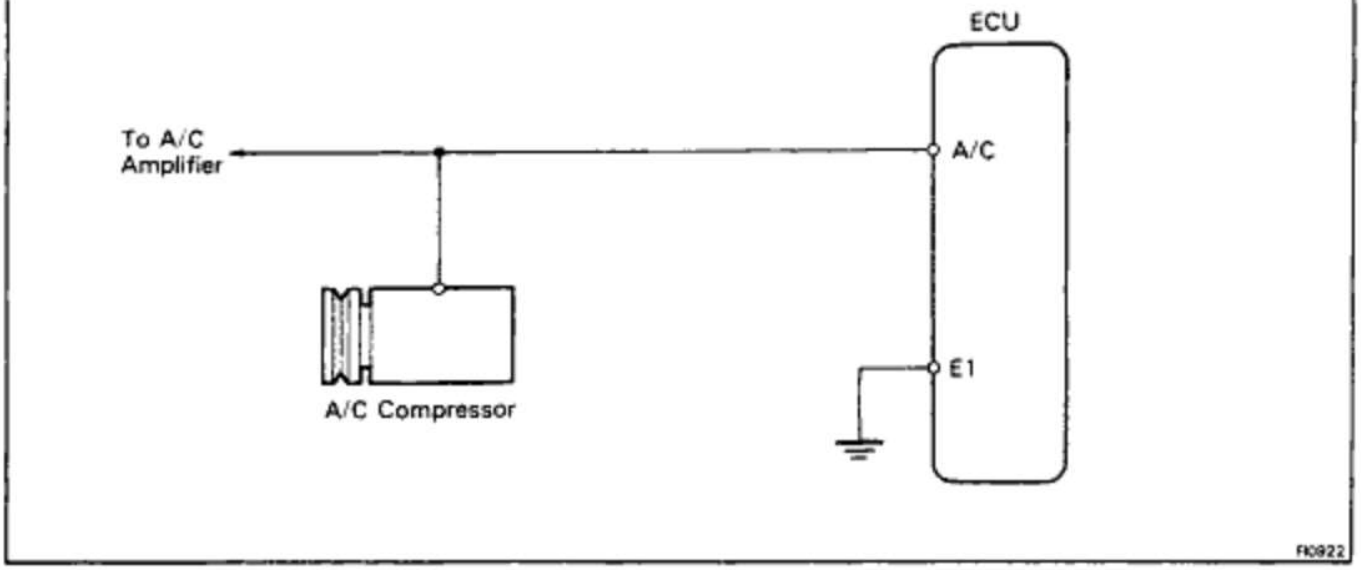
Repair or replace.

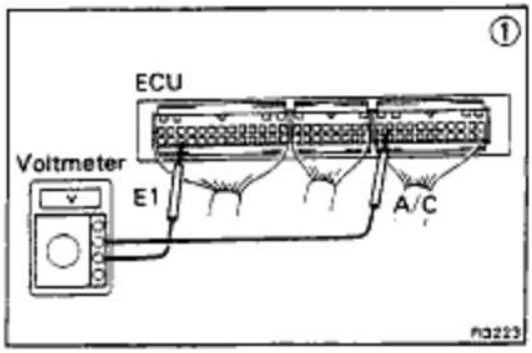
Fuse blows again

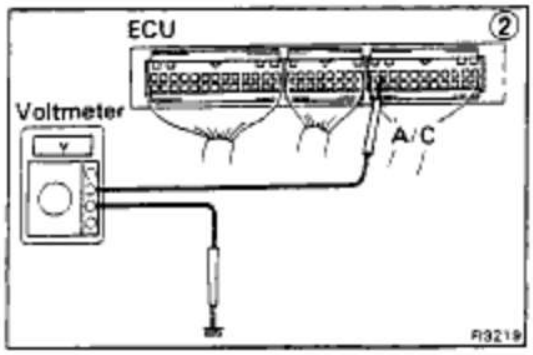
Check wiring between ECU terminal W and fuse.

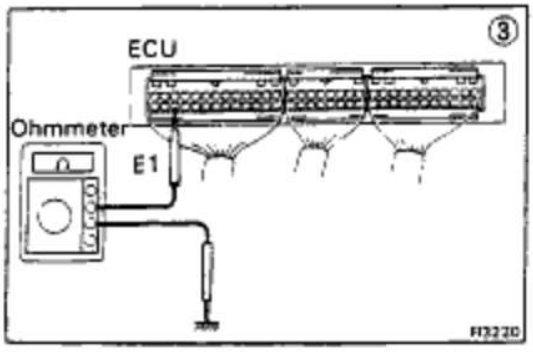
Repair or replace.

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







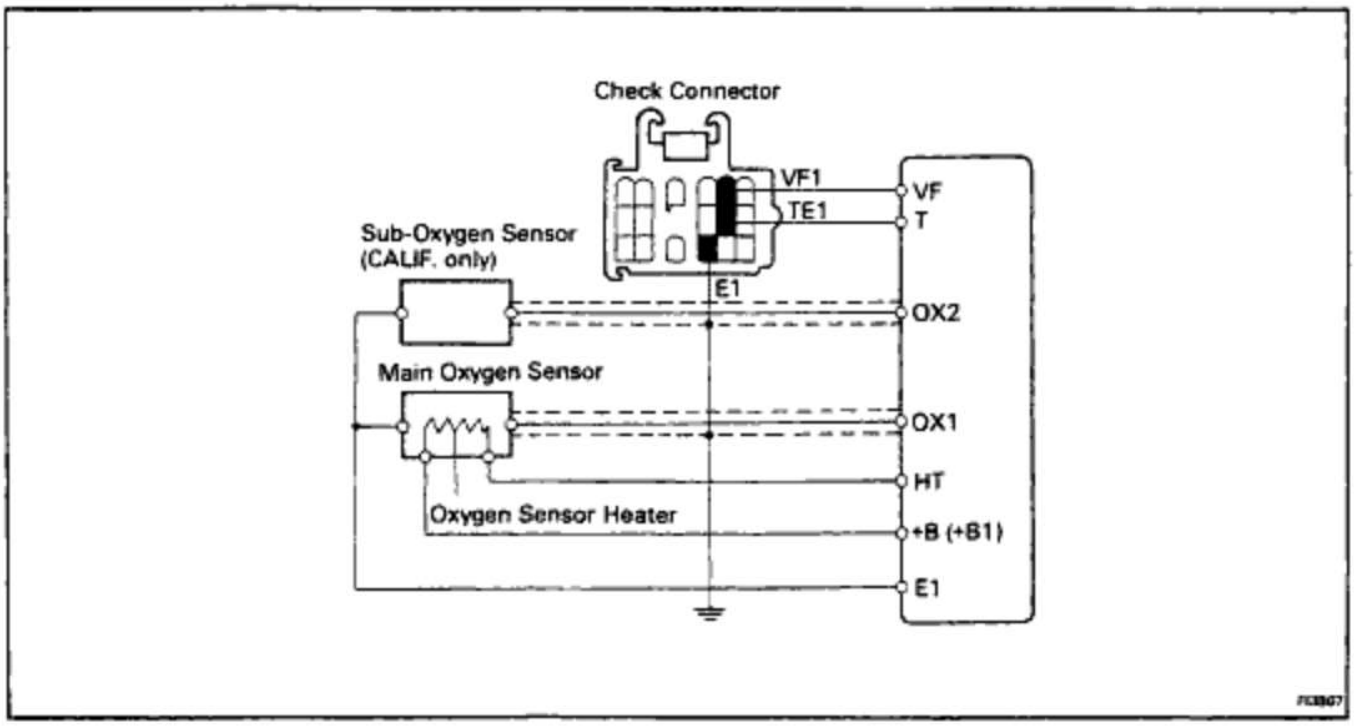


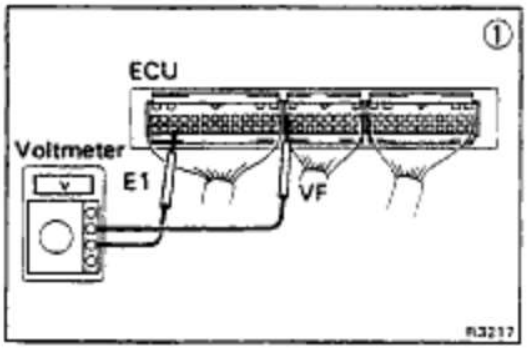
① There is no voltage between ECU terminals A/C and El. (Air conditioning ON)

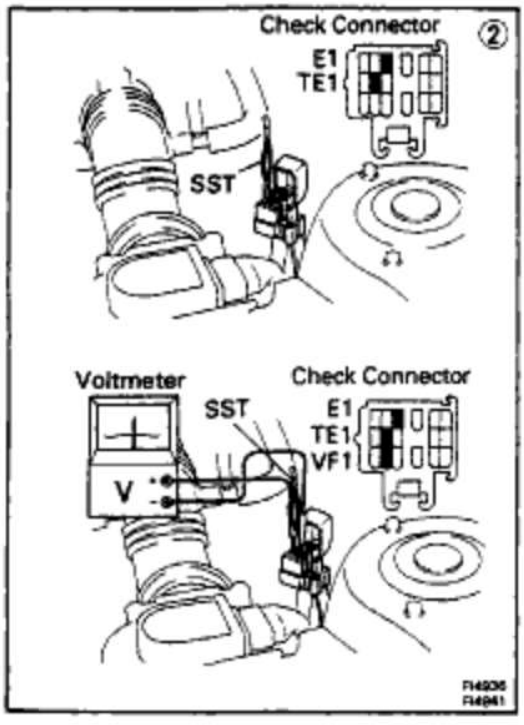
② Check that there is voltage between ECU terminal A/C and body ground.

NO → ③ Check wiring between ECU terminal E 1 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.







¿ There is no voltage between ECU terminals VF and E 1.

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

NO → OK: Check wiring between ECU terminal E i and body ground.

- OK: Try another ECU.
- BAD: Repair or replace.

Check for suction of air into exhaust system. — BAD: Repair air suction.

OK

Check for air leak from air intake system. — BAD: Repair air leak.

OK

Check spark plugs. — BAD: Repair or replace.

OK

Check distributor and ignition system. — BAD: Repair or replace.

OK

Check fuel pressure. — BAD: Repair or replace_

OK

Check injectors. — BAD: Repair or replace.

OK

Check cold start injector. — BAD: Repair or replace.

OK

Check air flow meter. — BAD: Repair or replace.

OK

¿¿ Check operation of oxygen sensors. — OK: System normal.

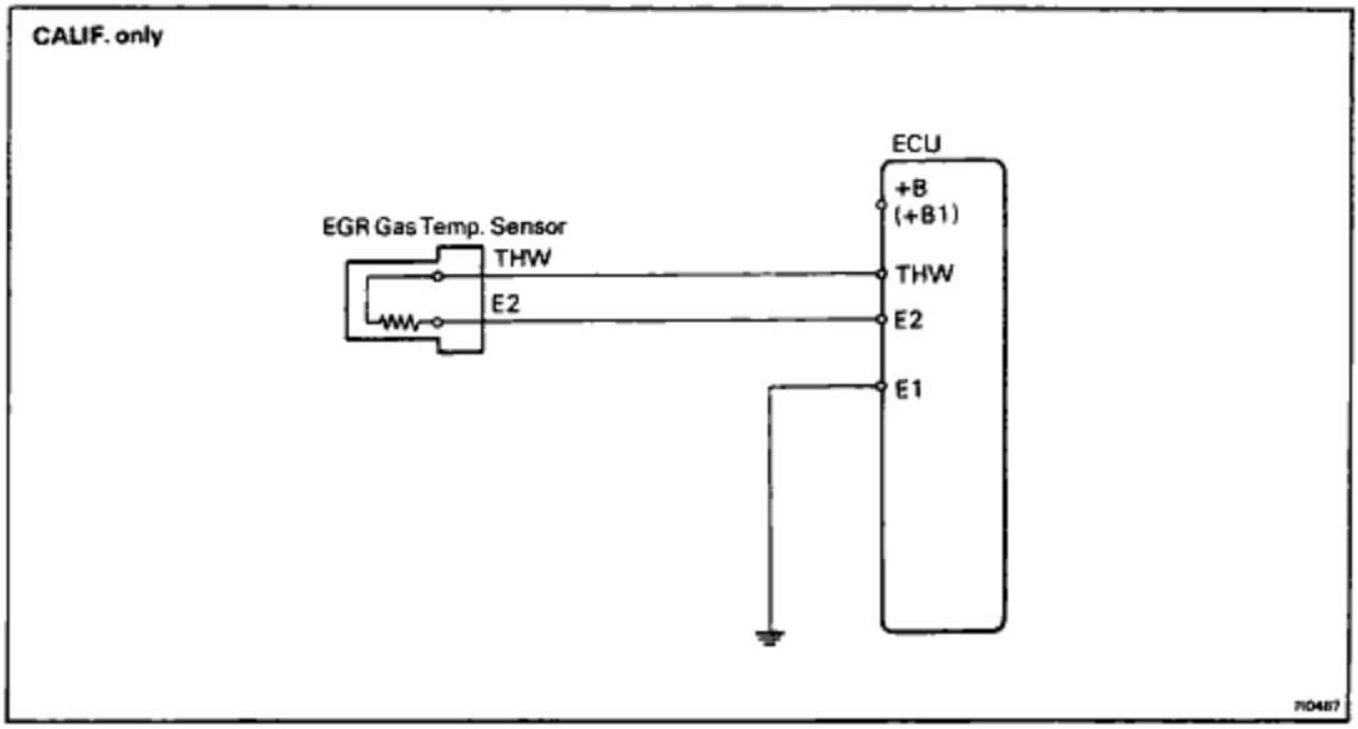
BAD

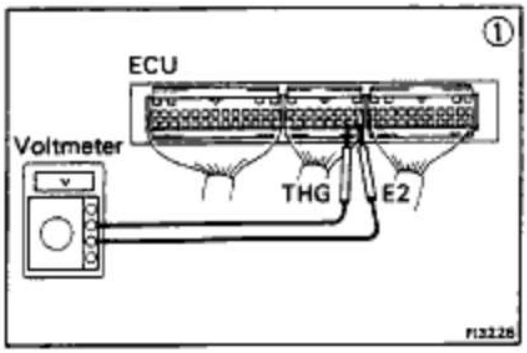
Check wiring between oxygen sensors and ECU connectors. — BAD: Repair wiring.

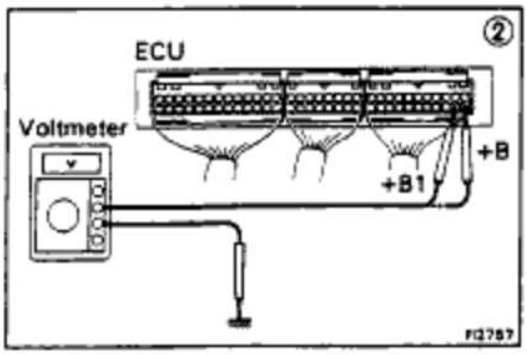
OK

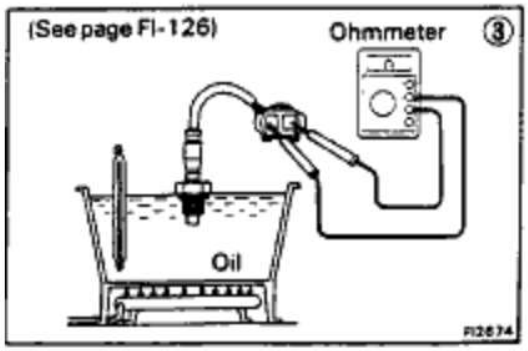
Replace oxygen sensors.

* Rich malfunction only









① No voltage between ECU terminal THG 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 to No. 1. (See page FI–32)

OK → Check EGR system.

BAD → Repair or replace.

OK → ③ Check EGR gas temp. sensor. (See page FI–126)

BAD → Replace EGR gas temp. sensor.

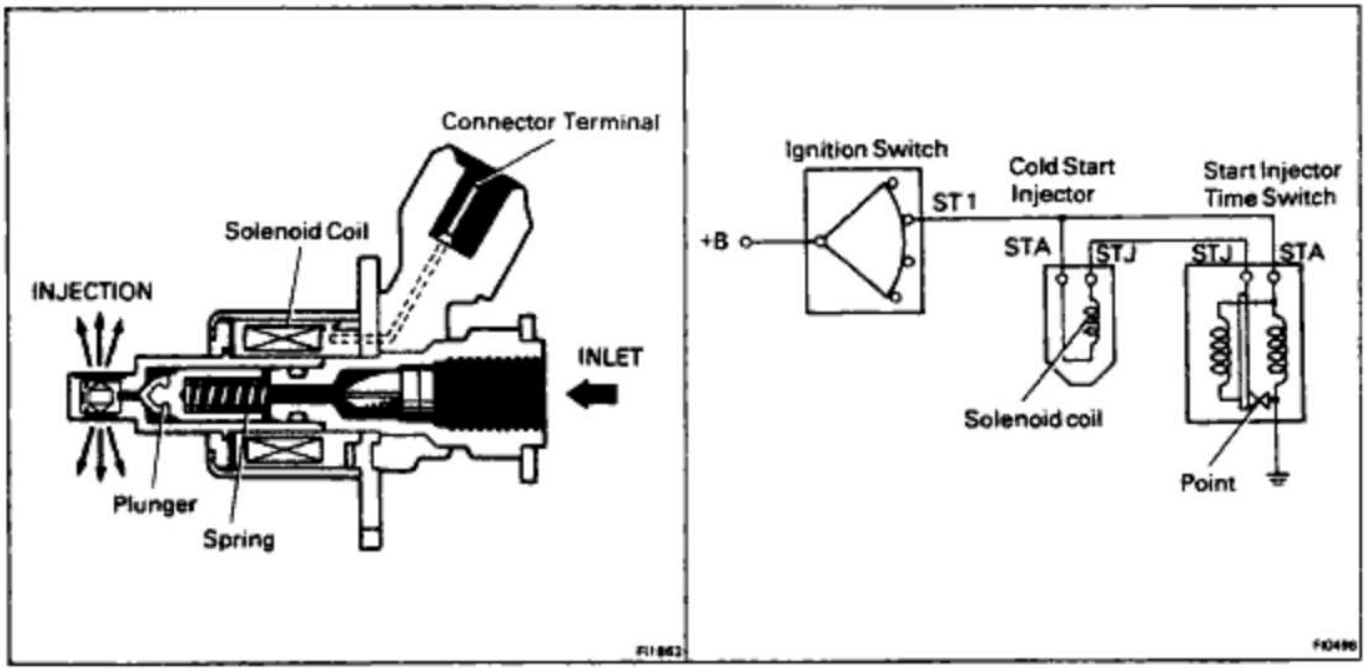
OK → Check wiring between ECU and EGR gas temp. sensor.

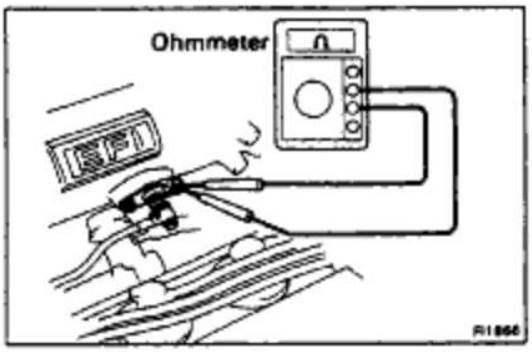
OK → Try another ECU.

BAD → Repair or replace.

BAD → Repair or replace.

Cold Start Injector (3S–FE)





ON–VEHICLE INSPECTION

INSPECT RESISTANCE OF COLD START INJECTOR

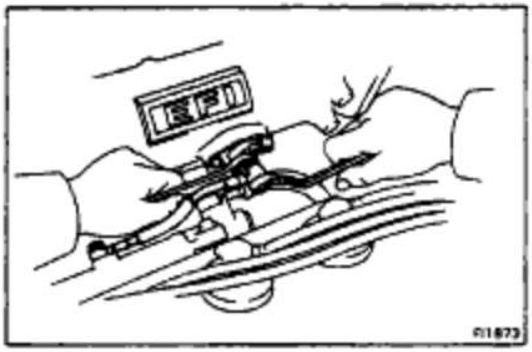
(a) Disconnect the cold start injector connector.

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

Resistance: 2 – 4)

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

(e) Reconnect the cold start injector connector.



REMOVAL OF COLD START INJECTOR

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. DISCONNECT COLD START INJECTOR CONNECTOR

3. DISCONNECT COLD START INJECTOR PIPE

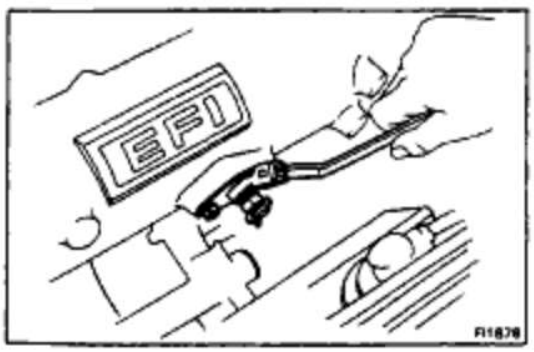
(a) Put a suitable container or shop towel under the injector tube.

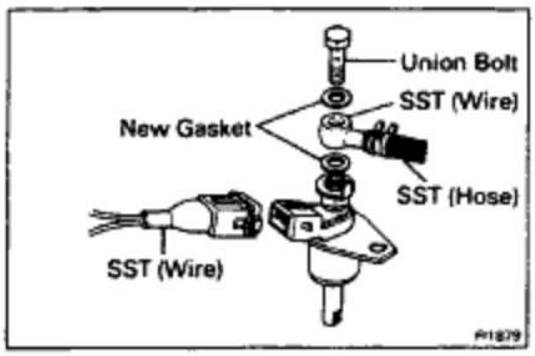
(b) Remove the two union bolts and four gaskets and injector pipe. .

HINT: Slowly loosen the union bolt.

4. REMOVE COLD START INJECTOR

Remove the two bolts, cold start injector and gasket.





INSPECTION OF COLD START INJECTOR

1. INSPECT INJECTION OF COLD START INJECTOR

NOTICE: Keep clear for sparks during the test.

(a) Install SST (two unions) to the injector and delivery pipe with new gaskets and the union bolts.
SST 09268–41045 (09268–41080)

(b) Connect SST (hose) to the unions.
SST 09268–41045

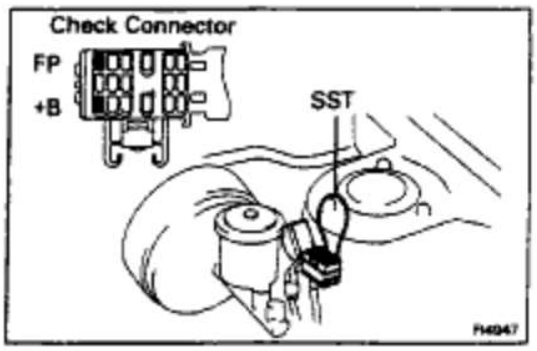
(c) Connect SST (wire) to the injector.
SST 09842–30050

(d) Put a container under the injector.

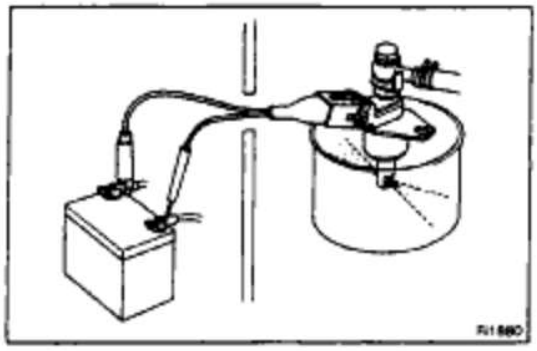
(e) Reconnect the battery negative (–) cable.

(f) Turn the ignition switch ON.

NOTICE: Do not start the engine.

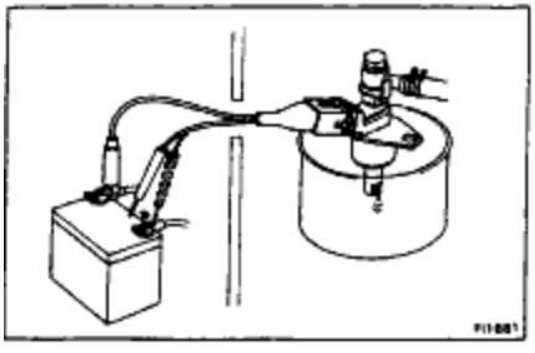


(g) Using SST, connect terminals +B and FP of the check connector.
SST 09843–18020



(h) Connect the test probes of the SST (wire) to the battery, and check that the fuel spray is as shown.
SST 09842–30050

NOTICE: Perform this check within the shortest possible time.



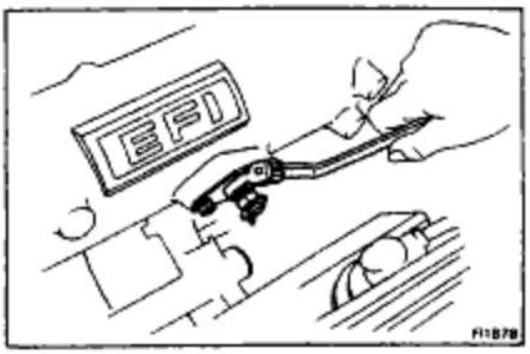
2. INSPECT LEAKAGE

(a) In the condition above, disconnect the test probes of SST (wire) from the battery and check fuel leakage from the injector.
SST 09842–30050

Fuel drop: One drop or less per minute

(b) Disconnect the battery negative H cable.

