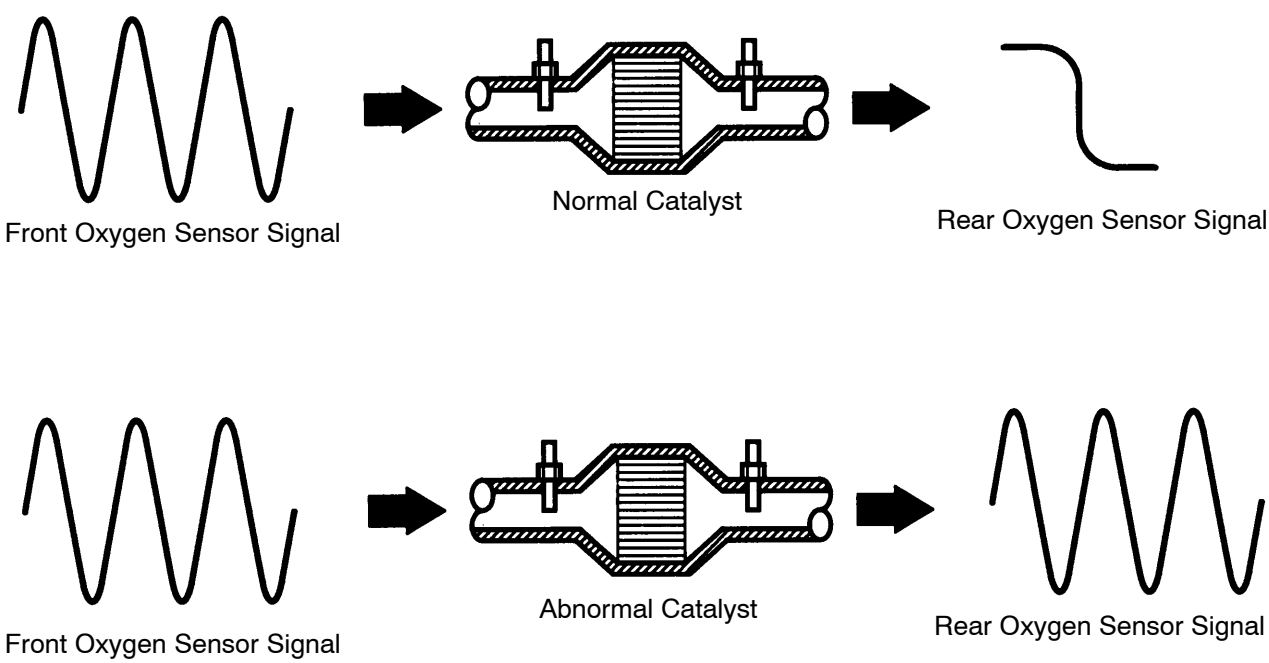
DTC	P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)

DTC	P0430	CATALYST SYSTEM EFFCIENCY BELOW THRESHOLD (BANK 2)

MONITOR DESCRIPTION

In order to monitor the catalyst deterioration, the engine control module (ECM) checks the catalyst deterioration level while the vehicle is running under the specified conditions. If this level exceeds the malfunction threshold several times, the ECM sets this DTC (2 trip detection logic).

The catalyst deterioration level is a ratio of the signal lengths (and areas) between rear oxygen sensor and front oxygen sensor. While the vehicle is running under closed loop, the rear sensor switches the signal much slower than the front sensor. This switching frequency becomes greater and the catalyst deterioration level increases with the catalyst deteriorating.



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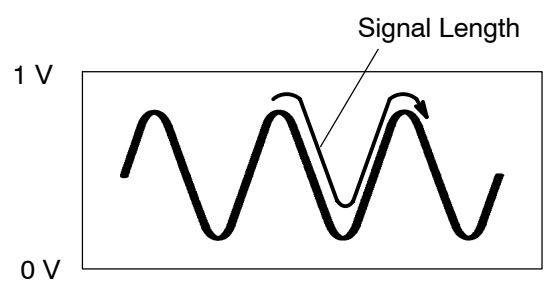
Sensor Signal Length



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DTC	Detection Condition	Trouble Area
P0420	Bank 1 catalyst deterioration level exceeds malfunction threshold while driving vehicle under specified conditions (2 tip detection logic).	• TWC (front catalyst bank 1) • Exhaust pipe assy front (rear catalyst) • Gas leakage in exhaust system • Heated oxygen sensor (bank1 sensor 2) • Heated oxygen sensor (bank1 sensor 1)
P0430	Bank 2 catalyst deterioration level exceeds malfunction threshold while driving vehicle under specified conditions (2 tip detection logic).	• TWC (front catalyst bank 2) • Exhaust pipe assy front (rear catalyst) • Gas leakage in exhaust system • Heated oxygen sensor (bank2 sensor 2) • Heated oxygen sensor (bank2 sensor 1)

MONITOR STRATEGY

Required Sensors/Components (Main)	Front and rear catalysts
Required Sensors/Components (Related)	Front and rear heated oxygen sensors
Frequency of Operation	Once per driving cycle
Duration	160 sec (20 sec 8 times)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever these DTCs are not present	See page 05–19
Accumulated time that all of following conditions are met	20 sec
Battery voltage	11 V or more
IAT	–10°C (14°F) or more
Idle status	OFF
MAF	13 to 45 g/sec
Engine RPM	Less than 4000 rpm
ECT	75°C (167°F) or more
Fuel system status	Closed loop
Upstream catalyst temperature	450 to 850°C (842 to 1562°F)
Downstream catalyst temperature	450 to 850°C (842 to 1562°F)

TYPICAL MALFUNCTION THRESHOLDS

Catalyst deterioration level	0.4 or more
Number of detection	8 times

MONITOR RESULT (MODE 6)

Refer to page 05–25 for detailed information.

Catalyst monitor bank 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
$21	$A1	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$21	$A2	Multiply by 0.0003 [no dimension]	Voltage area ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$21	$A3	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$21	$A4	Multiply by 0.0003 [no dimension]	HO2S frequency ratio of sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$21	$A5	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$21	$A6	Multiply by 0.0003 [no dimension]	Voltage area ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst

Catalyst monitor bank 2

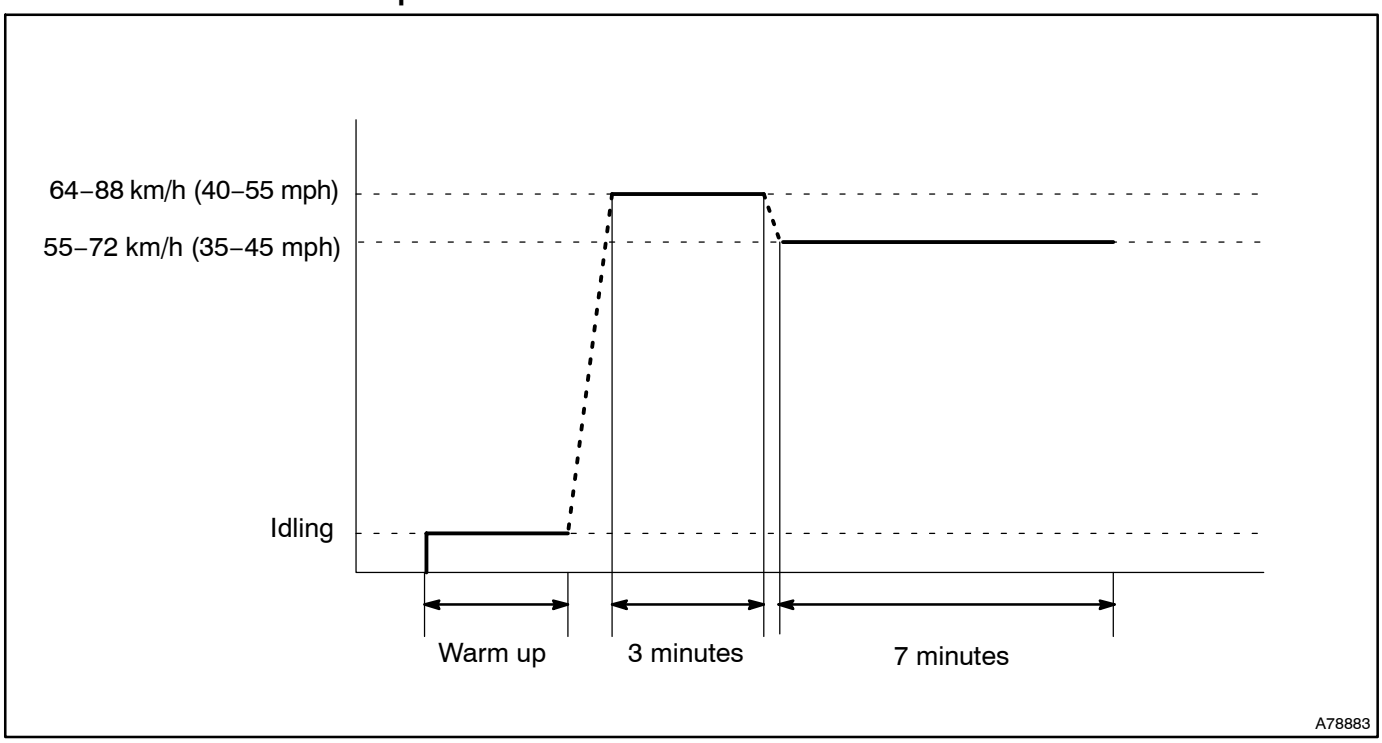
MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
$22	$A1	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$22	$A2	Multiply by 0.0003 [no dimension]	Voltage area ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$22	$A3	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$22	$A4	Multiply by 0.0003 [no dimension]	HO2S frequency ratio of sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$22	$A5	Multiply by 0.0003 [no dimension]	Locus length ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst
$22	$A6	Multiply by 0.0003 [no dimension]	Voltage area ratio of HO2S sensor 1 and sensor 2	Minimum test limit for catalyst	Maximum test limit for catalyst

