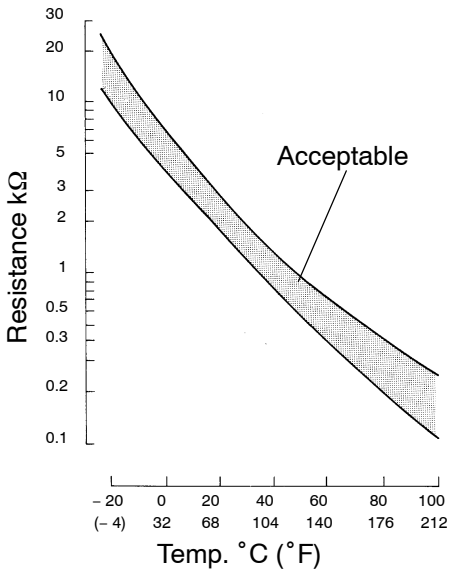
DTC	24 (1)	INTAKE AIR TEMPERATURE CIRCUIT MALFUNCTION

CIRCUIT DESCRIPTION

(fig. 1)



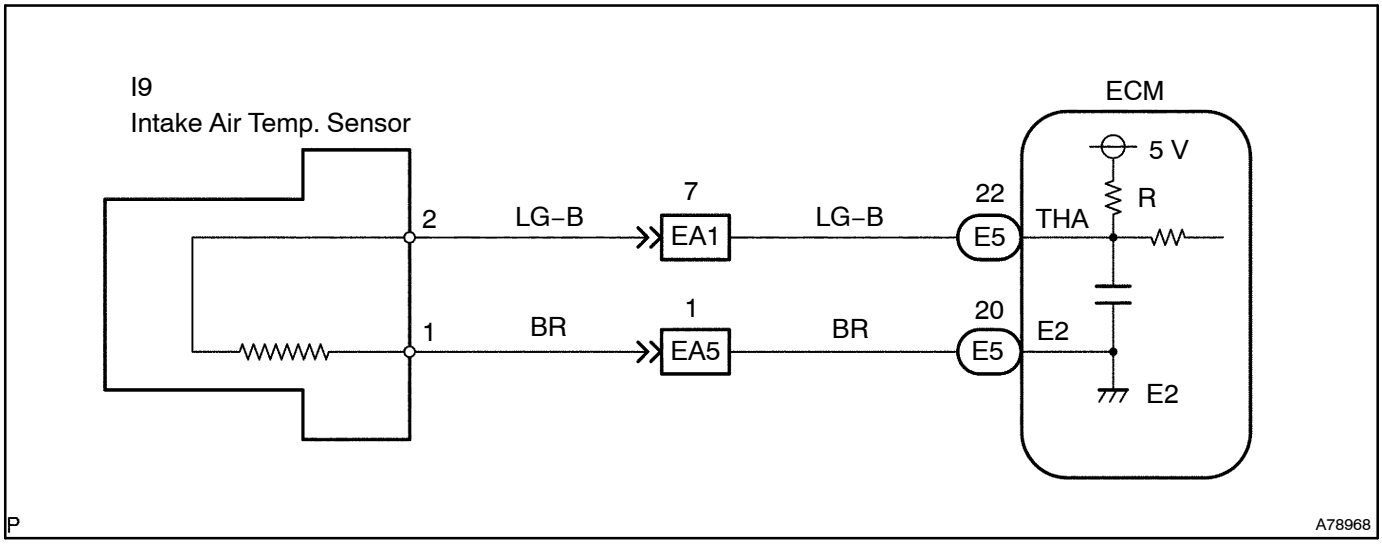
The intake air temperature sensor is built into the intake manifold and senses the intake air temperature. A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature, the greater the thermistor resistance value is, and the greater the intake air temperature is, the lower the thermistor resistance value (See Fig. 1) is.
The intake air temperature sensor is connected to the ECM. The 5 V power source voltage in the ECM 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 change in accordance with changes in the coolant temperature, potential at terminal THW also changes.s. Based on this signal, the ECM increases the fuel injection volume to improve drivability during cold engine operation.

DTC No.	DTC Detection Condition	Trouble Area
24 (1)	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 • ECM

HINT:
After confirming DTC 24, use the hand–held tester to check the intake air temperature from the 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 DTCs 22, 24, 35 and 39 are output simultaneously, terminal E2 (sensor ground) may be open.
- Read freeze frame data using the hand–held tester, 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, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	READ VALUE OF HAND–HELD TESTER

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Read the temperature value displayed on the hand–held tester.
Standard: The same as the actual water temperature.

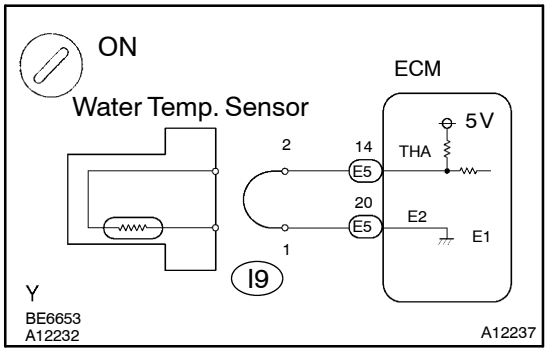
- If there is an open circuit, the hand–held tester indicates –40°C (–40°F). Proceed to A.
- If there is a short circuit, the hand–held tester indicates 140°C (284°F) or more. Proceed to B.

