Catalyst and HO2S Layout

ITSW01112006-01

DTC Description / Detecting Condition / Confirmation Procedure

P0420

Refer to "DTC P0420: Catalyst System Efficiency below Threshold".

Catalyst Monitor

Operation

DTCs	P0420
Monitor execution	Once per driving cycle
Sensors / components OK	ECT, Primary HO2S heater, IAT, Fuel level sensor, BARO sensor, MAP sensor, VSS
Monitoring Duration	45 s

Enable conditions

Parameter	Minimum	Maximum
Engine coolant temp.	70 (158) °C (°F)	110 (230) °C (°F)
Intake air temp.	–10 (14) °C (°F)	70 (158) °C (°F)
Barometric pressure	560 mmHg	
Fuel level	15%	
Time from engine start	360 s	
Engine speed	2300 rpm (MT) 1500 rpm (AT)	4500 rpm (MT) 4500 rpm (AT)
Calculated MAF	6.4 g/s	17 g/s
Fuel system status	Closed loop mode	
Calculated load value	26%	80%

Typical malfunction thresholds

Delay of rear oxygen sensor response > 688 – 762 ms (According to Calculated MAF)

MODE $06 Data

Self diagnostic test item	Test value		Description	Scaling
	TID	CID		
Three-way catalyst Function (P0420)	$01	$00	Response time	*8.19/256 msec
	$01	$10	Counter of secondary HO2S voltage change	*1/256 times

OBD System Description - Misfire Monitor

STSW011121011 (03(01)

System Description / Monitoring Procedure

ECM (PCM) measures the angle speed of the crankshaft based on the pulse signal from the CKP sensor and CMP sensor for each cylinder. If it detects a large change in the angle speed of the crankshaft, it concludes occurrence of a misfire. When the number of misfire is counted by the ECM (PCM) beyond the DTC detecting condition, it determines the cylinder where the misfire occurred and outputs it as DTC.

DTC Description / Detecting Condition / Confirmation Procedure

P0300, P0301, P0302, P0303, P0304

Refer to "DTC P0300 / P0301 / P0302 / P0303 / P0304: Random Misfire (Misfire Detected at 2 or More Cylinders) / Cylinder 1 Misfire / Cylinder 2 Misfire / Cylinder 3 Misfire / Cylinder 4 Misfire Detected".

Misfire Monitor

Operation

DTCs	P0300, P0301, P0302, P0303, P0304
Monitor execution	Continuous
Sensors / components OK	MAP sensor, TP sensor, ECT sensor, CKP sensor, CMP sensor, VSS, IAT sensor

System Description / Monitoring Procedure

For both HO2S–1 and –2 heaters, the system monitors proper current and loaded voltage.

DTC Description / Detecting Condition / Confirmation Procedure

P0135

Refer to "DTC P0135: Heated Oxygen Sensor (HO2S) Heater Circuit Malfunction (Sensor-1)".

P0141

Refer to "DTC P0141: Heated Oxygen Sensor (HO2S) Heater Circuit Malfunction (Sensor-2)".

Primary HO2S Heater Monitor

Operation

DTCs	P0135
Monitoring Duration	5 s

Enable conditions

Parameter	Minimum	Maximum
Phase 1 (Heater resistance)		
Heater control	Off	
Phase 2 (Circuit continuity)		
Heater control	On	

Typical malfunction thresholds

Phase 1: Resistor voltage < 2.5 V
Phase 2: Resistor voltage ≥ 0.31 V

Secondary HO2S Heater Monitor

Operation

DTCs	P0141
Monitoring Duration	5 s

Enable conditions

Parameter	Minimum	Maximum
Phase 1 (Heater resistance)		
Heater control	Off	
Phase 2 (Circuit continuity)		
Heater control	On	

Typical malfunction thresholds

Phase 1: Resistor voltage < 2.5 V
Phase 2: Resistor voltage ≥ 0.31 V

MODE $06 Data

Self diagnostic test item (related DTC)	Test value TID	Test value CID	Description	Scaling
O2S 1 heater circuit malfunction (P0135)	$06	$00	Heater voltage at heater on	*5/256/256 V
	$06	$00	Heater voltage at heater off	*5/256/256 V
O2S 2 heater circuit malfunction (P0141)	$07	$00	Heater voltage at heater on	*5/256/256 V
	$07	$00	Heater voltage at heater off	*5/256/256 V

OBD System Description - EGR System Monitor

STSW011121016 (03(01)

System Description / Monitoring Procedure

The EGR system consists of an EGR valve, an EGR pressure transducer, and an EGR solenoid vacuum valve. To detect EGR system malfunction, a MAP sensor and an EGR solenoid vacuum valve (for system check) are added to the EGR system.

The intake pressure changes are measured by two kinds of procedure. One method is the measuring of the pressure change during the steady state condition switching the EGR solenoid vacuum valve on and off to detect entire system leak. Another method is the measuring of the pressure change during deceleration condition switching the EGR solenoid vacuum valve (for system check) on and off to detect EGR valve failure.

EGR System Monitoring System

ITSW01111140-01

DTC Description / Detecting Condition / Confirmation Procedure

P0400

Refer to "DTC P0400: Exhaust Gas Recirculation Flow Malfunction".

EGR System Monitor

Operation

DTCs	P0400
Monitoring Duration	2 s (phase 1) / 1 s (phase 2)

Enable conditions

Parameter	Minimum	Maximum
Phase 1		
Engine coolant temp.	70 (158) °C (°F)	110 (230) °C (°F)
Intake air temp.	–10 (14) °C (°F)	70 (158) °C (°F)
Barometric pressure	560 mmHg	
Engine speed	1400 rpm	4000 rpm
Vehicle speed	32 km/h	
TP change		0.244 ° / 16 firings
Time from engine start	240 s	
EGR system status	EGR control mode	
Phase 2		
Engine coolant temp.	70 (158) °C (°F)	110 (230) °C (°F)
Intake air temp.	–10 (14) °C (°F)	70 (158) °C (°F)
Barometric pressure	560 mmHg	
Engine speed	1700 rpm	4000 rpm
Vehicle speed	32 km/h	
Time from engine start	290 s	
Fuel system status	Fuel shut off mode	

Typical malfunction thresholds

Phase 1: Intake pressure difference: 1.2 – 6.0 mmHg (According to BARO Pressure)
Phase 2: Intake pressure difference: 23 – 70 mmHg (According to Engine Speed)

MODE $06 Data

Self diagnostic test item (related DTC)	Test value		Description	Scaling
	TID	CID		
EGR (P0400)	$08	$00	Differential pressure	*1250/256/256 mmHg
	$08	$00	Differential pressure	*1250/256/256 mmHg
EGR (P0400)	$0A	$00	Differential pressure	*1250/256/256 mmHg
	$0A	$00	Differential pressure	*1250/256/256 mmHg

OBD System Description - Comprehensive Component (Engine Input) Monitor

STSW011121018 (03(01)

Monitoring Procedure

- Input signals of MAP (P0106 / P0107 / P0108), IAT (P0112 / P0113), ECT (P0117 / P0118 / P0125), TP (P0121 / P0122 / P0123), CKP sensor (P0335), CMP sensor (P0340), Fuel tank pressure sensor (P0450), Fuel level sensor (P0461 / P0463), Vehicle speed sensor (P0500), Closed throttle position switch (P0510) and Barometric pressure sensor (P1450), Engine starter signal (P1500), ECM back-up power circuit (P1510), Ignition timing adjustment switch circuit (P1530) are checked for open, short of circuit or sensor rationality by monitoring input voltage.