ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE

Camshaft Position Sensor-A Bank-1 Correlation	**P0016**	Detects CMP to CKP misalignment by monitoring if CMP sensor pulse occurs during the incorrect CKP position (CMP to CKP Correlation Diagnostic)	Non-Encoded CMP Sensor
			CMP sensor pulse occurs outside CKP MedRes region 2
			
			The CKP MedRes region is a certain number of CKP sensor pulses. ECM thru-put prohibits using every CKP sensor pulse. Typical CKP MedRes region is twice per cylinder, but varies in each engine.
				Non-Encoded CMP Sensor
				IF[CAM_TYPE = NON_ENCODED_CAM AND
				CKP_MedRes_Active = TRUE AND
				Crank_Sync_Flag = Crank_In_Sync AND
				Fault_Pending[P0341] = FALSE AND
				Fault_Active[P0340] = FALSE AND
				Fault_Active[P0335] = FALSE AND
				Fault_Active[P0385] = FALSE AND
				Fault_Active[P1372] = FALSE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					Non-Encoded CMP Sensor
					Fail Report = 8 CMP pulses out of the last 10 CMP sensor pulses are outside Malfunction Criteria.
						DTC Type B

HO2S Heater Control Circuit Bank 1 Sensor 1	**P0030**	This DTC detects when the circuit is shorted to ground. -- Circuit check	Circuit fault indicated	10 V < System Voltage < 18 V	45 fails out of 50 samples	DTC Type B
HO2S Heater Control Circuit Bank 1 Sensor 2	**P0036**	This DTC detects when the circuit is shorted to ground. -- Circuit check	Circuit fault indicated	10 V < System Voltage < 18 V	45 fails out of 50 samples	DTC Type B
HO2S Heater Control Circuit Bank 1 Sensor 1	**P0050**	This DTC detects when the circuit is shorted to ground. -- Circuit check	Circuit fault indicated	10 V < System Voltage < 18 V	45 fails out of 50 samples	DTC Type B
Mass Airflow (MAF) Sensor Performance	**P0101**	This DTC determines if the MAF sensor is stuck within the normal operating range.	Filtered airflow error > 32 grams per second and Filtered manifold pressure 2 error > 15 kPa and Filtered throttle error < 320 kPa grams per second	No MAF circuit DTCs set No MAP circuit DTCs set No EGR DTCs set No ECT circuit DTCs set No IAT circuit DTCs set No CKP DTCs set RPM < Engine Speed < 6700 RPM 500 70°C < Engine Coolant Temperature < 121°C -7°C < Intake Air Temperature < ~~60~~°C 65°C	Immediate Frequency: 12.5 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
MAF Sensor Circuit Low Frequency	**P0102**	This DTC detects a continuous short to low or open in either the signal circuit or the MAF sensor.	MAF sensor signal< 1135 Hz	Engine Run Time > 1 second RPM > 250 rpm System Voltage > 10.5V Enable Criteria Stable Time >0 seconds	20 test failures in a 100 test sample 80 samples/sec	DTC Type B
MAF Sensor Circuit High Frequency	**P0103**	This DTC detects a continuous short to high in either the signal circuit or the MAF sensor.	MAF sensor signal >11000 Hz	Engine Run Time > 1 second RPM > 250 rpm System Voltage > 10.5V Enable Criteria Stable Time >0 seconds	20 test failures in a 100 test sample 80 samples/sec	DTC Type B
Manifold Absolute Pressure (MAP) Sensor 1 Performance	**P0106**	This DTC determines if the MAP sensor is stuck within the normal operating range.	Filtered manifold pressure 1 error > 20 kPa and Filtered manifold pressure 2 error > 15 kPa and Filtered throttle error < 320 kPa grams per second	No MAF circuit DTCs set No MAP circuit DTCs set No EGR DTCs set No ECT circuit DTCs set No IAT circuit DTCs set No CKP DTCs set 500 RPM < Engine Speed < 6700 RPM 70°C < Engine Coolant Temperature < 121°C -7°C < Intake Air Temperature < ~~60°C 65°C~~	Immediate Frequency: 12.5 ms loop Continuous	DTC Type B
MAP Circuit Low Input	**P0107**	This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP < 1.5% of 5 Volt reference	No TPS DTC's No 5 Volt Reference DTC's Controller State = RUN [(TPS ≥ 0% & Engine Speed ≤ 1000 rpm) or (TPS ≥ 9.9% & Engine Speed > 1000 rpm)]	20 test failures in a 40 test sample 20 samples/sec	DTC Type B
MAP Circuit High Input	**P0108**	This DTC detects a continuous short to high or open in either the signal circuit or the MAP sensor.	MAP > 97.5% of 5 Volt reference	No TPS DTC's No 5 Volt Reference DTC's Controller State = RUN Engine Run Time > table value based on start-up coolant temperature [(TPS < 89.9% & Engine Speed ≤ 1000 rpm) or (TPS < 97.5% & Engine Speed > 1000 rpm)]	20 test failures in a 40 test sample 20 samples/sec	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
IAT Sensor Circuit Low Voltage	**P0112**	This DTC determines if the IAT sensor is shorted low by checking for an IAT sensor resistance below a threshold	IAT Resistance < 25 Ω	No ECT DTC's No VSS DTC's ECT < 110°C VSS >= 40.2 kph Engine Run Time > 10 seconds	10 test failures in a 20 test sample 4 samples/sec	DTC Type B
IAT Sensor Circuit High Voltage	**P0113**	This DTC determines if the IAT sensor is shorted high by checking for an IAT sensor resistance above a threshold	IAT Resistance > 1800000 Ω	No ECT DTC's No VSS DTC's No MAF DTC's ECT >= 50°C VSS < 1.6 kph MAF < 12 g/s Engine Run Time > 10 seconds	10 test failures in a 20 test sample 4 samples/sec	DTC Type B
ECT Sensor Circuit Low Voltage	**P0117**	This DTC determines if the ECT sensor is shorted low by checking for an ECT sensor resistance below a threshold	ECT Resistance < 25 Ω	No IAT DTC's IAT ≤ 70.2 °C or Engine run time ≥ 10 sec.	10 test failures in a 100 test sample 1 sample/sec	DTC Type B
ECT Sensor Circuit High Voltage	**P0118**	This DTC determines if the ECT sensor is shorted high by checking for an ECT sensor resistance above a threshold	ECT Resistance > 1800000 Ω	No IAT DTC's IAT ≥ -7 °C or Engine run time ≥ 60 sec.	10 test failures in a 100 test sample 1 sample/sec	DTC Type B
Throttle Position (TP) Sensor 1 Performance	**P0121**	This DTC determines if the TP sensor is stuck within the normal operating range.	Filtered throttle error > 320 kPa grams per second and Filtered manifold pressure 2 error < 15 kPa	• No MAF circuit DTCs set • No MAP circuit DTCs set • No EGR DTCs set • No ECT circuit DTCs set • No IAT circuit DTCs set • No CKP DTCs set • 500 RPM < Engine Speed < 6700 RPM • 70°C < Engine Coolant Temperature < 121°C • -7°C < Intake Air Temperature < ~~60°C~~ 65°C	Immediate Frequency: 12.5 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Throttle Position Sensor Circuit Low Voltage	**P0122**	This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor	TPS < 3.1% of 5 Volt reference	No 5 Volt Reference DTC's	20 test failures in a 40 test sample 10 samples/sec	DTC Type B
Throttle Position Sensor Circuit High Voltage	**P0123**	This DTC detects a continuous short to high or open in either the signal circuit or the TP sensor.	TPS > 95.1% of 5 Volt reference	No 5 Volt Reference DTC's	20 test failures in a 40 test sample 10 samples/sec	DTC Type B
Engine Coolant Temperature (ECT) Insufficient for Closed Loop Fuel Control	**P0125**	This DTC detects if the engine coolant temperature rises too slowly due to an ECT sensor or cooling system fault.	Actual accumulated airflow > predicted accumulated airflow and engine coolant temperature > 35°C Airflow is accumulated every second if airflow > 10 grams per second up to a maximum of 250 grams per second	No MAF, IAT, or VSS DTCs set No ECT sensor circuit DTCs set Start up ECT < 30°C Minimum Average Airflow > 14 gram per second Vehicle speed > 5 MPH for 1 kilometer 120 sec < Engine Run Time < 1800 sec IAT ≥ -6.99°C	30 seconds Frequency: Once per ignition cycle 1 second loop	DTC Type B
Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	**P0128**	This DTC detects if the engine coolant temperature rises too slowly due to an ECT sensor or cooling system fault.	Actual accumulated airflow > predicted accumulated airflow and engine coolant temperature > 80°C Airflow is accumulated every second if airflow > 10 grams per second up to a maximum of 35 grams per second	No MAF, IAT, or VSS DTCs set No ECT sensor circuit DTCs set Start up ECT < 75°C Minimum Average Airflow > 14 gram per second Vehicle speed > 5 MPH for 1 kilometer 120 sec < Engine Run Time < 1800 sec IAT ≥ -6.99°C	30 seconds Frequency: Once per ignition cycle 1 second loop	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Closed Loop Rationality Bank 1 Sensor 1	**P0130**	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed loop fuel control O2 sensor Ready flag set to "Not Ready." O2 sensor voltage must be > 650 millivolts or < 250 millivolts to set closed loop fuel O2 Ready flag. Once set to "Ready," the O2 sensor voltage cannot be > 250 millivolts and < 650 millivolts for > 120 seconds or the O2 Ready flag will be reset to "Not Ready." Both Bank 1 Sensor 1 and Bank 2 Sensor 1 O2 sensor Ready flags must be set to Ready to enable closed loop fueling.	No injector DTC's No MAF DTC's No TP sensor DTC's No MAP DTC's No ECT sensor DTC's No Bank 1 Sensor 1 or Bank 2 Sensor 1 DTC's Engine Run Time > 12.75 sec. Coolant temp > 70 C Predicted O2 Heater Temp > 600 C 10 volts < Ignition Voltage < 18 volts Traction control not active. Catalyst Protection mode not active. 500 ≤ RPM ≤ 5000 3.0 grams per second ≤ MAF ≤ 30.0 grams per second Decel Fuel Cut Off not active. Power Enrichment not active. Above conditions must be met for 5.0 seconds.	160 test failures in a 200 test sample. 100 millisecond execution rate. Continuous	DTC Type B
HO2S Circuit Low Voltage (bank 1 sensor 1)	**P0131**	This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady	O2 sensor voltage < 75 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled No injectors are disabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	90 test failures in a 100 test sample for 5 sets of samples 100 millisecond execution rate. Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit High Voltage (bank 1 sensor 1)	**P0132**	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle	O2 sensor voltage > 900 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	90 test failures in a 100 test sample for 5 sets of samples 100 millisecond execution rate. Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Slow Response (bank 1 sensor 1)	**P0133**	This DTC determines if the O2 sensor functioning properly by checking its response time.	O2 sensor average transition time: L/R > 219 msec R/L > 219 msec O2 voltage between 325 mv and 625 mv.	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set DTC P1133 (Too Few Switches) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled Traction control not active No injectors are disabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	65.00 seconds Once per key cycle	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Insufficient Activity (bank 1 sensor 1)	**P0134**	This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 400 millivolts but < 500 millivolts .	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Traction control not active 10 volts < Ignition Voltage < 18 volts Engine run time > 200 seconds	510 test failures in a 600 test sample 100 millisecond execution rate. Continuous	DTC Type B
HO2S Heater Circuit (bank 1 sensor 1)	**P0135**	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. It is also used by the RCOHT algorithm to indicate that the O2 heater resistance is out of range.	3.125 amps < Heater current < 0.25 amps OR 1.8 ohms < (Expected heater circuit resistance – Calculated heater circuit resistance) < -3.5 ohms	Heater driver DTC P0030, P0036, P0050 not set Delta ignition voltage during current measurement < 1 volt Engine Run Time > 180 seconds 500 < RPM < 3000 5 grams per second < MAF < 30grams per second O2 heater overtemp control not active. . RCOHT executes at engine start after a soak of at least 8 hours.	Average of 10 current samples compared to thresholds for each test. 5 tests per key cycle, 120 second delay between tests. 100 millisecond execution rate.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
O2S Circuit Bank 1 Sensor 2	**P0136**	This DTC determines if the post catalyst O2 sensor is stuck in a normal voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic includes a passive (stage 1) test and an intrusive (stage 2) test. The stage 2 increases or reduces delivered fuel to achieve the required rich or lean threshold.	Post catalyst O2 sensor cannot achieve voltage ≥ 721 millivolts and voltage ≤ 299 millivolts	Common Enable Criteria • No O2 circuit, heater, response or heater driver DTC's active • No TP Sensor DTC's • No MAF DTC's • No ECT DTC's • No MAP DTC's • No IAT DTC's • No EVAP DTC's • No Fuel Injector DTC's • No Fuel Trim DTC's • No AIR DTC's • 10 volts ≤ system voltage ≤ 18 volts • Engine Runtime ≥ 2 seconds Stage 2 Specific Enable Criteria: • Stage 1 portion of test not passed • 100 rpm ≤ Engine Speed ≤ 3000 rpm • 8 gps ≤ Airflow ≤ 30 gps • 24 kph ≤ Vehicle Speed ≤ 145 kph All of the above met for at least 2 seconds, and then: • 0.9 ≤ Short term fuel trim ≤ 1.10 • Fuel state = closed loop • EVAP diagnostic not in control of purge	Stage 1: Up to 1190 seconds Stage 2: Up to 15 seconds for each threshold Frequency: One test per trip	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Low Voltage (bank 1 sensor 2)	**P0137**	This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady throttle	O2 sensor voltage < 9 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled No injectors are disabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.50 but ≤ 14.8 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	90 test failures in a 100 test sample for 5 sets of samples 100 millisecond execution rate. Continuous	DTC Type B
HO2S Circuit High Voltage (bank 1 sensor 2)	**P0138**	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle	O2 sensor voltage > 950 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.50 but ≤ 14.80 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	560 test failures in a 600 test sample for 2 sets of samples. 100 millisecond execution rate. Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Insufficient Activity (bank 1 sensor 2)	**P0140**	This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 400 millivolts but < 500 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's DTC P0141 (O2 Heater) not set Closed Loop Fuel Enabled EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Traction control not active 10 volts < Ignition Voltage < 18 volts Engine run time > 200.00 seconds Minimum 2 occurrences of a delta TP sensor > 5 % during diagnostic test	1300 test failures in a 1500 test sample 100 millisecond execution rate. Once per key cycle.	DTC Type B
HO2S Heater Circuit (bank 1 sensor 2)	**P0141**	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. It is also used by the RCOHT algorithm to indicate that the O2 heater resistance is out of range.	0.906 amps < Heater current < 0.15 amps OR 3.85 ohms < (Expected heater circuit resistance – Calculated heater circuit resistance) < -6.51 ohms	Heater driver DTC P0030, P1031, P1032 not set Delta ignition voltage during current measurement < 1 volt Engine Run Time > 180 seconds 500 < RPM < 3000 4 grams per second < MAF < 30grams per second O2 heater overtemp control not active. RCOHT executes at engine start after a soak of at least 8 hours.	Average of 10 current samples compared to thresholds for each test. 5 tests per key cycle, 120 second delay between tests 100 millisecond execution rate	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Closed Loop Rationality Bank 2 Sensor 1	**P0150**	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed loop fuel control O2 sensor Ready flag set to “Not Ready.” O2 sensor voltage must be > 650 millivolts or < 250 millivolts to set closed loop fuel O2 Ready flag. Once set to “Ready,” the O2 sensor voltage cannot be > 250 millivolts and < 650 millivolts for > 120 seconds or the O2 Ready flag will be reset to “Not Ready.” Both Bank 1 Sensor 1 and Bank 2 Sensor 1 O2 sensor Ready flags must be set to Ready to enable closed loop fueling.	No injector DTC’s No MAF DTC's No TP sensor DTC's No MAP DTC's No ECT sensor DTC's No Bank 1 Sensor 1 or Bank 2 Sensor 1 DTC’s Engine Run Time > 12.75 sec. Coolant temp > 75 C Predicted O2 Heater Temp > 600 C 10 volts < Ignition Voltage < 18 volts Traction control not active. Catalyst Protection mode not active. 500 ≤ RPM ≤ 5000 3.0 grams per second ≤ MAF ≤ 30.0 grams per second Decel Fuel Cut Off not active. Power Enrichment not active. Above conditions must be met for 5.0 seconds.	160 test failures in a 200 test sample. 100 millisecond execution rate. Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Low Voltage (bank 2 sensor 1)	**P0151**	This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady throttle	O2 sensor voltage < 75 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled No injectors are disabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	90 test failures in a 100 test sample for 5 sets of samples 100 millisecond execution rate. Continuous	DTC Type B
