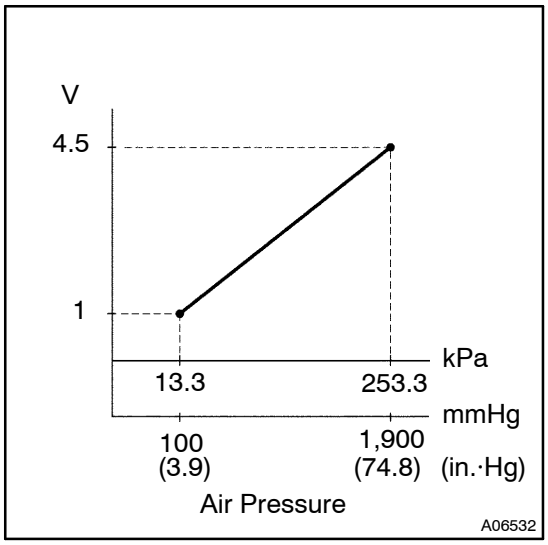
| DTC | 35 | MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT MALFUNCTION |
|---|---|---|

## CIRCUIT DESCRIPTION



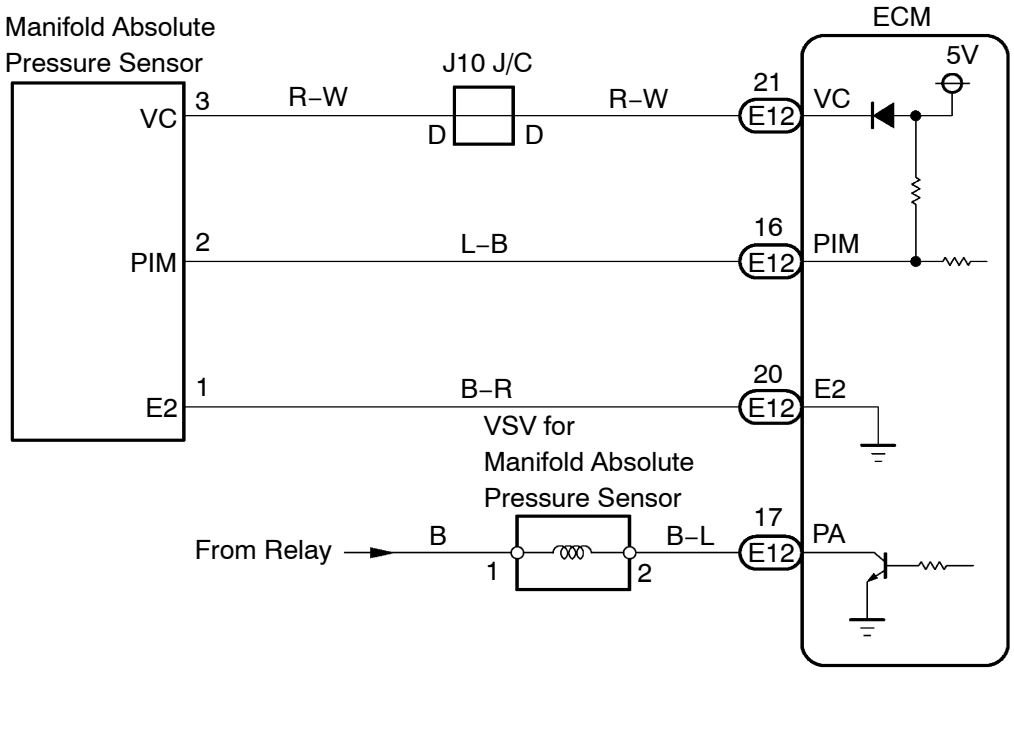

The manifold absolute pressure sensor is connected to the intake manifold. The ECM detects the intake manifold pressure as a voltage by the sensor. The ECM uses the intake manifold pressure signal for correction of injection volume control and injection timing control.
The VSV for manifold absolute pressure sensor switches the atmosphere applied to the manifold absolute pressure sensor to the intake manifold pressure. The manifold absolute pressure sensor monitors both the atmospheric pressure and intake manifold pressure and transmits the output voltage to the ECM, and the ECM uses this atmospheric pressure value for correcting the injection volume.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| 35 | Open or short in manifold absolute pressure sensor circuit for 2 sec. or more | • Open or short in manifold absolute pressure sensor circuit<br>• Manifold absolute pressure sensor<br>• Open or short in VSV for manifold absolute pressure sensor circuit<br>• VSV for manifold absolute pressure sensor<br>• Vacuum hose disconnected or blocked<br>• Turbocharger<br>• EGR valve<br>• Mass air flow meter<br>• ECM |

