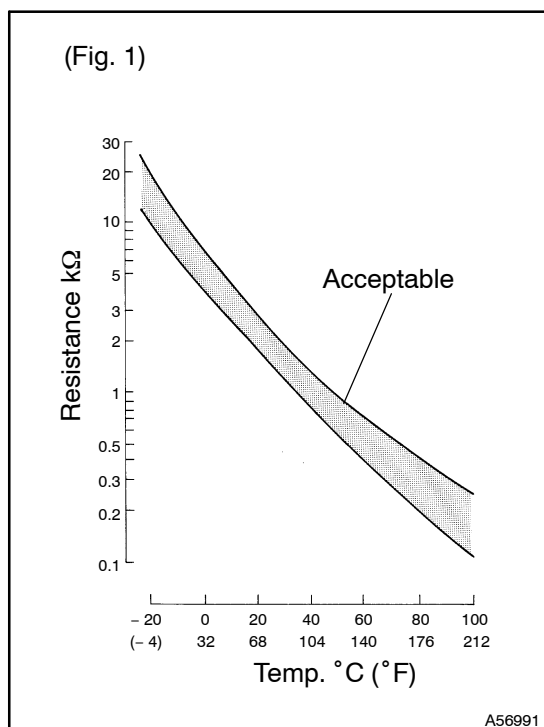


DTC	24(1)	INTAKE AIR TEMP.SENSOR CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION



The inlet air temperature sensor is built into the intake manifold and senses the inlet air temperature. A thermistor built in the sensor changes the resistance value according to the inlet air temperature. The lower the inlet air temperature, the greater the thermistor resistance value, and the higher the inlet air temperature, the lower the thermistor resistance value (See Fig. 1).

The inlet air temperature sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the inlet air temperature sensor from terminal THA via a resistor R. That is the resistor R and the inlet air temperature sensor are connected in series. When the resistance value of the inlet air temperature sensor changes. Based on this signal, the ECM increases the fuel injection volume to improve drivability during cold engine operation.

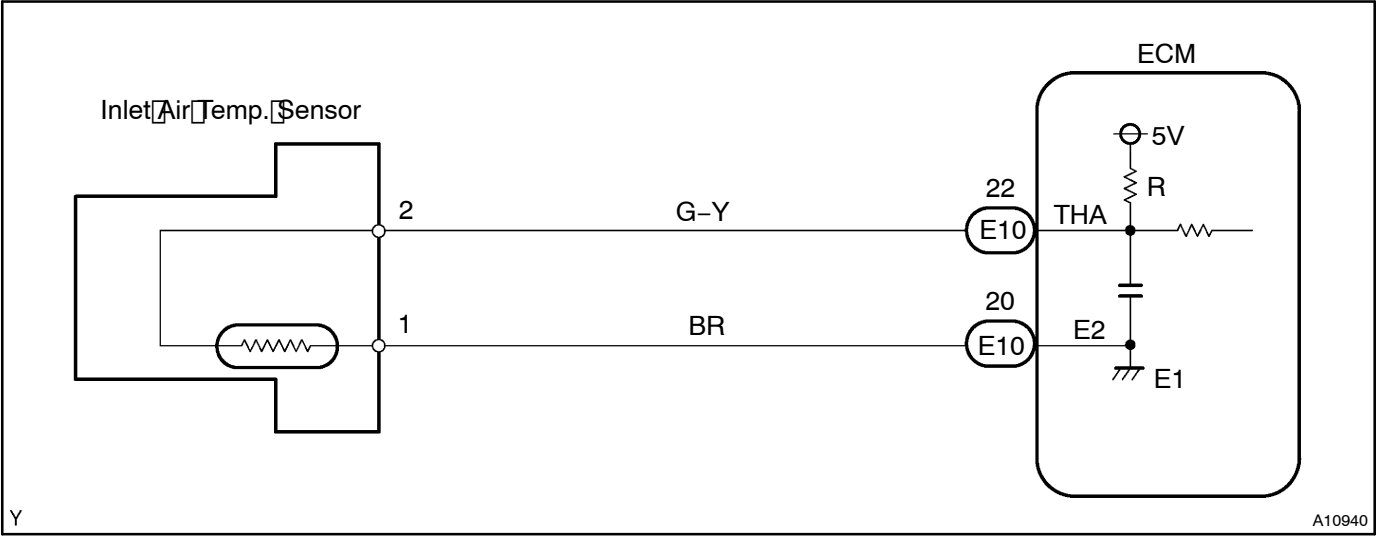
DTC No.	DTC Detection Condition	Trouble Area
24 (1)	Open or short in inlet air temp. sensor circuit for 0.5 sec. or more	<ul style="list-style-type: none"> • Open or short in inlet air temp. sensor circuit • Inlet air temp. sensor • ECM

