

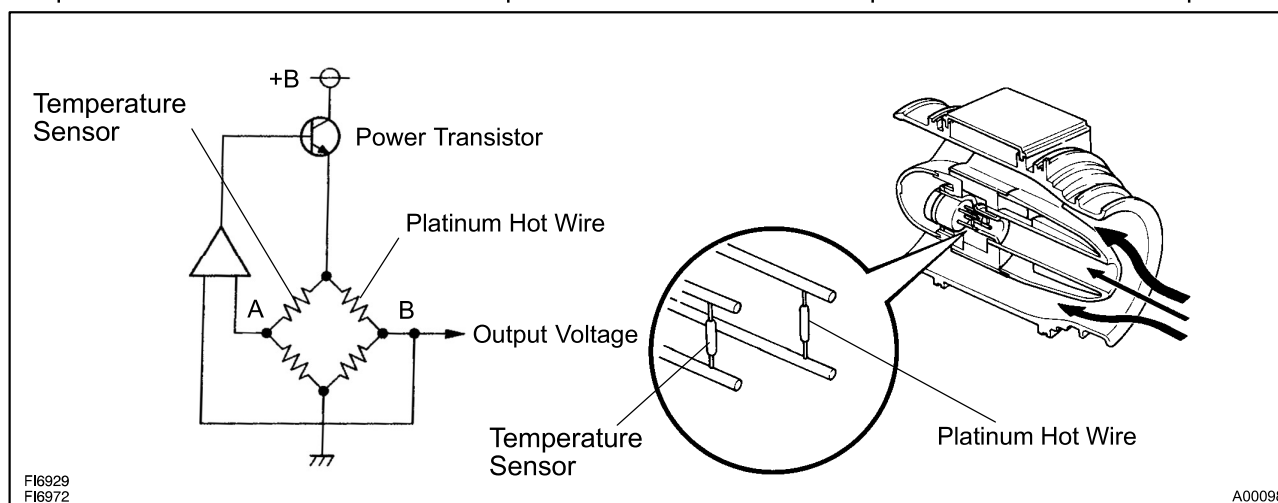
CIRCUIT INSPECTION

DTC	P0100	Mass Air Flow Circuit Malfunction
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CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, temperature sensor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and temperature sensor 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 mass air flow meter.

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.



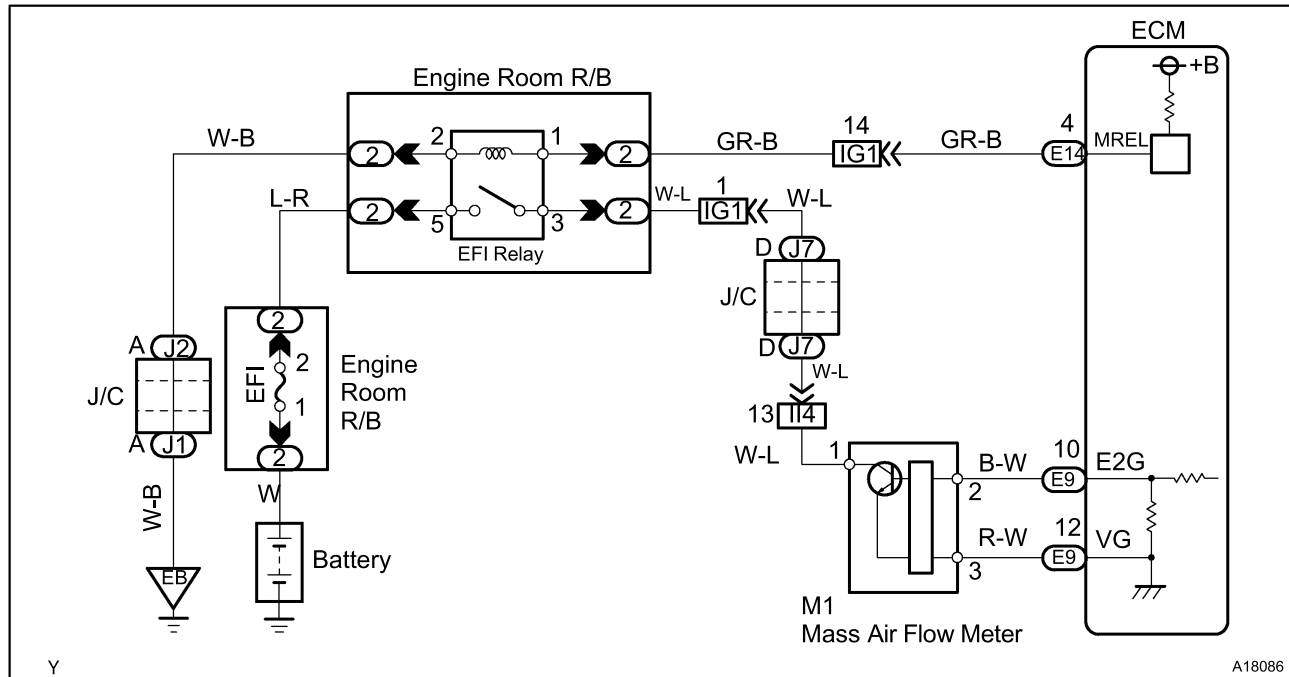
DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or less	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM
	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or more (2 trip detection logic)	

