DTC	P0141/27	OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION (BANK 1 SENSOR 2)

CIRCUIT DESCRIPTION

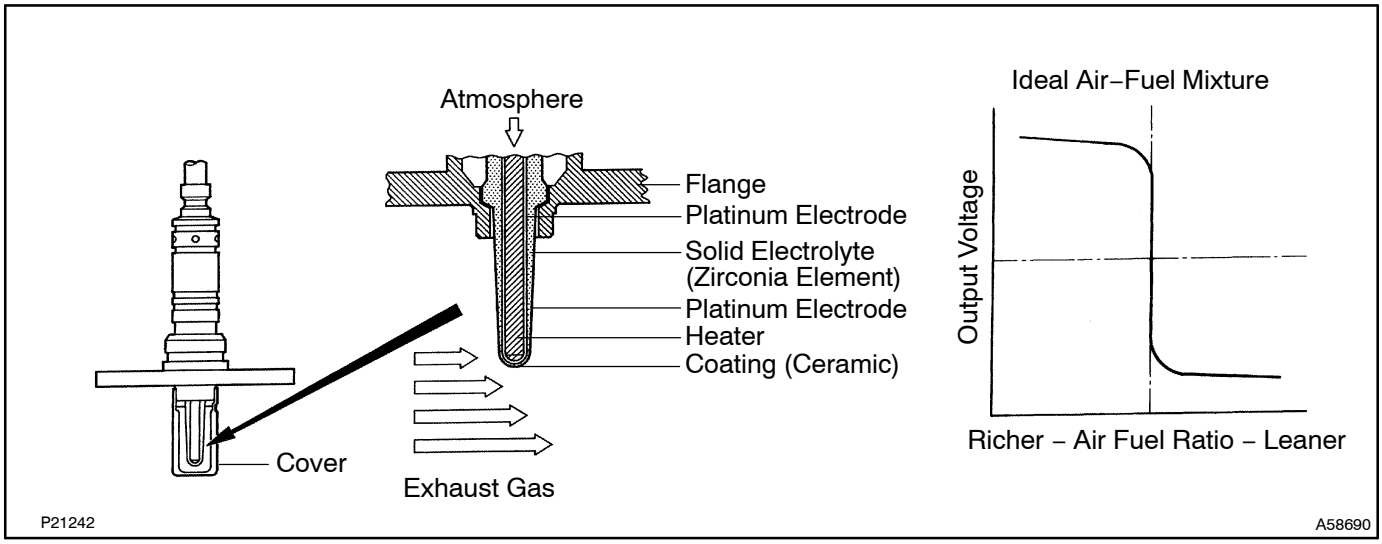
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.

The oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This is used to detect the oxygen concentration in the exhaust gas and provide feedback to the computer for control of the air–fuel ratio.

When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the ECM of the LEAN condition (small electromotive force: < 0.45 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the ECM of the RICH condition (large electromotive force: > 0.45 V). The ECM judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the ECM is unable to perform accurate air–fuel ratio control.

The main heated oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.

