

DTC	P0100	Mass or Volume Air Flow Circuit
DTC	P0102	Mass or Volume Air Flow Circuit Low Input
DTC	P0103	Mass or Volume Air Flow Circuit High Input

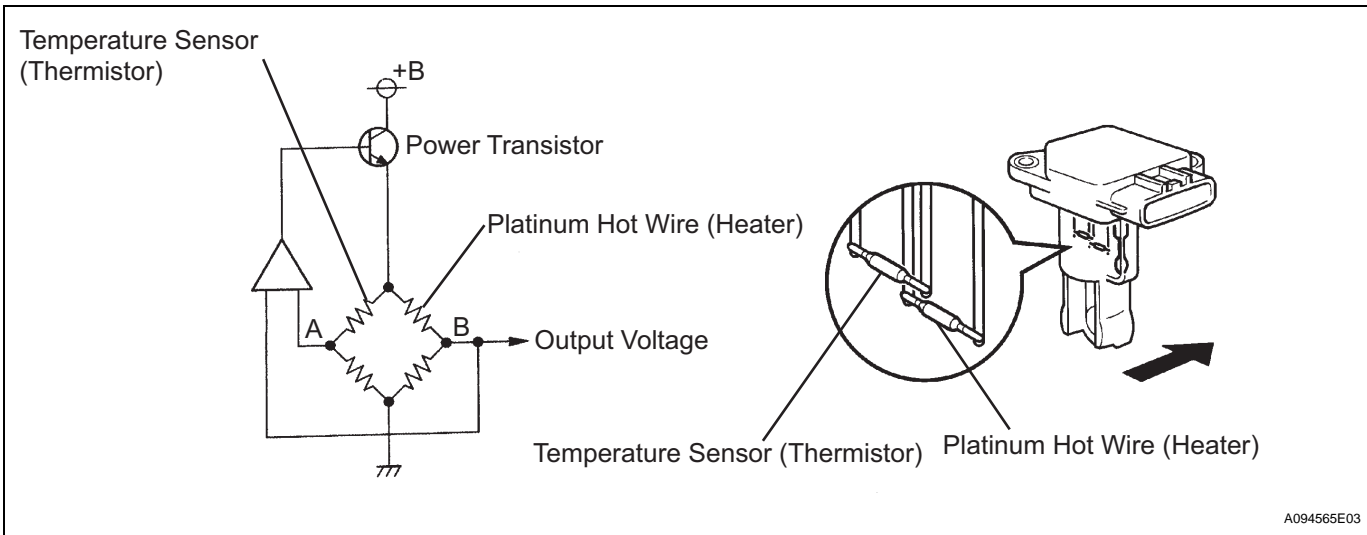
DESCRIPTION

The Mass Air Flow (MAF) meter measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provide a proper air fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

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By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, changing their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the air flow through the sensor. The ECM interprets this voltage as the intake air amount.

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



A094565E03

DTC No.	DTC Detection Condition	Trouble Area
P0100	When MAF meter circuit has an open or a short for more than 3 seconds under 4,000 rpm engine speed	<ul style="list-style-type: none"> • Open or short in MAF meter circuit • MAF meter • ECM
P0102	When MAF meter circuit has an open for more than 3 seconds under 4,000 rpm engine speed	<ul style="list-style-type: none"> • Open or short in MAF meter circuit • MAF meter • ECM
P0103	When MAF meter circuit has a short for more than 3 seconds under 4,000 rpm engine speed	<ul style="list-style-type: none"> • Open or short in MAF meter circuit • MAF meter • ECM

HINT:

After confirming DTC P0100, P0102 or P0103, use the intelligent tester or the OBD II scan tool to confirm the MAF ratio from the ALL menu (to reach the ALL menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL).

Air Flow Value (gm/s)	Malfunction
Approx. 0.0	<ul style="list-style-type: none"> • Open in MAF meter power source circuit • Open or short in VG circuit
271.0 or more	<ul style="list-style-type: none"> • Open in E2G circuit

MONITOR DESCRIPTION

If there is a defect in the sensor, or an open or short circuit, the voltage level will deviate from the normal operating range. The ECM interprets this deviation as a defect in the MAF meter and sets a DTC.

Example:

The sensor voltage output is less than 0.2 V or more than 4.9 V and either condition continues for more than 3 seconds.