A	**Go to step 2**
B	**Go to step 4**

OK

CHECK FOR INTERMITTENT PROBLEMS

2	READ VALUE OF HAND–HELD TESTER

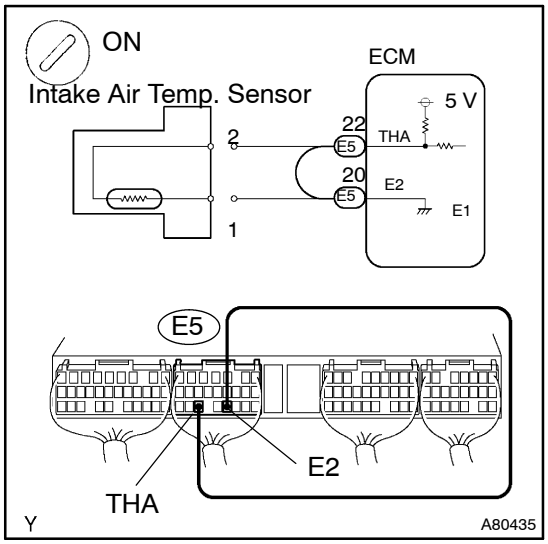


(a) Connect the hand–held tester to the DLC3.
(b) Connect the I9 sensor wire harness terminals together.
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
Standard: 140˚C (284˚F) or more

OK	REPLACE INTAKE AIR TEMPERATURE SENSOR

NG

3	READ VALUE OF HAND–HELD TESTER



(a) Connect the hand–held tester to the DLC3.
(b) Connect terminals THA and E2 of the E5 ECM connector.

The water temperature sensor connector is disconnected. Before checking, perform a visual and contact pressure check for the ECM connector.

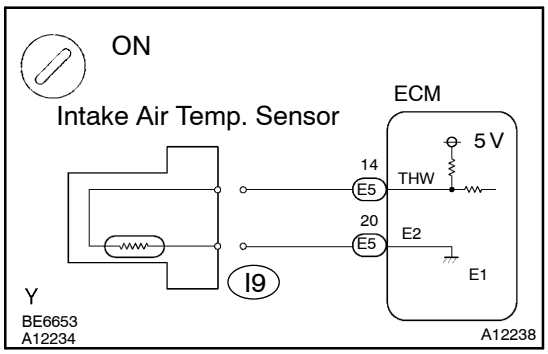
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
Standard: 140˚C (284˚F) or more

OK	REPAIR OR REPLACE HARNESS AND CONNECTOR

NG

REPLACE ECM

4 READ VALUE OF HAND–HELD TESTER

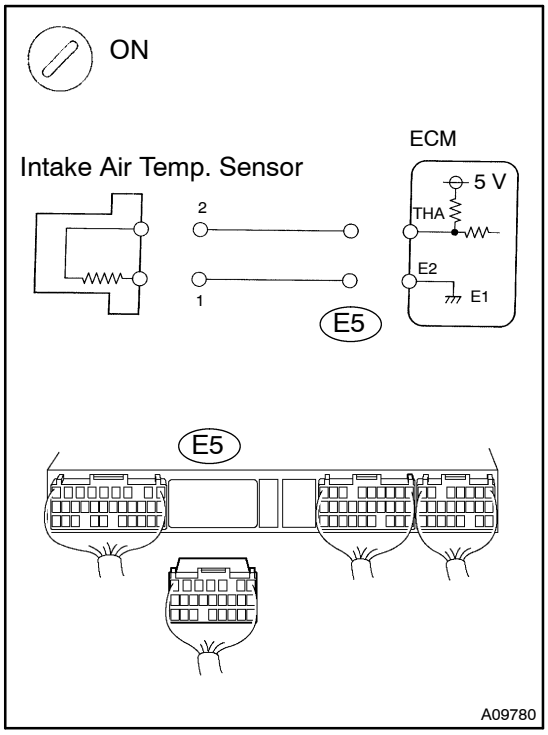


(a) Connect the hand–held tester to the DLC3.
(b) Disconnect the I9 intake air temp. sensor connector.
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
Standard: –40˚C (–40˚F)

OK	REPLACE INTAKE AIR TEMPERATURE SENSOR

NG

5 READ VALUE OF HAND–HELD TESTER



(a) Disconnect the E5 connector from the ECM.
(b) The intake air temperature sensor connector is disconnected.
(c) Turn the ignition switch ON.
Standard: –40˚C (–40˚F)

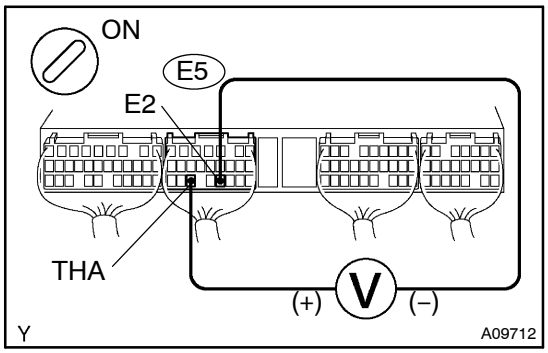
OK	REPAIR OR REPLACE HARNESS AND CONNECTOR

NG

CHECK AND REPLACE ECM (See page 01–27)

When not using hand–held tester:

1	CHECK ECM



(a) Turn the ignition switch ON.
(b) Measure the voltage between terminals THA and E2 of the E5 ECM connector.
Voltage:

Intake Air Temp. °C (°F)	Voltage
20 (68) (Engine is cool)	0.2 – 3.8 V
80 (176) (Engine is hot)	0.1 – 1.5 V

OK → CHECK FOR INTERMITTENT PROBLEMS

NG

2	CHECK INTAKE AIR TEMPERATURE SENSOR (See page 16–2)

NG → REPLACE INTAKE AIR TEMPERATURE SENSOR

OK

3	CHECK WIRE HARNESS (ECM ⇔ INTAKE AIR TEMPERATURE SENSOR) (See page 01–17)

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM