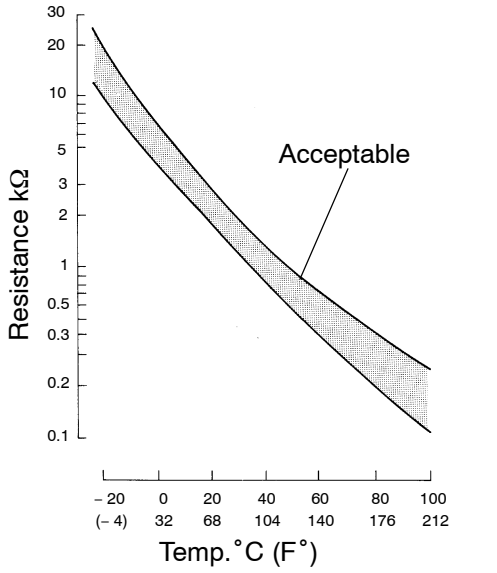
DI32I–03

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

(fig.1)



CIRCUIT DESCRIPTION

The intake air temp. sensor is mounted on the air cleaner cap and sensors the intake air temp.

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 engine 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 temp. 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 temp. is assumed to be 20˚C (68˚F).

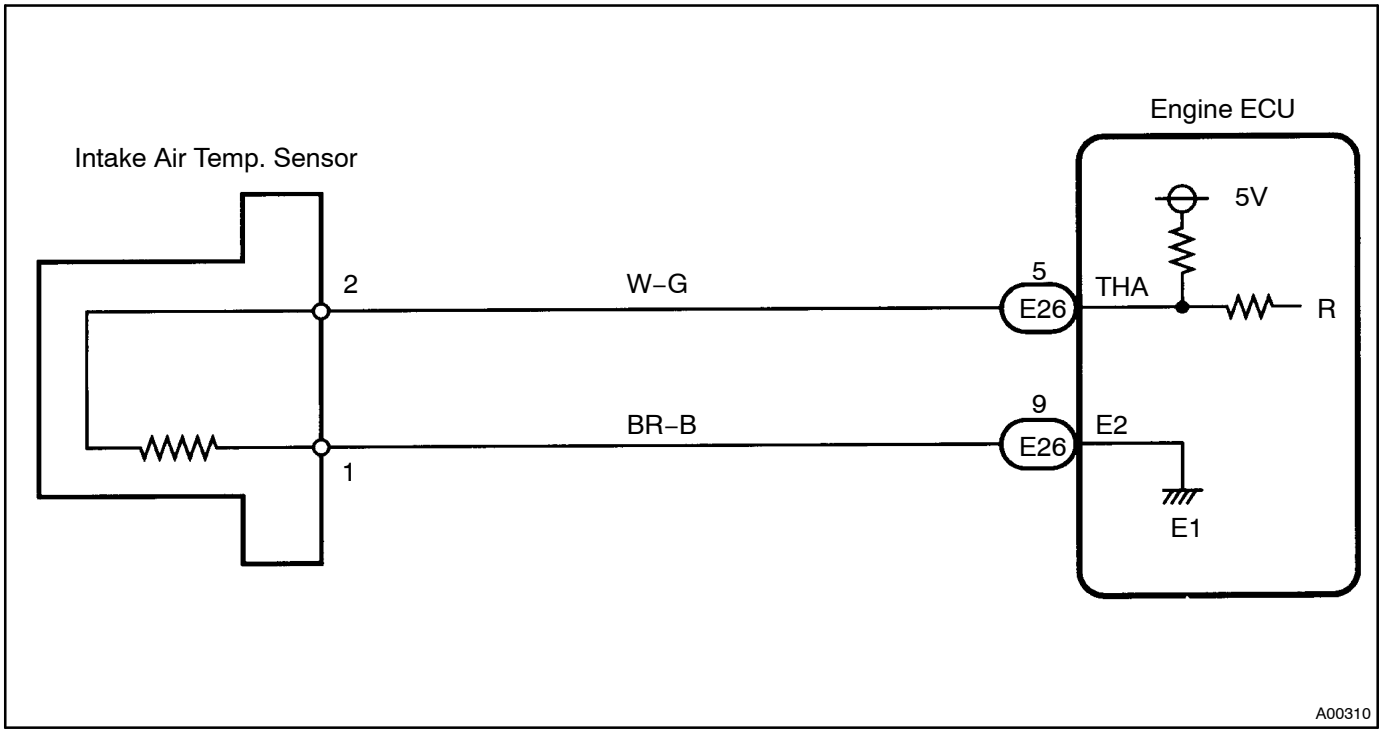
DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit for 0.5 sec or more	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:

After confirming DTC P110/24 use the hand–held tester to confirm the intake air temp. from "CURRENT DATA".

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freed 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 temp.**

PREPARATION:

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

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

CHECK:

Read temp. value on the hand–held tester.

OK:

Same as actual intake air temp.

HINT:

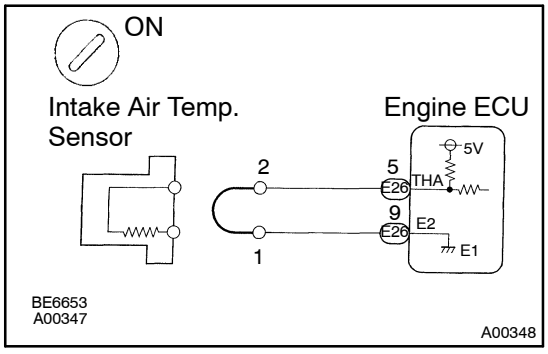
- If there is open circuit,hand–held tester indicates – 40°C (– 40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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 gage DI–18).

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



PREPARATION:

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

(b) Connect sensor wire harness terminals together.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

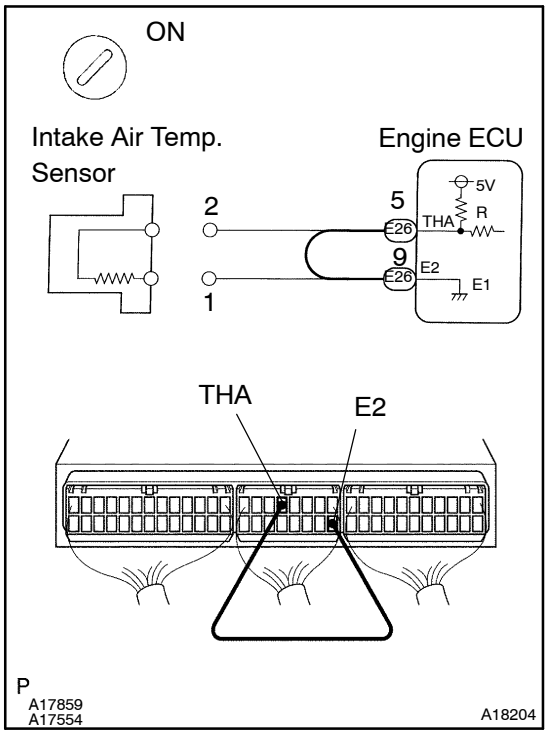
OK:

Temp. 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 side trim bracket (See page FU–48).

(b) Connect between terminals THA and E2 of engine ECU E26 connector.

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–20).

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

OK:

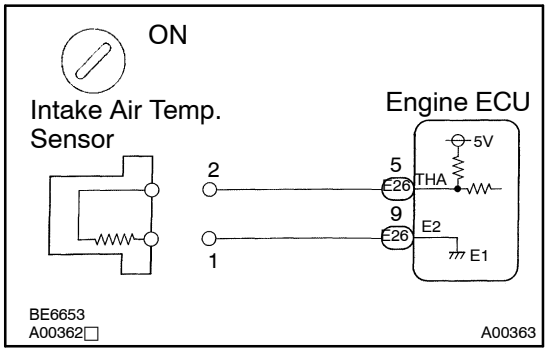
Temp. value: 140°C (284°F) or more

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 (See page IN–20).

