SFI SYSTEM (2AZ–FE)

10068–01

ON–VEHICLE INSPECTION

1. INSPECTION THROTTLE BODY

(a) Inspect the throttle control motor for operating sound.
  (1) Turn the ignition switch ON.
  (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

(b) Inspect the throttle position sensor.
  (1) Connect the hand–held tester or OBD II scan tool to the DLC3.
  (2) Turn the ignition switch ON.
  (3) Check that the check engine warning light does not light up.
  (4) Check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA shown the standard value.

  Standard throttle valve opening percentage:
  60 % or more

2. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) When turning ignition switch ON, check that the voltage of the throttle position sensor of the CURRENT DATA shown the standard value.

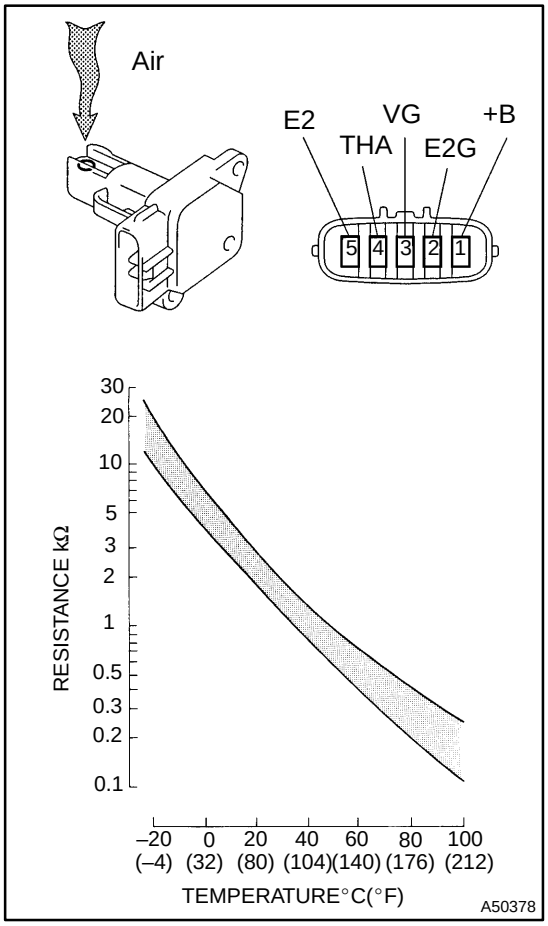
  Standard voltage: 0.6 – 1.0 V

3. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Connect the hand–held tester or OBD II scan tool to the DLC3.
(b) Turn the ignition switch ON.
(c) Start the engine and warmed it up.
(d) Connect the hand–held tester and select the VVT from the ACTIVE TEST menu.
(e) Check the engine speed when the OCV is operated by the hand–held tester.

  Standard:
  VVT system is OFF (OCV is OFF): Normal engine speed
  VVT system is ON (OCV is ON): Rough idle or engine stalled

INSPECTION



1. INTAKE AIR FLOW METER SUB–ASSY

(a) Output voltage inspection.
  (1) Apply battery voltage across terminals 1 (+B) and 2 (E2G).
  (2) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
  (3) Blow air into the MAF meter, and check that the voltage fluctuates.

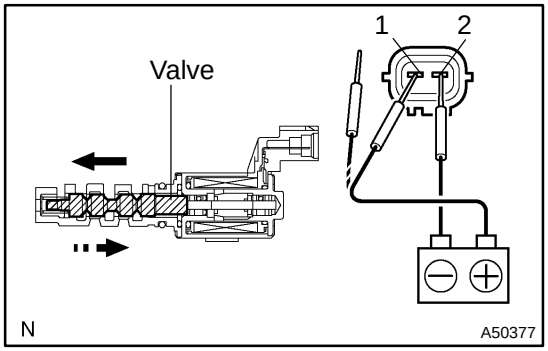
(b) Resistance inspection.
  (1) Using an ohmmeter, measure the resistance between terminals 4 (THA) and 5 (E2).

Resistance:
–20°C (–4°F) 13.6 – 18.4 kΩ
20°C (68°F) 2.21 – 2.69 kΩ
60°C (140°F) 0.493 – 0.667 kΩ

2. CAMSHAFT TIMING OIL CONTROL VALVE ASSY

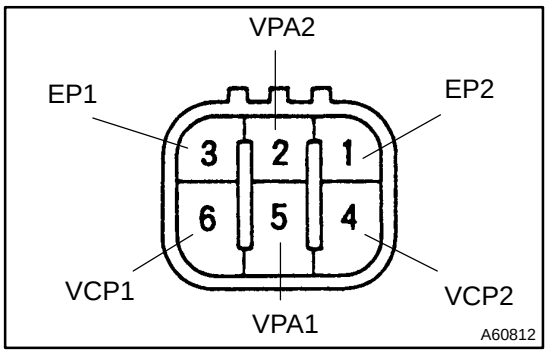
(a) Resistance inspection.
  (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 6.9 – 7.9 Ω at 20 °C (68 °F)



(b) Movement inspection.
  (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, and check the movement of the valve.

