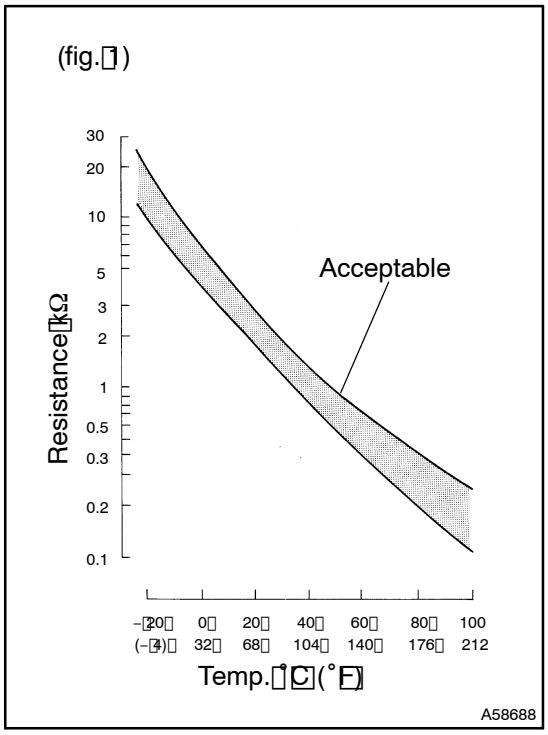
DTC P0110/24 INTAKE AIR TEMP. CIRCUIT MALFUNCTION

CIRCUIT DESCRIPTION



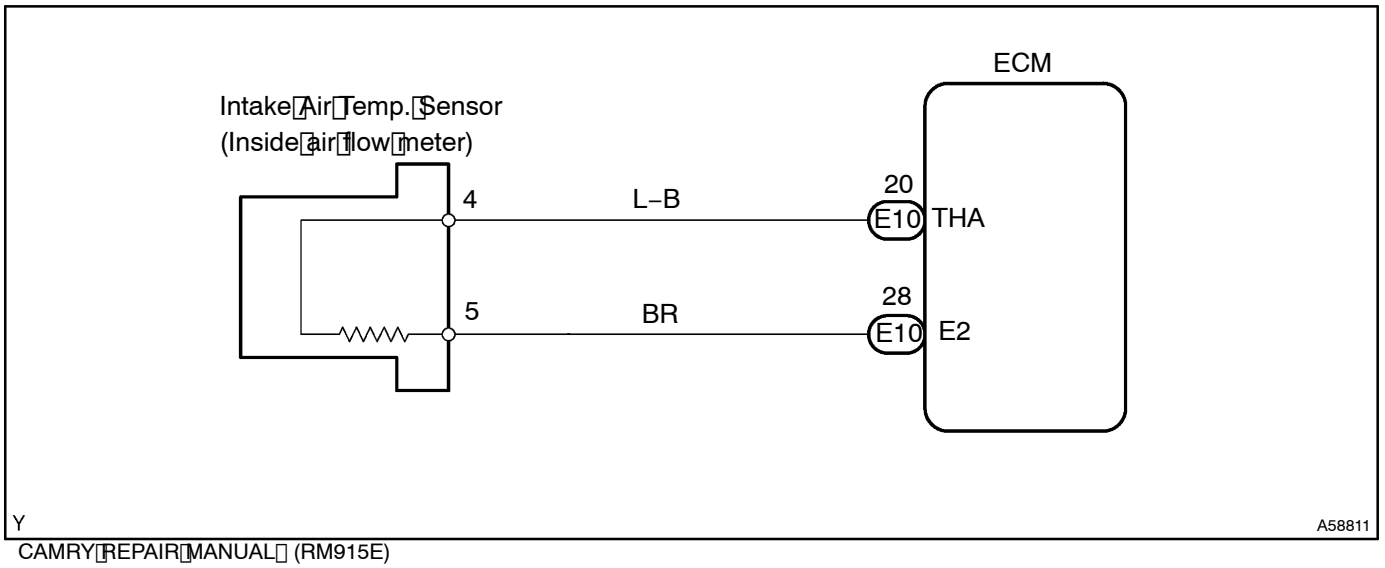
The intake air temperature sensor is built in the air flow meter (See page 05–25) and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature, the greater the thermistor resistance value is, and the higher the intake air temperature, the lower the thermistor resistance value is (See Fig. 1).
The air intake 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 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 in proportion to the 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 driveability during the cold engine operation.

DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (inside air flow meter) • ECM

HINT:
After confirming DTC P0110/24, use the hand–held tester to confirm the intake air temperature from the CURRENT DATA.

Temp. Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110/24, P0115/22, P0116/22, P120/41 and P0121/41 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using the hand–held tester, as 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, 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(INTAKE AIR TEMPERATURE)