MONITOR STRATEGY

Related DTCs	P0100: MAF Meter Range Check (Chattering) P0102: MAF Meter Range Check (Low voltage) P0103: MAF Meter Range Check (High voltage)
Required sensors / components (Main)	MAF meter
Required sensors / components (Related)	Crankshaft position sensor
Frequency of operation	Continuous
Duration	3 seconds
MIL operation	Immediate: Engine RPM is less than 4,000 rpm 2 driving cycles: Engine RPM is 4,000 rpm or more
Sequence operation	None

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TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
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TYPICAL MALFUNCTION THRESHOLDS

P0100:

MAF meter voltage	Less than 0.2 V, or more than 4.9 V
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P0102:

MAF meter voltage	Less than 0.2 V
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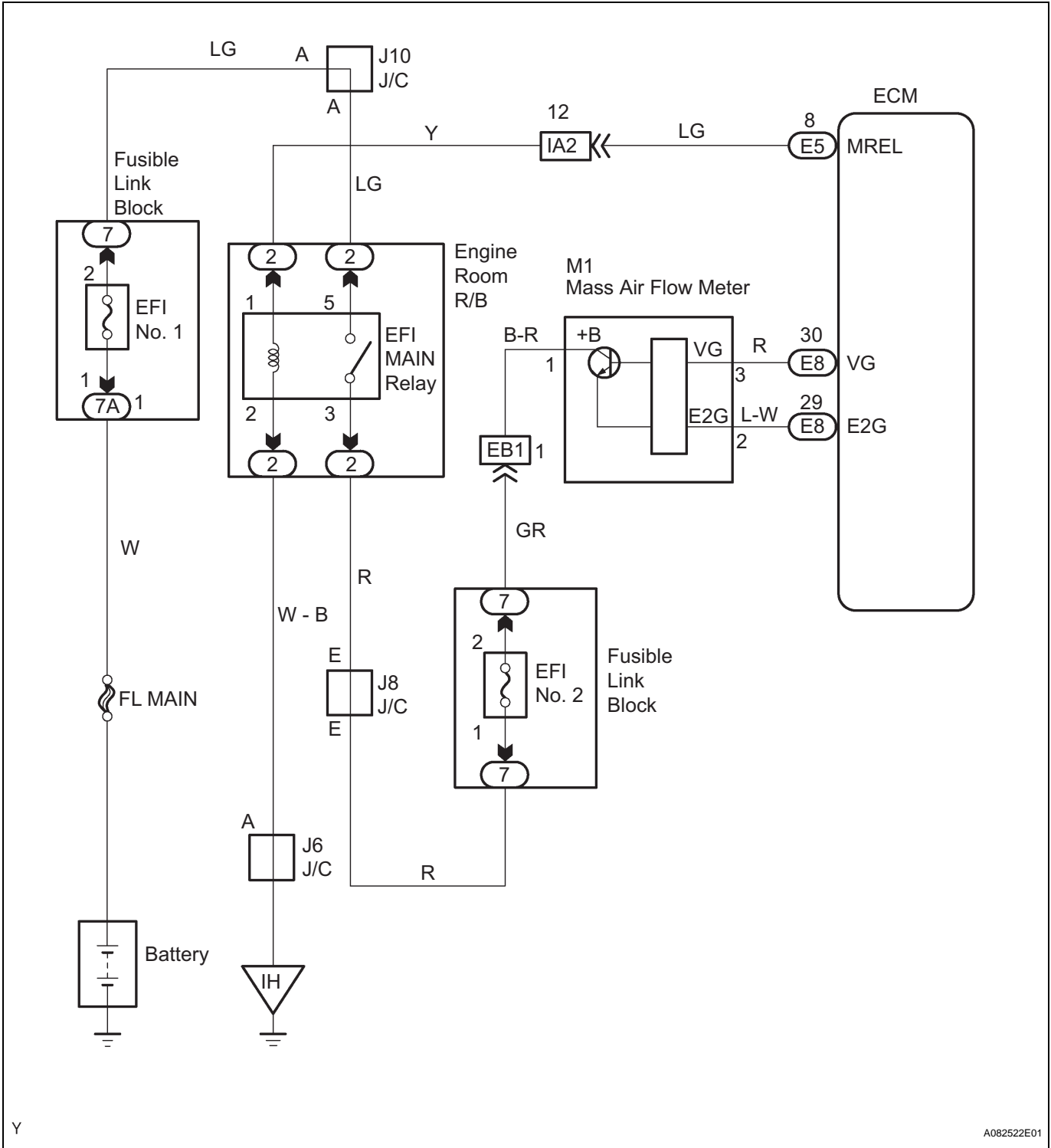
P0103:

MAF meter voltage	More than 4.9 V
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COMPONENT OPERATING RANGE

Mass air flow meter voltage	Between 0.4 V and 2.2 V
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WIRING DIAGRAM



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HINT:

Read freeze frame data using the intelligent tester or the OBD II scan tool. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF INTELLIGENT TESTER OR OBD II SCAN TOOL (MASS AIR FLOW RATE)

- (a) Connect the intelligent tester or the OBD II scan tool to the DLC3.
- (b) Start the engine.
- (c) Push the intelligent tester or the OBD II scan tool main switch ON.
- (d) On the intelligent tester or the OBD II scan tool, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF. Read the values.