(c) Remove SST and the service wire.
SST 09268–41045 and 09842–30050



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. CONNECT COLD START INJECTOR PIPE

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

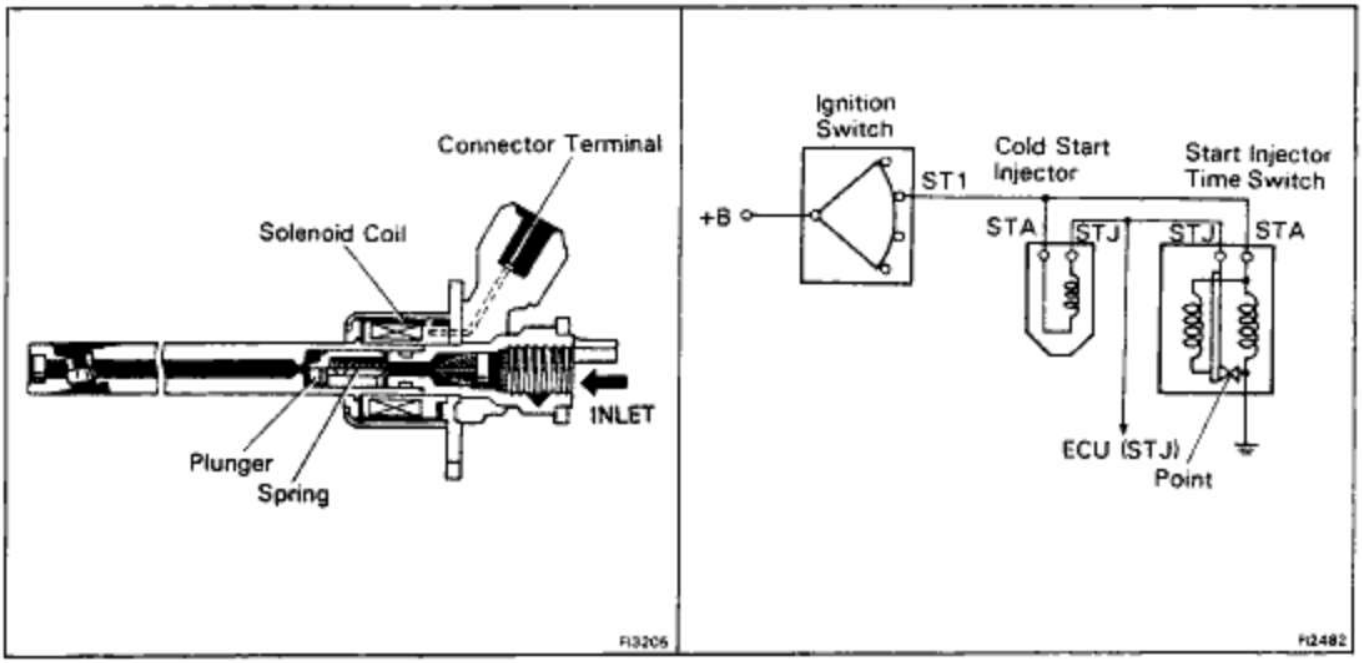
Torque: 180 kg–cm (13 ft–lb, 18 N–m)

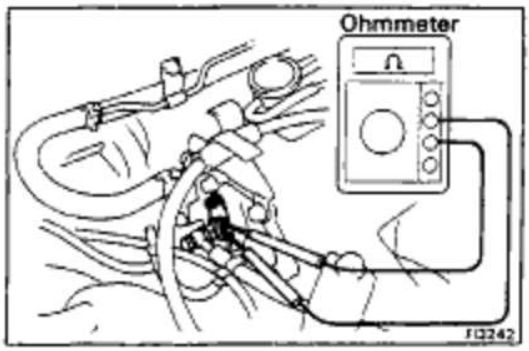
3. CONNECT COLD START INJECTOR CONNECTOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

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

Cold Start Injector (2VZ–FE)





ON–VEHICLE INSPECTION

INSPECT RESISTANCE OF COLD START INJECTOR

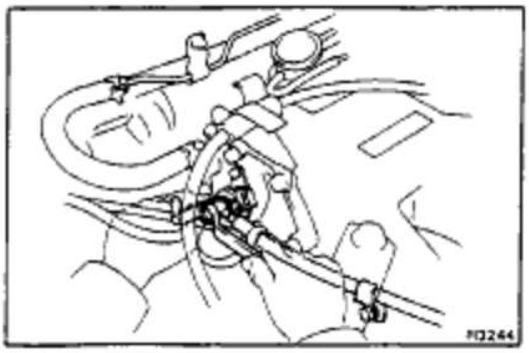
(a) Disconnect the cold start injector connector.

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

Resistance: 2 – 4Ω

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

(e) Reconnect the cold start injector connector.



REMOVAL OF COLD START INJECTOR

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. DISCONNECT COLD START INJECTOR CONNECTOR

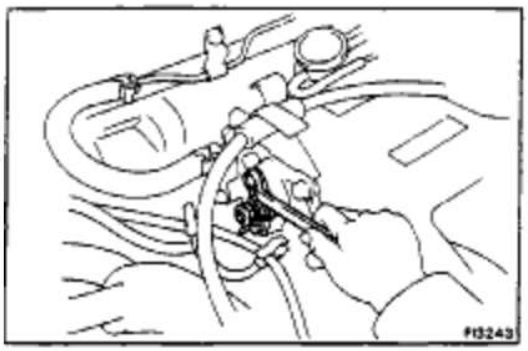
3. DISCONNECT COLD START INJECTOR TUBE

(a) Put a suitable container or shop towel under the injector tube.

(b) Remove the union bolt and two gaskets, and disconnect the injector tube.

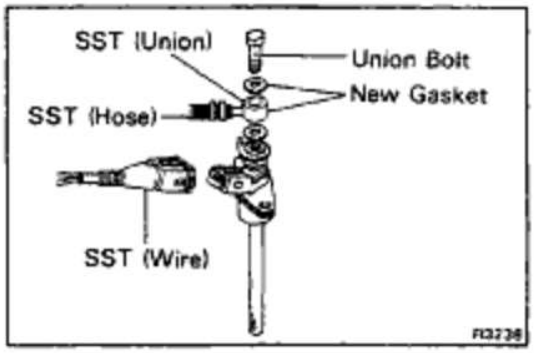
HINT: Slowly loosen the union bolt.

(e) Disconnect the injector tube from the clamp.



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

NOTICE: Keep clear for sparks during the test.

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

SST 09268–41045 (09268–41080)

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

SST 09268–41045

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

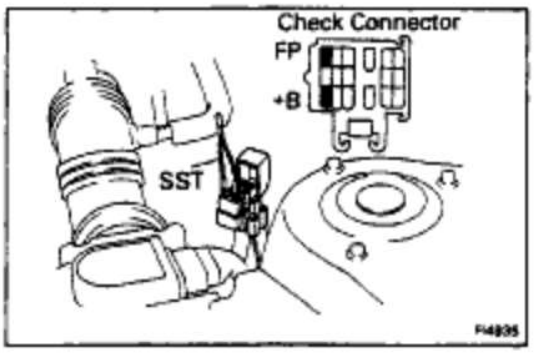
SST 09842–30050

(d) Put a container under the injector.

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

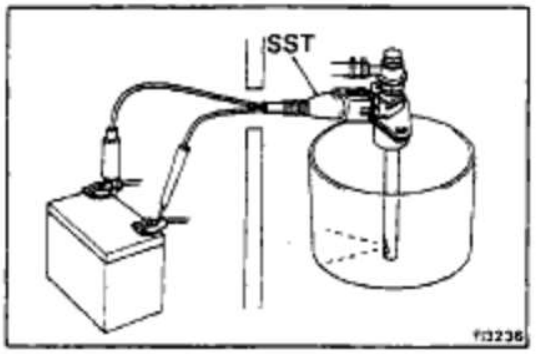
(f) Turn the ignition switch ON.

NOTICE: Do not start the engine.



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

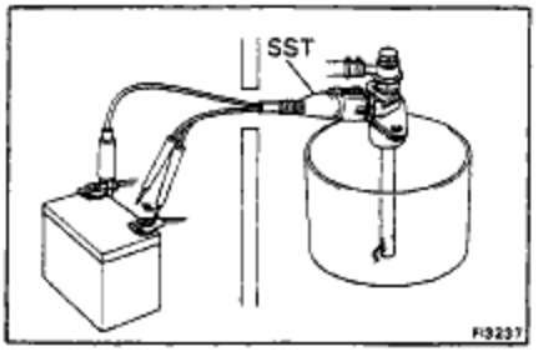
SST 09843–18020



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

SST 09842–30050

NOTICE: Perform this check within the shortest possible time.



2. INSPECT LEAKAGE –

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

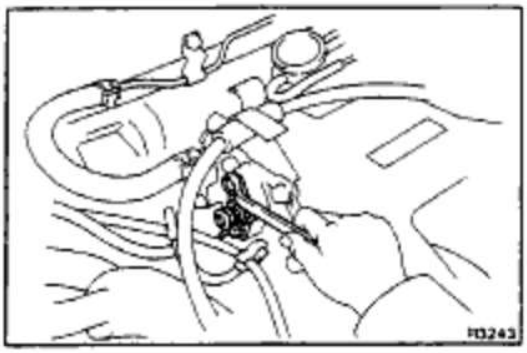
SST 09842–30050

Fuel drop: One drop or less per minute

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

(c) Remove SST and the service wire.

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

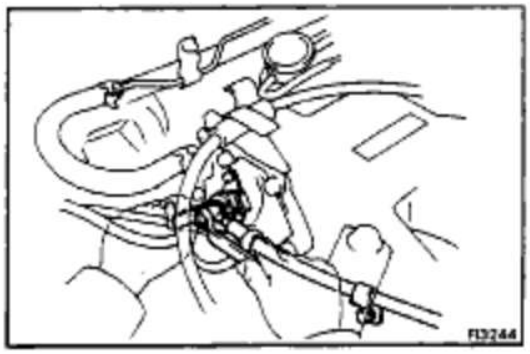


INSTALLATION OF COLD START INJECTOR

1. INSTALL COLD START INJECTOR

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

Torque: 55 kg–cm (48 in.–lb, 5.4 N–m)



2. CONNECT COLD START INJECTOR TUBE

(a) Connect the injector tube to clamp.

(b) Connect the injector tube with two new gaskets and the union bolt.

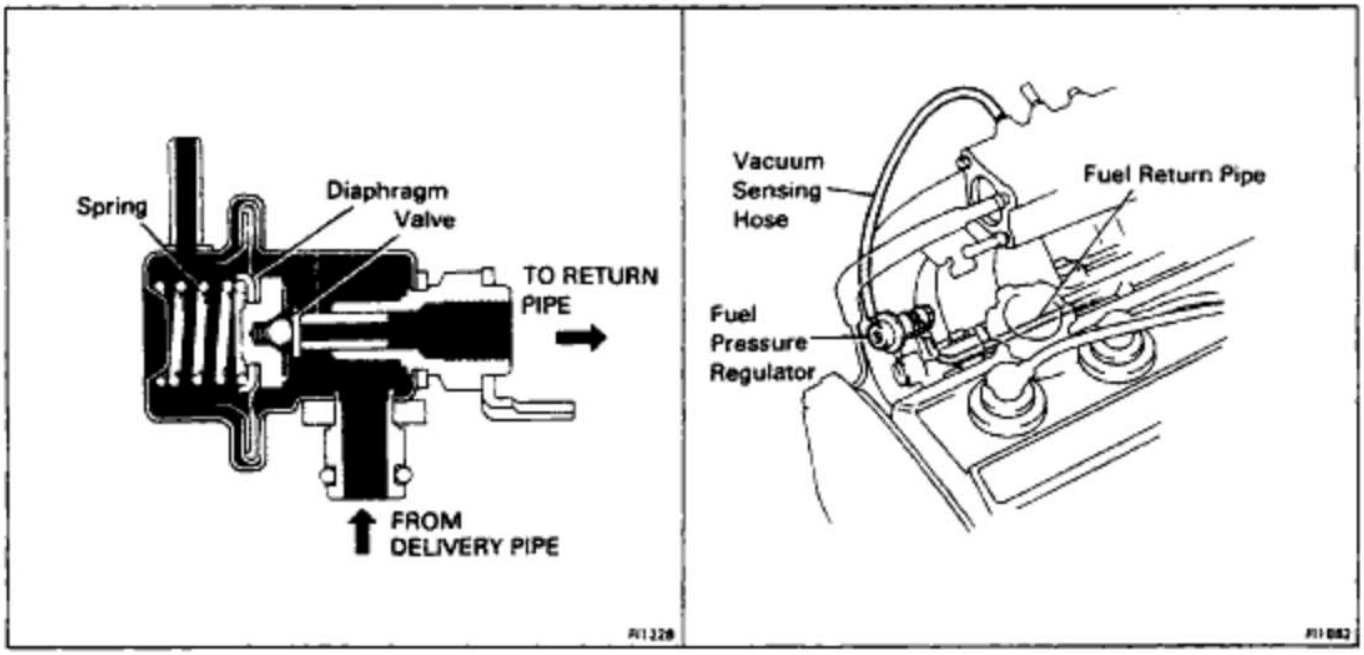
Torque: 200 kg–cm (14 ft–lb, 20 N–m)

3. CONNECT COLD START INJECTOR CONNECTOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

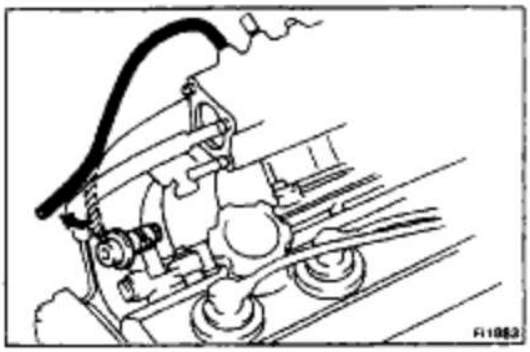
5. CHECK FOR FUEL LEAKAGE (See page FI–9)

Fuel Pressure Regulator (3S–FE)



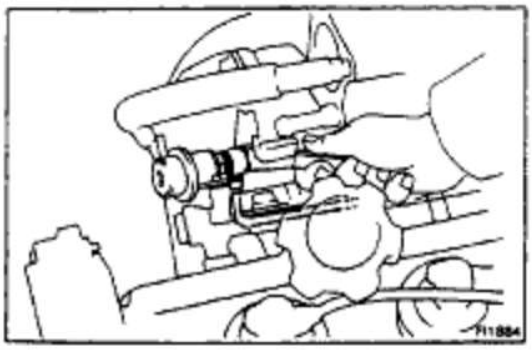
ON–VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page FI–70)



REMOVAL OF FUEL PRESSURE REGULATOR

1. DISCONNECT VACUUM SENSING HOSE

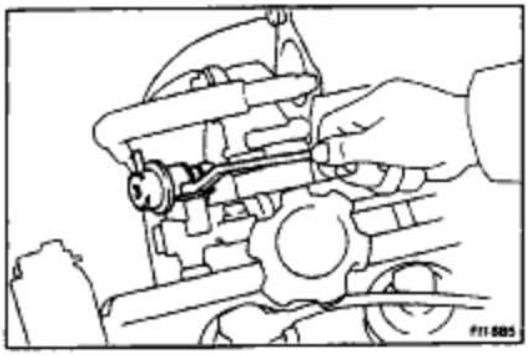


2. DISCONNECT FUEL RETURN PIPE

(a) Put a suitable container or shop towel under the pressure regulator.

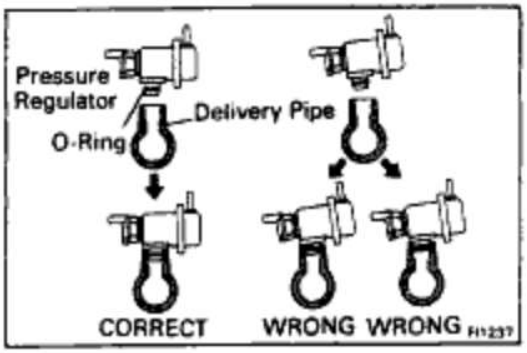
(b) Remove the union bolt and two gasket, and disconnect the return pipe from the pressure regulator.

HINT: Slowly loosen the union bolt.



3. REMOVE FUEL PRESSURE REGULATOR

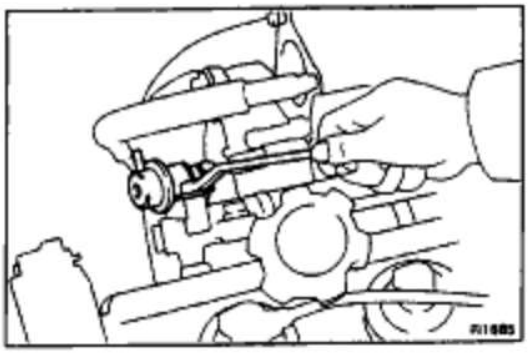
(a) Remove the two bolts, and pull out the pressure regulator.
(b) Remove the 0–ring from the pressure regulator.



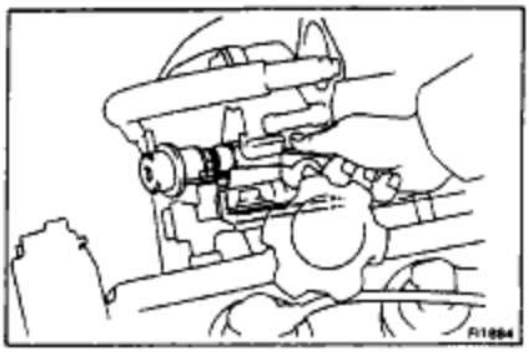
INSTALLATION OF FUEL PRESSURE REGULATOR

1. INSTALL FUEL PRESSURE REGULATOR

(a) Apply a light coat of gasoline to a new 0–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)



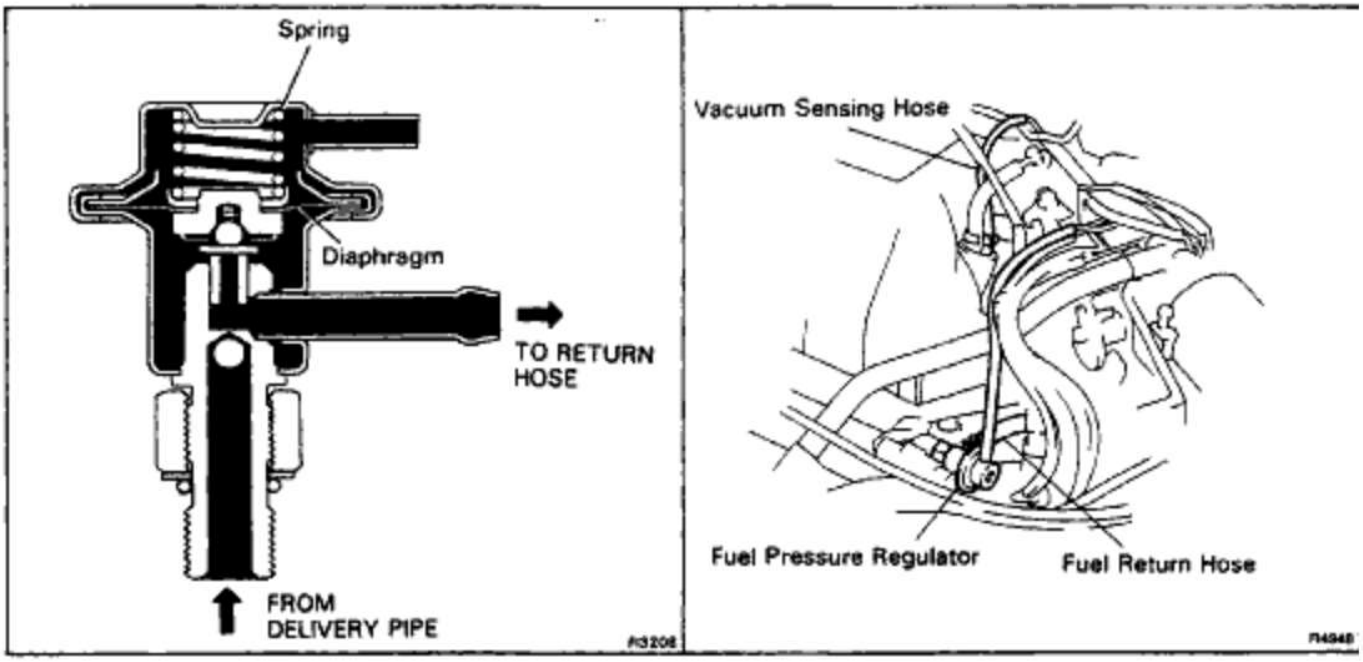
2. CONNECT FUEL RETURN PIPE

Install the return pipe with two new gasket and the union bolt.
Torque: 180 kg–cm (13 ft–lb, 18 N–m)

3. CONNECT VACUUM SENSING HOSE

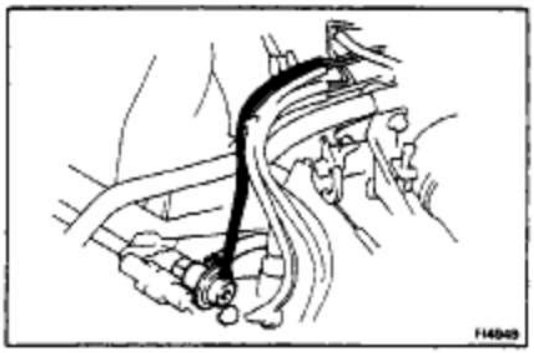
4. CHECK FOR FUEL LEAKAGE (See page FI–9)

Fuel Pressure Regulator (2VZ–FE)



ON–VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page FI–70)



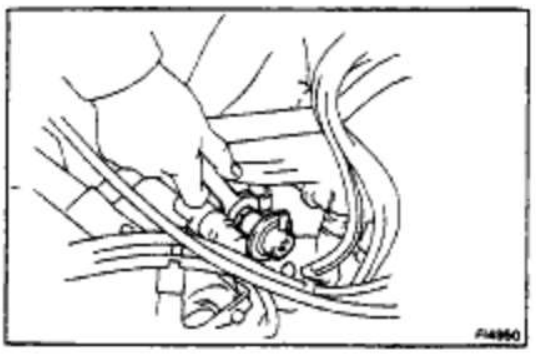
REMOVAL OF FUEL PRESSURE REGULATOR

1. DISCONNECT VACUUM SENSING HOSE

2. DISCONNECT FUEL R RN HOSE

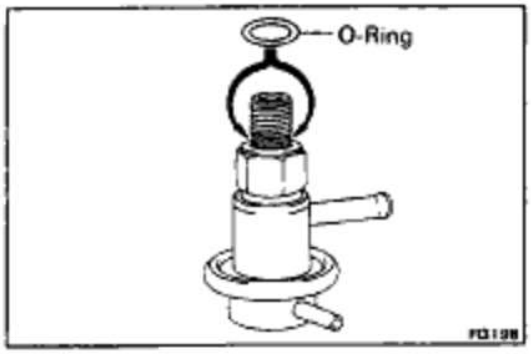
(a) Put a suitable container or shop towel under the pressure regulator.

(b) Disconnect the return hose from the pressure regulator.



3. REMOVE FUEL PRESSURE REGULATOR

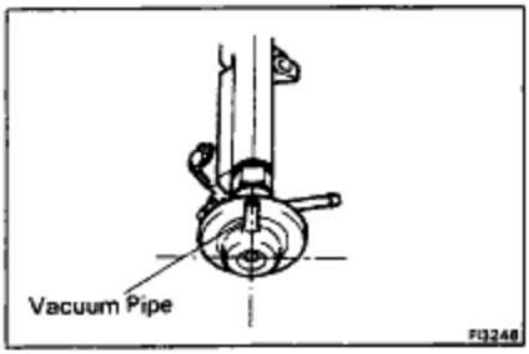
Loosen the lock nut, and remove the pressure regulator.



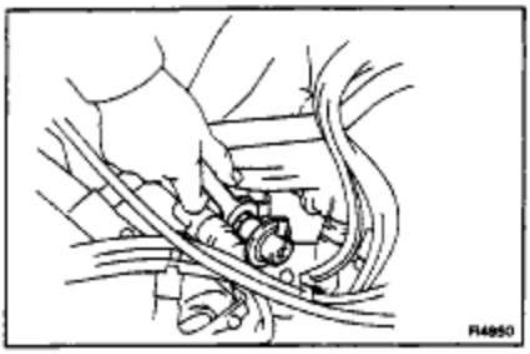
INSTALLATION OF FUEL PRESSURE REGULATOR

1. INSTALL FUEL PRESSURE REGULATOR

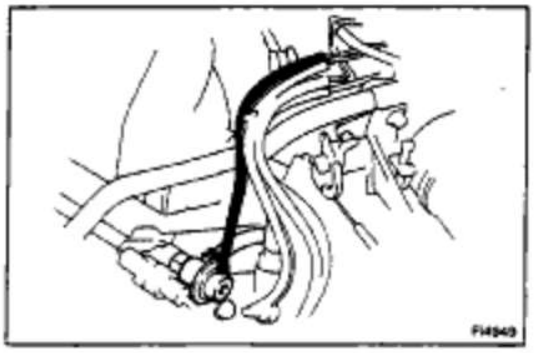
(a) Fully loosen the lock nut of the pressure regulator.
(b) Apply a light coat of gasoline to a new O–ring, and install it to the pressure regulator.



(c) Thrust the pressure regulator completely into the delivery pipe by hand.
(d) Turn the pressure regulator counterclockwise until the vacuum pipe faces in the direction indicated in the figure.



(e) Tighten the lock nut.
Torque: 330 kg–cm (24 ft–lb, 32 N–m)

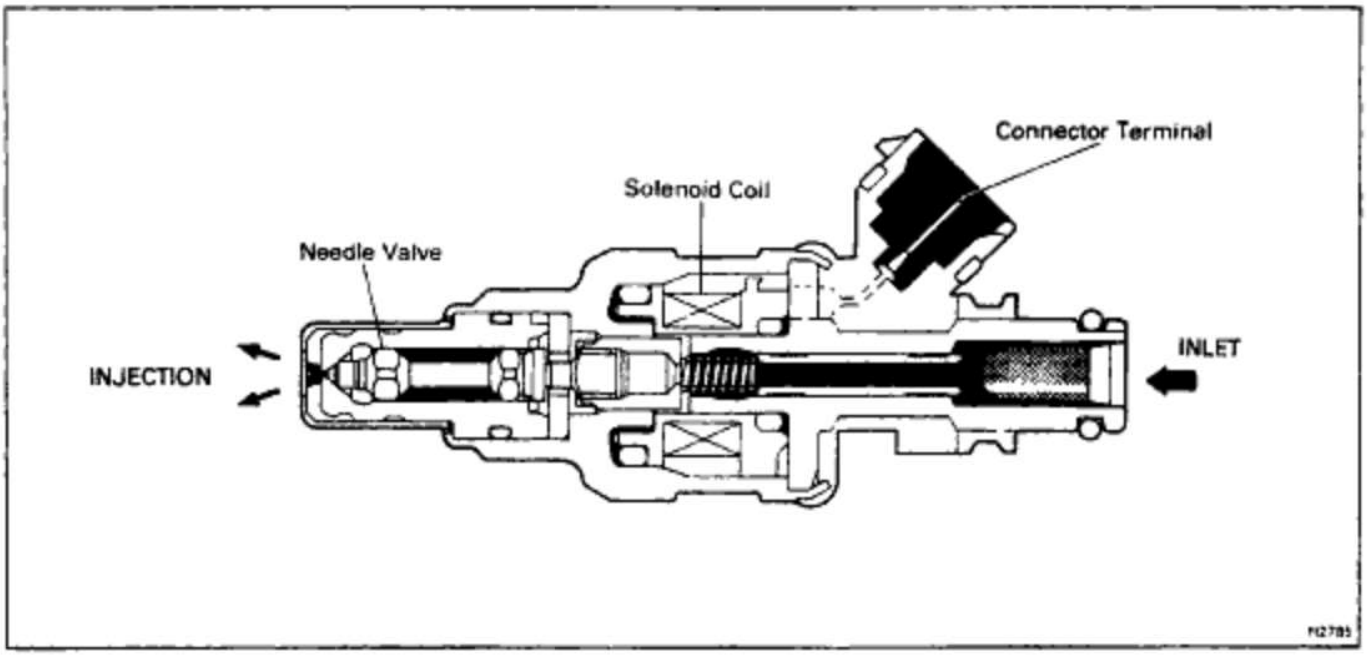


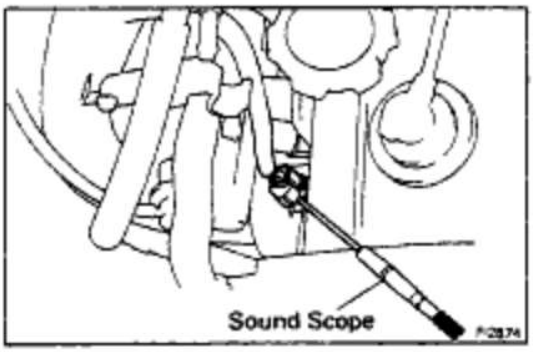
2. CONNECT FUEL RETURN HOSE

3. CONNECT VACUUM SENSING HOSE

4. CHECK FOR FUEL LEAKAGE (See page FI–9)

Injectors (3S–FE)



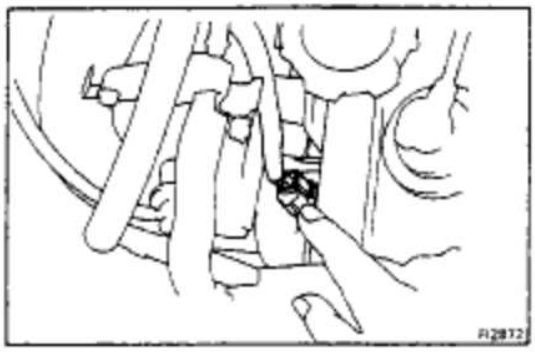


ON–VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

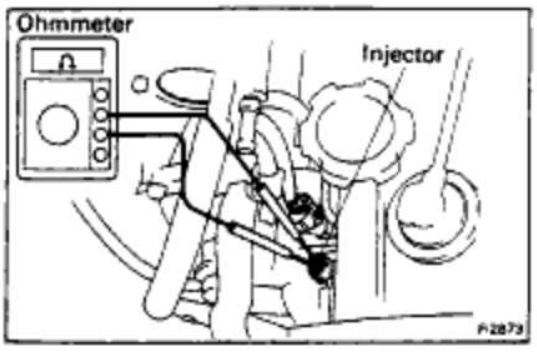
Check operation sound from each injector.

