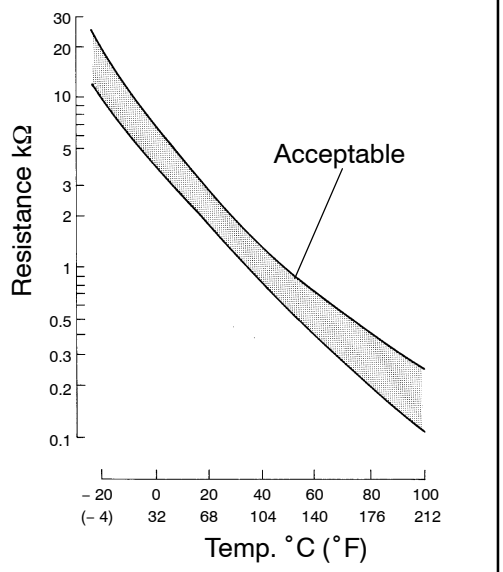
| DTC | 23 | AIR TEMPERATURE CIRCUIT MALFUNCTION |
|---|---|---|

## CIRCUIT DESCRIPTION

(Fig. 1)



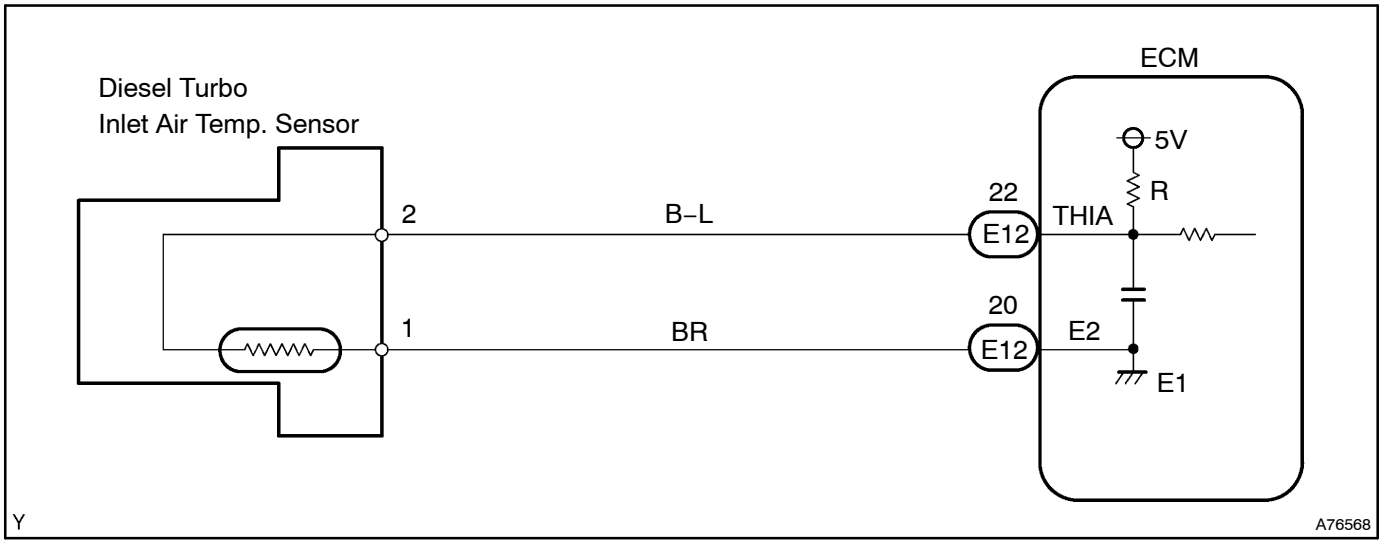

The inlet air temperature sensor is built into the intercooler assy and senses the inlet air temperature. A thermistor built in the sensor changes the resistance value according to the inlet air temperature. The lower the inlet air temperature, the greater the thermistor resistance value, and the higher 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 in accordance with changes in the inlet air temperature, the potential at the terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve drive ability during cold engine operation.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| 23 | Open or short in inlet air temperature sensor circuit for 0.5 sec. or more | • Open or short in inlet air temp. sensor circuit<br>• Inlet air temperature sensor<br>• ECM |

HINT:
After confirming DTC 23, 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 different DTCs that are related to different systems 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, as freeze frame 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, 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:**

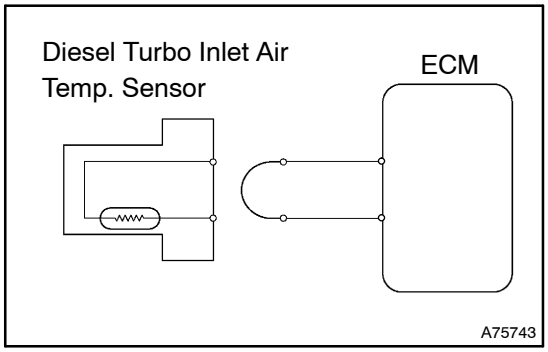
| Display | Proceed |
|---|---|
| – 40 °C (– 40 °F) | A |
| 140 °C (284 °F) or more | B |
| OK | C |

**B** → **Go to step 4**

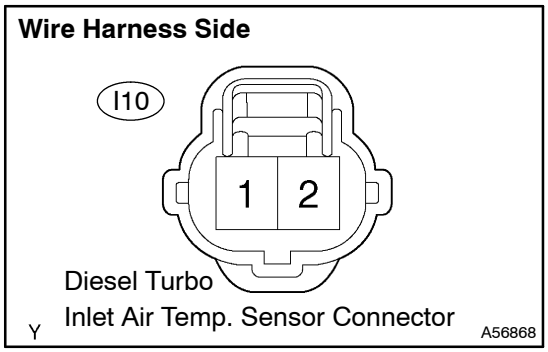
**C** → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–429)**

**A**

## 2 CHECK HARNESS AND CONNECTOR(CHECK FOR OPEN)



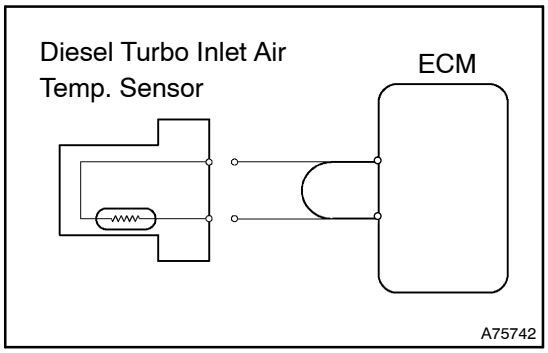

(a) Disconnect the diesel turbo inlet air temperature sensor connector.
(b) Connect the terminals 1 with 2 of the diesel turbo inlet air temperature sensor harness side connector.
(c) Turn the ignition switch ON.
(d) Read the temperature value on the hand–held tester.
**Temperature: 140°C (284°F) or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



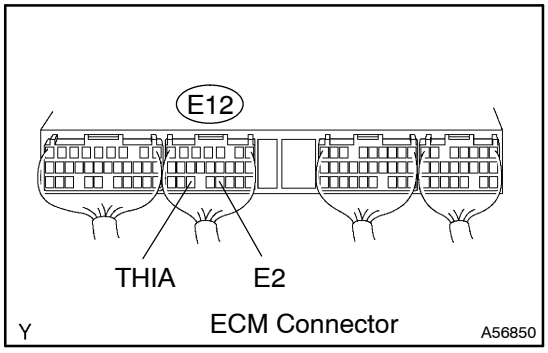

**OK** → **REPLACE DIESEL TURBO INLET AIR TENPERATURE SENSOR**

**NG**

## 3 INSPECT ECM(CHECK FOR OPEN)




(a) Connect between terminals THIA and E2 of the ECM E12 connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
**Temperature: 140°C (284°F) or more**

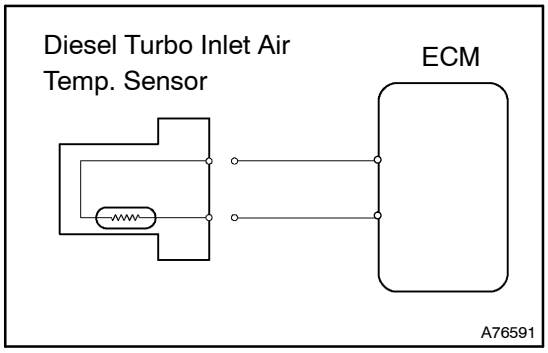


| OK | REPAIR OR REPLACE HARNESS OR CONNECTOR |
|---|---|

NG

**CHECK AND REPLACE ECM**

## 4 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT)

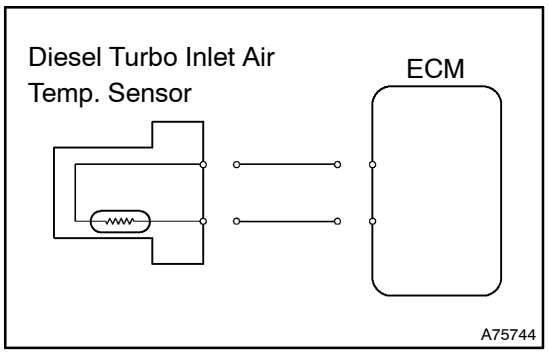



(a) Disconnect the diesel turbo inlet air temperature sensor connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
**Temperature: – 40°C (– 40°F)**

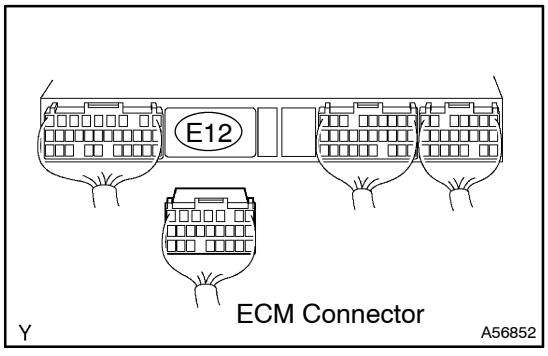
| OK | REPLACE DIESEL TURBO INLET AIR TENPERATURE SENSOR |
|---|---|