HINT:

After confirming DTC 24, use the hand-held tester to confirm the inlet air temperature from the CURRENT DATA.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC 22, 24, 35 and 39, E2 (sensor ground) may be open.
- Read freeze frame data using hand-held tester. Because freeze frame 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, etc. at the time of the malfunction.

When using hand-held tester:

1

READ VALUE OF HAND-HELD TESTER (INTAKE AIR TEMP)

- (a) Read temperature value on the hand-held tester.
- Temperature: The same as actual inlet air temperature

Result:

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

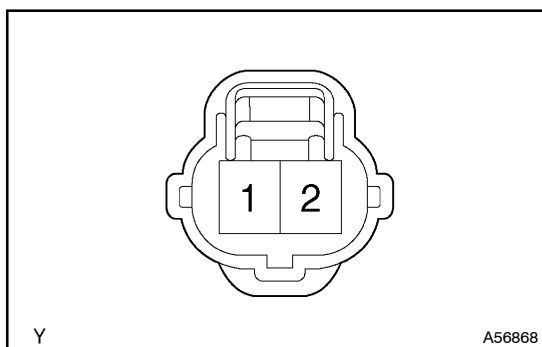
B

Go to step 4

C

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-156)

A

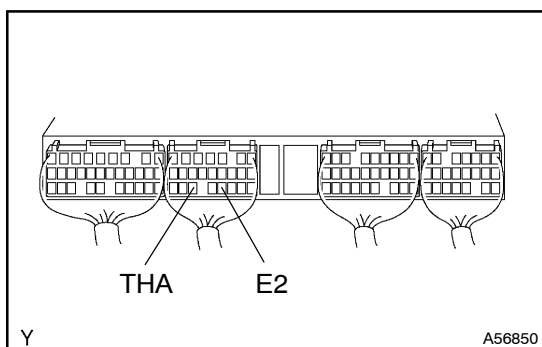
2 CHECK HARNESS AND CONNECTOR(CHECK FOR OPEN)

- (a) Disconnect the inlet air temperature sensor connector.
- (b) Connect the terminals 1 with 2 of the inlet air temperature sensor harness side connector.
- (c) Turn the ignition switch ON.
- (d) Read the temperature value on the hand-held tester.
Temperature: 140°C (284°F) or more

OK

**REPLACE DIESEL TURBO
INLET AIR TEMPERATURE SENSOR**

NG

3 INSPECT ECM(CHECK FOR OPEN)

- (a) Connect between terminals THA and E2 of the ECM connector.
- (b) Turn the ignition switch ON.
- (c) Read the temperature value on the hand-held tester.
Temperature: 140°C (284°F) or more

OK

**REPAIR OR REPLACE
HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM**4 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT)**

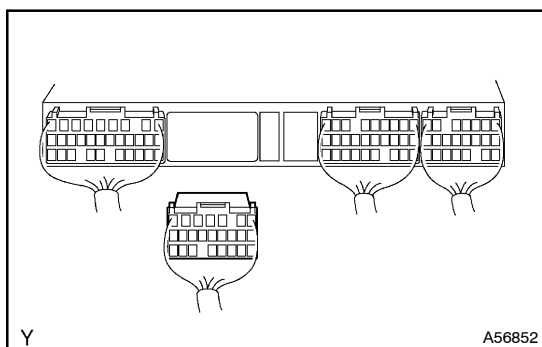
- (a) Disconnect the inlet air temperature sensor connector.
- (b) Turn the ignition switch ON.
- (c) Read the temperature value on the hand-held tester.
Temperature: - 40°C (- 40°F)

