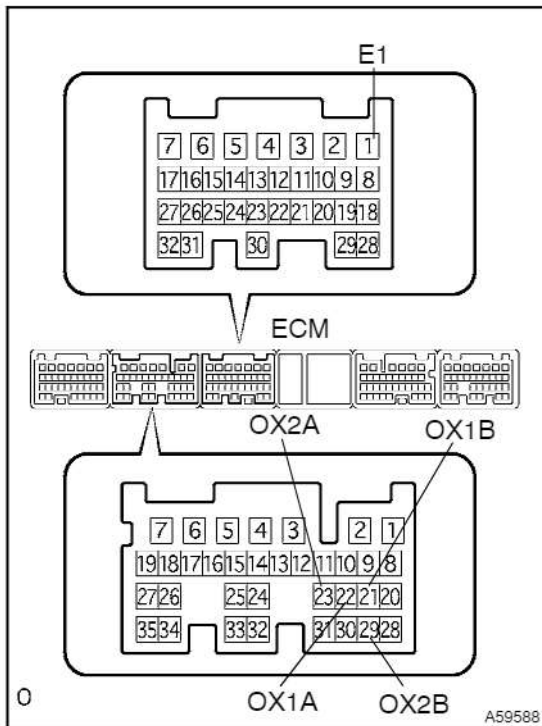


EMISSION CONTROL SYSTEM (2AZ-FSE)

ON-VEHICLE INSPECTION

12008-01



1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

HINT:

Check the system by choosing "DATA MONITOR/ O₂ SENSOR OUTPUT VOLTAGE" on the monitor of the hand-held tester.

(a) Connect the hand-held tester to the following each pair of the ECM terminals:

- (1) Terminals 21 (OX1B) and 1 (E1)
- (2) Terminals 22 (OX1A) and 1 (E1)
- (3) Terminals 23 (OX2A) and 1 (E1)
- (4) Terminals 29 (OX2B) and 1 (E1)

CAUTION:

Connect test leads from the back side of the connector with the ECM connected.

- (b) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 2 minutes.
- (c) Confirm that the voltage output varies between 0 V and 1 V with the engine speed at 2,500 rpm.

OK:

The voltage output varies more than 8 times in 10 seconds.

CAUTION:

- Perform the check immediately after the warming up.
- If the voltage variation could not be verified, warm up the heated oxygen sensor again.

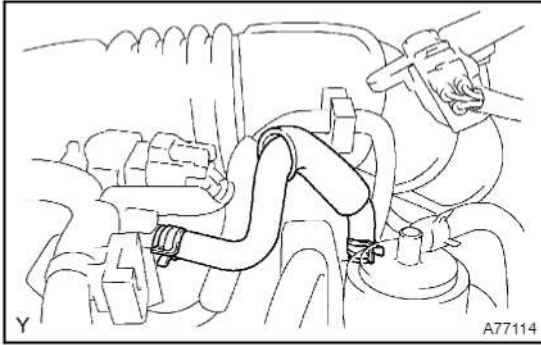
2. INSPECT FUEL CUT OFF RPM

(a) Check the operation.

- (1) Increase the engine speed to at least 3,500 rpm.
- (2) Use a sound scope to check the fuel injector operating noise.
- (3) Check that when the accelerator pedal is released, the fuel injector operation noise stops momentarily at 2,500 rpm and then resumes at 1,200 rpm.