NOTICE:
Confirm the valve does not adhere.
HINT:
Bad returning of the valve by entrance of foreign objects causes subtle pressure leak to the advanced direction. Then, DTC can be detected.

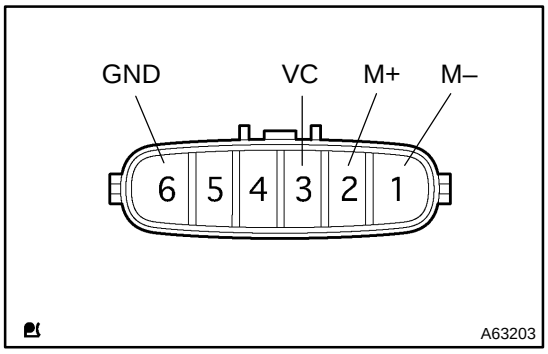


3. ACCELERATOR PEDAL ASSY

(a) Resistance inspection
(1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

Terminal No.	Resistance
2 (VPA2) ⇔ 3 (EP1)	5.0 kΩ or less
5 (VPA1) ⇔ 1 (EP2)	5.0 kΩ or less
6 (VCP1) ⇔ 3 (EP1)	2.25 – 4.75 kΩ
4 (VCP2) ⇔ 1 (EP2)	2.25 – 4.75 kΩ

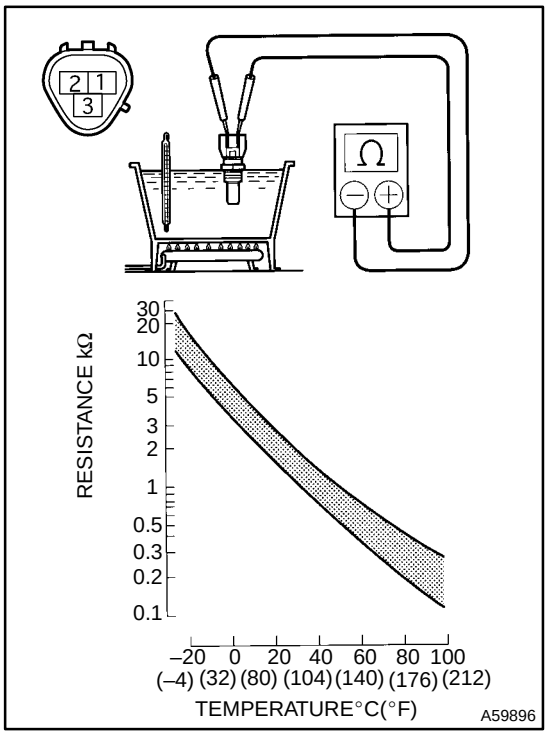


4. THROTTLE BODY ASSY

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

Resistance:

Terminal No.	Resistance
3 (VC) ⇔ 6 (GND)	1.2 – 3.2 kΩ (20°C)
2 (M+) ⇔ 1 (M–)	0.3 – 100 kΩ (20°C)

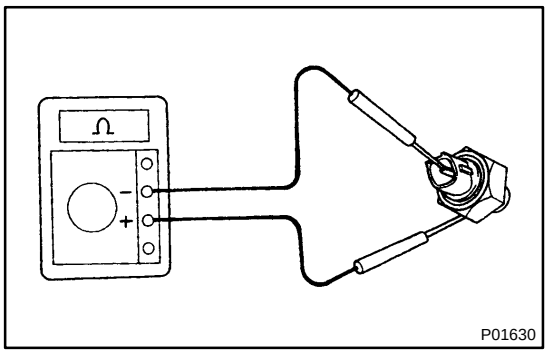


5. E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

(a) Resistance inspection.
(1) Using an ohmmeter, measure the resistance between terminal 1 and 2.