HO2S Circuit High Voltage (bank 2 sensor 1)	**P0152**	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle	O2 sensor voltage > 900 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled Traction control not active 10 volts < Ignition Voltage < 18 volts Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position ≥ 3 % but ≤ 25 % Above conditions must be met for 3.0 seconds.	90 test failures in a 100 test sample for 5 sets of samples 100 millisecond execution rate. Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Slow Response (bank 2 sensor 1)	**P0153**	This DTC determines if the O2 sensor functioning properly by checking its response time.	O2 sensor average transition time: L/R >219 msec R/L > 219 msec O2 voltage between 325 mv and 625 mv.	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0155 (O2 Heater) not set DTC P1153 (Too Few Switches) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled Traction control not active No injectors are disabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	90.00 seconds Once per key cycle	DTC Type B
HO2S Circuit Insufficient Activity (bank 2 sensor 1)	**P0154**	This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 400 millivolts but < 500 millivolts	No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No AIR DTC's No ECT sensor DTC's EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Traction control not active 10 volts < Ignition Voltage < 18 volts Engine run time > 200 seconds	510 test failures in a 600 test sample 100 millisecond execution rate. Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Heater Circuit (bank 2 sensor 1)	**P0155**	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. It is also used by the RCOHT algorithm to indicate that the O2 heater resistance is out of range.	3.125 amps < Heater current < 0.25 amps OR 1.8 ohms < (Expected heater circuit resistance – Calculated heater circuit resistance) < -3.5 ohms	Heater driver DTC P0030, P0036, P0050 not set Delta ignition voltage during current measurement < 1 volt Engine Run Time > 180 seconds 500 < RPM < 3000 4 grams per second < MAF < 30 grams per second O2 heater overtemp control not active. RCOHT executes at engine start after a soak of at least 8 hours.	Average of 10 current samples compared to thresholds for each test. 5 tests per key cycle, 120 second delay between tests. 100 millisecond execution rate.	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel System Too Lean Bank 1	**P0171**	Determines if the fuel control system is in a lean condition.	The EWMA of long term fuel trim (LTM) samples ≥ 1.24 Note: EWMA stands for "Exponentially Weighted Moving Average". This is essentially the LTM for current cell unless 1. current cell has not been learned since engine start. 2. in transition between cells see notes 1 and 2 below Notes: 1. The first 90 seconds (115 for idle cells) of fuel trim learning in each fuel trim cell are not considered usable, and are not updated in EWMA. This is to allow the fuel control system time to learn the cell's long term fuel trim. 2. One (1) second of data is not updated to EWMA after switching fuel trim cells. This is to allow the fuel control system time to transition to the proper long-term fuel trim for the new cell.	• No Misfire, O2 Sensor, EVAP, Fuel Injector, IAC, MAF, MAP, EGR, A.I.R DTC's • Engine speed > 400 rpm but < 6000 rpm • BARO > 70kpa • ECT > -40°C but < 127°C • MAP > 5 kpa • IAT > -20 °C • Mass Airflow > 0.5 g/s • Vehicle speed < 134 kph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in a Decel Fuel Trim Cell • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test (Canister DC > 2% & canister vent valve closed). • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) • EWMA has accumulated at least 10 sec of usable data since engine start (10 sec after fuel control system learns first cell)	1 test failures Frequency: Continuous 100 ms loop	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel System Too Rich Bank 1	**P0172**	Determines if the fuel control system is in a rich condition.	The Purge-Off EWMA of long term fuel trim (LTM) samples ≤ 0.78 at the conclusion of a Excess Vapor Test Note: EWMA stands for "Exponentially Weighted Moving Average". This is essentially the LTM for current cell unless 1. current cell has not been learned since engine start. 2. in transition between cells see notes 1 and 2 below Notes: 1. The first 90 seconds (115 for idle cells) of fuel trim learning in each fuel trim cell are not considered usable, and are not updated in EWMA. This is to allow the fuel control system time to learn the cell's long term fuel trim. 2. One (1) second of data is not updated to EWMA after switching fuel trim cells. This is to allow the fuel control system time to transition to the proper long-term fuel trim for the new cell. 3. The intrusive test consists of a minimum of two 10-sec purge-off segments, (until 2 fails, or 2 passes are collected). Segments are at the most 60 sec long, but can be as small as 10 sec if the cell is already learned. Segments are separated by a purge period that is 10 sec long or until 5 grams of purge flow, whichever is smaller. 4. The excess vapor test is allowed to continue until a different cell. 5. At the conclusion of an	• No Misfire, O2 Sensor, EVAP, Fuel Injector, IAC, MAF, MAP, EGR, A.I.R DTC's • Engine speed > 400 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -40°C but < 127°C • MAP > 5 kpa • IAT > -20°C • Mass Airflow > 0.5 g/s • Vehicle speed < 134 kph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in a Decel Fuel Trim Cell • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test (Canister DC > 2% & canister vent valve closed). • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) • EWMA has accumulated at least 10 sec of usable data since engine start (10 sec after fuel control system learns first cell) <u>Enable Conditions for Excess Vapor Test</u> • The EWMA of long term fuel trim (LTM) samples ≤ 0.78 (with or w/out purge) (This test uses passive data if enough purge-off data was collected, otherwise it collects purge-off data intrusively.) <u>Enable Conditions for Excess Vapor Passive Test</u> • Purge-off EWMA of long term fuel trim has collected data for at least 10 sec . • Purge-off EWMA of long term fuel trim has collected data for at least 10 sec at a coolant temperature ≥ -40 °C <u>Enable Conditions for Excess Vapor Intrusive Test</u> • Purge valve control is not overridden by	1 test failure if excess vapor test was based on passively collected purge-off data. 2 test failures/3 tests if excess vapor test was based on intrusively collected purge-off data. <u>Frequency:</u> Continuous 100 ms loop (but reporting pass/fails is done every 2 sec, or instantly at conclusion of an excess vapor test)	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel System Too Lean Bank 2	**P0174**	Determines if the fuel control system is in a lean condition.	The EWMA of long term fuel trim (LTM) samples ≥ 1.24 Note: EWMA stands for "Exponentially Weighted Moving Average". This is essentially the LTM for current cell unless 3. current cell has not been learned since engine start. 4. in transition between cells see notes 1 and 2 below Notes: 3. The first 90 seconds (115 for idle cells) of fuel trim learning in each fuel trim cell are not considered usable, and are not updated in EWMA. This is to allow the fuel control system time to learn the cell's long term fuel trim. 4. One (1) second of data is not updated to EWMA after switching fuel trim cells. This is to allow the fuel control system time to transition to the proper long-term fuel trim for the new cell.	• No Misfire, O2 Sensor, EVAP, Fuel Injector, IAC, MAF, MAP, EGR, A.I.R DTC's • Engine speed > 400 rpm but < 6000 rpm • BARO > 70kpa • ECT > -40°C but < 127°C • MAP > 5 kpa • IAT > -20 °C • Mass Airflow > 0.5 g/s • Vehicle speed < 134 kph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in a Decel Fuel Trim Cell • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test (Canister DC > 2% & canister vent valve closed). • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) • EWMA has accumulated at least 10 sec of usable data since engine start (10 sec after fuel control system learns first cell)	1 test failures Frequency: Continuous 100 ms loop	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel System Too Rich Bank 2	**P0175**	Determines if the fuel control system is in a rich condition.	The Purge-Off EWMA of long term fuel trim (LTM) samples ≤ 0.78 at the conclusion of a Excess Vapor Test Note: EWMA stands for "Exponentially Weighted Moving Average". This is essentially the LTM for current cell unless 3. current cell has not been learned since engine start. 4. in transition between cells see notes 1 and 2 below Notes: 6. The first 90 seconds (115 for idle cells) of fuel trim learning in each fuel trim cell are not considered usable, and are not updated in EWMA. This is to allow the fuel control system time to learn the cell's long term fuel trim. 7. One (1) second of data is not updated to EWMA after switching fuel trim cells. This is to allow the fuel control system time to transition to the proper long-term fuel trim for the new cell. 8. The intrusive test consists of a minimum of two 10-sec purge-off segments, (until 2 fails, or 2 passes are collected). Segments are at the most 60 sec long, but can be as small as 10 sec if the cell is already learned. Segments are separated by a purge period that is 10 sec long or until 5 grams of purge flow, whichever is smaller. 9. The excess vapor test is allowed to continue until a cell. 10. At the conclusion of an	• No Misfire, O2 Sensor, EVAP, Fuel Injector, IAC, MAF, MAP, EGR, A.I.R DTC's • Engine speed > 400 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -40°C but < 127°C • MAP > 5 kpa • IAT > -20°C • Mass Airflow > 0.5 g/s • Vehicle speed < 134 kph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in a Decel Fuel Trim Cell • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test (Canister DC > 2% & canister vent valve closed). • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) • EWMA has accumulated at least 10 sec of usable data since engine start (10 sec after fuel control system learns first cell) <u>Enable Conditions for Excess Vapor Test</u> • The EWMA of long term fuel trim (LTM) samples ≤ 0.78 (with or w/out purge) (This test uses passive data if enough purge-off data was collected, otherwise it collects purge-off data intrusively.) <u>Enable Conditions for Excess Vapor Passive Test</u> • Purge-off EWMA of long term fuel trim has collected data for at least 10 sec . • Purge-off EWMA of long term fuel trim has collected data for at least 10 sec at a coolant temperature ≥ -40 °C <u>Enable Conditions for Excess Vapor Intrusive Test</u> • Purge valve control is not overridden by	1 test failure if excess vapor test was based on passively collected purge-off data. 2 test failures/3 tests if excess vapor test was based on intrusively collected purge-off data. <u>Frequency:</u> Continuous 100 ms loop (but reporting pass/fails is done every 2 sec, or instantly at conclusion of an excess vapor test)	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel Injector 1 Control Circuit	**P0201**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 2 Control Circuit	**P0202**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 3 Control Circuit	**P0203**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 4 Control Circuit	**P0204**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 5 Control Circuit	**P0205**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 6 Control Circuit	**P0206**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B
Fuel Injector 7 Control Circuit	**P0207**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Fuel Injector 8 Control Circuit	**P0208**	circuit continuity	Injector Driver feedback indication = fault	Ignition voltage > 11.5 for 5 seconds ALDL mode $AE state = inactive	10 failures out of 20 samples frequency: 250 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	**P0300** **P0301** **P0302** **P0303** **P0304** **P0305** **P0306** **P0307** **P0308**	These DTC 's will determine if a random misfire or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index Vs Engine Speed Vs Load and Camshaft Position Emission Failure Threshold = 2.08 % Misfire Catalyst Damage Threshold = 5% - 11.25% Misfire depending on engine speed and engine load.	• Engine run time > 2 crankshaft revolutions • DTCs not active for VSS, CKP, TP, MAP, ECT, MAF, and IAT sensors. • P0315 (Crankshaft Position System Variation Not Learned) not active or engine speed < 1000 RPM. • Fuel cutoff not active. • Power management is not active. • Brake torque management not active. • Drag Control not active. • Fuel level > 8 %. Disablement ends 200 engine cycles, after a low fuel level condition ceases, and fuel disable does not occur with a fuel sensor DTC. • -7 °C < ECT < 129 °C. • If ECT at startup < -7 °C, then disable until ECT > 21 °C. • 500 RPM < Engine speed < 6500 RPM. • 9 volts < System voltage < 18 volts. • + Throttle position delta < 16 % per 100 ms. • - Throttle position delta < 14 % per 100 ms. • Abnormal engine speed is not present. • Excess Engine Acceleration is not present. • ABS rough road not detected. • ABS is not active, TCS is not active. • Positive and zero torque (except the CARB approved 3000 rpm to redline triangle). Positive and zero torque is detected when both is true: 1) engine load > zero torque cal (cal a function of engine speed and temperature), and 2) TP > 1.6% or VSS < 30 KPH. • Detectable engine speed and engine load region. • EGR Intrusive test not active. • AIR Intrusive test not active. • CAM sensor is in sync with CKP sensor. • Misfire Diag is not requesting to disable TCC when transmission is in hot mode. • Crankshaft Ring Filter inactive (after a low level misfire, another misfire may not be detectable until crankshaft ringing ceases)	Emission Exceedence = (5) failed 200 revolution blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 revolution block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = Number of 200 revolution blocks as data supports for catalyst damage. 2nd and subsequent Catalyst Exceedences = (1) 200 revolution block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP. Frequency: Continuous	DTC Type B (MIL Flashes with Catalyst Damaging Misfire)

