

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Camshaft Sensor Misinstalled	P0016	1X Signal This diagnostic will determine if the Cam sensor and cam timing have been installed correctly	Cam signal falling edge out of phase -20 or + 70degrees from cam falling edge.	Engine is running – run flag is true No crank position sensor circuit or performance DTC's No Fault Pending CAM Circuit DTC's	4 test failures within a 5 test sample size. Time necessary to complete sample: Varies with engine speed 1 Sample = 1 cam pulse.	DTC Type B
B1S1 Oxygen Sensor Heater Circuit (ODM)	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	Output driver commanded on Ignition switch is in crank or run 10 volts < Ignition Voltage < 18 volts RPM > 425	100 failures out of 120 samples Frequency: 250ms loop Continuous	DTC Type B
B1S2 Oxygen Sensor Heater Circuit (ODM)	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	Output driver commanded on Ignition switch is in crank or run 10 volts < Ignition Voltage < 18 volts RPM > 425	100 failures out of 120 samples Frequency: 250ms loop Continuous	DTC Type B
B2S1 Oxygen Sensor Heater Circuit (ODM)	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	Output driver commanded on Ignition switch is in crank or run 10 volts < Ignition Voltage < 18 volts RPM > 425	100 failures out of 120 samples Frequency: 250ms loop Continuous	DTC Type B
B1S1 Oxygen Sensor Heater Resistance	P0053	Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or out of range (OOR) resistance value.	O2 Heater Resistance < 2.8 ohms OR O2 Heater Resistance > 9.5 ohms (O2 Heater Resistance is corrected to 20 degrees C)	Engine Soak Time > 10 Hours Coolant – IAT < 8°C -30°C < Coolant Temp < 45°C ECM/PCM Internal Engine Off Timer Performance Fault Not Active No ECT faults Active No IAT faults Active	Frequency: Once per valid cold start 12.5mSec Loop 1.0 Sec Loop for reporting	DTC Type B
B1S2 Oxygen Sensor Heater Resistance	P0054	Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or out of range (OOR) resistance value.	O2 Heater Resistance < 8.7 ohms OR O2 Heater Resistance > 20.8 ohms (O2 Heater Resistance is corrected to 20 degrees C)	Engine Soak Time > 10 Hours Coolant – IAT < 8°C -30°C < Coolant Temp < 45°C ECM/PCM Internal Engine Off Timer Performance Fault Not Active No ECT faults Active No IAT faults Active	Frequency: Once per valid cold start 12.5mSec Loop 1.0 Sec Loop for reporting	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
B2S2 Oxygen Sensor Heater Circuit (ODM)	*P0056	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	Output driver commanded on Ignition switch is in crank or run 10 volts < Ignition Voltage < 18 volts RPM > 425	100 failures out of 120 samples Frequency: 250ms loop Continuous	DTC Type B 4 Sensor Systems
B2S1 Oxygen Sensor Heater Resistance	*P0059	Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or out of range (OOR) resistance value.	O2 Heater Resistance < 2.8 ohms OR O2 Heater Resistance > 9.5 ohms (O2 Heater Resistance is corrected to 20 degrees C)	Engine Soak Time > 10 Hours Coolant – IAT < 8°C -30°C < Coolant Temp < 45°C ECM/PCM Internal Engine Off Timer Performance Fault Not Active No ECT faults Active No IAT faults Active	Frequency: Once per valid cold start 12.5mSec Loop 1.0 Sec Loop for reporting	DTC Type B 4 Sensor Systems
B2S2 Oxygen Sensor Heater Resistance	*P0060	Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or out of range (OOR) resistance value.	O2 Heater Resistance < 8.7 ohms OR O2 Heater Resistance > 20.8 ohms (O2 Heater Resistance is corrected to 20 degrees C)	Engine Soak Time > 10 Hours Coolant – IAT < 8°C -30°C < Coolant Temp < 45°C ECM/PCM Internal Engine Off Timer Performance Fault Not Active No ECT faults Active No IAT faults Active	Frequency: Once per valid cold start 12.5mSec Loop 1.0 Sec Loop for reporting	DTC Type B 4 Sensor Systems
MAP/MAF/Throttle Position Correlation	P0068	Detect when manifold absolute pressure and measured airflow do not match estimated engine airflow as established by the TPS	Difference between measured MAP and estimated MAP < 65 kPa Difference between measured MAF and estimated MAF < 75 grams/sec	Engine running No PCM processor, throttle actuation DTCs Both TPS circuits DTCs are set	187.5 msec Continuous in the main processor	DTC Type A
MASS AIR FLOW SYSTEM PERFORMANCE (RATIONALITY)	P0101	This DTC determines if the MAF sensor is stuck within the normal operating range	(Measured Flow – Modeled air Flow) Filtered > 9.5 AND (Measured Manifold Air Pressure – Manifold Model 2 pressure)Filtered > 15	Engine rpm =>550 and <= 5750 MAP sensor high/low DTC's not active EGR DTC's P0401, P0405, and P1404 not active MAF sensor high/low DTC's not active Crank sensor DTC's not active Engine Coolant DTC's not active Intake Air Temp. DTC's not active Engine Coolant > 70 deg C and < 125 deg C Intake Air Temp > -7 deg C and < 125 deg C	Continuous The Mass Air Flow reading and Mass Air Flow calculation are performed during the same 12.5 ms loop	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
MASS AIR FLOW SENSOR CIRCUIT LOW FREQUENCY	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	<u>LOW FREQUENCY TEST:</u> MAF \leq 10 Hz	<u>LOW FREQUENCY TEST</u> Engine Running Engine Speed \geq 300 RPM System Voltage \geq 8 volts The above must be present for a period of time greater than 3 seconds	<u>LOW FREQUENCY TEST:</u> 30 test failures in a 40 test sample. 1 sample every Lo Res event	DTC Type B
MASS AIR FLOW SENSOR CIRCUIT HIGH FREQUENCY	P0103	Detects a continuous short to high in either the signal circuit or the MAF sensor	<u>HIGH FREQUENCY TEST:</u> MAF \geq 13500 Hz	<u>HIGH FREQUENCY TEST:</u> Engine Running Engine Speed \geq 300 RPM System Voltage \geq 8 volts The above must be present for a period of time greater than 3 seconds	<u>HIGH FREQUENCY TEST:</u> 18 test failures in a 24 test sample. 1 sample every Lo Res event	DTC Type B
MAP SENSOR RANGE/ PERFORMANCE (RATIONALITY)	P0106	This DTC determines if the MAP sensor is stuck within the normal operation range	(Measured MAP - Manifold Model 1 pressure) filtered $>$ 15 AND (Measured MAP - Manifold Model 2 pressure) filtered $>$ 15	Engine rpm \Rightarrow 550 and \leq 5750 MAP sensor high/low DTC's not active EGR DTC's P0401,,P0405, and P1404 not active MAF sensor high/low DTC's not active Crank sensor DTC's not active Engine Coolant DTC's not active Intake Air Temp. DTC's not active Engine Coolant $>$ 70 deg C and $<$ 125 deg C Intake Air Temp $>$ -7 deg C and $<$ 125 deg C	Continuous The MAP reading and the Manifold Model calculations are performed in the same LoRes loop	DTC Type B
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW	P0107	This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	Raw MAP $<$.06volts (3 counts)	TP sensor DTC's not active Engine Running Throttle Position is \geq 0% when engine speed is \leq 800 RPM Or Throttle Position is \geq 12.5 % when engine speed is $>$ 800 RPM No 5v ref. DTC's	320 test failures in a 400 test sample. 1 sample/100 ms	DTC Type B
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH	P0108	This DTC detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor	Raw MAP $>$ 4.89 Volts (250 counts)	Cold Start Run Time - Table value in seconds based on Powerup Coolant Temperature <u>Run Test</u> TP sensor DTC's not active Engine Running Throttle Position is \leq 0.996094 % when engine speed is \leq 1200 RPM Or Throttle Position is \leq 20 % when engine speed is $>$ 1200 RPM	320 test failures in a 400 test sample. 1 sample/100 ms	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
INTAKE AIR TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0112	This DTC detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT < 25 ohms	VS sensor DTC's not active Vehicle speed ≥ 40 kph ECT sensor DTC's not active Engine run time > 45 seconds Coolant Temperature < 125°C	25 test failures in a 50test sample 1 sample/sec	DTC Type B
