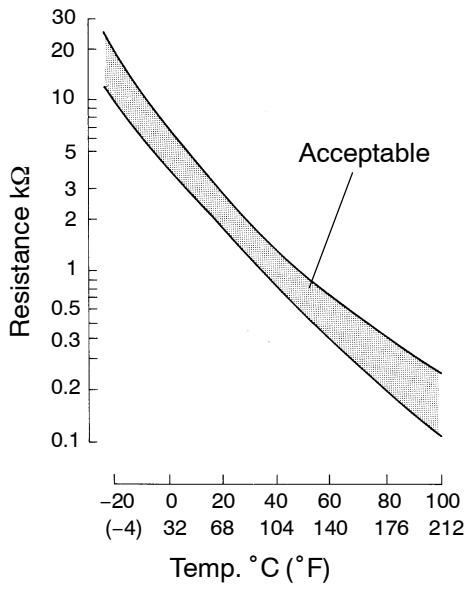
DI9S2–01

DTC	23	Intake Air Temp. Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Fig. 1



The intake air temperature sensor is built in the intake air pipe and senses the intake air temperature (after turbocharged). A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature is, the greater the thermistor resistance value becomes, and the higher the intake air temperature is, the lower the thermistor resistance value becomes (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 THA via a resistor R. That is, the resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes, 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.

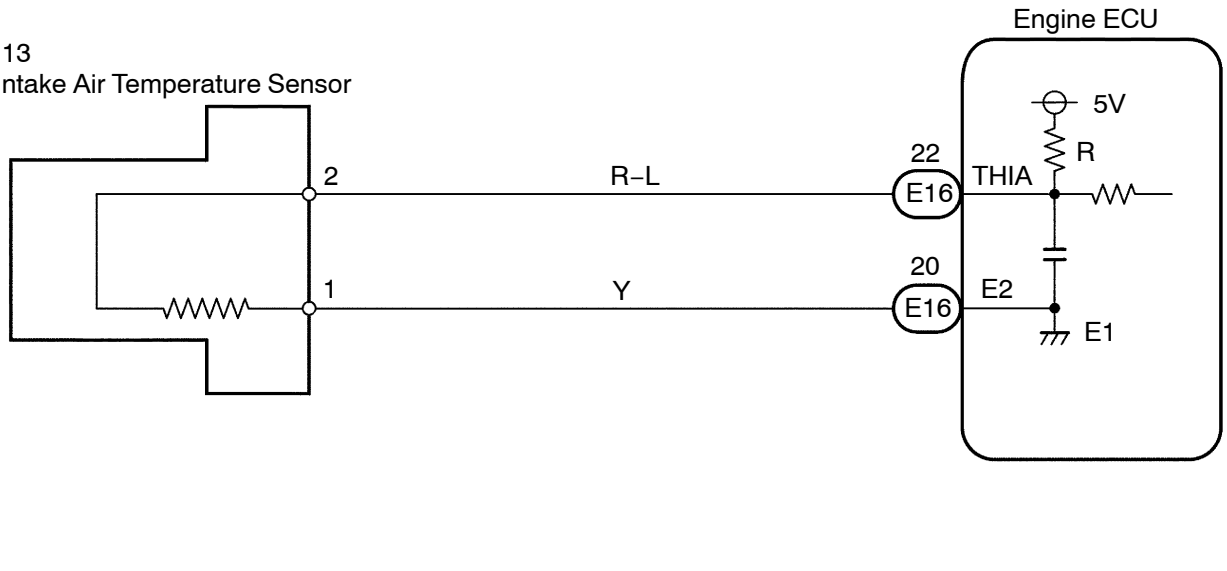
DTC No.	DTC Detecting Condition	Trouble Area
23	Open or short in intake air temp. sensor circuit for 0.5 sec. or more	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:
After confirming DTC 23, use the hand–held tester to confirm the intake air temperature from the CURRENT DATA.

