

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

Refer to DTC P0125 on page [DI-42](#).

DTC No.	DTC Detecting Condition	Trouble Area
P1130	Voltage output* 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"> <li>• Open or short in A/F sensor circuit</li> <li>• A/F sensor</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector</li> <li>• ECM</li> </ul>
	Voltage output* 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)	

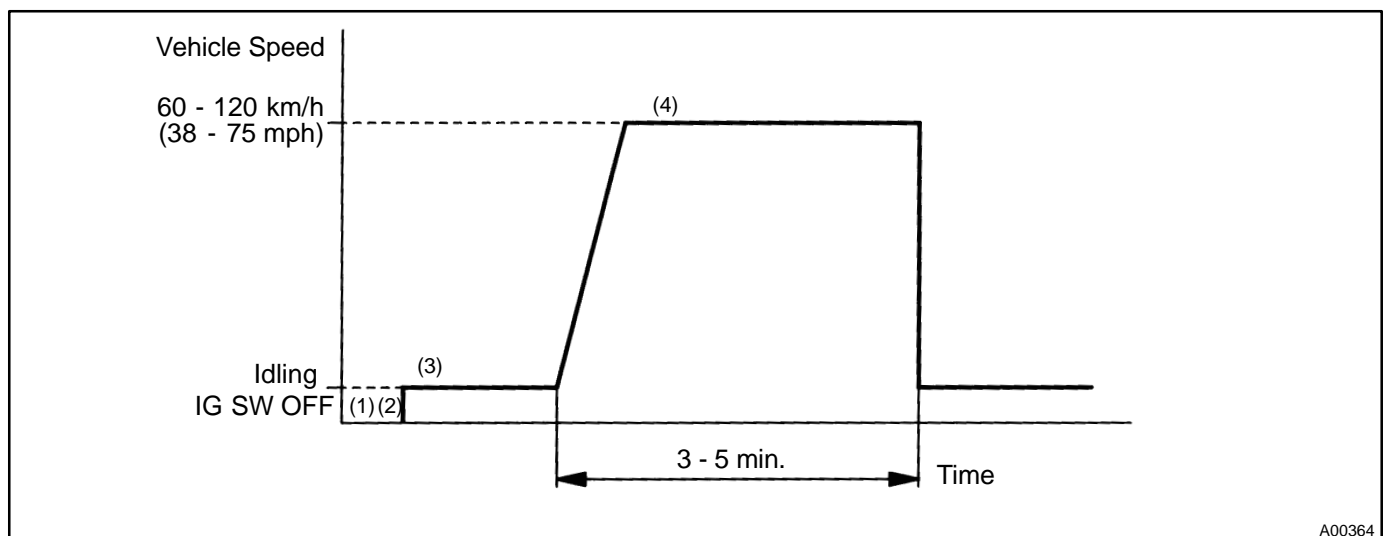
### HINT:

- After confirming DTC P1130, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output 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 using the OBD II scan tool or TOYOTA hand-held tester.
- The ECM controls the voltage of 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

Refer to DTC P0125 on page [DI-42](#).

## CONFIRMATION DRIVING PATTERN



A00364

- (1) Connect the TOYOTA hand-held tester to the DLC3.
- (2) Switch the TOYOTA hand-held tester from the normal mode to the check mode (See page [DI-3](#)).

- (3) Start the engine and warm it up with all the accessory switches OFF.
- (4) Drive the vehicle at 60 - 120 km/h (38 - 75 mph) and the engine speed at 1,600 - 3,200 rpm for 3 - 5 min.

HINT:

If a malfunction exists, the MIL will light up during step (4).

**NOTICE:**

- If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.
- If you do not have a TOYOTA hand-held tester, turn the ignition switch OFF after performing steps (3) and (4), then perform steps (3) and (4) again.

## INSPECTION PROCEDURE

HINT:

- If DTC P1130 is displayed, check the bank 1 sensor 1 circuit.
- Read frame freeze data using the 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.

1	<b>Are there any other codes (besides DTC P1130) being output?</b>
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YES

Go to relevant DTC chart.

NO

2	<b>Connect OBDII scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor.</b>
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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 of the A/F sensor on the screen of OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AF1+ terminals of the ECM is fixed at 3.3 V and the voltage of the AF1- terminals 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"> <li>• Not remains at 3.30 V (0.660 V*)</li> <li>• Not remains at 3.8 V (0.76 V*) or more</li> <li>• Not remains at 2.8 V (0.56 V*) or less</li> </ul> *: 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 (0.76V\*) 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.

\*: When you use 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-7](#) ).

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-21](#) ).

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 runs out of fuel in past?

NO

Check for intermittent problems (See page [DI-3](#) ).

YES

DTC P1130 is caused by running out of fuel.