

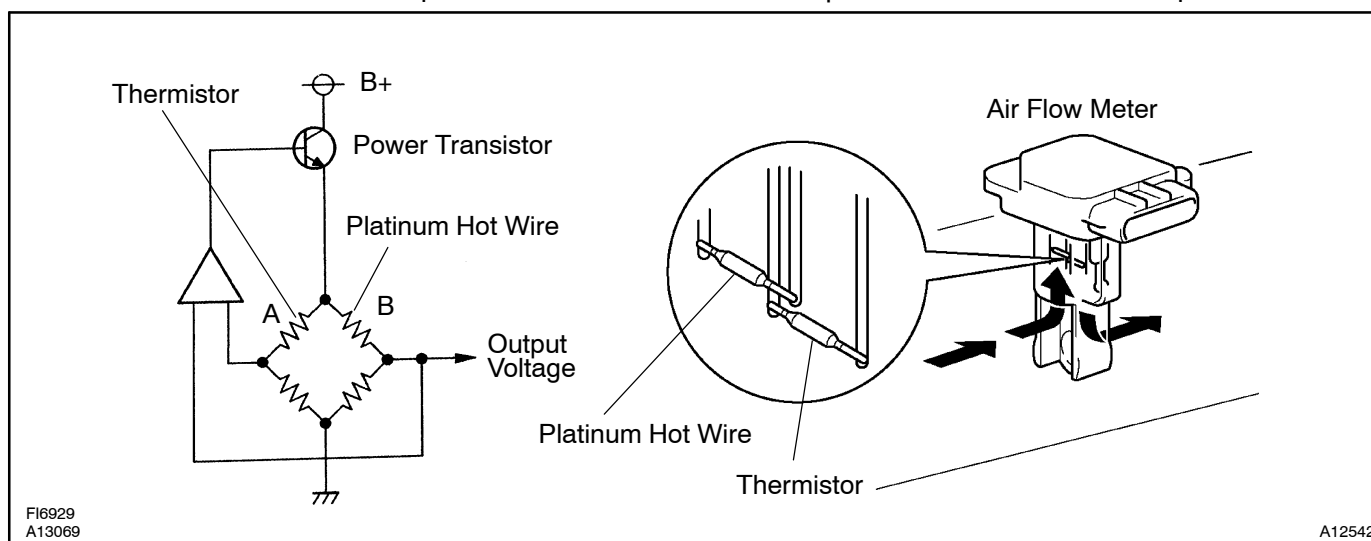
| | | |
|------------|-----------|-------------------------------------|
| DTC | 31 | AIR FLOW CIRCUIT MALFUNCTION |
|------------|-----------|-------------------------------------|

CIRCUIT DESCRIPTION

The air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, thermistor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and thermistor located in the intake air bypass of the housing detect any changes in the intake air temperature.

The hot wire is maintained at the set temperature by controlling the current flow through the hot wire. This current flow is then measured as the output voltage of the air flow meter.

The circuit is constructed so that the platinum hot wire and thermistor provide a bridge circuit with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



