DIDYA–01

DTC	P0110/24*	Intake Air Temperature Sensor Circuit

HINT:

*: Only for Europe

CIRCUIT DESCRIPTION

Fig. 1

FI4741
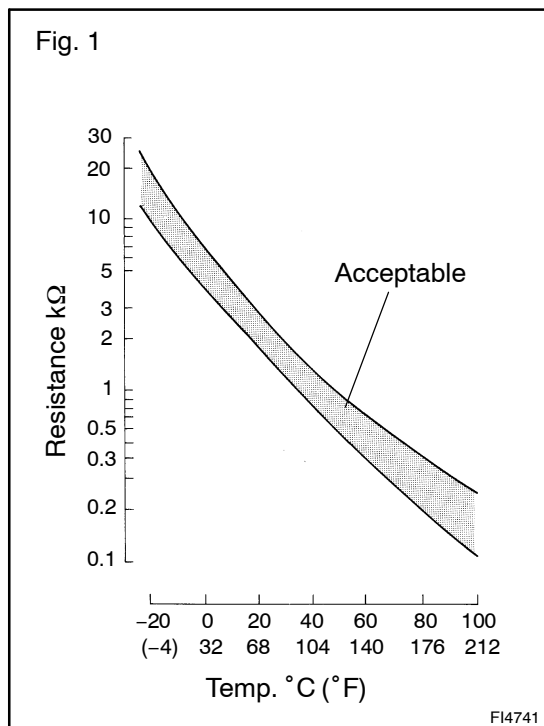
The intake air temperature sensor is built into the air flow meter and senses the intake air temperature. A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).

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

DTC No.	DTC Detection 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 (built into air flow meter) • Engine ECU

HINT:

When DTC P0110/24 is detected, check the intake air temperature by entering the following menus on the intelligent tester II: Powertrain / Engine and ECT / Data List / Intake Air.

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

WIRING DIAGRAM

A20
Intake Air Temp. Sensor
(Built into Air Flow Meter)

