

<b>DTC</b>	<b>P0420</b>	<b>CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)</b>
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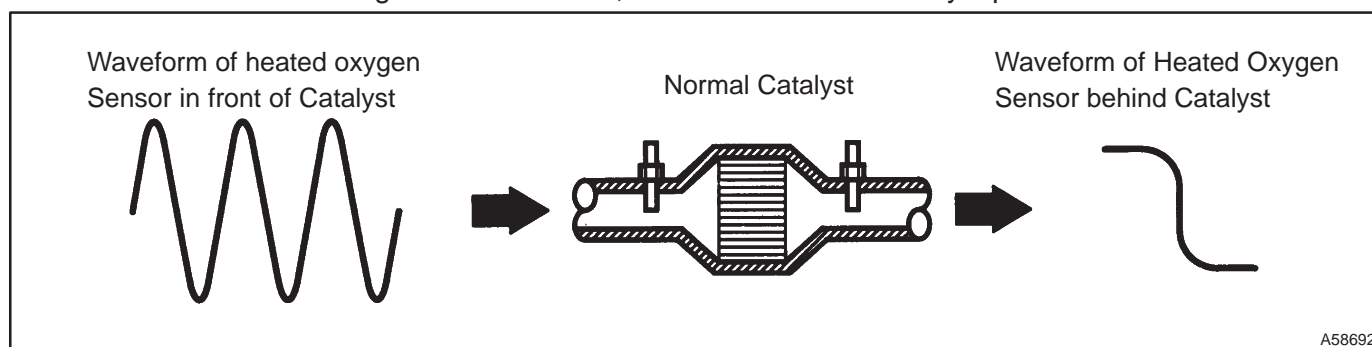
## CIRCUIT DESCRIPTION

The ECM compares the 2 waveforms of the heated oxygen sensors located before and after the catalyst to determine whether or not the catalyst performance has deteriorated.

Air-fuel ratio feedback compensation keeps the waveform of the heated oxygen sensor in front of the catalyst alternates between back and forth, from rich to lean.

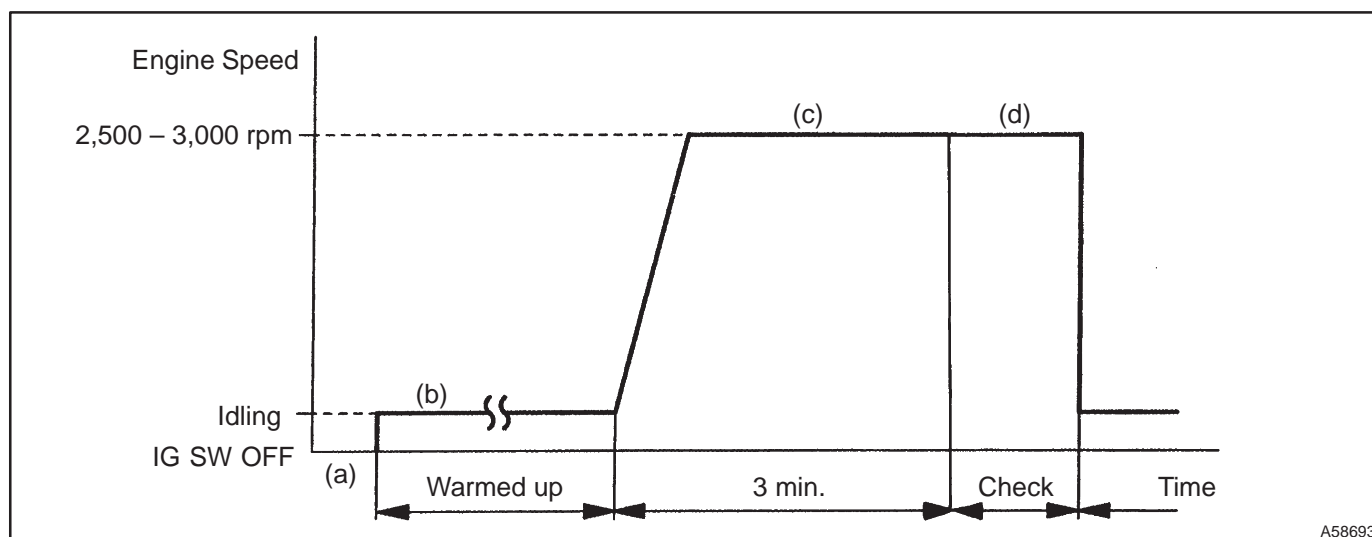
If the catalyst is functioning normally, the waveform of the heated oxygen sensor behind the catalyst switches back and forth between rich and lean much more slowly than the waveform of the heated oxygen sensor in front of the catalyst.

