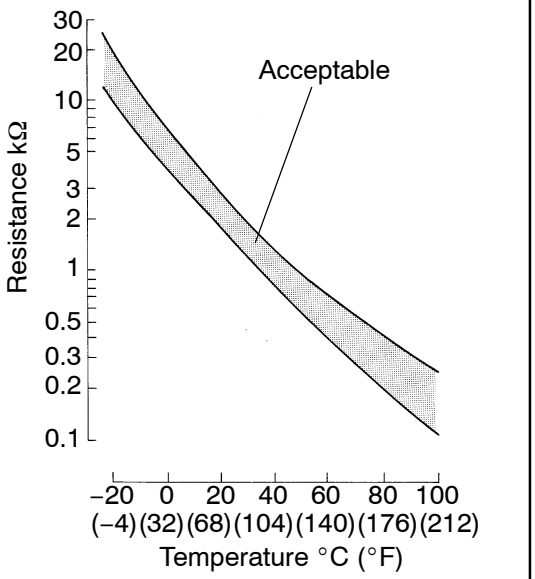
DTC P0110/24 INTAKE AIR TEMPERATURE CIRCUIT

CIRCUIT DESCRIPTION

(Fig. 1)



The intake air temperature sensor is built into the mass 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 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 ECM (see below). The 5 V power source voltage in the ECM is applied to the intake air temperature sensor from the terminal THA via 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 in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

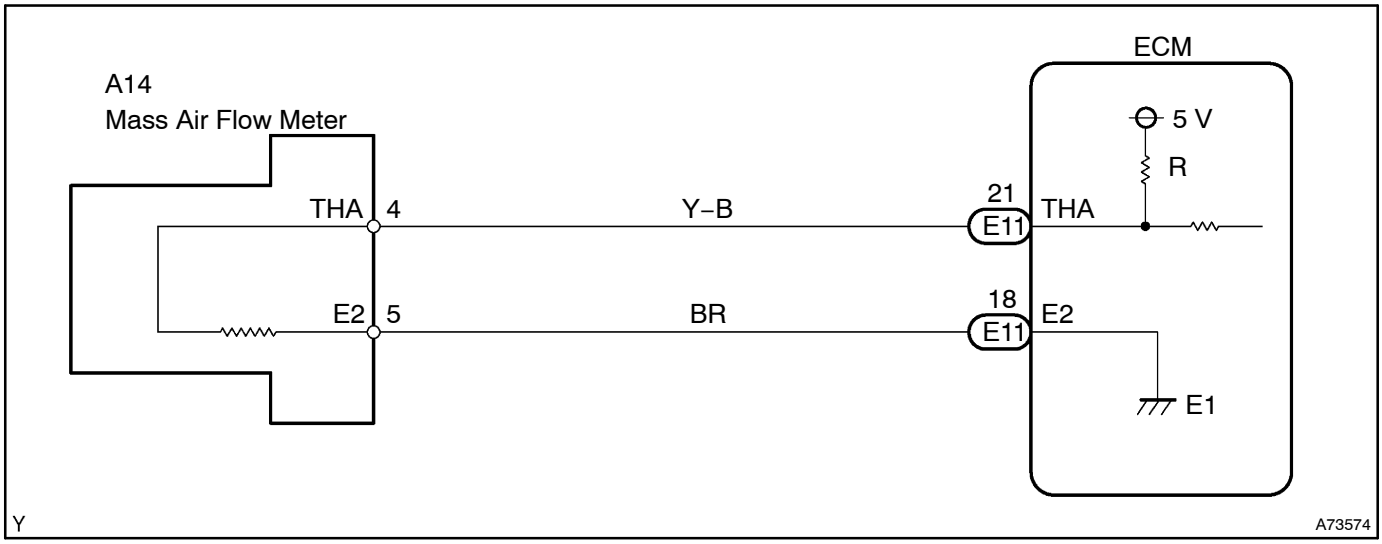
DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temperature sensor circuit for 0.5 sec. or more	• Open or short in intake air temperature sensor circuit • Intake air temperature (built in mass air flow meter) • ECM

HINT:

After confirming DTC P0110/24 use the hand–held tester to confirm the intake air temperature from the ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA”.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freeze frame data using 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.
- If different DTCs that are related to different systems are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.

