

DTC	P0125	INSUFFICIENT COOLANT TEMP. FOR CLOSE LOOP FUEL CONTROL
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CIRCUIT DESCRIPTION

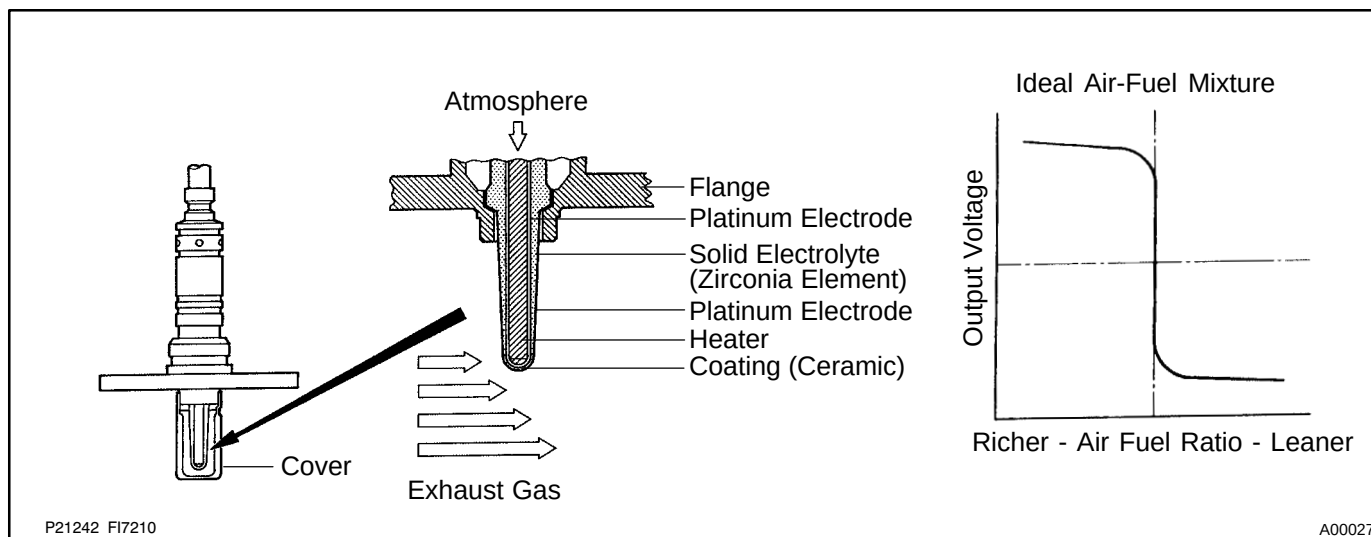
To obtain a high purification rate for the CO, HC and NO_x components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel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

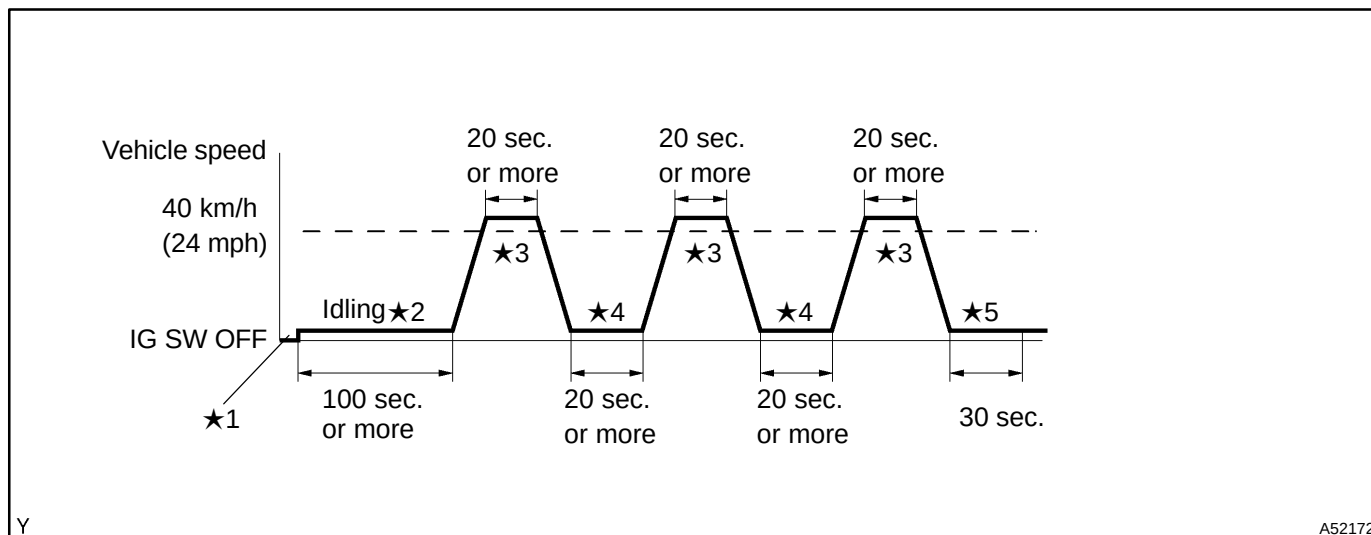
The main heated oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