HINT:
After confirming DTC 35, use the hand–held tester to confirm the intake manifold pressure from the CURRENT DATA.

| Intake Manifold Pressure (kPa) | Malfunction |
|---|---|
| Approx. 0 | • PIM circuit short |
| 250 or more | • VC circuit open or short<br>• PIM circuit open<br>• E2 circuit open |

## WIRING DIAGRAM




## INSPECTION PROCEDURE

HINT:

- If different DTCs that are related to different systems are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.
- Read freeze frame data using the hand–held tester, as freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, etc. at the time of the malfunction.

### When using hand–held tester:

| 1 | READ VALUE OF HAND–HELD TESTER(INTAKE MANIFOLD PRESSURE) |
|---|---|

(a) Read the value of intake manifold pressure on the hand–held tester.
**Pressure: The same as atmospheric pressure.**

| OK | Go to step 6 |
|---|---|

NG

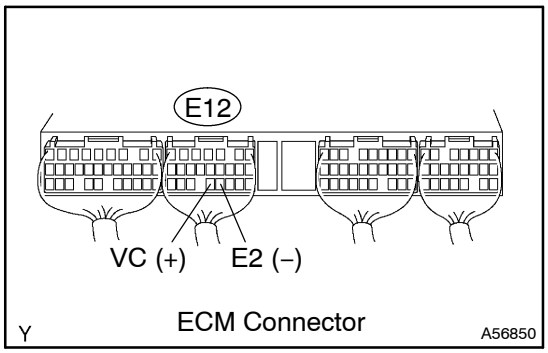
| 2 | INSPECT MANIFOLD ABSOLUTE PRESSURE SENSOR (See page 13–13) |
|---|---|

SST 09992–00242

NG → REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

OK

| 3 | INSPECT ECM(CHECK VOLTAGE) |
|---|---|




(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the ECM E12 connector.

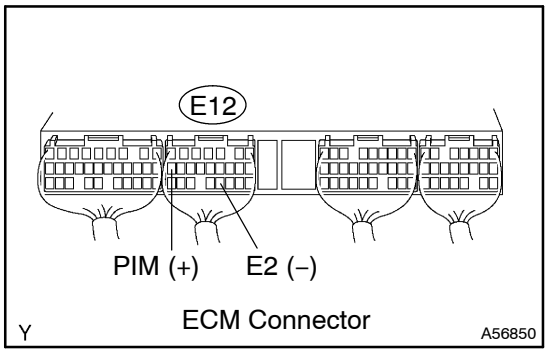
**Voltage:**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (E12 – 21) ⇔ E2 (E12 – 20) | 4.5 – 5.5 V |

NG → CHECK AND REPLACE ECM

OK

| 4 | INSPECT ECM(CHECK VOLTAGE) |
|---|---|




(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the ECM E12 connector.