OK

**REPLACE DIESEL TURBO
INLET AIR TEMPERATURE SENSOR**

NG

5 INSPECT ECM (CHECK FOR SHORT)



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

OK

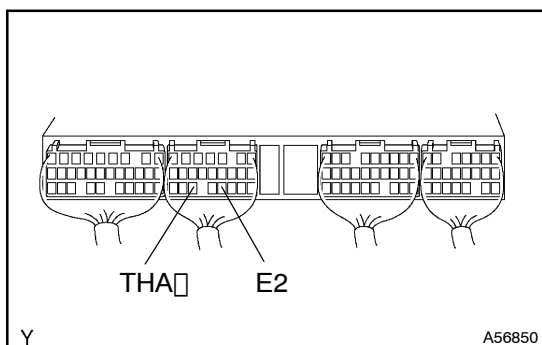
**REPAIR OR REPLACE
HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM

When not using hand-held tester:

1 INSPECT ECM



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

Voltage:

Intake Air Temp. $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	Voltage
20 (68) (Engine is cool)	0.2 - 3.8 V
80 (176) (Engine is hot)	0.1 - 1.5 V

OK

**CHECK FOR INTERMITTENT PROBLEMS
(See page 05-156)**

NG

2 INSPECT DIESEL TURBO INLET AIR TEMPERATURE SENSOR

- (a) Disconnect the inlet air temperature sensor connector.
- (b) Measure resistance between the inlet air temperature sensor terminals.

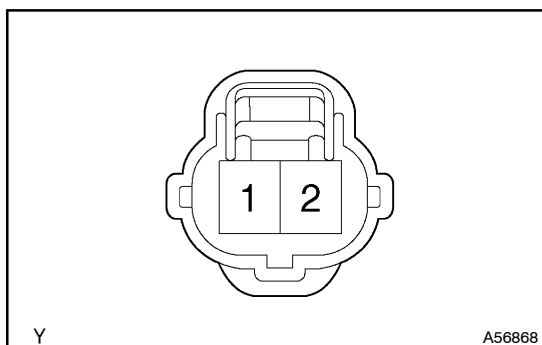
Resistance: 2 - 3 k Ω at 20 $^{\circ}\text{C}$ (68 $^{\circ}\text{F}$)

NG

**REPLACE DIESEL TURBO
INLET AIR TEMPERATURE SENSOR**

OK

3 CHECK AND REPLACE HARNESS AND CONNECTOR (ECM-INLET AIR TEMP.SENSOR)



- (a) Disconnect the inlet air temperature sensor connector.
- (b) Disconnect the ECM E10 connector.
- (c) Check for open between the terminals 2 of the inlet air temperature sensor harness side connector and THA of the ECM E10 connector.

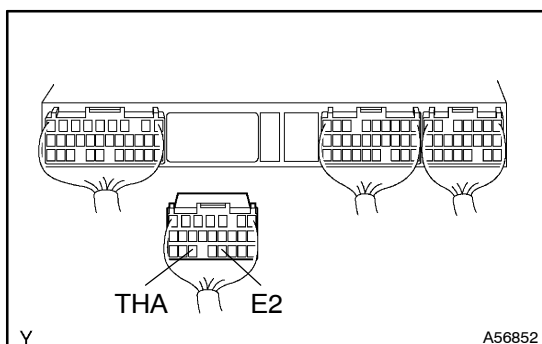
Resistance: 1 Ω or less

- (d) Check for short between the terminals THA and E2 of the ECM E10 connector.

Resistance: 1 M Ω or more

- (e) Check for open between the terminals 1 of the inlet air temperature sensor harness side connector and E2 of the ECM E10 connector.

Resistance: 1 Ω or less



NG

**REPAIR OR REPLACE
HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE ECM