When using hand–held tester:

1	READ VALUE OF HAND–HELD TESTER (INTAKE AIR)

(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) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/INTAKE AIR” and read its value displayed the hand–held tester.

Result:

Temperature value	Proceed to
–40˚C (–40˚F)	A
140˚C (284˚F) or more	B
OK (Same as present temperature)	C

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 140°C (284°F) or more.

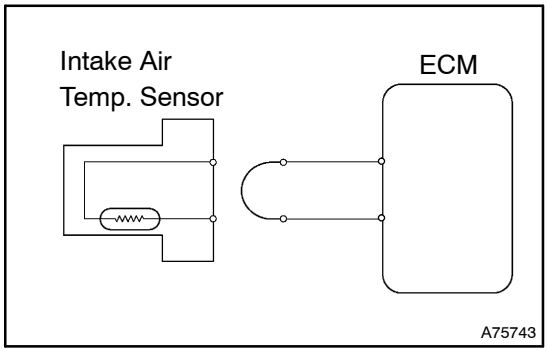
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

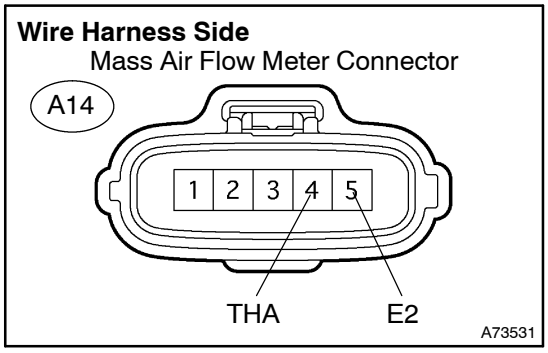
A

2 READ VALUE OF HAND–HELD TESTER (CHECK FOR OPEN IN WIRE HARNESS)

SST 09843–18040



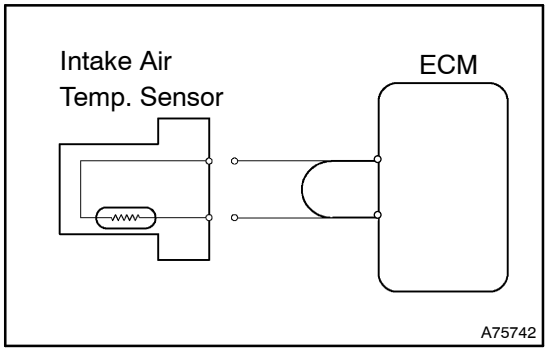
(a) Disconnect the A14 mass air flow meter connector.
(b) Connect the terminals THA (A14–4) and E2 (A14–5) of the mass air flow meter wire harness side connector.
(c) Turn the ignition switch ON.
(d) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/INTAKE AIR" and read its value displayed the hand–held tester.
Temperature: 140°C (284°F) or more



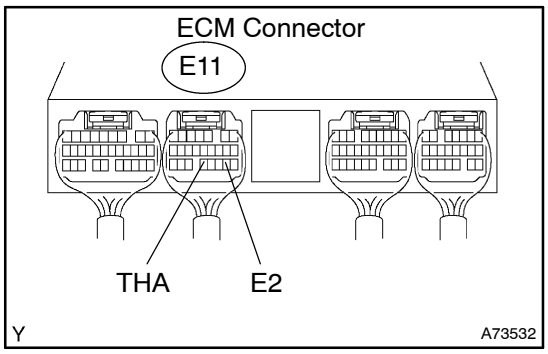
OK → **REPLACE MASS AIR FLOW METER (INTAKE AIR TEMPERATURE SENSOR)**

NG

3 READ VALUE OF HAND–HELD TESTER (CHECK FOR OPEN IN ECM)



(a) Connect the terminals THA (E11–21) and E2 (E11–18) of the ECM connector.
(b) Turn the ignition switch ON.
(c) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/INTAKE AIR" and read its value displayed the hand–held tester.
Temperature: 140°C (284°F) or more