DTC No.	DTC Detecting Condition	Trouble Area
P0125	After engine is warmed up, A/F sensor output* does not change when conditions (a), (b), (c) and (d) continue for at least 1.5 min: *: Output value changes at inside of the ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 - 100 km/h (25 - 62 mph) (c) Throttle valve is not fully closed (d) 140 sec. or more after starting engine	• Open or short in A/F sensor (bank 1, 2 sensor 1) circuit • A/F sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • PCV hose connection • ECM

HINT:

- After confirming DTC P0125, use the OBD II scan tool or hand-held tester to confirm voltage output of the A/F sensor (bank 1, 2 sensor 1) from the CURRENT DATA.
- The ECM controls the voltage of the AFR+, AFL+, AFR- and AFL- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without the OBD II scan tool or hand-held tester.
- OBD II scan tool (excluding hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the hand-held tester.

CONFIRMATION DRIVING PATTERN

- Switch the hand-held tester from the normal mode to the check mode. (See page 05-5)★1
- Start the engine and let the engine idle for 100 seconds or more.★2
- Drive the vehicle at 40 km/h (24 mph) or more for 20 seconds or more.★3
- Let the engine idle for 20 seconds or more.★4
- Repeat the procedure ★3 and ★4 three times.
- Let the engine idle for 30 seconds.★5
- Check the O2 sensor output voltage.

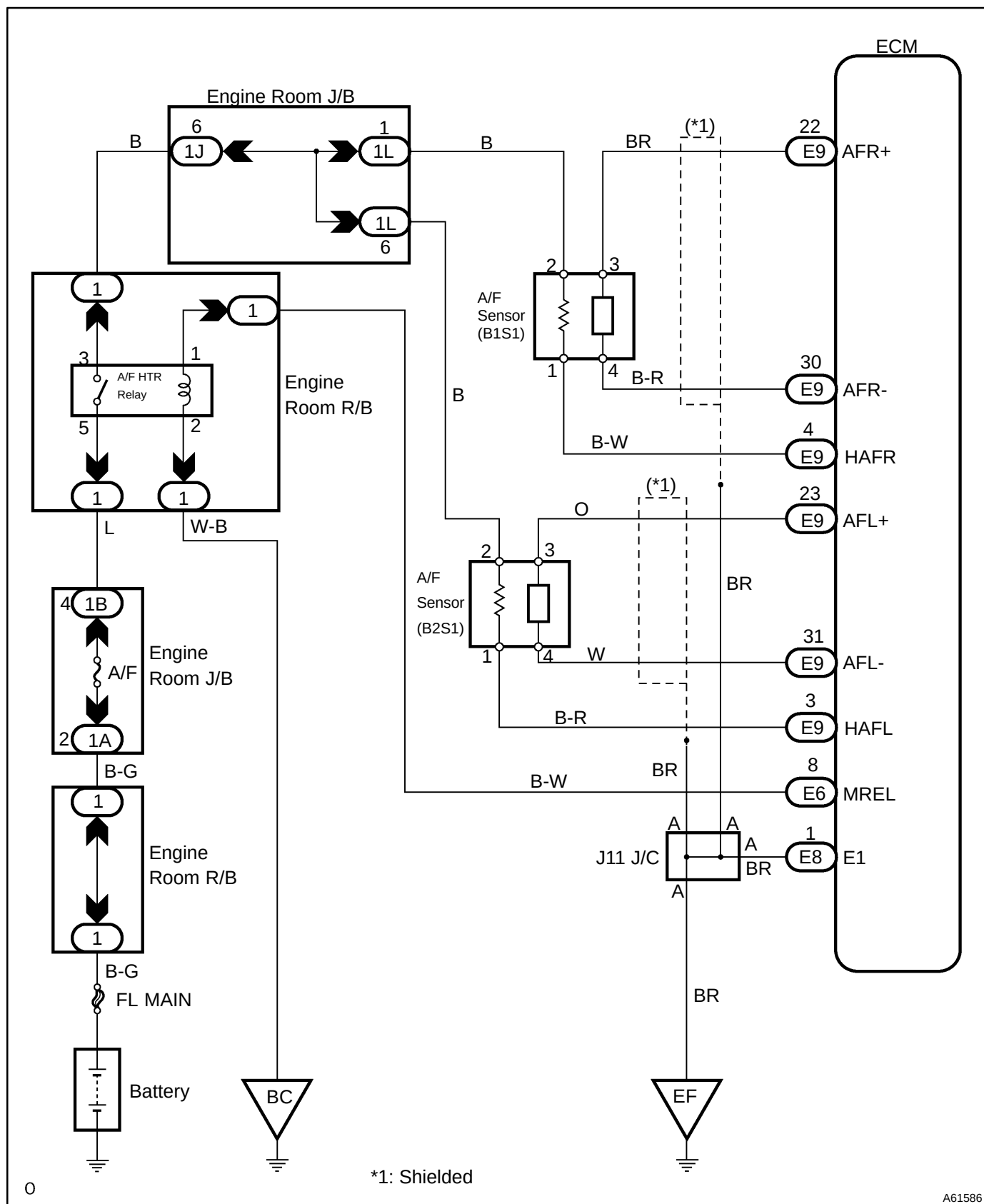
HINT:

If a malfunction exists, the check engine warning light comes on.

NOTICE:

If the conditions on this test are not strictly followed, the malfunction will not be detected.

WIRING DIAGRAM



A61586

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand-held tester or OBD II scan tool. 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, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1 CHECK OTHER DTC OUTPUT(BESIDES DTC P0125)

YES

GO TO RELEVANT DTC CHART

NO

2 READ VALUE OF A/FS(B1S1, B2S1)

- Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.
- Read the voltage value of the A/F sensor on the screen of OBD II scan tool or hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AFR+ or AFL+ terminal of the ECM is fixed at 3.3 V and the voltage of the AFR- or AFL- terminal is fixed at 3.0 V. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AFR+, AFL+/AFR-, AFL-) of the ECM.

Result:

Condition	A/F Sensor Voltage Value
Engine idling	- Not remains at 3.30 V (0.660 V*) - Not remains at 3.8 V (0.76 V*) or more - Not remains at 2.8 V (0.56 V*) or less *: When you use OBD II scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding hand-held tester).

OK

Go to step 10

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3 CHECK CONNECTION OF PCV HOSE

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REPAIR OR REPLACE PCV HOSE

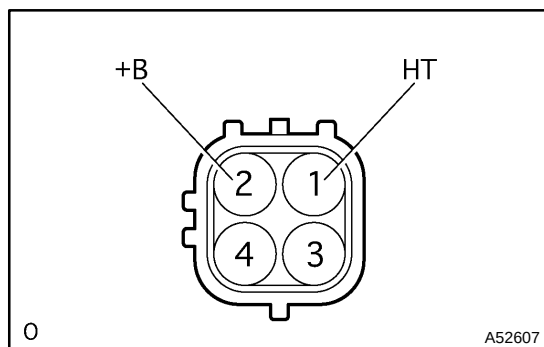
OK

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

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REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 INSPECT AIR FUEL RATIO SENSOR(CHECK HEATER RESISTANCE)

- (a) Disconnect the air fuel ratio sensor.
(b) Measure resistance between the terminals HT and +B of the air fuel ratio sensor.

Resistance: 2.16 - 2.88 Ω (20°C)

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REPLACE AIR FUEL RATIO SENSOR

OK

6 CHECK AIR INDUCTION SYSTEM (See page 11-1)

NG

REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

7 CHECK FUEL PRESSURE (See page 11-4)

NG

REPAIR OR REPLACE FUEL SYSTEM

OK

8 INSPECT FUEL INJECTOR ASSY (See page 11-7)

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REPLACE FUEL INJECTOR ASSY

OK

9 CHECK EXHAUST GAS LEAK

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REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT

OK

REPLACE AIR FUEL RATIO SENSOR

10	PERFORM CONFIRMATION DRIVING PATTERN (See page 05-52)
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GO

11	READ OUTPUT DTC(DTC P0125 OUTPUT AGAIN)
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YES	CHECK AND REPLACE ECM
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NO

12	CONFIRM VEHICLE RUNS OUT OF FUEL IN THE PAST
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NO	CHECK FOR INTERMITTENT PROBLEMS
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YES

DTC P0125 IS CAUSED BY RUNNING OUT OF FUEL	
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