4	Check for short in harness and engine ECU.



PREPARATION:

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

(b) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

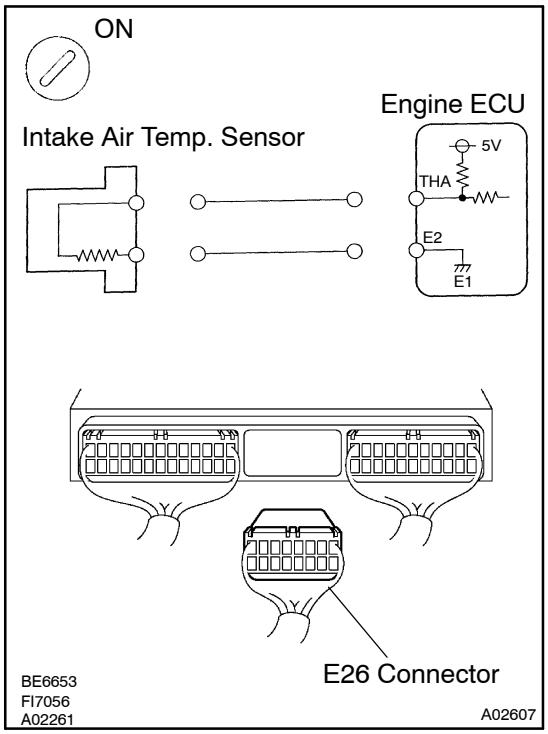
OK:

Temp. 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 side trim bracket (See page FU–48).

(b) Disconnect the E26 connector of engine ECU.

HINT:

Intake air temp. sensor connector is disconnected.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

OK:

Temp. value: – 40°C (– 40°F)

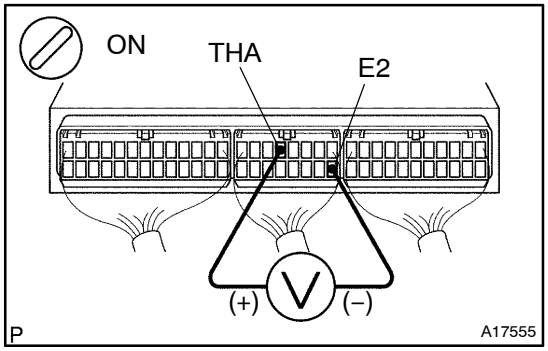
OK → **Repair or replace harness or connector.**

NG

Check and replace engine ECU (See page IN–20).

When not using hand–held tester

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



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Turn ignition switch ON.

CHECK:

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

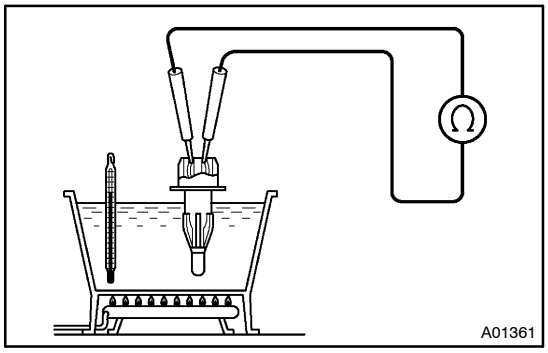
Intake air temp. °C(°F)	Voltage V
20 (68)	0.5 – 3.4
60 (140)	0.2 – 1.0

OK:

OK	Check for intermittent problem (See page DI–18).

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 Temp. °C(°F)	Resistance
20 (68)	2.2 – 2.7 kΩ
80 (176)	0.2 – 0.7 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–20).**

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

OK

Check and replace engine ECU (See page IN–20).