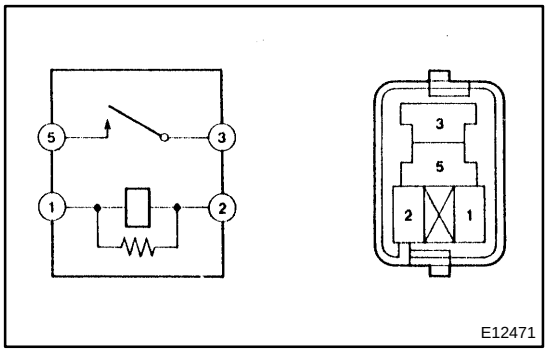
Resistance:
Approx. 20°C (68°F) 2.29 – 2.6 kΩ
Approx. 80°C (176°F) 0.300 – 0.327 kΩ

NOTICE:
In case of checking the water temperature sensor in the water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.



6. KNOCK CONTROL SENSOR

(a) Continuity inspection.
(1) Using an ohmmeter, check that no continuity exists between the terminal and body.



7. E.F.I. CIRCUIT OPENING RELAY ASSY
E.F.I ECU RELAY

(a) Continuity inspection.
(1) Using an ohmmeter, check that continuity exists between each terminal.

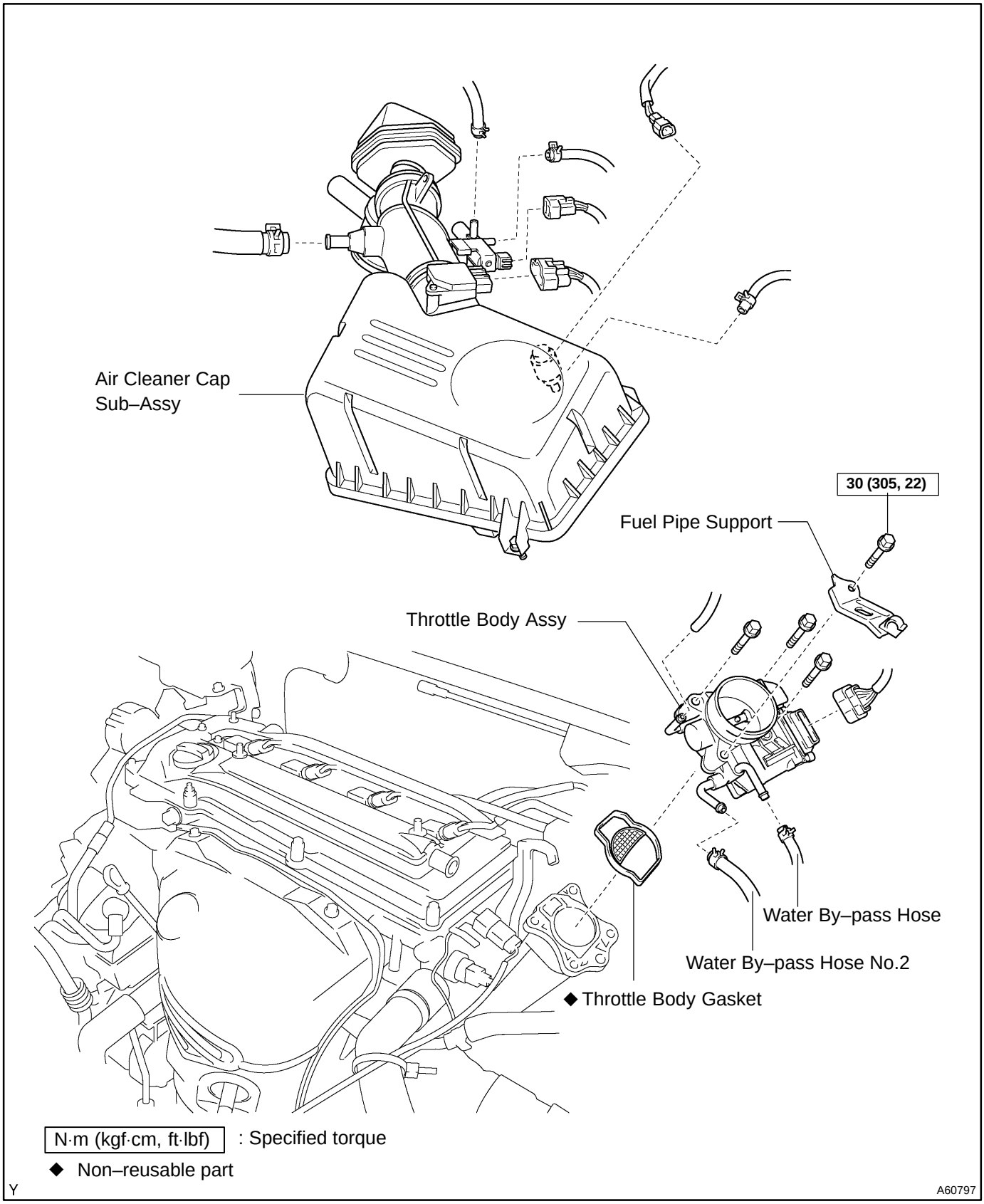
Specified condition:
Between terminal 1 and 2 Continuity
Between terminal 3 and 5 No continuity

(2) Using an ohmmeter, check that continuity exists between terminals 3 and 5 when the battery voltage is applied across terminals 1 and 2.