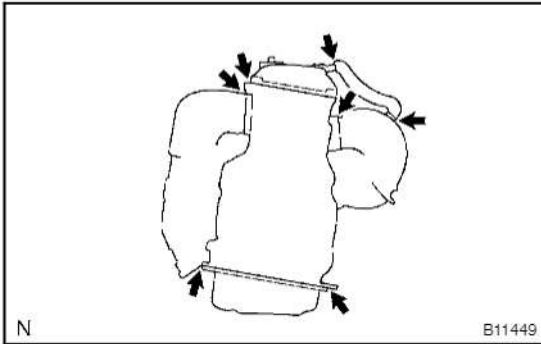
2,500 rpm: Fuel cut off rpm

1,200 rpm: Fuel return rpm



3. INSPECT EVAPORATIVE EMISSION CONTROL SYSTEM

- (a) After starting the engine, disconnect the vacuum hose shown in the illustration.
- (b) Check if vacuum occurs at the VSV port when choosing "ACTIVE TEST" and "PURGE VSV" according to the display on hand-held tester.
- (c) Finish "ACTIVE TEST", then reconnect the vacuum hose.
- (d) After entering to "ECU DATA MONITOR" on the hand-held tester, choose "PURGE VSV" to check the operation of the purge VSV.
- (e) After driving the vehicle with a warm engine, confirm that the VSV turns from OFF to ON.



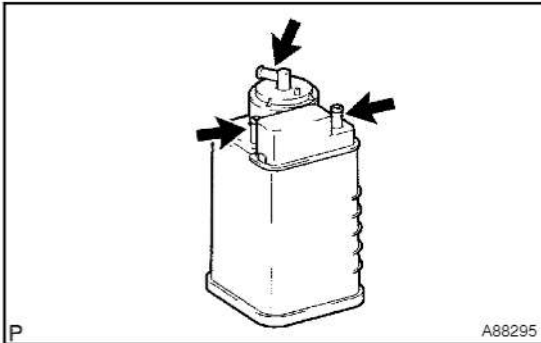
4. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- (a) Check the appearance.
 - (1) Check the engine assembly if the portions indicated with the arrows are cracked, leaked or damaged.

HINT:

Separation of the engine oil level gauge, oil filler cap, PCV hose, etc. may cause the engine to run improperly. 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 improperly. If necessary, repair the engine assembly.

INSPECTION

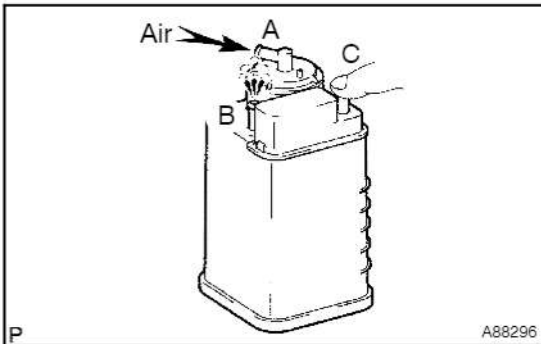


1. INSPECT CHARCOAL CANISTER ASSY

(a) Check the appearance.

- (1) Visually check the charcoal canister if the portions indicated with the arrows are cracked or damaged.

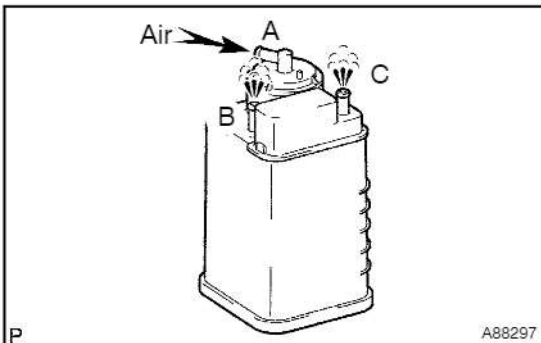
If necessary, replace the charcoal canister.



(b) Check the ventilation.

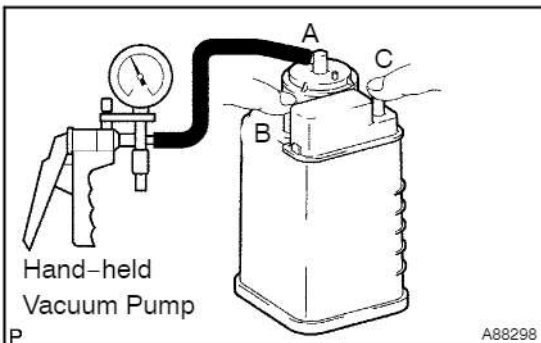
- (1) Blow air (4.7 kPa (48 gf/cm², 0.68 psi)) into the port A, then check that the air flows from the B while holding the port C closed.

