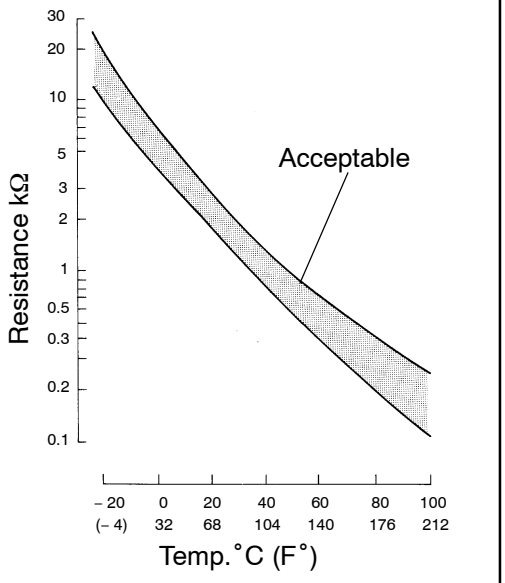
DI4E4–03

DTC	P0110	Intake Air Temp. Circuit Malfunction

(fig.1)



CIRCUIT DESCRIPTION

The intake air temperature sensor is mounted on the air cleaner cap 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 is the greater the thermistor resistance value, and the higher the intake air temperature the lower the thermistor resistance value becomes (See fig.1).

The air intake temperature sensor is connected to the engine ECU (See below). The 5V power source voltage in the engine ECU is applied to the intake air temperature sensor from the terminal THA via resistor R. That is the 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 engine ECU increases the fuel injection volume to improve driveability during cold engine operation.

If the engine ECU detects the DTC "P0110", it operates the fail–safe function in which the intake air temperature is assumed to be 20˚C (68˚F).

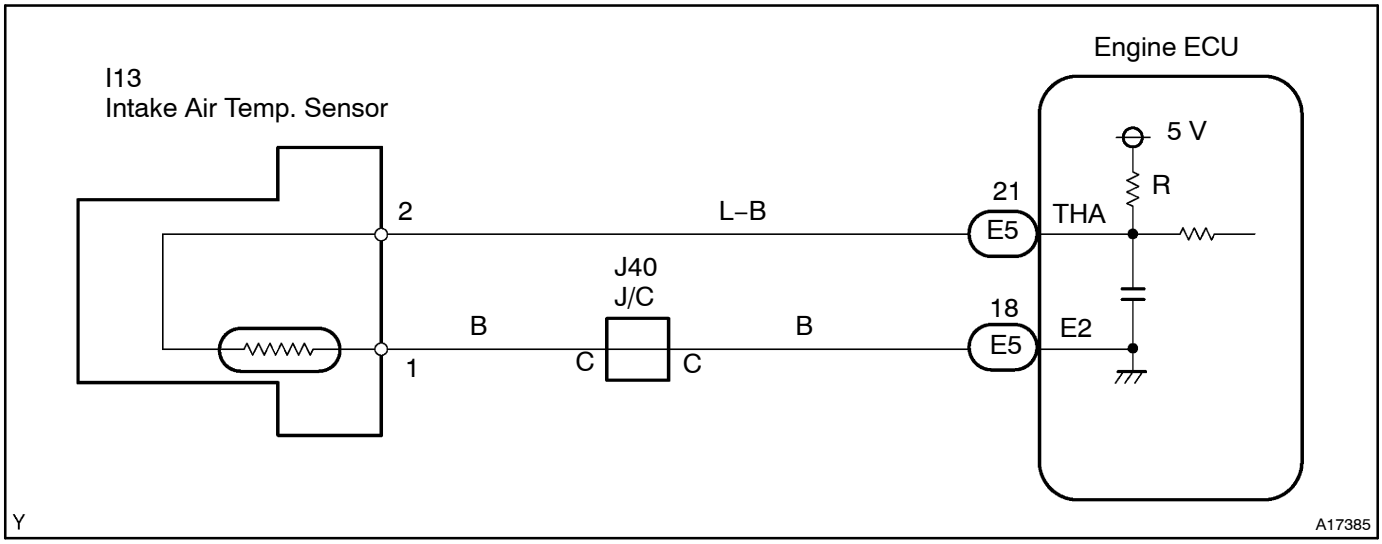
DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temperature sensor circuit for 0.5 sec or more (1 trip detection logic)	• Open or short in intake air temperature sensor circuit • Intake air temperature sensor • Engine ECU

HINT:

After confirming DTC P110, use the 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:

- Read freeze frame data using the hand–held tester. Because freeze frame data 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.
- If DTCs ”P0110” (Intake Air Temperature Circuit Malfunction), ”P0115” (Water Temperature Circuit Malfunction), ”P0120” (Throttle Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

When using hand–held tester

1	Connect the hand–held tester, and read value of intake air temperature

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

The same as the actual intake air temperature

HINT:

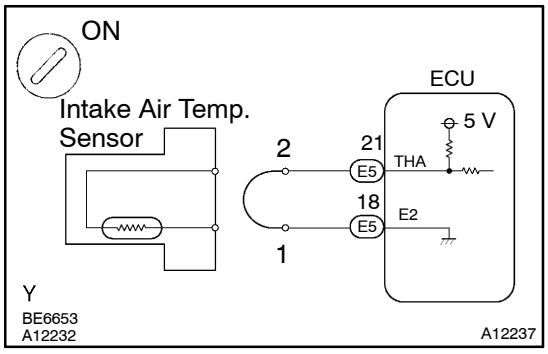
- If there is an open circuit, the hand–held tester indicates – 40°C (– 40°F).
- If there is a short circuit, the hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F) ... Go to step 2.**
140°C (284°F) ... Go to step 4.