INTAKE AIR TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0113	This DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	Raw IAT > 200,000 ohms	MAF sensor DTC's not active ECT sensor DTC's not active VS sensor DTC's not active Coolant Temperature > 60 °C Mass Air Flow < 15 g/s Vehicle Speed < 11 kph Engine run time > 120 seconds	25 test failures in a 50 test sample. 1 sample/sec	DTC Type B
ENGINE COOLANT TEMP SENSOR RATIONALITY (HIGH-SIDED)	P0116	Detects coolant temp sensor stuck in mid range	A failure will be reported if any of the following occur: ECT at powerup > IAT at powerup by 99.9843°C after a minimum 10 hour soak (fast fail). ECT at powerup > IAT at powerup by 15°C after a minimum 10 hour soak and a block heater has not been detected. ECT at powerup > IAT at powerup by 15°C after a minimum 10 hour soak and the time spent cranking the engine without starting is greater than 10 seconds with the fuel level being above a minimum level of 5%.	No VSS DTC's No IAT DTC's No ECT sensor shorted DTC's ECM/PCM Internal Engine Off Timer Performance DTC not active Non-volatile memory failure has not been detected on power-up. Engine off time > 600 minutes (10 hours) Test run this trip = false Test aborted this trip = false Block heater detection: ECT at powerup > IAT at powerup by 15°C Powerup IAT > -7°C Vehicle driven a minimum of 400 seconds above 15 mph and IAT drops more than 8° C from powerup IAT.	1 failure 200 ms loop	DTC Type B
ENGINE COOLANT TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0117	This DTC detects a continuous short to ground in the ECT signal circuit or the ECT sensor.	Raw ECT < 50 ohms	Engine run time > 60 seconds Or Engine run time < 60 seconds IAT < 0° C	45 test failures in a 50 test sample. 1 sample/sec	DTC Type B
ENGINE COOLANT TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0118	Circuit Continuity This DTC detects a continuous short to high or open in the ECT signal circuit or the ECT sensor.	Raw IAT > 200,000 ohms	Engine run time > 60 seconds Or Engine run time < 60 seconds IAT > 0° C	45 test failures in a 50 test sample. 1 sample/sec Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Position (TP) Sensor 1 Circuit	P0120	Detects a continuous or intermittent short or open in TP sensor #1 circuit	0.275 V > TPS > 4.725 V	Ignition in unlock/accessory, run or crank System voltage>5.23 V No PCM processor, 5 V reference DTCs	20/40 counts; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
TP SENSOR CIRCUIT PERFORMANCE (RATIONALITY)	P0121	The DTC determines if a TPS sensor is stuck within the normal operating range	(The calculated throttle residual from the MAF model and the Manifold Model) filtered > 250	Engine rpm =>550 and <= 5750 MAP sensor high/low DTC's not active EGR DTC's P0401,.P0405, and P1404 not active MAF sensor high/low DTC's not active Crank sensor DTC's not active Engine Coolant DTC's not active Intake Air Temp. DTC's not active Engine Coolant > 70 deg C and < 125 deg C Intake Air Temp > -7 deg C and < 125 deg C	<u>Continuous</u> Calculations are performed every 12.5 ms	DTC Type B
Throttle Position (TP) Sensor 1 Circuit Lo	P0122	Detects a continuous or intermittent OOR lo TPS	TPS < 0.275 V	Ignition in unlock/accessory, run or crank System voltage>5.23 V No PCM processor, 5 V reference DTCs	20/40 counts; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
Throttle Position (TP) Sensor 1 Circuit Hi	P0123	Detects a continuous or intermittent OOR lo TPS	TPS > 4.725 V	Ignition in unlock/accessory, run or crank System voltage>5.23 V No PCM processor, 5 V reference DTCs	20/40 counts; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
COOLANT TEMPERATURE BELOW STAT REGULATING TEMPERATURE	P0128	Under driving conditions, target coolant temperature should be achieved based on amount of cumulative airflow ingested, and based on startup coolant temperature	A table defines maximum cumulative airflow based on startup coolant temperature and IAT at which target coolant temperature must have been reached For -7°C < IAT < 10°C, Target = 55°C For IAT > 10°C, Target = 75°C	12 gps < Airflow < 50 gps Avg airflow > 5gps Engine runtime <1370seconds before test completes Engine runtime > 120 seconds IAT > -7°C Vehicle speed > 5 mph for 1.5 miles For -7°C < IAT < 10°C, Startup ECT<50 For IAT > 10°C, Startup ECT<70 No ECT, Throttle, IAT, VSS, MAF or MAP faults	Once per trip Time based on flow	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S1) HEATED OXYGEN SENSOR CIRCUIT LOW	P0131	Circuit Continuity Detects a HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage < 200 mV <OR> In PE Oxygen sensor voltage < 360 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V .992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No , , Throttle, IAT , Injector, Coolant, Air Flow, Purge Control, , MAP Fuel Composition or Engine Protect faults active. Traction Control not active Power Enrichment active 1 sec Fuel > 10% 10 V < System Voltage < 18V Engine runtime > 30 sec No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Fuel Composition or Engine Protect faults active. Traction Control not active	310 failures out of 330 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken. 100 ms/sample Continuous 95 failures out of 100 samples 100 ms/sample Continuous	DTC Type B
(B1S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0132	Circuit Continuity Detects a HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage > 1050 mV <OR> In DFCO Oxygen sensor voltage > 540 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18V .992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Fuel Composition or Engine Protect faults active. Traction Control not active Decel Fuel Cut Off active 2 sec Fuel > 10% 10 V < System Voltage < 18 V Engine runtime > 30 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Fuel Composition or Engine Protect faults active. Traction Control not active	90 failures out of 96 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken. 100 ms/sample Continuous 45 failures out of 50 samples 100 ms/sample Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S1) HEATED OXYGEN SENSOR CIRCUIT SLOW RESPONSE	P0133	Detects slow symmetrical rich to lean or lean to rich HO2S signal transition rates.	The oxygen sensor transitions between 250 – 625 mV. HO2S sensor average transition time: L/R > 700 ms R/L > 700 ms	Closed Loop Fuel Control Engine runtime > 160 sec 1000 < RPM < 3000 18 < Air Flow < 55g/s. 10 V < System Voltage < 18V TPS > 5% Fuel > 10% ECT > 60 °C CCP > 0 0 °C < Predicted Oxygen Sensor Temp < 2048 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults active. Traction Control not active Automatic transmissions in drive	100 sec Once per trip.	DTC Type B
(B1S1) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0134	Circuit Continuity Detects a HO2S circuit open.	350 mV < B1S1 voltage < 550 mV	Engine runtime > 300 sec 10 V < System Voltage < 18V No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protection or Fuel Composition faults active. Traction Control not active	570 failures out of 600 samples 100 ms/sample Continuous.	DTC Type B