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Crankshaft Position System Variation Not Learned	**P0315**	The DTC will determine if the Crankshaft Position System Variation has not been learned.	Sum of compensation factors not within range	PCM state = run Manufacturers enable counter must be Zero.	0.50 sec 100ms loop continuous	DTC Type A
Knock Sensor Circuit	**P0325**	rationality	Knock sensor voltage >4.8V	Ignition 1 voltage ≥ 11 volts Air per Cylinder (load) > 176g	35 failures out of 40 frequency: 1.0 s cont.	DTC Type B
Knock Sensor Circuit Excessive Spark Retard	**P0326**	performance check	Knock total retard ≥ a value f(MAP, RPM)	Knock detection = enabled Engine Speed > 500 rpm MAP > 56 kpa	35 failures out of 40 samples frequency: 100 msec cont.	DTC Type B
Knock Sensor Circuit Low Voltage - Bank 1	**P0327**	range check	Knock sensor background noise ≤ 0.20V	Ignition 1 Voltage ≥ 11V Engine Speed ≥ 2016 RPM	35 failures out of 40 frequency: 1.0 s cont.	DTC Type B
Knock Sensor Circuit Low Voltage - Bank 2	**P0332**	range check	Knock sensor background noise ≤ 0.20V	Ignition 1 Voltage ≥ 11V Engine Speed ≥ 2016 RPM	35 failures out of 40 frequency: 1.0 s cont.	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE

Crankshaft Position Sensor-A Circuit	**P0335**	CKP Event Test:
		Incorrect number of CKP sensor pulses in a given number of CMP sensor pulses (CKP Circuit Diagnostic)
		
		CKP Time Without Match Test:
		Excessive time without CKP sensor Match (CKP Circuit Diagnostic)
			CKP Event Test:
			Number-of-CKP-pulses < 47 OR > 49
			
			CKP Time Without Match Test:
			See 'TIME LENGTH AND FREQUENCY' column
				CKP Event Test:
				IF[(Engine_Running = TRUE OR Engine_Cranking = TRUE) AND (Primary_Cam_Sync_Flag = CAM_SIDE OR Primary_Cam_Sync_Flag = CAM_CYLINDER) AND Fault_Active[Primary_Cam-Ckt] = FALSE AND Fault_Active[Primary_Cam-Perf] = FALSE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
				
				CKP Time Without Match Test:
				IF[(Engine_Running = TRUE OR Engine_Cranking = TRUE) AND (Engine_Speed_Defaulted < 6500) AND {(Cranking_Motor_Is_Engaged = TRUE AND MAF ≥ 0) OR (MAF ≥ 3) }]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					CKP Event Test:
					One Test = 1 CMP sensor pulse.
					Fail Report = (1) If Crank_Sync_Flag ≠ Crank_In_Sync then 8 out of the last 10 tests exceed malfunction criteria, else (2) 8 out of the last 10 tests exceed malfunction criteria
					
					CKP Time Without Match Test:
					Fail Report During Engine Crank = Match has not occurred within the last 2 seconds.
					Fail Report During Engine Run = Match has not occurred within the last .4 seconds
						DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE

Crankshaft Position Sensor-A Performance	**P0336**	CKP Excessive Resyncs Test:
		Excessive number of CKP Resyncs
			CKP Excessive Resyncs Test:
			See 'TIME LENGTH AND FREQUENCY' column
				CKP Excessive Resyncs Test:
				IF[Engine_Running = TRUE OR Engine_Cranking = TRUE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					CKP Excessive Resyncs Test:
					Fail Report = 5 CKP Resyncs occur within 10 seconds
						DTC Type B

Camshaft Position Sensor-A Bank-1 Circuit	**P0340**	Detects CMP sensor circuit malfunctions by monitoring for the absence of CMP sensor pulses (CMP sensor Circuit Diagnostic)	See 'TIME LENGTH AND FREQUENCY' column	IF[MAF ≥ 0 AND
				[(Engine_Cranking = TRUE AND Cam_Sync_Flag ≠ CAM_CYLINDER) OR Engine_Running = TRUE]]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					Fail Report = 1 sensor pulse do NOT occur within 3 Seconds	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE

Camshaft Position Sensor-A Bank-1 Performance	**P0341**	Detects CMP sensor performance malfunctions by monitoring for the incorrect number of CMP sensor pulses in a given number of CKP sensor pulses (CMP sensor Performance Diagnostic)	After Engine Start (CMP Slow Event Based Test):
			Number-of-CMP-pulses < 90 OR > 110
			Near Engine Start (CMP Fast Event Based Test):
			Number-of-CMP-pulses < 1 OR > 1
				After Engine Start (CMP Slow Event Based Test) :
				IF[
				CKP_MedRes_Active = TRUE AND
				Crank_Sync_Flag = Crank_In_Sync AND
				Fault_Active[P0340] = FALSE AND
				Fault_Active[P0335] = FALSE
				ANDFault_Active[P0385] = FALSE
				ANDFault_Active[P1372] = FALSE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
				
				Near Engine Start (CMP Fast Event Based Test):
				IF[MedRes_CKP_Counter ≤ 16 AND
				CKP_MedRes_Active = TRUE AND
				Crank_Sync_Flag = Crank_In_Sync AND
				CAM_TYPE ≠ CSI_CAM AND
				Fault_Active[CMP-Ckt] = FALSE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
				
				Footnote = The CKP_MedRes_Counter increments when the diagnostic is enabled and counts the number of CKP MedRes software interrupts. ECM thru-put prohibits interrupting on every CKP sensor pulse. Typical CKP MedRes software interrupts occur twice per cylinder, put varies in each engine
					After Engine Start (CMP Slow Event Based Test):
					One Test = 1600 MedRes software interrupts (Footnote).
					Fail Report = 8 Failed-Tests out of the last 10 Tests
					
					Near Engine Start (CMP Fast Event Based Test):
					One Test = 16 MedRes CKP software interrupts (Footnote).
					Fail Report = One Failed Test.
					
