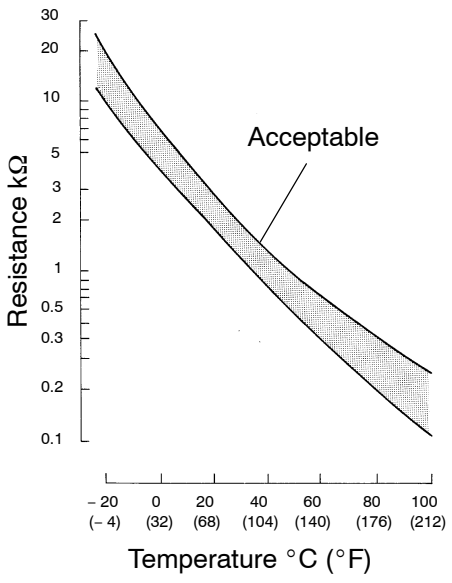
DTC	P0110	INTAKE AIR TEMPERATURE CIRCUIT

DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT

DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

(Figure 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 Figure 1).

The intake air temperature sensor is connected to the ECM (see wiring diagram). 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 voltage 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.

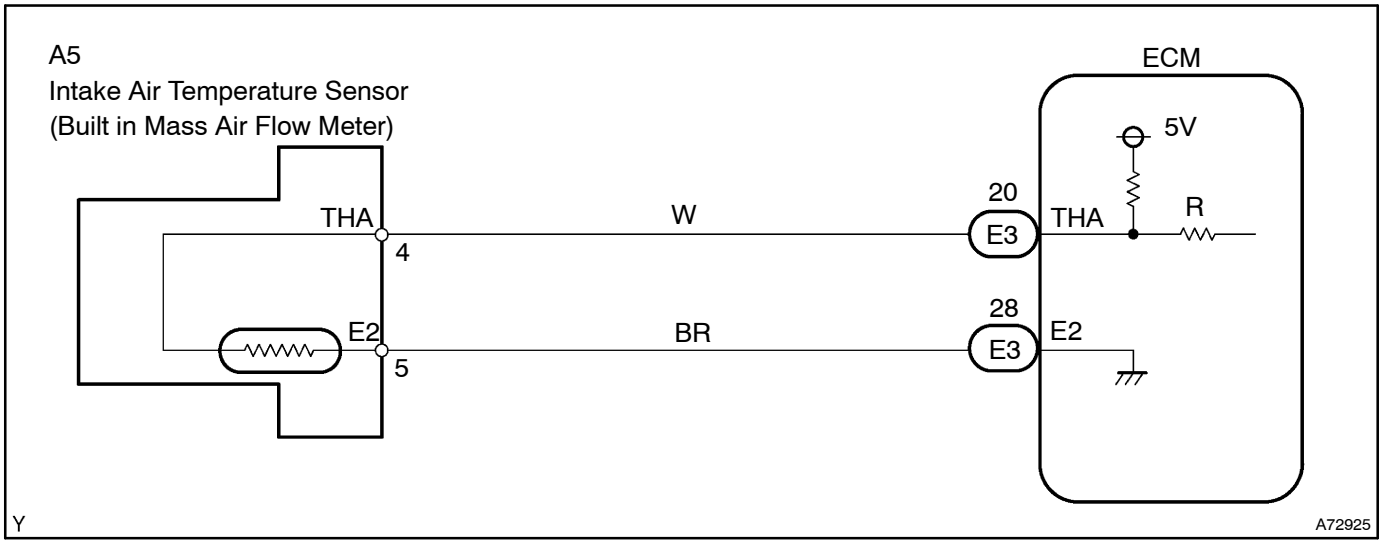
DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in intake air temperature sensor circuit for 0.5 second	• Open or short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM
P0112	Step 4	Short in intake air temperature sensor circuit for 0.5 second	• Short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM
P0113	Step 2	Open in intake air temperature sensor circuit for 0.5 second	• Open in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM

HINT:

After confirming DTC P0110, P0112 or P0113, confirm the intake air temperature in Powertrain / Engine and ECT / Data List / Intake Air using the intelligent tester II.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F)	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 intelligent tester II. Freeze frame data records the engine condition when 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	READ VALUE OF INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the values.
Temperature value: Same as the ambient air temperature.
Result:

Temperature Displayed	Proceed to
–40˚C (–40˚F)	A
140˚C (284˚F)	B
OK (Same as ambient air temperature)	C

HINT:

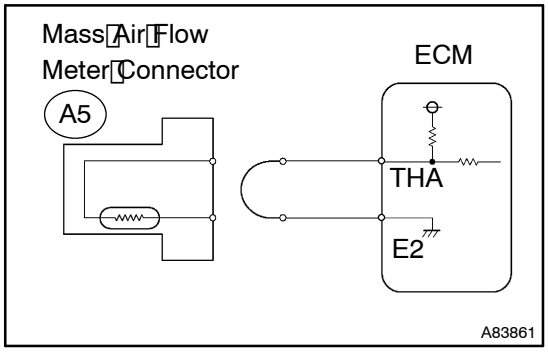
- If there is an open circuit, the intelligent tester II indicates –40˚C (–40˚F).
- If there is a short circuit, the intelligent tester II indicates 140˚C (284˚F).

B → **Go to step 4**

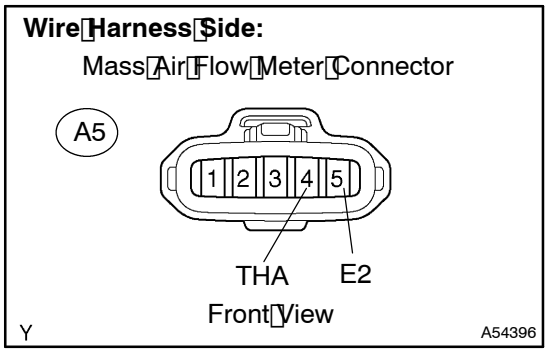
C → **CHECK FOR INTERMITTENT PROBLEMS**

A

2	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR OPEN IN WIRE HARNESS)



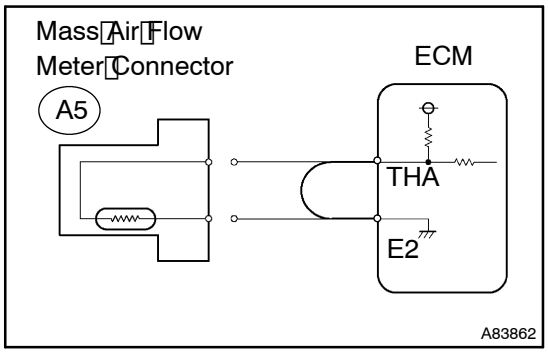
(a) Disconnect the A5 mass air flow meter connector.
(b) Connect terminals THA and E2 of the mass air flow meter wire harness side connector.
(c) Turn the power switch ON (IG).
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Intake Air. Read the values.
OK:
Temperature value: 140°C (284°F)
(e) Reconnect the mass air flow meter connector.



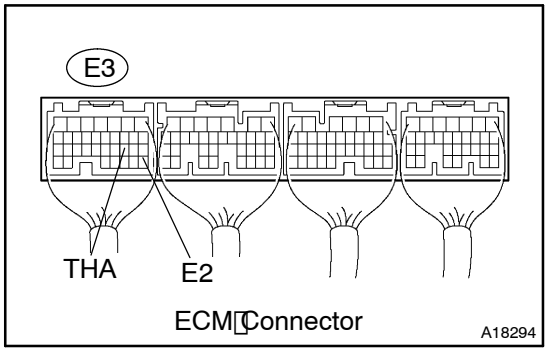
OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW SENSOR

NG

3	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR OPEN IN ECM)



(a) Disconnect the A5 mass air flow meter connector.
(b) Connect terminals THA and E2 of the E3 ECM connector.
HINT:
Before checking, do a visual and contact pressure check on the ECM connector.
(c) Turn the power switch ON (IG).
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Intake Air. Read the values.
OK:
Temperature value: 140°C (284°F)
(e) Reconnect the mass air flow meter connector.

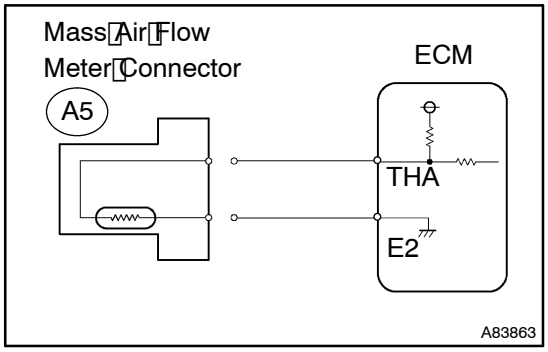


OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM (See page 10–24)

4	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR SHORT IN WIRE HARNESS)

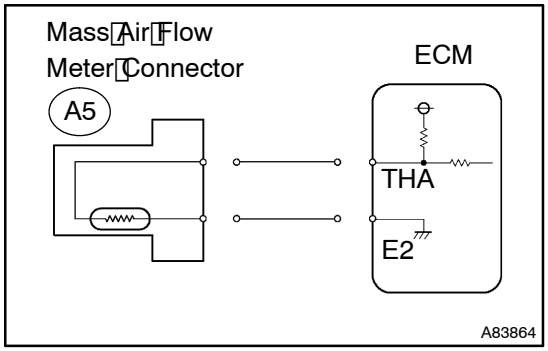


(a) Disconnect the A5 mass air flow meter connector.
(b) Turn the power switch ON (IG).
(c) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Intake Air. Read the values.
OK:
Temperature value: –40°C (–40°F)
(d) Reconnect the mass air flow meter connector.

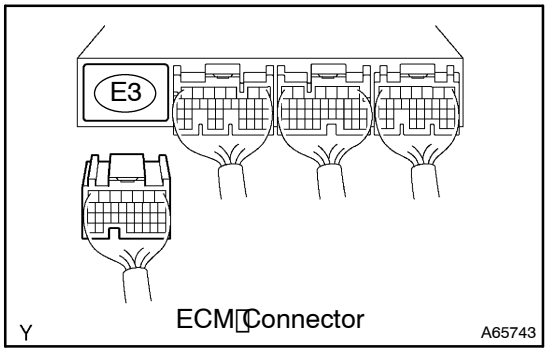
OK	REPLACE MASS AIR FLOW METER

NG

5	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR SHORT IN ECM)



(a) Disconnect the E3 ECM connector.
(b) Turn the power switch ON (IG).
(c) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Intake Air. Read the values.
OK:
Temperature value: –40°C (–40°F)
(d) Reconnect the ECM connector.



OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10–24)