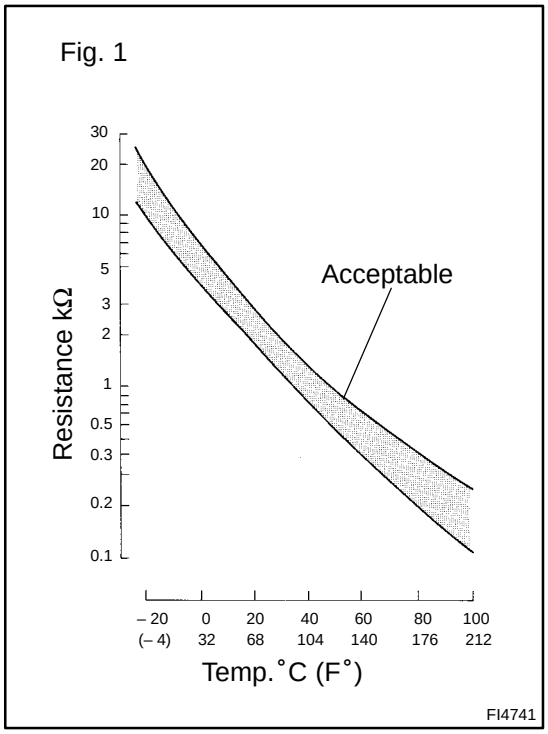
DI12I–13

DTC	P0110	Intake Air Temperature Circuit Malfunction

CIRCUIT DESCRIPTION



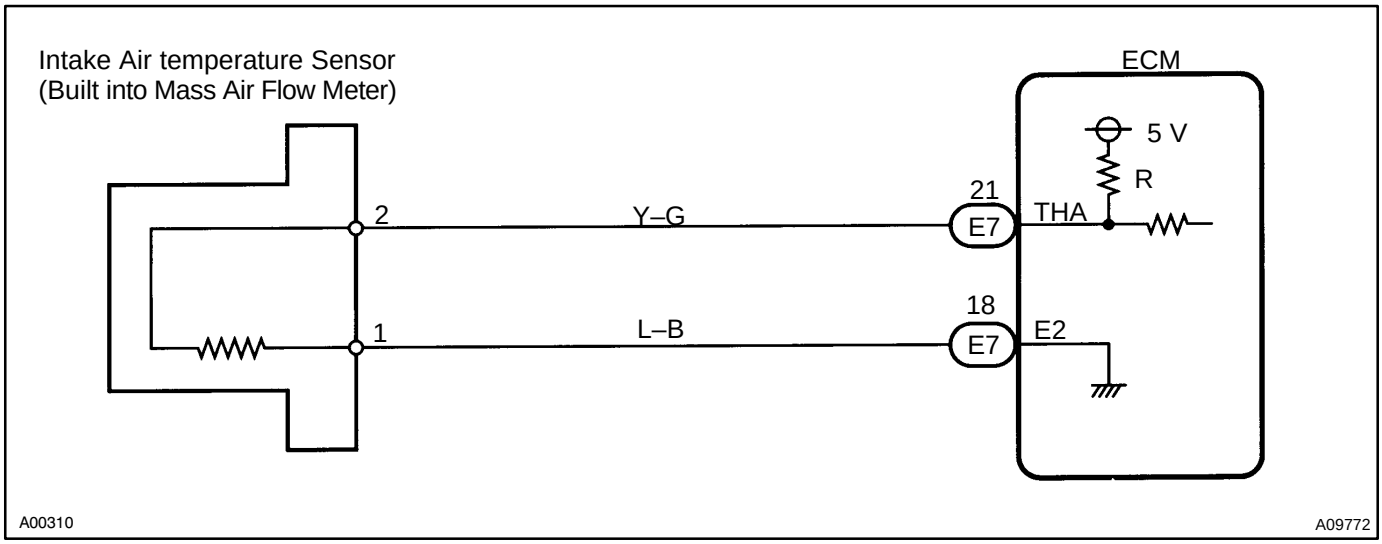
The intake air temperature sensor is built into mass air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature, the greater the thermistor resistance value, and the 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 temperature sensor from terminal THA via a 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.

DTC No.	DTC Detection 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 P110, use the hand–held tester or the OBD II scan tool to confirm the intake air temperature from the ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL”.

Temperature Displayed	Malfunction
–40˚C (–40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

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 or the OBD II scan tool, 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, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester or OBD II scan tool, and read value of intake air temperature.**

PREPARATION:

(a) Connect the hand–held tester or OBD II scan tool to DLC3.
(b) Turn the ignition switch ON and push the hand–held tester or OBD II scan tool main switch ON.
(c) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR”.

CHECK:

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

OK:

Same value as the actual intake temperature.

