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Model Year: 2007	Model: Camry	Doc ID: RM000000WC0011X
Title: 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0420: Catalyst System Efficiency Below Threshold (Bank 1) (2007 Camry)		

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)
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DTC	P0430	Catalyst System Efficiency Below Threshold (Bank 2)
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MONITOR DESCRIPTION

The ECM uses the sensors mounted in front of and behind the Three-Way Catalytic Converter (TWC) to monitor its efficiency.

The first sensor, the Air-Fuel Ratio (A/F) sensor, sends pre-catalyst information to the ECM. The second sensor, the Heated Oxygen (HO2) sensor, sends post-catalyst information to the ECM.

In order to detect any deterioration in the TWC, the ECM calculates the Oxygen Storage Capacity (OSC) of the TWC. This calculation is based on the voltage output of the HO2 sensor while performing active air-fuel ratio control, rather than the conventional detecting method, which uses the locus ratio.

The OSC value is an indication of the oxygen storage capacity of the TWC. When the vehicle is being driven with a warm engine, active air-fuel ratio control is performed for approximately 15 to 20 seconds. When it is performed, the ECM deliberately sets the air-fuel ratio to lean or rich levels. If a rich-lean cycle of the HO2 sensor is long, the OSC becomes greater. There is a direct correlation between the OSCs of the HO2 sensor and the TWC.

The ECM uses the OSC value to determine the state of the TWC. If any deterioration has occurred, it illuminates the MIL and sets a DTC.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0420	OSC value is smaller than standard value under active air-fuel ratio control (2 trip detection logic)	<ul style="list-style-type: none"> • Gas leakage from exhaust system • A/F sensor (bank 1 sensor 1) • HO2 sensor (bank 1 sensor 2) • Exhaust manifold (TWC)

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0430	OSC value is smaller than standard value under active air-fuel ratio control (2 trip detection logic)	<ul style="list-style-type: none"> • Gas leakage from exhaust system • A/F sensor (bank 2 sensor 1) • HO2 sensor (bank 2 sensor 2) • Exhaust manifold (TWC)

HINT:

- Bank 1 refers to the bank that includes cylinder No. 1.
- Bank 2 refers to the bank that does not include cylinder No. 1.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.

MONITOR STRATEGY

Related DTCs	P0420: Catalyst Deterioration P0420: Catalyst Deterioration
Required Sensors/Components (Main)	TWC
Required Sensors/Components (Sub)	A/F sensor, heated oxygen sensor, intake air temperature sensor, mass air flow meter, crankshaft position sensor and engine coolant temperature sensor
Frequency of Operation	Once per driving cycle
Duration	Approximately 30 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	P0011, 14 (VVT System 1 - Advance) P0012, 15 (VVT System 1 - Retard) P0031, 32, 51, 52 (A/F Sensor heater - Sensor 1)
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	P0037, 38, 58, 59 (O2 Sensor heater - Sensor 2) P0100 - P0103 (MAF meter) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0136, P0156(O2 Sensor - Sensor 2) P0171, P0172, P0174, P0175 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0351 - P0354 (Igniter) P0500 (VSS) P2196, P2198 (A/F Sensor - rationality) P2A00, P2A03 (A/F Sensor - slow response)
Battery voltage	11 V or more
IAT	-10°C (14°F) or more
ECT	70 kPa (525 mmHg) or more
Atmospheric pressure	-
Idle	OFF
Engine RPM	Less than 3,200 rpm
A/F sensor	Activated
Fuel system status	Closed loop
Engine load	10 to 70 %
All of the following conditions 1, 2 and 3 are met:	-
1. MAF	5 to 25 g/sec.
2. Front catalyst temperature (estimated)	600 to 750°C (1,112 to 1,382°F)
3. Rear catalyst temperature (estimated)	100 to 900°C (212 to 1,652°F)
EVAP system monitor	The monitor has not run yet or the vacuum introduction has been completed.
A/F sensor monitor	Completed
Rear HO2S monitor	Completed
Shift position	4th or higher

TYPICAL MALFUNCTION THRESHOLDS

OSC (Oxygen Storage Capacity) of Catalyst	Less than 0.046 g
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