(B1S1) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0135	Current Monitor: Detects a malfunctioning HO2S heater circuit by monitoring the current through the circuit AND Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or (OOR) resistance value.	Current Monitor: 0.25 A < Heater Current < 3.125 A OOR: -4.21 < Limit Part Error < 2.48 NOTE: If the P0135 DTC sets for an OOR fault, then the Current Monitor test for this sensor will be disabled, until another pass or fail decision is made. (This eliminates the scenario in which a OOR fail and then a Current Monitor pass would prevent illumination of the MIL.)	Current Monitor: 10 V < System Voltage < 18 V Coolant > 50 °C 3 g/s < Airflow < 40 g/s Device control not active Engine runtime > 300 sec 500 < RPM < 3000 No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active OOR: Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 45 failures out of 50 samples Frequency: 2 times per key cycle OOR: Once per valid cold start.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S2) HEATED OXYGEN SENSOR POSD	P0136	Detects post sensors that are stuck in range, outside of the open or shorted regions.	<p>Stage1 - Passive Test: During the ignition cycle the O2 signal must exceed the upper bound of the post O2 PID control window set at 710mV, and also drop below 349mV, which is the minimum lean voltage used by the Idle Catalyst diagnostic.</p> <p>Stage2 - Intrusive Test: If the Stage1 test has not reported a pass during the first 218 seconds, then an 8% lean and/or rich fueling change will be commanded to force the signal to cross the appropriate threshold as described above. The DTC will set if the sensor has not responded to the intrusive rich or lean test after 60 seconds.</p>	<p>Stage1 – Passive Test: Engine runtime > 2 sec</p> <p>Stage2 – Intrusive Test: Closed Loop Fuel Control Engine runtime > 218 sec 3 < Airflow < 100 g/s 10 V < System Voltage < 18V 500 < Engine Speed < 5000 RPM 15 < Vehicle speed < 82 mph 0.96< Short Term Integrator < 1.04 Above conditions met for 1 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, or MAP faults active.</p> <p>Lean test: Pre sensors must drop below 300mV Rich test: Pre sensors must exceed 600mV</p> <p>Stage2 test order: Lean then Rich</p>	<p>DTC will set if Stage2 test length exceeds 60 sec.</p> <p>Maximum of 25 Stage2 attempts (aborts).</p> <p>Once per trip</p>	DTC Type B
(B1S2) HEATED OXYGEN SENSOR CIRCUIT LOW	P0137	Circuit Continuity Detects a HO2S voltage stationary lean (low signal voltage) condition.	<p>Oxygen sensor voltage < 80 mV</p> <p><OR></p> <p>Oxygen sensor voltage < 420 mV</p>	<p>Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V</p> <p>.992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active</p> <p>Power Enrichment active 2 sec Fuel > 10% 10 V < System Voltage < 18V</p> <p>Engine runtime > 30 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active</p>	<p>380 failures out of 400 samples Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken.</p> <p>100 ms/sample Continuous</p> <p>95 failures out of 100 samples</p> <p>100 ms/sample Continuous</p>	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0138	Circuit Continuity Detects a HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage > 950 mV <OR> Oxygen sensor voltage > 480 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V .992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active Decel Fuel Cut Off active 10 sec Fuel > 10% 10 V < System Voltage < 18 V Engine runtime > 30 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active	380 failures out of 400 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken. 100 ms/sample Continuous 45 failures out of 50 samples. 100 ms/samples Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0140	Circuit Continuity Detects a HO2S circuit open.	410 mV < B1S2 voltage < 490 mV Or Post O2 sensor fast pass B1S2 > 550 mV B1S2 < 350 mV	Engine runtime > 300 sec Closed Loop Fuel Control. 10 V < System Voltage < 18 V 5% Δ TPS within 1 sec, 6 times DTC P0141 not set No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active 10 V < System Voltage < 18 V Engine runtime < 200 sec DTC P0141 not set No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active	1450 failures out of 1500 samples. 100 ms/sample Once per trip 550 more passing samples than failing samples. 100 ms/sample Once per trip	DTC Type B
(B1S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0141	Current Monitor: Detects a malfunctioning HO2S heater circuit by monitoring the current through the circuit AND Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or (OOR) resistance value.	Current Monitor: 0.25 A < Heater Current < 1.375A (OOR): -7.50 < Limit Part Error < 4.57 NOTE: If the P0141 DTC sets for an OOR fault, then the Current Monitor test for this sensor will be disabled, until another pass or fail decision is made. (This eliminates the scenario in which a OOR fail and then a Current Monitor pass would prevent illumination of the MIL.)	Current Monitor: 10 V < System Voltage < 18 V. Coolant > 50 °C 3 g/s < Airflow < 40 g/s Device control not active Engine runtime > 300 sec 500 < RPM < 3000No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active OOR: Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 45 failures out of 50 samples Frequency: 2 times per key cycle OOR: Once per valid cold start.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S1) HEATED OXYGEN SENSOR CIRCUIT LOW	*P0151	Circuit Continuity Detects a HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage < 200 mV <OR> In PE Oxygen sensor voltage < 360 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V .992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active Power Enrichment active 1 sec Fuel > 10% 10 V < System Voltage < 18 V Engine runtime > 30 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Fuel Composition or Engine Protect faults active. Traction Control not active	310 failures out of 330 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken. 100 ms/sample Continuous 95 failures out of 100 samples 100 ms/sample Continuous	DTC Type B 4 Sensor Systems

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S1) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	*P0154	Circuit Continuity Detects a HO2S circuit open.	350 mV < B2S1 voltage < 550 mV	Engine runtime > 300 sec 10 V < System Voltage < 18 V No Throttle, IAT, Injector, Coolant, Air Flow., Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active	570 failures out of 600 samples. 100 ms/sample Continuous	DTC Type B 4 Sensor Systems
(B2S1) HEATED OXYGEN SENSOR HEATER CIRCUIT	*P0155	Current Monitor: Detects a malfunctioning HO2S heater circuit by monitoring the current through the circuit AND Out-Of-Range (OOR) Resistance: Detects an oxygen sensor heater having an incorrect or (OOR) resistance value	Current Monitor: 0.25 A < Heater Current < 3.125 A OOR: -4.21 < Limit Part Error < 2.48 NOTE: If the P0155 DTC sets for an OOR fault, then the Current Monitor test for this sensor will be disabled, until another pass or fail decision is made. (This eliminates the scenario in which a OOR fail and then a Current Monitor pass would prevent illumination of the MIL.)	Current Monitor: 10 V < System Voltage < 18 V Coolant > 50 °C 3 g/s < Airflow < 40 g/s Device control not active Engine runtime > 300 sec 500 < RPM < 3000 No Throttle, IAT, Injector, Coolant, Air Flow., Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active OOR: Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 45 failures out of 50 samples Frequency: 2 times per key cycle OOR: Once per valid cold start.	DTC Type B 4 Sensor Systems

