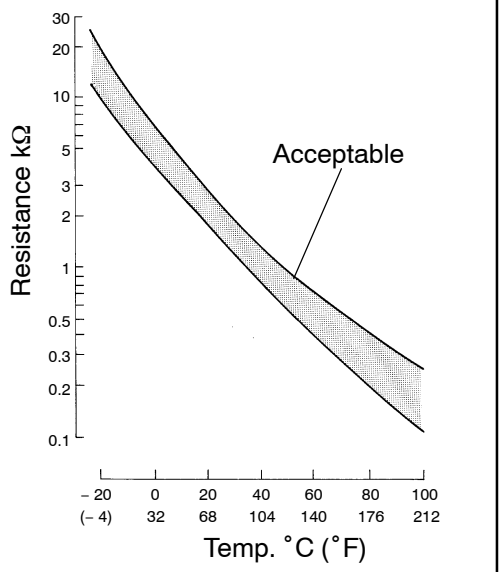
DTC	24	AIR TEMPERATURE CIRCUIT MALFUNCTION

CIRCUIT DESCRIPTION

(Fig. 1)



The intake air temperature sensor is built into the mass 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 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 resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at the terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve drive ability during cold engine operation.

DTC No.	DTC Detection Condition	Trouble Area
24	Open or short in intake air temperature sensor circuit for 0.5 sec. or more	• Open or short in intake air temp. sensor circuit • Intake air temperature sensor (built into mass air flow meter) • ECM

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 05–482.

INSPECTION PROCEDURE

HINT:

- If different DTCs that are related to different systems are output simuitaneously while teminal E2 is used is used as a ground teminal, terimnal E2 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, etc. at the time of the malfunction.

When using hand–held tester:

1	READ VALUE OF HAND–HELD TESTER(ATMOSPHERIC TEMP.)

(a) Read temperature value on the hand–held tester.
Temperature: The same as actual atmospheric air temperature

Result:

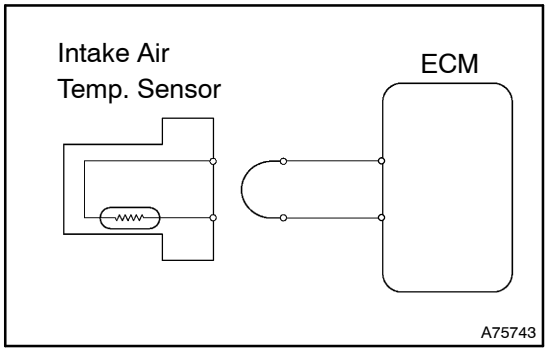
Display	Proceed
– 40 °C (– 40 °F)	A
140 °C (284 °F) or more	B
OK	C

B → **Go to step 4**

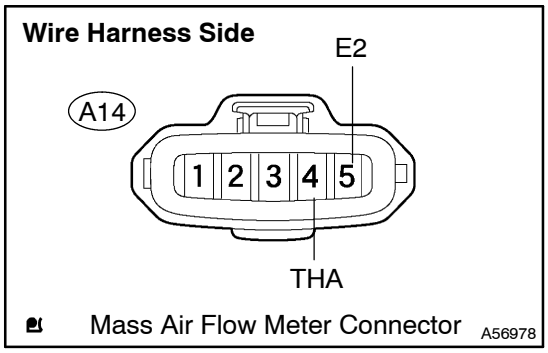
C → **CHECK FOR INTERMITTENT PROBLEMS** (See page 05–429)

A

2	CHECK HARNESS AND CONNECTOR(CHECK FOR OPEN)



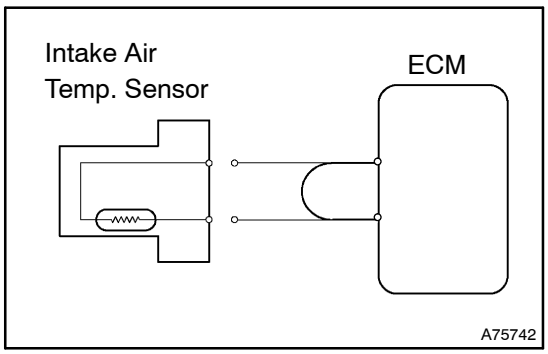
(a) Disconnect the mass air flow meter connector.
(b) Connect the terminals E2 with THA of atmospheric temperature sensor harness side connector.
(c) Turn the ignition switch ON.
(d) Read the temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more