THROTTLE BODY ASSY (2AZ–FE)

COMPONENTS

1006A–01

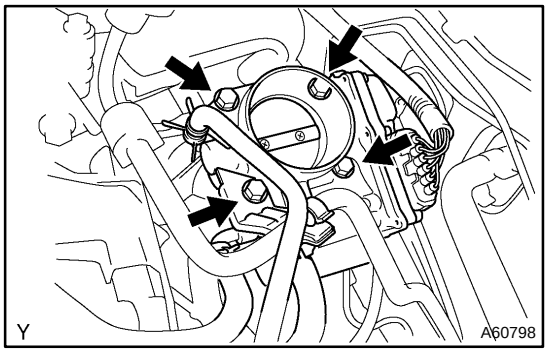


1006B–01

Removal & Installation and Disassembly & Reassembly

1. **DRAIN COOLANT(See page 16–6)**
2. **REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE**
3. **REMOVE THROTTLE BODY ASSY**

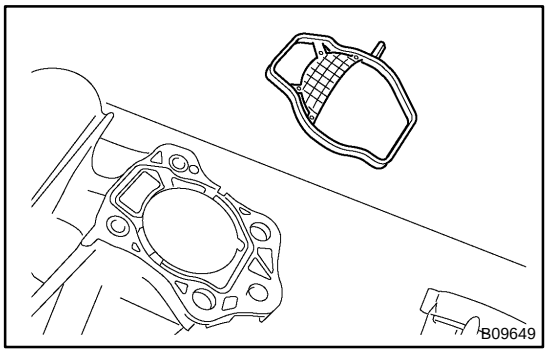
(a) Disconnect the throttle body assy connector.
(b) Disconnect the vacuum hose from the throttle body.
(c) Disconnect 2 water by–pass hoses.

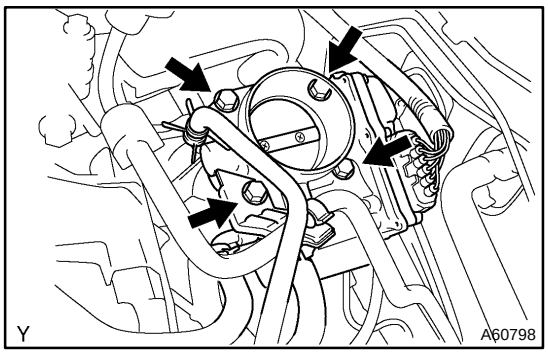


(d) Remove 4 bolts and throttle body assy from intake manifold.
(e) Remove the throttle body gasket.

4. **INSTALL THROTTLE BODY ASSY**

(a) Install a new gasket on the intake manifold, as shown in the illustration.





(b) install the throttle body assy with 4 bolts.
Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)
(c) Connect 2 water by–pass hoses to the throttle body assy.
(d) Connect the throttle body assy connector.
(e) Connect the vacuum hose to the throttle body assy.

5. **ADD COOLANT (See page 16–6)**
6. **INSPECT CHECK ENGINE COOLANT LEAK (See page 16–1)**

SFI SYSTEM (1MZ–FE)

10064–01

ON–VEHICLE INSPECTION

1. INSPECTION THROTTLE BODY

(a) Inspect the throttle control motor for operating sound.
  (1) Turn the ignition switch ON.
  (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

(b) Inspect the throttle position sensor.
  (1) Connect the hand–held tester or OBD II scan tool to the DLC3.
  (2) Turn the ignition switch ON.
  (3) Check that the check engine warning light does not light up.
  (4) Check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA shown the standard value.

