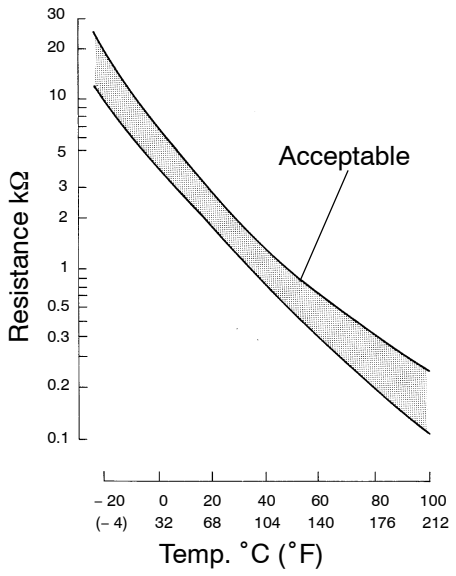
DI2S3–02

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(fig. 1)



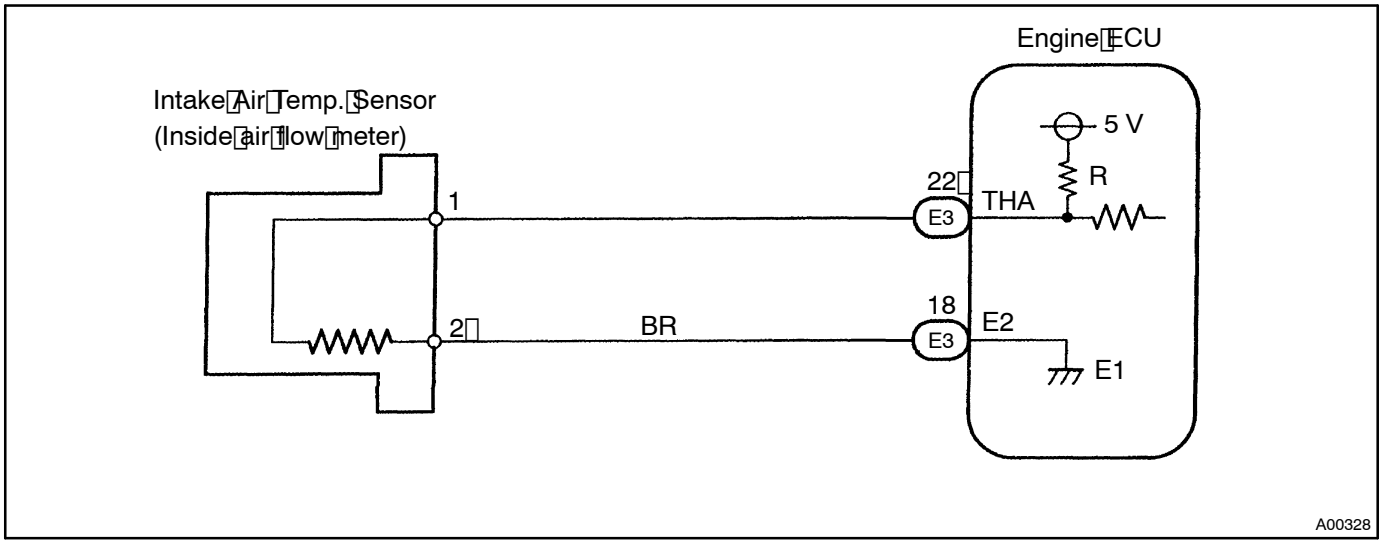
The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See fig. 1).
The intake air temp. sensor is connected to the engine ECU (See below). The 5 V power source voltage in the engine ECU is applied to the intake air temp. sensor from the terminal THA via 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 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.

DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (inside air flow meter) • 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:

- If DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.
- 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.

When using hand–held tester

1	**Connect 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 temperature value on the hand–held tester.

OK:

Same as actual intake air temperature

HINT:

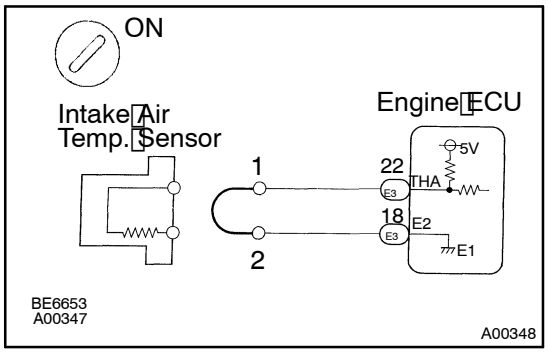
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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

