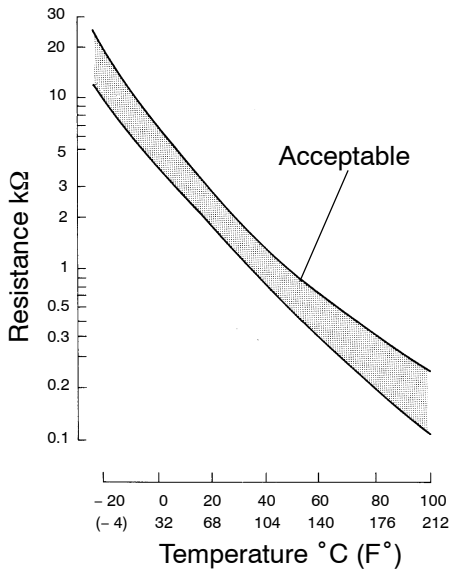
DI31D–03

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(fig.1)



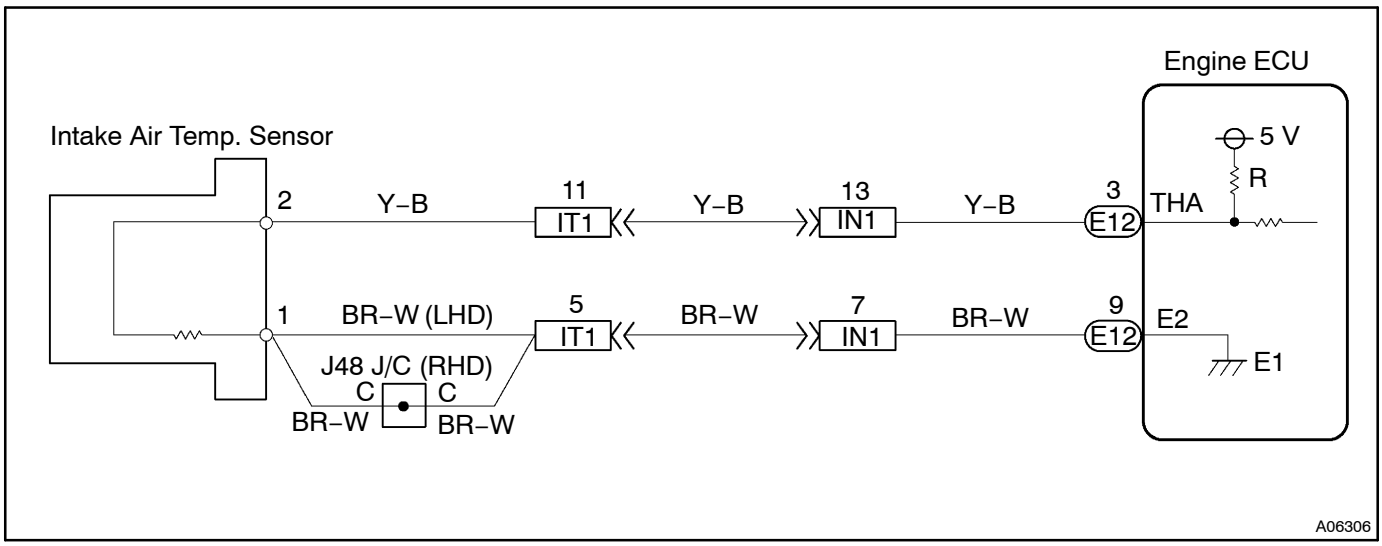
The intake air temp. sensor is mounted on the air cleaner cap and sensors the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temp. The lower the intake air temp. the greater the thermistor resistance value, and the higher the intake air temp. the lower the thermistor resistance value (See fig.1).
The air intake temp. sensor is connected to the engine ECU (See below). The 5V power source voltage in the ECU is applied to the intake air temp. sensor from the terminal THA via a resistor R.
That is the resistor R and the intake air temp. sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temp. 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 "P0110/24", 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
P0110/24	Open or short in intake air temp. sensor circuit for 0.5 sec. or more	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:
After confirming DTC P0110/24 use the hand–held tester to confirm the intake air temperature from "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 hand–held tester. 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.
- If DTC ”P0105/31” (Vacuum Sensor Circuit Malfunction), ”P0110/24” (Intake Air Temp. Circuit Malfunction), ”P0115/22” (Water Temp. Circuit Malfunction), ”P0120/41” (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 DLC3.

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

CHECK:

Read temperature value on the hand–held tester.

OK:

Same as actual intake air temperature

HINT:

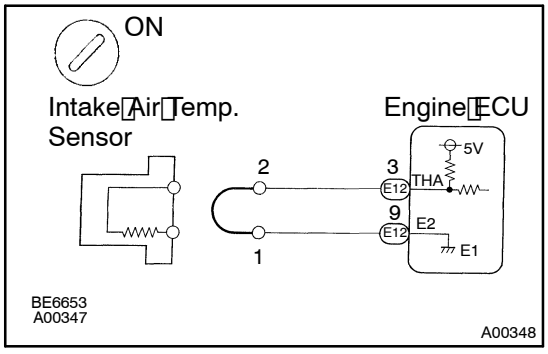
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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

OK

Check for intermittent problem (See page DI–4).

