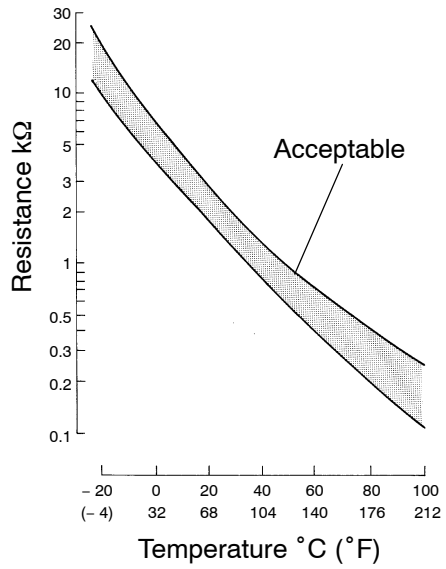
DTC	P0095/23	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT

DTC	P0097/23	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT LOW

DTC	P0098/23	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT HIGH

CIRCUIT DESCRIPTION

(Fig. 1)



The intake air temperature (IAT) sensor (after turbocharged), built into the intake pipe, senses the turbocharged air temperature. A thermistor built in the sensor changes the resistance value according to the IAT. The lower the IAT, the greater the thermistor resistance value, and the higher the IAT, the lower the thermistor resistance value (see Fig. 1).

The IAT sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the IAT sensor from terminal THIA via a resistor R. The resistor R and 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 the terminal THIA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation.

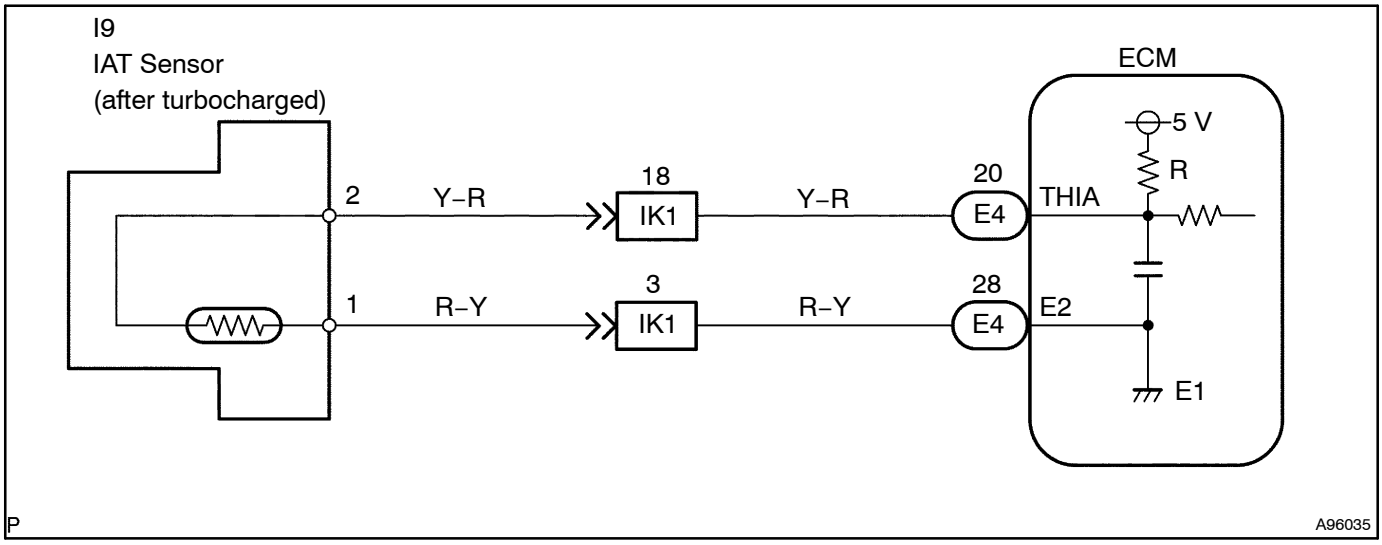
DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0095/23	Step 1	Open or short in IAT sensor (after turbocharged) circuit for 0.5 seconds (1 trip detection logic)	• Open or short in IAT sensor (after turbocharged) circuit • IAT sensor (after turbocharged) • ECM
P0097/23	Step 4	Short in IAT sensor (after turbocharged) circuit for 0.5 seconds	Same as DTC No. P0095/23
P0098/23	Step 2	Open in IAT sensor (after turbocharged) circuit for 0.5 seconds	Same as DTC No. P0095/23

HINT:

After confirming DTC P0095/23, P0097/23 or P0098/23, use the hand–held tester to confirm the IAT from the AMBI TEMP SENS menu (to reach the AMBI TEMP SENS menu: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS).

Temperature Displayed	Malfunction
– 40˚C (– 40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

When using hand–held tester:

1	READ VALUE OF DATA LIST (INTAKE AIR TEMPERATURE)

(a) Connect the hand–held tester (with 24 V VIM) to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester ON.
(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS. Read the values.
Standard: Same as actual inlet air temperature
Result:

Temperature Display	Proceed to
– 40°C (– 40°F)	A
140°C (284°F) or more	B
OK (same as air temperature near intake manifold)	C

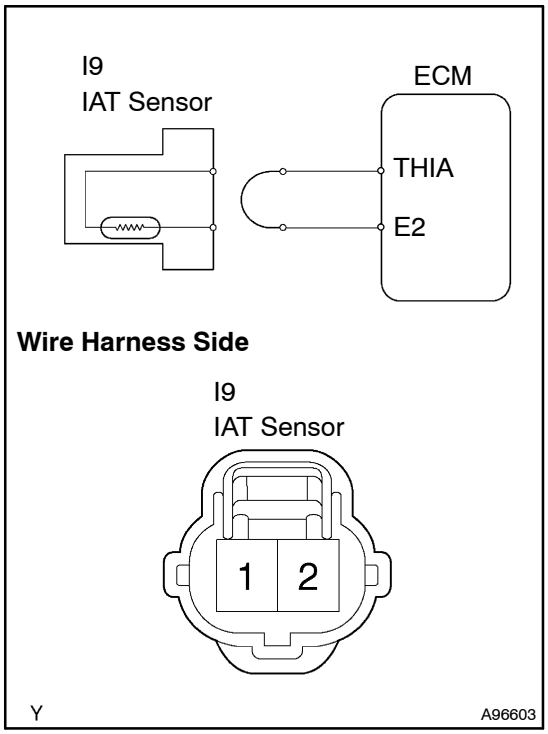
HINT:
- If there is an open circuit, the hand–held tester indicates – 40˚C (– 40˚F).
- If there is a short circuit, the hand–held tester indicates 140˚C (284˚F) or more.

B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05–10)**

A

2	READ VALUE OF DATA LIST (CHECK FOR OPEN IN WIRE HARNESS)

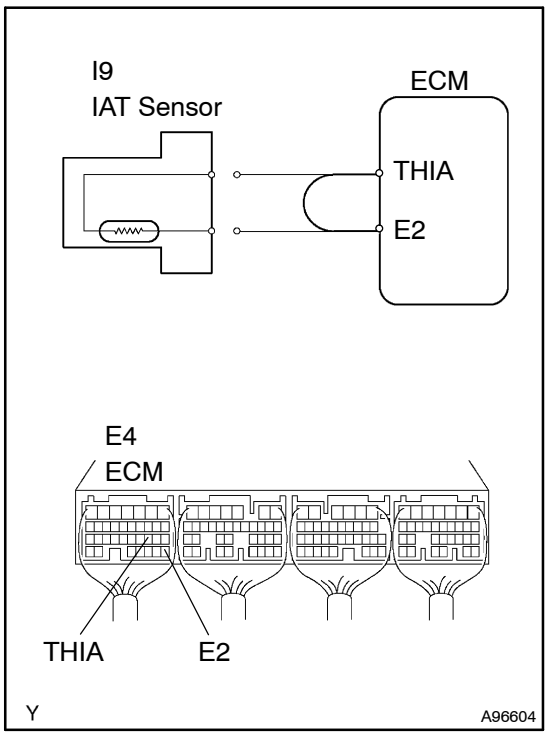


(a) Disconnect the I9 IAT sensor connector.
(b) Connect the terminals 1 and 2 of the IAT sensor harness side connector.
(c) Turn the ignition switch ON.
(d) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS. Read the values.
Standard: 140°C (284°F) or more