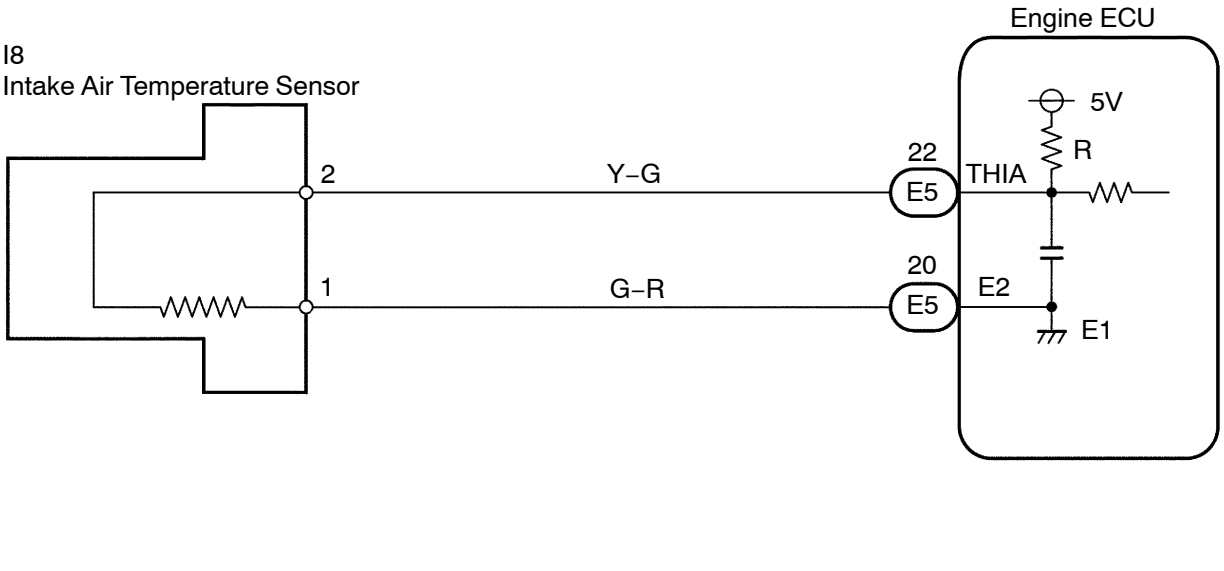
Temperature displayed	Malfunction
–40°C (–40°F)	Open circuit
190°C (374°F) or more	Short circuit

WIRING DIAGRAM

KLH



KDN



INSPECTION PROCEDURE

HINT:

Read freeze frame data on the hand–held tester. Because freeze frame data 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 was warmed up or not, etc. at the time of the malfunction.

When using hand–held tester:

1	**Read value of intake air temperature on the hand–held tester.**

OK:

The same as the actual intake air temperature.

HINT:

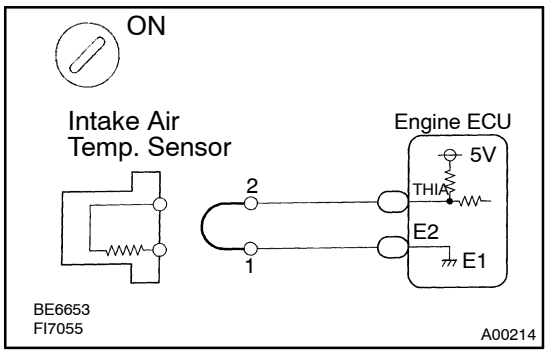
- If there is an open circuit, the hand–held tester indicates –40°C (–40°F).
- If there is a short circuit, the hand–held tester indicates 190°C (374°F) or more.

NG → **–40°C (–40°F) ... Go to step 2.**
190°C (374°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 intake air temperature sensor 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.