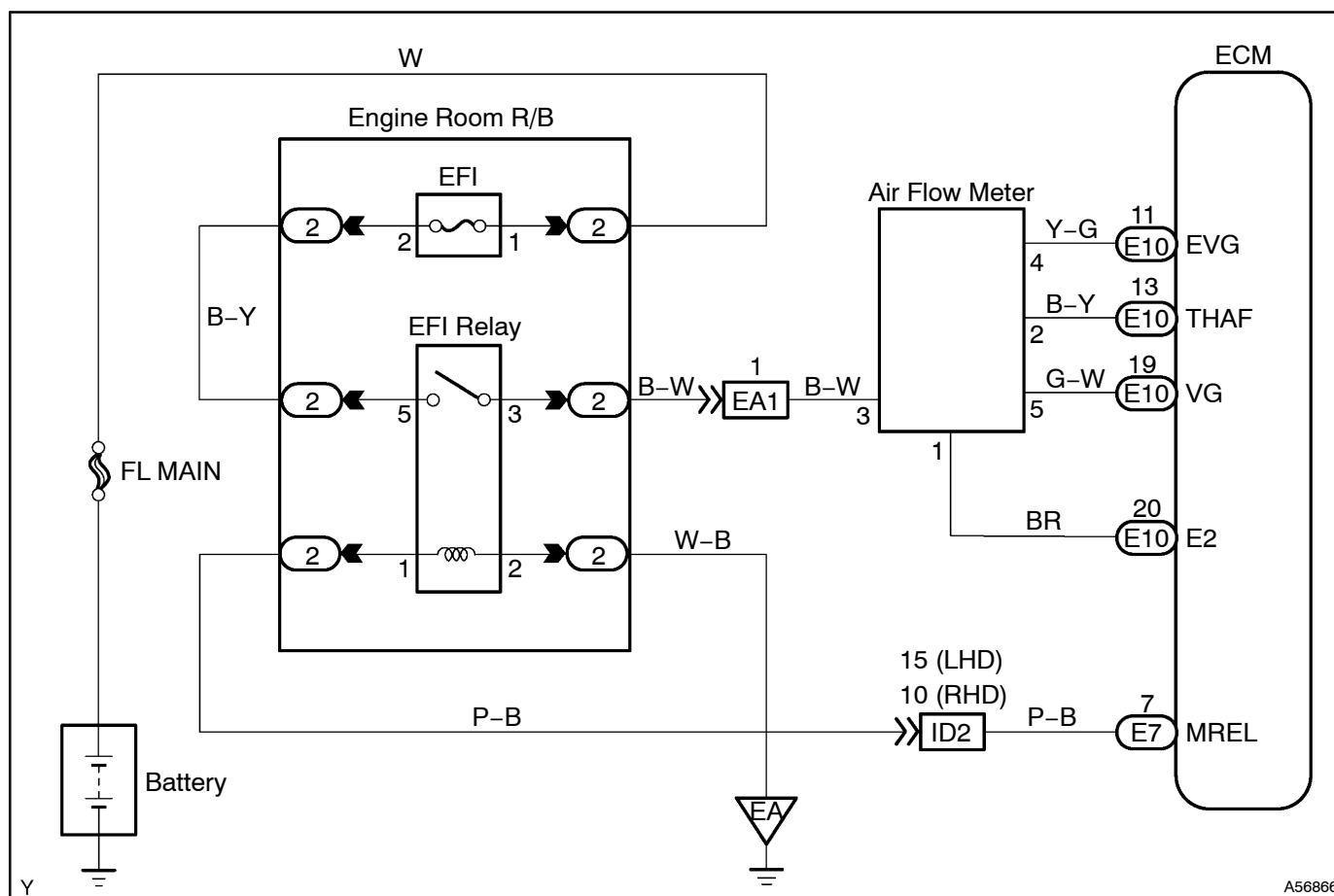
| DTC No. | DTC Detection Condition | Trouble Area |
|---------|---|--|
| 31 | Open or short in air flow meter circuit with more than 3 sec. | <ul style="list-style-type: none"> • Open or short in air flow meter circuit • Air flow meter • ECM |

HINT:

After confirming DTC 31, use the hand-held tester to confirm the air flow ratio from the CURRENT DATA.

| Air Flow Value (gm/sec.) | Malfunction |
|--------------------------|--|
| Approx. 0.0 | <ul style="list-style-type: none"> • Air flow meter power source circuit open • VG circuit open or short |
| 174.0 or more | <ul style="list-style-type: none"> • EVG circuit open |

WIRING DIAGRAM



INSPECTION PROCEDURE

Read freeze frame data using 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(MASS AIR FLOW RATE)

(a) Read the air flow rate on the hand-held tester.

