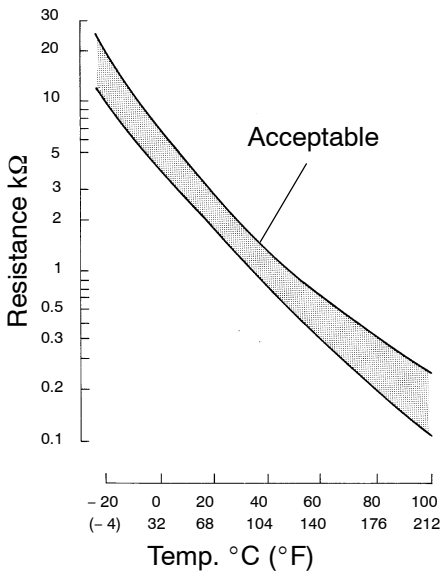
DTC	P0110	INTAKE AIR TEMPERATURE CIRCUIT

DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT

DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

Fig.1



The Intake Air Temperature (IAT) sensor, mounted on the Mass Air Flow (MAF) meter, monitors the intake air temperature. The IAT sensor has a thermistor that varies its resistance depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected as voltage changes to the ECM terminal (see Fig. 1).

The IAT sensor is connected to the ECM (See below). The 5 V power source voltage in the ECM is applied to the IAT sensor from terminal THA via resistor R.

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

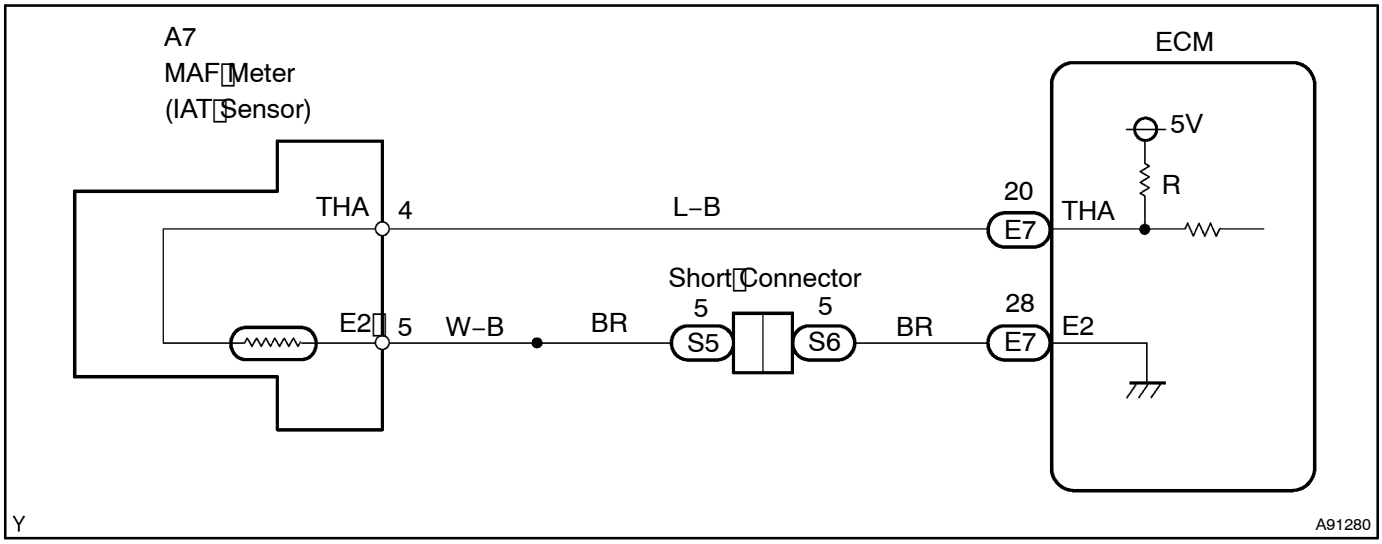
DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in IAT sensor circuit for 0.5 seconds	• Open or short in IAT sensor circuit • IAT sensor (built in MAF meter) • ECM
P0112	Step 4	Short in IAT sensor circuit for 0.5 seconds	• Open or short in IAT sensor circuit • IAT sensor (built in MAF meter) • ECM
P0113	Step 2	Open in IAT sensor circuit for 0.5 seconds	• Open or short in IAT sensor circuit • IAT sensor (built in MAF meter) • ECM

HINT:

After confirming DTC P0110, P0112 or P0113, use the hand–held tester to confirm the IAT from the ALL menu (to reah the ALL menu: DIAGNOSIS / OBD/MOBD / 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 DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the hand–held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF HAND–HELD TESTER

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON. Push the hand–held tester main switch ON.

(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / INTAKE AIR. Read the values.