HINT:

After confirming DTC P0100, use the OBD II scan tool or TOYOTA hand-held tester to confirm the mass air flow ratio from the CURRENT DATA.

Mass Air Flow Value (gm/sec.)	Malfunction
Approx. 0	• Mass air flow meter power source circuit open • VG circuit open or short
11.0 - 25.1 (idling after warmed up)	• E3 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Connect OBD II scan tool or TOYOTA hand-held tester, and read value of mass air flow rate.
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PREPARATION:

- Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
- Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.
- Start the engine.

CHECK:

Read the mass air flow rate on the OBD II scan tool or TOYOTA hand-held tester.

RESULT:

	Type I	Type II
Mass Air Flow Rate (gm/sec.)	Approx. 0	11.0 ~ 25.1 (idling after warmed up)

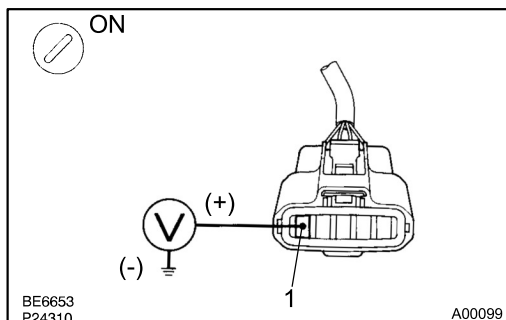
Type I

Go to step 2.

Type II

Go to step 5.

2 Check voltage of mass air flow meter power source.



PREPARATION:

- (a) Disconnect the mass air flow meter connector.
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal 1 of the mass air flow meter connector and body ground.

OK:

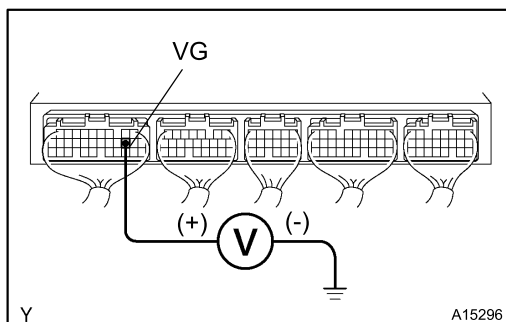
Voltage: 9 - 14 V

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page [IN-28](#)).

OK

3 Check voltage between terminal VG of ECM connector and body ground.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-54](#)).
- (b) Start the engine.

CHECK:

Measure the voltage between terminal VG of the ECM connector and body ground while the engine is idling.

OK:

Voltage:

1.1 - 1.5 V (P or N position and A/C switch OFF)

OK

Check and replace ECM (See page [IN-28](#)).

NG

4 Check for open and short in harness and connector between mass air flow meter and ECM (See page [IN-28](#)).

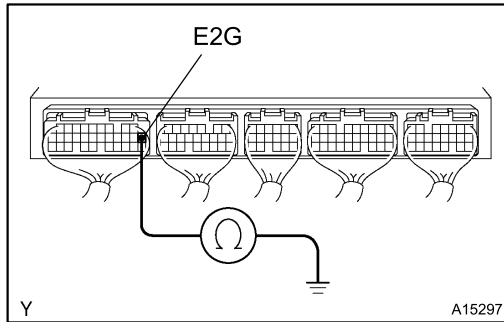
NG

Repair or replace harness or connector.

OK

Replace mass air flow meter.

5 Check continuity between terminal E2G of ECM connector and body ground.



PREPARATION:

Remove the glove compartment (See page [SF-54](#)).

CHECK:

Check the continuity between terminal E2G of the ECM connector and body ground.

OK:

Continuity (1 Ω or less)

NG

Check and replace ECM (See page [IN-28](#)).

OK

6 Check for open in harness and connector between mass air flow meter and ECM (See page [IN-28](#)).

NG

Repair or replace harness or connector.

OK

Replace mass air flow meter.