					Footnote = CKP MedRes software interrupts occur in a certain number of CKP sensor pulses. ECM thru-put prohibits interrupting on every CKP sensor pulse. Typically occurs twice per cylinder, put each engine varies.
						DTC Type B

Ignition Coil 1 Control Circuit	**P0351**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Ignition Coil 2 Control Circuit	**P0352**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 3 Control Circuit	**P0353**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 4 Control Circuit	**P0354**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 5 Control Circuit	**P0355**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 6 Control Circuit	**P0356**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 7 Control Circuit	**P0357**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B
Ignition Coil 8 Control Circuit	**P0358**	This DTC detects when the circuit is shorted to ground Circuit check	Fault flag indicated.	Ignition 1 is powered	5 failures for 10 cylinder events	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Crankshaft Position Sensor-B Circuit	**P0385**	CKP Event Test: Incorrect number of CKP sensor pulses in a given number of CMP sensor pulses (CKP Circuit Diagnostic) CKP Time Without Match Test: Excessive time without CKP sensor Match (CKP Circuit Diagnostic)	CKP Event Test: Number-of-CKP-pulses < 47 OR > 49 CKP Time Without Match Test: See 'TIME LENGTH AND FREQUENCY' column	CKP Event Test: IF[(Engine_Running = TRUE OR Engine_Cranking = TRUE) AND (Primary_Cam_Sync_Flag = CAM_SIDE OR Primary_Cam_Sync_Flag = CAM_CYLINDER) AND Fault_Active[Primary_Cam-Ckt] = FALSE AND Fault_Active[Primary_Cam-Perf] = FALSE] THEN ENABLE DIAGNOSTIC ELSE DISABLE DIAGNOSTIC ENDIF CKP Time Without Match Test: IF[(Engine_Running = TRUE OR Engine_Cranking = TRUE) AND (Engine_Speed_Defaulted < 6500) AND {(Cranking_Motor_Is_Engaged = TRUE AND MAF ≥ 0) OR (MAF ≥ 3) }] THEN ENABLE DIAGNOSTIC ELSE DISABLE DIAGNOSTIC ENDIF	CKP Event Test: One Test = 1 CMP sensor pulse. Fail Report = (1) If Crank_Sync_Flag ≠ Crank_In_Sync then 8 out of the last 10 tests exceed malfunction criteria, else (2) 8 out of the last 10 tests exceed malfunction criteria CKP Time Without Match Test: Fail Report During Engine Crank = Match has not occurred within the last 2 seconds. Fail Report During Engine Run = Match has not occurred within the last .4 seconds	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE

Crankshaft Position Sensor-B Performance	**P0386**	CKP Excessive Resyncs Test:
		Excessive number of CKP Resyncs
			CKP Excessive Resyncs Test:
			See 'TIME LENGTH AND FREQUENCY' column
				CKP Excessive Resyncs Test:
				IF[Engine_Running = TRUE OR Engine_Cranking = TRUE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					CKP Excessive Resyncs Test:
					Fail Report = 5 CKP Resyncs occur within 10 seconds
						DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Exhaust Gas Recirculation -- Insufficient Flow Detected	**P0401**	During a closed throttle decel condition, the EGR valve is normally closed. This diagnostic opens the valve to a pre-determined position, and the change in MAP is computed. This change in MAP correlates to the flow rate of the EGR system.	With EGR valve open, the peak + MAP Δ is monitored over a period of time. This value is compared with a threshold from Engine Speed vs Baro table and the difference computed. The result is statistically filtered (EWMA) and compared to a decision limit. DTC is set when the filtered result exceeds the decision limit of KE_EGRF_Decel_MAP_Change_Thresh	<u>Test Enables</u> No fuel injector DTCs set No CKP DTCs set No TP sensor DTC's set No MAP DTC's set No VSS DTC's set No ETC DTC's set No 5 volt reference DTC's set No IAT sensor DTC's set No ECT sensor DTC's set No IAC DTC's set No EGR Pintle Position DTC set No Misfire DTC's set No MAF DTC's set No Engine Metal Overtemperature Protection Not in Power Take Off (PTO) Mode Not in device control Traction control not active EGR valve icing not occuring EGR valve over temperature not occuring EGR Engine run time expired Not in Power Enrichment Not in Catalyst protection mode ECT > 80°C ECT < 110°C BARO > 70 kpa (9000 Ft) BARO data is valid IAT < 50°C System Voltage < 16V System Voltage> 11V decel fuel cut off status is unchanged Vehicle speed < 75 KPH Vehicle Speed > 37 KPH Throttle Position is virtually closed A/C clutch status is unchanged Transmission status is unchanged <u>Stability Mode Enables</u> EGR Position < 1.19% 700 RPM < Engine Speed < 1200_RPM MAP Δ < 2 kpa 11kpa < Compensated MAP < 50 kpa Throttle Area Delta < 2.99% Difference between desired & actual airflow < 3.79 g/s <u>Intrusive Mode Enables</u> Vehicle Speed Δ < 4.19 KPH	<u>Test Time</u> 2.8 seconds <u>Frequency</u> 100 ms loop Once per trip (typically) Rapid Step Response feature will initiate multiple tests: IF the difference between the current EWMA and the current map diff > 3.23 kpa ANDcurrent map diff > -0.398 kpa THEN 3 tests will be run per trip until 10 tests have been completed Fast Initial Response feature will initiate multiple tests upon code clear: Several tests per trip will run until 15 tests have been completed.	DTC Type A

