

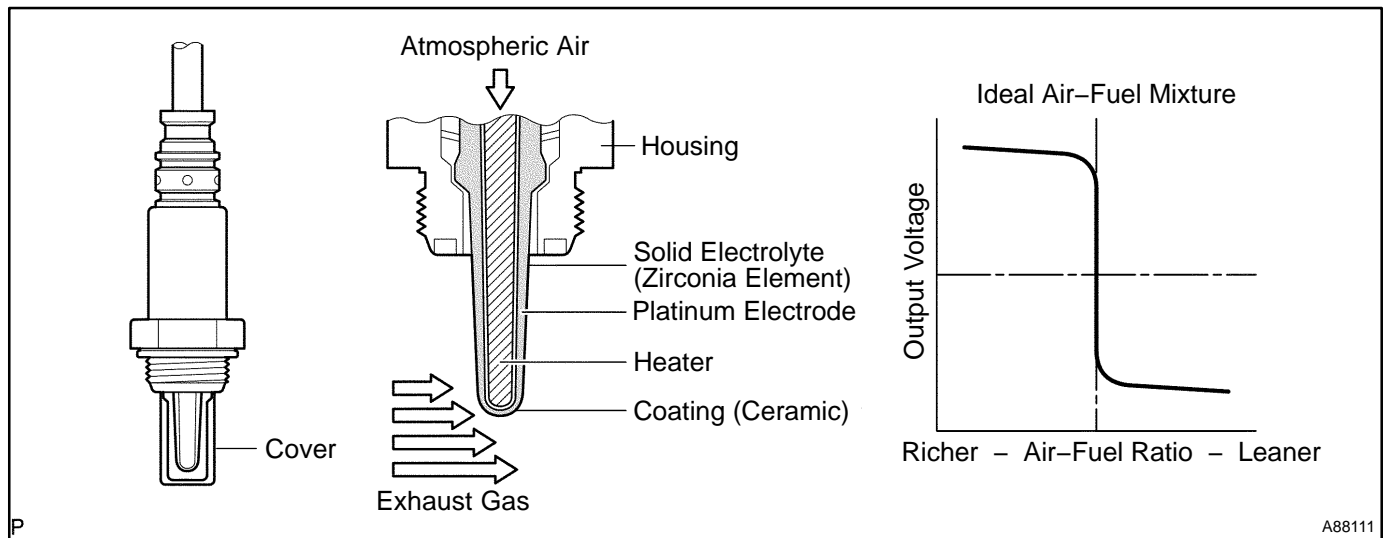
DTC	P0142	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 3)
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HINT:

This DTC has been added to meet the requirement for Partial Zero Emission Vehicle (PZEV)
(see page 05-418).

CIRCUIT DESCRIPTION

This sensor (heated oxygen sensor 3) is similar to the heated oxygen sensor 2, only difference between the two sensors is that this is not used to regulate the air-fuel ratio. The sensor is located after the rear catalyst (hydrocarbon (HC) absorptive catalyst) only to detect the deterioration in the catalyst.



In a circuit inside the ECM, impedance* of the heated oxygen sensor 3 is measured by the ECM. The ECM determines that there is a malfunction in the sensor when the measured impedance deviates from the standard range.

*: The effective resistance in an alternating current electrical circuit.

HINT:

The impedance can not be measured with an ohm meter.

DTC No.	DTC Detection Condition	Trouble Area
P0142	The sensor impedance is outside of the normal range, at a time when the ECM expects the sensor to be warmed-up and operating normally.	• Heated oxygen sensor 3 (bank 1 sensor 3)

HINT:

"P0142 and P0143 (see page 05-421)"

- P0142 indicates deterioration of the heated oxygen sensor 3 by the ECM calculating the impedance of the sensor 3 after the typical enabling conditions are satisfied (detected after 2 driving-cycles).
- P0143 indicates an open or short circuit in the heated oxygen sensor 3 system. (1 driving-cycle). The ECM determines this by sensing that the impedance of the sensor exceeds the threshold, i.e. less than 5 Ω or more than 5,000 Ω .