DTC	P0101	Mass Air Flow Circuit Range/Performance Problem
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CIRCUIT DESCRIPTION

Refer to DTC P0100 on page [DI-21](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P0101	After engine is warmed up, conditions (a) and (b) continue with engine speed 900 rpm or less: (2 trip detection logic) (a) Throttle valve fully closed (b) Mass air flow meter output > 2.2 V	• Mass air flow meter
	Conditions (a) and (b) continue with engine speed 1,500 rpm or more: (2 trip detection logic) (a) VTA $\geq$ 0.63 V (b) Mass air flow meter output < 1.06 V	

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0101) being output?
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NO

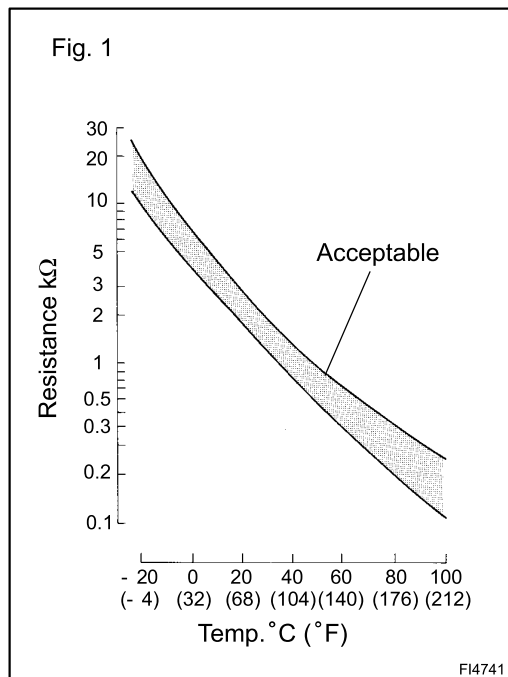
Replace mass air flow meter.

YES

Go to relevant DTC chart (See page [DI-13](#)).

DTC	P0110	Intake Air Temp. Circuit Malfunction
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CIRCUIT DESCRIPTION



The intake air temperature sensor is built into the mass air flow meter and senses the intake air temperature.

A thermistor built in the sensor changes the resistance value according to the intake air temperature.

The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).

The intake air temperature sensor is connected to the ECM (See below). The 5 V power source voltage in the ECM is applied to the intake air temp. sensor from terminal THA via resistor R.

That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation. If the ECM detects the DTC P0110, it operates the fail safe function in which the intake air temperature is assumed to be 20°C (68°F).

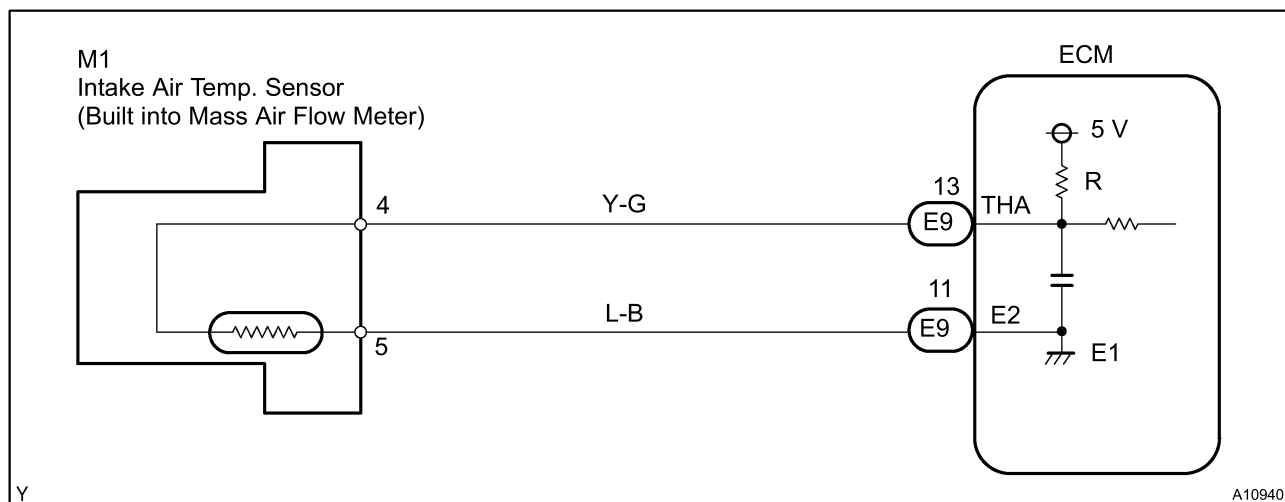
DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (built into mass air flow meter) • ECM

HINT:

After confirming DTC P0110, use the OBD II scan tool or TOYOTA hand-held tester to confirm the intake air temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
-40 °C (-40°F)	Open circuit
140 °C (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Connector OBD II scan tool or TOYOTA hand-held tester, and read value of intake air temperature
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PREPARATION:

- Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
- Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Same as actual intake air temperature.