2	**Check for open in harness or engine ECU.**



PREPARATION:

(a) Disconnect the intake air temp. sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

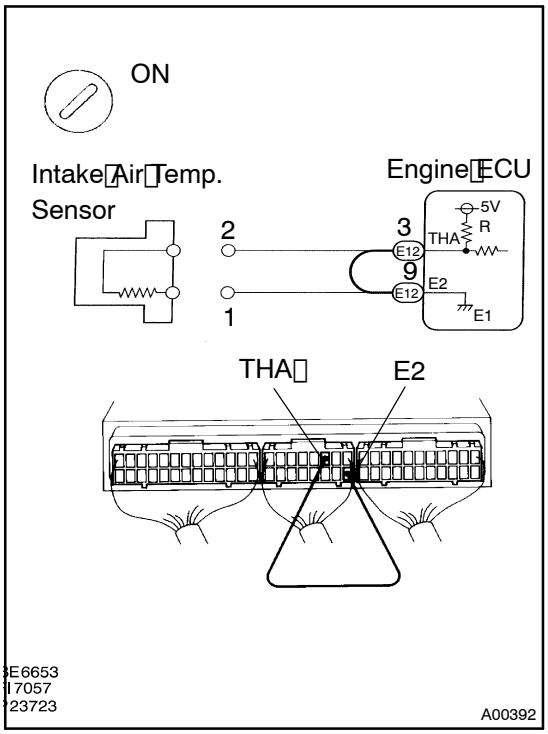
OK:

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

OK → **Confirm good connection at sensor. If OK, replace intake air temp. sensor.**

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment door.

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

HINT:

Intake air temp. 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:

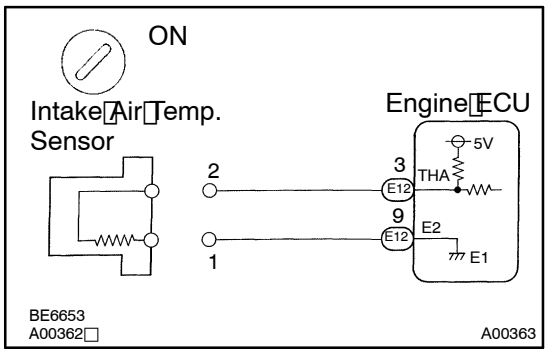
Temperature value: 140°C (284°F) or more

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 temp. sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

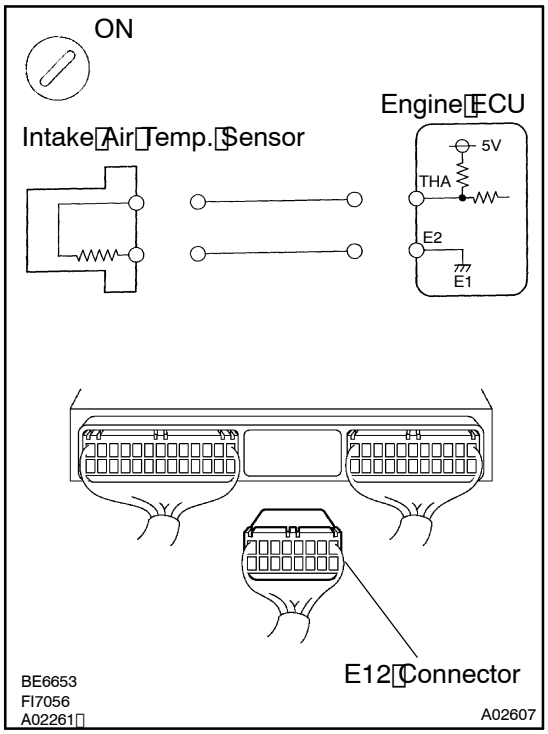
OK:

Temperature value: – 40°C (– 40°F)

OK	Replace intake air temp. sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E12 connector of engine ECU.

HINT:

Intake air temp. sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

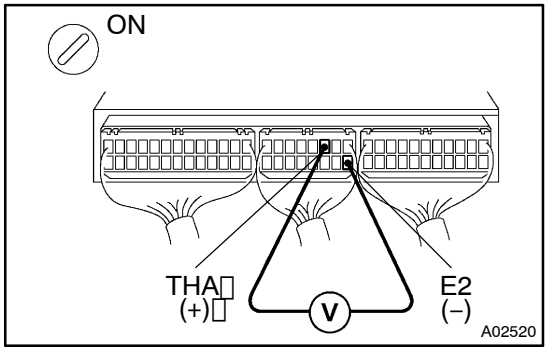
OK → **Repair or replace harness or connector.**

NG

Check and replace engine ECU (See page IN–19).

When not using hand-held tester

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



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

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

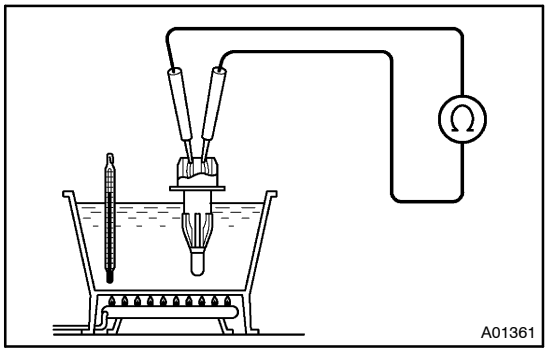
OK:

Intake Air Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK	Check for intermittent problem (See page DI–4).

NG

2	Check intake air temp. sensor.



PREPARATION:

Disconnect the intake air temp. sensor connector.

CHECK:

Measure resistance between terminals.

OK:

Resistance is within Acceptable Zone on chart.

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

NG	Replace intake air temp. sensor.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temp. sensor (See page IN-19).

NG → Repair or replace harness or connector.

OK →

Check and replace engine ECU.