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| DTC | P0125 | Insufficient Coolant Temp. for Closed Loop Fuel Control (California Spec.) |
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CIRCUIT DESCRIPTION

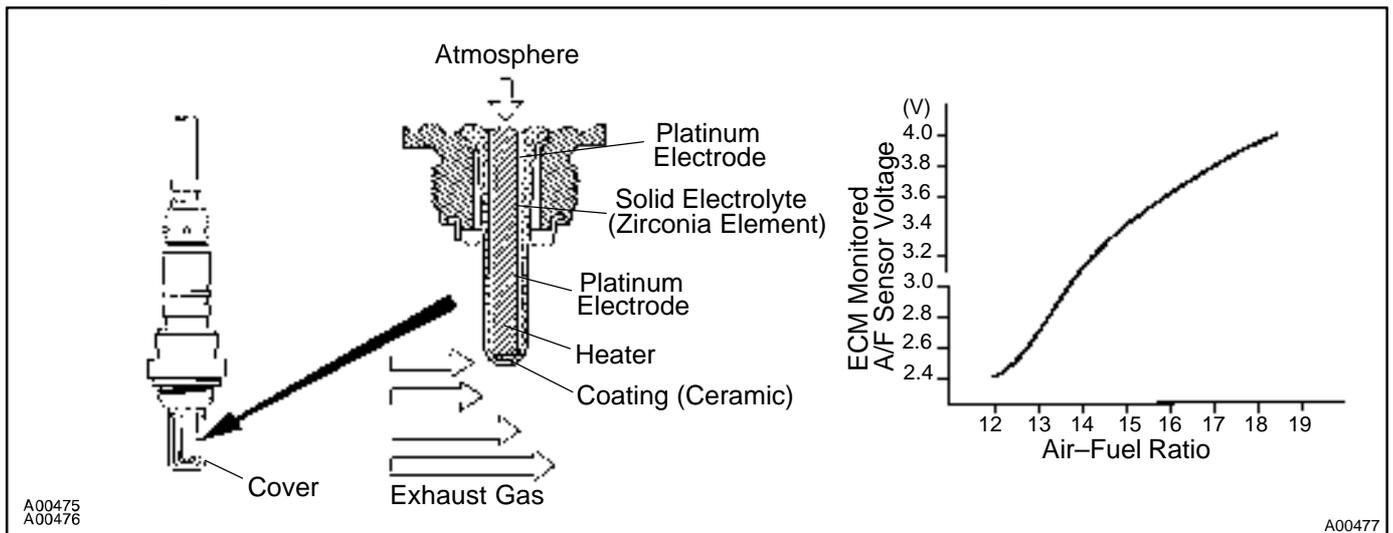
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel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

The A/F sensor has the characteristic that provides output voltage* approximately proportional to the existing air-fuel ratio. The A/F sensor output voltage* is used to provide feedback for the ECM to control the air-fuel ratio.

By the A/F sensor output, the ECM can determine the deviation amount from the stoichiometric air-fuel ratio and control the proper injection time immediately. If the A/F sensor is malfunctioning, ECM is unable to perform accurate air-fuel ratio control.

The A/F sensor is equipped with a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temp. of the exhaust gas is low), current flows to the heater to heat the sensor for accurate oxygen concentration detection.

*: The voltage value changes at the inside of the ECM only.