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

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

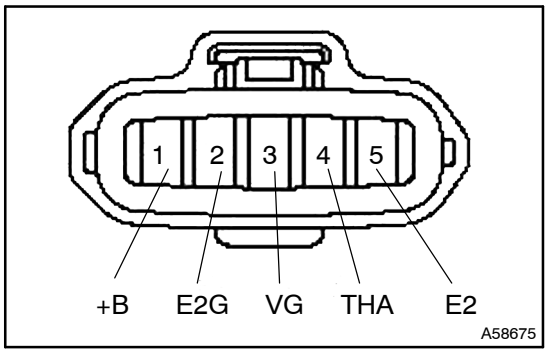
B → **Go to step 2**

C → **Go to step 4**

A

CHECK FOR INTERMITTENT PROBLEMS

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

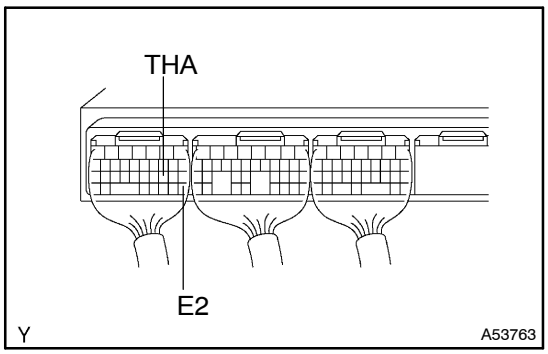


(a) Disconnect the intake air flow meter connector.
(b) Connect the terminal THA and E2.
(c) Turn the ignition switch ON.
(d) Read temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more

OK → **REPLACE INTAKE AIR FLOW METER SUB–ASSY**

NG

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



(a) Connect the terminals THA of the ECM connector and E2 of the ECM connector.

HINT:

Before checking, do a visual check and connector connection and terminal inspection of the ECM.

(b) Read temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more

OK	REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

NG

CHECK AND REPLACE ECM

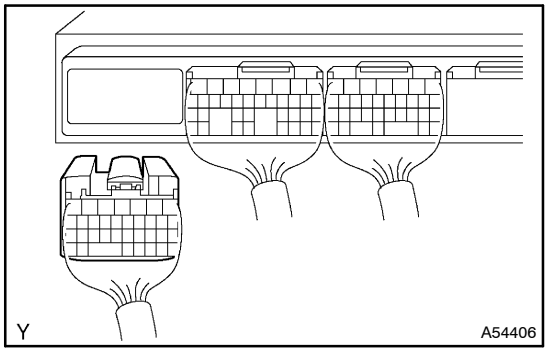
4	READ VALUE OF HAND–HELD TESTER(CHECK FOR SHORT IN HARNESS)

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

OK	REPLACE INTAKE AIR FLOW METER SUB–ASSY

NG

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



(a) Disconnect the the ECM E10 connector.
(b) Turn the ignition switch ON.
(c) Read temperature value on the hand–held tester.
Temperature: –40°C (–40°F)

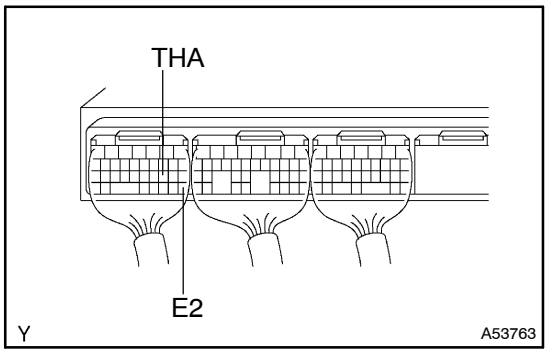
OK	REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

NG

CHECK AND REPLACE ECM

When not using Hand–held Tester:

1	INSPECT ECM



(a) Turn the ignition switch ON.
(b) Measure voltage between terminals THA and E2 of engine ECU connector.

VOLTAGE:

Intake air temp. °C (°F)	Voltage
20 (68)	0.5 – 3.4 V
60 (140)	0.2 – 1.0 V

OK ⇒ **CHECK FOR INTERMITTENT PROBLEMS**

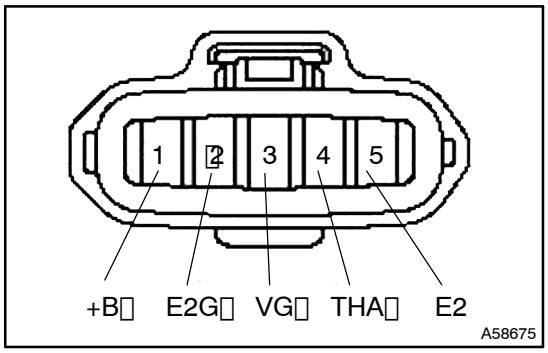
NG

2	CHECK INTAKE AIR FLOW METER SUB–ASSY (See page 10–2)

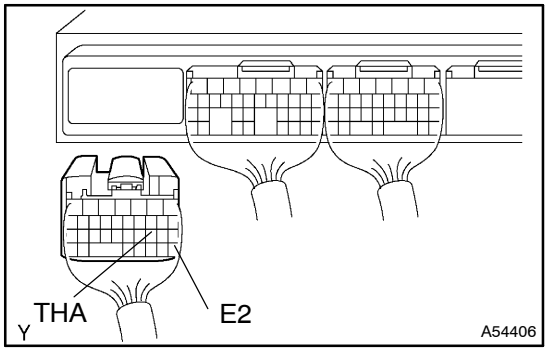
NG ⇒ **REPLACE INTAKE AIR FLOW METER SUB–ASSY**

OK

3	CHECK WIRE HARNESS OR CONNECTOR(ECM–INTAKE AIR TEMP. SENSOR)



(a) Disconnect the intake air flow meter connector.
(b) Disconnect the ECM E10 connector.
(c) Check for open between the terminals THA of the intake air flow meter connector and THA of the ECM connector.
Resistance: 1 Ω or less
(d) Check for short between the terminals THA and E2 of the ECM connector.
Resistance: 1 MΩ or more



NG ⇒ **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ECM