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S2) HEATED OXYGEN SENSOR POSTD	*P0156	Detects post sensors that are stuck in range, outside of the open or shorted regions.	<p>Stage1 - Passive Test: During the ignition cycle the O2 signal must exceed the upper bound of the post O2 PID control window set at 710mV, and also drop below 349mV, which is the minimum lean voltage used by the Idle Catalyst diagnostic.</p> <p>Stage2 - Intrusive Test: If the Stage1 test has not reported a pass during the first 218 seconds, then an 8% lean and/or rich fueling change will be commanded to force the signal to cross the appropriate threshold as described above. The DTC will set if the sensor has not responded to the intrusive rich or lean test after 60 seconds.</p>	<p>Stage1 – Passive Test: Engine runtime > 2 sec</p> <p>Stage2 – Intrusive Test: Closed Loop Fuel Control Engine runtime > 218 sec 5 < Airflow < 100 g/s 10 V < System Voltage < 18V 500 < Engine Speed < 5000 RPM 15 < Vehicle speed < 82 mph 0.96< Short Term Integrator < 1.04 Above conditions met for 1 sec No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, or MAP faults active.</p> <p>Lean test: Pre sensors must drop below 300mV Rich test: Pre sensors must exceed 600mV</p> <p>Stage2 test order: Lean then Rich</p>	<p>DTC will set if Stage2 test length exceeds 60 sec.</p> <p>Maximum of 25 Stage2 attempts (aborts).</p> <p>Once per trip</p>	DTC Type B 4 Sensor Systems
(B2S2) HEATED OXYGEN SENSOR CIRCUIT LOW	*P0157	Circuit Continuity Detects a HO2S voltage stationary lean (low signal voltage) condition.	<p>Oxygen sensor voltage < 80 mV</p> <p><OR></p> <p>Oxygen sensor voltage < 420 mV</p>	<p>Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V</p> <p>.992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled Above conditions met for 2 sec No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active</p> <p>Power Enrichment active 2 sec Fuel > 10%</p> <p>10 V < System Voltage < 18 V Engine runtime > 30 sec No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active</p>	<p>380 failures out of 400 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken.</p> <p>100 ms/sample Continuous</p> <p>95 failures out of 100 samples.</p> <p>100 ms/sample Continuous</p>	DTC Type B 4 Sensor Systems

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	*P0158	Circuit Continuity Detects a HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage > 950 mV <OR> Oxygen sensor voltage > 480 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% .992 < Equivalence Ratio < 1.0136 All valves of active cylinders enabled 10 V < System Voltage < 18 V Above conditions met for 2 sec No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active Decel Fuel Cut Off active 10 sec Fuel > 10% 10 V < System Voltage < 18 V Engine runtime < 30 sec No Throttle, IAT, Injector, Coolant, Air Flow Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active	380 failures out of 400 samples. Sensor monitored for 5 sets of samples. After 5 sets of failures, related sensors checked for same failure. If related sensor also failing, then no action is taken. 100 ms/sample Continuous 45 failures out of 50 samples. 100 ms/sample Continuous	DTC Type B 4 Sensor Systems
(B2S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	*P0160	Circuit Continuity Detects a HO2S circuit open.	410 mV < B2S2 voltage < 490 mV Or Post O2 sensor fast pass B2S2 > 550 mV B2S2 < 350 mV	Engine runtime > 300 sec Closed Loop Fuel Control. 10 V < System Voltage < 18 V 5% Δ TPS within 1 sec, 6 times DTC P0161 not set No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active 10 V < System Voltage < 18 V Engine runtime < 200 sec DTC P0161 not set No, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, , MAP, Engine Protect or Fuel Composition faults active. Traction Control not active	1450 failures out of 1500 samples. 100 ms/sample Once per trip 550 more passing samples than failing samples. 100 ms/sample Once per trip	DTC Type B 4 Sensor Systems

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	*P0161	<p>Current Monitor: Detects a malfunctioning HO2S heater circuit by monitoring the current through the circuit</p> <p>AND</p> <p>Out-Of-Range (OOR)</p> <p>Resistance: Detects an oxygen sensor heater having an incorrect or (OOR) resistance value</p>	<p>Current Monitor: 0.25 A < Heater Current < 1.375 A</p> <p>OOR: -7.50 < Limit Part Error < 4.57</p> <p>NOTE: If the P0161 DTC sets for an OOR fault, then the Current Monitor test for this sensor will be disabled, until another pass or fail decision is made. (This eliminates the scenario in which a OOR fail and then a Current Monitor pass would prevent illumination of the MIL.)</p>	<p>Current Monitor: 0 V < System Voltage < 18 V Coolant > 50 °C 3 g/s < Airflow < 40 g/s Device control not active Engine runtime > 300 sec 500 < RPM < 3000</p> <p>No Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, MAP, Engine Protect or Fuel Composition faults active. Traction Control not active</p> <p>OOR: Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C</p>	<p>Current Monitor: 45 failures out of 50 samples</p> <p>Frequency: 2 times per key cycle</p> <p>OOR: Once per valid cold start.</p>	DTC Type B 4 Sensor Systems
BANK 1 FUEL TRIM SYSTEM LEAN	P0171	Determines if the fuel control system is in a lean condition	The normalized long term fuel trim parameter > + 24 %	<p>No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, or Air flow, DTC's</p> <p>BARO > 70 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -20°C 6100 rpm > Engine speed > 400 rpm (LS4) 6500 rpm > Engine speed > 400 rpm (LH6 & LS2 SSR) Closed Loop Reset (NOT) Active VS < 132 kph Fuel Level > 10%</p>	Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
BANK 1 FUEL TRIM SYSTEM RICH	P0172	Determines if the fuel control system is in a rich condition	The normalized long term fuel trim parameter < -17% and no excessive purge vapors present	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, or Air flow, DTC's BARO > 70 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -20°C 6100 rpm > Engine speed > 400 rpm (LS4)6500 rpm > Engine speed > 400 rpm (LH6 & LS2 SSR) Closed Loop Reset (NOT) Active VS < 132 kph Fuel Level > 10%	Continuous	DTC Type B
BANK 2 FUEL TRIM SYSTEM LEAN	*P0174	Determines if the fuel control system is in a lean condition	The normalized long term fuel trim parameter > + 24 %	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, or Air flow, DTC's BARO > 70 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -20°C 6500 rpm > Engine speed > 400 rpm (LH6 & LS2 SSR) Closed Loop Reset (NOT) Active VS < 132 kph Fuel Level > 10%	Continuous	DTC Type B
BANK 2 FUEL TRIM SYSTEM RICH	*P0175	Determines if the fuel control system is in a rich condition	The normalized long term fuel trim parameter < -17% and no excessive purge vapors present	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, or Air flow, DTC's BARO > 70 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -20°C6500 rpm > Engine speed > 400 rpm (LH6 & LS2 SSR) Closed Loop Reset (NOT) Active VS < 132 kph Fuel Level > 10%	Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Injector Control Circuit (Cylinders 1-8) (ODM)	P0201 – P0208	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when “off”.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 400 rpm. Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous.	DTC Type B
Throttle Position (TP) Sensor 2 Circuit	P0220	Detects a continuous or intermittent short or open in TP sensor #2 circuit	0.275 V > TPS > 4.725 V	Ignition in Unlock/accessory, run, crank System voltage > 5.23 V No PCM processor, 5 V reference DTCs	15/35 counts ; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
Throttle Position (TP) Sensor 2 Lo	P0222	Detects a continuous or intermittent short or open in TP sensor #2 circuit	TPS < 0.275 V	Ignition in Unlock/accessory, run, crank System voltage > 5.23 V No PCM processor, 5 V reference DTCs	15/35 counts ; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
Throttle Position (TP) Sensor 2 Circuit Hi	P0223	Detects a continuous or intermittent short or open in TP sensor #2 circuit	TPS > 4.725 V	Ignition in Unlock/accessory, run, crank System voltage > 5.23 V No PCM processor, 5 V reference DTCs	15/35 counts ; 10 counts continuous; 12.5 msec /count in the motor processor	DTC Type A