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Linear EGR Circuit Fault	**P0403**	This DTC checks the Linear EGR circuit for electrical integrity	Output state invalid	Engine is running 8 < system voltage < 16	10 seconds 100ms loop Continuous	DTC Type B
EGR Valve Circuit Performance	**P0404**	This diagnostic detects if the pintle position error is too large	Pintle position error [absolute value of (desired position - actual position)] > 10%	5 Volt reference DTC's not active Engine is running Pintle cleaning not active P0401 not intrusive System voltage ≥ 11V EGR valve icing or over temperature not occurring EGR is enabled Desired EGR position > 0% Δ Desired EGR position < 20 %	90 seconds 100ms loop Continuous	DTC Type B
EGR Valve Position Sensor Circuit Low Voltage	**P0405**	This diagnostic detects if the pintle position feedback circuit is open or shorted to ground	EGR feedback sensor signal < 3.1% of A/D reference voltage	5 Volt reference DTC's not active Engine is running Pintle cleaning not active P0401 not intrusive System voltage ≥ 11V EGR valve icing or over temperature not occurring.	8 seconds 100ms loop Continuous	DTC Type B
EGR Valve Position Sensor Circuit High Voltage	**P0406**	This diagnostic detects if the pintle position feedback circuit is shorted high or if the ground circuit is open.	EGR feedback sensor signal > 95.4% of A/D reference voltage	5 Volt reference DTC's not active Engine is running Pintle cleaning not active P0401 not intrusive System voltage ≥ 11V EGR valve icing or over temperature not occurring.	350 seconds 100ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Secondary Air System	**P0410**	Active Test: HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation	Active Test: HO2S sensor > 150 mv for > 1.5 seconds or fuel integrator delta of < 0.054 when pump turned on during closed loop operation.	General Enable: No MAF DTC's set No MAP DTC's set No IAT DTC's set No ECT DTC's set No TP sensor DTC's set No HO2S DTC's set No Injector DTC's set No Misfire DTC's set No CKP DTC's set No EGR DTC's set No Fuel Trim DTC's set No IAC DTC's set No AIR pump relay DTC's set No AIR Solenoid DTC's set No EVAP DTC's set 5°C < IAT < 72.5°C 5°C < ECT < 108.5°C 5°C < Power Up ECT < 80°C Manifold Vacuum > 30 kpa Ignition voltage > 10.2V for a time > 10 seconds Engine Run Time > 2 seconds Airflow < 75 g/s 14.9%< Engine load < 79.9% ∆TPS < 9.9% Power Enrichment, Converter Over Temperature, Decel Fuel Cut Off Not Active Active Test: A/F State = Closed Loop Fuel integrator > 0.95 & < 1.05 BLM cell is valid RPM > 1000 RPM Engine Load < 79.9% Manifold Vacuum > 30 kpa	Active Test: 3 seconds Up to 3 times per trip if passive test fails or is inconclusive.	DTC Type B
Secondary AIR Solenoid Relay Control Circuit - Bank 1	**P0412**	This DTC checks the AIR Solenoid Relay circuit for electrical integrity	Output state invalid	Engine is running 8 < system voltage < 16	10 seconds 100 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Secondary AIR Pump Relay Control Circuit - Bank 1	**P0418**	This DTC checks the AIR Pump Relay circuit for electrical integrity	Output state invalid	Engine is running 8 < system voltage < 16	10 seconds 100 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Catalyst Low Efficiency - Bank 1	**P0420**	Oxygen Storage	OSC Time Difference ≥ .687 sec OSC Time Difference = OSC Worst Pass Thresh - OSC Compensation Factor * (Post Cat O2 Resp Time - Pre Cat O2 Resp Time) OSC Worst Pass Thresh = 4.375 sec	Trip Enable Criteria • No AIR DTC'c • No Misfire DTC's • No ECT DTC's • No VSS DTC's • No Fuel Trim DTC's • No TPS DTC's • No IAC DTC's • No MAP DTC's • No IAT DTC's • No MAF DTC's • No O2 Sensor DTC's • No Purge System DTC's Valid Idle Period Criteria • Engine Speed ≥ 800 rpm for minimum of 40 sec since end of last idle period • Engine Runtime ≥ 600 sec • Vehicle Speed ≤ 2 mph Test Enable Conditions • Closed loop fuel control • Fan clutch is stable • A/C clutch is stable • 300 °C ≤ Predicted Catalyst Temperature ≤ 425 °C • Barometric Pressure ≥ 74 kPa • -15 °C < IAT< 200 °C • 70 ≤ ECT ≤ 120 °C • System Voltage > 9 V • 0 < Idle Time ≤ 60 sec ⇒ Idle Time is incremented if: Vehicle Speed < 2 mph & Throttle Position ≤ 2 % • 3 ≤ Airflow ≤ KE_CATD_12 gps • Delta Throttle Position ≤ 1 % • % Engine Load Change while Fuel Control is Active ≤ 4 % • No other intrusive diagnostics active • Front O2 Sensor switches during stabilization > 2 • .94 ≤ Short Term Integrator Multiplier ≤ 1.06 • Delta RPM ≤ 200 RPM • (Actual RPM - Desired RPM) ≤ 125 rpm • (Desired RPM - Actual RPM) ≤ 125 rpm • CCP DC Multiplier ≤ 1 • Fuel Ethanol Percent ≤ 85 % • Tests Attempted this idle period < 1 Green Converter Delay Criteria • Predicted catalyst temperature ≥ 500 °C for 3600 sec (non-continuously) when vehicle is	1 test attempted per valid idle period Minimum of 1 test per trip. Rapid Step Response Maximum of 6 tests per trip. Maximum of 18 tests to detect failure when Rapid Step Response is enabled Frequency: Execution Rate 12.5 ms	DTC Type A

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Evap. Emission System Leak Detection (Small Leak)	**P0442**	This DTC will detect a small leak in the evap system between the fuel fill cap and up to the purge solenoid.	.040" EWMA Value > 0.031006 in. dia. OR 0.02" EWMA Value > 0.013504 in. dia.	General Test Enable: No IAT DTC's active No MAP DTC's active No TPS DTC's active No Vehicle Speed sensor DTC's active No ECT sensor DTC's active No EVAP output circuit DTC's active No Fuel Tank Pressure Sensor DTC's active DTC P0125 not active 15 % < Fuel Level < 85 % 10 V < System Voltage < 18 V 4 °C < IAT < 30 °C Baro > 74 kPa (8000 ft) Engine Coolant Temp. < 30 °C Startup (ECT – IAT) < 8 °C Vehicle Speed < 161 kph (0.02" leak only) [ΔVacuum Slosh < 0.36-0.81" H2O based on fuel level OR ΔFuel Slosh < 1.50-2.76% based on fuel level OR ΔVSS Slosh < 15 kph] If these occur, test will try to run again [ΔVacuum Slosh < 0.16-0.61" H2O based on fuel level OR ΔFuel Slosh < 1.00-2.26% based on fuel level OR ΔVSS Slosh < 10 kph] If these occur, the 0.02" EWMA will not be updated	Once per cold start. Test time is dependent on driving conditions. Max engine run time before test abort is 780 seconds	DTC Type A
Canister Purge Circuit Fault	**P0443**	This DTC checks the canister purge solenoid circuit for electrical integrity	Output state invalid	8V < System Voltage < 16V V	10 seconds 100 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Evap. Emission Control System - Vent Control Malfunction	**P0446**	This DTC will determine if a restriction is present in the vent solenoid, vent filter, vent hose or canister.	Fuel Tank Vacuum > 10" H2O for 5 seconds BEFORE Purge Volume > 6 liters OR Fuel Tank Vacuum < -2.5" H2O or Fuel Tank Vacuum > 5 " H2O for 15 seconds	No IAT DTC's active No MAP DTC's active No TPS DTC's active No Vehicle Speed sensor DTC's active No ECT sensor DTC's active No EVAP output circuit DTC's active No Fuel Tank Pressure Sensor DTC's active DTC P0125 not active 15 % < Fuel Level < 85 % 10 V < System Voltage < 18 V 4 °C < IAT < 30 °C Engine Coolant Temp < 30 °C Baro > 74 kPa (8000 ft)	Once per trip. Test time is dependent on driving conditions.	DTC Type B
Fuel Tank Vent Circuit Fault	**P0449**	This DTC checks the fuel tank vent solenoid circuit for electrical integrity	Output state invalid	8V < System Voltage < 16 V	10 seconds 100 ms loop Continuous	DTC Type B
Evap. Fuel Tank Pressure Sensor Circuit Low Voltage	**P0452**	This DTC will detect a vacuum sensor signal that is too low out of range.	Fuel Tank Pressure Sensor Circuit Voltage < 0.099609 volts for 80 out of 100 samples	0.1 second delay after sensor power-up for sensor warm up.	8 to 10 seconds continuous. frequency: Runs continuously every 100 ms after delay period for sensor warm-up.	DTC Type B
Evap. Fuel Tank Pressure Sensor Circuit High Voltage	**P0453**	This DTC will detect a vacuum sensor signal that is too high out of range.	Fuel Tank Pressure Sensor Circuit Voltage > 4.900391 volts for 80 out of 100 samples	0.1 second delay after sensor power-up for sensor warm up.	8 to 10 seconds continuous. frequency: Runs continuously every 100 ms after delay period for sensor warm-up.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Evap. Emission Control System - Malfunction	**P0455**	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the Evap. system.	Purge Volume > 10 liters BEFORE Fuel Tank Vacuum > 8.0 “H2O	General Test Enable: No IAT DTC's active No MAP DTC's active No TPS DTC's active No Vehicle Speed sensor DTC’s active No ECT sensor DTC’s active No EVAP output circuit DTC’s active No Fuel Tank Pressure Sensor DTC’s active DTC P0125 not active 15 % < Fuel Level < 85 % 10 V < System Voltage < 18 V 4 °C < IAT < 30 °C Baro > 74 kPa (8000 ft) Engine Coolant Temp. < 30 °C Startup (ECT – IAT) < 8 °C	Once per cold start. Test time is dependent on driving conditions. Max engine run time before test abort is 780 seconds	DTC Type B
Fuel Level Sensor Circuit Performance	**P0461**	rationality check	Fuel level delta < 3.7 ~~2~~ liters within 80kilometers	No fuel level DTC’s set 11 volts< system voltage < 16 volts	12.5 ms Continuous	DTC Type C
Fuel Level Sensor Circuit Low Input	**P0462**	This diagnostic will detect a fuel sender failed to a low voltage level.	Output voltage amplitude is low and stays constant	Discrete: Fuel level input < 6.5% 11 volts< system voltage < 16 volts OR ClassII Communication between the cluster and PCM is lost Default to gauge: 0 % Default to evap and misfire: 40%	12.5 ms Continuous Failed for 10 consecutive seconds	DTC Type C
Fuel Level Sensor Circuit High Input	**P0463**	This diagnostic will detect a fuel sender failed to a high voltage level.	Output voltage amplitude is high and stays constant	Discrete: Fuel level input > 62.1% 11 volts< system voltage < 16 volts OR ClassII Communication between the cluster and PCM is lost Default to gauge: 0% Default to evap and misfire: 40%	12.5 ms Continuous Failed for 60 consecutive seconds	DTC Type C