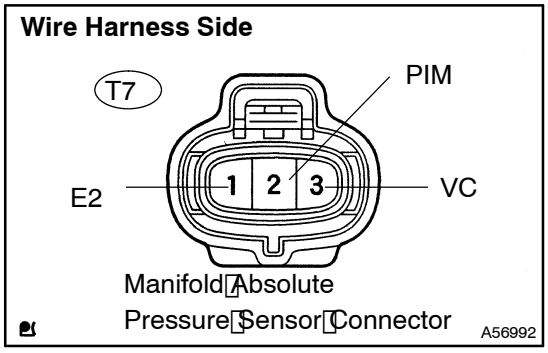
**Voltage:**

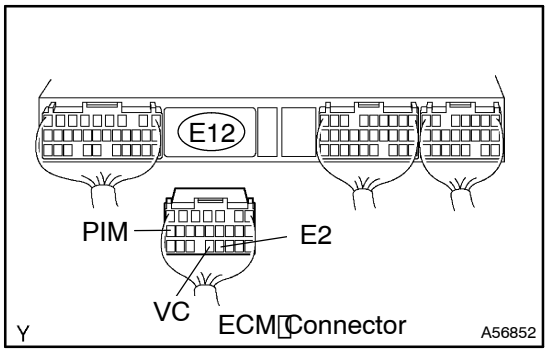
| Symbols (Terminal No.) | Specified condition |
|---|---|
| PIM (E12 – 16) ⇔ E2 (E12 – 20) | 1.7 – 2.9 V |

OK → CHECK AND REPLACE ECM

NG

| 5 | CHECK HARNESS AND CONNECTOR(ECM – MANIFOLD ABSOLUTE PRESSURE SENSOR) |
|---|---|




(a) Disconnect the manifold absolute pressure sensor connector.

(b) Disconnect the ECM E12 connector.

(c) Check the continuity between the wire harness side connector.

**Standard (Check for open):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (T7 – 3) ⇔ VC (E12 – 21) | Continuity |
| PIM (T7 – 2) ⇔ PIM (E12 – 16) | |
| E2 (T7 – 1) ⇔ E2 (E12 – 20) | |

**Standard (Check for short):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (E12 – 21) ⇔ PIM (E12 – 16) | No continuity |
| VC (E12 – 21) ⇔ E2 (E12 – 20) | |
| PIM (E12 – 16) ⇔ E2 (E12 – 20) | |

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

**CHECK AND REPLACE ECM**

| 6 | CHECK CONNECTION OF VACUUM HOSE(MANIFOLD ABSOLUTE PRESSURE SENSOR – VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR, AND VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR – INTAKE MANIFOLD) |
|---|---|

NG → REPAIR OR REPLACE VACUUM HOSE

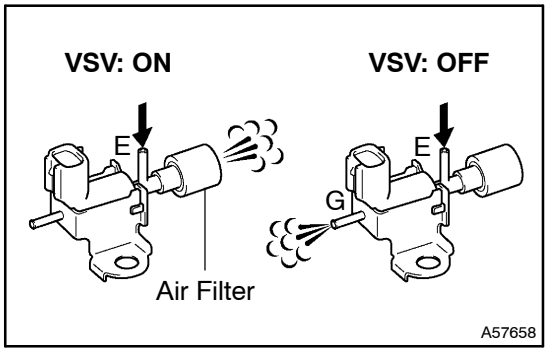
OK

| 7 | INSPECT VACUUM SWITCHING VALVE ASSY NO.1 (See page 13–16) |
|---|---|

NG → REPLACE VACUUM SWITCHING VALVE ASSY NO.1

OK

## 8 CHECK OPERATION OF VSV(PURGE FLOW)

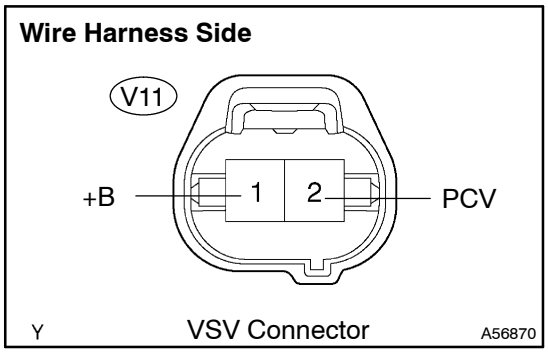



(a) Disconnect the vacuum hoses from the VSV.
(b) Turn the ignition switch ON.
(c) Check the operation of the VSV when it is operated by the hand–held tester.
**VSV is ON:**
**Air from port E flows out through the air filter.**
**VSV is OFF:**
**Air from port E flows out through port G.**

**OK** → **Go to step 10**

**NG**

## 9 CHECK HARNESS AND CONNECTOR(ECM – VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR,AND VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR – EFI RELAY)



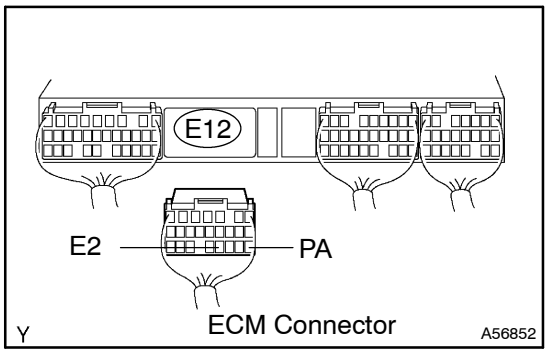

(a) Disconnect the VSV connector.
(b) Disconnect the ECM E12 connector.
(c) Remove the EFI relay from the engine room R/B.
(d) Check the continuity between the wire harness side connector.

