MODE $06 Data

Self diagnostic test item	Test value		Description	Scaling
	TID	CID		
Three-way catalyst Function (P0420)	$02	$00	Response time	*8.19/256 msec
	$02	$10	Counter of secondary HO2S voltage change	*1/256 times

OBD System Description - Misfire Monitor

SWSW011121011 (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
Monitoring Duration	200 rev. (phase 1) / 1000 rev. (phase 2)

Enable conditions

Parameter	Minimum	Maximum
Engine coolant temp.	–10 (14) °C (°F)	
Intake air temp.		70 (158) °C (°F)
Engine speed		4500 rpm
Barometric pressure	560 mmHg	
Fuel level	15%	
Engine speed change		165 rpm / 33 ms
MAP change		9.77 mmHg / firing
Time from engine start	5 s	
Time from fuel shut off	3 s	
Time from switching of AC, PSS, radiator fan or electric load	8 rev.	

Typical malfunction thresholds

Phase 1: Catalyst damage > 8 – 50% (According to Engine Speed and MAP)
Phase 2: FTP emission threshold > 2.5%

OBD System Description - EVAP Control System Monitor

SWSW011121012 (03(01)

System Description / Monitoring Procedure

To monitor the EVAP control system, a fuel tank pressure sensor and an EVAP canister air (vent) valve are added to the system.

The monitoring system measures pressure change of closed EVAP system circuit under the depressurized condition. The system also measures pressure change of closed circuit to compensate evaporative pressure with the normal range pressure, if necessary.

EVAP System Monitoring System (ORVR)

IWSW01111043-01

MODE $06 Data

Self diagnostic test item	Test value		Description	Scaling
	TID	CID		
EVAP Control System (P0440 / P0455)	$04	$00	Differential rising pressure	*125/256/256 – 62.5 mmHg
	$04	$10	Tank pressure	*125/256/256 – 62.5 mmHg
	$04	$11	Tank pressure	*125/256/256 – 62.5 mmHg
	$04	$20	Tank pressure	*125/256/256 – 62.5 mmHg
	$04	$30	Differential pressure	*125/256/256 – 62.5 mmHg
	$04	$40	Differential pressure	*125/256/256 – 62.5 mmHg
	$04	$41	Change of fuel level	*50/256/256 L

OBD System Description - Fuel System Monitor

SWSW011121013 (03(01)

System Description / Monitoring Procedure

The fuel system is equipped with fuel trim circuitry which includes short-term and long-term fuel trim. Short-term fuel trim is instantaneous feedback adjustment to maintain air-fuel ratio at its theoretical value. Long-term fuel trim is more gradual adjustment than short-term fuel trim to compensate continuous deviation from central value of the short-term fuel trim due to changing of the usage environment and aging of the engine.
The ECM monitors continuously the short-term and long-term fuel trim values whether the values are out of the specification limit.

DTC Description / Detecting Condition / Confirmation Procedure

P0171, P0172

Refer to “DTC P0171 / P0172: Fuel System Too Lean / Rich”.

Fuel System Monitor

Operation

DTCs	P0171, P0172
Monitor execution	Continuous
Sensors / components OK	IAT, ECT, Fuel level sensor, BARO
Monitoring Duration	30 s

Enable conditions

Parameter	Minimum	Maximum
Intake air temp.	–10 (14) °C (°F)	
Barometric pressure	560 mmHg	
Fuel level	15%	
Fuel system status	Closed loop mode	

Typical malfunction thresholds

P0171: Long + short term > 30 – 35%, short term > 20%
P0172: Long + short term < –34 – –30%, short term < –20%

OBD System Description - Oxygen Sensor Monitor

SWSW011121014 (03(01)

System Description / Monitoring Procedure

HO2S–1 (Primary HO2S)

For a HO2S–1, the system monitors maximum and minimum voltage, lean-to-rich and rich-to-lean response rates, and switching cycles during monitoring conditions once per driving cycle. The sensor is also monitored for activity continuously.

HO2S–2 (Secondary HO2S)

A HO2S–2 is used for catalyst system monitor only. During monitoring conditions, the system measures maximum and minimum output voltage and compares with criteria once per diving cycle.