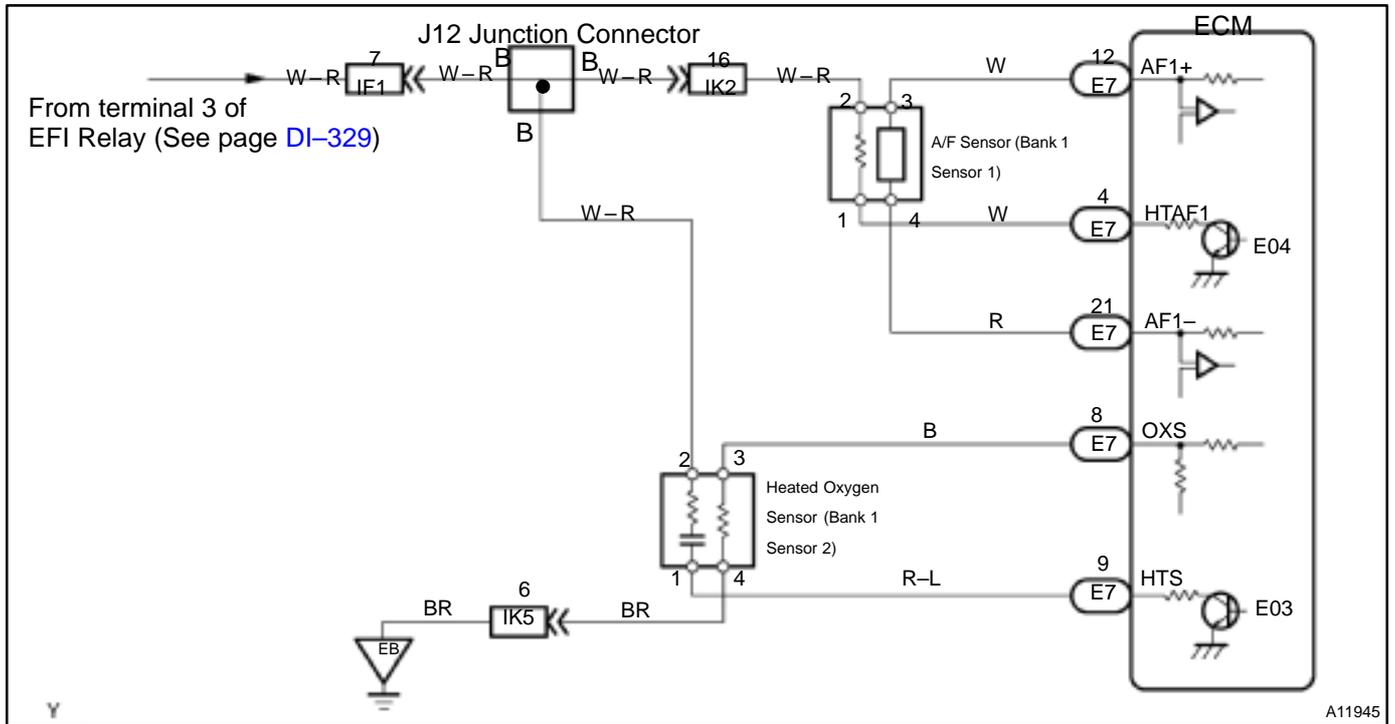
| DTC No. | DTC Detecting Condition | Trouble Area |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0125 | After engine is warmed up, A/F sensor output* does not change when conditions (a), (b) and (c) continue for at least 1.5 min.: *: Output value changes at inside of ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (c) Throttle valve does not fully closed (d) After starting engine \geq 140 sec. | <ul style="list-style-type: none"> • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • ECM |

HINT:

- After confirming DTC P0125, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output of the heated oxygen sensor (bank 1 sensor 1) from the CURRENT DATA.
- The ECM controls the voltage of the AF1+ and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.

- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If the vehicle run out of fuel, the air-fuel ratio is LEAN and DTC P0125 will be recorded. The MIL then comes on.
- Read freeze frame data using TOYOTA 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.

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| 1 | Are there any other codes (besides DTC P0125) being output? |
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YES → **Go to relevant DTC chart (See page DI-192).**

NO

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| 2 | Connect OBD II scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor (bank 1 sensor 1). |
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PREPARATION:

- (a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
 (b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage value of the A/F sensor on the screen of the OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AF1+ terminal of the ECM is 3.3 fixed and the AF1- terminal is 3.0 V fixed. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

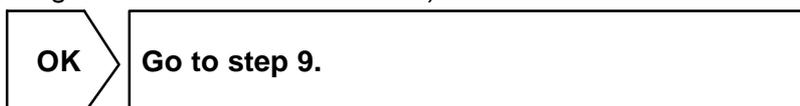
OK:

| Condition | A/F Sensor Voltage value |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engine idling | <ul style="list-style-type: none"> • Not remains at 3.3 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 the 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, A/F sensor circuit may be short.

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



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| 3 | Check for open and short in harness and connector between ECM and A/F sensor (bank 1 sensor 1) (See page IN-28). |
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| 4 | Check resistance of A/F sensor heater (bank 1 sensor 1) (See page SF-53). |
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NG Replace A/F sensor.

OK

5 Check air induction system (See page SF-1).

NG Repair or replace.

OK

6 Check fuel pressure (See page SF-5).

NG Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK

7 Check injector injection (See page SF-20).

NG Replace injector.

OK

8 Check gas leakage on exhaust system.

NG Repair or replace.

OK

Replace A/F sensor (bank 1 sensor 1).

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| 9 | Perform confirmation driving pattern (See page DI-301). |
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Go

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| 10 | Is there DTC P0125 being output again? |
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| YES | Check and replace ECM (See page IN-28). |
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NO

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| 11 | Did vehicle runs out of fuel in past? |
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| NO | Check for intermittent problems (See page DI-182). |
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YES

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| DTC P0125 is caused by running out of fuel. |
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