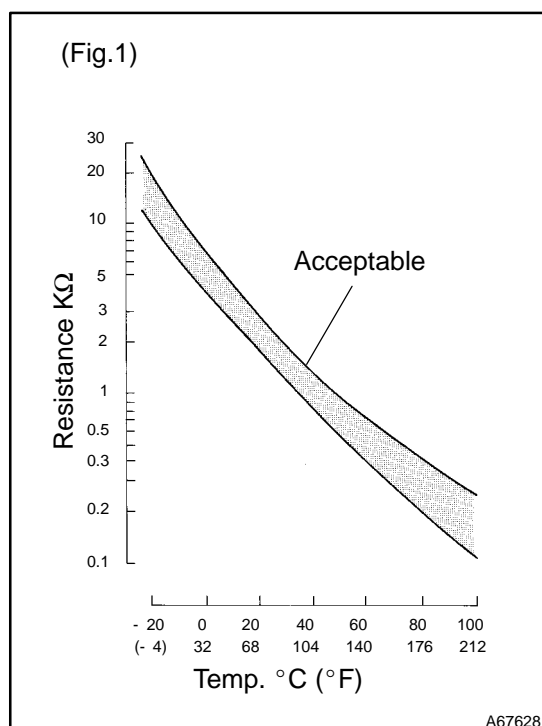


<b>DTC</b>	<b>P0110</b>	<b>INTAKE AIR TEMPERATURE CIRCUIT</b>
<b>DTC</b>	<b>P0112</b>	<b>INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT</b>
<b>DTC</b>	<b>P0113</b>	<b>INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT</b>

## CIRCUIT DESCRIPTION



The intake air temperature sensor is built in 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 terminal THA (THAR) via resistor R.

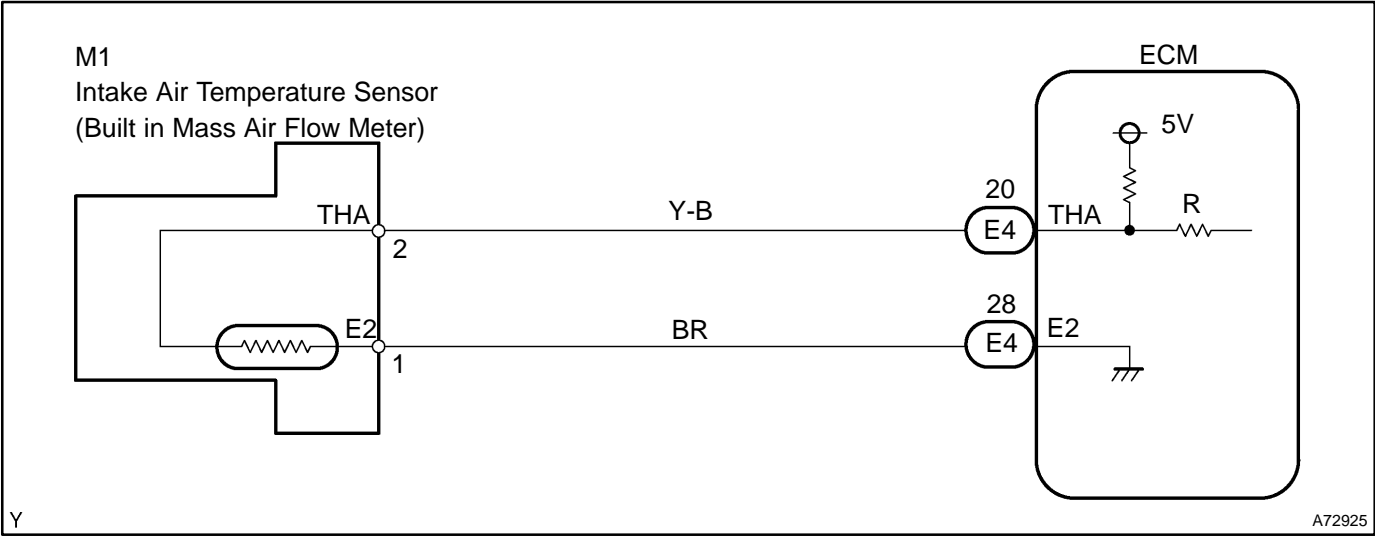
That is, the resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA (THAR) also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in intake air temp. sensor circuit for 0.5 sec.	<ul style="list-style-type: none"> <li>• Intake air temperature sensor circuit</li> <li>• Intake air temperature sensor (built in mass air flow meter)</li> <li>• ECM</li> </ul>
P0112	Step 4	Short in intake air temp. sensor circuit for 0.5 sec.	
P0113	Step 2	Open in intake air temp. sensor circuit for 0.5 sec.	