If the ventilation is not as specified, replace the charcoal canister.



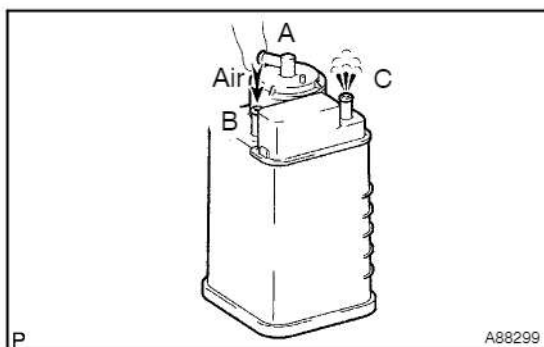
- (2) Blow air (4.7 kPa (48 gf/cm², 0.68 psi)) into the port A, then check that the air flows from the port B and C.

If the ventilation is not as specified, replace the charcoal canister.



- (3) Apply vacuum (2.0 kPa (15 mmHg, 0.59 in.Hg)) to the port A, then check that the vacuum does not decrease when port B and port C are closed, and check that the vacuum decrease when the port B is released.

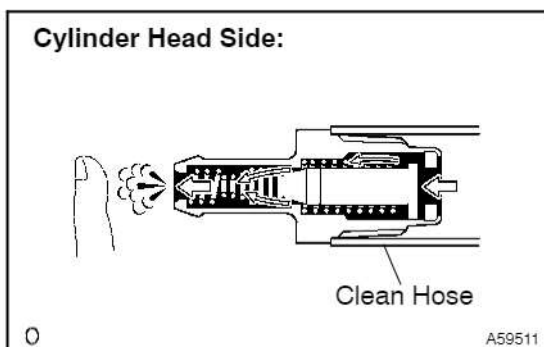
If the ventilation is not as specified, replace the charcoal canister.



- (c) Clean the filter in canister.
- (1) Clean the filter by blowing (19.6 kPa (0.2 kgf/cm², 2.8 psi)) compressed air into port B while holding the port A closed.

NOTICE:

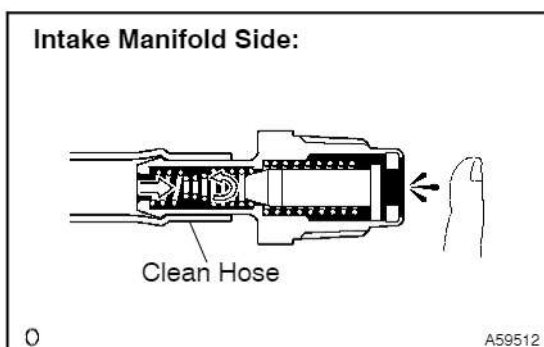
- Do not attempt to wash the charcoal canister.
- No activated carbon should come out.

**2. INSPECT VENTILATION VALVE SUB-ASSY**

- (a) Check the operation.
- (1) Install a clean hose as shown in the illustration.
- (2) Blow air into the cylinder head side, then check that air passes through easily.

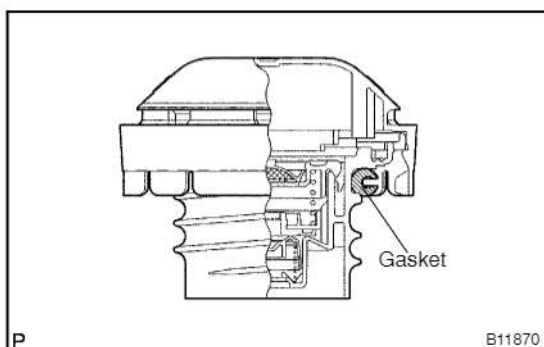
CAUTION:

Do not suck air through the ventilation valve. Petroleum substances inside the ventilation valve are harmful.