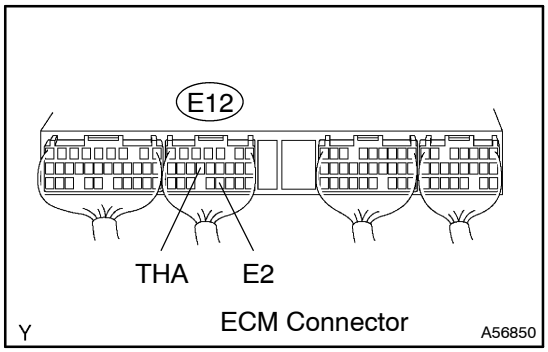
OK → **REPLACE MASS AIR FLOW METER**

NG

3 INSPECT ECM(CHECK FOR OPEN)



(a) Connect between terminals THA and E2 of the ECM E12 connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more

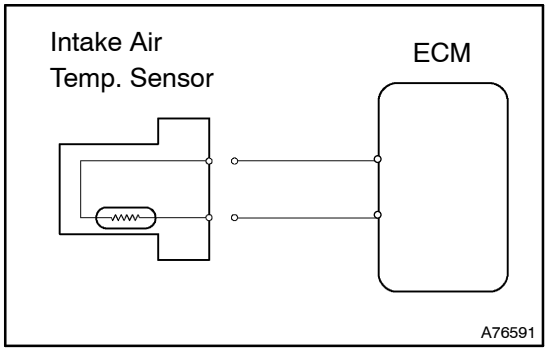


OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

CHECK AND REPLACE ECM

4 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT)

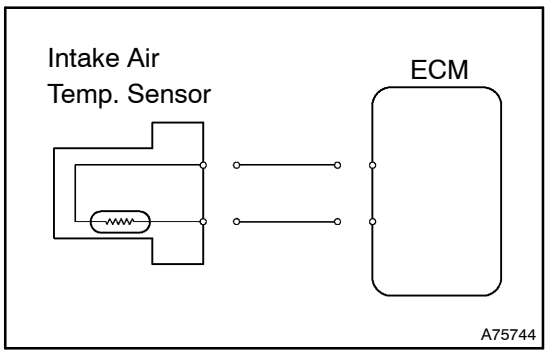


(a) Disconnect the mass air flow meter connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
Temperature: – 40°C (– 40°F)

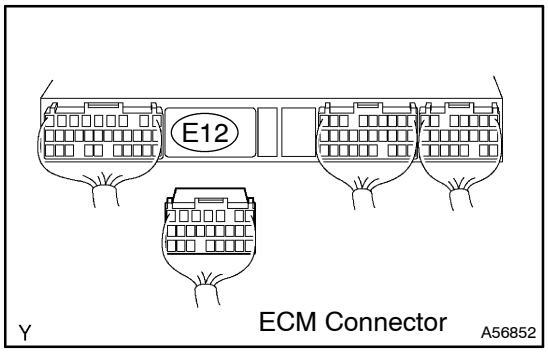
OK → **REPLACE MASS AIR FLOW METER**

NG

5	INSPECT ECM(CHECK FOR SHORT)



(a) Disconnect the ECM E12 connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
Temperature: – 40°C (– 40°F)



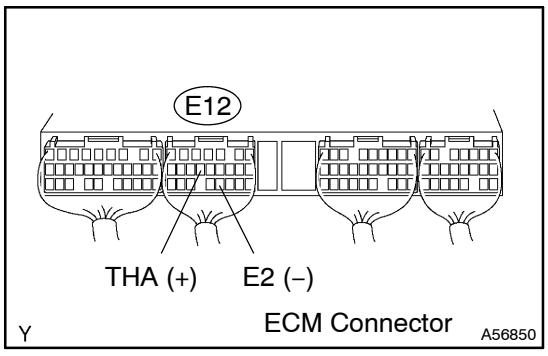
OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

CHECK AND REPLACE ECM

When not using hand–held tester:

1	INSPECT ECM



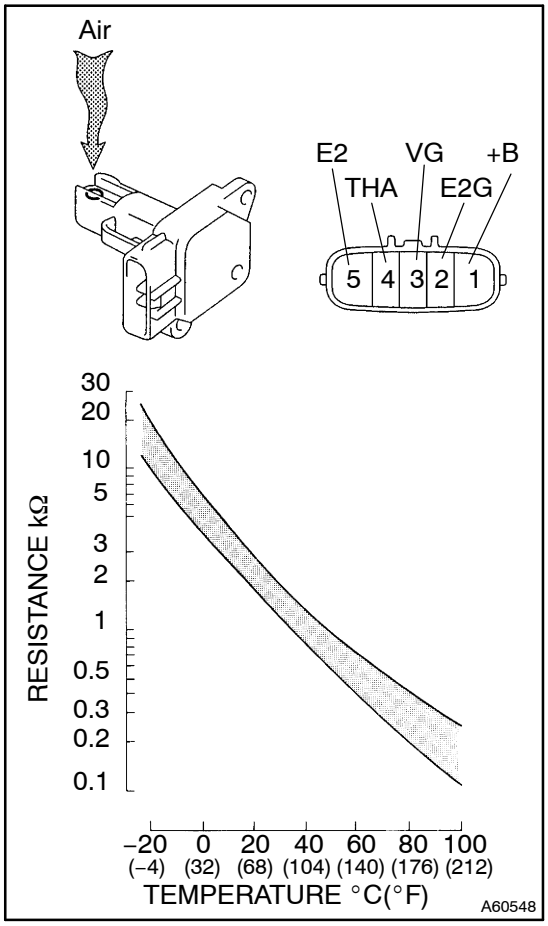
(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the ECM E12 connector.
Voltage:

Symbols (Terminal No.)	Condition	Specified condition
THA (E12 – 13) ⇔ E2 (E12 – 20)	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 05–429)**

NG

2	INSPECT MASS AIR FLOW METER



(a) Check the mass air flow meter for resistance.

(1) Using an ohmmeter, measure the resistance between terminals 4 (THA) and 5 (E2).

Resistance:

13.6 – 18.4 kΩ at –20°C (–4°F)

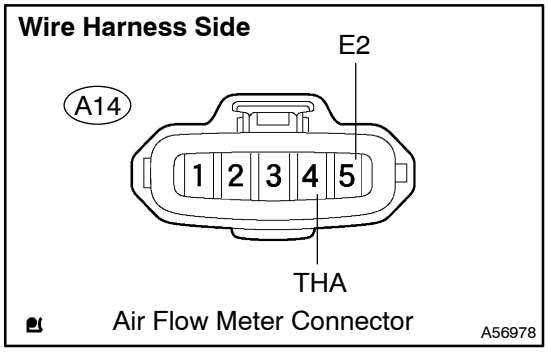
2.21 – 2.69 kΩ at 20°C (68°F)

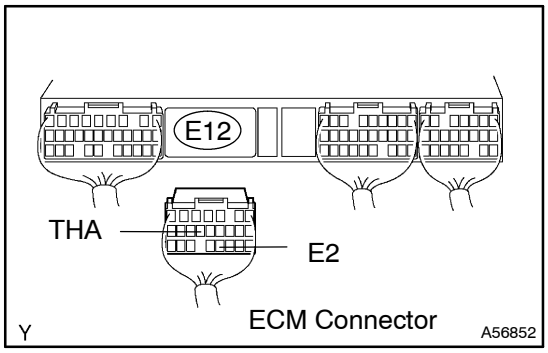
0.49 – 0.67 kΩ at 60°C (140°F)

NG → **REPLACE MASS AIR FLOW METER**

OK

3	CHECK HARNESS AND CONNECTOR(ECM – INTAKE AIR TEMPERATURE SENSOR)





(a) Disconnect the mass air flow meter connector.
(b) Disconnect the ECM E12 connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
THA (A14 – 4) ⇔ THA (E12 – 13)	Continuity
E2 (A14 – 5) ⇔ E2 (E12 – 20)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
THA (E12 – 13) ⇔ E2 (E12 – 20)	No continuity

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ECM