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

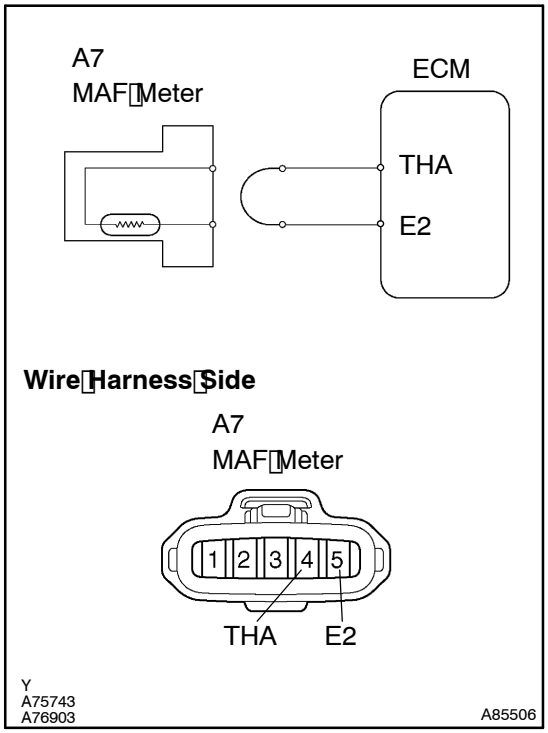
HINT:

- If there is an open circuit, the hand–held tester 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 05–8)**

A

2	READ VALUE OF HAND–HELD TESTER (INTAKE AIR TEMPERATURE)

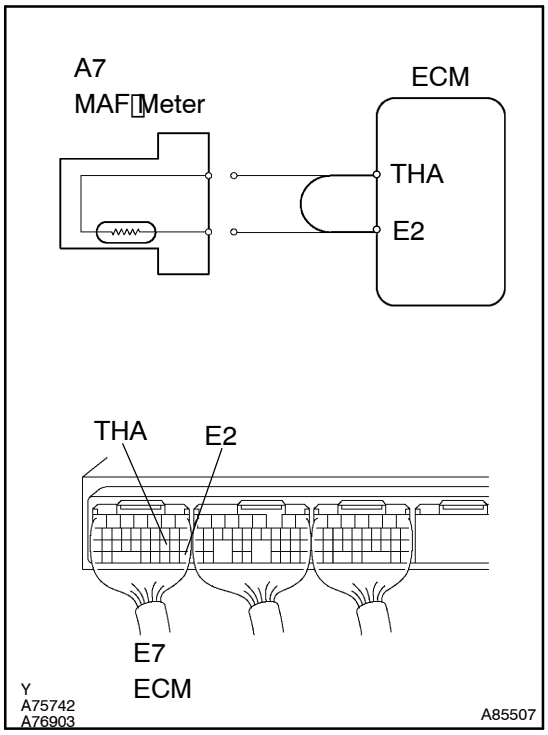


(a) Disconnect the A7 MAF meter connector.
(b) Connect terminals THA and E2 of the A7 MAF meter wire harness side connector.
(c) Turn the ignition switch ON.
(d) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / INTAKE AIR. Read the values.
OK: Temperature value: 140°C (284°F) or more

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

NG

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



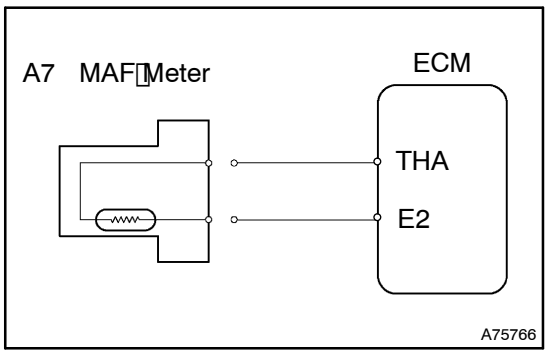
(a) Disconnect the A7 MAF meter connector.
(b) Connect terminals THA and E2 of the E7 ECM connector.
HINT:
Before checking, do a visual and contact pressure check for the ECM connector.
(c) Turn the ignition switch ON.
(d) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / INTAKE AIR. Read the values.
OK: Temperature value: 140°C (284°F) or more

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLASE ECM (See page 10–13)

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

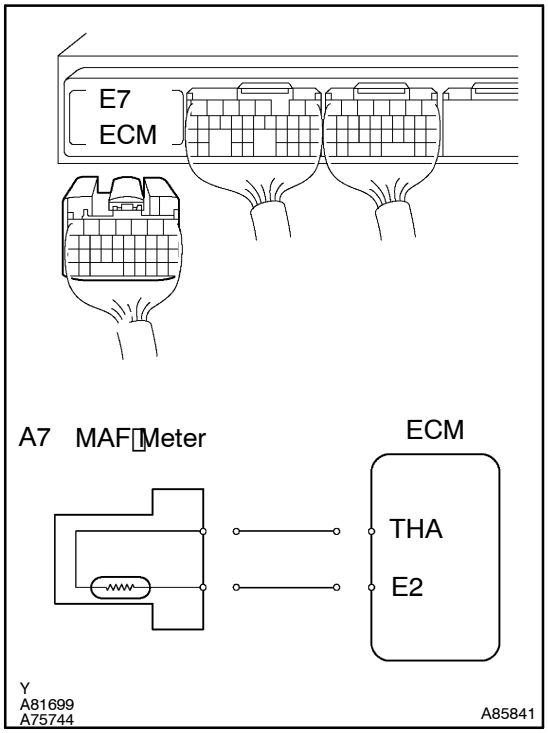


(a) Disconnect the A7 MAF meter connector.
(b) Turn the ignition switch ON.
(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / INTAKE AIR. Read the value.
OK: Temperature value: –40°C (–40°F)

OK	REPLACE MASS AIR FLOW METER

NG

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



(a) Disconnect the E7 ECM connector.
(b) Turn the ignition switch ON.
(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / INTAKE AIR. Read the value.
OK: Temperature value: –40°C (–40°F)

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10–13)