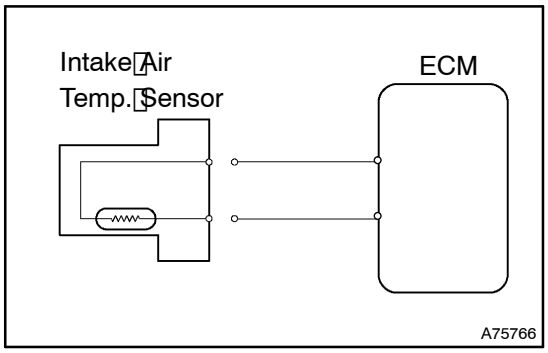


OK → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM (See page 01–36)

4 READ VALUE OF HAND–HELD TESTER (CHECK FOR SHORT IN WIRE HARNESS)

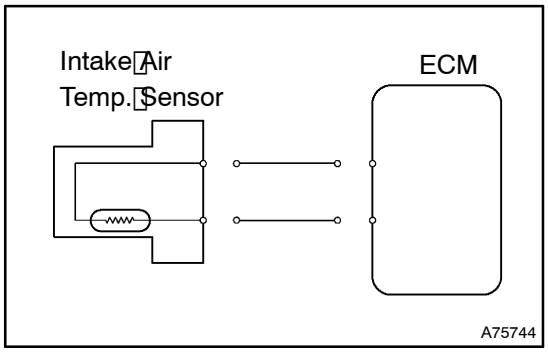


(a) Disconnect the A14 mass air flow meter connector.
(b) Turn the ignition switch ON.
(c) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/INTAKE AIR" and read its value displayed the hand–held tester.
Temperature: –40°C (–40°F)

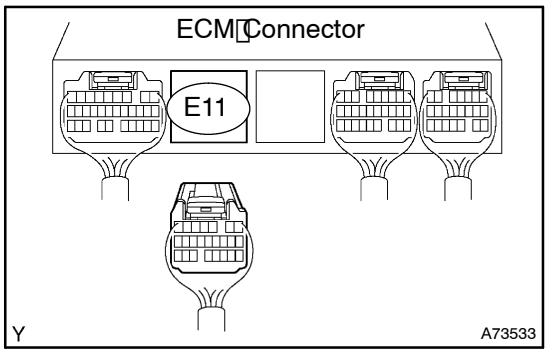
OK	**REPLACE MASS AIR FLOW METER (INTAKE AIR TEMPERATURE SENSOR)**

NG

5 READ VALUE OF HAND–HELD TESTER (CHECK FOR SHORT IN ECM)



(a) Disconnect the the E11 ECM connector.
(b) Turn the ignition switch ON.
(c) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/INTAKE AIR" and read its value displayed the hand–held tester.
Temperature: –40°C (–40°F)



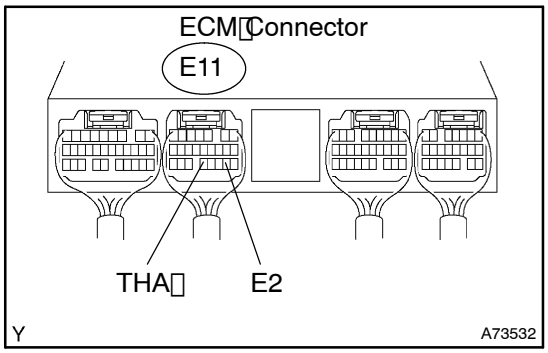
OK	**REPAIR OR REPLACE HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM (See page 01–36)

When not using hand-held tester:

1	CHECK ECM (CHECK VOLTAGE)



(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the E11 ECM connector.