HINT:

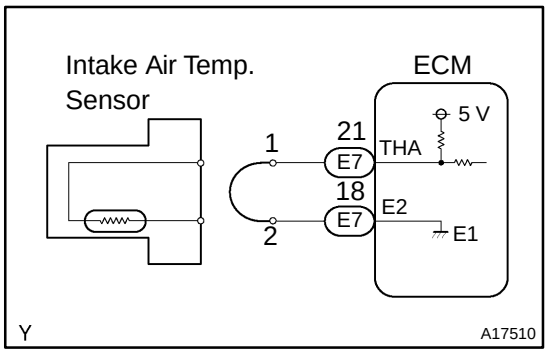
- If there is open circuit, hand–held tester or OBD II scan tool indicates –40˚C (–40˚F).
- If there is short circuit, hand–held tester or OBD II scan tool indicates 140˚C (284˚F) or more.

NG → **–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:

(a) Disconnect the mass air flow meter connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.
(d) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR”.

CHECK:

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

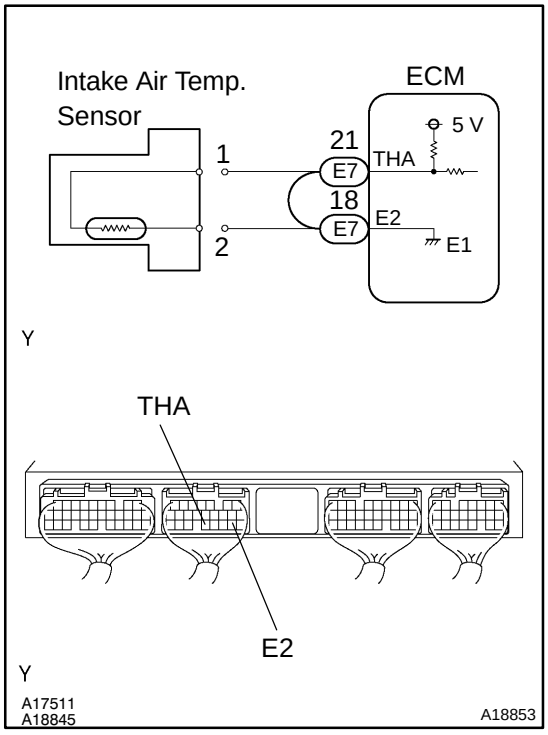
OK:

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:

(a) Disconnect the mass air flow meter connector.
(b) Remove the glove compartment (See page SF–55).
(c) 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).

(d) Turn the ignition switch ON.
(e) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR”.

CHECK:

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

OK:

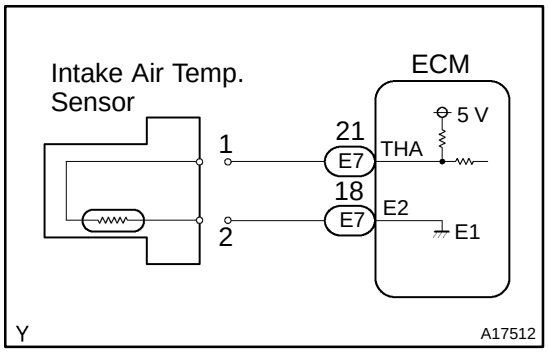
Temperature value: 140˚C (284˚F) or more

OK	Open in harness between terminal E2 or THA, repair or replace harness.

NG

Confirm good connection at ECM. If OK, replace ECM.

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



PREPARATION:

(a) Disconnect the mass air flow meter connector.
(b) Turn the ignition switch ON.
(c) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR”.

CHECK:

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

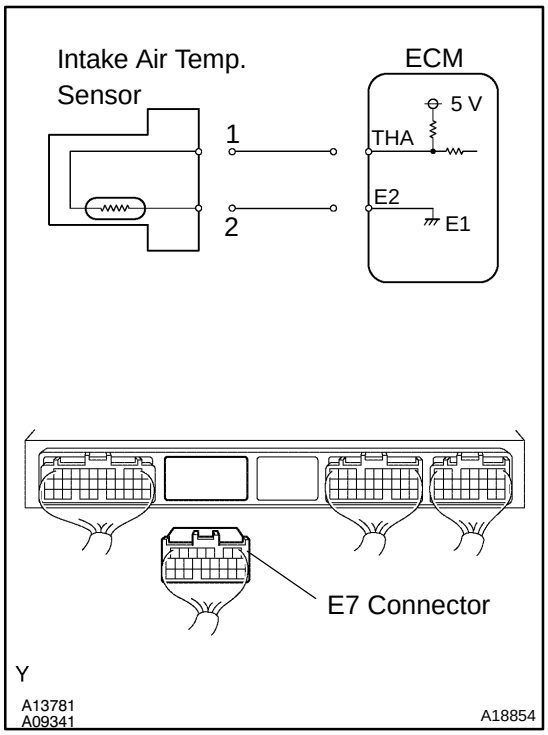
OK:

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–55).

(b) Disconnect the E7 ECM connector.

HINT:

The mass air flow meter connector is disconnected.

(c) Turn the ignition switch ON.

(d) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR”.

CHECK:

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

OK:

Temperature value: –40°C (–40°F)

OK → **Repair or replace harness or connector.**

NG

Check and replace ECM (See page IN–28).