

1UR-FSE ENGINE CONTROL SYSTEM > SFI SYSTEM > P0300 Random / Multiple Cylinder Misfire Detected / P0301 Cylinder 1 Misfire Detected / P0302 Cylinder 2 Misfire Detected / P0303 Cylinder 3 Misfire Detected / P0304 Cylinder 4 Misfire Detected / P0305 Cylinder 5 Misfire Detected / P0306 Cylinder 6 Misfire Detected / P0307 Cylinder 7 Misfire Detected / P0308 Cylinder 8 Misfire Detected

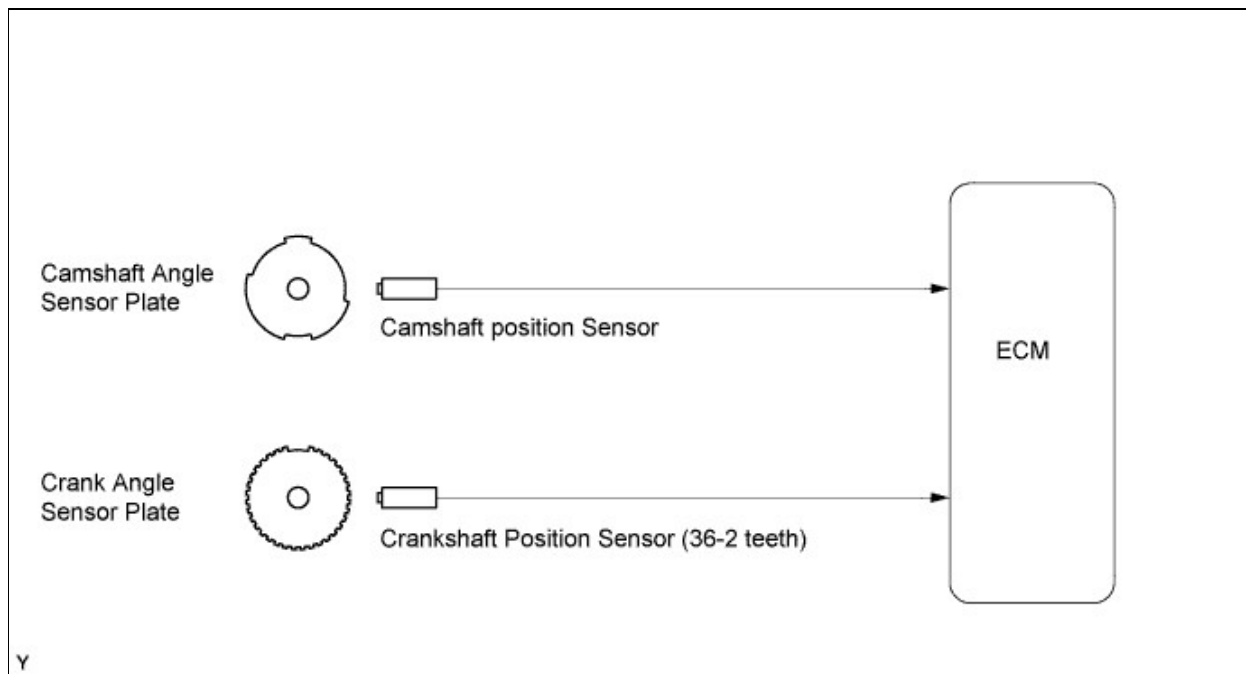
DESCRIPTION

When the engine misfires, high concentrations of hydrocarbons (HC) enter the exhaust gas. Extremely high HC concentration levels can cause an increase in exhaust emission levels. High concentrations of HC can also cause increases in the Three-Way Catalytic Converter (TWC) temperature, which may cause damage to the TWC. To prevent this increase in emissions and to limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the TWC reaches the point of thermal degradation, the ECM blinks the MIL. To monitor misfires, the ECM uses both the Camshaft Position (CMP) sensor and the Crankshaft Position (CKP) sensor. The CMP sensor is used to identify any misfiring cylinders and the CKP sensor is used to measure variations in the crankshaft rotation speed. Misfires are counted when the crankshaft rotation speed variations exceed predetermined thresholds. If the misfire exceeds the threshold levels and may cause emission deterioration, the ECM illuminates the MIL and sets a DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0300	<p>Simultaneous misfiring of several cylinders detected (2 trip detection logic)</p> <ul style="list-style-type: none"> High temperature misfire occurs in three-way catalytic converter (MIL blinks) Emission deterioration misfire occurs (MIL illuminates) 	<ul style="list-style-type: none"> Open or short in engine wire harness Connector connection Vacuum hose connections Ignition system Injector for direct injector Injector for port injector Fuel pressure Mass Air Flow (MAF) meter Engine Coolant Temperature (ECT) sensor Compression pressure Valve clearance Valve timing Ventilation valve and hose Ventilation hose connections Air induction system ECM
P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	<p>Misfiring of specific cylinder detected (2 trip detection logic)</p> <ul style="list-style-type: none"> High temperature misfire occurs in three-way catalytic converter (MIL Blinks) Emission deterioration misfire occurs (MIL illuminates) 	<ul style="list-style-type: none"> Open or short in engine wire harness Connector connection Vacuum hose connections Ignition system Injector for direct injector Injector for port injector Fuel pressure Mass Air Flow (MAF) meter Engine Coolant Temperature (ECT) sensor Compression pressure Valve clearance Valve timing Ventilation valve and hose Ventilation hose connections Air induction system ECM

If DTCs that indicate misfires are set for different cylinders, but DTC P0300 is not set, it indicates that misfires have been detected in different cylinders at different times. DTC P0300 is only set when several misfiring cylinders are detected at the same time.