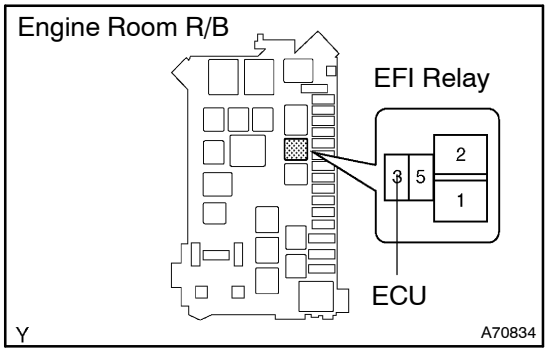
**Standard (Check for open):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| PCV (V11 – 2) ⇔ PA (E12 – 17) | Continuity |
| +B (V11 – 1) ⇔ ECU (EFI relay terminal 3 of R/B) | |

**Standard (Check for short):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| PA (E12 – 17) ⇔ E2 (E12 – 20) | No continuity |
| +B (V11 – 1) ⇔ E2 (E12 – 20) | |




**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**REPLACE VACUUM SWITCHING VALVE ASSY NO.1**

**10** **INSPECT TURBOCHARGER SUB–ASSY (See page 13–16)**

**NG** → **REPLACE TURBOCHARGER SUB–ASSY**

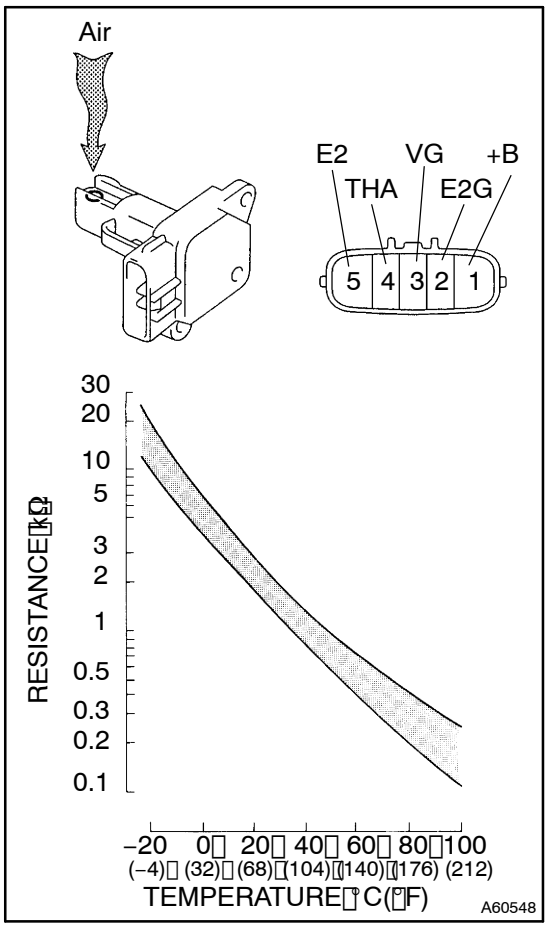
**OK**

**11** **INSPECT ELECTRIC EGR CONTROL VALVE ASSY (See page 12–28)**

**NG** → **REPLACE ELECTRIC EGR CONTROL VALVE ASSY**

**OK**

**12** **INSPECT MASS AIR FLOW METER**




(a) Check the mass air flow meter for resistance.

