# EXHAUST GAS RECIRCULATION (EGR) SYSTEM (Europe)

EC0A9–01

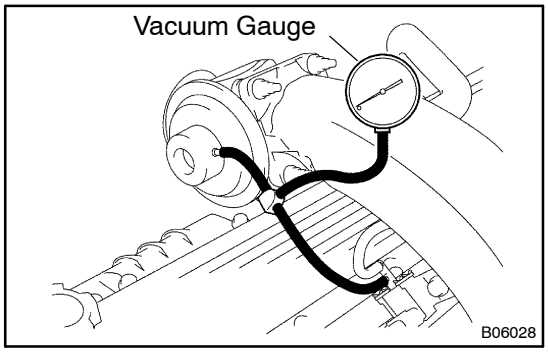
## ON–VEHICLE INSPECTION

HINT:

In a malfunction where the EGR system is always on, black smoke or white smoke may be output from the exhaust pipe. If this occurs, inspect the EGR system also.

**NOTICE:**

**Always stop the engine when installing or removing the vacuum gauge, or removing the vacuum hose.**




**1. INSTALL VACUUM GAUGE**

Using a 3 way connector, connect a vacuum gauge to the hose between the EGR valve and E–VRV.

**2. INSPECT SEATING OF EGR VALVE**

Start the engine and check that the engine starts and run at idle.

**3. INSPECT COLD ENGINE CONDITION**

(a) The coolant temperature should be below 20°C (64°F).

(b) Check that the vacuum gauge indicates zero at idle.

**4. INSPECT HOT ENGINE CONDITION**

(a) Warm up the engine, the coolant temperature should be above 70°C (104°F) and below 96°C (205°F).

(b) Check that the vacuum gauge indicates about 44.0 kPa (330 mmHg, 12.9 in.Hg) at idle.

(c) Check that the vacuum gauge indicator increases about 44.0 kPa (330 mmHg, 12.9 in.Hg) at 1,500 rpm.

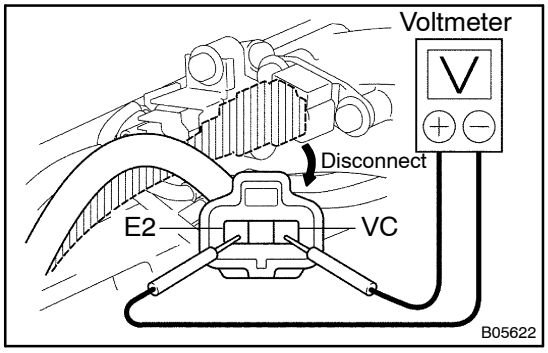
(d) When the accelerator pedal is quickly depress to the full open, check that the vacuum gauge indicator drops momentarily.

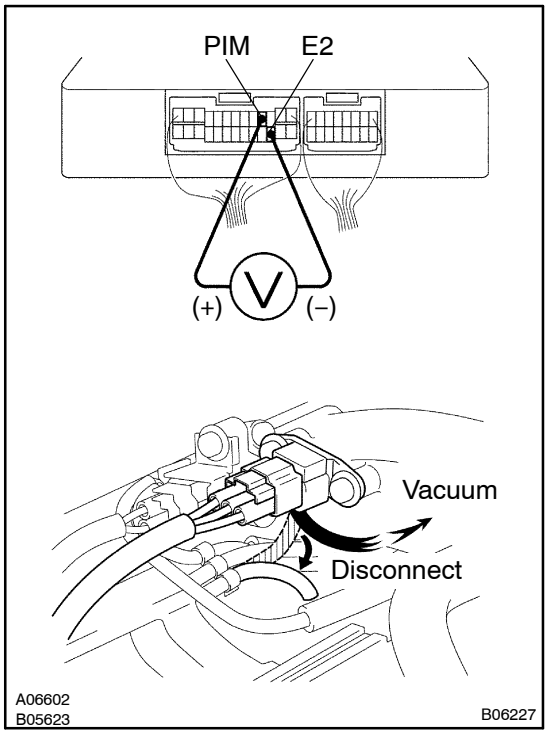
(e) Keep the engine speed at more than 4,000 rpm.