Result:

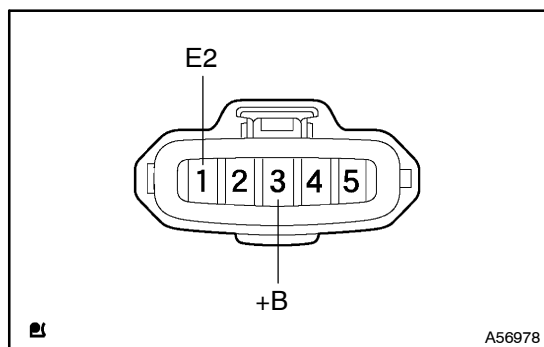
| | A | B |
|-------------------------|-----|---------------|
| Air Flow Rate (gm/sec.) | 0.0 | 174.0 or more |

B

Go to step 6

A

2 INSPECT INTAKE AIR FLOW METER SUB-ASSY(POWER SOURCE VOLTAGE)



- Disconnect the air flow meter connector.
- Turn the ignition switch ON.
- Measure the voltage between terminal +B and E2 of the air flow meter harness side connector.

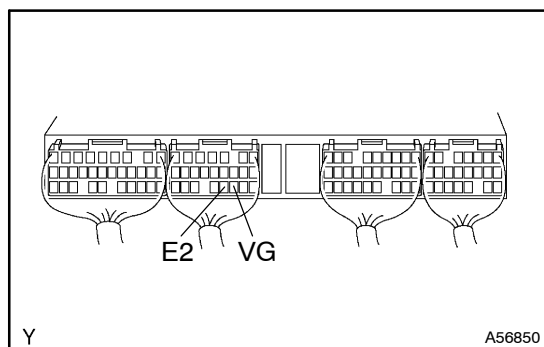
Voltage: 9 – 14 V

NG

Go to step 5

OK

3 INSPECT ECM



- Start the engine.
- Measure the voltage between terminal VG and E2 of the ECM connector while the engine is idling.

Voltage: 0.5 – 3.0 V

HINT:

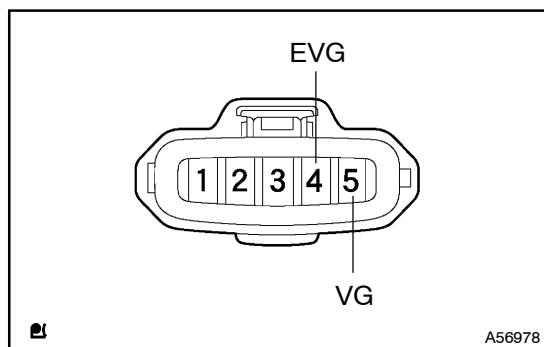
The shift position should be P or N, and A/C switch should be turned OFF.

OK

CHECK AND REPLACE ECM

NG

4 CHECK HARNESS AND CONNECTOR(AIR FLOW METER-ECM)



- Disconnect the air flow meter connector.
- Disconnect the ECM E10 connector.
- Check for open between the terminals VG of the air flow meter harness side connector and VG of the ECM E10 connector.

Resistance: 1 Ω or less

- Check for open between the terminals EVG of the air flow meter harness side connector and EVG of the ECM E10 connector.

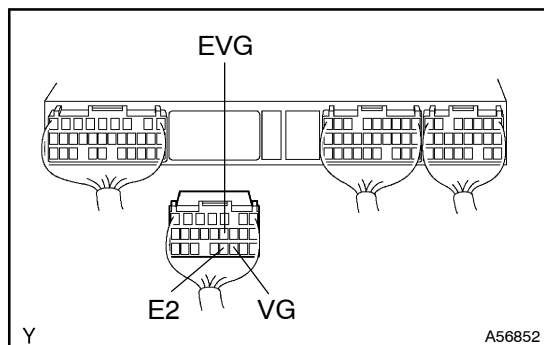
Resistance: 1 Ω or less

- Check for short between the terminals VG and EGV of the ECM E10 connector.

Resistance: 1 M Ω or more

- Check for short between the terminals VG and E2 of the ECM E10 connector.

