DTC	P0037	OXYGEN SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2)

DTC	P0038	OXYGEN SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2)

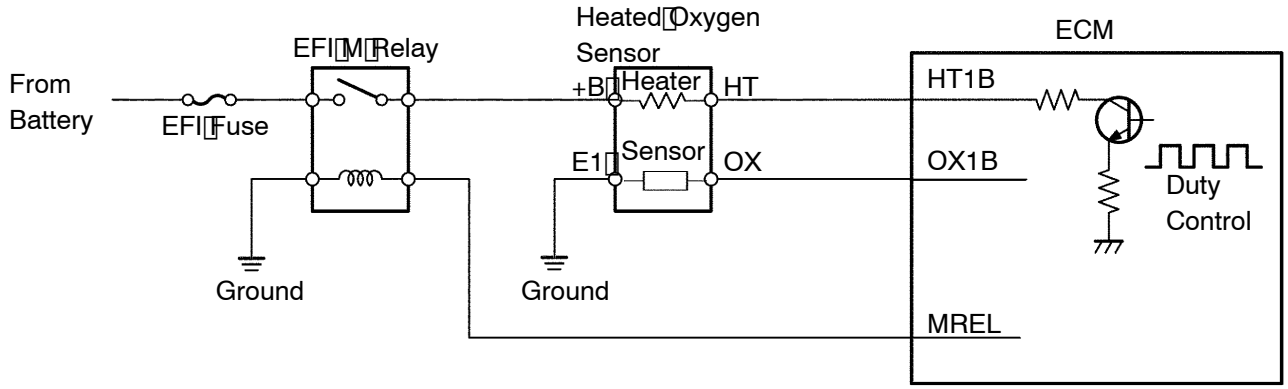
CIRCUIT DESCRIPTION

Refer to DTC P0136 on page 05–83.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the +B side of the circuit.

Reference (Bank 1 Sensor 2 System Diagram):



DTC No.	DTC Detection Condition	Trouble Area
P0037	Heater current is 0.25 A or less when the heater operates with +B greater than 11.5 V (1 trip detection logic)	• Open or short in heater circuit of the heated oxygen sensor • Heated oxygen sensor heater • EFI M relay (integration relay) • ECM
P0038	When the heater operates, heater current exceeds 2 A (1 trip detection logic)	• Short in heater circuit of the heated oxygen sensor • Heated oxygen sensor heater • EFI M relay (integration relay) • ECM

HINT:

- Sensor 1 refers to the sensor mounted before the TWC and is located near the engine assembly.
- Sensor 2 refers to the sensor mounted after the TWC and is located far from the engine assembly.

WIRING DIAGRAM

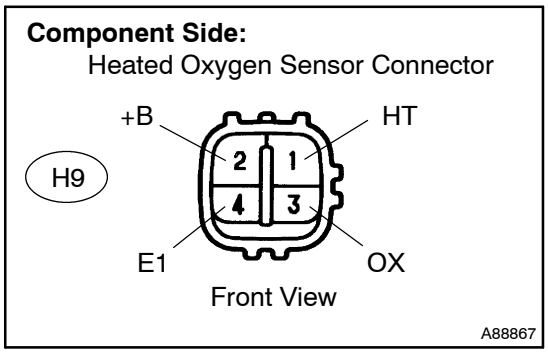
Refer to DTC P0136 on page 05–83.

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, 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 DTC P0038 is detected, proceed to step 4 if heater resistance is in normal range.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



(a) Disconnect the H9 heated oxygen sensor connector.

(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard (Bank 1 sensor 2):

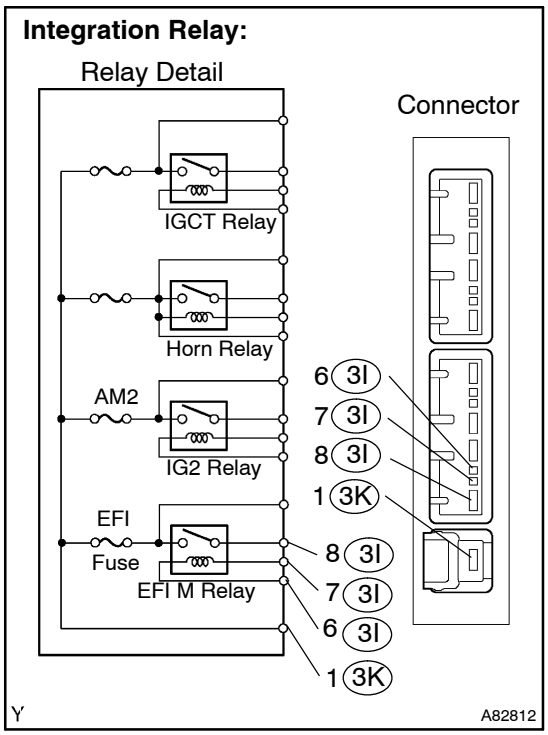
Tester Connection	Resistance
HT (H9–1) – +B (H9–2)	11 to 16 Ω at 20°C (68°F)
HT (H9–1) – E1 (H9–4)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

2 INSPECT INTEGRATION RELAY(EFI M RELAY)



(a) Remove the integration relay from the engine room R/B.