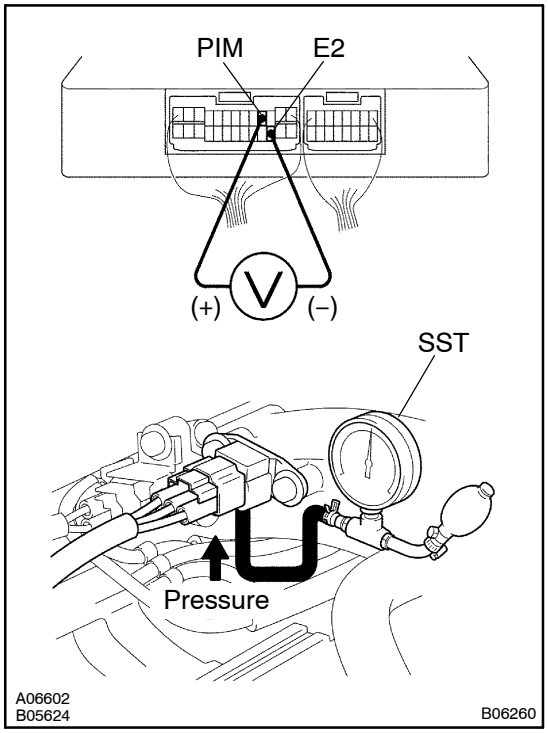
(f) Check that the vacuum gauge indicates zero.

(g) When the accelerator pedal is released, check that the vacuum gauge indicator drops momentarily while the engine speed decreases from more than 4,000 rpm to idle.

**5. REMOVE VACUUM GAUGE**




## 6. INSPECT VACUUM SENSOR

(a) Inspect the power source voltage of the vacuum sensor.
  (1) Disconnect the vacuum sensor connector.
  (2) Turn the ignition switch ON.
  (3) Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.

**Voltage: 4.75 – 5.25 V**

  (4) Turn ignition switch OFF.
  (5) Reconnect the vacuum sensor connector.

(b) Inspect the supply power of the vacuum sensor.
  (1) Turn the ignition switch ON.
  (2) Disconnect the vacuum hose from the vacuum sensor.
  (3) Connect a voltmeter to terminals PIM and E2 of the emission ECU, and measure the output voltage under ambient atmospheric pressure.
  (4) Apply vacuum to the vacuum sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) segments to 40.0 kPa (300 mmHg, 11.81 in.Hg).
  (5) Measure the voltage drop from step (3) above for each segment.

**Voltage drop:**

| Applied vacuum | Voltage drop |
|---|---|
| 13.3 kPa (100 mmHg, 3.94 in.Hg) | 0.25 – 0.45 V |
| 26.7 kPa (200 mmHg, 7.87 in.Hg) | 0.6 – 0.8 V |
| 40.0 kPa (300 mmHg, 11.81 in.Hg) | 1.0 – 1.2 V |

  (6) Using SST, apply pressure to the vacuum sensor in 19.6 kPa (0.20 kgf/cm$^2$, 2.84 psi) segments to 98.0 kPa (1.00 kgf/cm$^2$, 14.2 psi).

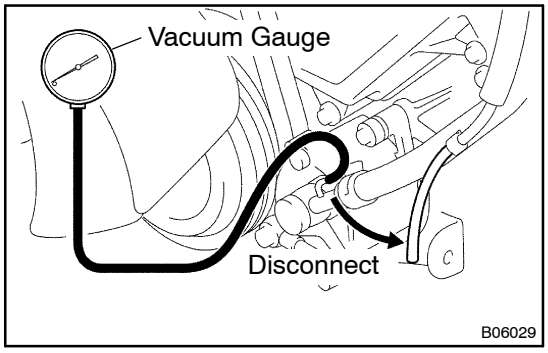
SST 09992–00241

  (7) Measure the voltage up from step (3) above for each segment.

**Voltage up:**

| Applied pressure | Voltage up |
|---|---|
| 19.6 kPa (0.20 kgf/cm$^2$, 2.84 psi) | 0.4 – 0.7 V |
| 39.2 kPa (0.40 kgf/cm$^2$, 5.69 psi) | 0.9 – 1.2 V |
| 58.8 kPa (0.60 kgf/cm$^2$, 8.53 psi) | 1.5 – 1.7 V |
| 78.5 kPa (0.80 kgf/cm$^2$, 11.4 psi) | 2.0 – 2.3 V |
| 98.0 kPa (1.00 kgf/cm$^2$, 14.2 psi) | 2.5 – 2.8 V |

  (8) Reconnect the vacuum hose to the vacuum sensor.




**7. INSPECT VACUUM PUMP**

(a) Connect a vacuum gauge to the output pipe.

(b) Warm up the engine and check that the vacuum gauge indicates above 86.7 kPa (650 mmHg, 25.59 in.Hg).

If a problem is found, repair the vacuum pump.