Engine ECU

THA

Y–B

31 E16 THAF

5 V

R

E2

BR

2
Ih1

BR

28 E16 E2

E1

A23864
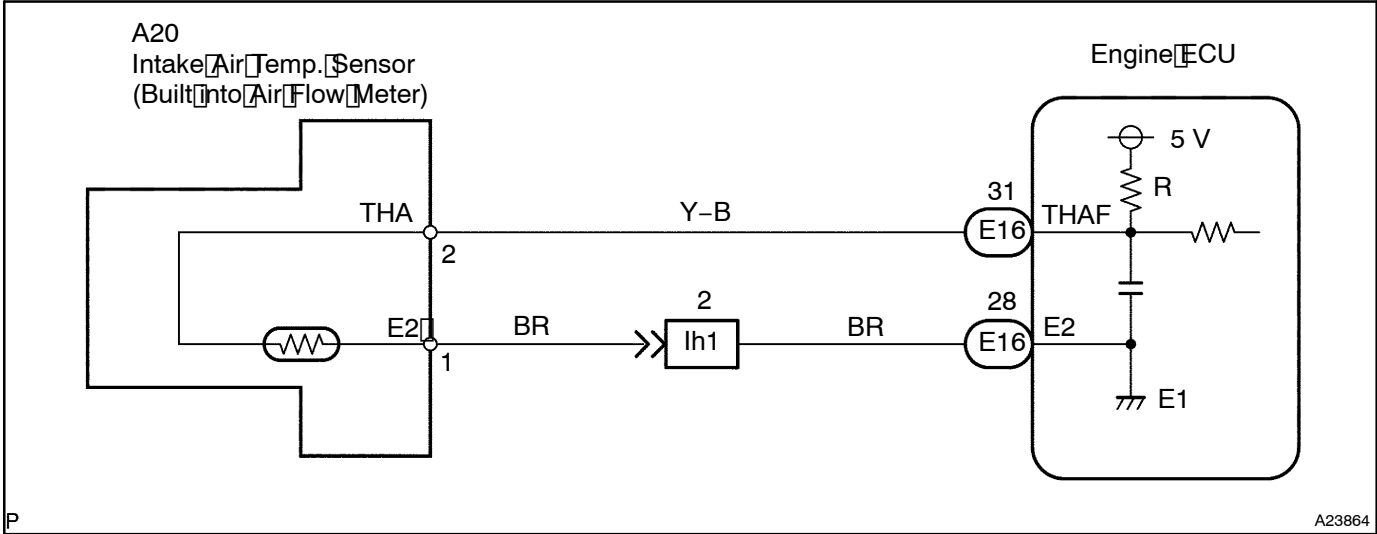
INSPECTION PROCEDURE

HINT:
- If DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, and other data from the time the malfunction occurred.

When using intelligent tester II:

1	Connect intelligent tester II, and read value of intake air temperature.

<u>PREPARATION:</u>
(a)   Connect the intelligent tester II to the DLC3.
(b)   Turn the ignition switch ON and push the intelligent tester II main switch ON.
<u>CHECK:</u>
Read the temperature value on the intelligent tester II.
<u>OK:</u>
Same as actual intake air temperature.
HINT:
- If there is open circuit, intelligent tester II indicates –40˚C (–40˚F).
- If there is short circuit, intelligent tester II 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.
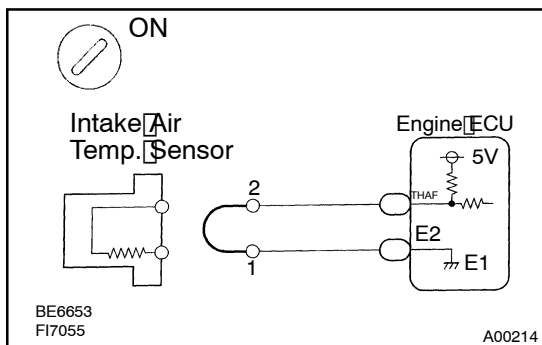
PREPARATION:
(a) Disconnect the air flow miter connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.
CHECK:
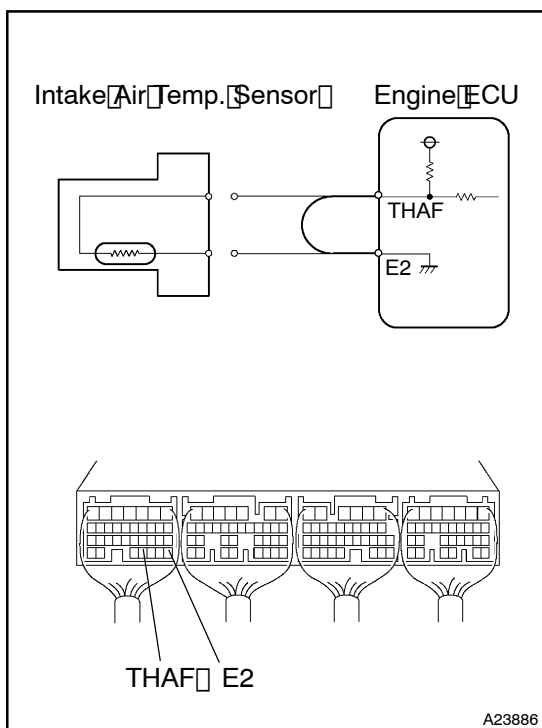Read the temperature value on the intelligent tester II.
OK:

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

OK	Confirm good connection at sensor. If OK, re-place 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 intelligent tester II.
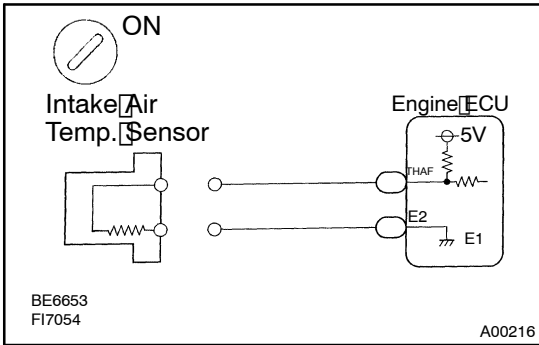**OK:**