When both waveforms change at a similar rate, it indicates that the catalyst performance has deteriorated.



DTC No.	DTC Detecting Condition	Trouble Area
P0420	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveforms of heated oxygen sensors have same amplitude (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Gas leakage in exhaust system</li> <li>• Heated oxygen sensor</li> <li>• Three-way catalytic converter</li> <li>• ECM</li> </ul>

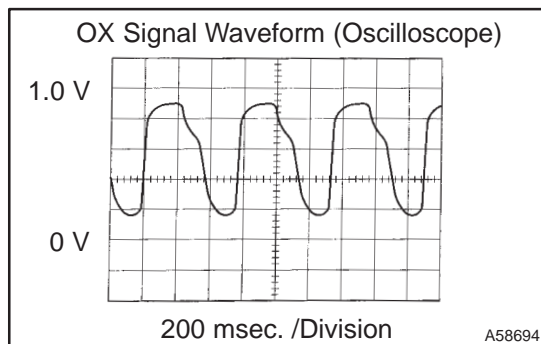
## CONFIRMATION DRIVING PATTERN



- (a) Connect the hand-held tester to the DLC3, or connect the probe of the oscilloscope between terminals HT1A, HT1B, OX1A, OX1B and E1 of the ECM connector.
- (b) Start the engine and warm it up with all the accessories switched OFF until the engine coolant temperature is stable.
- (c) Run the engine at 2,500 to 3,000 rpm for about 3 min.
- (d) After confirming that the waveform of the heated oxygen sensor (bank 1 sensor 1 (OX)) which oscillates around 0.5 V during feedback to the ECM, check the waveform of the heated oxygen sensor (bank 1 sensor 2 (OX)).

**HINT:**

- If there is a malfunction in the system, the waveform of the heated oxygen sensor (bank 1 sensor 2 (OX)) is similar to the wave from of the heated oxygen sensor (bank 1 sensor 1 (OX)) shown in the diagram on the left.
- There are some cases that, even though a malfunction exists, the CHK ENG may not be illuminated.

**INSPECTION PROCEDURE****HINT:**

Read freeze frame data using the hand-held tester. 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.

<b>1</b>	<b>READ OUTPUT DTC(BESIDES P0420)</b>
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- (a) Read the DTC using the hand-held tester.

**Result:**

Display (DTC output)	Proceed to
Only "P0420" is output	A
"P0420" and other DTCs are output	B

**HINT:**

If any other codes besides "P0420" are output, perform the troubleshooting for those DTCs first.

**B**

**GO TO RELEVANT DTC CHART**  
(See page 05-16)

**A**

**2 CHECK FOR EXHAUST GAS LEAKS****NG****REPAIR OR REPLACE****OK****3 INSPECT HEATED OXYGEN SENSOR(BANK 1 SENSOR 1) ([See Page 12-3](#))****NG****REPAIR OR REPLACE HEATED OXYGEN  
SENSOR****OK****4 INSPECT HEATED OXYGEN SENSOR(BANK 1 SENSOR 2) ([See Page 12-3](#))****NG****REPAIR OR REPLACE HEATED OXYGEN  
SENSOR****OK****REPLACE THREE-WAY CATALYTIC CONVERTER**