Result

Air Flow Rate (gm/s)	Proceed to
0.0	A
271.0 or more	B
MAF rate greater than 1 but less than 270.0*	C

HINT:

*: The value must change when the throttle valve is opened or closed.

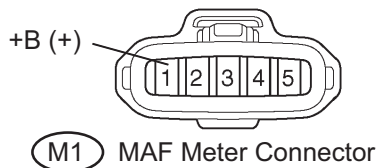
B → **Go to step 6**

C → **CHECK FOR INTERMITTENT PROBLEMS**

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2 INSPECT MASS AIR FLOW METER (POWER SOURCE VOLTAGE)

Wire Harness Side:



Y

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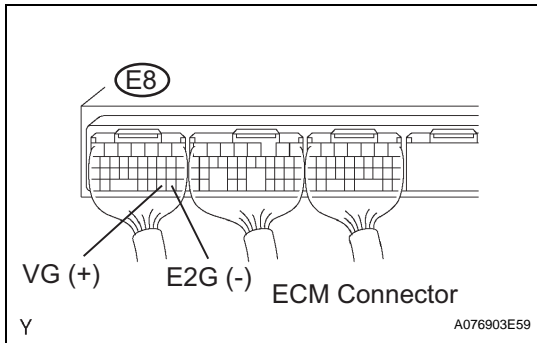
- (a) Turn the ignition switch ON.
 - (b) Disconnect the M1 MAF meter connector.
 - (c) Measure the voltage of the wire harness side connector.
- Standard voltage**

Tester Connection	Specified Condition
M1-1 (+B) - Body ground	9 to 14 V

NG → **Go to step 5**

OK

3 INSPECT ECM (VG VOLTAGE)



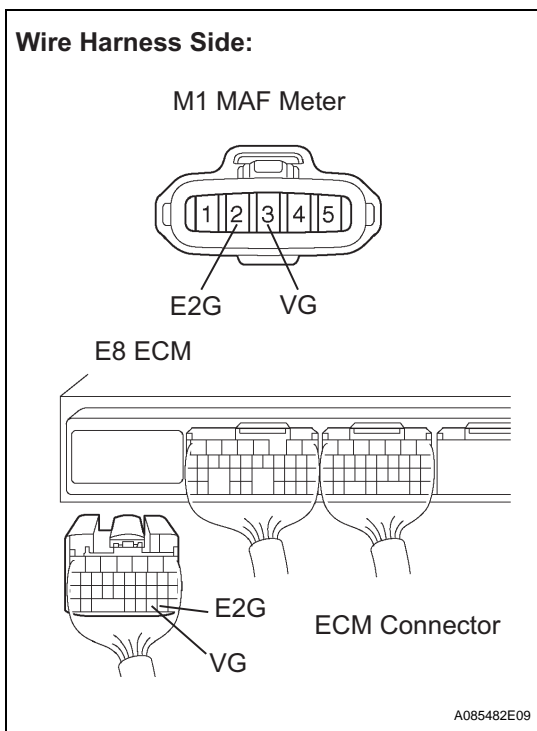
- (a) Start the engine.
 - (b) Measure the voltage of the E8 ECM connector.
- HINT:
The shift position should be P or N and the A/C switch should be turned OFF.
- Standard voltage**

Tester Connection	Condition	Specified Condition
E8-30 (VG) - E8-29 (E2G)	Engine is idling	0.5 to 3.0 V

OK → **REPLACE ECM**

NG

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



- (a) Disconnect the M1 MAF meter connector.
 - (b) Disconnect the E8 ECM connector.
 - (c) Measure the resistance of the wire harness side connectors.
- Standard resistance**

Tester Connection	Specified Condition
M1-3 (VG) - E8-30 (VG) M1-2 (E2G) - E8-29 (E2G)	Below 1 Ω
M1-3 (VG) or E8-30 (VG) - Body ground	10 kΩ or higher

