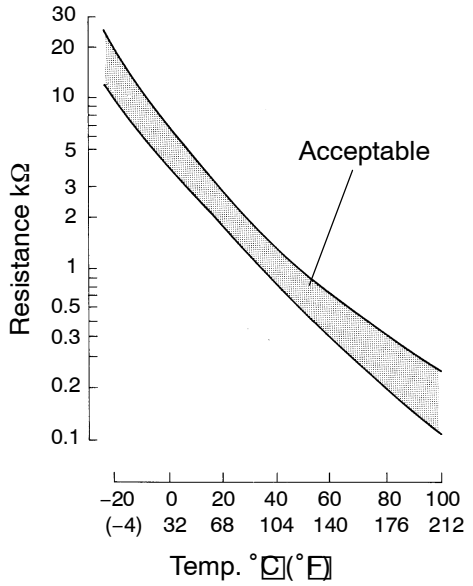
DI9MO–01

DTC	24 (2)	Atmospheric Temp. Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Fig. 1



The atmospheric temperature sensor is built into the air flow meter and senses the atmospheric temperature. A thermistor built in the sensor changes the resistance value according to the atmospheric temperature. The lower the atmospheric temperature, the greater the thermistor resistance value, and the higher the atmospheric temperature, the lower the thermistor resistance value (See Fig. 1).

The atmospheric temperature sensor is connected to the engine ECU. The 5 V power source voltage in the engine ECU is applied to the atmospheric temperature sensor from terminal THAF via a resistor R. That is resistor R and the atmospheric temperature sensor are connected in series. When the resistance value of the atmospheric temperature sensor changes. Based on this signal, the engine ECU increases the fuel injection volume to improve drivability during cold engine operation.

DTC No.	DTC Detection Condition	Trouble Area
24	Open or short in atmospheric temp. sensor circuit for 0.5 sec. or more	• Open or short in atmospheric temp. sensor circuit • Atmospheric temp. sensor (built into air flow meter) • Engine ECU

HINT:

After confirming DTC 24, use the hand–held tester to confirm the atmospheric temperature from the CURRENT DATA.

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

WIRING DIAGRAM

Refer to DTC 31 on page DI–31.

INSPECTION PROCEDURE

HINT:

- If DTC 22, 24, 35 and 39 displays, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held teste, 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, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of atmospheric 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:

Same as actual atmospheric temperature.

HINT:

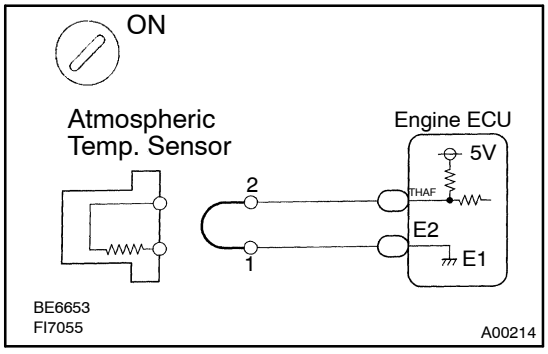
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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 miter 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.

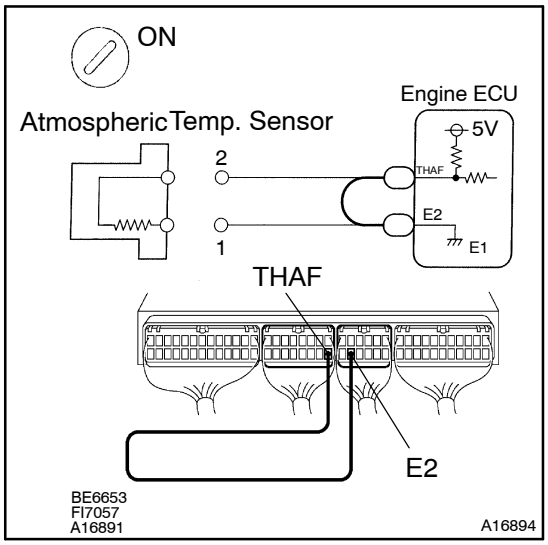
OK:

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 door.

