DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1) (Except California Spec.)

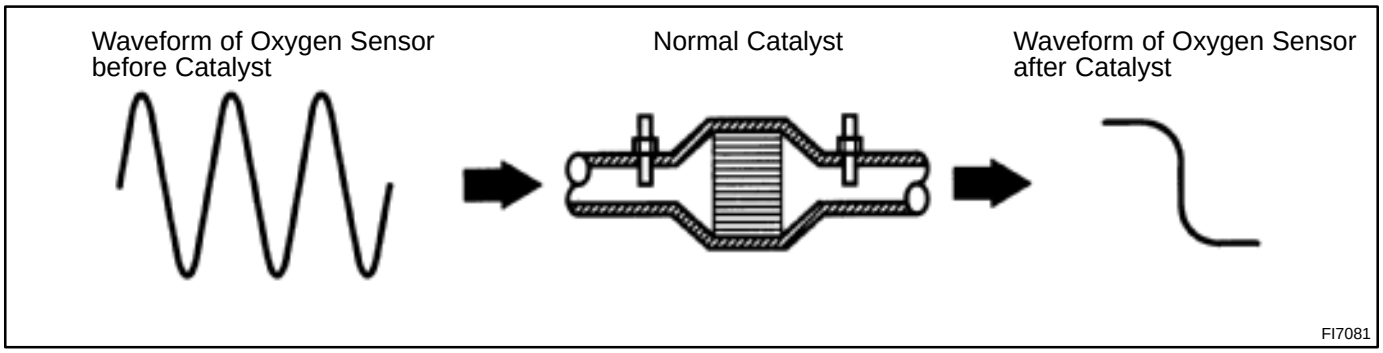
CIRCUIT DESCRIPTION

The ECM compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located after 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.

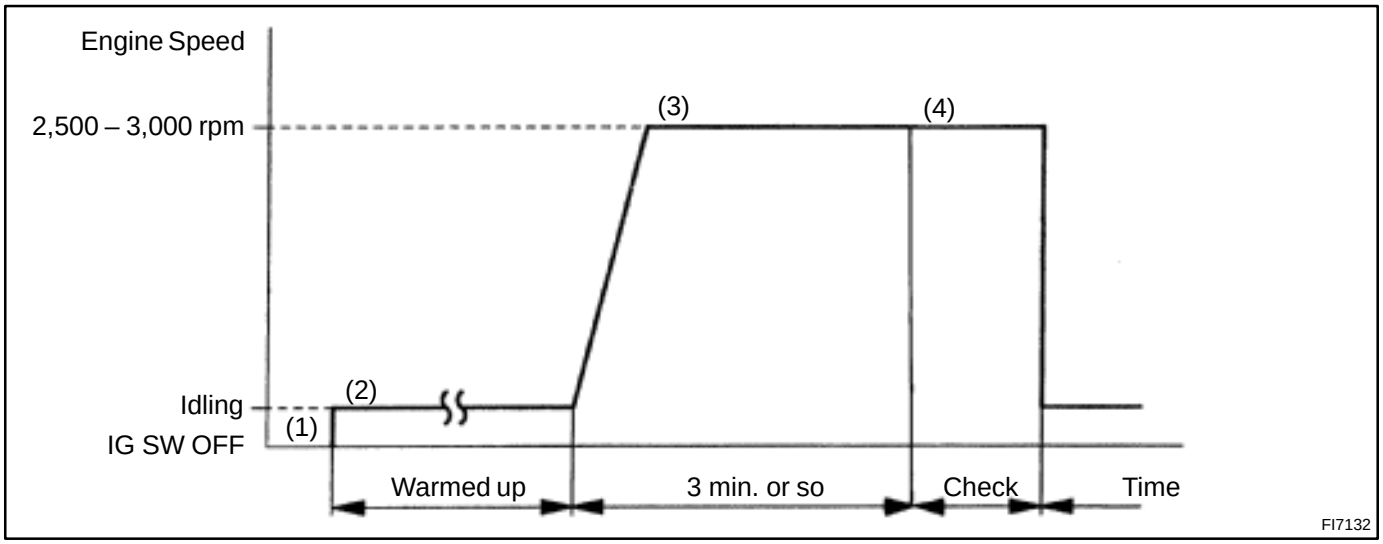
If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.

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



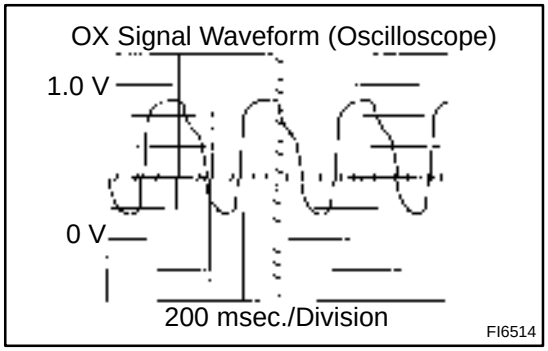
DTC No.	DTC Detecting Condition	Trouble Area
P0420	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of heated oxygen sensor have the same amplitude (2 trip detection logic)	• Gas leakage on exhaust system • Heated oxygen sensor • Three–way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the TOYOTA hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1, OX2 and E1 of ECM.

(2) Start the engine and warm it up with all accessories switched OFF until engine coolant temperature is stable.
(3) Race the engine at 2,500 – 3,000 rpm for about 3 min.
(4) After confirming that the waveform of the heated oxygen sensor (bank 1 sensor 1 (OX1)), oscillate around 0.5 V during feedback to the ECM, check the waveform of the heated oxygen sensor (bank 1 sensor 2 (OX2)).



HINT:
If there is a malfunction in the system, the waveform of the heated oxygen sensor (bank 1 sensor 2 (OX2)) is almost the same as that of the heated 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 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 P0420) being output?**

YES → **Go to relevant DTC chart (See page DI–192).**

NO

2	**Check gas leakage on exhaust system.**

NG → **Repair or replace.**

OK

3	**Check heated oxygen sensor (bank 1 sensor 1) (See page DI–238).**

NG → **Repair or replace.**

OK

4	Check heated oxygen sensor (bank 1 sensor 2) (See page DI–243).

NG → Repair or replace.

OK →

Replace three–way catalytic converter.