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

**Resistance:**

**13.6 – 18.4 kΩ at –20°C (–4°F)**
**2.21 – 2.69 kΩ at 20°C (68°F)**
**0.49 – 0.67 kΩ at 60°C (140°F)**

**NG** → **REPLACE MASS AIR FLOW METER**

**OK**

**CHECK AND REPLACE ECM**

## When not using hand–held tester:

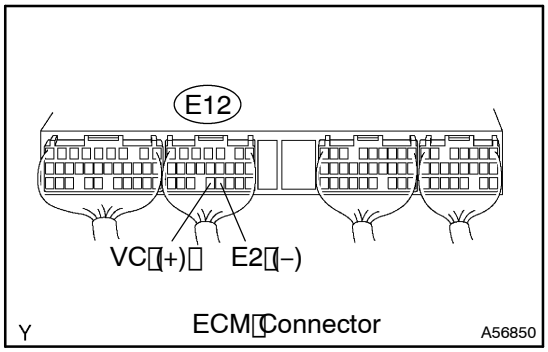
| 1 | INSPECT MANIFOLD ABSOLUTE PRESSURE SENSOR (See page 13–13) |
|---|---|

SST 09992–00242

NG → REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

OK

| 2 | INSPECT ECM(CHECK VOLTAGE) |
|---|---|




(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the ECM E12 connector.

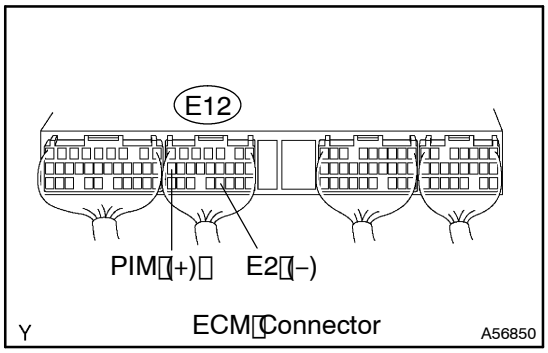
**Voltage:**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (E12 – 21) ⇔ E2 (E12 – 20) | 4.5 – 5.5 V |

NG → CHECK AND REPLACE ECM

OK

| 3 | INSPECT ECM(CHECK VOLTAGE) |
|---|---|




(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the ECM E12 connector.

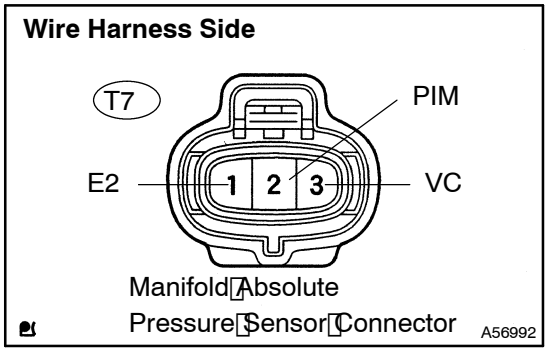
**Voltage:**

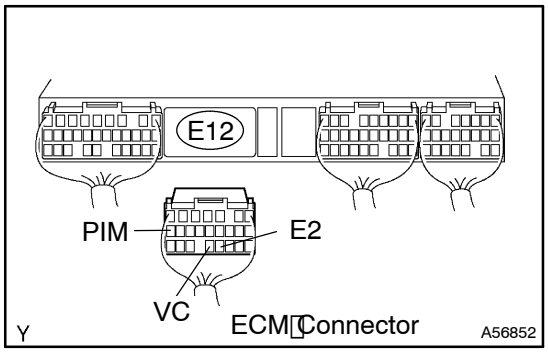
| Symbols (Terminal No.) | Specified condition |
|---|---|
| PIM (E12 – 16) ⇔ E2 (E12 – 20) | 1.7 – 2.9 V |

OK → CHECK AND REPLACE ECM

NG

| 4 | CHECK HARNESS AND CONNECTOR(ECM – MANIFOLD ABSOLUTE PRESSURE SENSOR) |
|---|---|




(a) Disconnect the manifold absolute pressure sensor connector.

(b) Disconnect the ECM E12 connector.

(c) Check the continuity between the wire harness side connector.