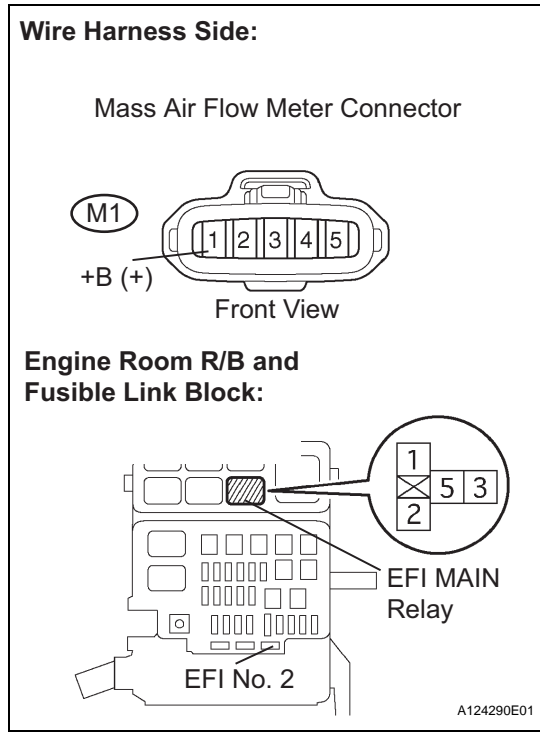
- (d) Reconnect the MAF meter connector and ECM connector.

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

OK

REPLACE MASS AIR FLOW METER

5 CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - EFI MAIN RELAY)



- (a) Check the EFI No. 2 fuse.
 - (1) Remove the EFI No. 2 fuse the fusible link block.
 - (2) Measure the resistance of the EFI No. 2 fuse.
- Standard:**
Below 1 Ω
- (3) Reinstall the EFI No. 2 fuse.
 - (b) Disconnect the M1 MAF meter connector.
 - (c) Remove the EFI MAIN relay from the engine room R/B.
 - (d) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
M1-1 (+B) - EFI MAIN relay terminal 3	Below 1 Ω
M1-1 (+B) or EFI MAIN relay terminal 3 - Body ground	10 kΩ or higher

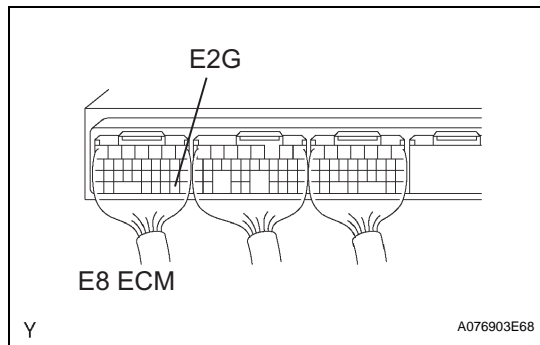
- (e) Reconnect the MAF meter connector.
- (f) Reinstall the EFI MAIN relay.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

INSPECT ECM POWER SOURCE CIRCUIT

6 INSPECT ECM (SENSOR GROUND)



- (a) Measure the resistance of the ECM connector.
- Standard resistance**

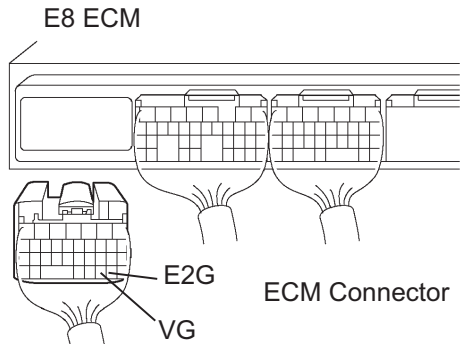
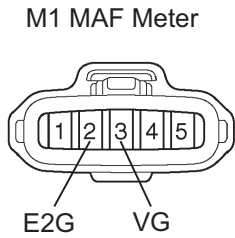
Tester Connection	Specified Condition
E8-29 (E2G) - Body ground	Below 1 Ω

NG **REPLACE ECM**

OK

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

Wire Harness Side:



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- (a) Disconnect the M1 MAF meter connector.
- (b) Disconnect the E8 ECM connector.
- (c) Measure the resistance of between the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
M1-3 (VG) - E8-30 (VG) M1-2 (E2G) - E8-29 (E2G)	Below 1 Ω
M1-3 (VG) or E8-30 (VG) - Body ground	10 kΩ or higher

- (d) Reconnect the MAF meter connector and ECM connector.

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

ES

OK

REPLACE MASS AIR FLOW METER