(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 ECU.



2. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

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

Resistance: Approx. 13.8Ω

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

(c) Reconnect the injector connector.

REMOVAL OF INJECTORS

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. DISCONNECT COLD START INJECTOR PIPE

(See steps 2 and 3 on page FI–78)

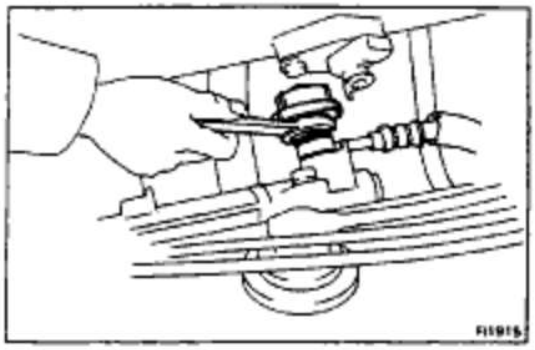
3. DISCONNECT VACUUM SENSING HOSE FROM FUEL PRESSURE REGULATOR (See step 1 on page FI–84)

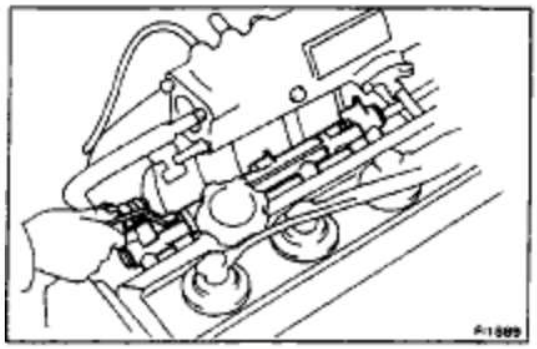
4. DISCONNECT INJECTOR CONNECTORS

5. DISCONNECT FUEL HOSE FROM FUEL RETURN PIPE

6. REMOVE FUEL PRESSURE PALSATION DAMPER

Remove the pulsation damper and two gaskets.





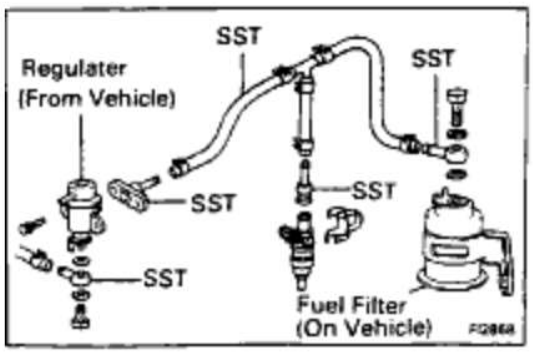
7. REMOVE DELIVERY PIPE AND INJECTORS

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

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

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

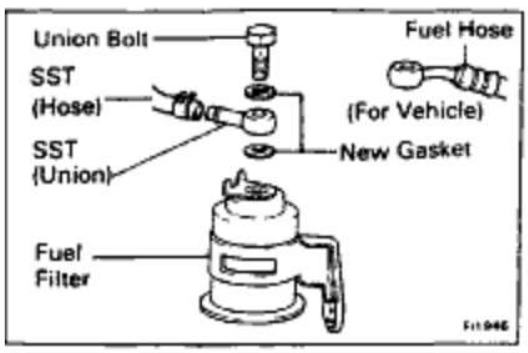
(c) Pull out the four injectors from the delivery pipe.



INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

NOTICE: Keep clear for sparks during the test.

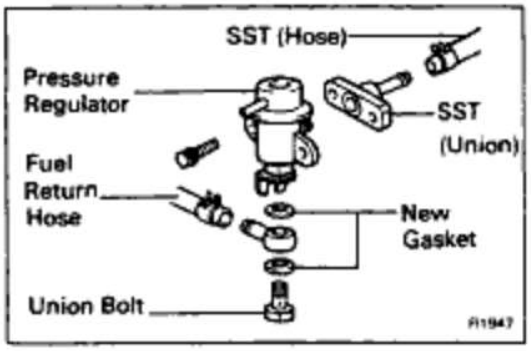


(a) Disconnect the fuel hose from the fuel filter outlet.

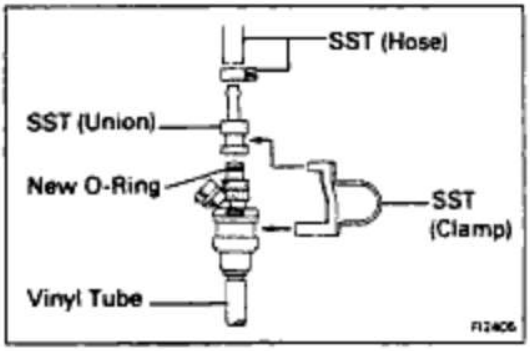
(b) Connect SST (union and hose) to the fuel filter outlet with two new gaskets and the union bolt.

SST 09268–41045 (90405–09015)

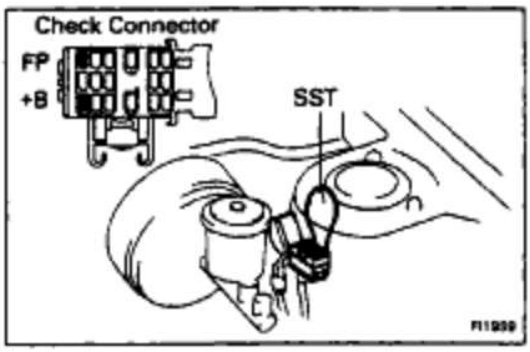
HINT: Use the vehicle's fuel filter.

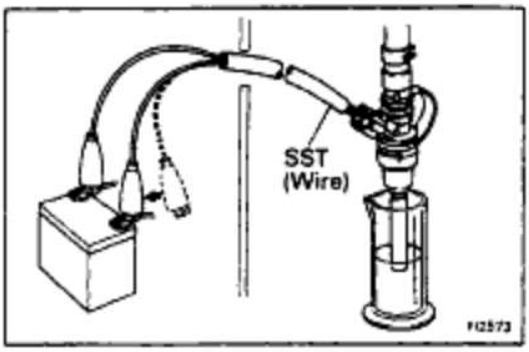


(e) Remove the pressure regulator. (See page FI–84)
(d) Connect the fuel return hose and SST (hose) to the pressure regulator with SST (union), two new gaskets and union bolt.
SST 09268–41045 (09268–41080, 09268–41090)



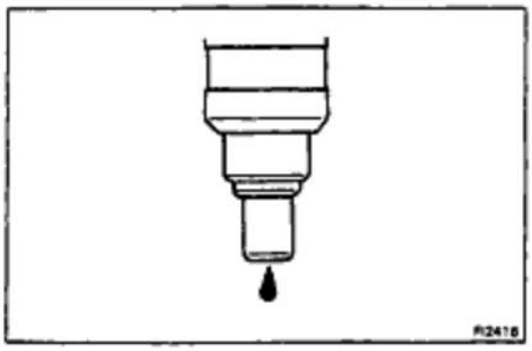
(e) Install a new O–ring to the injector.
(f) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268–41045
(g) Put the injector into the graduated cylinder.
HINT: Install the a suitable vinyl hose onto the injector to prevent gasoline from splashing out
(h) Reconnect the battery negative H cable.
(i) Turn the ignition switch ON.
HINT: Do not start the engine
(j) Using SST, connect terminals +B and FP of the check connector.
SST 49843–18020



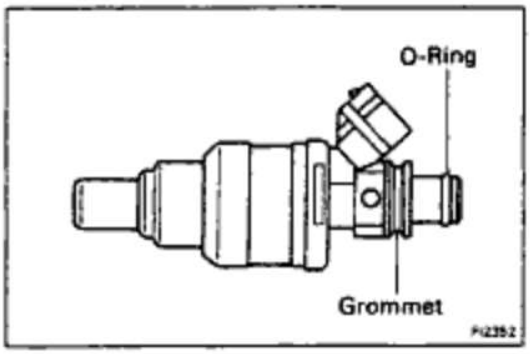


(k) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.
SST 09842–30070
Volume: 45 – 55 cc (2.7 – 3.4 cu in.) per 15 sec.
Difference between each injector:
5 cc (0.3 cu in.) or less
If the injection 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 and the service wire.
SST 09268–4.1045

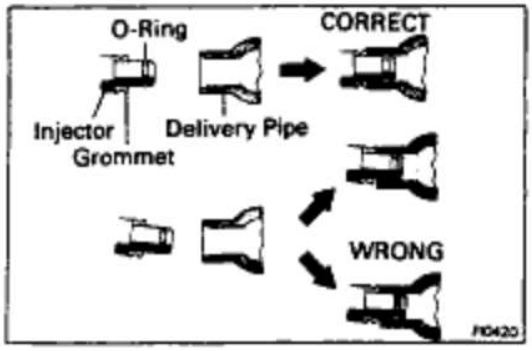


INSTALLATION OF INJECTORS

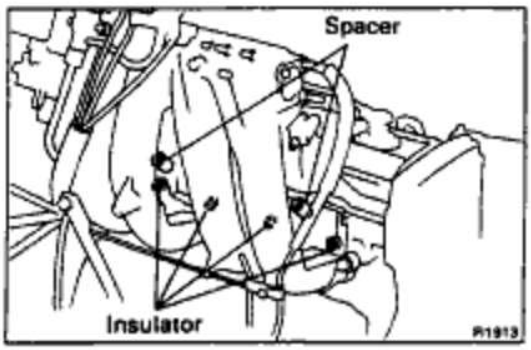
1. INSTALL INJECTORS AND DELIVERY PIPE

(a) Install a new grommet to the injector.

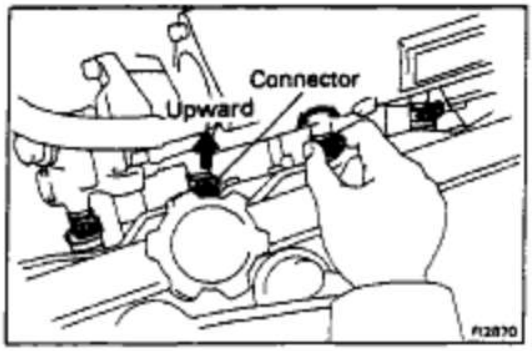
(b) Apply a light coat of gasoline to a new O–ring and install it to the injector.



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



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

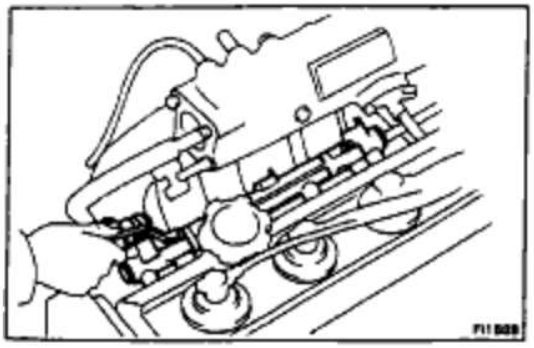


(e) Place the four injectors together with the delivery pipe in position on the cylinder head.

(f) Check that the injectors rotate smoothly.

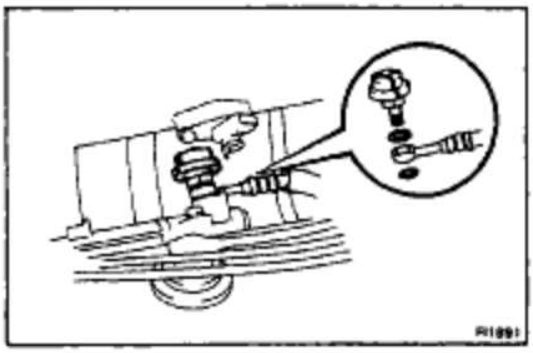
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings. Replace the O–rings.

(g) Position the injector connector upward.



(h) Install the two bolt.

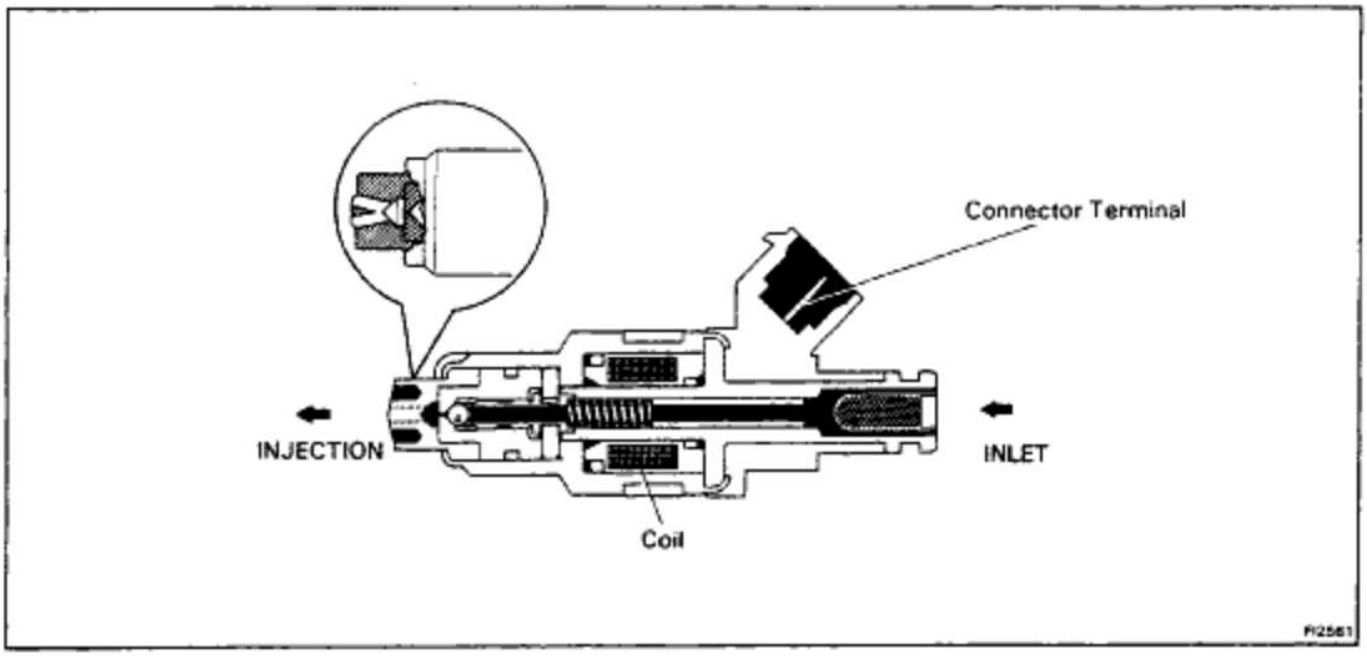
Torque: 130 kg–cm (9 ft–lb, 13 N–m)

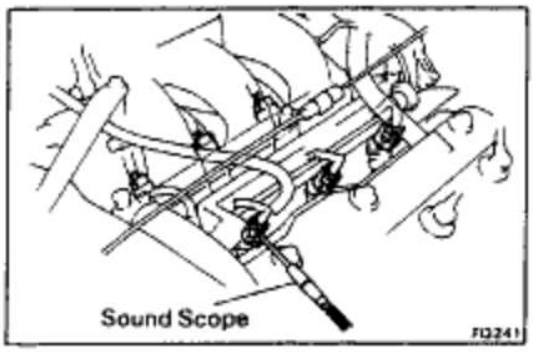


2. INSTALL FUEL PRESSURE PULSATION DAMPER
Install a new gasket, the fuel hose, a new gasket and the pulsation damper.

3. CONNECT FUEL RETURN HOSE
4. CONNECT INJECTOR CONNECTORS
5. CONNECT VACUUM SENSING HOSE
6. CONNECT COLD START INJECTOR PIPE
(See steps 2 and 3 on page FI–80)
7. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

Injectors (2VZ–FE)



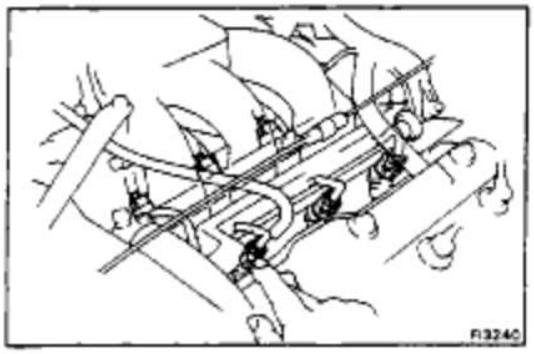


ON–VEHICLE INSPECTION

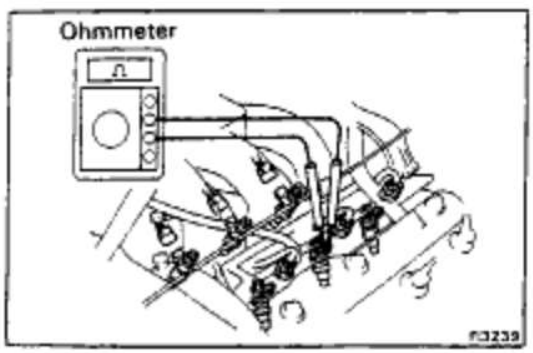
1. INSPECT INJECTOR OPERATION

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 ECU.



2. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

(b) Using an ohmmeter, measure the resistance between the terminals.
Resistance: Approx. 13.8Ω
If the resistance is not as specified, replace the injector.

(c) Reconnect the injector connector.

REMOVAL OF INJECTORS

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

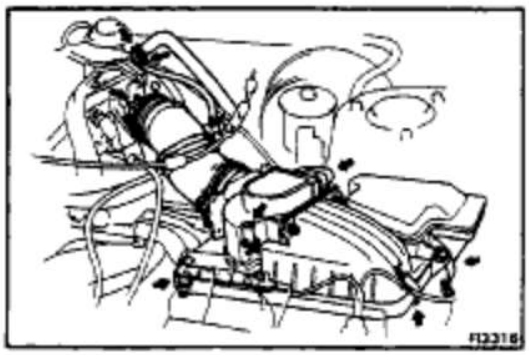
2. DRAIN ENGINE COOLANT (See page CO–5)

3. (A/T)
DISCONNECT THROTTLE CABLE FROM THROTTLE BODY AND BRACKET

4. DISCONNECT ACCELERATOR CABLE AND BRACKET FROM THROTTLE BODY AND AIR INTAKE CHAMBER

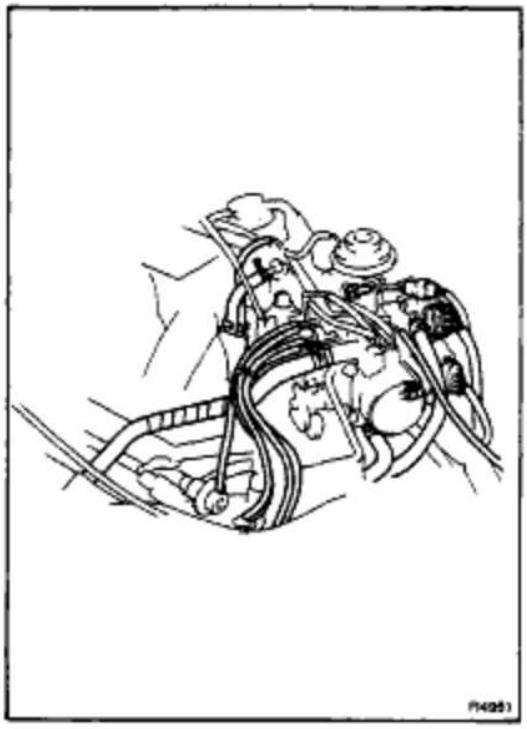
5. REMOVE AIR CLEANER CAP, AIR FLOW METER AND AIR CLEANER HOSE

(a) Disconnect the. air flow meter connector.
(b) Disconnect the air hoses.
(e) Loosen the air cleaner hose clamp bolt.
(d) Disconnect the air cleaner cap clips.
(e) Remove the air cleaner cap and air flow meter together with the air cleaner hose.



6. DISCONNECT HOSES AND CONNECTORS

(a) PCV hoses
(b) Vacuum sensing hose
(e) Water by–pass hoses
(d) Fuel pressure control VSV hose
(e) Emission control vacuum hoses
(f) ISC connector
(g) Throttle position sensor connector
(h) (CALIF. only)
EGR gas temp. sensor connector

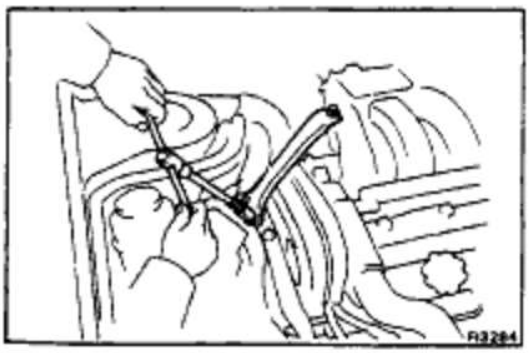


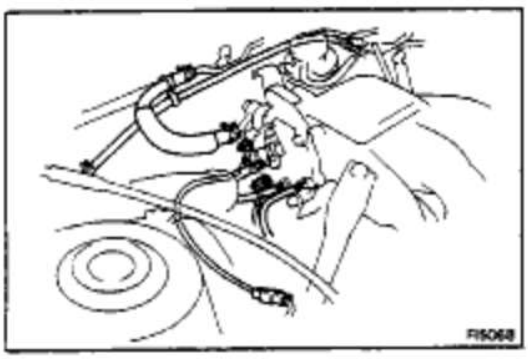
7. REMOVE NO. 1 RH ENGINE MOUNTING STAY

Remove the three bolts and mounting stay.

8. DISCONNECT COLD START INJECTOR CONNECTOR

9. DISCONNECT COLD START INJECTOR TUBE
(See step 3 on page FI–81)





10. DISCONNECT HOSES AND PARTS

(a) Brake booster vacuum hose
(b) PS vacuum and air hoses
(c) Cruise control vacuum hose
(d) Ground strap connector
(e) Wire harness clamp
Remove the nut, and disconnect the wire harness clamp.
(f) Fuel pressure control VSV hose.

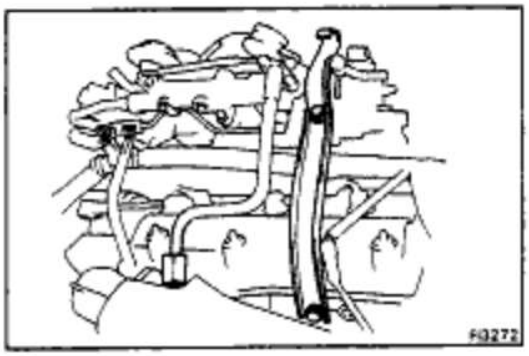
11. DISCONNECT WIRE HARNESS CLAMP

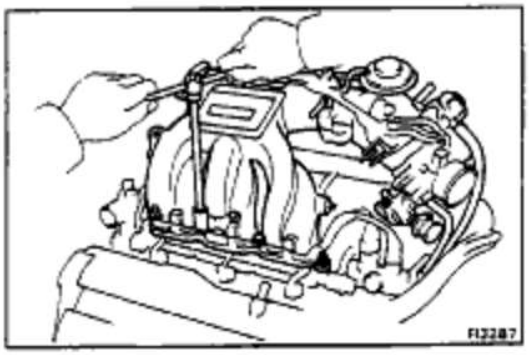
Remove the nut and disconnect the wire harness.

12. DISCONNECT EGR PIPE

13. REMOVE NO.1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

(a) Remove the two bolts and No.1 engine hanger.
(b) Remove the bolt, and disconnect the air intake chamber stay from air intake chamber.





14. REMOVE AIR INTAKE CHAMBER

Remove the two bolts, nuts, air intake chamber and gasket.

15. DISCONNECT CONNECTORS

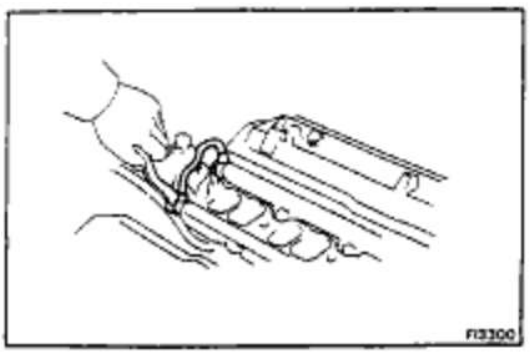
(a) Cold start injector connector
(b) Water temperature sensor connector
(c) Six injector connectors

16. DISCONNECT WIRE HARNESS CLAMPS FROM LH DELIVERY PIPE

Disconnect the three wire harness clamp.

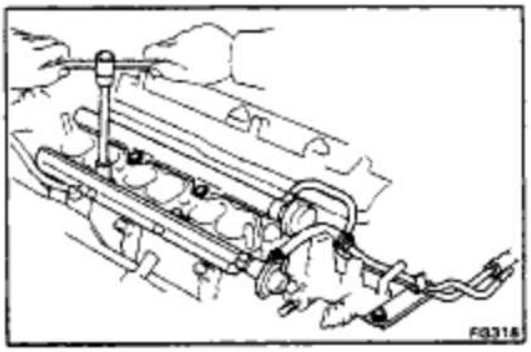
17. DISCONNECT FUEL INLET AND TWO RETURN HOSES

(a) Disconnect the fuel return hoses from the fuel pressure regulator and No.1 fuel pipe.
(b) Disconnect the fuel inlet hose from the fuel filter.



18. REMOVE NO.2 FUEL PIPE

Remove the two union bolts, four gaskets and No.2 fuel pipe.



19. REMOVE DELIVERY PIPES AND INJECTORS

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

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

(b) Remove the three bolts and RH delivery pipe with the No. 1 fuel pipe and three injectors.

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

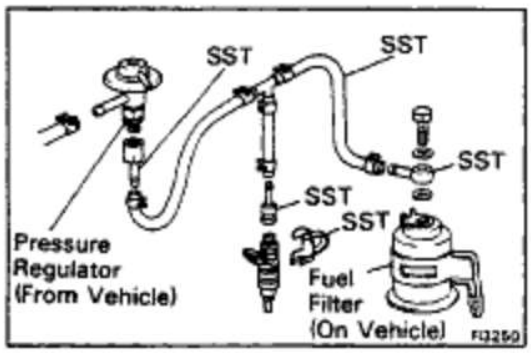
(c) Pull out the six injectors from the delivery pipes.

(d) Remove the six insulators and four spacers from the intake manifold.

INSPECTION OF INJECTORS

1. INSPECT INJECTOR INJECTION

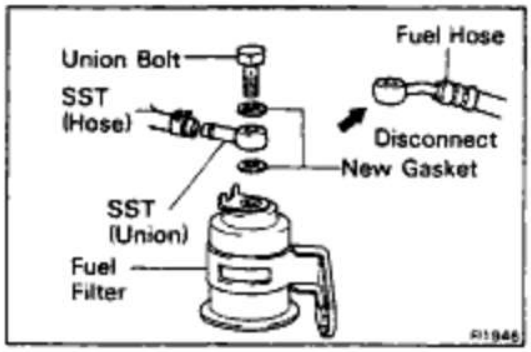
NOTICE: Keep clear for sparks during the test.