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Engine Cooling Fan Relay 1 Control Circuit	**P0480**	This DTC checks the Engine cooling fan relay 1 circuit for electrical integrity	Output state invalid	8V < System Voltage < 16 V Engine Speed > 425RPM	10 seconds 100 ms loop Continuous	DTC Type B
Engine Cooling Fan Relay 2 Control Circuit	**P0481**	This DTC checks the Engine cooling fan relay 2 circuit for electrical integrity	Output state invalid	8V < System Voltage < 16 V Engine Speed > 425RPM	10 seconds 100 ms loop Continuous	DTC Type B
Evap. Emission Control System - Continuous Open Purge Flow	**P0496**	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.	Fuel Tank Vacuum > 10” H2O for 5 seconds before purge time > 60 sec	No IAT DTC's active No MAP DTC's active No TPS DTC's active No Vehicle Speed sensor DTC’s active No ECT sensor DTC’s active No EVAP output circuit DTC’s active No Fuel Tank Pressure Sensor DTC’s active DTC P0125 not active 15 % < Fuel Level < 85 % 10 V < System Voltage < 18 V 4 °C < IAT < 30 °C Engine Coolant Temp < 30°C Baro > 74 kPa (8000 ft)	Once per trip. Max engine run time is 65 sec	DTC Type B
Vehicle Speed Sensor Circuit Low	**P0502**	Circuit check - low input			3 sec. Frequency: 25 ms cont.	DTC Type B
Vehicle Speed Sensor Intermittent Performance	**P0503**	This diagnostic detects unrealistically large ΔVSS with no gear range change -- rationality			1.0 sec. Frequency: 25 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Idle System Low	**P0506**	functional check	Idle rpm > 100 rpm below desired rpm based on coolant temperature. or idle spark > 12.3 degrees	General Test Enable:No MAF DTC's. No MAP DTC's. No IAT DTC's. No ECT DTC's No TP sensor DTC's. No injector fault DTC's. No VS sensor DTC's. No EGR pintle pos. DTC. No purge flow DTC's. No crank sensor DTC's. EGR diagnostic test not in progress. 10.5 ≤ System volt ≤18 volts. IAT ≥ -18 °C BARO ≥ 70 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 40 sec. Closed loop fueling enabled Idle test: General conditions met. Idle conditions present > 2 seconds Time since a transition to or from park/neutral > 3 sec.. Time since TCC mode change > 3 sec.	3 failed tests required to set fault 3 seconds per test frequency: 250 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Idle System High	**P0507**	functional check	Idle rpm > 100 RPM above desired RPM based on coolant temperature. or idle spark < -13.7 degrees	General Test Enable: No MAF DTC's . No MAP DTC's . No IAT DTC's . No ECT DTC's . No TP sensor DTC's . No injector fault DTC's . No VS sensor DTC's . No EGR pintle pos. DTC . No purge flow DTC's . No crank sensor DTC's . EGR diagnostic test not in progress. 10.5 ≤ System volt ≤18 volts. IAT ≥ -18 °C BARO ≥ 70 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 40 sec. Closed loop fueling enabled Idle test: General conditions met. Idle conditions present > 2 secondsTime since a transition to or from park/neutral > 3 sec.. Time since TCC mode change > 3 sec.	3 failed tests required to set fault 3 seconds per test frequency: 250 ms cont.	DTC Type B
PCM Memory	**P0601**	functional check	Computed EPROM checksum not equal to expected	None	1 failure during the first execution 5 failures thereafter Background loop cont.	DTC Type A
PCM not Programmed	**P0602**	functional check	Calibration parameter not equal to expected value	None	1 failure 250 ms cont.	DTC Type A

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
PCM Memory - RAM	**P0604**	functional check	Bad RAM location found		100 failure if found during first test in ignition cycle. 2 failures if found during subsequent tests in the ignition cycle. Continuous	DTC Type A
5 Volt Reference A Circuit	**P0641**	This DTC detects a problem with the 5 volt reference A circuit	5 volt reference is too high or too low. Determined by the HW IO	Ignition On	200 fails out of 240 samples 100 ms	DTC Type B
Malfunction Indicator Lamp (MIL) Control Circuit	**P0650**	This DTC checks the Malfunction Indicator Lamp circuit for electrical integrity	Output state invalid	8V < System Voltage < 16 V Engine Speed > 425 RPM	10 seconds 100 ms loop Continuous	DTC Type B
5 Volt Reference B Circuit	**P0651**	This DTC detects a problem with the 5 volt reference B circuit	5 volt reference is too high or too low. Determined by the HW IO	Ignition On	200 fails out of 240 samples 100 ms	DTC Type B
	P0705					DTC Type B
A/T Input Speed Sensor Circuit Performance	**P0716**	Detects large ΔISS -- rationality		No SSA sol. DTC's failing No VSS DTC's failing No TP sensor DTC's failing No ISS low DTC fault act. or act. this key on SSA stuck on code counters = 0 Transmission in D4 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. Throttle Position ≥ 12% Vehicle speed ≥ 16 kph Raw ISS > 1050 RPM ≥ 2.0 sec Raw +ΔISS ≤ 500 ≥ 2.0 sec 8 V ≤ System Voltage ≤ 18 V	1.0 sec. Frequency: 25 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
A/T Input Speed Sensor Circuit No Activity	**P0717**	range check - low		No IMS DTC failing No VSS DTC's failing Vehicle speed > 16 kph Transmission Range ≠ Park or Neutral 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec 8V ≤ System Voltage ≤ 18V	6 sec. Frequency: 100 ms cont.	DTC Type B
Torque Converter Clutch System Performance - Stuck Off	**P0741**	Detects high torque converter slip when TCC is commanded on -- rationality		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No TCC Stuck on DTC failing No TCC Electrical DTC failing TCC capacity ≥ 0% ≥ 5 sec No Engine Torque Default Transmission range = D2, D3, or D4 10% ≤ Throttle position ≤ 50% 20° C. ≤ Transmission Fluid Temp. ≤ 133° C. 43 N-m ≤ Engine Torque ≤ 215 N-m 450 ≤ Engine RPM ≤ 7500 ≥ 5.0 sec TCC Pressure ≥ 450 kPa ≥ 5.0 sec. Last manual range Δ ≥ 6 sec.	5 sec. Fail test count ≥ 1 Frequency: 100 ms cont.	DTC Type B
Torque Converter Clutch System Performance - Stuck On	**P0742**	Detects low converter slip when TCC commanded off -- rationality		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No TCC Stuck off DTC failing No TCC Electrical DTC failing TCC is commanded OFF No Engine Torque Default Transmission is in D4, not in 1st gear 14% < Throttle position ≤ 90% 180 N-m ≤ Delivered Torque ≤ 294 N-m 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec 20° C. < Transmission Fluid Temp. < 133° C. 500 ≤ Engine RPM ≤ 5500 16 kph ≤ Vehicle Speed ≤ 130 kph 0.65 ≤ Diagnostic Trans. Ratio ≤ 1.05	5 sec. Fail Test count ≥ 2 Frequency: 100 ms cont.	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Shift Solenoid A Circuit Performance	**P0751**	This DTC detects when 1-2 shift solenoid is stuck off		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No Shift Solenoid Electrical DTC failing No Engine Torque Default Vehicle Speed ≥ 8 kph Transmission is in D4, D3, D2, or D1 20° C. < Transmission Fluid Temp. < 133° C Throttle position ≥ 7.5% 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 80 N-m ≤ Engine Torque ≤ 395 N-m	Case 1. 1.5 sec. Case 2. 4.0 sec. Frequency: 100 ms cont.	DTC Type B
Shift Solenoid A Circuit Performance	**P0752**	This DTC detects when 1-2 shift solenoid is stuck on		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No Shift Solenoid Electrical DTC failing No Engine Torque Default Vehicle Speed ≥ 8 kph Transmission is in D4, D3, D2, or D1 20° C. < Transmission Fluid Temp. < 133° C Throttle position ≥ 7.5% 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 80 N-m ≤ Engine Torque ≤ 395 N-m	Case 1. 2.0 sec. Case 2. 4.0 sec. Frequency: 100 ms cont.	DTC Type B
Shift Solenoid B Circuit Performance	**P0756**	This DTC detects when 2-3 shift solenoid is stuck on		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No Shift Solenoid Electrical DTC failing Transmission is in D4, D3, D2, or D1 No Engine Torque Default 20° C. ≤ Transmission Fluid Temp. ≤ 133° C. 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec.	Case 1. 1.0 sec. Case 2. 0.5 sec. Frequency: 100 ms cont.	DTC Type A