HINT:

- If there is open circuit, OBD II scan tool or TOYOTA hand-held tester indicates -40°C (-40°F).
- If there is short circuit, OBD II scan tool or TOYOTA hand-held tester indicates 140°C (284°F) or more.

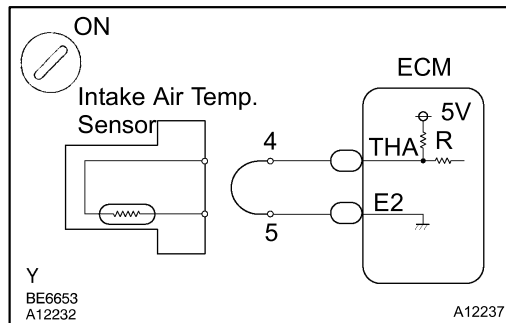
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-40°C (-40°F) ... Go to step 2.
 140°C (284°F) or more ... Go to step 4.

OK

Check for intermittent problems
(See page [DI-3](#)).

2 Check for open in harness or ECM.



PREPARATION:

- Disconnect the mass air flow meter connector.
- Connect the sensor wire harness terminals together.
- Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

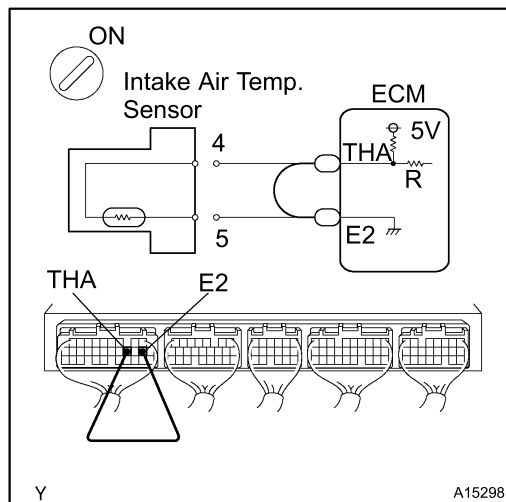
Temperature value: 140°C (284°F) or more

OK

Confirm good connection at sensor. If OK, replace mass air flow meter.

NG

3 Check for open in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-54](#)).
- Connect between terminals THA and E2 of the ECM connector.

HINT:

The mass air flow meter connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page [IN-28](#)).

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

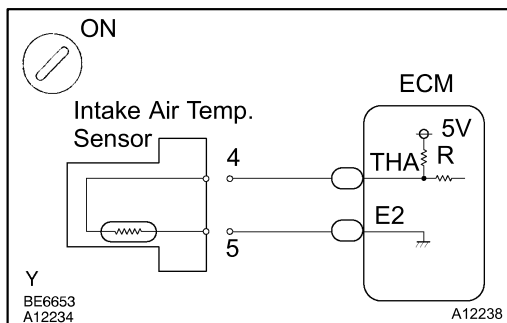
Temperature value: 140°C (284°F) or more

OK

Open in harness between terminals E2 and THA, repair or replace harness.

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-28](#)).

4 Check for short in harness and ECM.**PREPARATION:**

- (a) Disconnect the mass air flow meter connector.
- (b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

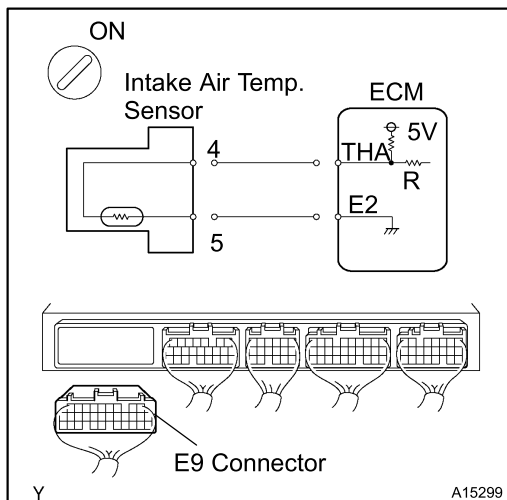
OK:

Temperature value: -40°C (-40°F)

OK

Replace mass air flow meter.

NG

5 Check for short in harness or ECM.**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-54](#)).
- (b) Disconnect the E9 connector from the ECM.

HINT:

The mass air flow meter connector is disconnected.

- (c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Check and replace ECM (See page [IN-28](#)).