  Standard throttle valve opening percentage: 60 % or more

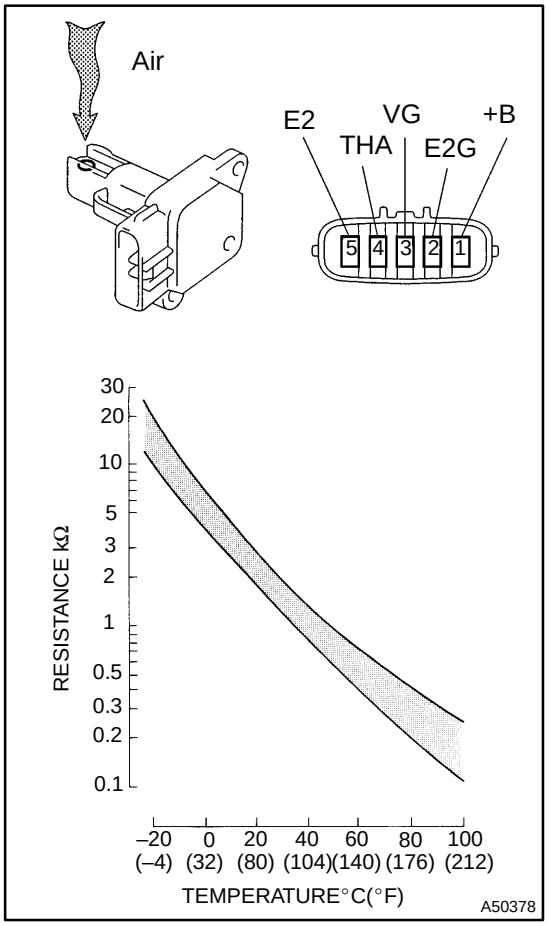
2. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) When turning ignition switch ON, check that the voltage of the throttle position sensor of the CURRENT DATA shown the standard value.

  Standard voltage: 0.6 – 1.0 V

10065–01

INSPECTION

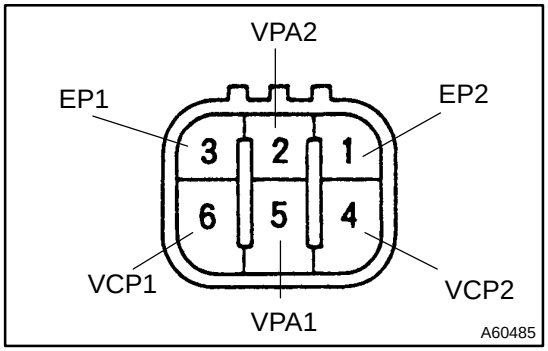


1. INTAKE AIR FLOW METER SUB–ASSY

(a) Output voltage inspection.
  (1) Apply battery voltage across terminals 1 (+B) and 2 (E2G).
  (2) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
  (3) Blow air into the MAF meter, and check that the voltage fluctuates.

(b) Resistance inspection.
  (1) Using an ohmmeter, measure the resistance between terminals 4 (THA) and 5 (E2).

Resistance:
–20°C (–4°F) 13.6 – 18.4 kΩ
20°C (68°F) 2.21 – 2.69 kΩ
60°C (140°F) 0.493 – 0.667 kΩ

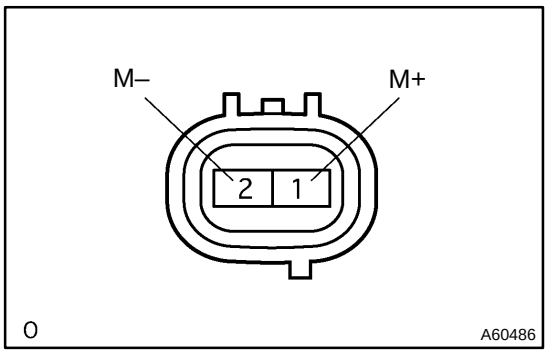


2. ACCELERATOR PEDAL ASSY

(a) Resistance inspection
  (1) Using an ohmmeter, measure the resistance between terminals.

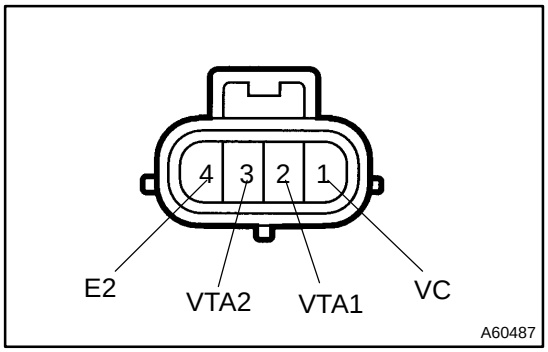
Resistance:

Terminal	Resistance
2 (VPA2) ⇔ 3 (EP1)	5.0 kΩ or less
5 (VPA1) ⇔ 1 (EP2)	5.0 kΩ or less
6 (VCP1) ⇔ 3 (EP1)	2.25 – 4.75 kΩ
4 (VCP2) ⇔ 1 (EP2)	2.25 – 4.75 kΩ