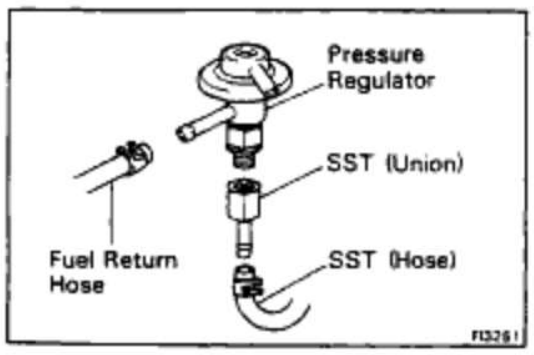


(a) Disconnect the fuel hose from the fuel filter outlet.

(b) Connect SST (union and hose) to the fuel fitter outlet with two new gaskets and the union bolt.
SST 49268–41045 (90405–09015)

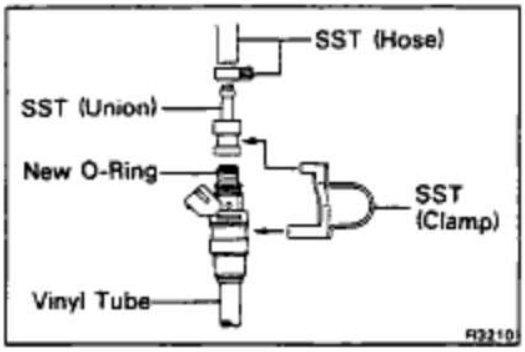
HINT: Use the vehicle's fuel filter.



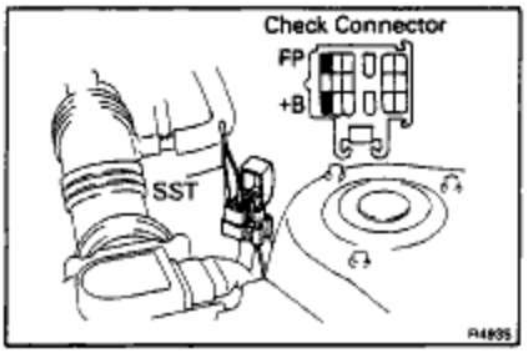


(e) Remove the pressure regulator. (See page FI–86)

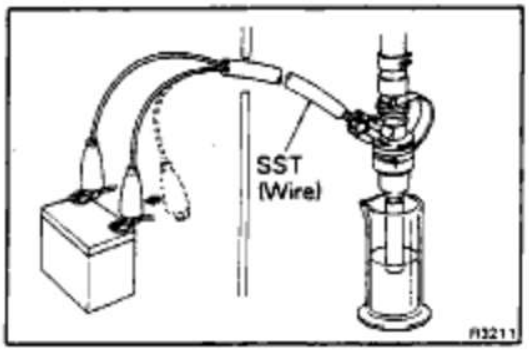
(d) Connect the fuel return hose and SST (hose) to the pressure regulator with SST (union).
SST 09268–41045 (09268–41060)



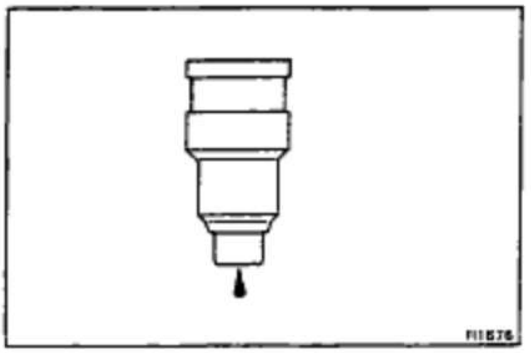
(e) Install a new O–ring to the injector.
(f) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268–41045
(g) Put the injector into the graduated cylinder.
HINT: Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.
(h) Reconnect the battery negative (–) cable.
(i) Turn the ignition switch ON.
NOTICE: Do not start the engine.



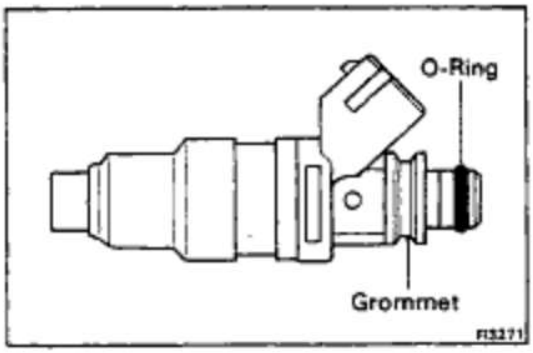
Using SST, connect terminals +B and FP of the check connector.
SST 09843–18020



(k) 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

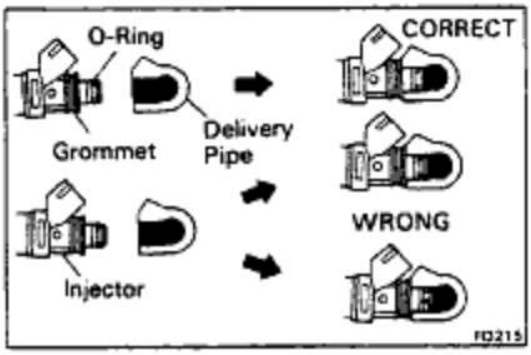


INSTALLATION OF INJECTORS

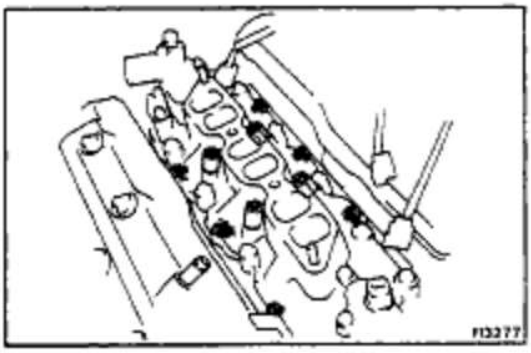
1. INSTALL INJECTORS AND DELIVERY PIPES

(a) Install a new grommet to the injector.

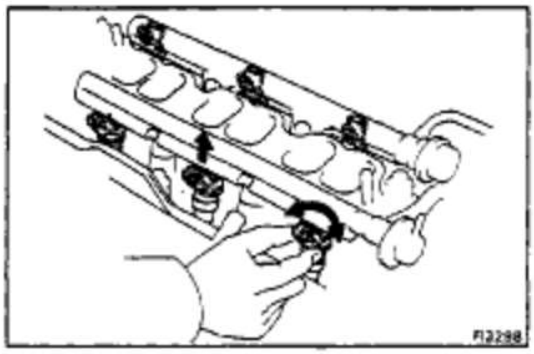
(b) Apply a light coat of gasoline to a new 0–ring and install it to the injector.



(c) While turning the injector left and right, install it to the delivery pipes. Instal! the six injectors.



(d) Place the six insulators and four spacers in position on the intake manifold.



(e) Place the three injectors together with the RH delivery pipe and No.1 fuel pipe in position on the intake manifold.

(f) Place the three injectors together with the LH delivery pipe in position on the intake manifold.

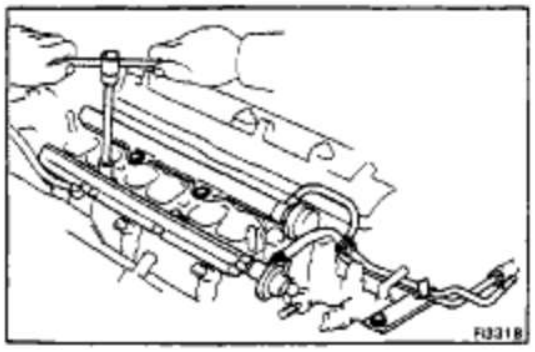
(g) Check that the injectors rotate smoothly.

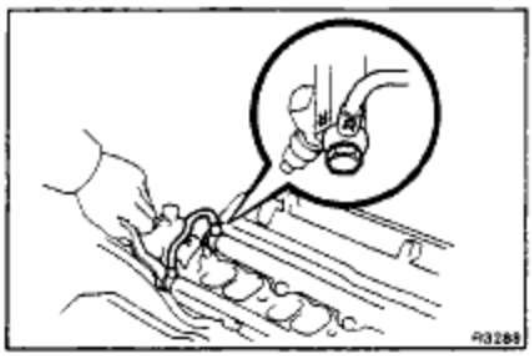
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of 0–rings. Replace the O–rings.

(h) Position the injector connector upward.

(i) Install the five bolts:

Torque: 130 kg–cm (9 ft–lb, 13 N–m)





2. INSTALL NO.2 FUEL PIPE

Install the No.2 fuel pipe with four new gaskets and the union bolts as shown in the illustration.

Torque: 330 kg–cm (24 ft–lb, 32 N–m)

3. CONNECT FUEL INLET AND RETURN HOSES

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

(b) Connect the two return hoses to the pressure regulator and No.1 fuel pipe.

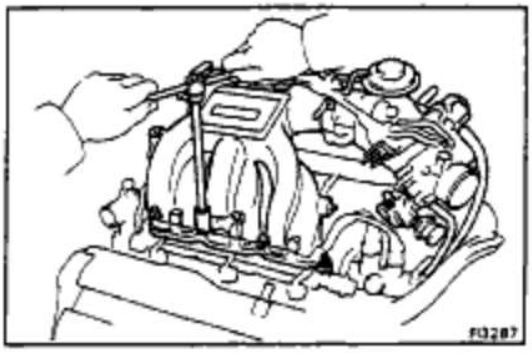
4. CONNECT THREE WIRE HARNESS CLAMPS TO LH DELIVERY PIPE

5. CONNECT CONNECTORS

(a) Six injector connectors

(b) Cold start injector connector

(e) Water temperature connector



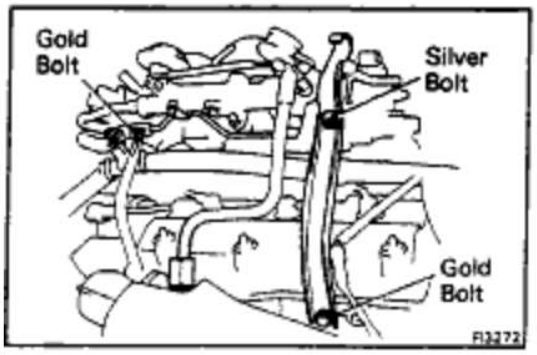
6. INSTALL AIR INTAKE CHAMBER

Install a new gasket and the air intake chamber with the two bolts and nuts.

Torque: 440 kg–cm (32 ft–lb, 43 N–m)

7. CONNECT EGR PIPE

Torque: 800 kg–cm (58 ft–1b, 78 N–m)



8. CONNECT WIRE HARNESS CLAMP

Connect the wire harness clamp with the nut.

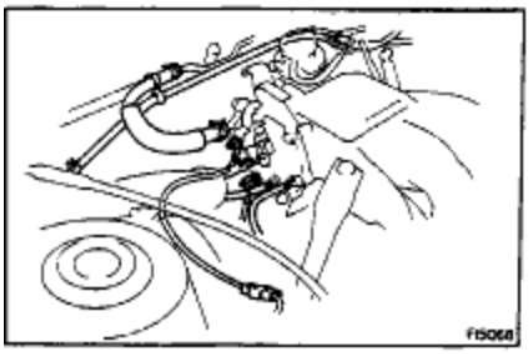
9. INSTALL NO.1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

(a) Connect the air intake chamber stay with the two bolts.

Torque: 380 kg–cm (27 ft–lb,37 N–m)

(b) Install the No.1 engine hanger with the two bolts.

Torque: 380 kg–cm (27 it–lb,37 N–m)



10. CONNECT HOSES AND PARTS

(a) Wire harness clamp

Connect the wire harness clamp with the nut.

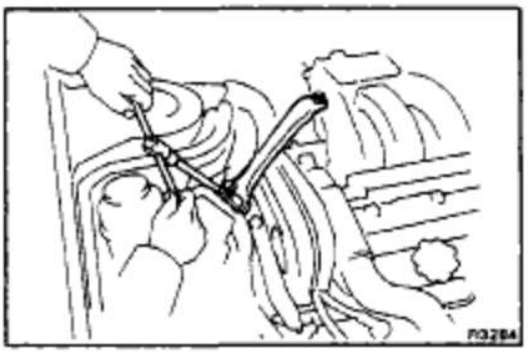
(b) Brake booster vacuum hose

(c) PS vacuum and air hoses

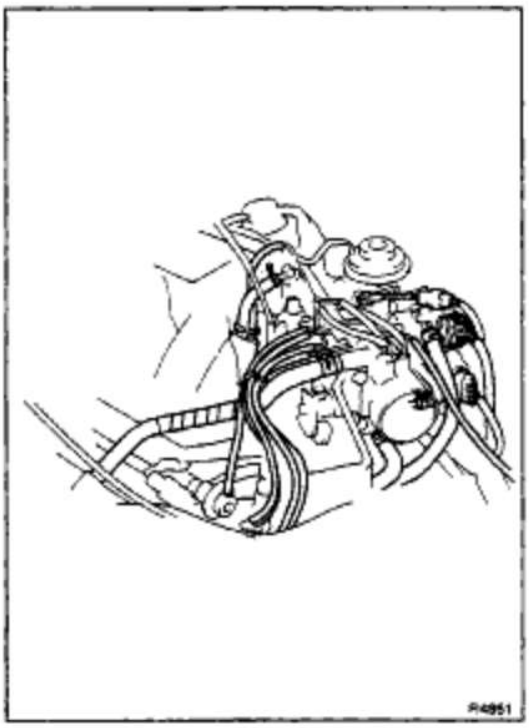
(d) Cruise control vacuum hose

(e) Ground strap connector

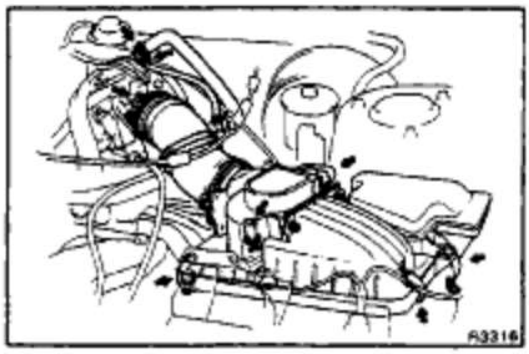
(f) Fuel pressure control VSV hose



11. CONNECT COLD START INJECTOR TUBE
(See step 2 on page FI–83)
12. CONNECT COLD START INJECTOR CONNECTOR
13. INSTALL NO. 1 RH ENGINE MOUNTING STAY
Install the mounting stay with the three bolts.
Torque: 530 kg–cm (38 ft–lb, 52 N–m)



14. CONNECT CONNECTORS AND HOSES
(a) ISC connector
(b) Throttle position sensor connector
(c) (CALIF. only)
EGR gas temp. sensor connectors
(d) PCV hoses
(e) Vacuum sensing hoses
(f) Water by–pass hoses
(g) Fuel pressure VSV hose
(h) Emission control vacuum hoses

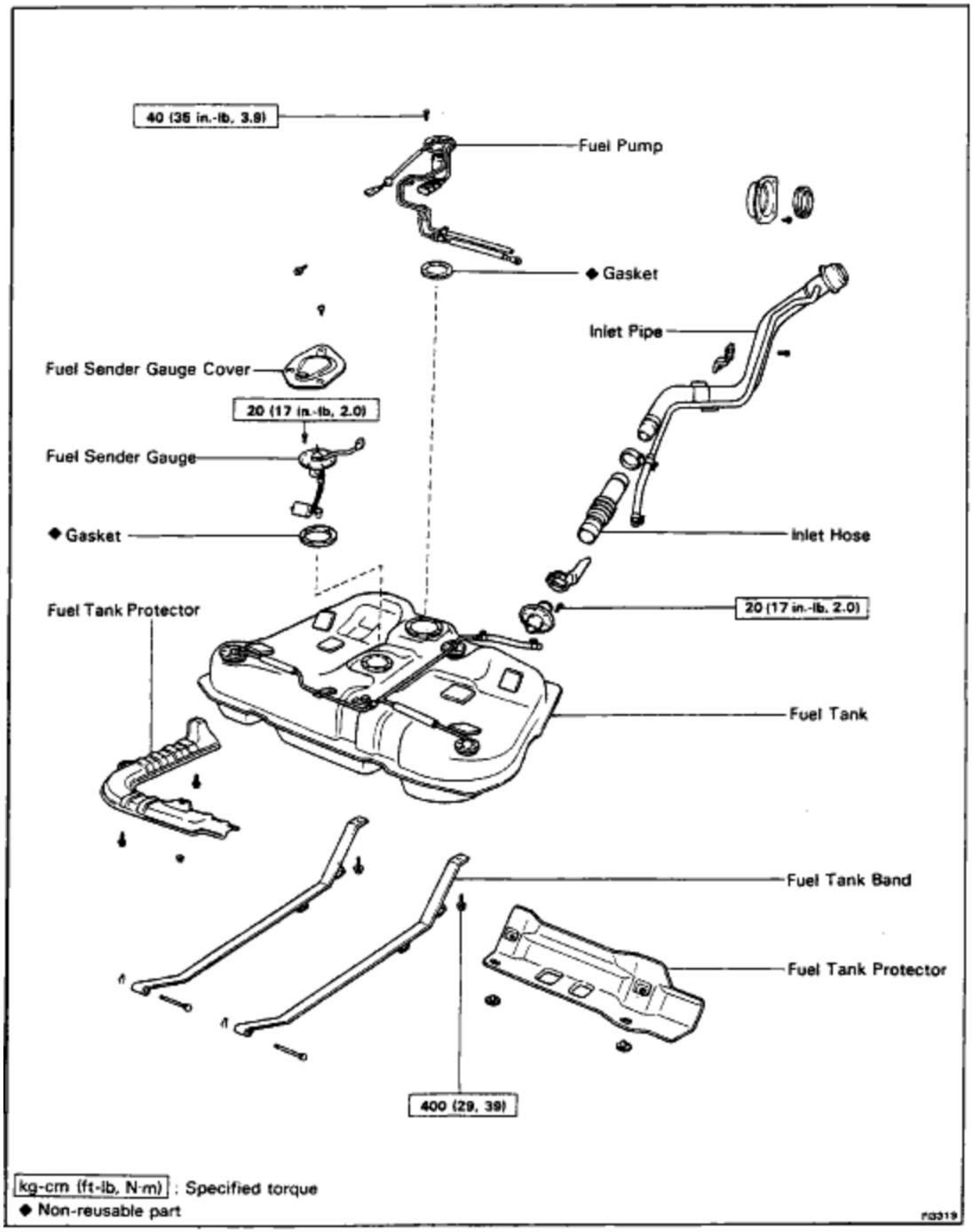


15. INSTALL AIR CLEANER CAP, AIR FLOW METER AND AIR CLEANER HOSE
(a) Connect the air cleaner hose, and install the air cleaner cap and air flow meter with the four clips.
(b) Tighten the air cleaner hose clamp bolt.
(c) Connect the air hoses.
(d) Connect the air flow meter connector.

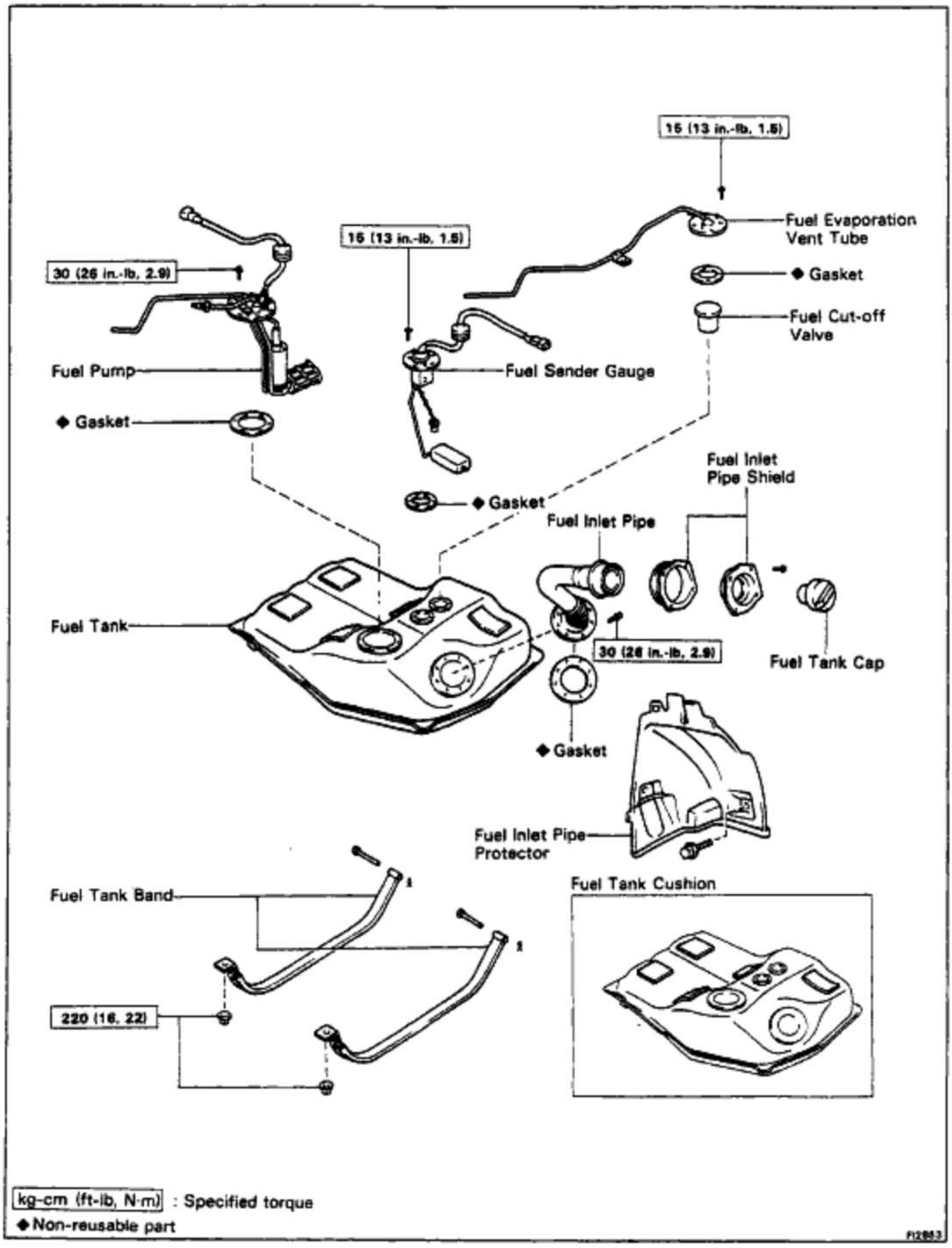
16. CONNECT ACCELERATOR CABLE AND BRACKET TO THROTTLE BODY AND AIR INTAKE CHAMBER
17. (A/T)
CONNECT THROTTLE CABLE TO THROTTLE BODY AND BRACKET, AND ADJUST IT
18. FILL WITH COOLANT (See page CO–5)
19. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

Fuel Tank and Lines

COMPONENTS (2WD)

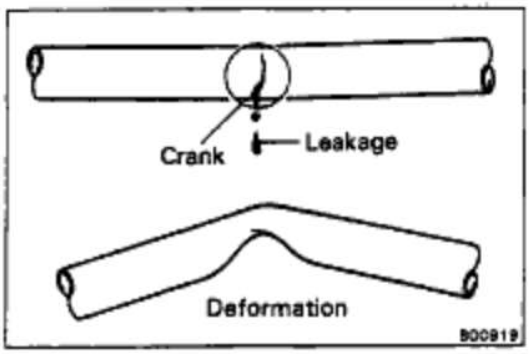


COMPONENTS (4WD)



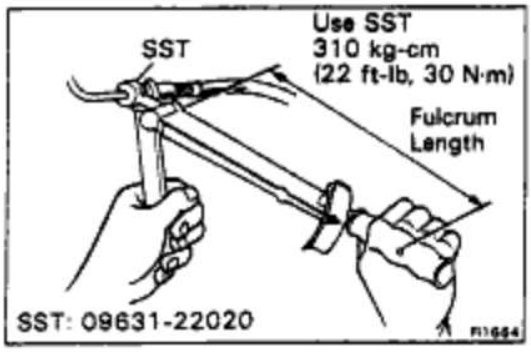
PRECAUTIONS

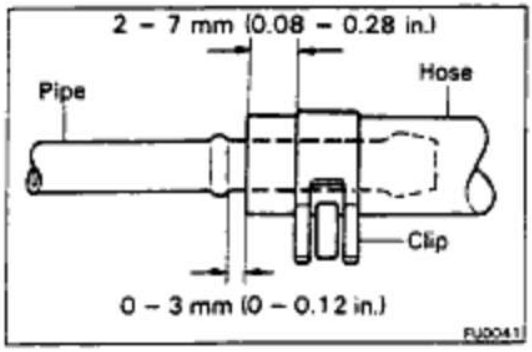
1. Always use new gaskets when replacing the fuel tank or component parts.
2. Apply the proper torque to all parts tightened.



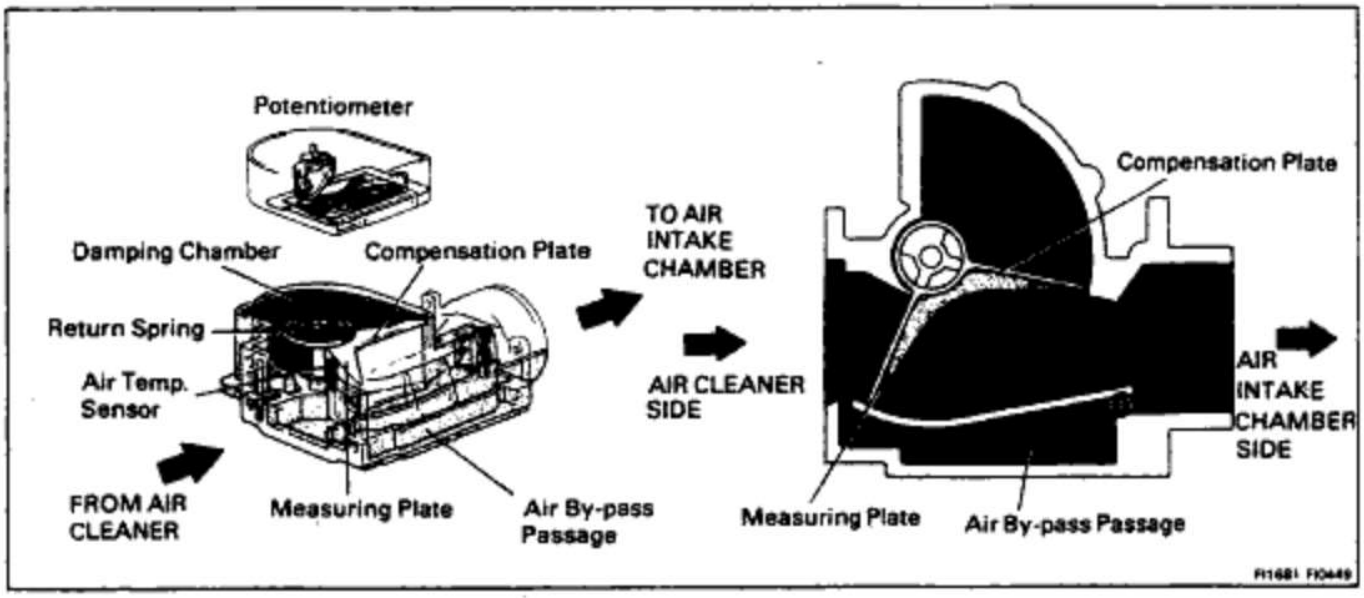
INSPECT FUEL LINES AND CONNECTIONS

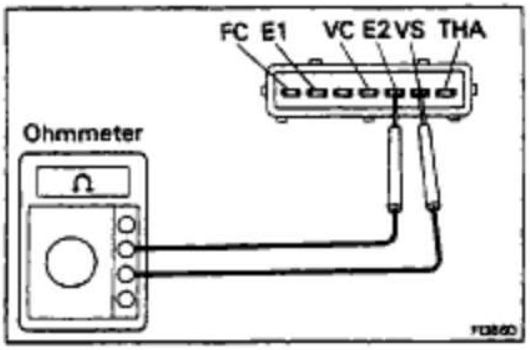
(a) Check the fuel lines for cracks or leakage, and all connections for deformation.
(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.
(e) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
(d) Check the filler neck for damage or fuel leakage.
(e) Hose and tube connections are as shown in the illustration. If a problem is found, repair or replace the parts as necessary.