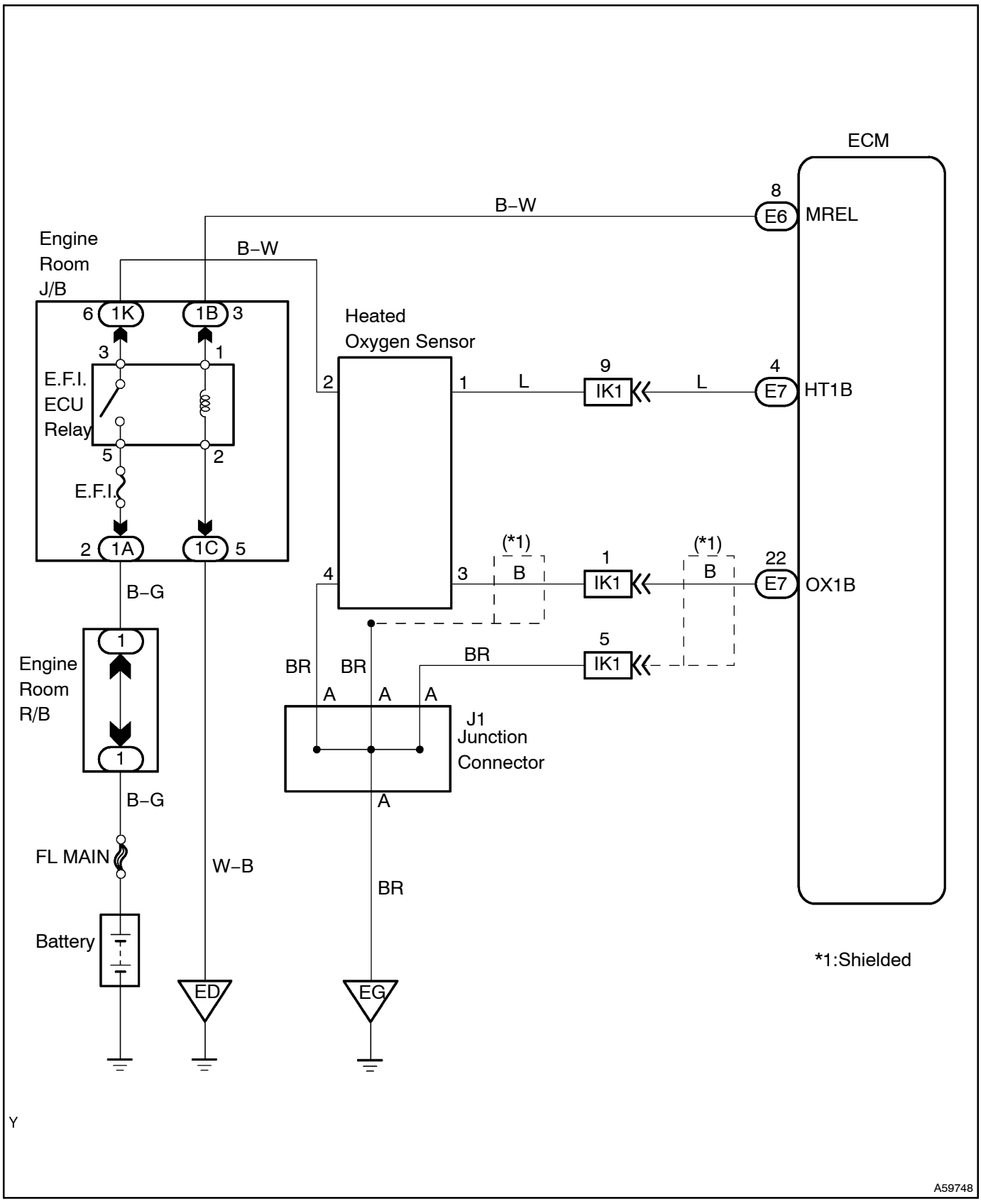


DTC No	DTC Detecting Condition	Trouble Area
P0141/27	• When heater operates, heater current exceeds 2 A (2 trip detection logic) • Heater current of 0.2 A or less when heater operates (2 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • ECM

HINT:

- Bank 1 refers to the bank that includes cylinder No. 1.
- Sensor 2 refers to the sensor being farther from the engine body.

WIRING DIAGRAM

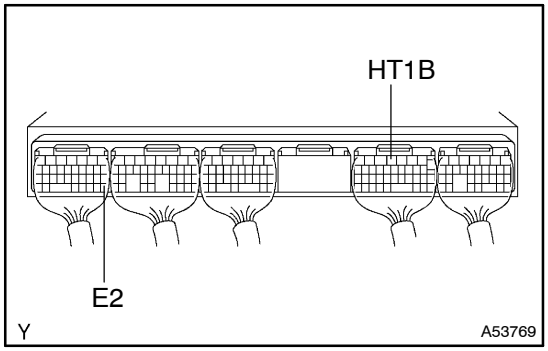


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand–held tester, as freeze frame data 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, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	INSPECT ECM

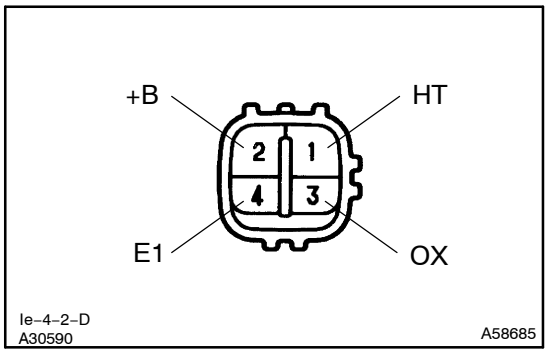


(a) Turn the ignition switch ON.
(b) Measure the voltage between terminals HT1B and E2 of the ECM connector.
Voltage: 9 – 14 V

