

DTC	P0420	Catalyst System Efficiency Below Threshold
------------	--------------	---

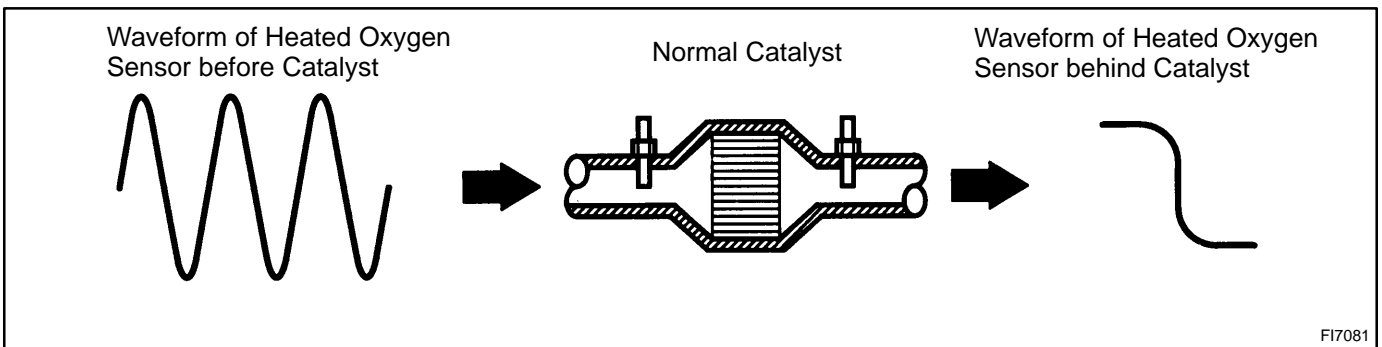
CIRCUIT DESCRIPTION

The ECM compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located behind the catalyst to determine whether or not catalyst performance has deteriorated.

Air-fuel ratio feedback compensation keeps the waveform of the oxygen sensor before the catalyst repeatedly changing back and forth from rich to lean.

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

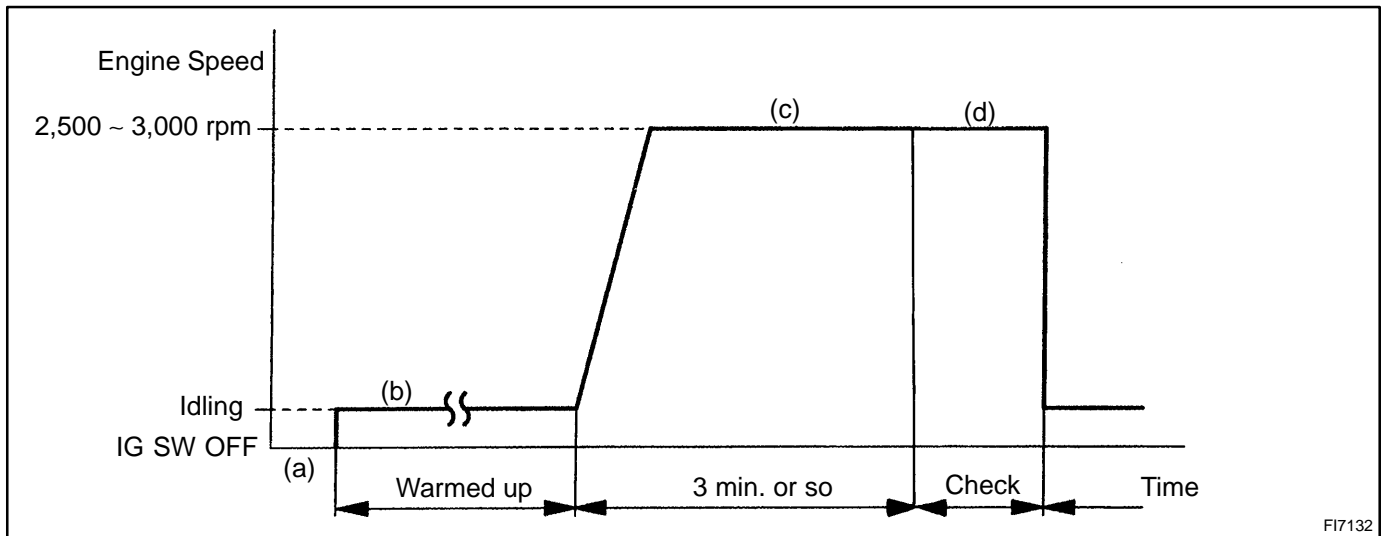
But when both waveforms change at a similar rate, it indicates that catalyst performance has deteriorated.



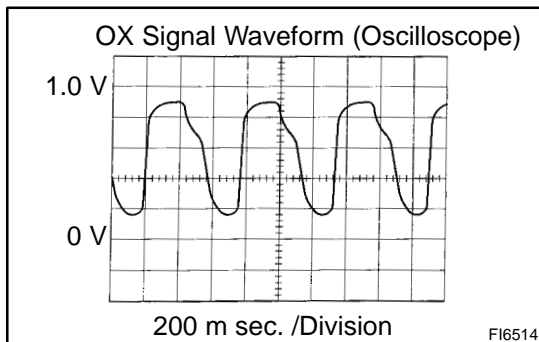
FI7081

DTC No.	DTC Detecting Condition	Trouble Area
P0420	After the engine and the catalyst are warmed up, and while the vehicle is driven within the set vehicle and engine speed range, the waveforms of the oxygen sensors (bank 1 sensor 1 and bank 1 sensor 2) have the same amplitude (2 trip detection logic)	<ul style="list-style-type: none"> • Gas leakage on exhaust system • Open or short in heated oxygen sensor circuit • Heated oxygen sensor • Three-way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



- (a) Connect the TOYOTA hand-held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1, OX2 and E1 of the ECM connector.
- (b) Start engine and warm it up with all accessories switched OFF until water temp. is stable.
- (c) Race the engine at 2,500 - 3,000 rpm for about 3 min.
- (d) After confirming that the waveforms of the oxygen sensor, bank 1 sensor 1 (OX1), oscillate around 0.5 V during feedback to the ECM, check the waveform of the oxygen sensor, bank 1 sensor 2 (OX2).



HINT:

- If there is a malfunction in the system, the waveform of the oxygen sensor, bank 1 sensor 2 (OX2), is almost the same as that of the oxygen sensor, bank 1 sensor 1 (OX1), on the left.
- There are some cases where, even though a malfunction exists, the MIL may either light up or not light up.

INSPECTION PROCEDURE

HINT:

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 warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0420) being output?
----------	--

YES

Go to relevant DTC chart (See page [DI-14](#)).

NO

2 Check gas leakade on exhaust system.

NG Repair or replace exhaust system.

OK

3 Check oxygen sensor (bank 1 sensor 1) (See page [DI-48](#)).

NG Repair or replace oxygen sensor (bank 1 sensor 1).

OK

4 Check oxygen sensor (bank 1 sensor 2) (See page [DI-57](#)).

NG Repair or replace oxygen sensor (bank 1 sensor 2).

OK

Replace three-way catalytic converter.