> 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.
<u>**CHECK:**</u>
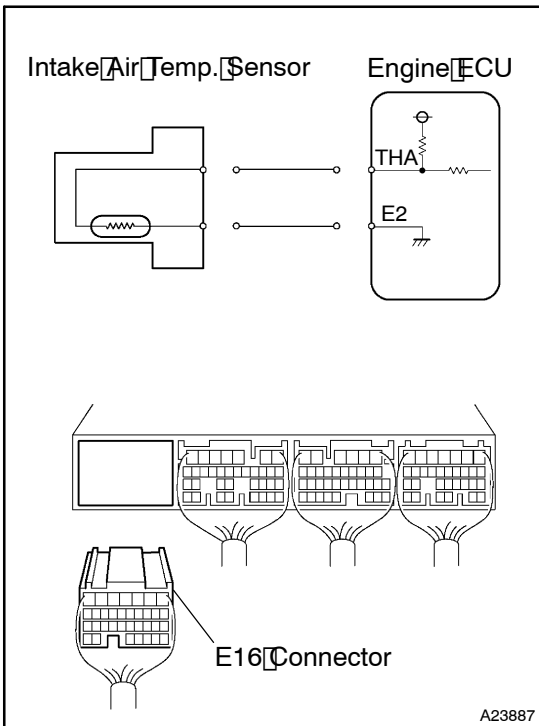Read the temperature value on the intelligent tester II.
<u>**OK:**</u>
      Temperature value: –40°C (–40°F)

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 E16 connector from the engine ECU.
HINT:
The air flow meter connector is disconnected.
(c)   Turn the ignition switch ON.
<u>**CHECK:**</u>
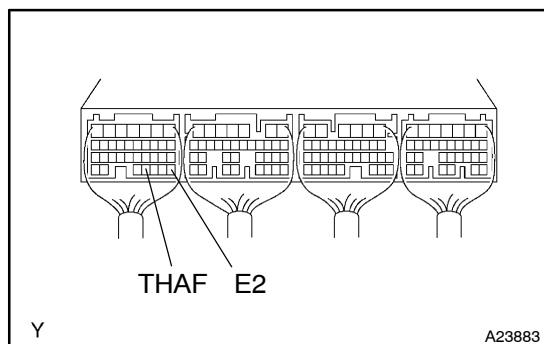Read the temperature value on the intelligent tester II.
<u>**OK:**</u>
      Temperature value: –40°C (–40°F)

OK ⟩	Repair or replace harness or connector.

NG ⬇

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

When not using intelligent tester II:

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

Y   A23883

PREPARATION:
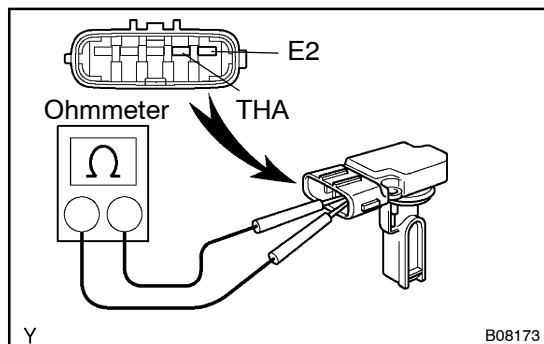(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals THAF and E2 of the engine ECU connector.
OK:

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

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

NG

2	Check intake air temperature sensor.

Y   B08173

PREPARATION:
Disconnect the air flow meter connector.
CHECK:
Using an ohmmeter, measure the resistance between terminals THA and E2.
OK:

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