OK

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

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

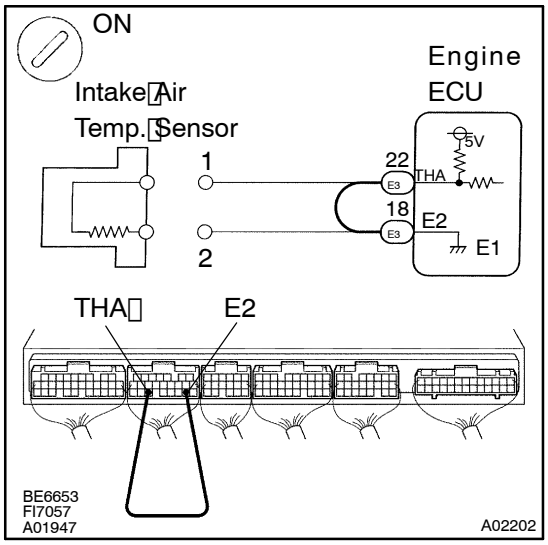
OK:

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

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

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

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

HINT:

Air flow meter connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–29).

CHECK:

Read temperature value on the hand–held tester.

OK:

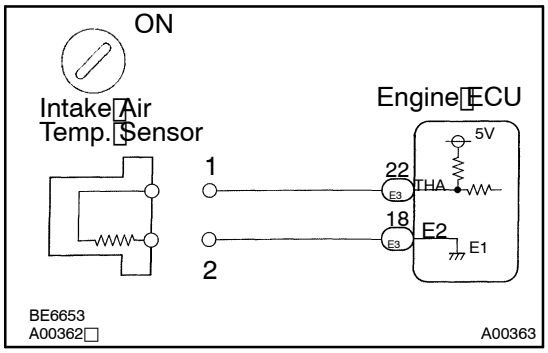
Temperature value: 140°C (284°F) or more

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

NG

**Confirm good connection at engine ECU.
If OK, check and replace engine ECU.
(See page IN–29)**

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

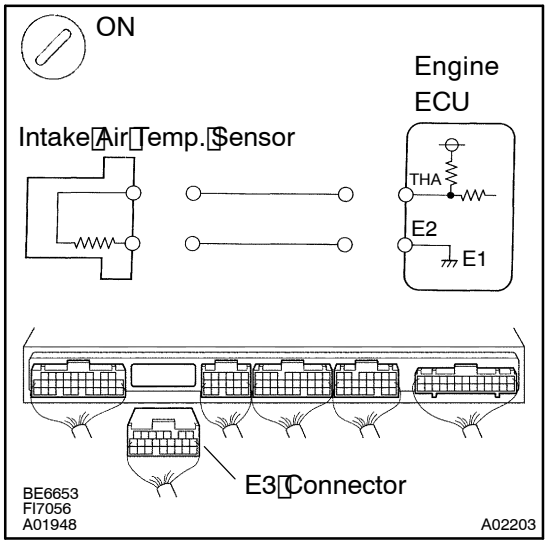
OK:

Temperature value: –40°C (–40°F)

OK	Replace air flow meter.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Disconnect the J4 connector of the engine ECU.

HINT:

Air flow meter 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)

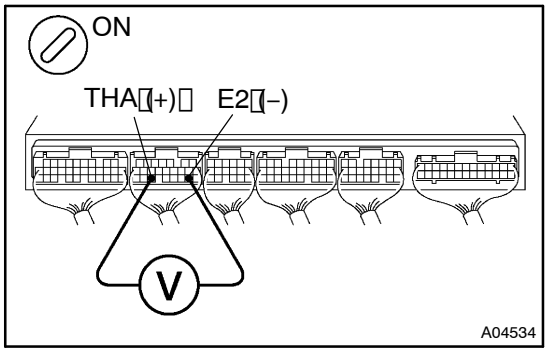
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–29).

When not using hand-held tester

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn ignition switch ON.

CHECK:

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

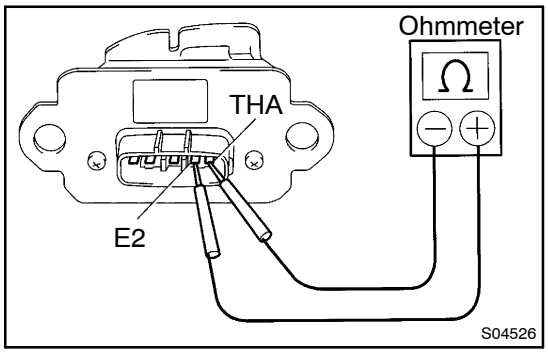
OK:

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

OK	Check for intermittent problems (See page DI–15).

NG

2	Check intake air temp. sensor.



PREPARATION:

Disconnect the air flow meter connector.

CHECK:

Measure resistance between terminals THA and E2 of air flow meter connector.

OK:

Resistance is within acceptable zone on chart.

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

NG	Replace air flow meter.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temp. sensor (See page DI–21).

NG → Repair or replace harness or connector.

OK →

Check and replace engine ECU.