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Shift Solenoid B Circuit Performance	**P0757**	This DTC detects when 2-3 shift solenoid is stuck off		No IMS DTC failing No VSS DTC failing No TP sensor DTC failing No ISS DTC failing No Shift Solenoid Electrical DTC failing Transmission is in D4, D3, D2, or D1 No Engine Torque Default 20° C. ≤ Transmission Fluid Temp. ≤ 133° C. 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec.	Case 1. 3.0 sec. Case 2. 2.0 sec. Frequency: 100 ms cont.	DTC Type A
Shift Solenoid A Control Circuit - Low Voltage	**P0973**	This DTC detects a continuous open or short to ground in SSA ckt/sensor		High Side Driver 2 enabled 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 8 V ≤ System Voltage ≤ 18 V	43 fails out of 50 samples	DTC Type B
Shift Solenoid A Control Circuit - High Voltage	**P0974**	This DTC detects a continuous short to +12 volts in SSA ckt/sensor		Shift Solenoid A commanded on. 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 8 V ≤ System Voltage ≤ 18 V	43 fails out of 50 samples	DTC Type B
Shift Solenoid B Control Circuit - Low Voltage	**P0976**	This DTC detects a continuous open or short to ground in SSB ckt/sensor		High Side Driver 2 enabled 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 8 V ≤ System Voltage ≤ 18 V	43 fails out of 50 samples	DTC Type B
Shift Solenoid B Control Circuit - High Voltage	**P0977**	This DTC detects a continuous short to +12 volts in SSB ckt/sensor		Shift Solenoid B commanded on. 450 ≤ Engine RPM ≤ 7500 ≥ 5 sec. 8 V ≤ System Voltage ≤ 18 V	43 fails out of 50 samples	DTC Type B
Intake Rationality Cross-check Out of Range	**P1101**	This DTC determines if there are multiple air induction system problems affecting airflow and/or manifold pressure.	Filtered throttle error > 320 kPa grams per second and Filtered manifold pressure 2 error > 15 kPa and [Filtered manifold pressure 1 error > 20 kPa or Filtered airflow error > 32 grams per second]	No MAF circuit DTCs set No MAP circuit DTCs set No EGR DTCs set No ECT circuit DTCs set No IAT circuit DTCs set No CKP DTCs set 500 RPM < Engine Speed < 6700 RPM 70°C < Engine Coolant Temperature < 121°C -7°C < Intake Air Temperature < ~~60°C~~ 65°C	Immediate Frequency: 12.5 ms loop Continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Insufficient Switching (bank 1 sensor 1)	**P1133**	This DTC determines if the O2 sensor functioning properly by monitoring the number of L/R and R/L switches. Half cycle (HC) switch count is reported if a minimum number of slope time (ST) Switches are counted.	Slope Time L/R switches < 1 OR Slope Time R/L switches < 1 OR Half Cycle L/R switches < 32 OR Half Cycle R/L switches < 32 O2 voltage between 325 millivolts and 625 millivolts	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	65 seconds of response data after enable Once per key cycle	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Transition Time -Difference (bank 1 sensor 1)	**P1134**	This DTC diagnoses degraded slow rich to lean or lean to rich response times.	Difference (mS)of R-L time minus L-R time Transition time difference <-54 OR Transition time difference > 90	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set DTC P1133 (Too Few Switches) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	65 seconds of response data after enable Once per key cycle	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Insufficient Switching (bank 2 sensor 1)	**P1153**	This DTC determines if the O2 sensor functioning properly by monitoring the number of L/R and R/L switches. Half cycle (HC) switch count is reported if a minimum number of Slope time (ST) switches are counted.	Slope Time L/R switches < 1 OR Slope Time R/L switches < 1 OR Half Cycle L/R switches < 32 OR Half Cycle R/L switches < 32 O2 voltage between 325 millivolts and 625 millivolts	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 2 Sensor 1 Voltage DTC's DTC P0155 (O2 Heater) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	65 seconds of response data after enable Once per key cycle	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
HO2S Circuit Transition Time Difference(bank 2 sensor 1)	**P1154**	This DTC diagnoses degraded slow rich to lean or lean to rich response times.	Difference (mS)of R-L time minus L-R time Transition time difference <-54 OR Transition time difference > 90 O2 voltage between 325 millivolts and 625 millivolts	No misfire DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No ECT sensor DTC's No AIR DTC's No Bank 2 Sensor 1 Voltage DTC's DTC P0155 (O2 Heater) not set DTC P1153 (Too Few Switches) not set EGR Flow diagnostic test not active AIR diagnostic test not active Catalyst diagnostic test not active Closed Loop Fuel Enabled 10 volts < Ignition Voltage < 18 volts Engine Run Time > 202 sec. Coolant temp > 75 C 1200 < RPM < 2300 15.0 grams per second < MAF < 30.0 grams per second Throttle position ≥ 3 % Transmission not in Park, Reverse or Neutral Above conditions met for 3.0 seconds.	65 seconds of response data after enable Once per key cycle	DTC Type B
Engine Coolant Overtemperature – Protection Mode Active	**P1258**	activity check	Engine Overtemperature mode activity status = active	None	8 sec. frequency: 500 ms cont.	DTC Type A

Crankshaft Position Sensors Performance	**P1372**	CKP Excessive Resyncs Test:
		Excessive number of CKP Resyncs
			CKP Excessive Resyncs Test:
			See 'TIME LENGTH AND FREQUENCY' column
				CKP Excessive Resyncs Test:
				IF[Engine_Running = TRUE OR Engine_Cranking = TRUE]
				THEN
				ENABLE DIAGNOSTIC
				ELSE
				DISABLE DIAGNOSTIC
				ENDIF
					CKP Excessive Resyncs Test:
					Fail Report = 5 CKP Resyncs occur within 10 seconds
						DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
ABS Rough Road Malfunction	**P1380**	This diagnostic detects if the ABS controller is indicating a fault. When this occurs, misfire will STILL run.	ABS controller sends a message to PCM indicating that a failure has occurred in the ABS module	none	16 failures out of 20 samples	DTC Type C (DTC sets when a P0300 is active)
ABS System Rough Road Detection Communication Fault	**P1381**	This diagnostic detects if the rough road information is no longer being received from the ABS module. When this occurs, misfire will STILL run.	Serial data messages are lost for 5 seconds	none	16 failures out of 20 samples	DTC Type C (DTC sets when a P0300 is active)
EGR Valve Circuit Performance - Actual Position > Commanded Position	**P1404**	This diagnostic detects if the valve is stuck open when commanded closed.	Actual pintle position > 5% of A/D reference voltage from closed position	5 Volt reference DTC's not active Engine is running ~~Pintle cleaning not active~~ P0401 not intrusive System voltage ≥ 11V EGR valve icing or over temperature not occurring. EGR is enabled EGR stroke is enabled Desired EGR position = 0	4 failures for 10 seconds (with pintle movement > 30% for 5 seconds opening time between tests) 100ms loop Continuous	DTC Type B
PCM EEPROM Performance	**P1621**	This DTC detects a hardware error in the PCM non-volatile memory areas.	All blocks of non-volatile memory storage are bad except for the one currently being used.	None	Immediate set. continuous	DTC Type B

ENGINE DIAGNOSTIC PARAMETERS

2005file5a.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUM. TYPE
Control Module Ignition Off Timer Performance	**P2610**	This DTC determines if the ignition off timer has failed.	1. A failure will be reported if the following occurs 3 times: Ignition Off Time < 0 Or Ignition Off Time > 10 2. A failure will be reported if any of the following occur 15 times out of 20 tests: Time since last ignition off timer increment > 1.39375 Current Ignition Off Time < Old Ignition Off Time Time between ignition off timer increments < .575 Time between ignition off timer increments > 1.39375 Current Ignition Off Time - Old Ignition Off Time =1	Test Run This Trip = FALSE Ignition Off Timer Enabled = TRUE -40 < Intake Air Temperature < 125	Frequency: 100 ms loop Continuous	DTC Type B