DTC Description / Detecting Condition / Confirmation Procedure

P0131, P0132

Refer to “DTC P0131 / P0132: Heated Oxygen Sensor (HO2S) Circuit Low / High Voltage (Sensor-1)”.

Secondary HO2S Circuit Monitor

Operation

DTCs	P0136
Monitor execution	Once per driving cycle
Sensors / components OK	ECT, IAT, MAP, Fuel level sensor, BARO sensor, Primary HO2S, Secondary HO2S heater
Monitoring Duration	Min. 5 min. (phase 1) / 10 s (phase 2)

Enable conditions

Parameter	Minimum	Maximum
Phase 1		
Intake air temp.	–10 (14) °C (°F)	70 (158) °C (°F)
Barometric pressure	560 mmHg	
Fuel level	15%	
Engine speed	1000 rpm	
Driving counter	5 times (2 – 32 km/h)	
Heater operative time	60 s	
Fuel system status	Closed loop mode	
MAP	Steady state value	
Phase 2		
Heater operative time	60 s	

Typical malfunction thresholds

Phase 1: Maximum voltage < 0.49 V, Minimum voltage > 0.41 V
Phase 2: Pull-up voltage > 4.5 V

MODE $06 Data

Self diagnostic test item	Test value TID	CID	Description	Scaling
O2S 1 circuit low volt (P0131)	$06	$00	Minimum voltage	*5/256/256 V
O2S 1 circuit high volt (P0132)	$06	$01	Maximum voltage	*5/256/256 V
Slow response (P0133)	$06	$02	Min. switch time for rich to lean	*8.19/256 msec
	$06	$03	Min. switch time for lean to rich	*8.19/256 msec
	$06	$04	Mean period of feed back	*32.76/256 msec
No activity detect (P0134)	$07	$00	Count of irregular volt detected	*1/256 times
	$07	$01	Count of irregular volt detected	*1/256 times
O2S 2 circuit volt (P0136)	$09	$00	Minimum terminal voltage	*5/256/256 V
	$09	$01	Maximum voltage	*5/256/256 V
	$09	$02	Time of irregular volt detected	*1.049/256 S

OBD System Description - HO2S Heater Monitor

SWSW011121015 (03(01)

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
Monitor execution	Continuous
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 > 0.488 V

Secondary HO2S Heater Monitor

Operation

DTCs	P0141
Monitor execution	Continuous
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 > 0.488 V

MODE $06 Data

Self diagnostic test item (related DTC)	Test value TID	Test value CID	Description	Scaling
O2S 1 heater circuit malfunction (P0135)	$0B	$00	Heater voltage at heater on	*5/256/256 V
	$0B	$10	Heater voltage at heater off	*5/256/256 V
	$0B	$20	Heater voltage at heater on	*5/256/256 V
	$0B	$21	Heater voltage at heater off	*5/256/256 V
O2S 2 heater circuit malfunction (P0141)	$0C	$00	Heater voltage at heater on	*5/256/256 V
	$0C	$10	Heater voltage at heater off	*5/256/256 V
	$0C	$20	Heater voltage at heater on	*5/256/256 V
	$0C	$21	Heater voltage at heater off	*5/256/256 V

OBD System Description - Comprehensive Component (Engine Input) Monitor

SWSW011121016 (03(01)

Monitoring Procedure

- Input signals of MAP (P0106 / P0107 / P0108), IAT (P0111 / P0112 / P0113), ECT (P0117 / P0118 / P0125), TP (P0121 / P0122 / P0123), CKP sensor (P0335), CMP sensor (P0340), Fuel tank pressure sensor (P0450 / P0451), Fuel level sensor (P0461 / P0463), Vehicle speed sensor (P0500) 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.
- Barometric pressure sensor performance problem (P1451) is monitored by comparing manifold MAP sensor value with barometric pressure sensor value.

DTC Description / Detecting Condition / Confirmation Procedure

P0106

Refer to “DTC P0106: Manifold Absolute Pressure (MAP) Circuit Performance Problem”.

P0107

Refer to “DTC P0107: Manifold Absolute Pressure (MAP) Circuit Low Input”.

P0108

Refer to “DTC P0108: Manifold Absolute Pressure (MAP) Circuit High Input”.