Resistance: 1 M Ω or more



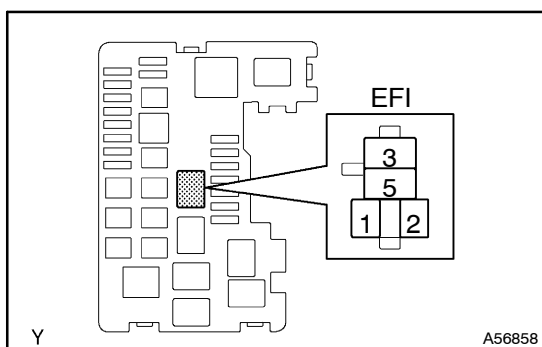
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REPAIR OR REPLACE HARNESS AND CONNECTOR

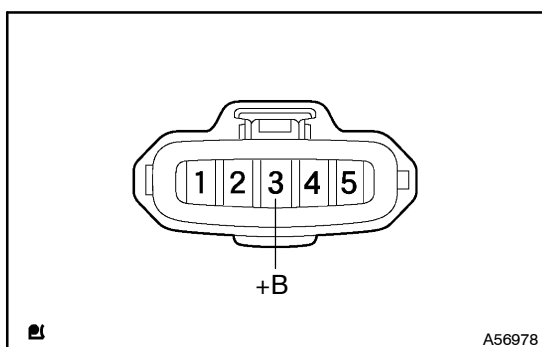
OK

REPLACE INTAKE AIR FLOW METER SUB-ASSY

5 CHECK HARNESS AND CONNECTOR(AIR FLOW METER +B CIRCUIT)



- Remove the EFI relay from the engine room R/B.
- Disconnect the air flow meter connector.
- Check for open between the terminals +B of the air flow meter connector and 3 of the EFI relay.

Resistance: 1 Ω or less

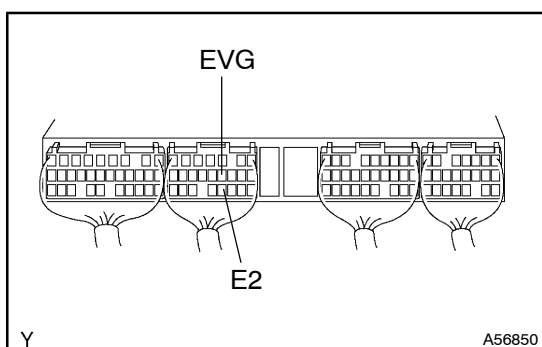
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REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK FOR ECM POWER SOURCE CIRCUIT

6 INSPECT ECM



- Check for open between the terminals EVG and E2 of the ECM connector.

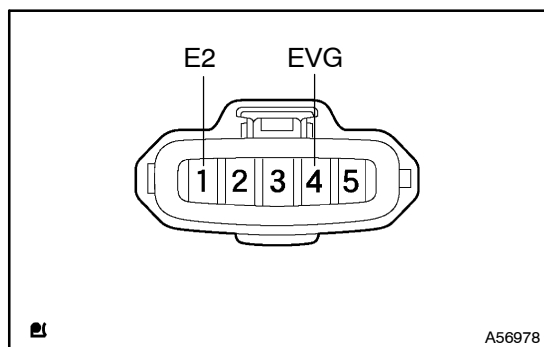
Resistance: 1 Ω or less

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CHECK AND REPLACE ECM

OK

7 CHECK HARNESS AND CONNECTOR(AIR FLOW METER-ECM)

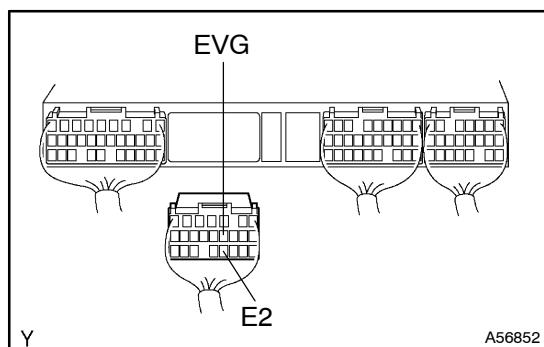


- (a) Disconnect the air flow meter connector.
- (b) Disconnect the ECM E10 connector.
- (c) Check for open between the terminals EVG of the air flow meter harness side connector and EVG of the ECM E10 connector.