FUEL PUMP CONTROL CIRCUIT (ODM)	P0230	Circuit Continuity Control circuit voltage is monitored during operation. It should be high during operation and near 0 volts when “off”.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 0 rpm. Ignition voltage > 10.0 volts, but < 18 volts	2.5 seconds Continuous.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index Vs	<ul style="list-style-type: none"> • Engine run time > 2 crankshaft revolutions. • DTCs not active for VSS, CKP, TP, MAP, ECT, IAT, and MAF sensors. • No engine protection faults. • P0315 (Crankshaft Position System Variation Not Learned) not active or engine speed < 1000 RPM. • Fuel cutoff not active. • Power management is not active. • Not an automatic transmission shift with a Throttle position>95% • Brake torque management not active. • Fuel level > 10% (disablement ends 500 after a low fuel level condition ceases, and fuel disable does not occur with a fuel sensor DTC). • -7°C < ECT < 130°C. • If ECT at startup < -7°C, then disable until ECT > 21°C. • 400 RPM < Engine speed < 62 00 RPM. • 9 volts < System voltage < 18 volts. • + Throttle position delta < 60% per 100 ms. • - Throttle position delta < 60% per 100 ms. • Abnormal engine speed is not present. • ABS rough road not detected. • ABS is not active. • Not an abusive engine speed condition Abusive engine speed = 7100 RPM. Abusive engine speed delay = 1250 cycles (Manual Trans only) • 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) TPS > 3 or VSS < 30. • Detectable engine speed and engine load region. • 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) • DoD transition (disablement ends 7 cycles after transition into and out of Displacement on Demand) 	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. <u>Frequency:</u> Continuous	DTC Type B (MIL Flashes with Catalyst Damaging Misfire)
Cylinder 1 Misfire Detected	P0301		Engine speed Vs			
Cylinder 2 Misfire Detected	P0302		Load and Camshaft Position Emission Failure Threshold = 1.35%			
Cylinder 3 Misfire Detected	P0303		Catalyst Damage Threshold = 5% to 10.625% depending on engine speed and engine load			
Cylinder 4 Misfire Detected	P0304					
Cylinder 5 Misfire Detected	P0305					
Cylinder 6 Misfire Detected	P0306					
Cylinder 7 Misfire Detected	P0307					
Cylinder 8 Misfire Detected	P0308					

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CRANKSHAFT POSITION SYSTEM VARIATION NOT LEARNED	P0315	Monitor for valid crankshaft error compensation factors	Factors are considered NOT valid if the factor sum is greater than 4.003997 or less than 3.996002	OBD Manufacturer Enable Counter = 0	100 ms/test	DTC Type A
KNOCK SENSOR CIRCUIT	P0325	This diagnostic will detect a failed internal ECM component associated with knock control	$0.05 \geq \text{Knock Sensor Voltage} \geq 4.95$	Engine RPM ≥ 500 Engine run time > 10 sec Air Per Cylinder > 0 PTO not active	80 fails out of 100 samples 100ms sample rate Continuous	DTC Type B
KNOCK SENSOR PERFORMANCE	P0326	This diagnostic checks for an overactive knock sensor caused by noisy engine components (e.g. lifters)	Fast Retard $\geq 12^\circ$	Engine RPM ≥ 500 MAP ≥ 55 kPa PTO not active No Throttle Faults	80 fails out of 100 samples 100ms sample rate Continuous	DTC Type B
KNOCK SENSOR 1 CIRCUIT LOW	P0327	Checks knock sensor and wiring based on delta noise levels	Delta Noise level < 0.60	Engine RPM ≥ 1000 Coolant temp $\geq 70^\circ$ C Engine run time ≥ 10 sec Air Per Cylinder > 200	60 fails out of 100 samples 100ms sample rate Continuous	DTC Type B
KNOCK SENSOR 2 CIRCUIT LOW	P0332	Checks knock sensor and wiring based on delta noise levels	Delta Noise level < 0.60	Engine RPM > 1000 Coolant temp $\geq 70^\circ$ C Engine run time ≥ 10 sec Air Per Cylinder > 200	60 fails out of 100 samples 100ms sample rate Continuous	DTC Type B
CRANKSHAFT POSITION SENSOR CIRCUIT	P0335	24X signal This diagnostic will detect if there is no output from the crankshaft position sensor or not enough output from the crankshaft position sensor.	No Pulses from the Crank Sensor for > 2 seconds during engine run or 6 seconds during engine crank. Or < 1 Crank Pulses during one CAM Rotation Or < 1 Crank Pulses during one CAM Rotation = one failed test	(Sensed mass airflow 5.0078 during engine run) Or (Sensed mass Airflow > 2.00 g/s and Starter request seen during crank) Or No Cam Position Sensor DTC's ECM state = CRANK Or No Cam Position Sensor DTC's ECM state = Run	Failure set in 2 or 6 seconds as discussed in malfunction criteria Or 1 test failures in 1 test samples with 1 test = one CAM rotation Or 4 test failures in 5 test samples with 1 test = one CAM rotation	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0336	24X signal This diagnostic will detect occurrences when engine position is no longer known or valid.	Engine Control system has resynced > 20 times in 25 seconds Or >0 and < 47 or > 49 Crank Pulses during one CAM Rotation = one failed test	ECM state = RUN or Crank Or No Cam Position Sensor DTC's ECM state = Run	Test runs continuously. Or 4 test failures in 5 test samples with 1 test = one CAM rotation	DTC Type B
CAMSHAFT POSITION SENSOR CIRCUIT	P0340	1X signal This diagnostic will detect if there is no output from the Camshaft position sensor	< 1 Cam pulse in 6 seconds during crank or < 1 cam pulse in 3 seconds during run Or < 1 Cam pulse during the first Engine cycle after crank sync Or < 1 CAM pulses in 100 engine cycles	(Sensed mass airflow 5.0078 during engine run) Or (Sensed mass Airflow >2.00 g/s and Starter request seen during crank) OR Engine Crank state = InSync Engine MedRes is not disabled No Crank Position Sensor DTC's OR Engine Crank state = InSync Engine MedRes is not disabled No Crank Position Sensor DTC's	Failure set in 3 or 6 seconds as discussed in malfunction criteria Or Single failure during the first engine cycle after crank sync. OR 8 failures out of 10 samples 1 sample = 100 engine cycles Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0341	1X Signal This diagnostic will detect a missing or noisy CAM position sensor signal	>0 and < 99 CAM pulses or > 101 CAM pulses in 100 engine cycles Or >2 during the first Engine cycle after crank sync for Fast Event Based.	ECM State = Ready or Crank Engine Crank state = InSync Engine MedRes is not disabled No Crank Position Sensor DTC's OR ECM State = Ready or Crank Engine Crank state = InSync Engine MedRes is not disabled No Crank Position Sensor DTC's	Single failure during the first engine cycle after crank sync. OR 8 failures out of 10 samples 1 sample = 100 engine cycles Continuous	DTC Type B
IGNITION CONTROL #1 CIRCUIT	P0351	Monitor EST channel A (Cylinder 1)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	3 Failures out of 10 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #1 CIRCUIT	P0351	Monitor EST channel B (Cylinder 1)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #2 CIRCUIT	P0352	Monitor EST channel B (Cylinder 2)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
IGNITION CONTROL #3 CIRCUIT	P0353	Monitor EST channel C (Cylinder 3)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #4 CIRCUIT	P0354	Monitor EST channel D (Cylinder 4)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #5 CIRCUIT	P0355	Monitor EST channel E (Cylinder 5)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #6 CIRCUIT	P0356	Monitor EST channel F (Cylinder 6)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is ≤ 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
IGNITION CONTROL #7 CIRCUIT	P0357	Monitor EST channel G (Cylinder 7)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B