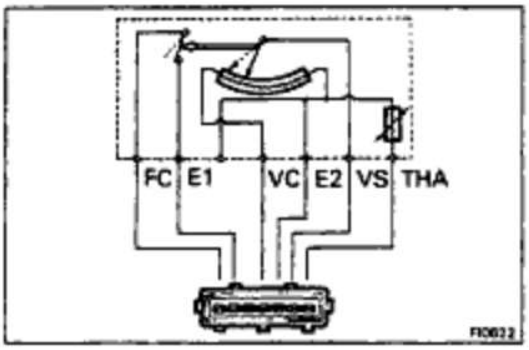




AIR INDUCTION SYSTEM
Air Flow Meter







ON–VEHICLE INSPECTION

INSPECT RESISTANCE OF AIR FLOW METER

(a) Disconnect the air flow meter connector.

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

Between terminals	Resistance (Ω)	Temp. °C (°F)
VS — E2	200 — 600	—
VC — E2 3S-FE	3,000 — 7,000	—
VC — E2 2VZ-FE	200 — 400	—
THA — E2	10,000 — 20,000	-20 (-4)
	4,000 — 7,000	0 (32)
	2,000 — 3,000	20 (68)
	900 — 1,300	40 (104)
	400 — 700	60 (140)
FC — E1	Infinity	—

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

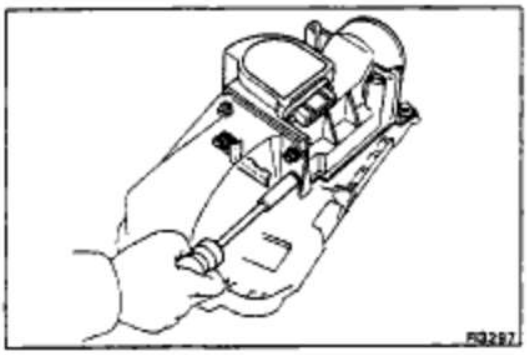
(e) Reconnect the air flow meter connector.

REMOVAL OF AIR FLOW METER

1. DISCONNECT AIR FLOW METER CONNECTOR

2. DISCONNECT AIR CLEANER HOSE

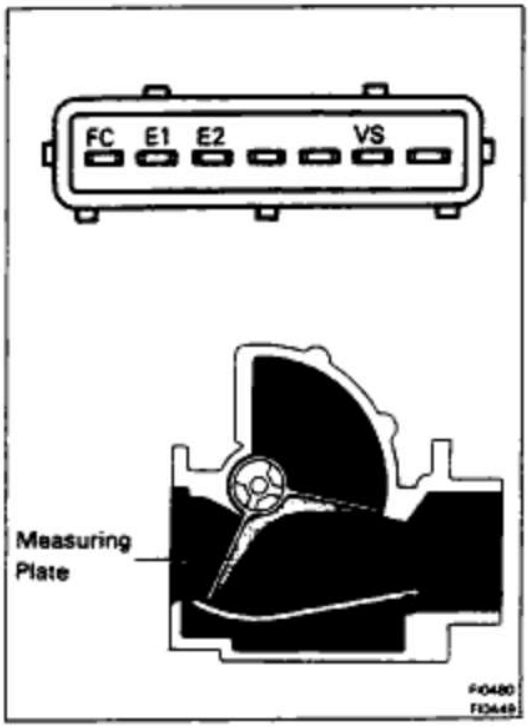
3. REMOVE AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY



5. REMOVE AIR FLOW METER FROM AIR CLEANER CAP

(a) Remove the two bolts and resonator.

(b) Pry off the lock plate, and remove the bolt, four nuts, four plates washers, air flow meter and gasket.



INSPECTION OF AIR FLOW METER

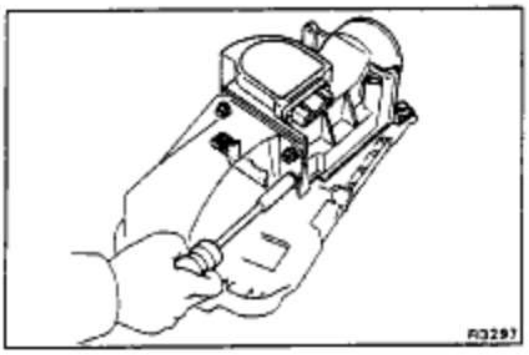
INSPECT RESISTANCE OF AIR FLOW METER

Using an ohmmeter, measure the resistance between each terminal by moving the measuring plate.

Between terminals	Resistance (fl)	Measuring plate opening
FC — E1	Infinity	Fully closed
	Zero	Other than closed
VS — E2	200 — 600	Fully closed
	20 — 1,000	Fully open

HINT: Resistance between terminals E2 and VS will change in a wave pattern as the measuring plate slowly opens.

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



INSTALLATION OF AIR FLOW METER

1. INSTALL AIR FLOW METER TO AIR CLEANER CAP

(a) Install the air flow meter with the gasket, lock plate, four plate washers, four nuts and bolt. Pry the lock plate on the nut.

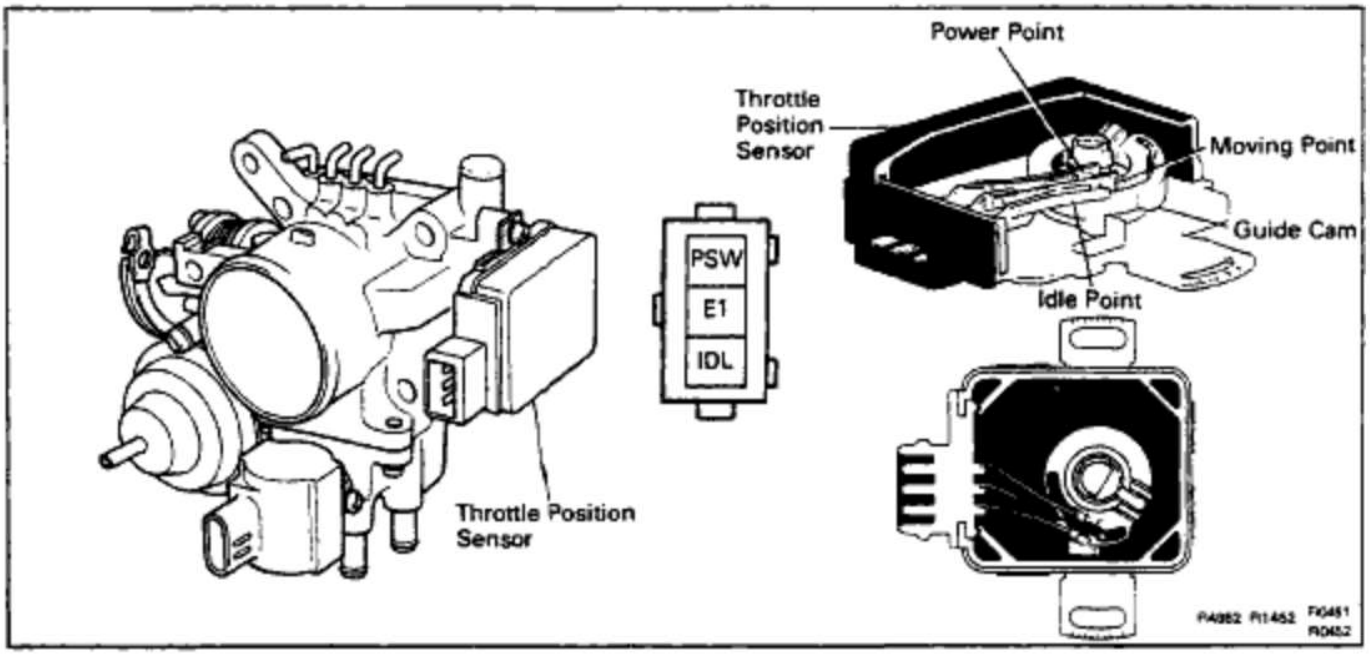
(b) Install the resonator with the two bolts.

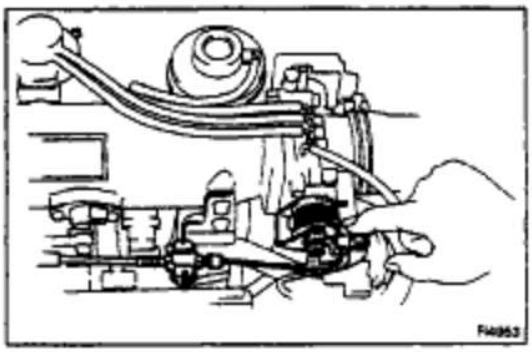
2. INSTALL AIR CLEANER CAP AND AIR FLOW METER ASSEMBLY

3. CONNECT AIR CLEANER HOSE

4. CONNECT AIR AIR FLOW METER CONNECTOR

Throttle Body (3S–FE w o ECT)

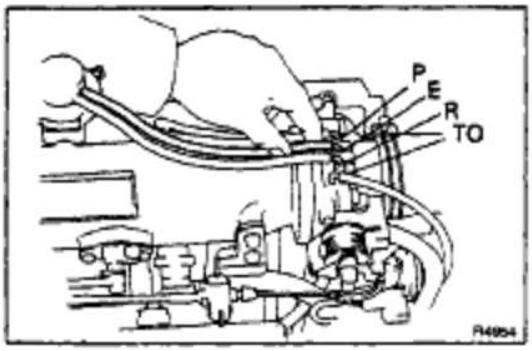




ON–VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

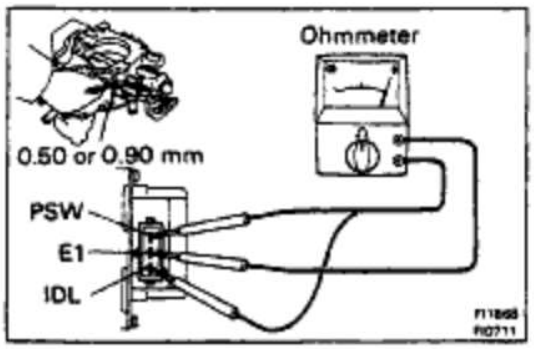
(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

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

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

Clearance between lever and stop screw	Continuity between terminals	
	ID – EI	PSW – E 1
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

(d) Reconnect the sensor connector.

REMOVAL OF THROTTLE BODY

1. DRAIN ENGINE COOLANT (See page CO–4)

2. (A/T)
DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

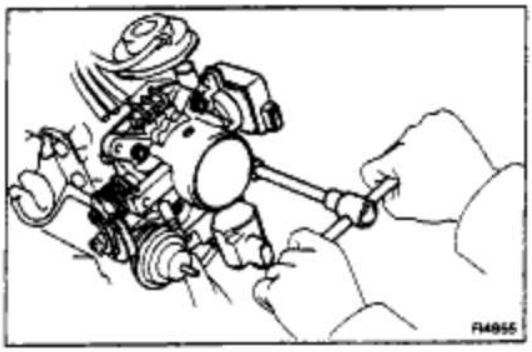
4. DISCONNECT AIR CLEANER HOSE

5. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

6. DISCONNECT ISC VALVE CONNECTOR

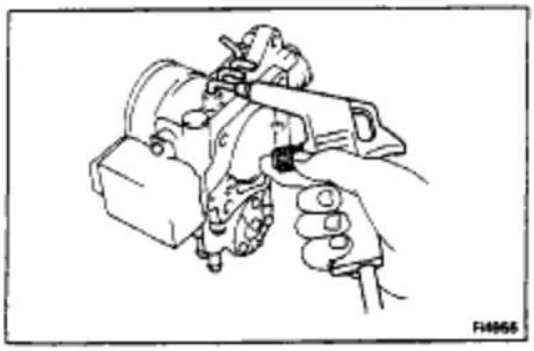
7. REMOVE THROTTLE BODY

(a) Disconnect the following hoses:
- PCV hose
- Water by–pass hoses
- Air tube hose
- Emission control vacuum hoses



(b) Remove the four bolts, throttle body and gasket.

8. IF NECESSARY, REMOVE ISC VALVE FROM THROTTLE BODY (See page FI–116)

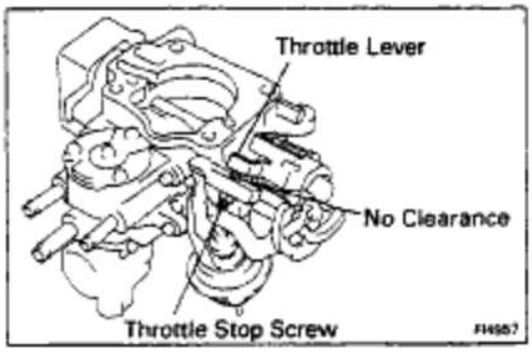


INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

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

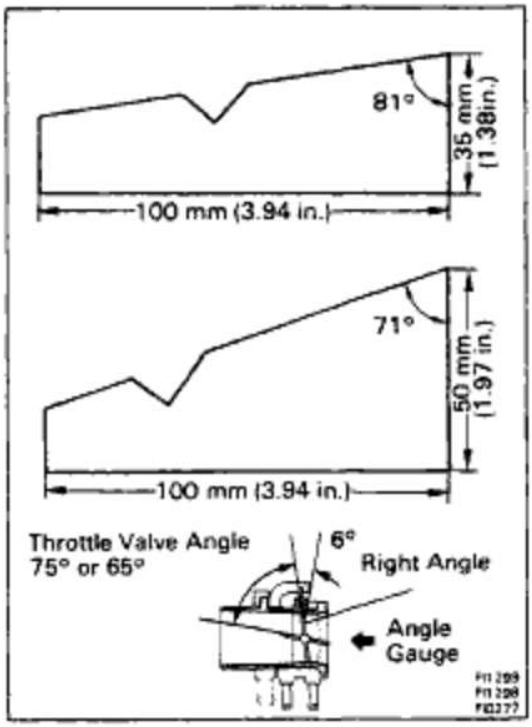
(b) Using compressed air, clean all the passages and apertures.
NOTICE: To prevent deterioration, do not clean the throttle position sensor.



2. INSPECT THROTTLE VALVE

(a) Apply the vacuum to the throttle opener.

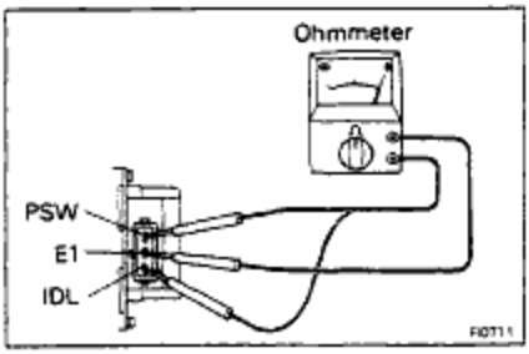
(b) Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.



3. INSPECT THROTTLE POSITION SENSOR

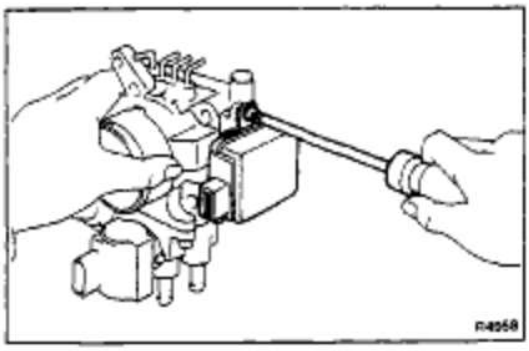
(a) Make an angle gauge as shown in the figure.

(b) Set the throttle valve opening to 810 or 710 from the vertical position (incl. throttle valve fully closed angle 6°).



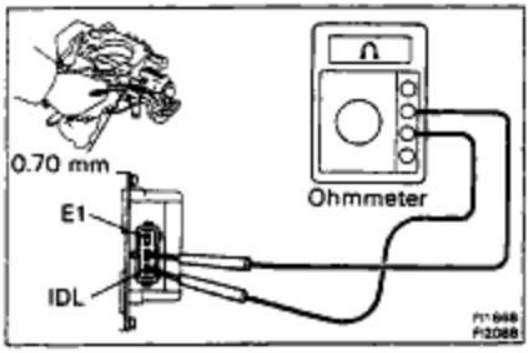
(c) Using an ohmmeter, check the continuity between each terminal.

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

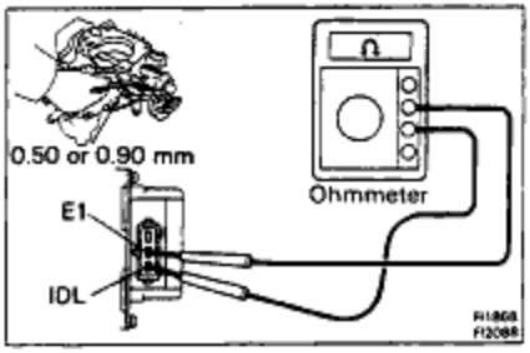


4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

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

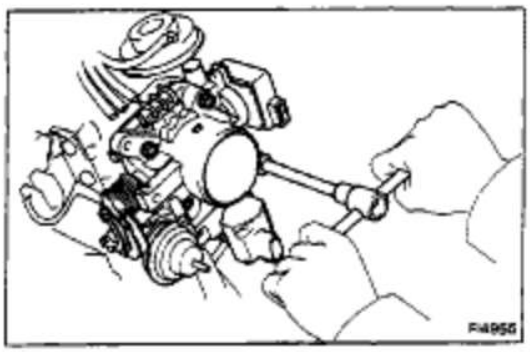


(b) Insert a 0.70 mm (0.028 in.) feeler gauge, between the throttle stop screw and stop lever.
(c) Connect the test probe of an ohmmeter to the terminals IDL and E1 of the sensor.
(d) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



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

Clearance between lever and stop screw	Continuity (IDL – EI)
0.50 mm (0.002 in.)	Continuity
0.90 mm (0.035 in.)	No continuity



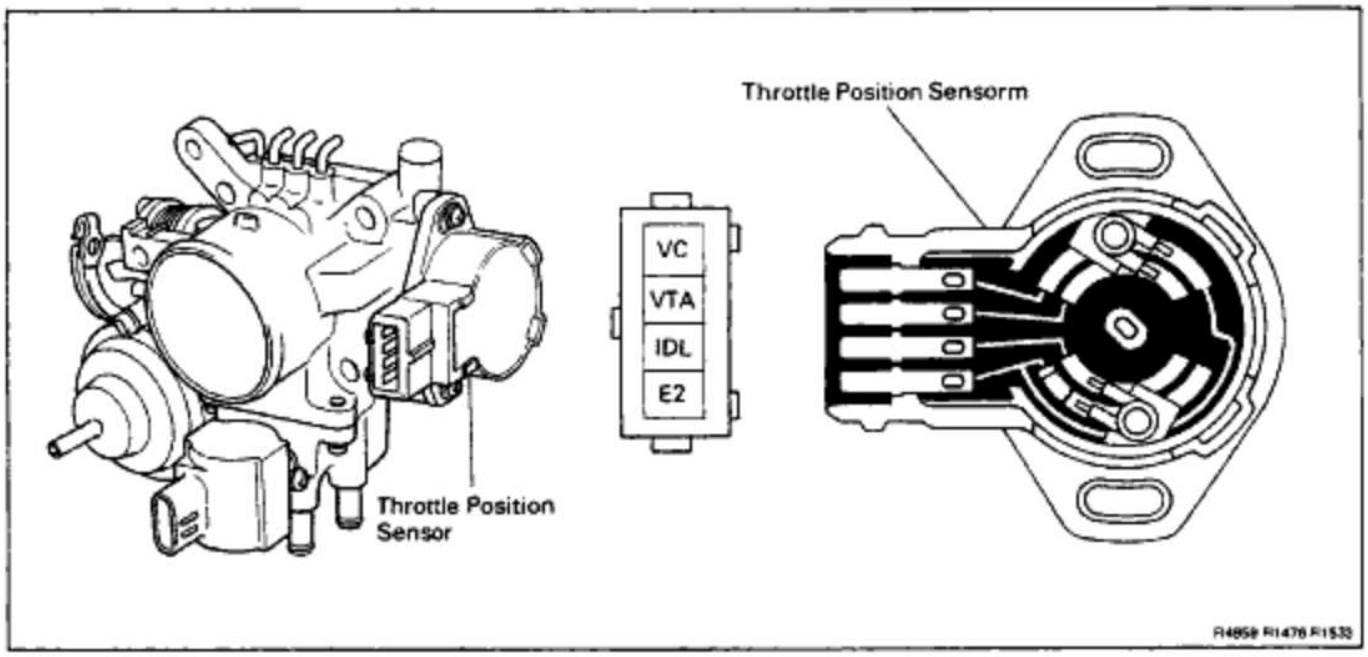
INSTALLATION OF THROTTLE BODY

1. INSTALL ISC VALVE TO THROTTLE BODY
(See page FI–117)
2. INSTALL THROTTLE BODY
(a) Install a new gasket and the throttle body with the four bolts.
Torque: 195 kg–cm (14 ft–lb, 19 N–m)

(b) Connect the following hoses:
- PCV hose
- Water by–pass hoses
- Air tube hose
- Emission control vacuum hoses

3. CONNECT ISC VALVE CONNECTOR
4. CONNECT THROTTLE POSITION SENSOR CONNECTOR
5. CONNECT AIR CLEANER HOSE
6. CONNECT ACCELERATOR CABLE, AND ADJUST IT
7. (A/T)
CONNECT THROTTLE CABLE, AND ADJUST IT
8. FILL WITH ENGINE COOLANT (See page CO–5)

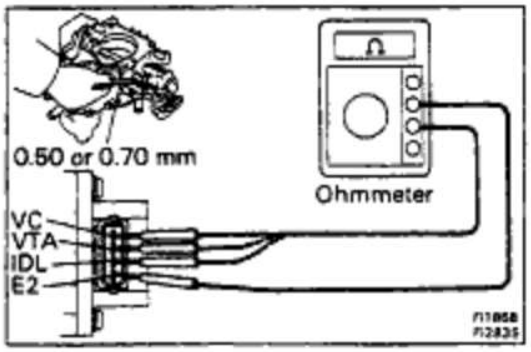
Throttle Body (3S–FE w ECT)

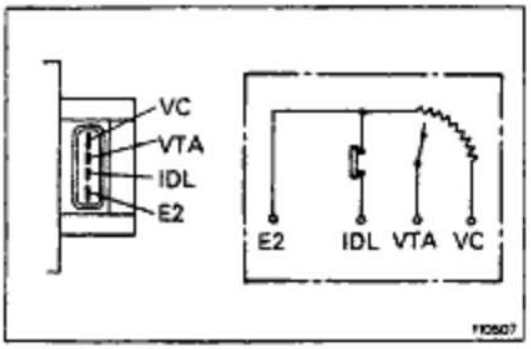


ON–VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

(See step 1 on page FI–106)





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.

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

(d) Reconnect the sensor connector.

REMOVAL OF THROTTLE BODY

(See page FI–107)

INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

(See step 1 on page FI–107)

2. INSPECT THROTTLE VALVE

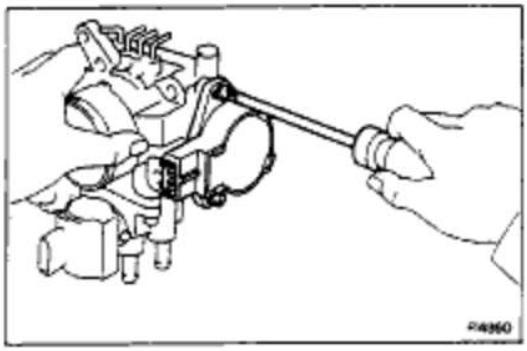
(See step 2 on page FI–108)

3. INSPECT THROTTLE POSITION SENSOR

(See step 2 on page FI–110)

4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

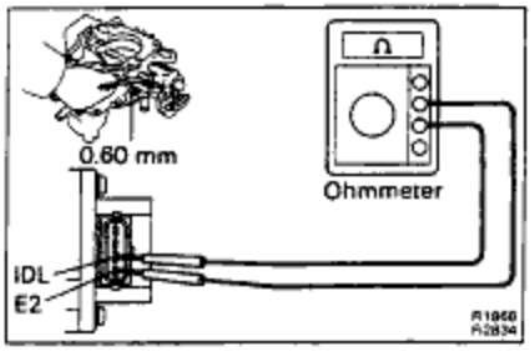
(a) Loosen the two set screws of the sensor.



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

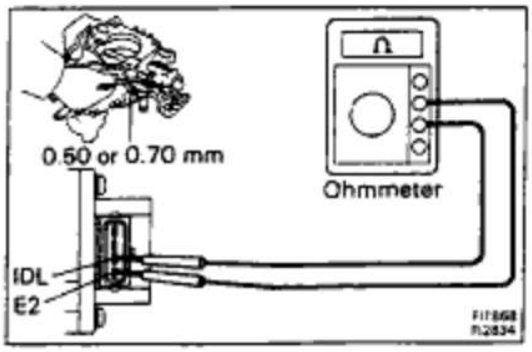
(c) Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.

(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.