MONITOR DESCRIPTION



The ECM illuminates the MIL and sets a DTC when either one of the following conditions, which could cause emission deterioration, is detected (2 trip detection logic):

- Within the first 1000 crankshaft revolutions of the engine starting, an excessive misfiring rate (approximately 20 to 50 misfires per 1000 crankshaft revolutions) occurs once.
- After the first 1000 crankshaft revolutions, an excessive misfiring rate (approximately 20 to 60 misfires per 1000 crankshaft revolutions) occurs 4 times in sequential crankshaft revolutions.

The ECM flashes the MIL and sets a DTC when either one of the following conditions, which could cause the Three-Way Catalytic Converter (TWC) damage, is detected (2 trip detection logic):

- In every 200 crankshaft revolutions at a high engine rpm, the threshold misfiring percentage is recorded once.
- In every 200 crankshaft revolutions at a normal engine rpm, the threshold misfiring percentage is recorded 3 times.

MONITOR STRATEGY

Related DTCs	P0300: Multiple cylinder misfire P0301: Cylinder 1 misfire P0302: Cylinder 2 misfire P0303: Cylinder 3 misfire P0304: Cylinder 4 misfire P0305: Cylinder 5 misfire P0306: Cylinder 6 misfire P0307: Cylinder 7 misfire P0308: Cylinder 8 misfire
Required Sensors/Components (Main)	Crankshaft position sensor and camshaft position sensor
Required Sensors/Components (Related)	Crankshaft, Camshaft, Engine coolant temperature sensor and intake air temperature sensors and Mass air flow meter
Frequency of Operation	Continuous

Duration	1000 to 4000 crankshaft revolutions: Emission related misfire 200 to 600 crankshaft revolutions: Catalyst damaged misfire
MIL Operation	2 driving cycles: Emission related misfire MIL flashes immediately: Catalyst damaged misfire
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Misfire:

Monitor runs whenever following DTCs are not present	P0016, P0018 (VVT System - Misalignment) P0017, P0019 (Exhaust VVT System - Misalignment) P0102, P0103, P010C, P010D (Mass Air Flow Sensor) P0097, P0098, P0112, P0113 (Intake Air Temperature Sensor) P0115, P0117, P0118 (Engine Coolant Temperature Sensor) P0125 (Insufficient Coolant Temperature for Closed Loop Fuel Control) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P2135 (Throttle Position Sensor) P0327, P0328, P0332, P0333, P032C, P032D, P033C, P033D (Knock Sensor) P0335 (Crankshaft Position Sensor) P1340 (Camshaft Position Sensor) P0351 - P0358 (Igniter) P0500 (Vehicle Speed Sensor) P0705 (Shift lever position switch)
Battery voltage	8 V or more
VVT system	Not operated by scan tool
Engine RPM	335 to 6600 rpm
Either of the following conditions 1 and 2 is met:	-
1. ECT at engine start	More than -7°C (19°F)
2. ECT	More than 20°C (68°F)
Fuel cut	OFF

Monitor period of emission-related-misfire:

First 1000 revolutions after engine start, or Check Mode	Crankshaft 1000 revolutions
Except above	Crankshaft 1000 revolutions x 4

Monitor period of catalyst-damaged-misfire (MIL blinks):

All of following conditions 1, 2 and 3 are met:	Crankshaft 200 revolutions x 3
1. Driving cycles	1st
2. Check mode	OFF
3. Engine RPM	Less than 2200 rpm
Except above (MIL blinks immediately)	Crankshaft 200 revolutions

TYPICAL MALFUNCTION THRESHOLDS

Monitor period of emission-related-misfire:

Misfire rate (for 2WD)	2% or more
Misfire rate (for AWD)	1.5% or more

Monitor period of catalyst-damage-misfire (MIL blinks):

Number of misfire per 200 revolutions (for 2WD)	144 or more (varies with intake air amount and RPM)
Number of misfire per 200 revolutions (for AWD)	103 or more (varies with intake air amount and RPM)

MONITOR RESULT

Refer to CHECKING MONITOR STATUS (Refer to 1UR-FSE ENGINE CONTROL SYSTEM > SFI SYSTEM > CHECKING MONITOR STATUS(200909 -)).

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the engine switch on (IG).
3. Turn the Techstream on.
4. Record the DTC(s) and freeze frame data.
5. Using the Techstream, switch the ECM from normal mode to check mode (Refer to 1UR-FSE ENGINE CONTROL SYSTEM > SFI SYSTEM > CHECK MODE PROCEDURE(200909 -)).
6. Read the misfire counts of each cylinder (Cylinder #1 Misfire Count to Cylinder #8 Misfire Count) with the engine idling. If any misfire count is displayed, skip the following confirmation driving pattern.
7. Drive the vehicle several times with the conditions, such as engine rpm and engine load, shown in Misfire RPM and Misfire Load in the Data List.

HINT:

In order to store misfire DTCs, it is necessary to operate the vehicle for the period of time shown in the table below, using the Misfire RPM and Misfire Load in the Data List.

Engine RPM	Duration
Idling	3.5 minutes or more
1000	3 minutes or more
2000	1.5 minutes or more
3000	1 minute or more

8. Check whether misfires have occurred by checking DTCs and freeze frame data.

HINT:

Do not turn the engine switch off until the stored DTC(s) and freeze frame data have been recorded. When the ECM returns to normal mode (default), the stored DTC(s), freeze frame data and other data will be erased.

9. Record the DTC(s), freeze frame data and misfire counts.
10. Turn the engine switch off and wait for at least 5 seconds.