OK

Check for intermittent problem
(See page DI–3).

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

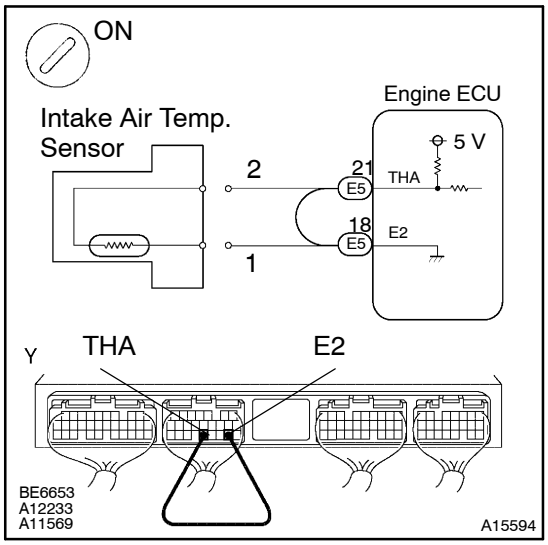
OK:

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

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

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment.

(b) Connect terminals THA and E2 of the engine ECU.

HINT:

the intake air temperature sensor connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–19).

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

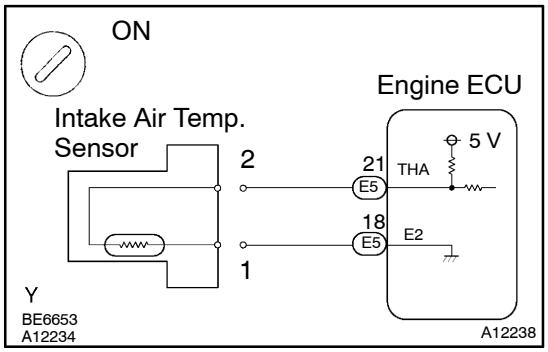
temperature value: 140°C (284°F) or more

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

NG

Confirm good connection at engine ECU.
If OK, replace engine ECU.

4	Check for short in harness and engine ECU (See page IN–19).



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

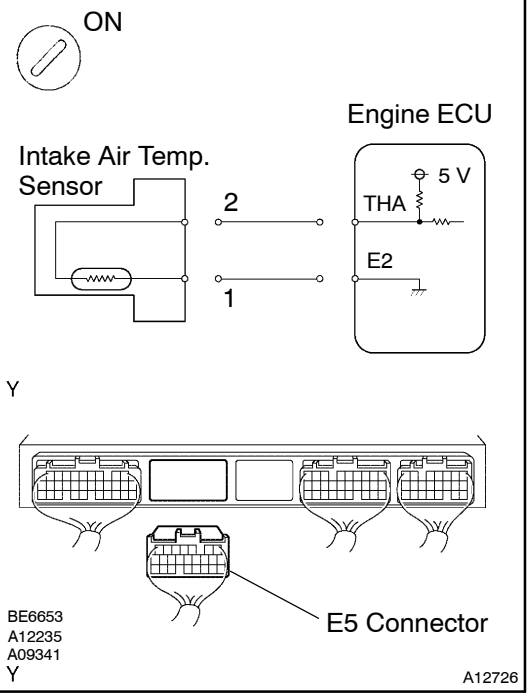
OK:

Temperature value: – 40°C (– 40°F)

OK	Replace intake air temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment.

(b) Disconnect the E5 connector of engine ECU.

HINT:

The intake air temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: – 40°C (– 40°F)

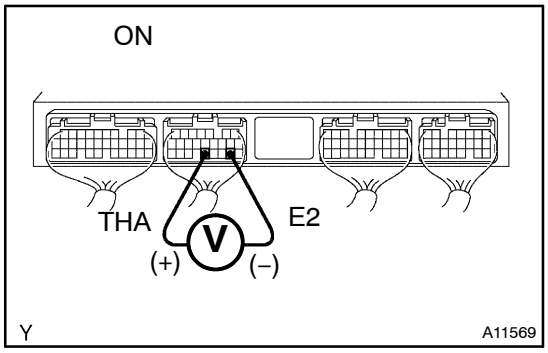
OK → **Repair or replace harness or connector.**

NG

Check and replace engine ECU.

When not using hand–held tester

1	Check voltage between terminals THA and E2 of engine ECU connecter.



PREPARATION:

(a) Remove the glove compartment.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THA and E2 of the engine ECU connector.

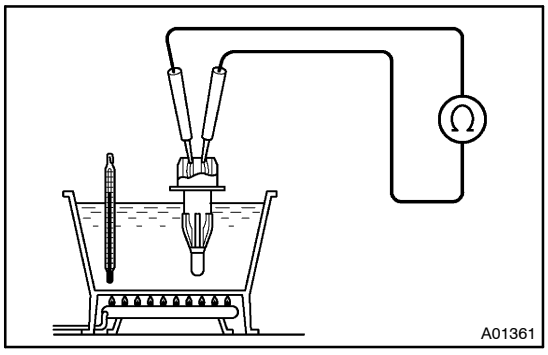
OK:

Intake air temperature °C(°F)	Voltage V
20 (68)	0.5 ~ 3.4
60 (140)	0.2 ~ 1.0

OK	Check for intermittent problem (See page DI–3).

NG

2	Check intake air temperature sensor.



PREPARATION:

Disconnect the intake air temperature sensor connector.

CHECK:

Measure the resistance between the terminals.

OK:

Resistance is within the acceptable zne on the chart.

Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2 – 3
80 (176)	0.2 – 0.4

NG	Replace intake air temperature sensor.

OK

3	**Check for open and short in harness and connector between engine ECU and Intake air temperature sensor (See page IN–19).**

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

OK

Check and replace engine ECU.