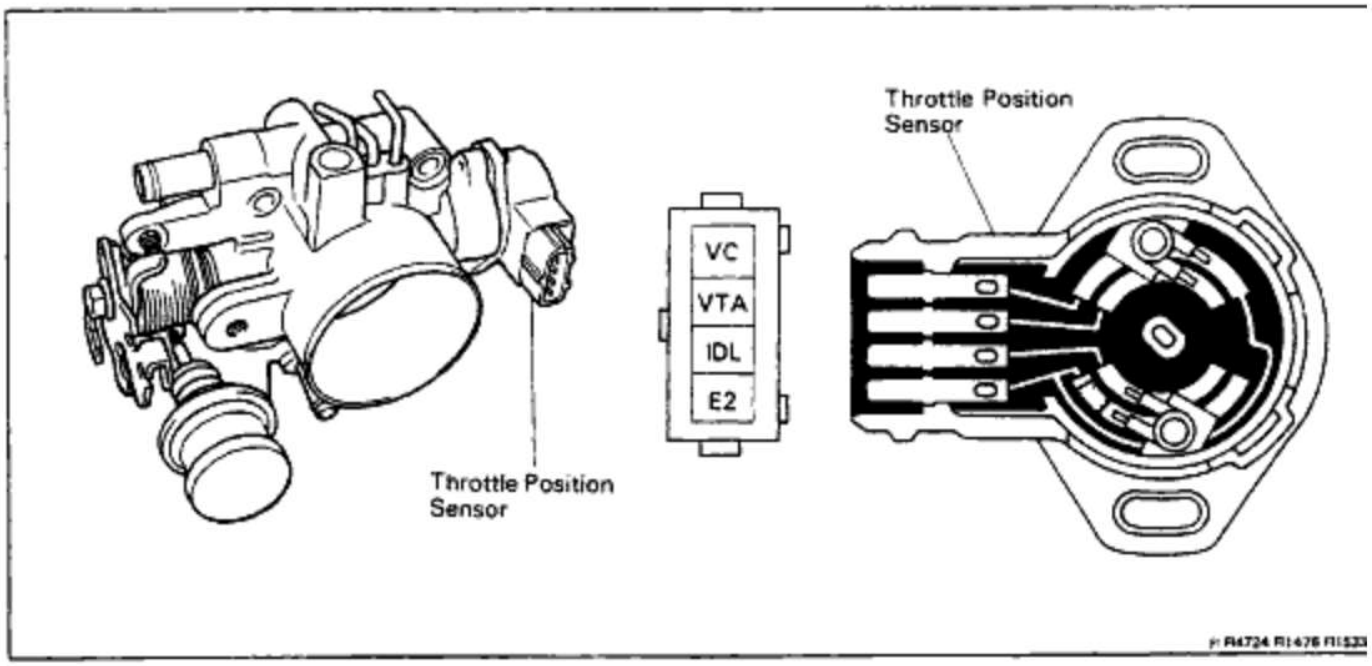
Clearance between fever and stop screw	Continuity (IDL – E2)
0.50 mm (0.020 in.)	Continuity
0.70 mm (0.028 in.)	No continuity



INSTALLATION OF THROTTLE BODY

(See page FI –109)

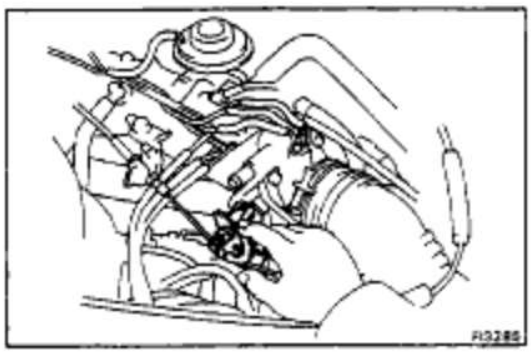
Throttle Body (2VZ–FE)



ON–VEHICLE INSPECTION

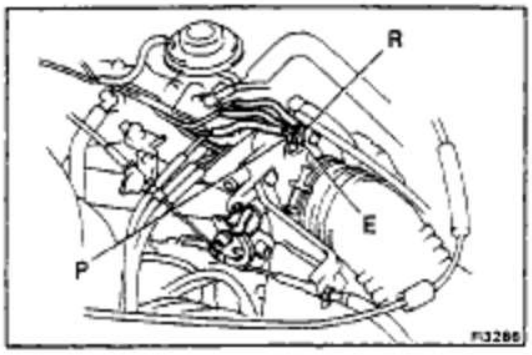
1. INSPECT THROTTLE BODY

(a) Check that the throttle linkage moves smoothly.



(b) Check the vacuum at each port.

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



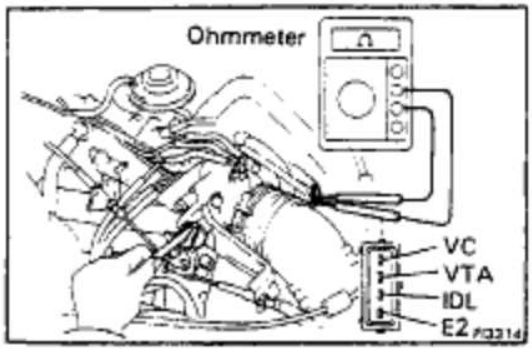
Port name	At idling	Other than idling
P	No vacuum	Vacuum
E	No vacuum	Vacuum
R	No vacuum	Vacuum

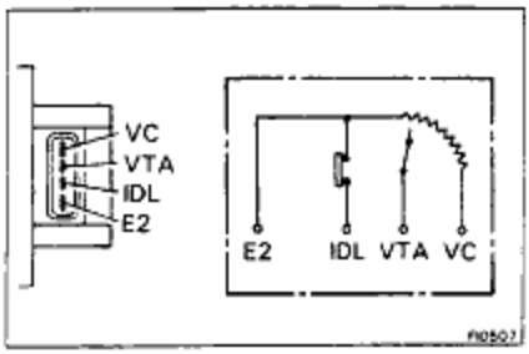
2. INSPECT THROTTLE POSITION SENSOR

(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.





Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA — E2	0.3 — 6.3 kΩ
0.30 mm (0.012 in.)	IDL — E2	2.3 kΩ or less
0.70 mm (0.028 in.)	IDL — E2	Infinity
Throttle valve fully opened	VTA — E2	3.5 — 10.3 kΩ
—	VC — E2	4.25 — 8.25 kΩ

(d) Reconnect the sensor connector.

REMOVAL OF THROTTLE BODY

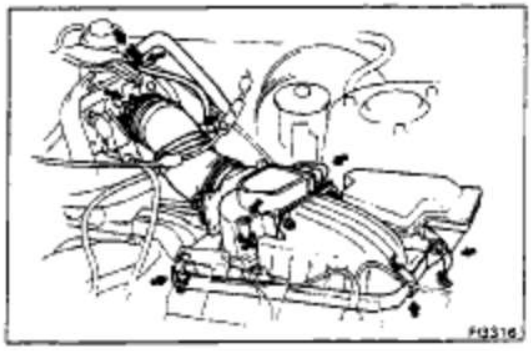
1. DRAIN ENGINE COOLANT (See page CO–5)

2. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

4. REMOVE AIR CLEANER CAP, AIR FLOW METER AND AIR CLEANER HOSE



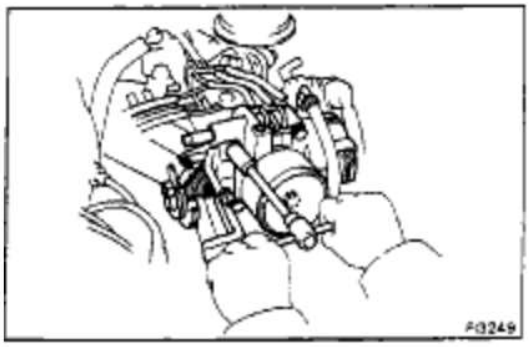
(a) Disconnect the air flow meter connector.
(b) Disconnect the air hoses.
(c) Loosen the air cleaner hose clamp bolt.
(d) Disconnect the air cleaner cap clips.
(e) Remove the air cleaner cap, air flow meter and air cleaner hose assembly.

5. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

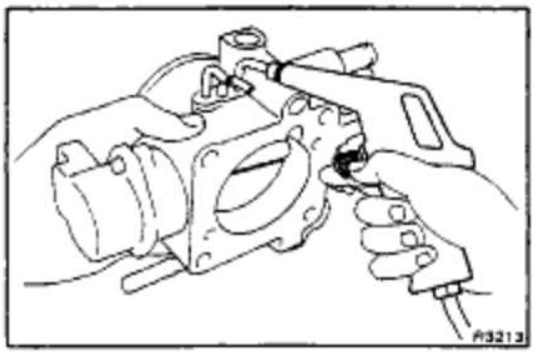
6. REMOVE THROTTLE BODY

(a) Disconnect the following hoses:
- PCV hose
- Water by–pass hoses
- Emission control vacuum hoses

(b) (A/T)
Remove the two bolts and throttle cable bracket.



(c) Remove the four (M/T) or three (A/T) bolts, throttle body and gasket.



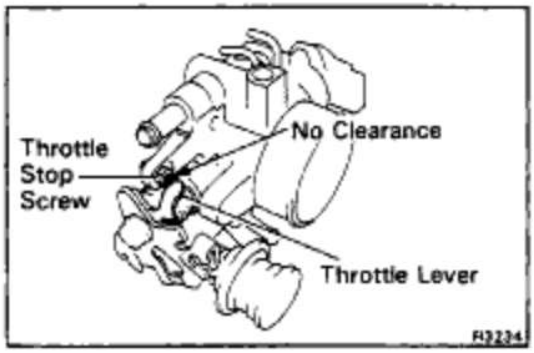
INSPECTION OF THROTTLE BODY

1. CLEAN THROTTLE BODY

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

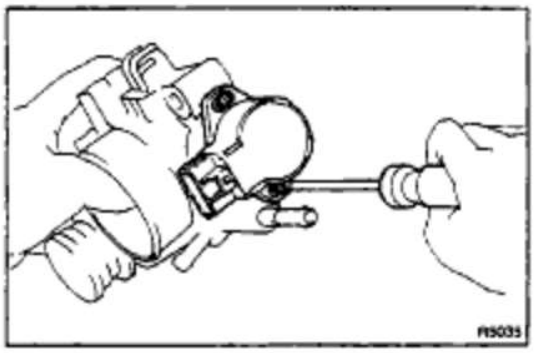
(b) Using compressed air, clean all the passages and apertures.

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.

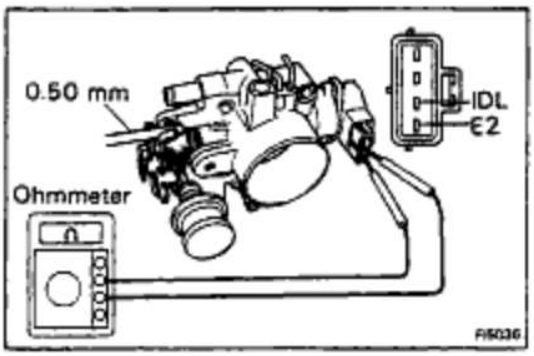


3. INSPECT THROTTLE POSITION SENSOR

(See step 2 on page FI–112)

4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

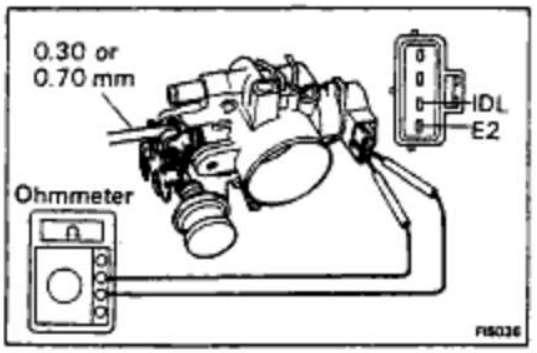
(a) Loosen the two set screws of the sensor.



(b) Insert a 0.50 mm (0.020 in.) feeler gauge, between the throttle stop screw and stop lever.

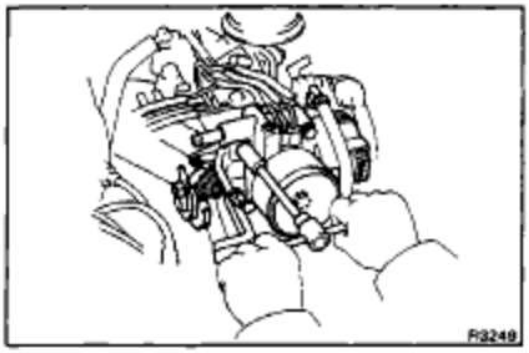
(c) Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.

(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)
0.30 mm (0.012 in.)	Continuity
0.70 mm (0.028 in.)	No continuity



INSTALLATION OF THROTTLE BODY

1. INSTALL THROTTLE BODY

(a) Install a new gasket and the throttle body with the four (M/T) or three (A/n bolts.

Torque: 130 kg–cm (9 ft–lb, 13 N–m)

(b) (A/T)

Install the throttle cable bracket with the two bolts.

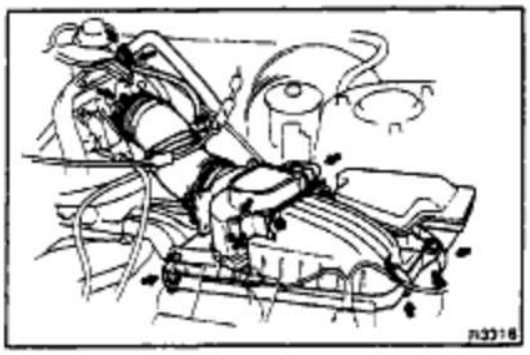
Torque: 130 kg–cm (9 ft–lb, 13 N–m)

(c) Connect the following hoses:

- PCV hose
- Water by–pass hoses
- Emission control vacuum hoses

2. CONNECT THROTTLE POSITION SENSOR CONNECTOR

3. INSTALL AIR CLEANER CAP, AIR FLOW METER AND AIR CLEANER HOSE



(a) Connect the air cleaner hose, and install the air cleaner cap and air flow meter with the four clips.

(b) Tighten the air cleaner hose clamp bolt.

(c) Connect the air hoses.

(d) Connect the air flow meter connector.

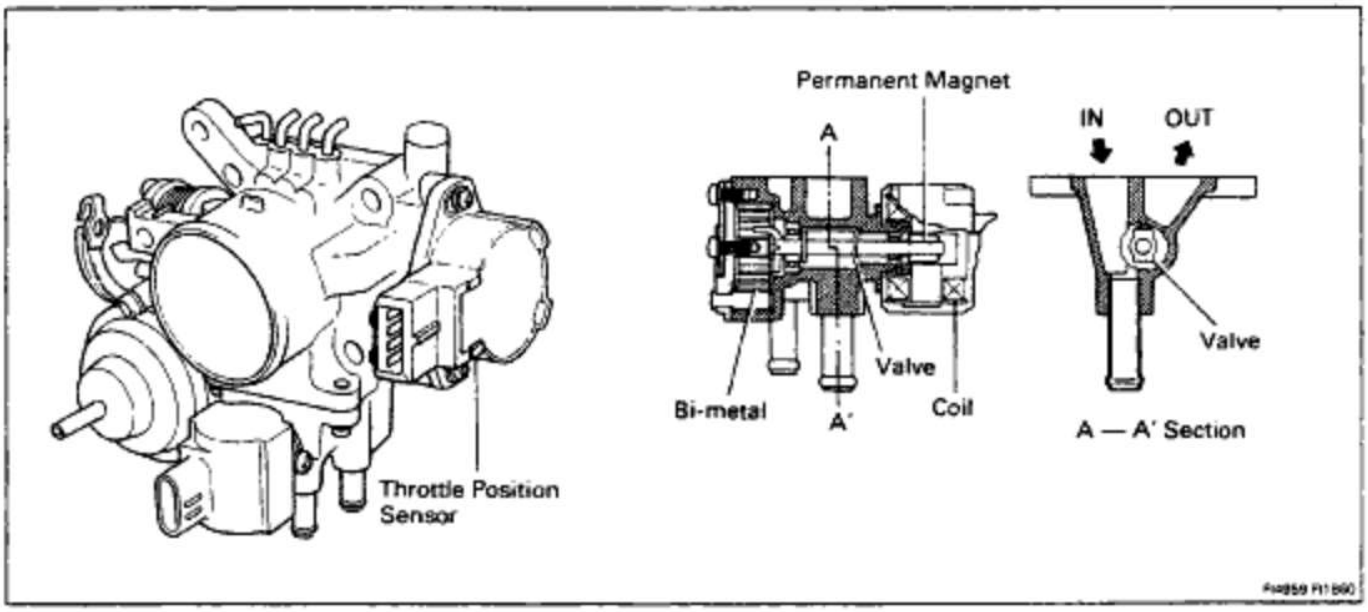
4. CONNECT ACCELERATOR CABLE, AND ADJUST IT

5. (A/T)

CONNECT THROTTLE CABLE, AND ADJUST IT

6. FILL WITH ENGINE COOLANT (See page CO–5)

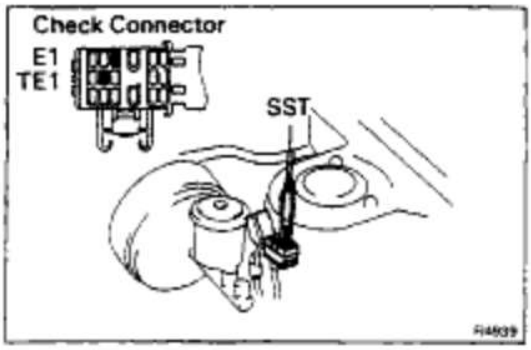
Idle Speed Control (ISC) Valve (3S–FE)



ON–VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

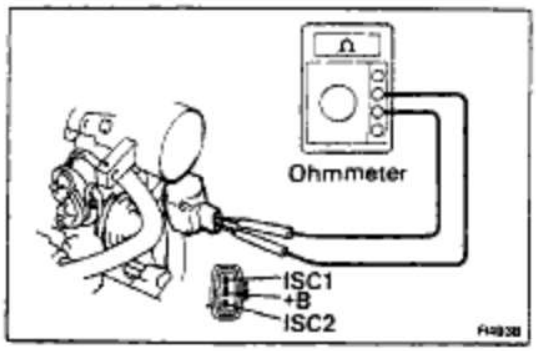
(a) Initial conditions:
- Engine at normal operating temperature
- Idle speed set correctly
- Transmission in ”N” range



(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 the service wire.



2. INSPECT ISC VALVE RESISTANCE

(a) Disconnect the ISC valve connector.

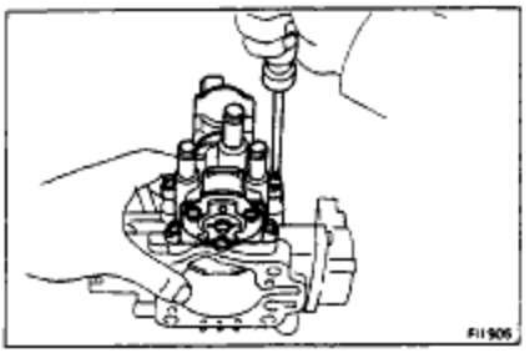
(b) Using an ohmmeter, measure the resistance between terminal +B and other terminals (ISC1, ISC2).
Resistance: 16.0 – 17.0)
If the resistance is not as specified, replace the ISC valve.

(c) Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

1. REMOVE THROTTLE BODY

(See steps 1 to 7 on page FI–107)



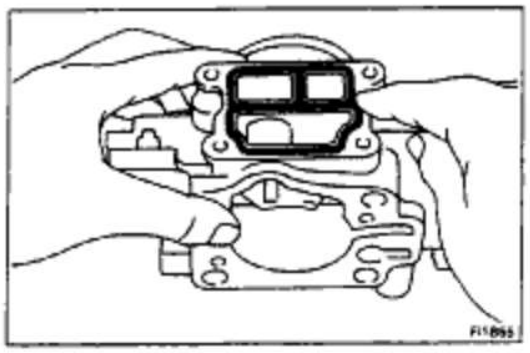
2. REMOVE ISC VALVE

Remove the four screws, ISC valve and gasket.

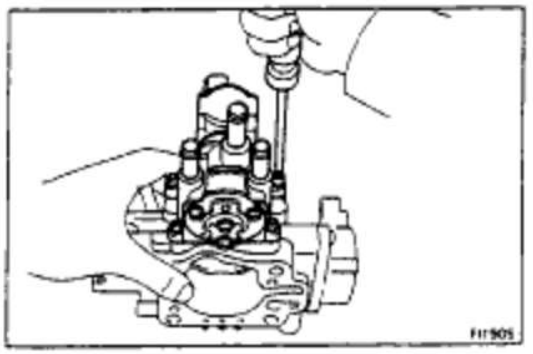
INSTALLATION OF ISC VALVE

1. INSTALL ISC VALVE

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



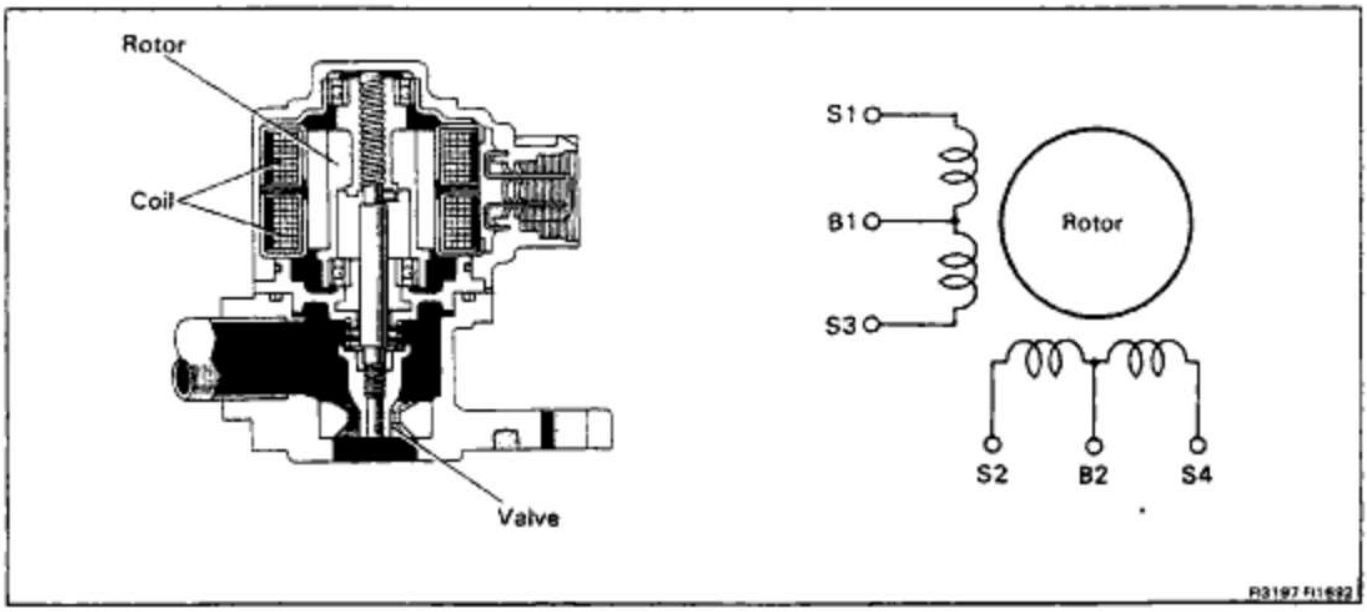
(b) Install the ISC valve with the four screws.



2. INSTALL THROTTLE BODY

(See steps 2 to 8 on page FI–109)

Idle Speed Control (ISC) Valve (2VZ–FE)

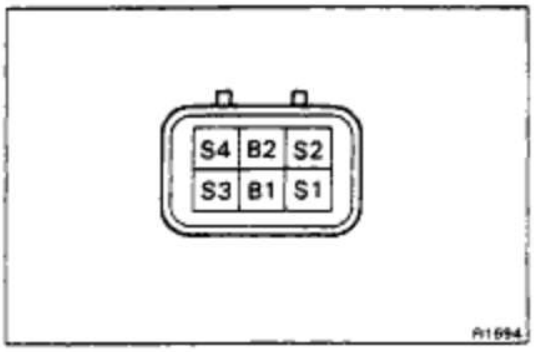




ON–VEHICLE INSPECTION

1. CHECK FOR OPERATING SOUND FROM ISC VALVE

Check that there is a clicking sound immediately stopping the engine.



2. INSPECT ISC VALVE RESISTANCE

(a) Disconnect the ISC valve connector.

(b) Using an ohmmeter, measure the resistance between terminal 131 – S1 or S3, and B2 – S2 or S4.

Resistance: B1 – S1 or S3 10 – 30)
B2 – S2 or S4 10 – 30)

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

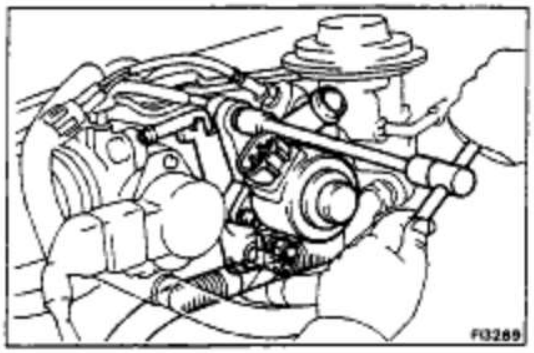
(c) Reconnect the ISC valve connector.

REMOVAL OF ISC VALVE

1. DRAIN ENGINE COOLANT (See page CO–5)

2. DISCONNECT ISC VALVE CONNECTOR

3. DISCONNECT AIR HOSE AND TWO WATER BY–PASS HOSES



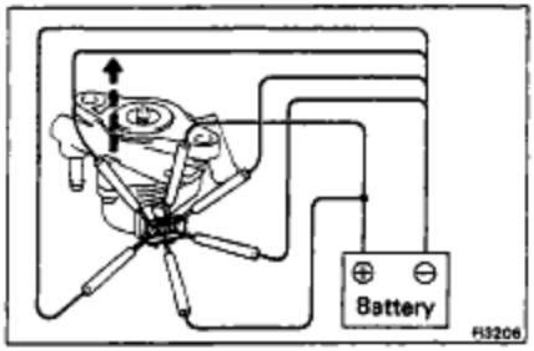
4. REMOVE ISC VALVE

(a) Remove the nut, and disconnect the wire harness clamp.

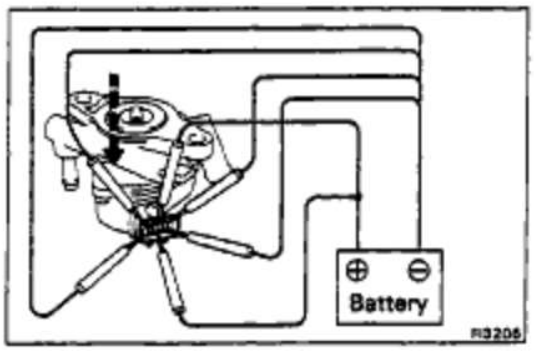
(b) Remove the two bolts, ISC valve and gasket.

INSPECTION OF ISC VALVE

INSPECT ISC VALVE OPERATION



(a) Apply battery voltage to terminals 81 and B2, and while repeatedly grounding S1 – S2 – S3 – S4 – S1 in sequence, check that the valve moves to¿¿rd the closed position.

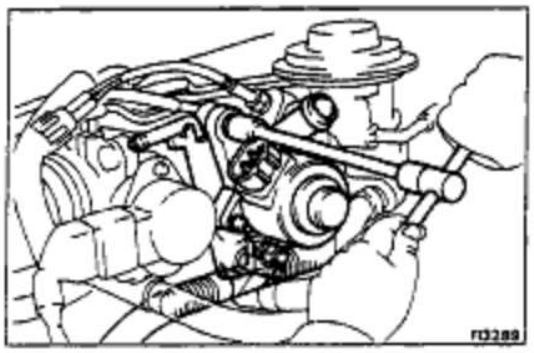


(b) Apply battery voltage to terminals 81 and 82, and while repeatedly grounding S4 – S3 S2 – S 1 – S4 in sequence, check that the valve moves toward the open position.

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

INSTALLATION OF ISC VALVE

1. INSTALL ISC VALVE



(a) Install a new gasket and the ISC valve with the two bolts.

Torque: 130 kg–cm (9 ft–lb, 13 N–m)

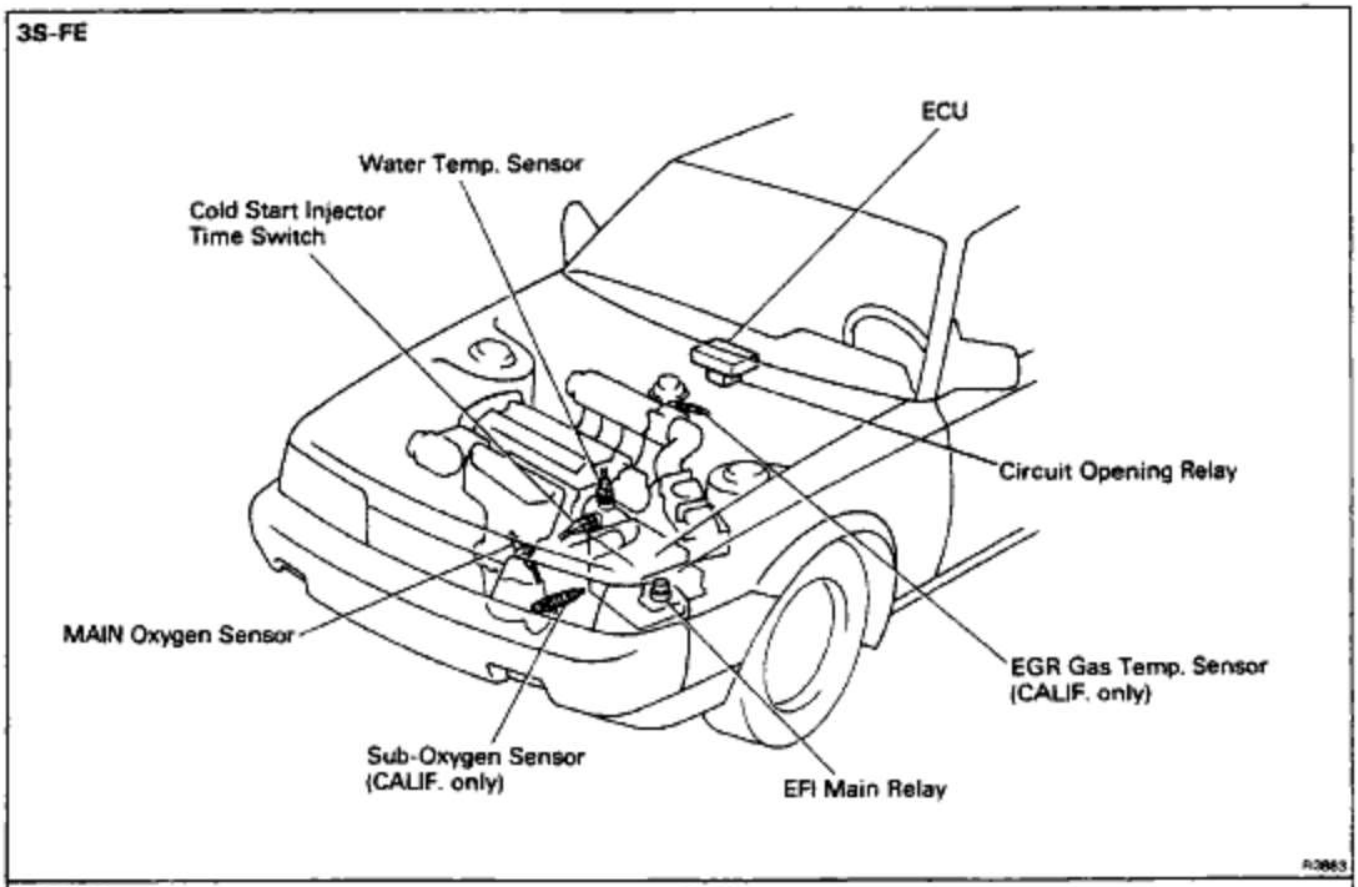
(b) Connect the wire harness clamp with the nut.

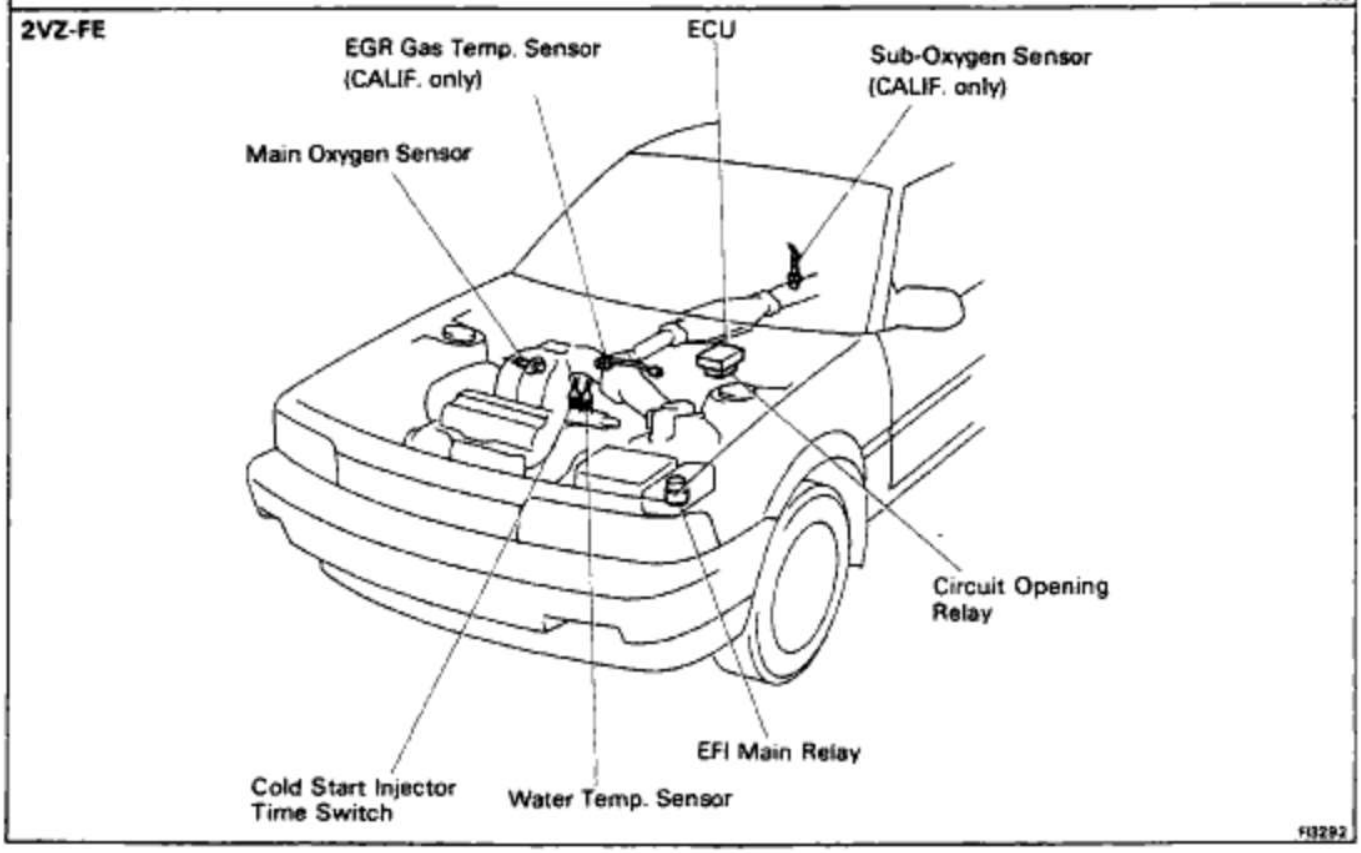
2. CONNECT TWO WATER BY–PASS HOSES AND AIR HOSE

3. CONNECT ISC VALVE CONNECTOR

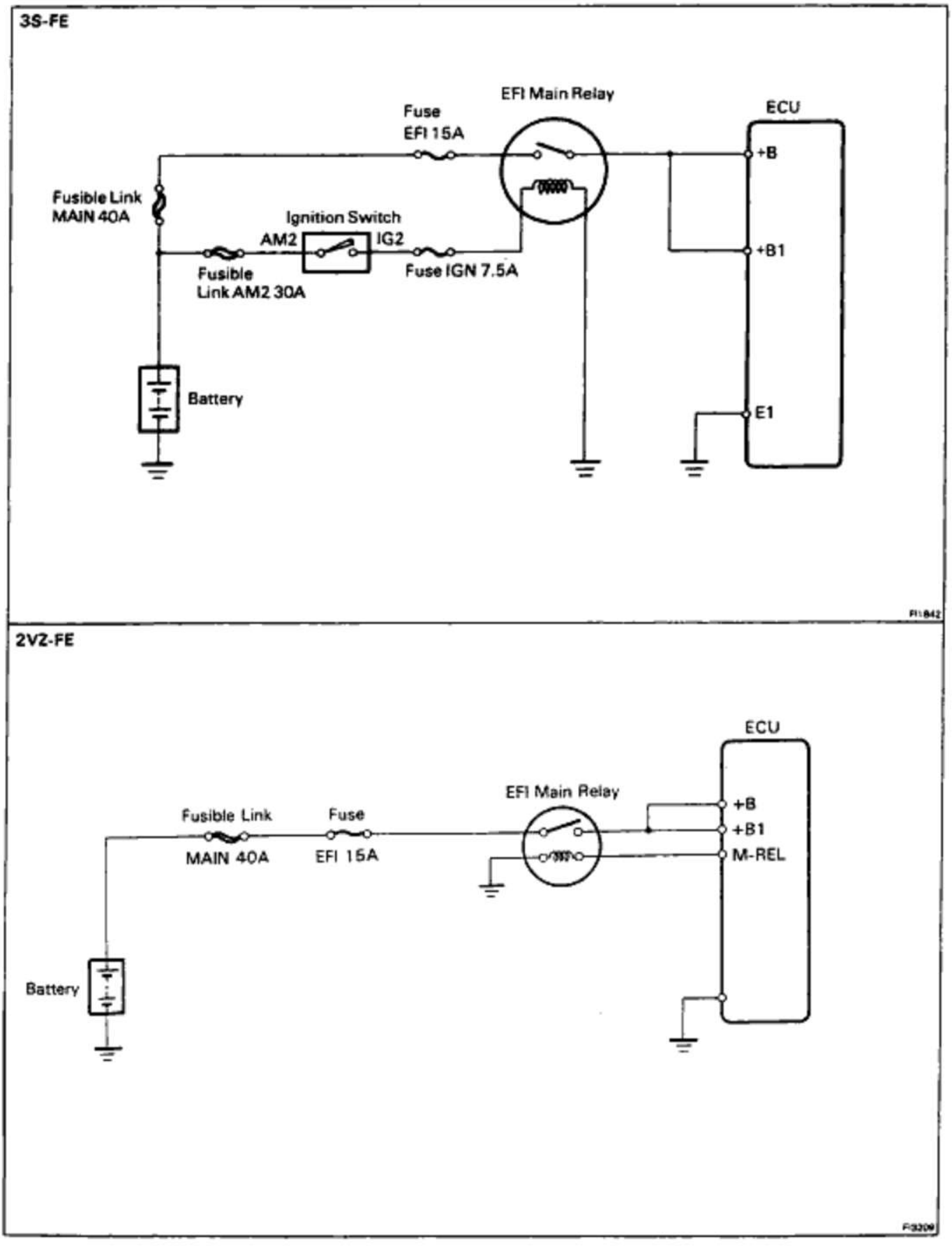
4. FILL WITH ENGINE COOLANT (See page CO–5)

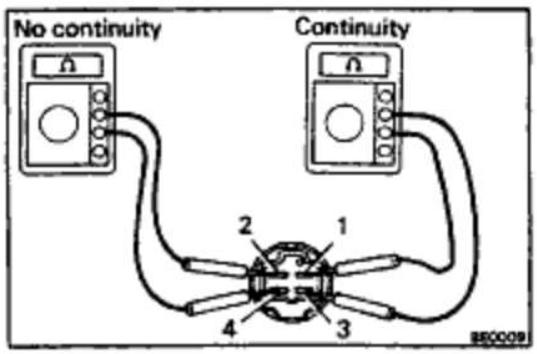
ELECTRONIC CONTROL SYSTEM
Location of Electronic Control Parts





EFI Main Relay





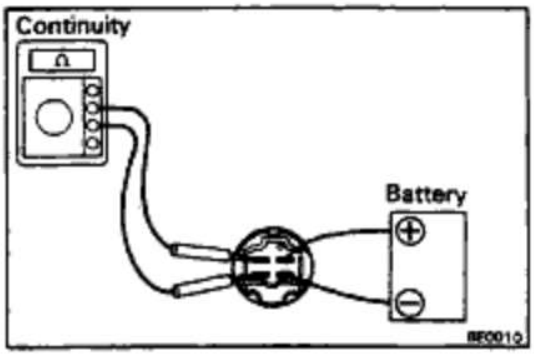
INSPECTION OF EFI MAIN RELAY

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.



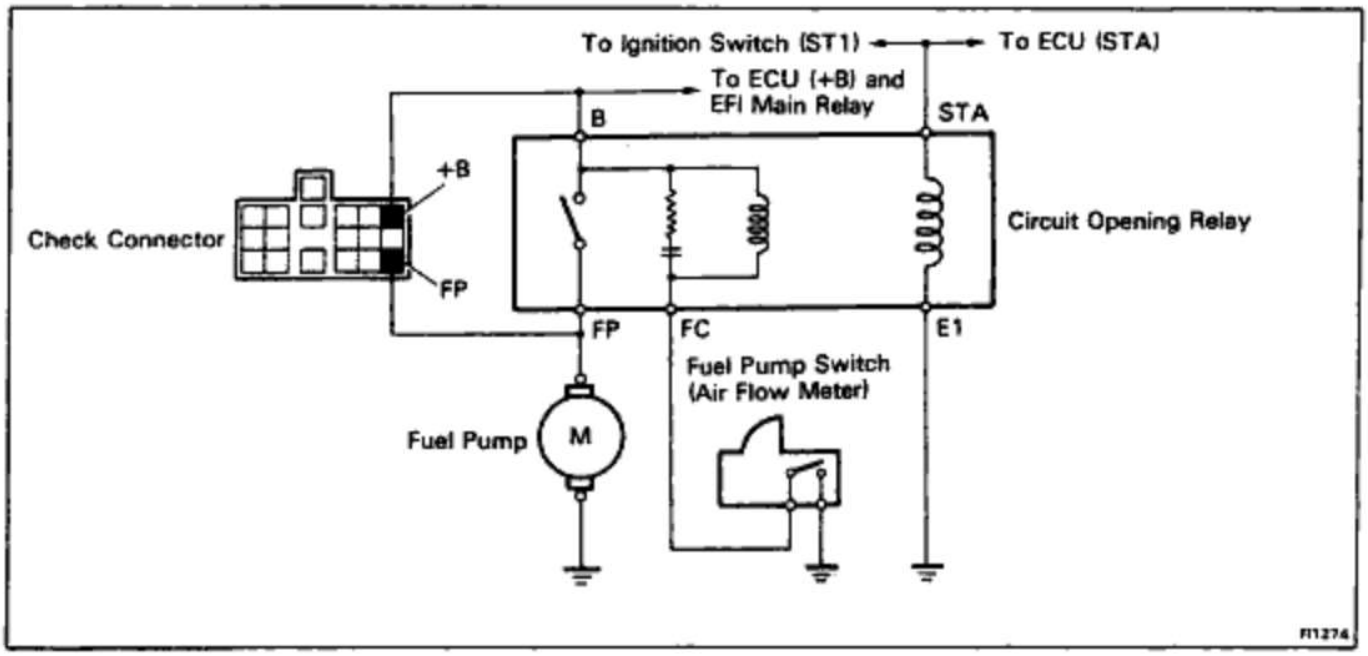
2. INSPECT RELAY OPERATION

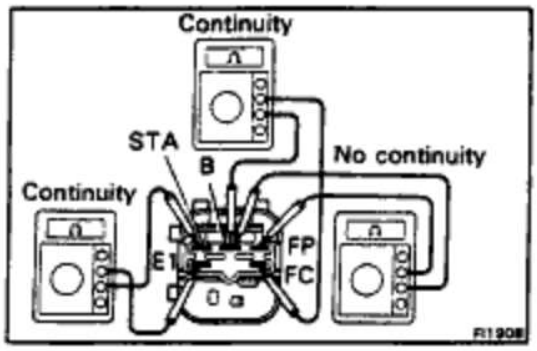
(a) Apply battery voltage across terminals 1 and 3.

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

If operation is not as specified, replace the relay.

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.

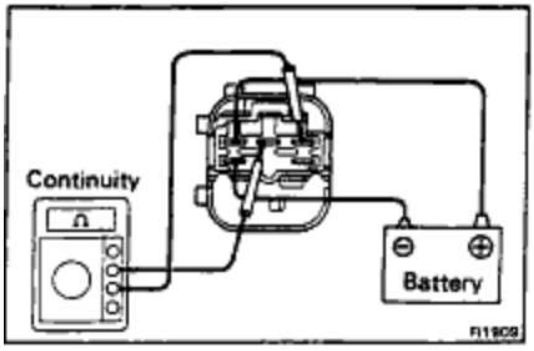
(c) Check that there is no continuity between terminals B and FP.

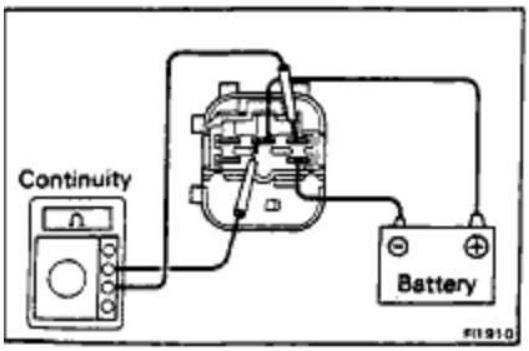
If continuity is not as specified, replace the relay.

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.



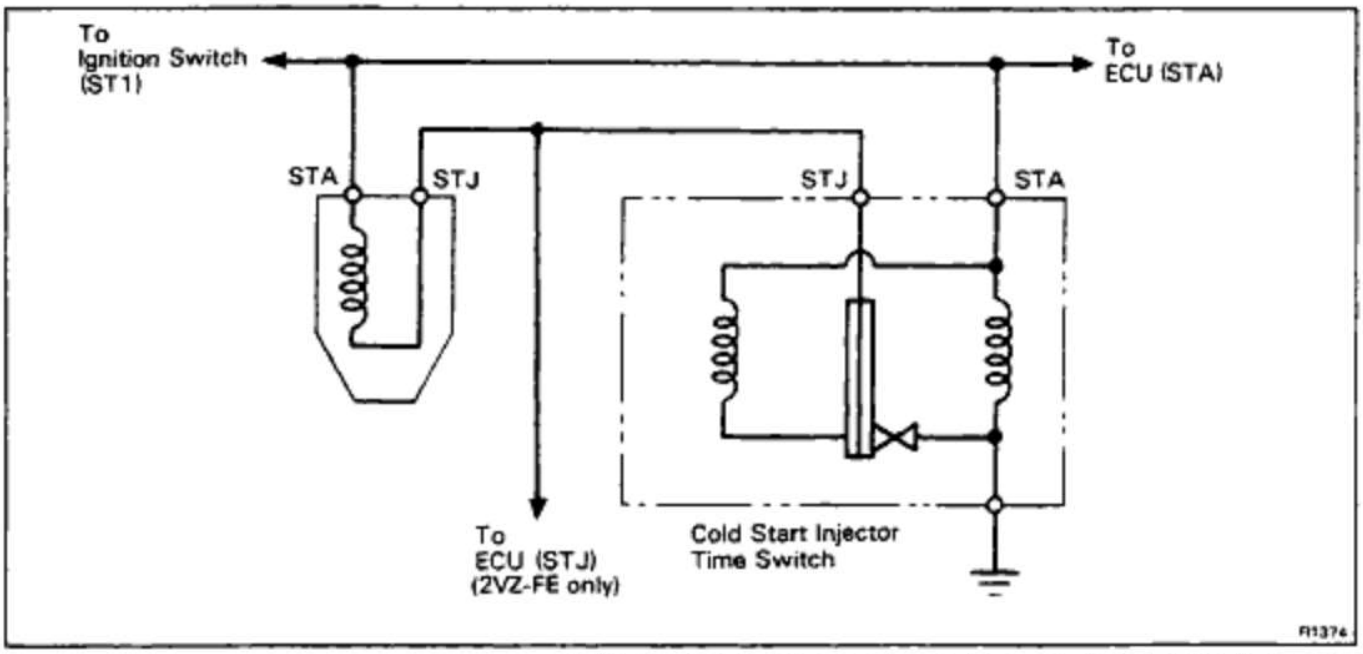


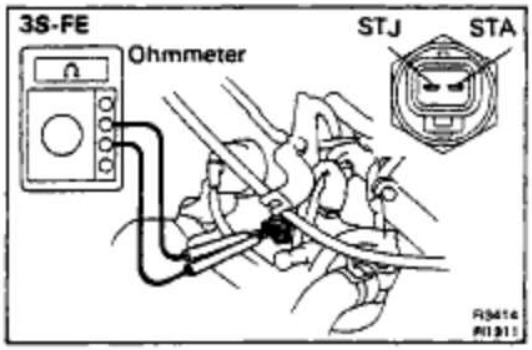
(c) Apply battery voltage across terminals B and FC.

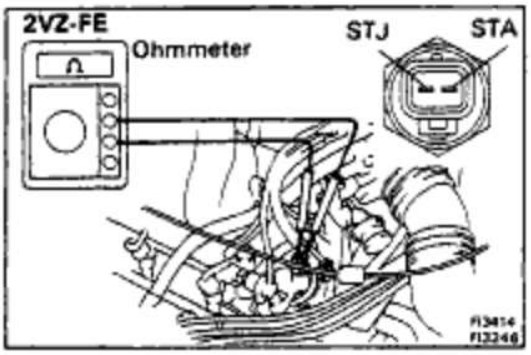
(d) Check that there is continuity between terminals B and FP.

If operation is not as specified, replace the relay.

Cold Start Injector Time Switch







INSPECTION OF COLD START INJECTOR TIME SWITCH

INSPECT RESISTANCE OF COLD START INJECTOR TIME SWITCH

Using an ohmmeter, measure the resistance between each terminal.

Resistance:

3S–FE STA – STJ

20 – 40Ω below 30°C (86°F)
40 – 60) above 40°C (I04°F)

STA – Ground

20 – 80)

2VZ–FE STA – STJ

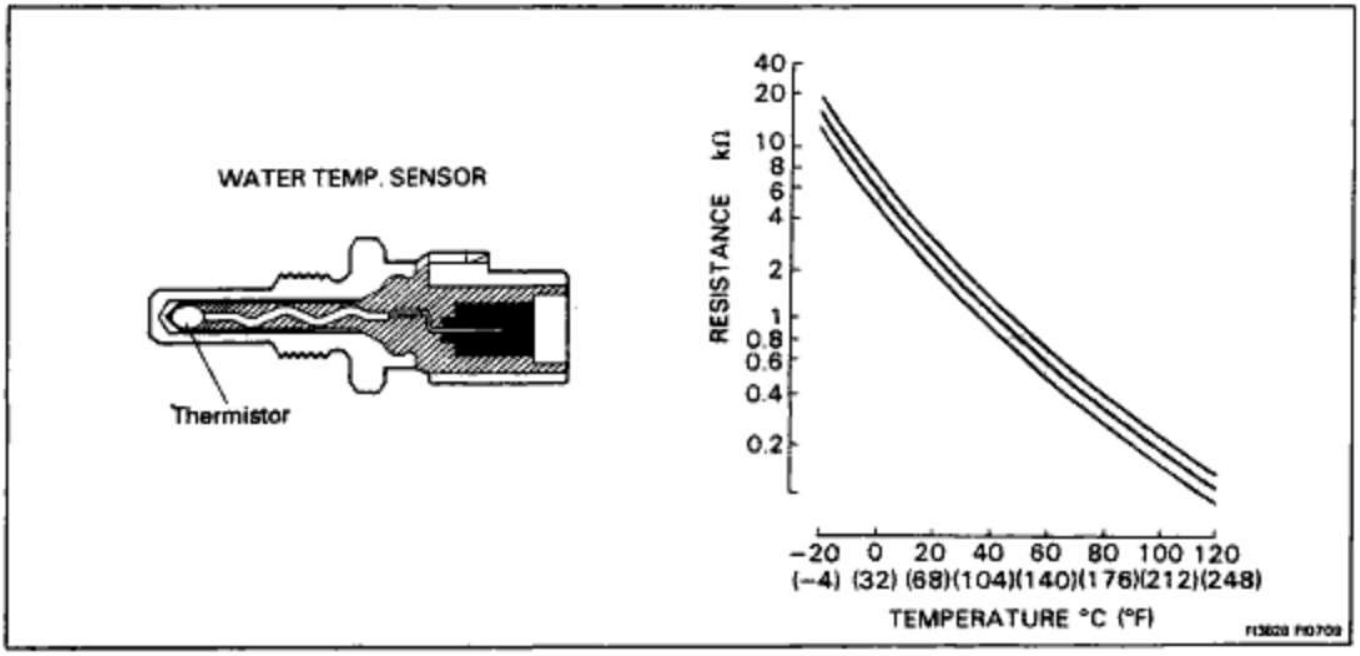
25 – 45) below 15°C (59°F)
65 – 85) above 30°C (86°F)

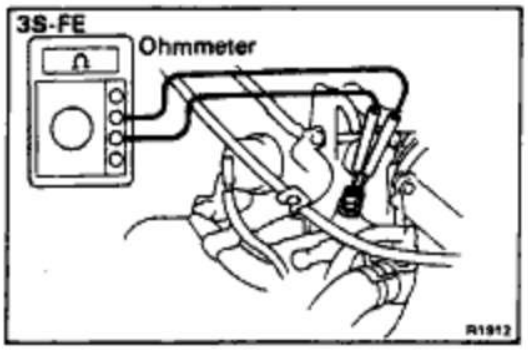
STA – Ground

25 – 85)

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

Water Temperature Sensor





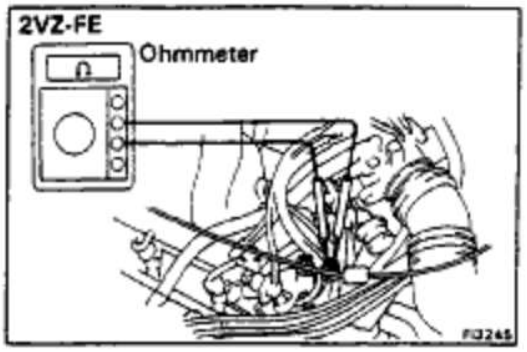
INSPECTION OF WATER TEMPERATURE SENSOR

INSPECT RESISTANCE OF WATER TEMPERATURE SENSOR

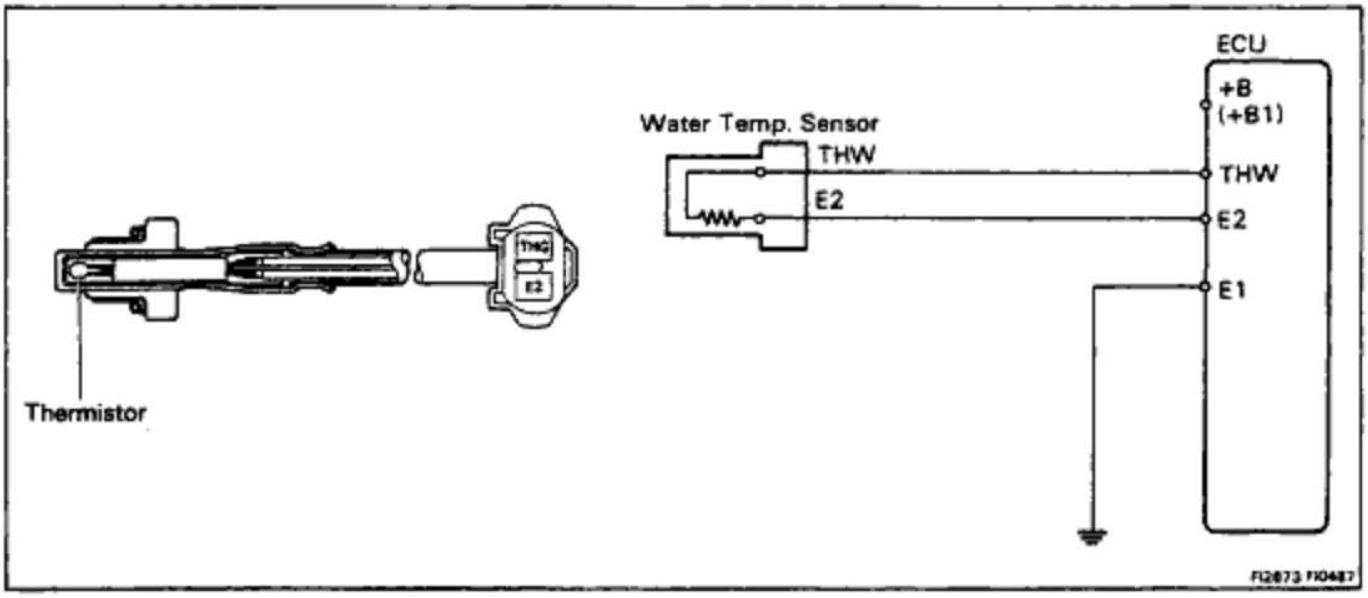
Using an ohmmeter, measure the resistance between the terminals.