OK → **REPLACE INTAKE AIR TEMPERATURE SENSOR**

NG

3 READ VALUE OF DATA LIST (CHECK FOR OPEN IN ECM)



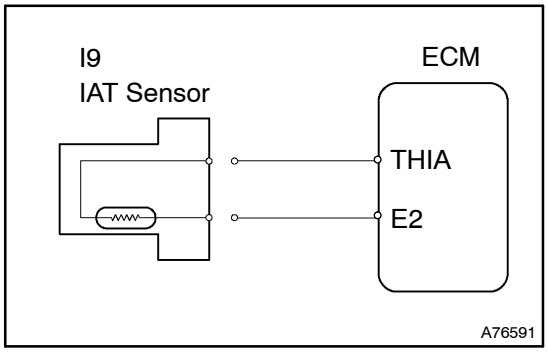
(a) Disconnect the I9 IAT sensor connector.
(b) Connect terminals THIA and E2 of the E4 ECM connector.
HINT:
Before checking, do a visual and contact pressure check for the ECM connector.
(c) Turn the ignition switch ON.
(d) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS. Read the values.
Standard: 140°C (284°F) or more

NG → **REPLACE ECM (See page 10–10)**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR

4 READ VALUE OF DATA LIST (CHECK FOR SHORT IN WIRE HARNESS)

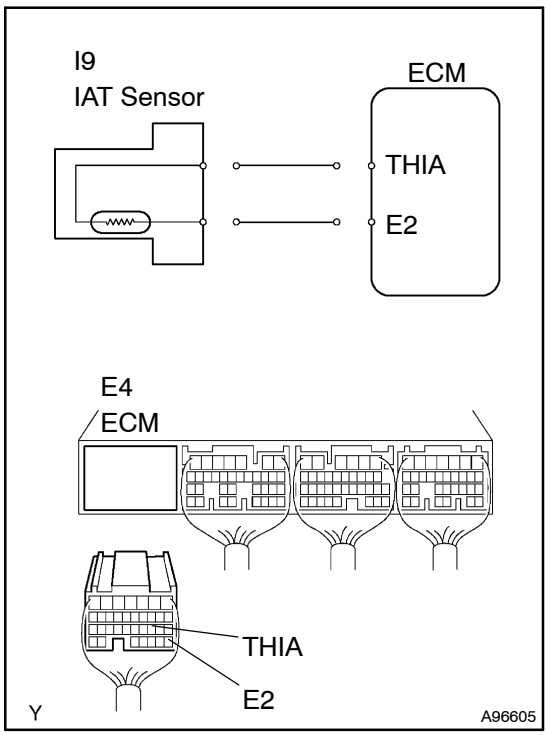


(a) Disconnect the I9 IAT sensor connector.
(b) Turn the ignition switch ON.
(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS. Read the values.
Standard: – 40°C (– 40°F)

OK → **REPLACE INTAKE AIR TEMPERATURE SENSOR**

NG

5	READ VALUE OF DATA LIST (CHECK FOR SHORT IN ECM)



(a) Disconnect the E4 ECM connector.
(b) Turn the ignition switch ON.
(c) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / AMBI TEMP SENS. Read the values.
Standard: – 40°C (– 40°F)

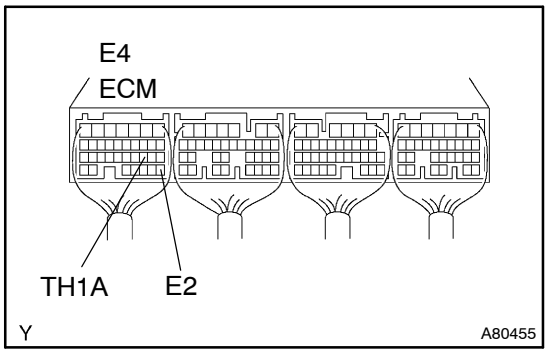
NG → **REPLACE ECM (See page 10–10)**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR

When not using hand–held tester:

1 CHECK ECM (TH1A VLTAGE)



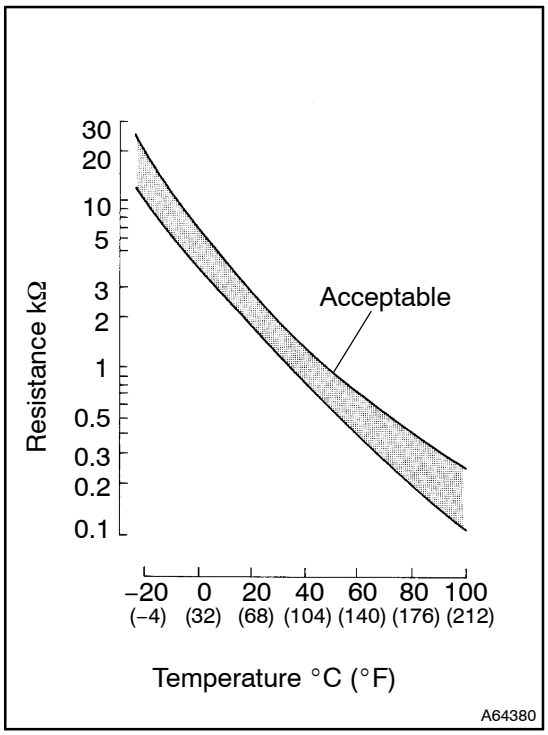
(a) Turn the ignition switch ON.
(b) Measure the voltage of the ECM connector.
Standard:

Tester Connection	Condition	Specified Condition
E4–20 (THIA) – E4–28 (E2)	20°C (68°F)	0.2 to 3.8 V
E4–20 (THIA) – E4–28 (E2)	80°C (176°F)	0.1 to 1.5 V

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–10)**

NG

2 CHECK INTAKE AIR TEMPERATURE SENSOR



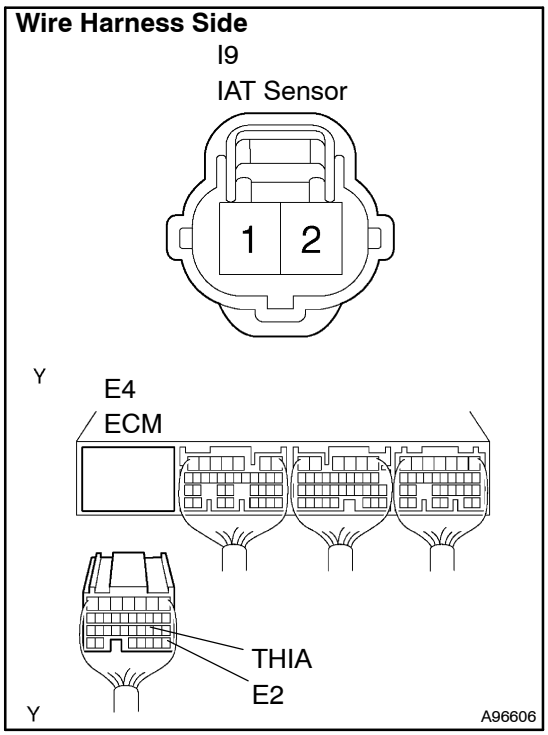
(a) Remove the IAT sensor.
(b) Measure the resistance between the terminals.
Standard:
2.21 to 2.65 kΩ at approximately 20°C (68°F)

NOTICE:
If checking the ECT sensor in water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.

NG → **REPLACE INTAKE AIR TEMPERATURE SENSOR**

OK

3 CHECK WIRE HARNESS (ECM – IAT SENSOR)



(a) Disconnect the I9 IAT sensor connector.
(b) Disconnect the E4 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
I9–2 (THIA) – E4–20 (THIA) I9–1 (E2) – E4–28 (E2)	Below 1 Ω
I9–2 (THIA) or E4–20 (THIA) – Body ground I9–1 (E2) or E4–28 (E2) – Body ground	10 kΩ or higher

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

OK

REPLACE ECM (See page 10–10)