**Standard (Check for open):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (T7 – 3) ⇔ VC (E12 – 21) | Continuity |
| PIM (T7 – 2) ⇔ PIM (E12 – 16) | |
| E2 (T7 – 1) ⇔ E2 (E12 – 20) | |

**Standard (Check for short):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| VC (E12 – 21) ⇔ PIM (E12 – 16) | No continuity |
| VC (E12 – 21) ⇔ E2 (E12 – 20) | |
| PIM (E12 – 16) ⇔ E2 (E12 – 20) | |

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

| 5 | CHECK CONNECTION OF VACUUM HOSE(MANIFOLD ABSOLUTE PRESSURE SENSOR – VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR, AND VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR – INTAKE MANIFOLD) |
|---|---|

NG → **REPAIR OR REPLACE VACUUM HOSE**

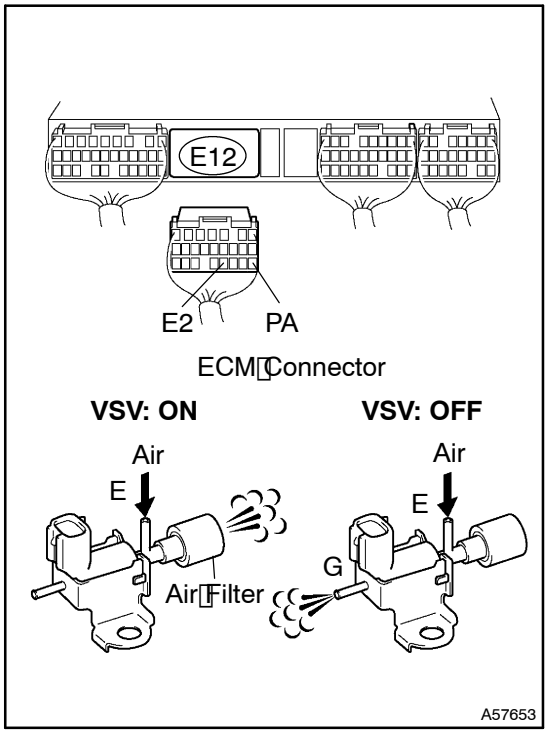
OK

| 6 | INSPECT VACUUM SWITCHING VALVE ASSY NO.1 (See page 13–16) |
|---|---|

NG → **REPLACE VACUUM SWITCHING VALVE ASSY NO.1**

OK

| 7 | CHECK OPERATION OF VSV(PURGE FLOW) |
|---|---|




(a) Disconnect the ECM E12 connector.
(b) Turn the ignition switch ON.
(c) Check the VSV function.
(1) Connect between terminal PA and E2 of the ECM connector. (VSV is ON)

**VSV is ON:**

**Air from port E flows out through the air filter.**

(2) Disconnect between terminal PA and E2 of the ECM connector. (VSV is OFF)