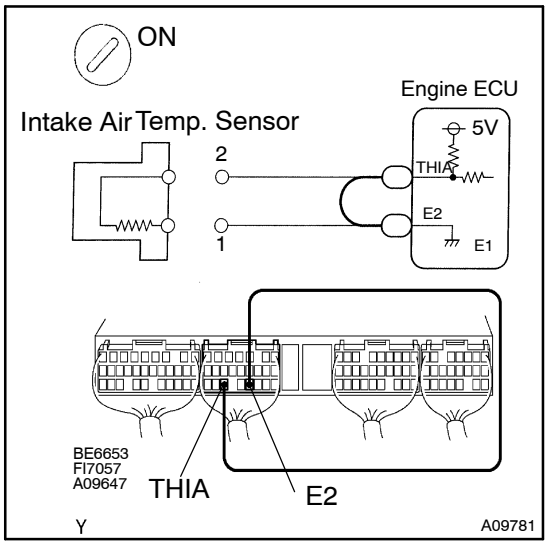
OK:

Temperature value: 190°C (374°F) or more

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

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment box.
(b) Connect terminals THIA and E2.
(c) Disconnect the intake air temperature sensor connector.
(d) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

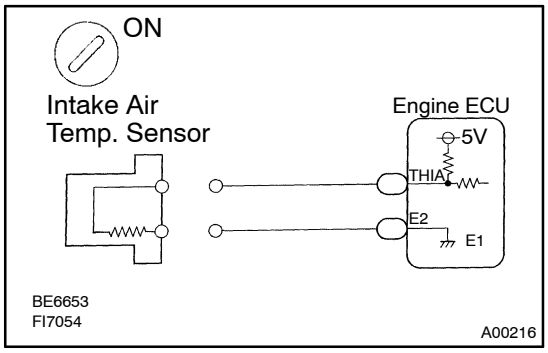
Temperature value: 190°C (374°F) or more

OK	Open in harness between terminal E2 or THIA, 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 intake air temperature sensor connector.
(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

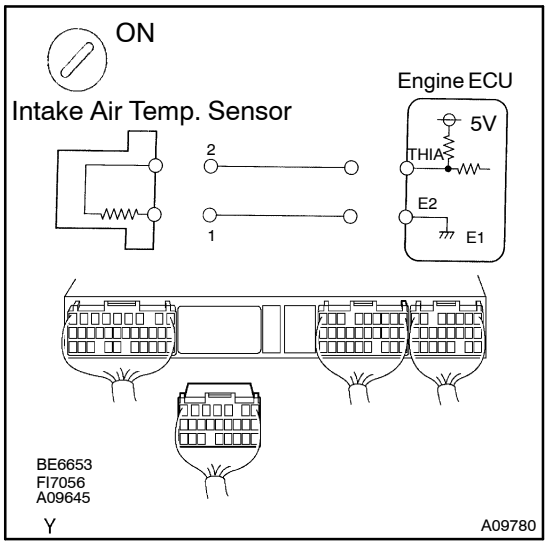
OK:

Temperature value: –40°C (–40°F)

OK	Replace intake air temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment box.
(b) KLH:
Disconnect the E16 connector from the engine ECU.
(c) KDN:
Disconnect the E5 connector from the engine ECU.
(d) Disconnect the intake air temperature sensor connector.
(e) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

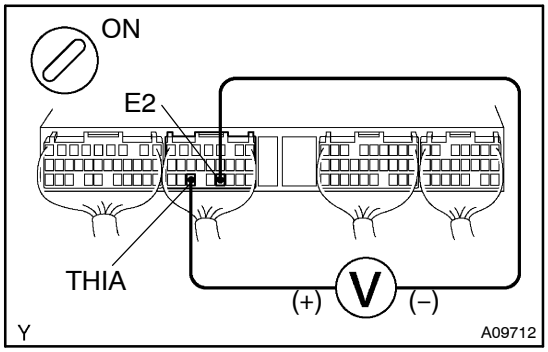
OK	Repair or replace harness or connector.

NG

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

When not using hand–held tester:

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



PREPARATION:

(a) Remove the glove compartment box.
(b) Turn the ignition switch ON.

CHECK:

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

OK:

Intake Air Temperature	Standard voltage
20 °C (68 °F)	0.2 – 3.8 V
80 °C (176 °F)	0.1 – 1.5 V

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

NG

2	Check intake air temperature sensor (See page ED–14).

NG → Replace intake air temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temperature sensor (See page IN–20).

NG → Repair or replace harness or connector.

OK

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