IGNITION CONTROL #8 CIRCUIT	P0358	Monitor EST channel H (Cylinder 8)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is < 1500 RPM test failures (if applicable) and samples increment by 1 each time the diagnostic executes. If engine speed is ≥ 1500 RPM test failures (if applicable) and samples increment by 2 each time the diagnostic executes in order to report a failure faster	10 Volts < Ignition Voltage < 18 Volts	30 Failures out of 100 500 msec / test Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0420	Oxygen Storage.	<p><u>OSC Time Difference</u> ≥ 0.30 (LS4), 0.16894 (LH6), 0.16406 (LS2 SSR)</p> <p>OSC Time Difference = OSC Worst Pass Thresh - OSC Compensation Factor * (Post Cat O2 Resp Time - Pre Cat O2 Resp Time)</p> <p><u>OSC Worst Pass Thresh</u> = 3.2 sec (LS4), 1.68124 (LH6 & LS2 SSR)</p>	<p><u>Trip Enable Criteria</u> No VSS, , Throttle, Purge control, Purge Circuit, Oxygen sensor, Misfire, IAT, MAP, Camel Mode, Injector, EST Control, Coolant, Crank sensor, Cam sensor, Air flow, IAC, or Fuel trim DTC's failing</p> <p><u>Valid Idle Period Criteria</u> Engine Speed ≥ 950 (LS4), 900 (LH6 & LS2 SSR) rpm for minimum of 25 sec since end of last idle period Vehicle Speed < 3.2 kph</p> <p><u>Test Enable Conditions</u> 449 < Predicted Catalyst Temperature < 800 (LS4) 523 < Predicted Catalyst Temperature < 750 LH6 520 < Predicted Catalyst Temperature < 750 LS2 SSR Predicted catalyst temperature > 449 (LS4), 523 (LH6), 520 (LS2 SSR) for 120 sec, and throttle not < 2% for 180 sec 0.90 < Short term fuel trim < 1.1 at start of idle 0.96 < Average Short term fuel trim < 1.04 during summing time to enable intrusive fuel control Min engine runtime ≥ 300 (LS4), 600 (LH6 & LS2 SSR) sec Barometric Pressure ≥ 70 kPa 3 g/s < Idle AirFlow < 16 g/s (LS4) 3 g/s < Idle AirFlow < 13 g/s (LH6 & LS2 SSR) -20 ≤ IAT ≤ 85°C 70°C ≤ ECT ≤ 125.5°C 0 < Idle Period ≤ 60 sec Tests Attempted this trip ≤ 6 Tests Attempted this idle period < 1 -8191.87 rpm ≤ (Engine Speed - Desired Speed) ≤ +8191.87 rpm</p> <p>10.9 Volts < Ignition Voltage</p> <p><u>Rapid Step Response Enable Criteria</u> OSC Time Difference Step ≥ 1.23 (LS4), 0.55371 (LH6), 0.53808 (LS2 SSR)</p> <p>OSC Time Difference ≥ 0.000 sec</p> <p>LS4, LH6, & LS2 SSR 2006 applications for small block cars & trucks – use material burnoff delay algorithm. Diagnostic will not enable until the following has been met: predicted catalyst temperature ≥ 500°C (LS4), 650°C (LH6 & LS2 SSR) for 1 hour (non-continuously).</p>	<p>1 test attempted per valid idle period</p> <p>Minimum of 1 test per trip.</p> <p>Maximum of 6 tests per trip.</p> <p>Maximum of 6 trips to detect failure when Rapid Step Response is enabled</p> <p>frequency: 12.5 ms continuous</p>	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0430	Oxygen Storage.	<p><u>OSC Time Difference</u> \geq 0.16894 (LH6), 0.1123 (LS2 SSR)</p> <p>OSC Time Difference = OSC Worst Pass Thresh - OSC Compensation Factor * (Post Cat O2 Resp Time - Pre Cat O2 Resp Time)</p> <p><u>OSC Worst Pass Thresh</u> = 1.68124 sec (LH6), 1.25625 (LS2 SSR)</p>	<p><u>Trip Enable Criteria</u> No VSS, EGR Control, , Throttle, Purge control, Purge Circuit, Oxygen sensor, Misfire, IAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Cam sensor, Air flow, AIR, IAC, or Fuel trim DTC's failing</p> <p><u>Valid Idle Period Criteria</u> Engine Speed \geq 900 (LH6 & LS2 SSR) rpm for minimum of 25 sec since end of last idle period Vehicle Speed < 3.2 kph</p> <p><u>Test Enable Conditions</u> 501 < Predicted Catalyst Temperature < 750 (LH6) 510 < Predicted Catalyst Temperature < 750 (LS2 SSR)</p> <p>Predicted catalyst temperature > 501 (LH6), 520 (LS2 SSR) for 120 sec, and throttle not < 2% for 180 sec 0.90 < Short term fuel trim < 1.1 at start of idle 0.96 < Average Short term fuel trim < 1.04 during summing time to enable intrusive fuel control Min engine runtime \geq 600 sec Barometric Pressure \geq 70 kPa 3 g/s < Idle AirFlow < 13 g/s -20 \leq IAT \leq 85°C 70°C \leq ECT \leq 125.5°C 0 < Idle Period \leq 60 sec Tests Attempted this trip \leq 6 Tests Attempted this idle period < 1 -8191.87 rpm \leq (Engine Speed - Desired Speed) \leq +8191.87 rpm</p> <p>10.9 Volts < Ignition Voltage</p> <p><u>Rapid Step Response Enable Criteria</u> OSC Time Difference Step \geq 0.55371 (LH6), 0.36718 (LS2 SSR) OSC Time Difference \geq 0.000 sec</p> <p>LH6 & LS2 SSR 2006 applications for small block trucks - use material burnoff delay algorithm. Diagnostic will not enable until the following has been met: predicted catalyst temperature \geq 650°C for 1 hour (non-continuously).</p>	<p>1 test attempted per valid idle period</p> <p>Minimum of 1 test per trip.</p> <p>Maximum of 6 tests per trip.</p> <p>Maximum of 6 trips to detect failure when Rapid Step Response is enabled</p> <p>frequency: 12.5 ms continuous</p>	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Small Leak Detected (not Pontiac GTO)	P0442	This DTC will detect a small leak ($\geq 0.020''$) in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used.	<p><u>SMALL LEAK TEST FAIL:</u> Engine Off Natural Vacuum (EONV) while the engine is off. The total pressure change achieved during the test is normalized against a target value that is based upon fuel level and ambient temperature. (value of 3.25" water). The normalized value is entered into EWMA (with 0= perfect pass and 1=perfect fail). Once EWMA exceeds the fail threshold, the DTC light is illuminated. The DTC light can be turned off if the EWMA falls below the re-pass threshold for 3 consecutive trips.</p> <p>Fail threshold = 0.60 Re-Pass threshold = 0.40</p>	<p><u>TEST ENABLE :</u> No MAP DTC's No Thermostat Rationality DTC's VS Sensor DTC's not active No Fuel Tank Pressure Sensor circuit DTC's No EVAP Canister Purge Solenoid circuit DTC's No EVAP Canister Vent Solenoid circuit DTC's No Fuel Level DTC's Coolant Sensor DTC's not active IAT Sensor DTC's not active EVAP CCP stuck open DTC not active. EVAP large leak DTC not active. Ignition off timer DTC not active. Canister Vent restriction DTC is not active Fuel Level $>15.0\%$ but $< 85.0\%$ Drive time ≥ 600 seconds. Drive length ≥ 8 kilometers. Coolant $\geq 70^{\circ}\text{C}$. No fuel filling (fuel level increment $\geq 10\%$) During EONV test. BARO $> 74.0\text{kPa}$ Estimated ambient temperature at end of drive $> 0^{\circ}\text{C}$ but $< 34^{\circ}\text{C}$.</p> <p>Estimate of Ambient Air Temperature Valid Conditions to be valid</p> <ol style="list-style-type: none"> 1. Cold Start Startup $\Delta^{\circ}\text{C}(\text{ECT-IAT}) < 8^{\circ}\text{C}$ if $\text{ECT} > \text{IAT}$ <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. Hot Restart Sufficient drive length to get accurate estimate of ambient air temperature (at least a minimum of 3 minutes and 5 kilometers) 	Once per trip, during hot soak (up to 2500 sec.). Time since last complete test ≥ 17 hours if EWMA is passing, or ≥ 10 hours if EWMA is failing. No more than 2 attempts per day.	DTC Type A EWMA Average run length is 9. under normal conditions Run length is 2 to 6 trips after code clear or non-volatile reset