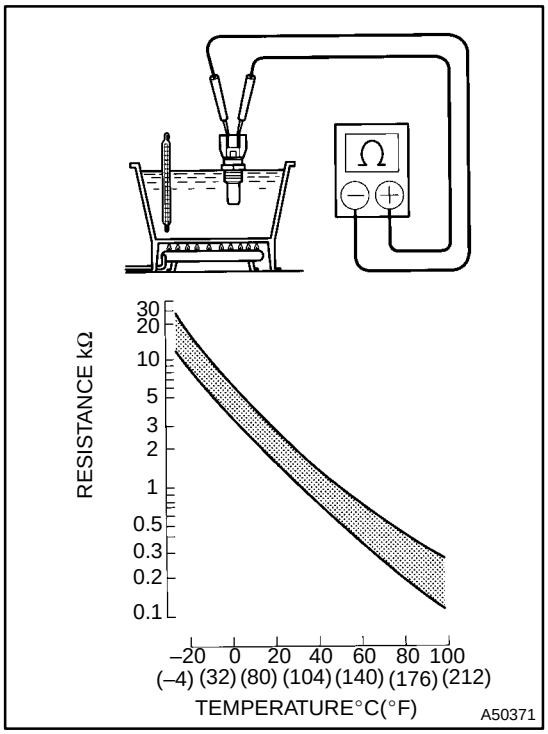
3. THROTTLE BODY ASSY

(a) Resistance inspection
(1) Using an ohmmeter, measure the resistance between terminals.
Resistance: 0.3 – 100 Ω at 20°C (68°F)



4. E.F.I. THROTTLE POSITION SENSOR

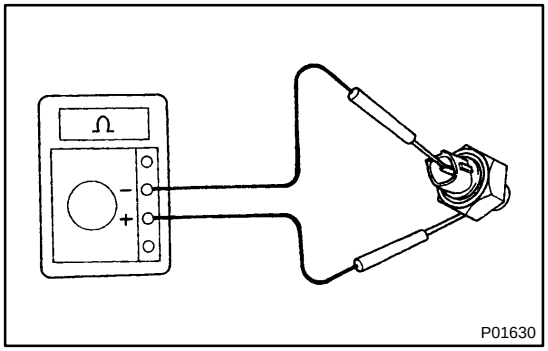
(a) Resistance inspection.
(1) Using an ohmmeter, measure the resistance between terminals 1 (VC) and 4 (E2).
Resistance: 1.2 – 3.2 kΩ



5. E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

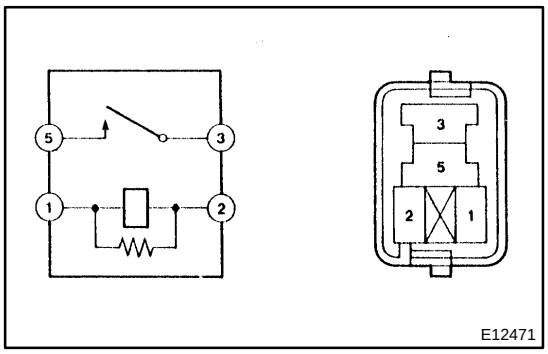
(a) Resistance inspection.
(1) Using an ohmmeter, measure the resistance between each terminal.
Resistance:
Approx. 20°C (68°F) 2.32 – 2.59 kΩ
Approx. 80°C (176°F) 0.310 – 0.326 kΩ

NOTICE:
In case of checking the water temperature sensor in the water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.



6. KNOCK CONTROL SENSOR

(a) Continuity inspection.
(1) Using an ohmmeter, check that no continuity exists between the terminal and body.



7. E.F.I. CIRCUIT OPENING RELAY ASSY
E.F.I ECU RELAY
AIR FUEL RATIO SENSOR HEATER RELAY

(a) Continuity inspection.

(1) Using an ohmmeter, check that continuity exists between each terminal.

Specified condition:

Between terminal 1and 2 Continuity

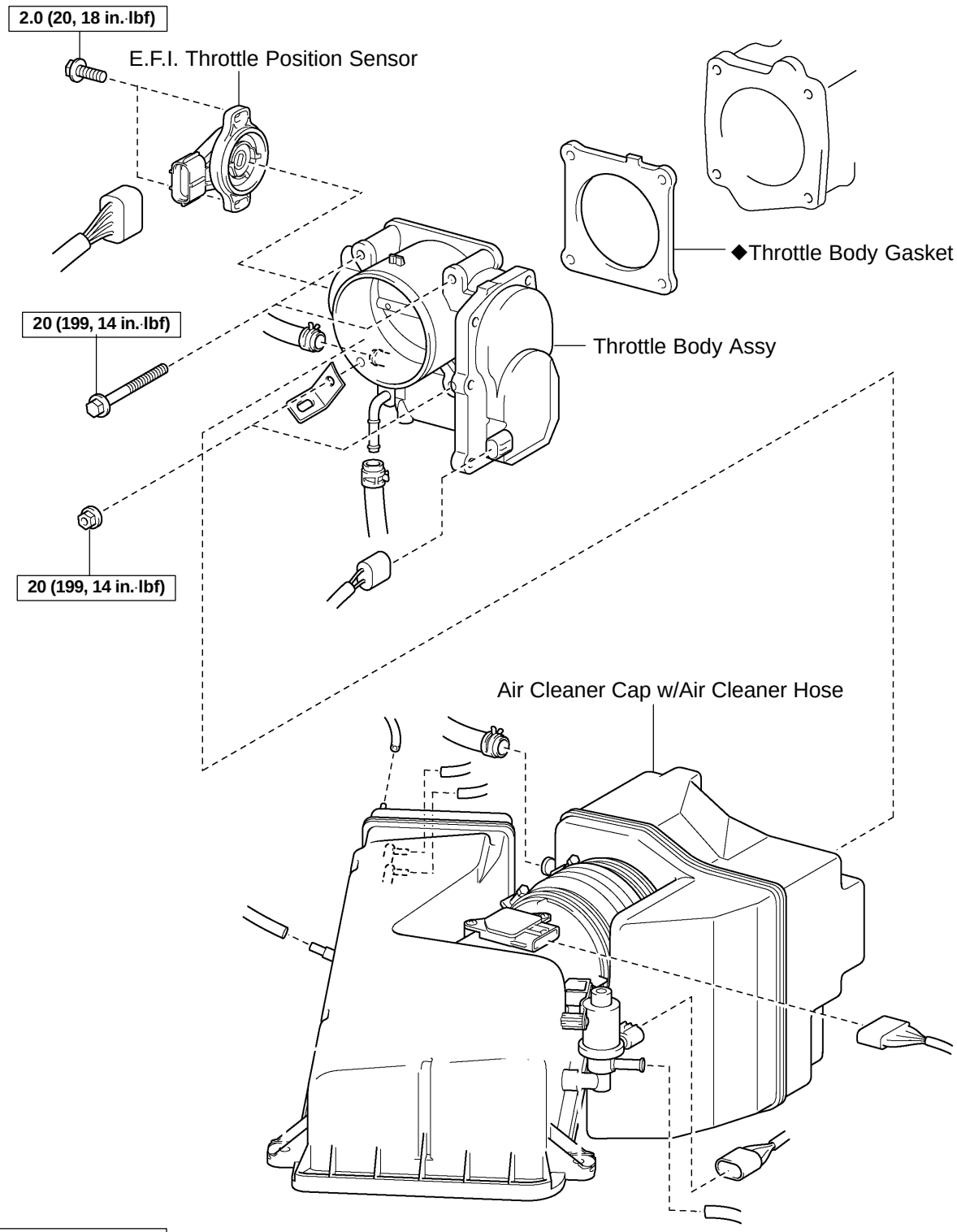
Between terminal 3and 5 No continuity

(2) Using an ohmmeter, check that continuity exists between terminals 3 and 5 when the battery voltage is applied across terminals 1 and 2.

THROTTLE BODY ASSY (1MZ–FE)

10066–01

COMPONENTS



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

◆ Non–reusable part

A60483

10067–01

Removal & Installation and Disassembly & Reassembly

1. DRAIN COOLANT(See page 16–20)

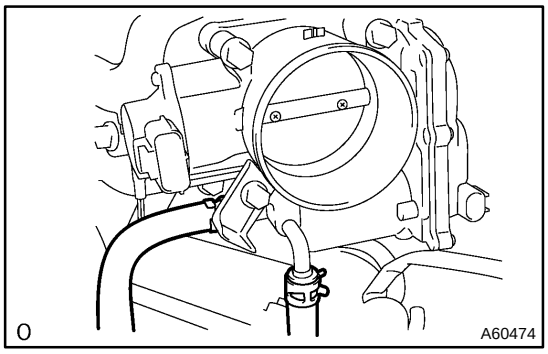
2. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE

(a) Disconnect the MAF meter connector.
(b) Disconnect the VSV connector for canister closed valve (CCV) and the air hose.
(c) Disconnect the 4 vacuum hoses and the ventilation hose.
(d) Remove the air cleaner cap with the hose.