CONFIRMATION DRIVING PATTERN

(a) Connect the hand–held tester to the DLC3.
(b) Clear DTCs.
(c) Warm–up the engine until the engine coolant temperature reaches 75°C (167°F).
(d) Drive the vehicle at 40 to 55 mph (64 to 88 km/h) for 3 minutes.
(e) Drive the vehicle at 35 to 45 mph (56 to 72 km/h) for 7 minutes.

NOTICE:

Drive with smooth throttle operation and avoid sudden closure of the throttle.



INSPECTION PROCEDURE

1	CHECK DTC OTHER THAN P0420 AND P0430

If DTC other than P0420 and P0430 is present, troubleshoot the DTC first.

Result:

DTC	Proceed to
P0420 or P0430	A
P0420 or P0430 and others	B

B → **GO TO DTC CHART (See page 05–53)**

A

2	CHECK FOR EXHAUST GAS LEAKAGE

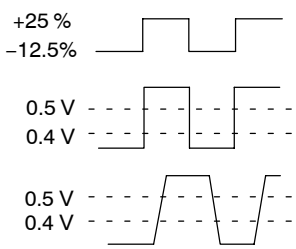
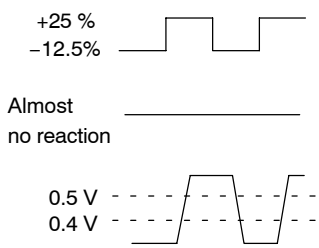
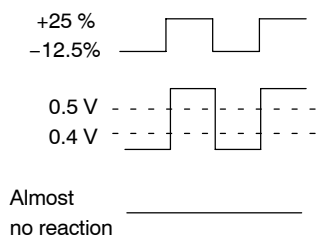
NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

3 PERFORM A/F CONTROL ACTIVE TEST

This active test enables you to identify a malfunction in the heated oxygen sensors.

(a) Connect the hand–held tester to the DLC3.
(b) Run the engine at 2500 rpm for 90 seconds to warm–up the oxygen sensors.
(c) Allow the engine to idle.
(d) Select from the tester menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
(e) Switch the injection volume between +25% and –12.5%, then read the oxygen sensor voltages.

	A	B	C
Injection volume O2S B1S1 O2S B2S1 O2S B1S2 O2S B2S2			
Trouble area	The sensors are OK.	Heated oxygen sensor (bank 1 sensor 1) (bank 2 sensor 1)	Heated oxygen sensor (bank 1 sensor 2) (bank 2 sensor 2)

NOTICE:
The rear heated oxygen sensors (O2S B1S2, O2S B2S2) output have 20 seconds of delay at maximum.

B → **REPLACE HEATED OXYGEN SENSOR (BANK 1 SENSOR 1 OR BANK 2 SENSOR 1)**

C → **REPLACE HEATED OXYGEN SENSOR (BANK 1 SENSOR 2 OR BANK 2 SENSOR 2)**

A

REPLACE FRONT AND REAR CATALYSTS (See page 15–1)

If DTC P0420 is present, replace both of the TWC (front catalyst bank 1) and exhaust pipe assy front (rear catalyst).
If DTC P0430 is present, replace both of the TWC (front catalyst bank 2) and exhaust pipe assy front (rear catalyst).