NG

## 5 INSPECT ECM(CHECK FOR SHORT)




(a) Disconnect the ECM E12 connector.
(b) Turn the ignition switch ON.
(c) Read the temperature value on the hand–held tester.
**Temperature: – 40°C (– 40°F)**



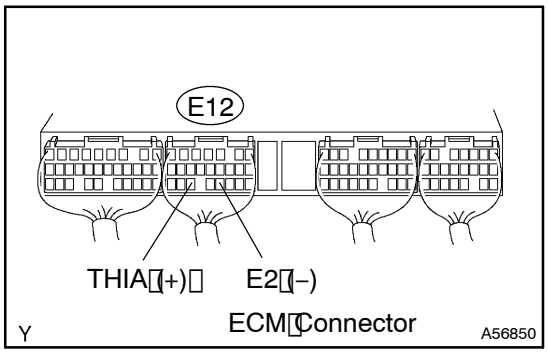

| OK | REPAIR OR REPLACE HARNESS OR CONNECTOR |
|---|---|

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 the terminals of the ECM E12 connector.

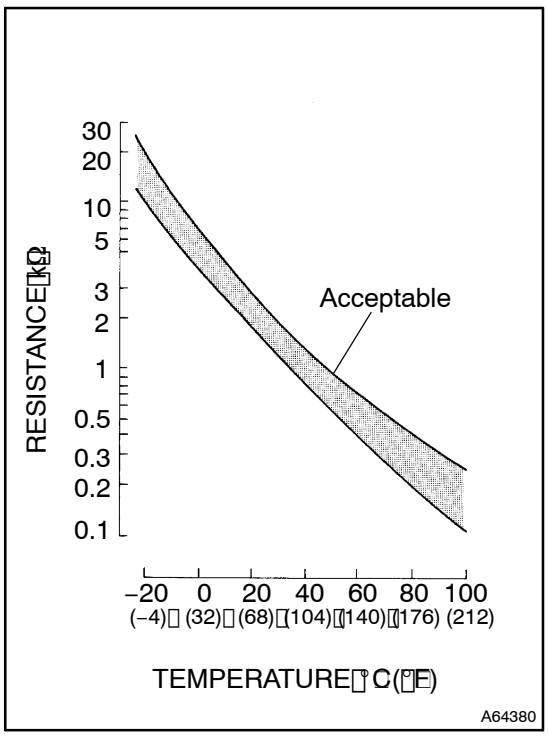
**Voltage:**

| Symbols (Terminal No.) | Condition | Specified condition |
|---|---|---|
| THIA (E12 – 22) ⇔ E2 (E12 – 20) | 20°C (68°F) | 0.2 – 3.8 V |
| | 80°C (176°F) | 0.1 – 1.5 V |

**OK** → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–429)**

**NG**

| 2 | INSPECT DIESEL TURBO INLET AIR TENPERATURE SENSOR |
|---|---|




(a) Check the diesel turbo inlet air temperature sensor for resistance.
(1) Using an ohmmeter, measure the resistance between terminals.

**Resistance: Approx. 20°C (68°F) 2.21 – 2.65 kΩ**

**NOTICE:**

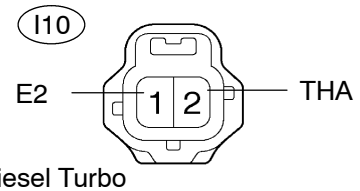
**In case of checking the water temperature sensor in the water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.**

**NG** → **REPLACE DIESEL TURBO INLET AIR TENPERATURE SENSOR**

**OK**

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

**Wire Harness Side**




Diesel Turbo
Inlet Air Temp. Sensor Connector

Y A66104

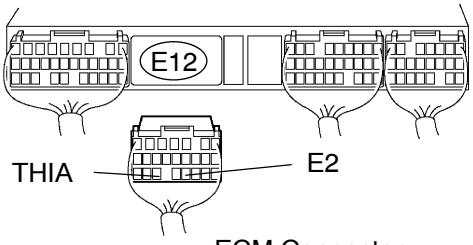
(a) Disconnect the diesel turbo inlet air temperature sensor connector.
(b) Disconnect the ECM E12 connector.
(c) Check the continuity between the wire harness side connector.

**Standard (Check for open):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| THA (I10 – 2) ⇔ THIA (E12 – 22) | Continuity |
| E2 (I10 – 1) ⇔ E2 (E12 – 20) | |

**Standard (Check for short):**

| Symbols (Terminal No.) | Specified condition |
|---|---|
| THW (E12 – 14) ⇔ E2 (E12 – 20) | No continuity |




Y ECM Connector A56852

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

OK

**CHECK AND REPLACE ECM**