Resistance: 1 Ω or less

- (d) Check for open between the terminals E2 of the air flow meter harness side connector and E2 of the ECM E10 connector.

Resistance: 1 Ω or less



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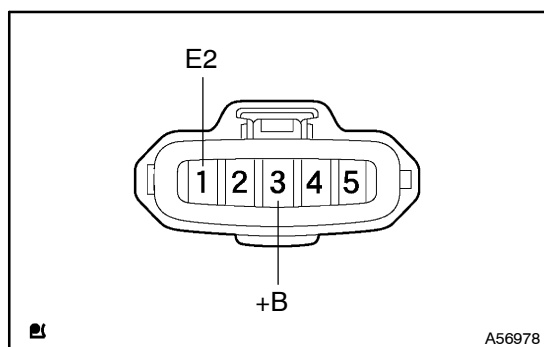
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE INTAKE AIR FLOW METER SUB-ASSY

When not using hand-held tester

1 INSPECT INTAKE AIR FLOW METER SUB-ASSY(POWER SOURCE VOLTAGE)



- (a) Disconnect the air flow meter connector.
- (b) Turn the ignition switch ON.
- (c) Measure the voltage between terminal +B and E2 of the air flow meter harness side connector.

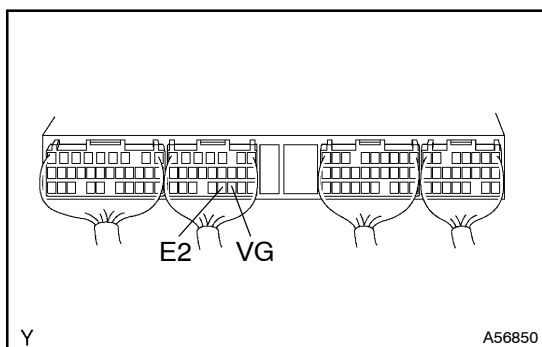
Voltage: 9 - 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 INSPECT ECM



- (a) Start the engine.
- (b) Measure the voltage between terminal VG and E2 of the ECM connector while the engine is idling.

Voltage: 0.5 – 3.0 V

HINT:

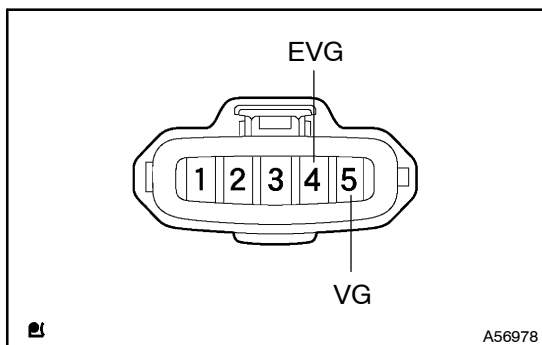
The shift position should be P or N and A/C switch should be turned OFF.

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CHECK AND REPLACE ECM

OK

3 CHECK HARNESS AND CONNECTOR(AIR FLOW METER-ECM)



- (a) Disconnect the air flow meter connector.
- (b) Disconnect the ECM E10 connector.
- (c) Check for open between the terminals VG of the air flow meter harness side connector and VG of the ECM E10 connector.

Resistance: 1 Ω or less

- (d) Check for open between the terminals EVG of the air flow meter harness side connector and EVG of the ECM E10 connector.

Resistance: 1 Ω or less

- (e) Check for short between the terminals VG and EGV of the ECM E10 connector.

Resistance: 1 M Ω or more

- (f) Check for short between the terminals VG and E2 of the ECM E10 connector.

Resistance: 1 M Ω or more

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REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE INTAKE AIR FLOW METER SUB-ASSY