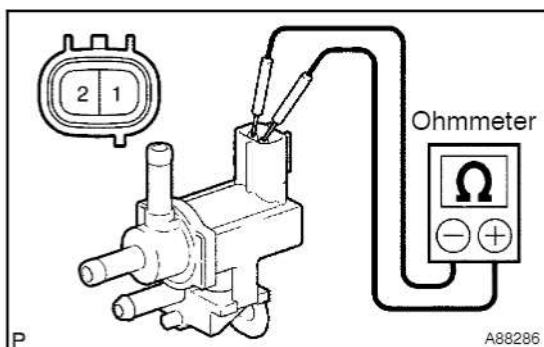
- (3) Blow air into intake manifold side, then check that air passes through with difficulty.

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

**3. INSPECT FUEL TANK CAP ASSY**

- (a) Check the appearance.
- (1) Visually check if the fuel tank cap and gasket are deformed or damaged.

If necessary, replace the fuel tank cap.

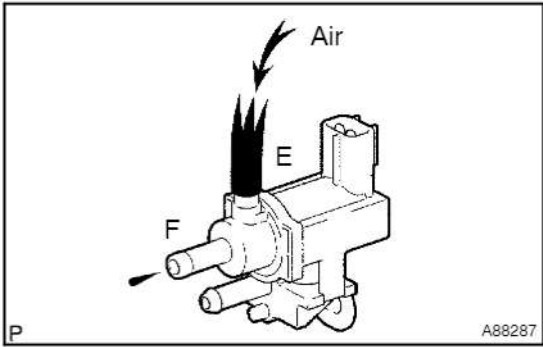
**4. INSPECT VACUUM SWITCHING VALVE ASSY NO.1**

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

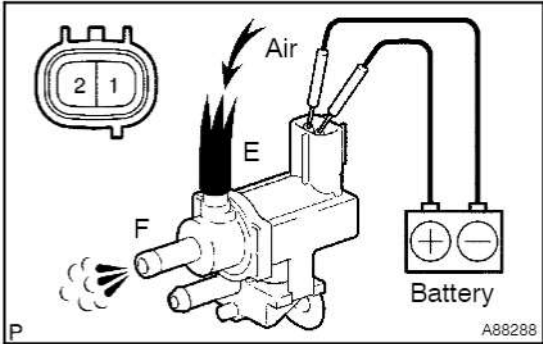
Standard:

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)

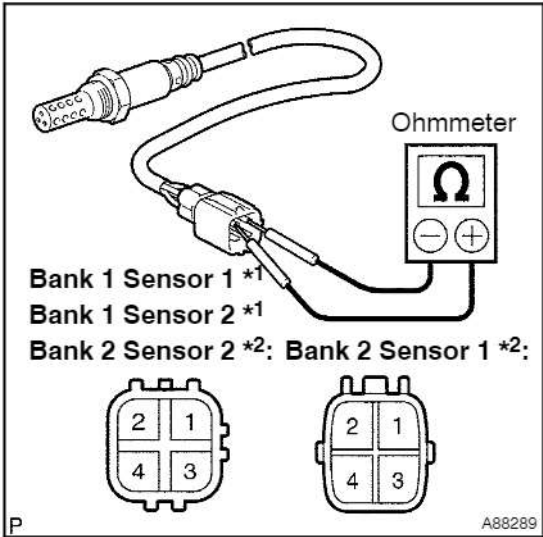
If the resistance is not as specified, replace the vacuum switching valve No. 1.



- (b) Check the operation.
- (1) Check that air does not flow from port E to F.
- If the operation is not as specified, replace the vacuum switching valve No. 1.



- (2) Apply battery voltage across the terminals.
- (3) Check that air flows from port E to F.
- If the operation is not as specified, replace the vacuum switching valve No. 1.



5. INSPECT HEATED OXYGEN SENSOR

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

Standard:

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 k Ω or higher

HINT:

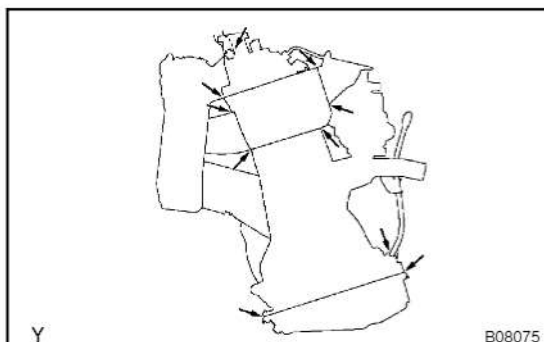
- *1: Bank 1 refers to the No. 1 and No. 4 cylinders
- *2: Bank 2 refers to the No. 2 and No. 3 cylinders

If the result is not as specified, replace the heated oxygen sensor.