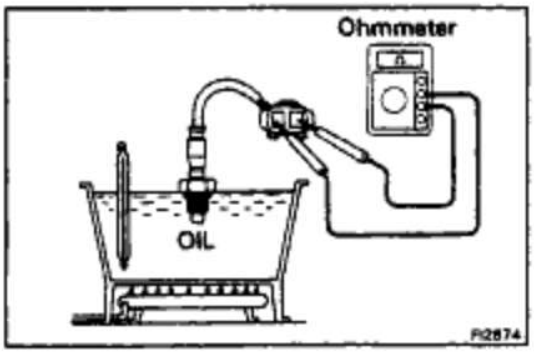
Resistance: Refer to chart

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



EGR Gas Temperature Sensor (CALIF. only)





INSPECTION OF EGR GAS TEMPERATURE SENSOR

INSPECT EGR GAS TEMPERATURE SENSOR

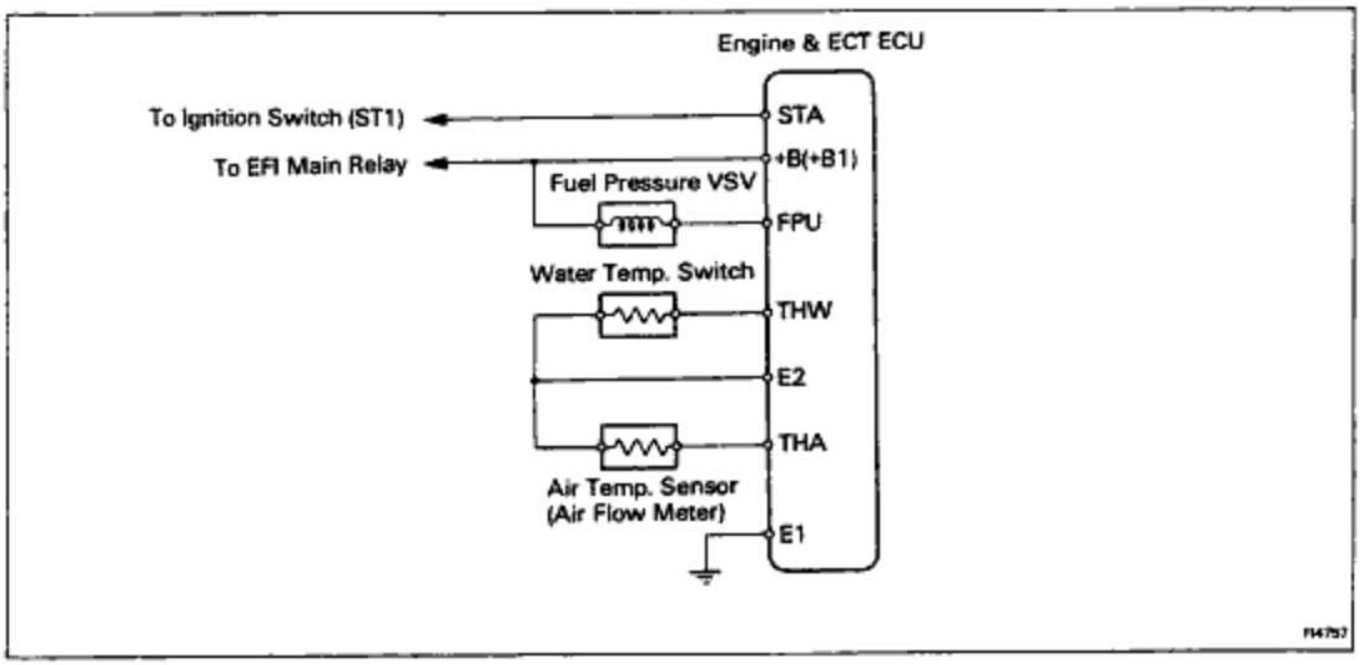
Using an ohmmeter, measure the resistance between the terminals.

Resistance:

69.40 – 88.50 kΩ at 50° C (11210 F)
11.89 –14.37 kΩ at 100° C (212° F)
2.79 – 3.59 k) at 150° C (302° F)

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

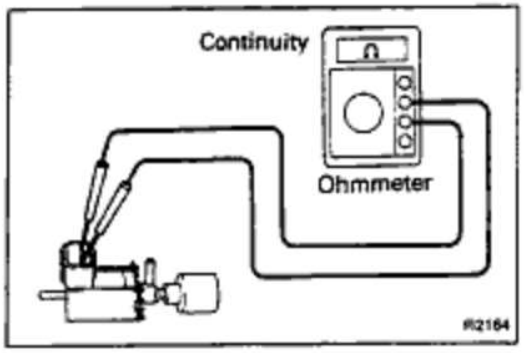
Fuel Pressure Control System



INSPECTION OF FUEL PRESSURE CONTROL SYSTEM.

1. INSPECT WATER TEMPERATURE SENSOR
(See page FI–49)

2. INSPECT INTAKE AIR TEMPERATURE SENSOR
(See page FI–37)



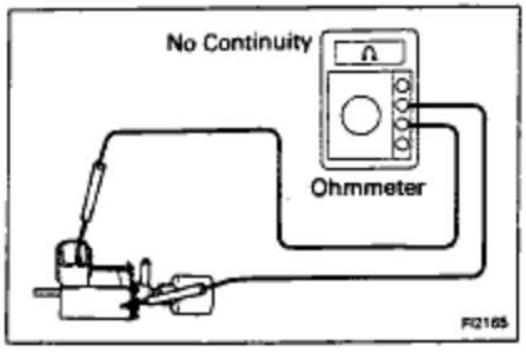
3. INSPECT FUEL PRESSURE VSV

A. Inspect VSV for open circuit.

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

Resistance (Cold): 33 – 39)

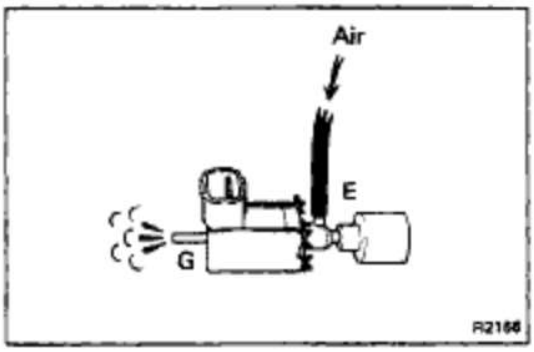
If there is no continuity, replace the VSV.



B. Inspect VSV for ground.

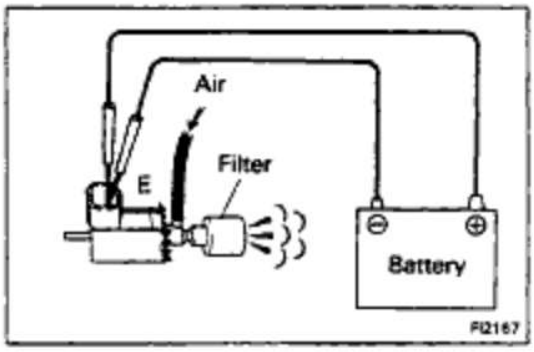
Using an ohmmeter, check that there is no continuity between each terminal and body.

If there is continuity, replace the VSV.



C. Inspect VSV operation

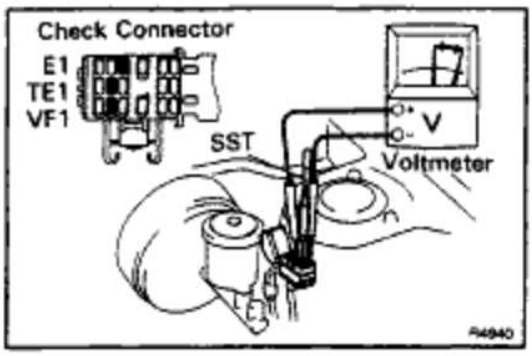
(a) Check that air flow from pipes E to G.



(b) Apply battery voltage across the terminals

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

If operation is not as specified, replace the VSV.



Main Oxygen Sensor

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:

Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 90 seconds.

Connect terminals TE1 and E1 of the check connector. And maintain engine speed at 2,500 rpm.

Replace the ECU.

Zero again

After replacing the oxygen sensor

Check the number of times the voltmeter needle fluctuates in 10 seconds.

Less than 8 times

8 times or more

Zero

Normal

Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 90 seconds. And maintain engine at 2,500 rpm.

8 times of more

Check the number of times the voltmeter needle fluctuates in 10 seconds.

Zero

Less than 8 times

Disconnect terminals TE1 and E1 of the check connector. And maintain engine speed at 2,500 rpm.

Measure voltage between terminals VF 1 and E 1.

0 V

More than 0 V

Read and record diagnostic codes. (See page FI–25 or 27)

Normal code, code Nos. 21, 25 and 26

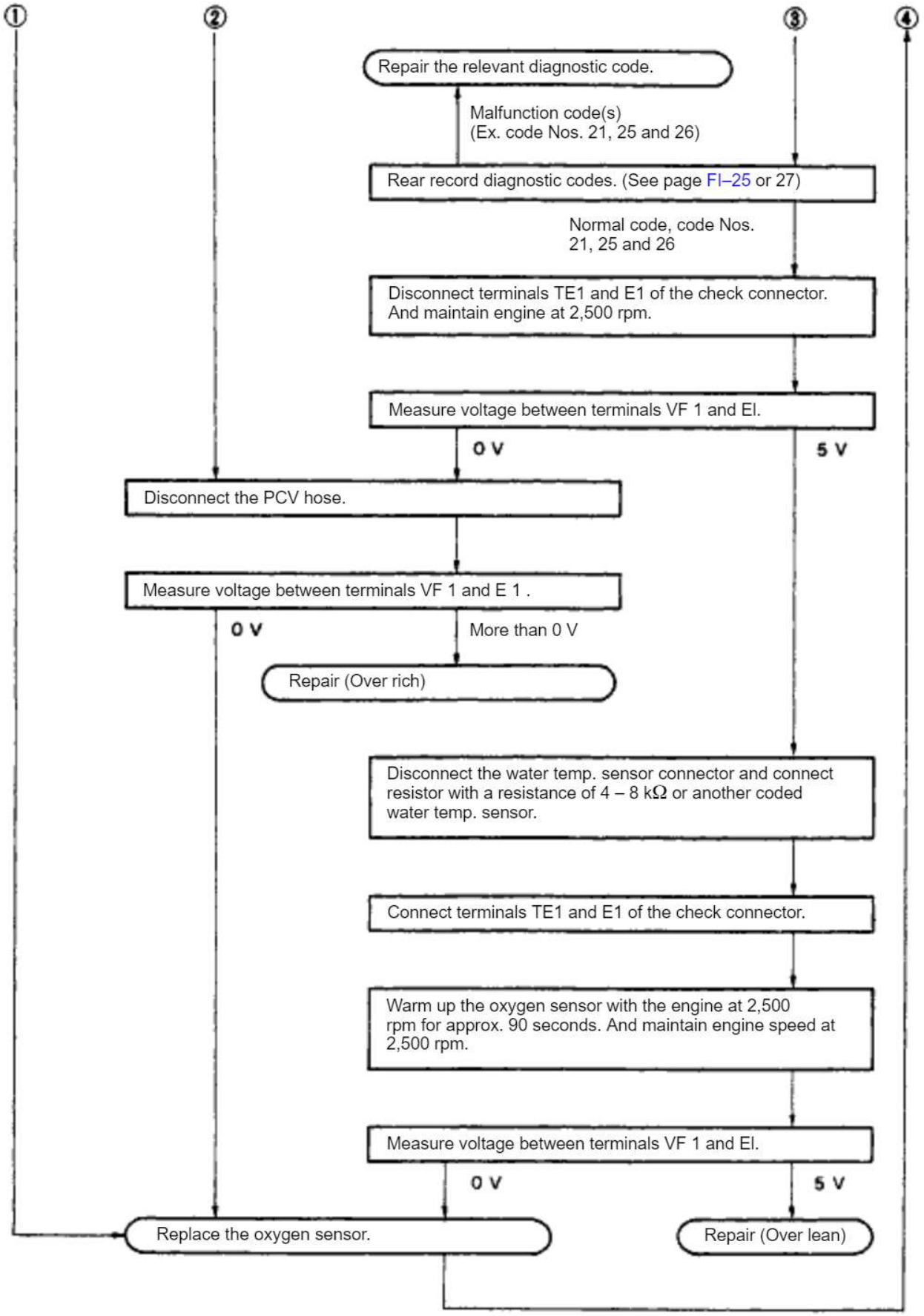
Malfunction code(s) (Ex. code Nos. 21, 25 and 26y

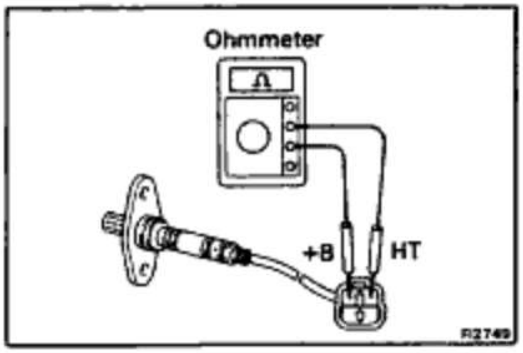
Repair the relevant diagnostic code.

① ② ③ ④

CONTINUED ON PAGE FI–30

CONTINUED FROM PAGE FI–129





3. (2VZ–FE)

INSPECT HEATER RESISTANCE OF OXYGEN SENSOR

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

Resistance (Cold): 5.1 6.3) at 20˚C (68˚F)

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

Sub–Oxygen Sensor (CALIF. only)

INSPECTION OF SUB–OXYGEN SENSOR

INSPECT SUB–OXYGEN SENSOR

HINT: Inspect only when code No.27 is displayed.

(a) Diagnostic code cancellation.

(See page FI–24)

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

(a) (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.

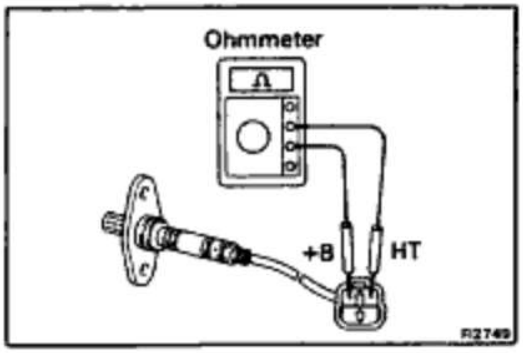
(d) Following the conditions in step (e), press fully on the accelerator pedal for 2 seconds or more.

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 suboxygen sensor.



3. (2VZ–FE)

INSPECT HEATER RESISTANCE OF OXYGEN SENSOR

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

Resistance (Cold): 5.1 6.3) at 20˚C (68˚F)

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

Sub–Oxygen Sensor (CALIF. only)

INSPECTION OF SUB–OXYGEN SENSOR

INSPECT SUB–OXYGEN SENSOR

HINT: Inspect only when code No.27 is displayed.

(a) Diagnostic code cancellation.

(See page FI–24)

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

(a) (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 (e), 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 suboxygen sensor.

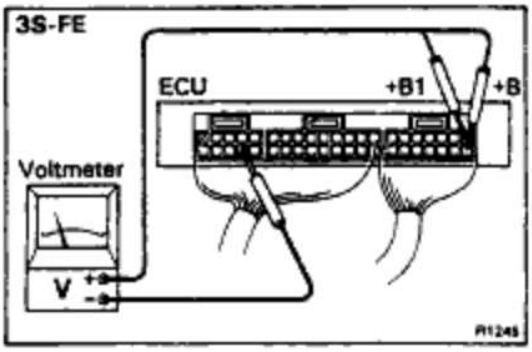
Electronic Controlled Unit (ECU)

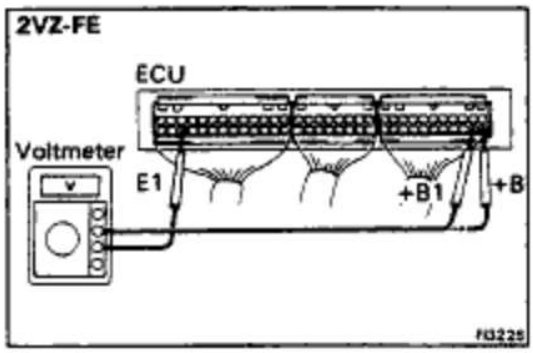
INSPECTION OF ECU

HINT: The EFI circuit can be checked by measuring the resistance and voltage at the wiring connectors of the ECU.

1. (2VZ–FE)

PREPARATION (See page FI–50)





2. INSPECT VOLTAGE OF ECU

Check the voltage between each terminal of the wiring connectors.

- Turn the ignition switch ON.
- Measure the voltage at each terminal.

HINT:

- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is ON.

Voltage at ECU Wiring Connectors (3S–FE)

Terminals	Condition		STD voltage (V)
+B, +B1 — E1	1G SW ON		10 — 14
BATT — E1	—		10 — 14
*1IDL — E1	IG SW ON	Throttle valve open	8 — 14
*1PSW — E1		Throttle valve fully closed	4 — 6
*2IDL — E2		Throttle valve open	8 — 14
*2VTA — E2		Throttle valve fully closed	0.1 — 1.0
		Throttle valve open	4 — 6
VC — E2			4 — 6
VS — E2		Measuring plate fully closed	4.0 — 5.5
		Measuring plate fully open	0 — 1
	Idling		2.0 — 4.0
	3,000 rpm		1.0 — 2.0
No.10, No.20 — E01, E02	IG SW ON		10 — 14
THA — E2	IG SW ON	Intake air temp. 20°C (68°F)	1 — 3
THW — E2		Coolant temp. 80°C (1 760F)	0.1 — 1.0
STA — E1	Cranking		6 — 14
IGT — E1	Cranking or idling		0.7 — 1.0
ISC1, ISC2 — E1	IG SW ON		9 — 14
W — E1	No trouble ("CHECK" engine warning light off) and engine running		10 — 14
*3A/C — E1	IG SW ON	Air conditioning ON	8 — 14
*3ACT — E1		Heater blower SW ON	4 — 6
T — E1		Check connector TE1 – E1 not connected	10 — 14
		Check connector TE 1 – E 1 connected	0.5 or less
NSW — E1		Shift position P or N range	0 — 2
		Ex. shift position P or N range	6 — 14
STP — E1	Stop light SW 4N (Brake pedal depressed) or defogger SW ON		10 — 14

ECU Terminals

*1 w/o ECT
*2 w/ ECT
*3 w/ A/C

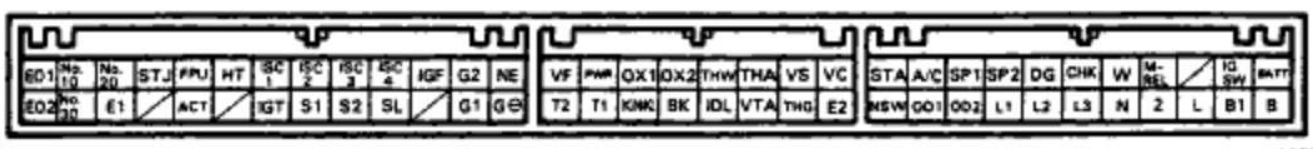


Voltage at ECU Wiring Connectors (2VZ–FE)

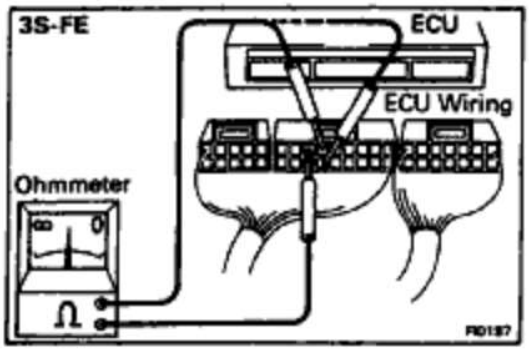
Terminals	Condition		Sm voltage (V)
BATT — E1			10 — 14
IG SW — E1	IG SW ON		
M-REL — E1			
+B, +B1 — E1			
IDL — E2	1G SW ON	Throttle valve open	4 — 6
VTA — E2		Throttle valve fully closed	0.1 — 1.0
		Throttle valve open	3.2 — 4.2
VC — E2			4 — 6
VS — E2		Measuring plate fully closed	3.7 — 4.3
		Measuring plate fully open	0.2 — 0.5
	Idling		1.6 — 4.1
	3,000 rpm		1.0 — 2.0
No.10, No.20, No.30 — E01, E02	IG SW ON		10 — 14
THA — E2	IG SW ON	Intake air temp. 20°C (68°F)	1 — 3
THW — E2		Coolant temp. 80°C (176°F)	0.1 — 1.0
STA — E1	Cranking		6 — 14
IGT — E1	Cranking or idling		0.7 — 1.0
ISC1, ISC2, ISC3, ISC4 — E1	IG SW ON		9 — 14
W — E1	No trouble ("CHECK" engine warning light off) and engine running		10 — 14
*1A/C — E1	IG SW ON	Air conditioning ON	8 — 14
*1ACT — E1		Heater blower SW ON	4 — 6
T — E1		Check connector TE1 – E1 not connected	4 — 6
		Check connector TE1 – E1 connected	0.5 or less
*2NSW — E1		Shift position P or N range	0 — 2
		Ex. shift position P or N range	10 — 14
*2BK — E1	Stop light SW ON (Brake pedal depressed)		10 — 14

ECU Terminals

*1 w/ A/C
*2 w/ ECT



FI2796



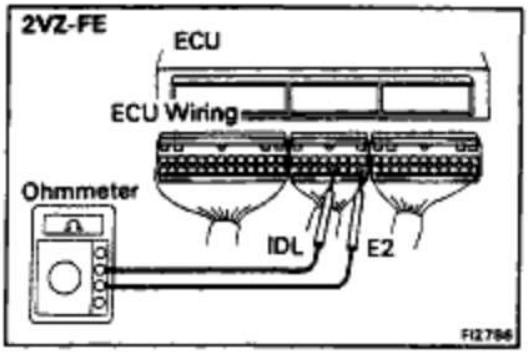
2. INSPECT RESISTANCE OF ECU

NOTICE:

- **Do not touch the ECU terminals.**
- **The tester probe should be inserted into the wiring connector from the wiring side.**

Check the resistance between each terminal of the wiring connectors.

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

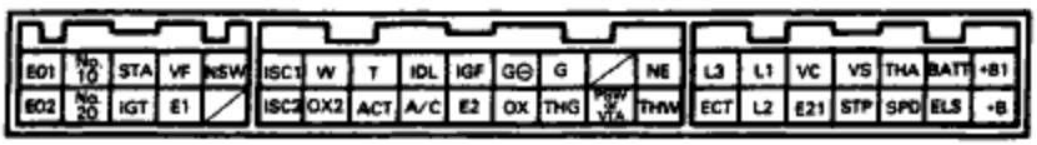


Resistance of ECU Wiring Connectors (3S–FE)

Terminals	Condition	STD resistance ( )
*1IDL — E1	Throttle valve open	Infinity
	Throttle valve fully closed	0
*1PSW — E1	Throttle valve fully open	0
	Throttle valve fully closed	Infinity
*2IDL — E2	Throttle valve open	Infinity
	Throttle valve fully closed	2,300 or less
*2VTA — E2	Throttle valve fully open	3,300 — 10,000
	Throttle valve fully closed	200 — 800
VC — E2	—	3,000 — 7,000
VS — E2	Measuring plate fully closed	200 — 600
	Measuring plate fully open	20 — 1,200
THA — E2	Intake air temp. 20°C (68°F)	2,000 — 3,000
THW — E2	Coolant temp. 80°C (176°F)	200 — 400
G, NE — G⊖	—	140 — 180
ISC1, ISC2 — +B, +B1		16.0 — 17.0

ECU Terminals

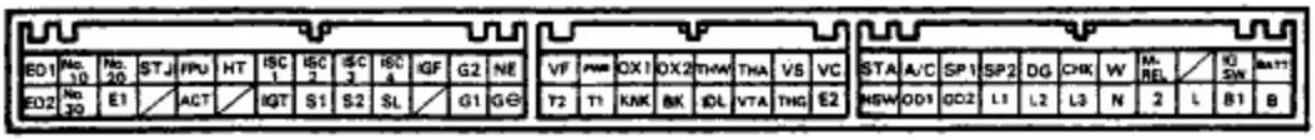
*1 w/o ECT
*2 w/ ECT



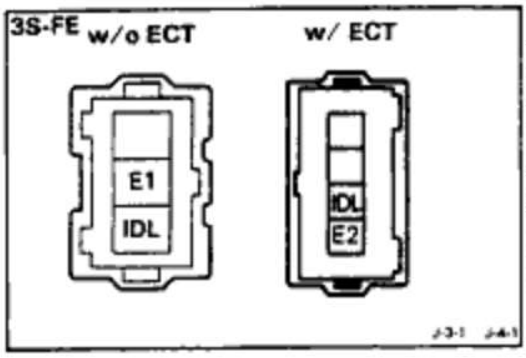
Resistance of ECU Wiring Connectors (2VZ–FE)

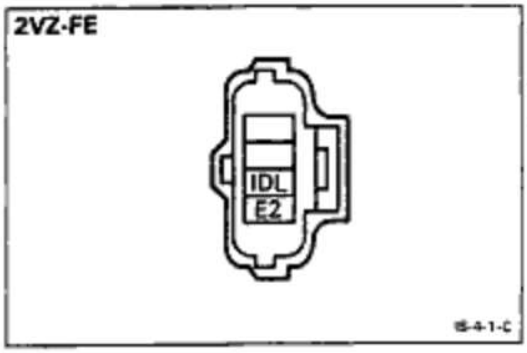
Terminals	Condition	STD resistance ( )
IDL — E2	Throttle valve open	Infinity
	Throttle valve fully closed	2,300 or less
VTA — E2	Throttle valve fully open	3,500 — 10,300
	Throttle valve fully closed	300 — 6,300
VC — E2		200 — 400
VS — E2	Measuring plate fully closed	200 — 600
	Measuring plate fully open	20 — 1,200
THA — E2	Intake air temp. 20°C (68°F)	2,000 — 3,000
THW — E2	Coolant temp. 80°C (176°F)	200 — 400
G1 G2 — G⊖ NE	—	140 — 180
ISC1 ISC2 — +B ISC3 — +B1 ISC4		10 — 30

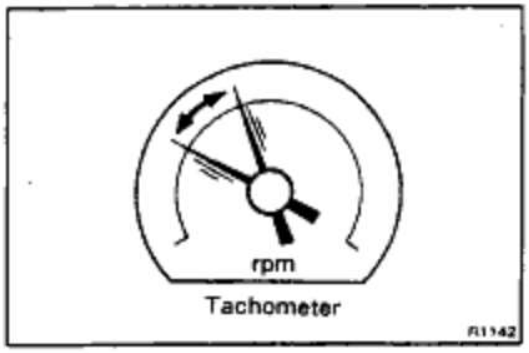
ECU Terminals



F02796







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 (3S–FE (w/o ECT)) or E2 (others) of the wiring connector.

(e) 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–FE 1,500 – 2,100 rpm**
2VZ–FE 1,800 rpm

Fuel return rpm: **3S–FE 1,000 rpm**
2VZ–FE 1,200 rpm