**VSV is OFF:**

**Air from port E flows out through port G.**

**NG** → **Go to step 11**

**OK**

| 8 | INSPECT TURBOCHARGER SUB–ASSY (See page 13–16) |
|---|---|

**NG** → **REPLACE TURBOCHARGER SUB–ASSY**

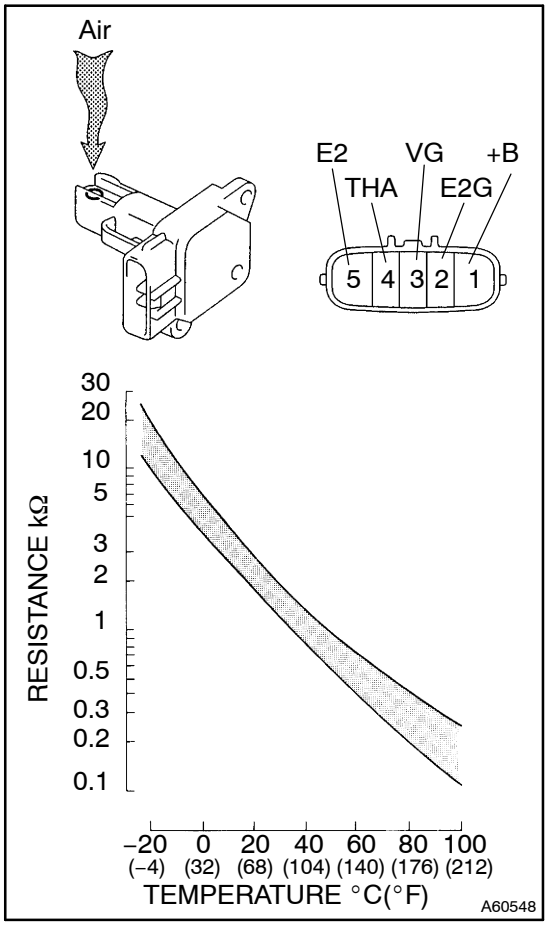
**OK**

| 9 | INSPECT ELECTRIC EGR CONTROL VALVE ASSY (See page 12–28) |
|---|---|

**NG** → **REPLACE ELECTRIC EGR CONTROL VALVE ASSY**

**OK**

| 10 | INSPECT MASS AIR FLOW METER |
|---|---|




(a) Check the mass air flow meter for resistance.

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

**Resistance:**

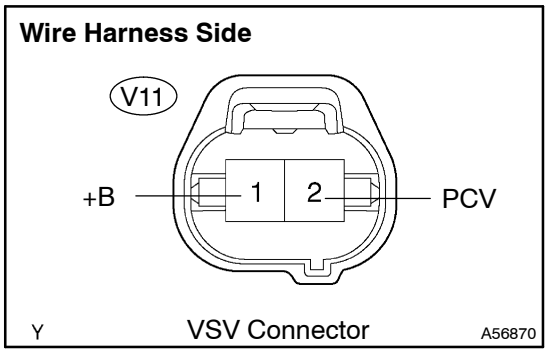
**13.6 – 18.4 kΩ at –20°C (–4°F)**
**2.21 – 2.69 kΩ at 20°C (68°F)**
**0.49 – 0.67 kΩ at 60°C (140°F)**

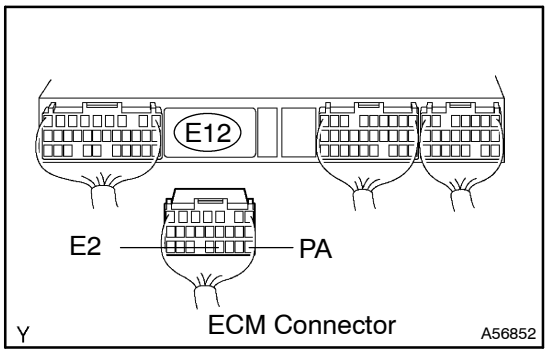
**NG** → **REPLACE MASS AIR FLOW METER**

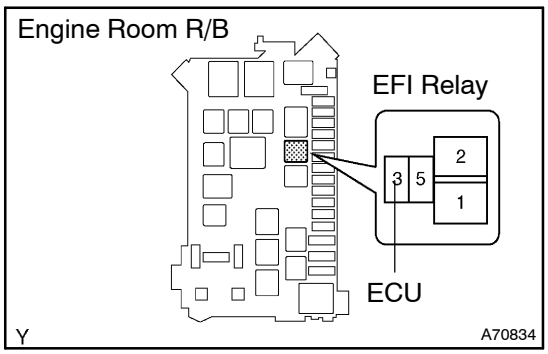
**OK**

**CHECK AND REPLACE ECM**

| 11 | CHECK HARNESS AND CONNECTOR(ECM – VSV FOR MANIFOLD ABSOLUTE PRESSURE SENSOR,AND FOR MANIFOLD ABSOLUTE PRESSURE SENSOR – EFI RELAY) |
|---|---|




(a) Disconnect the VSV connector.
(b) Disconnect the ECM E12 connector.
(c) Remove the EFI relay from the engine room R/B.
(d) Check the continuity between the wire harness side connector.

**Standard (Check for open):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| PCV (V11 – 2) ⇔ PA (E12 – 17) | Continuity |
| +B (V11 – 1) ⇔ ECU (EFI relay terminal 3 of R/B) | |

**Standard (Check for short):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| PA (E12 – 17) ⇔ E2 (E12 – 20) | No continuity |
| +B (V11 – 1) ⇔ E2 (E12 – 20) | |

**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**REPLACE VACUUM SWITCHING VALVE ASSY NO.1**