(b) Inspect the EFI M relay.

Standard:

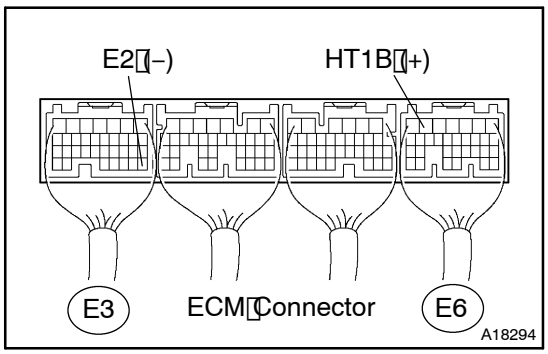
Tester Connection	Specified Condition
(3K–1) – (3I–8)	10 kΩ or higher
(3K–1) – (3I–8)	Below 1 Ω (Apply battery voltage to terminals 3I–6 and 3I–7)

(c) Reinstall the integration relay.

NG → **REPLACE INTEGRATION RELAY**

OK

3 INSPECT ECM (HT1B VOLTAGE)



(a) Turn the power switch ON (IG).

(b) Measure the voltage between the applicable terminals of the E3 and E6 ECM connectors.

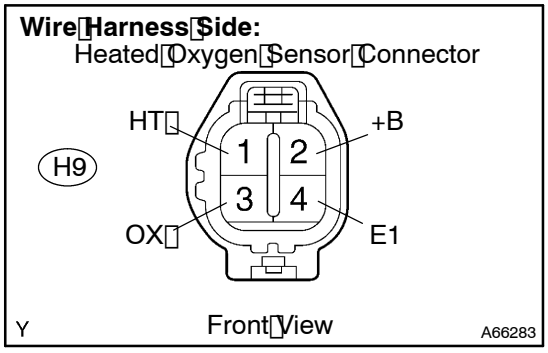
Standard:

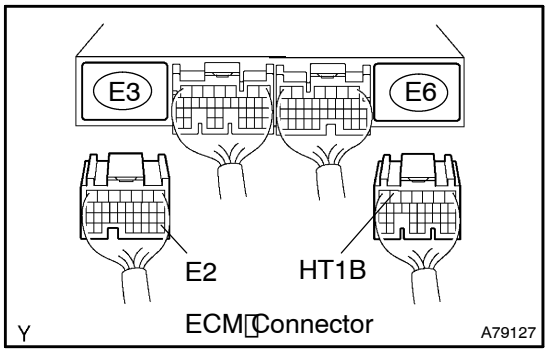
Tester Connection	Specified Condition
HT1B (E6–6) – E2 (E3–28)	9 to 14 V

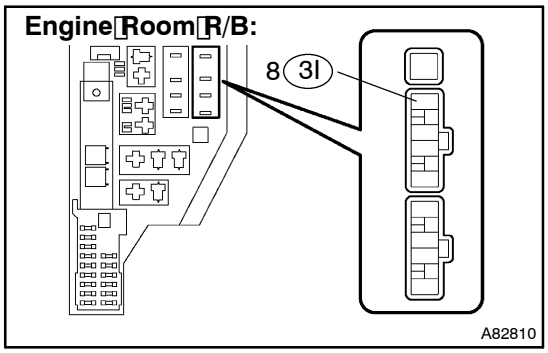
OK → **REPLACE ECM (See page 10–24)**

NG

4	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR – ECM, HEATED OXYGEN SENSOR – EFI M/RELAY)







(a) Check the harness and the connectors between the ECM and the heated oxygen sensor connectors.

(1) Disconnect the H9 heated oxygen sensor connector.

(2) Disconnect the E3 and E6 ECM connectors.

(3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
HT (H9–1) – HT1B (E6–6)	Below 1 Ω
E1 (H9–4) – E2 (E3–28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (H17–2) or HT1B (E6–6) – Body ground	10 kΩ or higher
HT (H9–1) – +B (H9–2)	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reconnect the ECM connectors.

(b) Check the harness and the connectors between the heated oxygen sensor connector and the EFI M relay.

(1) Disconnect the H9 heated oxygen sensor connector.

(2) Remove the integration relay from the engine room R/B.

(3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
+B (H9–2) – EFI M relay (3I–8)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (H9–2) or EFI M relay (3I–8) – Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reinstall the integration relay.

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

OK

REPLACE ECM (See page 10–24)