MONITOR STRATEGY

Related DTCs	P0142: HO2S (Sensor 3) Impedance in low/high frequency P0142: HO2S (Sensor 3) Impedance in high frequency
Required sensors/ components (Main)	HO2S (Sensor 3)
Required sensors/ components (Related)	CKP sensor, ECT sensor, MAF meter
Frequency of operation	Once per drive cycles
Duration	27 seconds: HO2S (Sensor 3) Impedance in low/high frequency 20 seconds: HO2S (Sensor 3) Impedance in high frequency
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

ALL:

The monitor will run whenever this DTC is not present	See page 05-360
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HO2S (Sensor 3) Impedance in low/high frequency:

Engine RPM	500 to 3,000 rpm
Fuel cut	OFF (for 20 seconds or more)
MAF	3 to 30 g/second
Vehicle speed change per 1 second	Within 2 mph (3 km/h)

HO2S (Sensor 3) Impedance in high frequency:

Engine RPM	1,050 to 3,000 rpm
Fuel cut	OFF (for 20 seconds or more)
MAF	3 to 30 g/second
Vehicle speed change per 1 second	Within 2 mph (3 km/h)
Continuous time that HO2S heater is operating	120 seconds or more
Estimated catalyst temperature	450 to 575°C (842 to 1,067°F)

TYPICAL MALFUNCTION THRESHOLDS

HO2S (Sensor 3) Impedance in low/high frequency:

Average of the sensor impedance ratio between high-frequency and low-frequency	Within 0.44, or more than 2.1
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HO2S (Sensor 3) Impedance in high frequency:

Impedance in high frequency	Less than 50 Ω, or 500 Ω or more
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COMPONENT OPERATING RANGE

Rear HO2S voltage	Varies between 0.1 and 0.9 V
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O2S TEST RESULT

Refer to page [05-369](#) for detailed information on O2S TEST RESULT.

Test ID	Test Item	Description	Unit Conversion	Unit	Standard Value
\$86	Time \$86	HO2S impedance ratio of high-frequency and low-frequency	Multiply by 0.3906	%	More than malfunction threshold

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction and sets DTC.

WIRING DIAGRAM

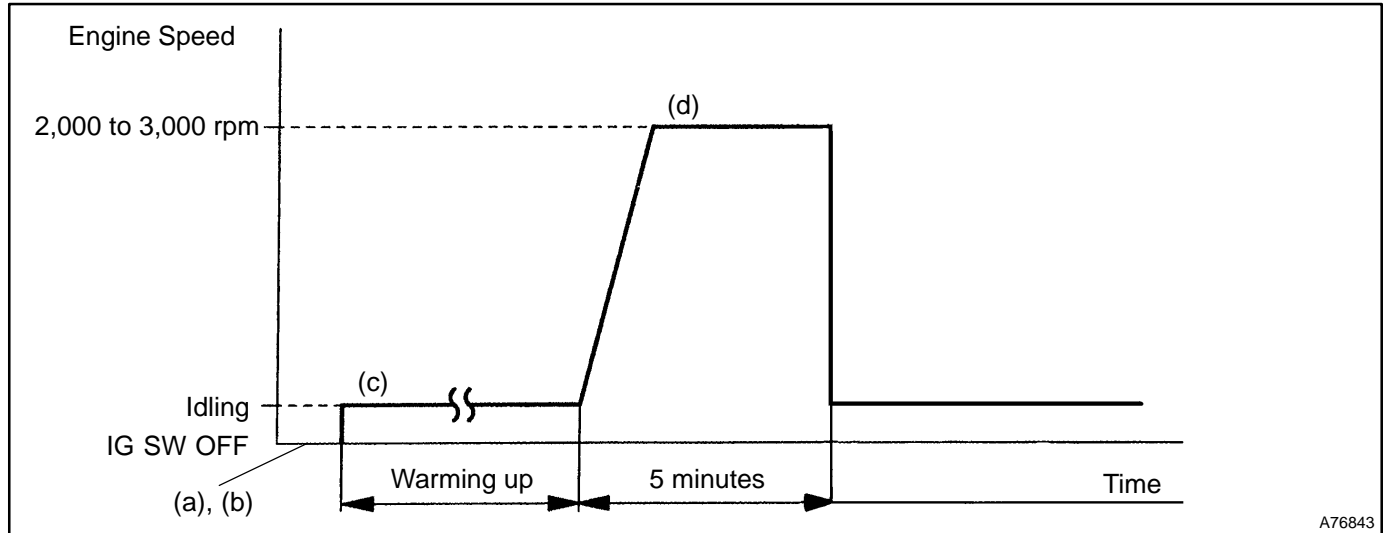
Refer to DTC P0136 on page [05-403](#).

CONFIRMATION ENGINE RACING PATTERN FOR READINESS MONITOR

PURPOSE (See page 05-371)

HINT:

Performing this confirmation pattern will activate the heated oxygen sensor 3 monitoring by the ECM. This is very useful for verifying the completion of a repair.



- (a) Clear the DTCs.
 - (1) Disconnect the battery cable or remove the EFI and ETCS fuses for 60 seconds or more.
- (b) Connect the hand-held tester to the DLC3.
- (c) Start the engine and warm it up with all the accessory switches OFF.
- (d) Run the engine at 2,000 to 3,000 rpm for about 5 minutes.
- (e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.

NOTICE:

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

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. 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.

REPLACE HEATED OXYGEN SENSOR