

DTC	P0031/21	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1)
DTC	P0032/21	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1)

HINT:

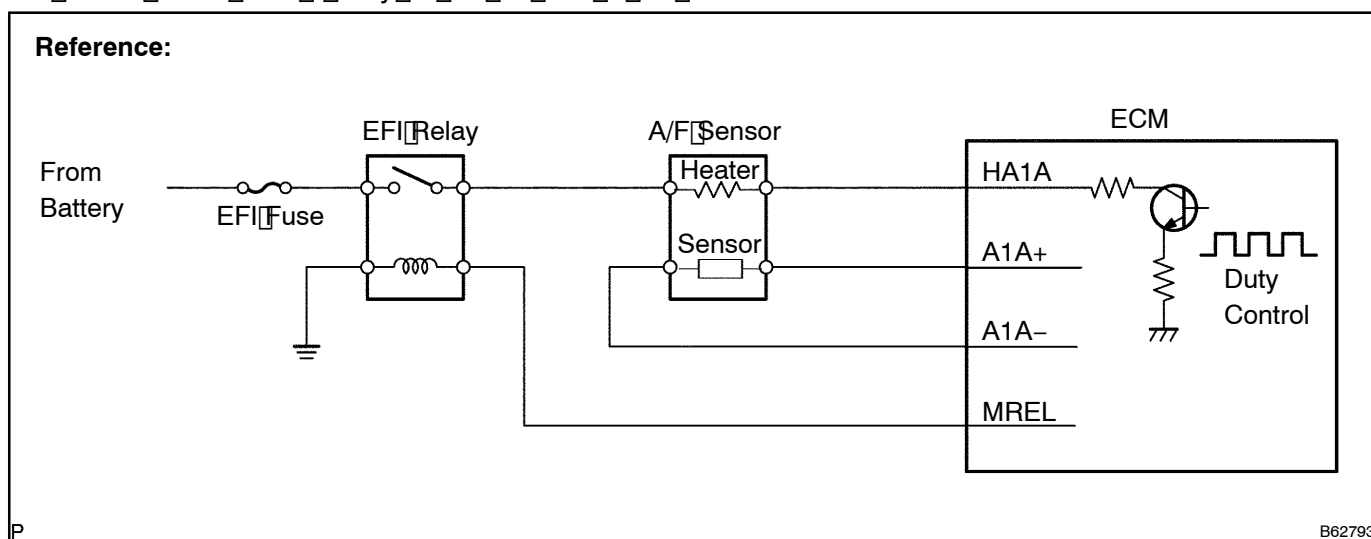
- Although each DTC title says the oxygen sensor, these DTCs are related to the air-fuel ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted before the Three-Way Catalytic Converter (TWC) and is located near the engine assembly.
- Sensor 2 refers to the sensor mounted after the TWC and is located far from the engine assembly.

CIRCUIT DESCRIPTION

Refer to DTC P2195 on [page 05-192](#).

HINT:

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



DTC No.	DTC Detection Condition	Trouble Area
P0031/21	Heated current is 0.8 A or less when the heater operates (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in heater circuit of A/F sensor A/F sensor heater EFI relay ECM
P0032/21	Heated current exceeds 10 A when the heater operates (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in heater circuit of A/F sensor A/F sensor heater EFI relay ECM

WIRING DIAGRAM

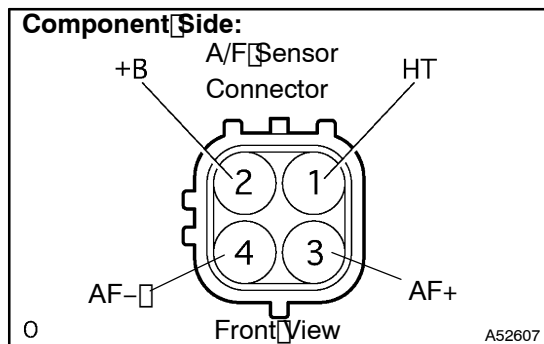
Refer to DTC P2195 on [page 05-192](#).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Intelligent Tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, 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.

1 INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)



- Disconnect the A/F sensor connector.
- Measure the resistance between the terminals of the A/F sensor.

Standard:

Tester Connection	Specified Condition
HT (1) - B (2)	1.8 to 3.4 Ω at 20°C (68°F)

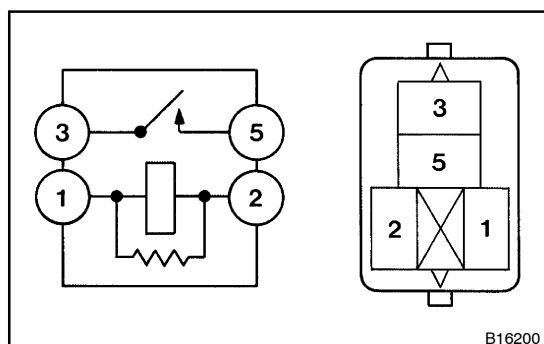
- Reconnect the A/F sensor connector.



REPLACE AIR FUEL RATIO SENSOR

OK

2 INSPECT EFI RELAY



- Remove the EFI relay from the engine room R/B.
- Check the EFI relay resistance.

Standard:

Tester Connection	Specified Condition
3 - 5	10 Ω or higher
3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

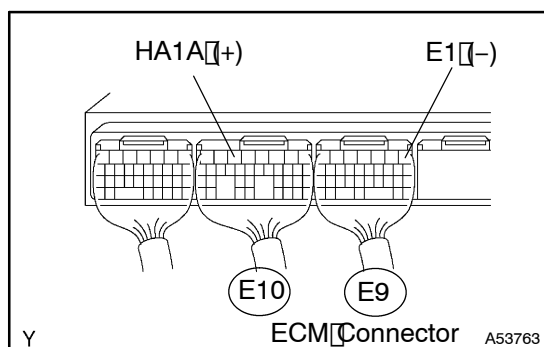
- Reinstall the EFI relay.



REPLACE EFI RELAY

OK

3 INSPECT ECM (HA1A VOLTAGE)



- Turn the ignition switch to ON.
- Measure the voltage between the applicable terminals of the E9 and E10 ECM connectors.

Standard:

Tester Connection	Specified Condition
HA1A (E10-5) - E1 (E9-1)	9 to 14 V



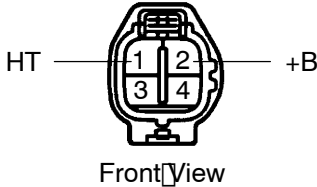
REPLACE ECM (See page 10-30)

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4 CHECK HARNESS AND CONNECTOR (A/F SENSOR - ECM, A/F SENSOR - EFI RELAY)

Wire Harness Side:

A4 A/F Sensor Connector



(a) Check the harness and the connectors between the ECM and the A/F sensor.

- (1) Disconnect the A4 A/F sensor connector.
- (2) Disconnect the E10 ECM connector.
- (3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
HT (A4-1) - HA1A (E10-5)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (A4-1) or HA1A (E10-5) - Body Ground	10 kΩ or higher

- (4) Reconnect the A/F sensor connector.
- (5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the A/F sensor and EFI relay.

- (1) Disconnect the A4 A/F sensor connector.
- (2) Remove the EFI relay from the engine room R/B.
- (3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (A4-2) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A4-2) or EFI relay (3) - Body Ground	10 kΩ or higher

- (4) Reconnect the A/F sensor connector.
- (5) Reinstall the EFI relay.

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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-30)