OK	CHECK AND REPLACE ECM

NG

2	INSPECT SENSOR, OXYGEN(OXYGEN SENSOR HEATER)

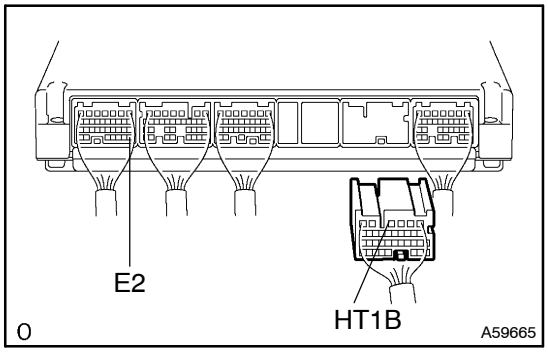


(a) Disconnect the oxygen sensor connector.
(b) Measure resistance between the terminal HT and +B of the oxygen sensor.
Resistance: 11 – 16 Ω

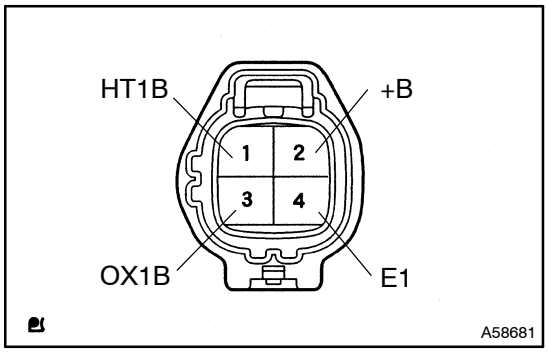
NG	REPLACE SENSOR, OXYGEN

OK

3 CHECK WIRE HARNESS OR CONNECTOR(ECM–OXYGEN SENSOR)



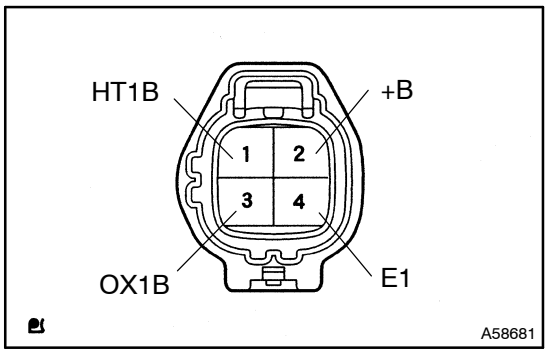
(a) Disconnect the oxygen sensor connector.
(b) Disconnect the ECM E7 connector.
(c) Check continuity between the terminals HT1B of the ECM connector and HT1B of the oxygen sensor connector.
Resistance: 1 Ω or less
(d) Check for short between the terminals HT1B and E2 of the ECM connector.
Resistance: 1 MΩ or more



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

OK

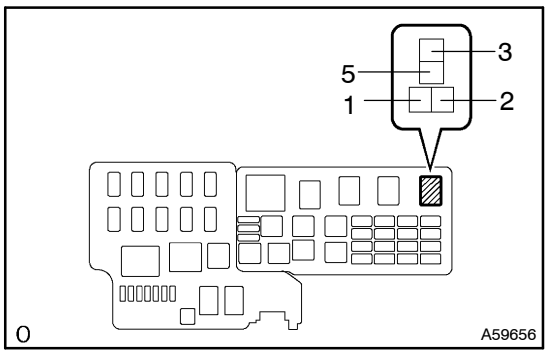
4 CHECK WIRE HARNESS OR CONNECTOR(OXYGEN SENSOR–E.F.I. ECU RELAY)



(a) Disconnect the battery negative (–) terminal.
(b) Disconnect the oxygen sensor connector.
(c) Remove the E.F.I. ECU relay.

NOTICE:
Do not insert the tester leads hard in procedure (d), or the holder may be damaged.

(d) Check continuity between the terminals HT1B of the oxygen sensor connector and E.F.I. ECU relay installation relay block.
Resistance: 1 Ω or less



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

OK

CHECK FOR ECM POWER SOURCE CIRCUIT