EMISSION CONTROL SYSTEM (1CD-FTV)(From September, 2003)

ON-VEHICLE INSPECTION

120CB-01

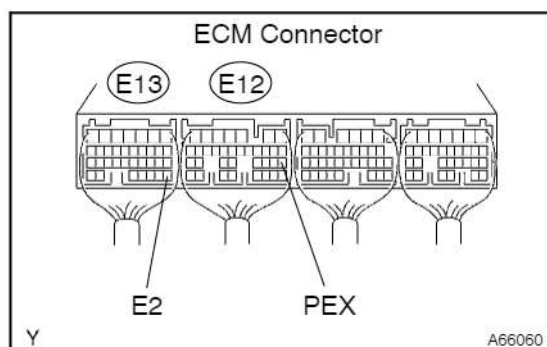


1. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- (a) Check for cracks, leaks or damage.
 - (1) Check the engine assembly to see if the indicated portions by the arrows have cracks, leaks or damage.

HINT:

Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run improperly. 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 improperly.



2. INSPECT DIFFERENTIAL PRESSURE SENSOR ASSY

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the specified terminals of the E12 and E13 ECM connector.

Standard:

Tester Connection	Specified Condition
PEX (E12-20) – E2 (E13-28)	0.4 to 4.8 V

If the result is not as specified, check the wiring and ECM.

INSPECTION

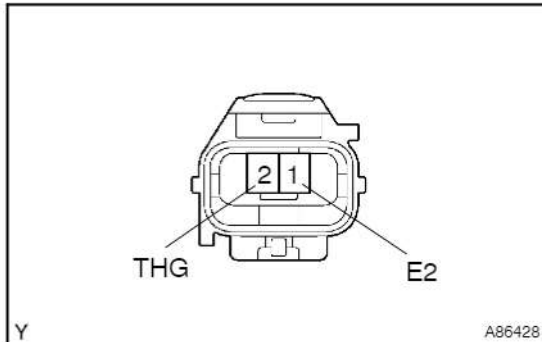
1. INSPECT EXHAUST FUEL ADDITION INJECTOR ASSY

- (a) Inspect the resistance.

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

Resistance: 11.6 to 12.4 Ω at 20°C (68°F)

If the result is not as specified, replace the exhaust fuel addition injector assembly (see page 14-166).



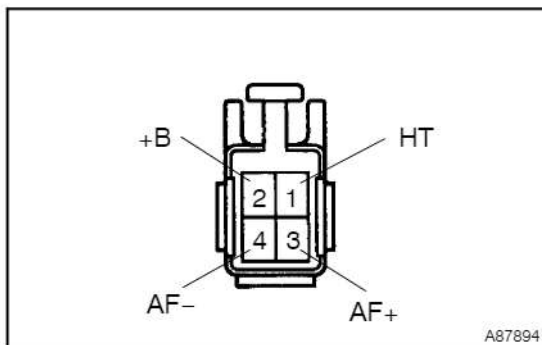
2. INSPECT EXHAUST GAS TEMPERATURE SENSOR

- (a) Inspect the resistance.

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

Resistance: 242 k Ω at 20°C (68°F)

If the result is not as specified, replace the exhaust gas temperature sensor (see page 14-108).



3. INSPECT AIR-FUEL RATIO SENSOR

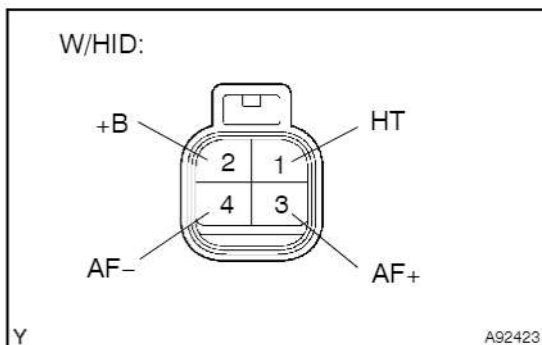
- (a) Inspect the resistance.

