

DTC	P1130	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)
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CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-184](#) .

DTC No.	DTC Detection Condition	Trouble Area
P1130	Output voltage* of A/F sensor remains at 3.8 V or more, or 2.8 V or less, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	<ul style="list-style-type: none"> • Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM
	Output voltage* of A/F sensor does not change from 3.30 V, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	
	Open or short in A/F sensor circuit (2 trip detection logic)	

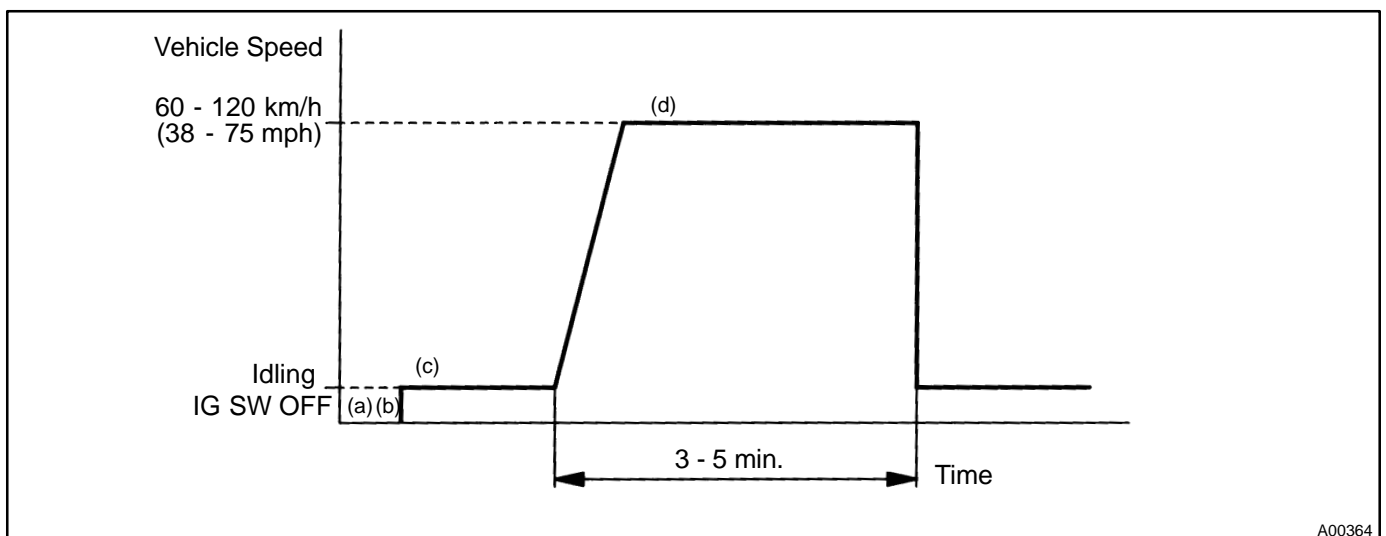
HINT:

- After confirming DTC P1130, use the OBD II scan tool or TOYOTA hand-held tester to confirm output voltage of the A/F sensor (AFS B1 S1/O2S B1 S1) from the CURRENT DATA.
- The A/F sensor's output voltage and the short-term fuel value can be read by using the OBD II scan tool or TOYOTA hand-held tester.
- The ECM controls the voltage of AF1+ and AF1- terminals of 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

Refer to DTC P0125 on page [DI-184](#) .

CONFIRMATION DRIVING PATTERN



A00364

- (a) Connect the TOYOTA hand-held tester to the DLC3.
- (b) Switch the TOYOTA hand-held tester from the normal mode to the check mode (See page [DI-146](#)).
- (c) Start the engine and warm it up with all the accessory switched OFF.
- (d) Drive the vehicle at 60 - 120 km/h (38 - 75 mph) and the engine speed at 1,600 - 3,200 rpm for 3 - 5 minutes.

HINT:

If a malfunction exists, the MIL will light up during step (d).

NOTICE:

- If the conditions in this test are not strictly followed, detection of the malfunction will impossible.
- Without a TOYOTA hand-held tester, turn the ignition switch OFF after performing steps (c) and (d), then perform steps (c) and (d) again.

INSPECTION PROCEDURE

HINT:

- If DTC P1130 is displayed, check bank 1 sensor 1 circuit.
- Read frame freeze data using the TOYOTA hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when a 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	Are there any other codes (besides DTC P1130) being output?
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YES

Go to relevant DTC chart (See page [DI-156](#)).

NO

2	Connect OBD II scan tool or TOYOTA hand-held tester, and read value of output voltage of A/F sensor.
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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 of 2,500 rpm for approximately 90 seconds.

CHECK:

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

HINT:

The voltage of the AF1+ terminal of the ECM is fixed at 3.3 V and the voltage of the AF1- terminal is fixed at 3.0 V. 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 3.30 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 using 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:

- Although there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*) during fuel enrichment, it is normal.
- Although there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*) during fuel cut, 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 (0.76V*) 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.

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

OK → **Go to step 8.**

NG

3 Check for open and short in harness and connector between ECM and A/F sensor (See page [IN-28](#)).

NG → **Repair or replace harness or connector.**

OK

4 Check resistance of A/F sensor heater (See page [SF-51](#)).

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-18](#)).

NG

Replace injector.

OK

Replace A/F sensor.

8 Perform confirmation driving pattern.

Go

9 Is there DTC P1130 being output again?

YES

Check and replace ECM (See page [IN-28](#)).

NO

10	Did vehicle run out of fuel in past?
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NO	Check for intermittent problems (See page DI-146).
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YES

DTC P1130 is caused by shortage of fuel.