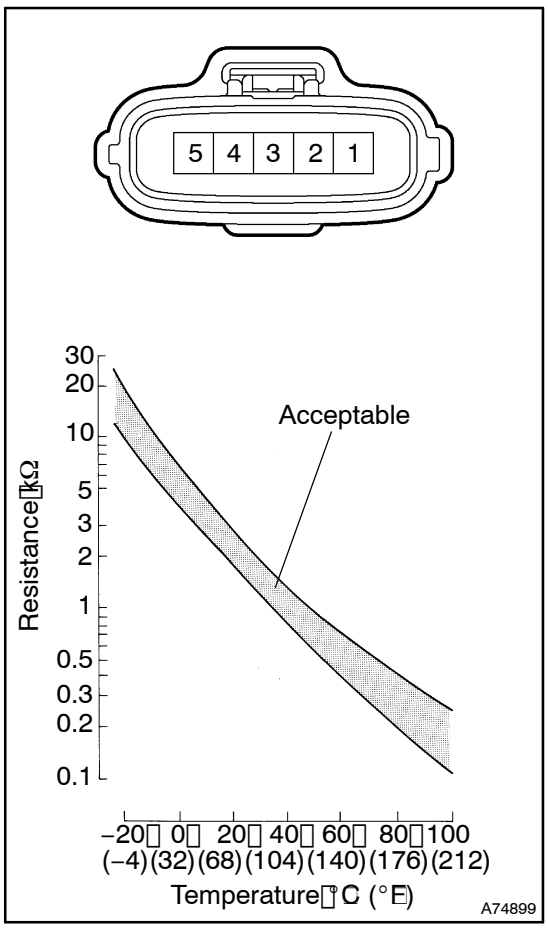
Voltage:

Symbols (Terminal No.)	Condition	Specified condition
THA (E11-21) ⇔ E2 (E11-18)	20°C (68°F)	0.5 – 3.4 V
	80°C (176°F)	0.2 – 1.0 V

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

NG

2	INSPECT MASS AIR FLOW METER (INTAKE AIR TEMPERATURE SENSOR)



(a) Measure the resistance between the terminals.

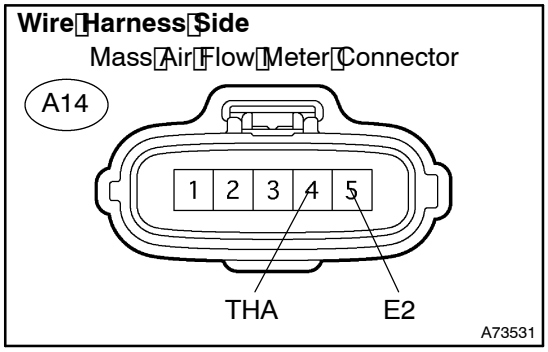
Resistance:

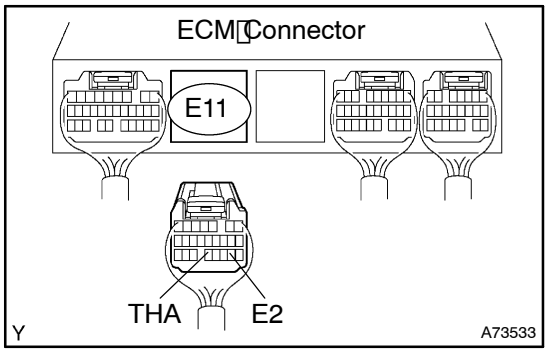
Symbols (Terminal No.)	Specified condition
4 ⇔ 5	12.5 – 16.9 kΩ at –20°C (–4°F)
	2.19 – 2.67 kΩ at 20°C (68°F)
	0.50 – 0.68 kΩ at 60°C (140°F)

NG → **REPLACE MASS AIR FLOW METER (INTAKE AIR TEMPERATURE SENSOR)**

OK

3	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER SUB–ASSY ⇔ ECM)





(a) Disconnect the A14 mass air flow meter connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
THA (A14–4) ⇔ THA (E11–21)	Continuity
E2 (A14–5) ⇔ E2 (E11–18)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
THA (A14–4) or THA (E11–21) ⇔ Other terminals and body ground	No continuity

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

OK →

CHECK AND REPLACE ECM (See page 01–36)