After confirming DTC "P0110, P0112 or P0113", use the hand-held tester or the OBD II scan tool to confirm the intake air temperature from the "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL".

Temperature Displayed	Malfunction
-40 °C (-40 °F)	Open circuit
140 °C (284 °F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs that are related to different system are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.
- Read freeze frame data using the hand-held tester or the OBD II scan tool, 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.

1	<b>READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(INTAKE AIR TEMPERATURE)</b>
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- (a) Turn the ignition switch ON.
- (b) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR" and read its value displayed on the hand-held tester or the OBD II scan tool.

**Temperature: Same value as the actual intake air temperature.**

**Result:**

Temperature Displayed	Proceed to
-40 °C (-40 °F)	A
140 °C (284 °F) or more	B
OK (Same as present temperature)	C

HINT:

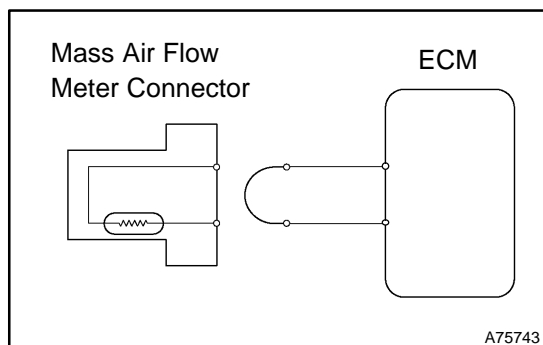
- If there is an open circuit, the hand-held tester or the OBD II scan tool indicates -40 °C (-40 °F).
- If there is a short circuit, the hand-held tester or the OBD II scan tool indicates 140 °C (284 °F) or more.

**B** → **Go to step 4**

**C** → **CHECK FOR INTERMITTENT PROBLEMS  
(See page 05-5 )**

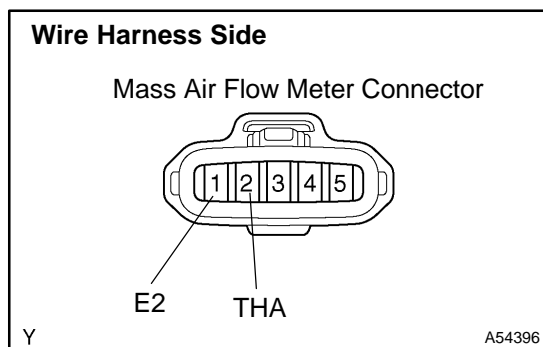
**A**

## 2 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(CHECK FOR OPEN IN WIRE HARNESS)



- Disconnect the mass air flow meter connector.
- Connect terminals THA and E2 of the mass air flow meter wire harness side connector.
- Turn the ignition switch ON.
- Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR" and read its value displayed on the hand-held tester or the OBD II scan tool.