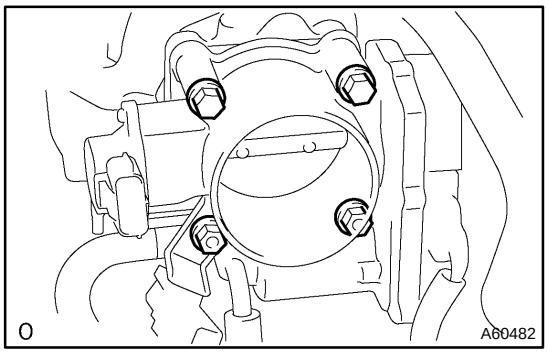
3. REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/ FRONT SUSPENSION BRACE UPPER CENTER)

4. REMOVE THROTTLE BODY ASSY

(a) Disconnect the throttle position sensor connector.
(b) Disconnect the throttle control motor connector.
(c) Disconnect the 2 water bypass hoses.

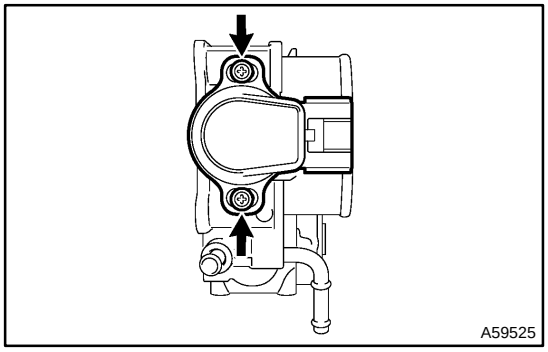


(d) Remove the 2 bolts, 2 nuts. throttle body and gasket.



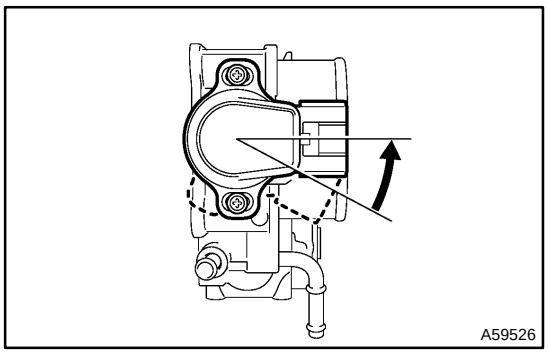
5. REMOVE E.F.I. THROTTLE POSITION SENSOR

(a) Remove the 2 set screws and throttle position sensor.

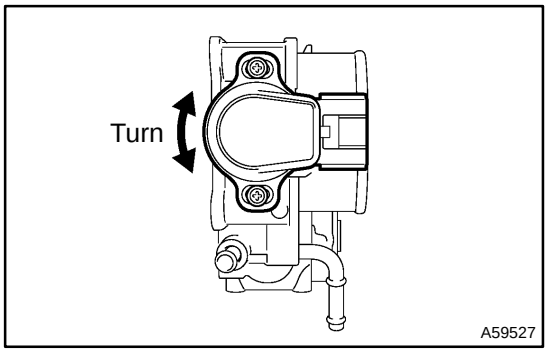


6. INSTALL E.F.I. THROTTLE POSITION SENSOR

(a) Check that the throttle valve is under the condition of the opener opening angle (about 7°).



(b) Install the sensor to the place where is at 20 – 30° rotated to the right from the specified installation position.
(c) Gradually turn sensor counterclockwise until it touches the throttle valve shaft, and temporarily tighten the 2 set screws.



(d) Connect the throttle position sensor connector.
(e) Connect the hand–held tester or OBD II scan tool to the DLC3.
(f) Turn the ignition switch ON.

NOTICE:
After turning the ignition switch ON, do not depress the accelerator pedal.

(g) While reading the valve of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA, turn the throttle position sensor slowly to left and right and set the sensor at the center value of the standard value, and then tighten the screws.
Standard throttle valve opening percentage:
16.8 – 18.4 %
Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)

NOTICE:
After turning the ignition switch ON, do not depress the accelerator pedal.

(h) Recheck throttle valve opening percentage.

If the throttle valve opening percentage is not as specified, repeat step (g).

(i) Perform fully closed throttle valve by hand and check that the valve of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA stays with the standard value.
Standard throttle valve opening percentage:
10 – 14 %

If the throttle valve opening percentage is not as specified, repeat step (g) to (i).

(j) Paint the 2 set screws.
(k) Turn the ignition switch OFF.
(l) Disconnect the hand–held tester or OBD II scan tool from the DLC3.
(m) Disconnect the throttle position sensor connector.

7. INSTALL THROTTLE BODY ASSY

(a) Install a new gasket and the throttle body.
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

8. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/ FRONT SUSPENSION BRACE UPPER CENTER)

Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

9. ADD COOLANT (See page 16–20)

10. CHECK ENGINE COOLANT LEAK (See page16–20)

11. INSPECT FUNCTION OF THROTTLE BODY ASSY (See page 10–7)