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

HINT:

The air flow meter 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 the temperature value on the hand–held tester.

OK:

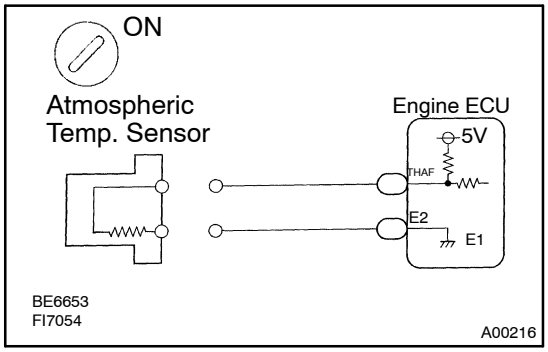
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminal E2 or THAF, 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.



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

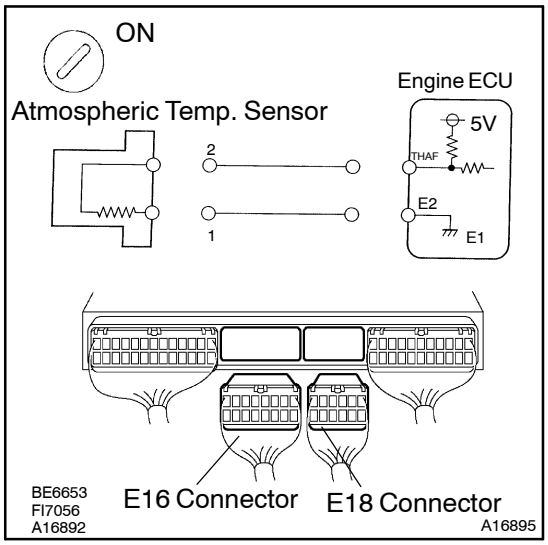
OK:

Temperature value: –40°C (–40°F)

OK	Replace air flow meter.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E6 and E18 connectors from the engine ECU.

HINT:

The air flow meter 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)

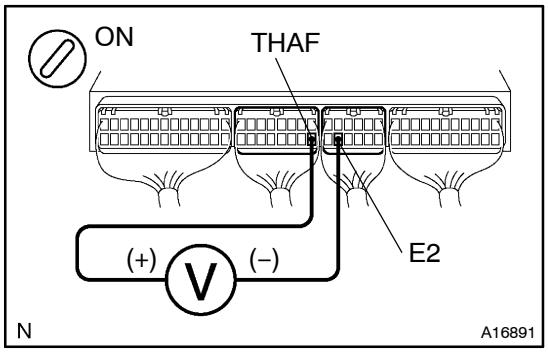
OK	Repair or replace harness or connector.

NG

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

When not using hand–held tester:

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



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

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

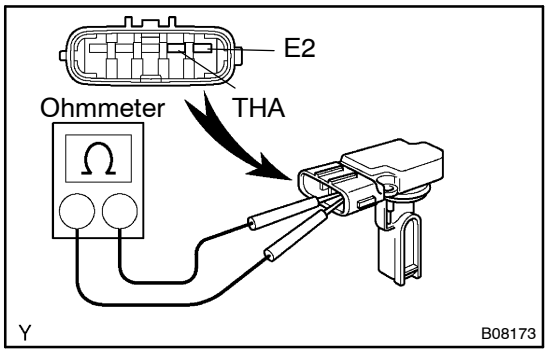
OK:

Atmospheric Temperature	Voltage
20°C (68°F) (Engine is cool)	0.2 – 3.8 V
80°C (176°F) (Engine is hot)	0.1 – 1.5 V

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

NG

2	Check atmospheric temperature sensor.



PREPARATION:

Disconnect air flow meter connector.

CHECK:

Using an ohmmeter, measure the resistance between terminals THA and E2.

OK:

Terminals	Resistance	Temperature
THA – E2	12.5 – 16.9 kΩ	–20°C (–4°F)
THA – E2	2.19 – 2.67 kΩ	20°C (68°F)
THA – E2	0.50 – 0.68 kΩ	60°C (140°F)

NG → **Replace air flow meter.**

OK

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

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

OK

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