**Temperature value: 140°C (284°F) or more**

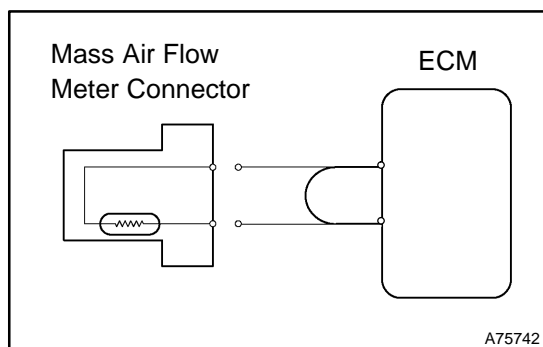


OK

**CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW METER**

NG

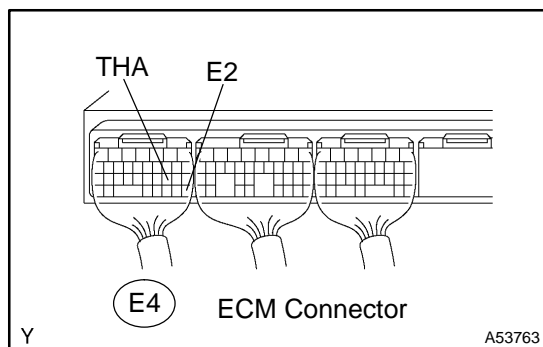
## 3 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(CHECK FOR OPEN IN ECM)



- Disconnect the mass air flow meter connector.
  - Connect terminals THA and E2 of the E4 ECM connector.
- HINT:  
Before checking, do a visual and contact pressure check for the ECM connector.

- Turn the ignition switch ON.
- Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR" and read its value displayed on the hand-held tester or the OBD II scan tool.

**Temperature value: 140°C (284°F) or more**



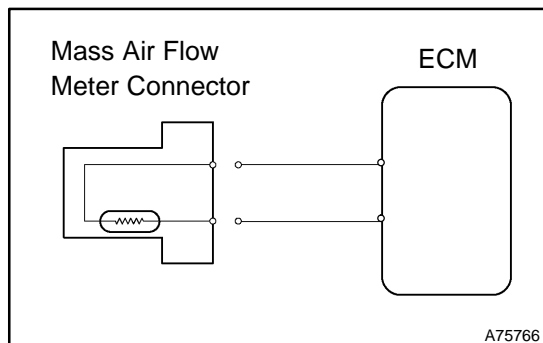
OK

**REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

**CONFIRM GOOD CONNECTION AT ECM. IF OK, CHECK AND REPLACE ECM (See page 01-35 )**

**4 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(CHECK FOR SHORT IN WIRE HARNESS)**



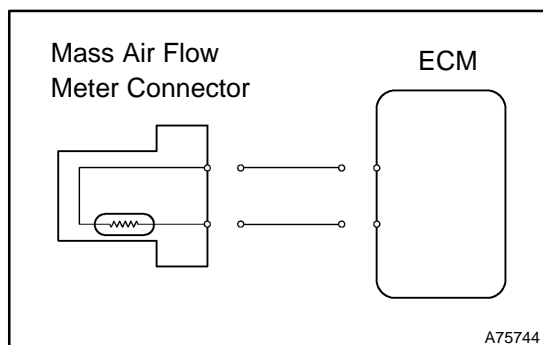
- Disconnect the mass air flow meter connector.
  - Turn the ignition switch ON.
  - Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR" and read its value displayed on the hand-held tester or the OBD II scan tool.
- Temperature value: -40°C (-40°F)**

**OK**

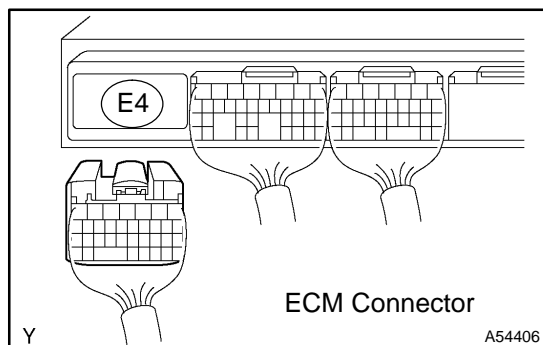
**REPLACE MASS AIR FLOW METER**

**NG**

**5 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(CHECK FOR SHORT IN ECM)**



- Disconnect the E4 ECM connector.
  - Turn the ignition switch ON.
  - Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR" and read its value displayed on the hand-held tester or the OBD II scan tool.
- Temperature value: -40°C (-40°F)**



**OK**

**REPAIR OR REPLACE HARNESS OR CONNECTOR**

**NG**

**CHECK AND REPLACE ECM (See page 01-35 )**