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

Resistance:

Tester Connection	Resistance
1 (HT) - 2 (+B)	0.8 to 1.4 Ω at 20°C (68°F)
1 (HT) - 4 (AF-)	10 k Ω or higher

If the result is not as specified, replace the air-fuel ratio sensor (see page 15-6).



EGR SYSTEM (1CD-FTV)(From September, 2003)

1209I-03

ON-VEHICLE INSPECTION

HINT:

In a malfunction that the EGR system is always operating, black smoke or white smoke may be emitted from the exhaust pipe. If this occurs, inspect the EGR system as well.

1. INSPECT SEATING OF EGR VALVE

- (a) Start the engine, then check that it starts and runs at idle.

2. INSPECT HOT ENGINE CONDITION (WHEN USING HAND-HELD TESTER)

- (a) Warm up the engine.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Start the engine, then run it at idle.
- (e) Turn the hand-held tester ON.
- (f) To confirm the following information in DATA LIST, select "DIAGNOSIS / OBD / MOBD / ACTIVE TEST / EGR STEP POS / ALL" on the hand-held tester.
- (g) Warm up the engine. The coolant temperature should be between 75°C (167°F) and 90°C (194°F).
- (h) Check the MAF reading with the engine idling.

Standard: MAF reading is between 4 g/s and 16 g/s

- (i) Operate the EGR valve with the hand-held tester. Regulate the valve opening angle to 0°, then check the MAF reading.

Standard: MAF reading is between 10 g/s and 16 g/s

If the MAF reading is out of range in either step (h) or (i), replace the EGR valve.

If the MAF reading is out of range in both step (h) and (i), check the air flow sensor ([see page 10-22](#)).

If it has no defects, check the operation of the EGR valve.

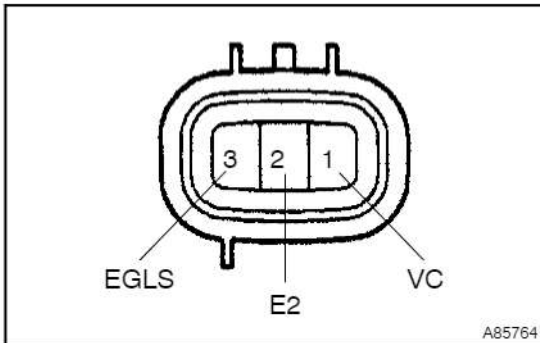
If any defects are found, replace the air flow meter, then check the operation of the EGR valve.

3. INSPECT HOT ENGINE CONDITION (WHEN NOT USING HAND-HELD TESTER)

- (a) Install the vacuum gauge.
 - (1) Using a 3-way connector, connect a vacuum gauge to the hose between the intake manifold and turbo pressure sensor.
- (b) Warm up the engine. The coolant temperature should be between 75°C (167°F) and 90°C (194°F).
- (c) Check that the vacuum gauge indicates 2.5 kPa (19 mmHg 0.7 in Hg) or higher.
- (d) Stop the engine with the ignition switch OFF, then remove the EGR valve connector.
- (e) Restart the engine, then check that the load under idling is 2.5 kPa (19 mmHg 0.7 in Hg) or lower.

If the load pressure exceeds the above value, replace the EGR valve.

INSPECTION



1. INSPECT EGR VALVE POSITION SENSOR

(a) Inspect the resistance.

- (1) Using an ohmmeter, measure the resistance between terminals 1 (VC) and 2 (E2).

Resistance: 4.0 to 6.0 k Ω at 20°C (68°F)

If the result is not as specified, replace the EGR valve position sensor.

2. INSPECT EGR VALVE ASSY

(a) Inspect the resistance.

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

Resistance: 6.5 to 7.5 Ω at 20°C (68°F)

If the result is not as specified, replace the EGR valve assembly.