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Small Leak Detected (Pontiac GTO)	P0442	This DTC will detect a small leak ($\geq 0.020''$) in the EVAP system between the fuel fill cap and the purge solenoid. The engine vacuum decay rate method (EVPD) is used.	<p><u>SMALL LEAK TEST FAIL:</u> Vacuum is achieved by closing the Canister Vent Valve and operating the purge valve to a level of $8''\text{H}_2\text{O}$. A leak size is predicted by the decay rate of the vacuum.</p> <p>This can be modified based off a normalized check of the pressurization of the fuel tank due to fuel vapor generation. This leak size is then entered into an EWMA. Once the EWMA exceeds the failure threshold, the DTC light is illuminated. The DTC light can be turned off if the EWMA falls below the re-pass threshold for 3 consecutive trips.</p> <p>0.020'' leak detection: Fail threshold = 0.011993 Re-Pass threshold = 0.007309</p> <p>0.040'' leak detection: Fail threshold = 0.024994 Re-Pass threshold = 0.018814</p>	<p><u>TEST ENABLE :</u> No MAP DTC's No Thermostat Rationality DTC's VS Sensor DTC's not active No Fuel Tank Pressure Sensor circuit DTC's No EVAP Canister Purge Solenoid circuit DTC's No EVAP Canister Vent Solenoid circuit DTC's No Fuel Level DTC's Coolant Sensor DTC's not active IAT Sensor DTC's not active EVAP CCP stuck open DTC not active. EVAP large leak DTC not active. Ignition off timer DTC not active. Canister Vent restriction DTC is not active Fuel Level $>15.0\%$ but $< 85.0\%$ $10\text{ V} < \text{System Voltage} < 18\text{ V}$ $4\text{ }^\circ\text{C} < \text{IAT} < 30\text{ }^\circ\text{C}$ Engine Coolant Temp. $< 30\text{ }^\circ\text{C}$ Baro $> 74\text{ KPa}$ (8000 ft) Δ Fuel level slosh $< 2.2\%$ Δ Vac slosh $< 0.6''\text{H}_2\text{O}$</p> <p><u>.020 Threshold</u> $15\% < \text{Fuel level (vapor volume)} < 85\%$ $\text{VSS} < 15\text{ kph}$ Δ Fuel slosh $< 2\%$ Δ Vac Slosh $0.4''\text{H}_2\text{O}$</p> <p><u>COLD START TEST:</u> Cold Temperature Δ (ECT - IAT): $< 8\text{ }^\circ\text{C}$</p>	Once per cold start Time is dependent on driving conditions. Max before test abort is 1000 seconds	DTC Type A EWMA
EVAP CANISTER PURGE SOLENOID VALVE CIRCUIT (ODM)	P0443	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Ignition voltage > 10.0 volts, but < 18 volts	5 seconds. continuous.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister	Tank Vacuum > 12.00 "H2O for 5 seconds BEFORE Purge Volume > 10 liters OR Vented Vacuum < -2.5 in. H2O or Vented Vacuum > 5 in. H2O for 15 seconds 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time.	General Test Enable No MAP DTC's No TP Sensor DTC's No VSS DTC's No IAT DTC's No ECT DTC's No Fuel Tank Pressure Sensor circuit DTC's No Evap Canister Purge solenoid circuit DTC's No EVAP Canister Vent Solenoid circuit DTC's No Thermostat Rationality DTC's 15 % < Fuel Level < 85. % 10.00 V < System Voltage < 18.00 V 4 °C < IAT < 30°C ECT < 30 °C BARO > 74.00 kPa (8000 ft)	Once per Cold Start Time is dependent on driving conditions Max. before test abort is 1000 seconds	DTC Type B
EVAP VENT SOLENOID CONTROL CIRCUIT (ODM)	P0449	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	<p>The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts)</p> <p>upper voltage threshold (voltage addition above the nominal voltage): 0.2 volts</p> <p>lower voltage threshold (voltage subtraction below the nominal voltage): 0.2 volts</p> <p>The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). Once EWMA exceeds the fail threshold, the DTC light is illuminated. The DTC light can be turned off if the EWMA falls below the re-pass threshold for 3 consecutive trips.</p> <p>Fail threshold = 0.73 Re-Pass threshold = 0.40</p>	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes	<p>This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.</p> <p>The length of the test is determined by the refueling rationality test which can take up to 600 seconds to complete.</p>	<p>DTC Type A EWMA</p> <p>average run length: 6</p> <p>Used on EONV Applications</p>
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	<p>Fuel tank pressure sensor signal < 0.1 volts produces a failing sample. Otherwise, the sample is considered passing.</p> <p>If 80 samples fail out of 100 samples total, then a fail will be reported to the DTC.</p>	<ul style="list-style-type: none"> • 0.10 second delay after sensor power up for sensor warm-up • ECM State <> crank 	<u>Frequency:</u> Continuous 100ms loop	DTC Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	<p>Fuel tank pressure sensor signal > 4.9 volts produces a failing sample. Otherwise, the sample is considered passing.</p> <p>If 80 samples fail out of 100 samples total, then a fail will be reported to the DTC.</p>	<ul style="list-style-type: none"> • 0.10 second delay after sensor power up for sensor warm-up • ECM state <> crank 	<u>Frequency:</u> Continuous 100ms loop	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	<p>If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.</p> <p>The abrupt change is defined as a change > 0.45 and < 1.0 "H2O vacuum in the span of 1.0 seconds.</p> <p>A refueling event is confirmed if the fuel level has a persistent change of 10.0 % for 30 seconds.</p> <p>The test will report a failure if 2 out of 3 samples are failures.</p>	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes	<p>This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.</p> <p>The length of the test is determined by the refueling rationality test which can take up to 600 seconds to complete.</p>	<p>DTC Type A</p> <p>Used on EONV Applications</p>

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the Evap system.	Purge volume > 25.00 liters BEFORE Tank vacuum < 11 "H ₂ O 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed previous trip and this trip. Passes if tank vacuum > 11 " H ₂ O. Note: Weak Vacuum Follow-up Test can only report a pass.	<u>General Test Enable</u> <ul style="list-style-type: none"> • No MAP DTC's • No TP Sensor DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Fuel Tank Pressure circuit Sensor DTC's • No Evap Canister Purge solenoid circuit DTC's • No EVAP Canister Vent Solenoid circuit DTC's • No Thermostat Rationality DTC's • 15 % < Fuel Level < 85. % • 10.00 V < System Voltage < 18.00 V • 4 °C < IAT < 30°C • ECT < 30 °C • BARO > 74.00 kPa (8000 ft) <p style="text-align: center;">Cold Start Test</p> <ul style="list-style-type: none"> • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 8 °C if ECT > IAT • Cold Test Timer < 1000 seconds 	Once per cold start Time is dependent on driving conditions Max. before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> On 2 nd trip with large leak detected, the follow-up test is limited to 600 seconds. Once the MIL is on, the follow-up test runs indefinitely.	DTC Type B
Fuel Level No Change, Stuck in Range Primary Tank	P0461	This DTC will detect a fuel sender stuck in range .	IF Delta Fuel Volume change less than 3 liters over a accumulated 200 Kilometers. OR If Primary is FULL and Secondary is EMPTY for > 200 kilometers.	No VSS DTC's set Engine Running	Continuous	DTC Type B
Fuel Level Stuck Low Primary Tank	P0462	This DTC will detect a fuel sender stuck out of range low	Fuel level Sender % of 5V range less than 10 %	runs continuously	60 failures out of 100 samples 1 sample = 100 ms Continuous	DTC Type B
Fuel Level Stuck High Primary Tank	P0463	This DTC will detect a fuel sender stuck out of range high	Fuel level Sender % of 5V range > than 70%	runs continuously	60 failures out of 100 samples 1 sample = 100 ms Continuous	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	<p>If a change in fuel level is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.</p> <p>The refuel event is defined as a change of 10.0 % fuel level during the engine-off test.</p> <p>A refueling event is confirmed if the fuel level has a persistent change of 10.0 % for 30 seconds.</p> <p>The test will report a failure if 2 out of 3 samples are failures.</p>	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes	<p>This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.</p> <p>The length of the test is determined by the refueling rationality test which can take up to 600 seconds to complete.</p>	<p>DTC Type A</p> <p>Used on EONV Applications</p>
PRIMARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P0480	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off"	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	Engine speed greater than 400 rpm Ignition voltage > 10 volts, but < 18 volts	5 seconds Continuous	<p>DTC Type B</p> <p>For use on vehicles with Discrete Electric Fans</p>
SECONDARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P0481	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	Engine speed greater than 400 rpm Ignition voltage > 10 volts, but < 18 volts	5 seconds Continuous	<p>DTC Type B</p> <p>For use on vehicles with Discrete electric fans</p>
EV Cooling Fan System Performance Error	*P0483	Detects an unacceptable error between the commanded fan RPM and the actual fan RPM	The difference between the commanded fan RPM and the actual fan RPM is > 1500 RPM.	<p>No EV Cooling Fan Sensor Circuit DTC present.</p> <p>Engine is running.</p> <p>System voltage > 8.5 volts.</p> <p>IAT > -7°C.</p> <p>EV Fan is commanded on.</p> <p>Commanded fan speed is stable for 10 seconds.</p> <p>Engine RPM is < 3200 RPM</p> <p>Engine speed not changing more than 250 RPM.</p> <p>This diagnostic demonstrates on the Unified Cycle</p>	398/400 counts 1 count per 100 millisecond Continuous	<p>DTC Type B</p> <p>For use on vehicles with EV fan</p>

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EV Cooling Fan Overspeed Problem	*P0493	Indicates that the EV Cooling fan is in an overspeed condition	EV Cooling Fan sensor input is > 6375 fan RPM).	Engine speed is > 1400 RPM	2/2 counts 1 count/msec Continuous	DTC Type A For use on vehicles with EV fan
EV Cooling Fan Speed Too High	*P0495	Detects that the EV Cooling Fan is spinning too fast when it has not been commanded on.	EV Cooling Fan RPM is > 1.1 Engine RPM . This is a lookup table of Engine RPM vs Fan RPM.	Engine is running. Engine RPM has been > 1750 RPM for > 115 seconds. System voltage is > 8.5 volts IAT > -7°C. Engine speed is between 1400 and 3200 RPM. EV Cooling Fan is not commanded on. This diagnostic demonstrates on the Unified Cycle	800/1000 counts .1 sec/count Continuous	DTC Type B For use on vehicles with EV fan
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.	Tank Vacuum > 10 "H2O for 5.00 sec BEFORE Test time > 60 seconds (cold start)	<u>General Test Enable</u> <ul style="list-style-type: none"> • No MAP DTC's • No TP Sensor DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Fuel Tank Pressure Sensor circuit DTC's • No EVAP canister purge solenoid circuit DTC's • No EVAP Canister Vent Solenoid circuit DTC's • No Thermostat Rationality DTC's • 15 % < Fuel Level < 85. % • 10.00 V < System Voltage < 18.00 V • 4 °C < IAT < 30°C • ECT < 30 °C • BARO > 74.00 kPa (8000 ft) <p style="text-align: center;">Cold Start Test</p> <ul style="list-style-type: none"> • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 8 °C if ECT > IAT • Cold Test Timer < 1000 seconds 	Once per cold start. Cold start: max time is 1000 seconds	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
VEHICLE SPEED SENSOR LOW OUTPUT	*P0502	This DTC detects a missing from the output speed sensor in a manual transmission vehicle.	Output speed sensor signal not detected	Manual VSS diagnostic enabled No MAP DTC's set No TPS DTC's set No idle system DTC's set 1000 < Engine speed < 5000 5 % < throttle position < 100 % 68 < engine torque(Nm) < 8192	No activity for 10sec while meeting enable criteria	DTC Type B Manual Transmission Only
VEHICLE SPEED SENSOR SYSTEM PERFORMANCE	*P0503	This DTC detects a intermittent signal from the output speed sensor in manual transmission vehicle	Output speed sensor signal erratic performance	Manual VSS diagnostic enabled No MAP DTC's set No TPS DTC's set No idle system DTC's set Positive rate change less than 150 counts per sample for at least 0.5 sec Output speed > 300 counts for 6 sec	Rate of speed change (negative) exceeds fail criteria for 6 sec	DTC Type B Manual Transmission Only
IDLE SYSTEM - LOW ENGINE SPEED	P0506	Determines if a low idle is a result of an engine mechanical problem. Low RPM is 100 RPM below desired	Idle > 100 RPM low from desired	Passive: No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, , VSS or Purge DTC Engine Run > 60 sec. ECT ≥ 60 ° C BARO > 65 kPa IGN. voltage > 9 & < 18 volts IAT > -10 ° C TP < 1% VS ≤ 1 MPH Time > 5 seconds to fail. > 8 seconds to pass	Passive: Must be outside the fail criteria continuously for 5 seconds. Must be within pass criteria for 8 seconds continuously.	DTC Type B
IDLE SYSTEM - HIGH ENGINE SPEED	P0507	Determines if a high idle is a result of an engine mechanical problem. High RPM is 200 RPM above desired	Passive: Idle > 200 RPM high from desired	Passive: No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, , VSS or Purge DTC Engine Run > 60 sec. ECT ≥ 60 ° C BARO > 65 kPa IGN. voltage > 9 & < 18 volts IAT > -10 ° C TP < 1% VS ≤ 1 MPH Time > 8 seconds to fail. > 8 seconds to pass	Passive: Must be outside the fail criteria continuously for 8 seconds. Must be within pass criteria for 8 seconds continuously.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
ENGINE OIL PRESSURE SENSOR RATIONALITY	*P0521	This DTC determines if the engine oil pressure sensor is stuck within the normal operation range	The filtered difference between actual engine oil pressure and predicted engine oil pressure (a function of engine speed and engine oil temperature) is either greater than 47 kPa or less than -50 kPa.	No MAF, IAT, ECT, crank sensor or other engine oil pressure DTCs Filtered test weighting (a function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability) > 0.300003	Continuous 100 msec	DTC Type B on vehicles with DoD
Engine Oil Pressure Sensor Low	P0522	This DTC detects a continuous short to low or open in either the signal circuit or the Oil Pressure sensor.	Oil Pressure sensor voltage < .04 volts (3 counts)	Engine is running System voltage is > 11 volts	80/100 counts 100 msec / count Continuous	DTC Type C DTC Type B on vehicles with DoD
Engine Oil Pressure Sensor High	P0523	This DTC detects an open sensor ground or continuous short to high in either the signal circuit or the Oil Pressure sensor	Oil Pressure sensor voltage > 4.89 volts (250 counts)	Engine is running System voltage is > 11 volts	80/100 counts 100 msec / count Continuous	DTC Type C DTC Type B on vehicles with DoD
EV Cooling Fan Sensor Circuit	*P0526	Detects a continuous open or short condition with the EV Cooling Fan Sensor input circuit(s).	No EV Fan Sensor Circuit input activity is detected (fan speed < 4 RPM).	Engine is running System voltage is > 8.5 volts	900 /1200 counts 100 msec / count Continuous	DTC Type B For use on vehicles with EV fan
Brake Booster Pressure Sensor Performance	*P0556	This DTC determines if the Brake Booster Vacuum sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	The engine vacuum value is compared to the brake booster vacuum sensor value when the throttle has been below a calibrated value for a calibrated period of time. When the throttle once again exceeds the calibrated value, the min and max vacuum sensor values are normalized and subtracted from a EWMA value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The EWMA value would be 0 in a passing system EWMA fail threshold > 0.69 EWMA re-pass threshold < 0.6	System voltage is >11 & < 18 volts Throttle position with idle ≤ 1% Above condition present for > 3 seconds	100 msec Continuous	DTC Type B on vehicles with DoD

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Brake Booster Pressure Sensor Low	*P0557	This DTC detects a continuous short to low or open in either the signal circuit or the Brake Booster Vacuum sensor.	Brake Booster Vacuum sensor voltage < .04 volts (3 counts)	System voltage is >11 & < 18 volts	320 / 400 counts 12.5 msec / count Continuous	DTC Type B on vehicles with DoD
Brake Booster Pressure Sensor High	*P0558	This DTC detects an open sensor ground or continuous short to high in either the signal circuit or the Brake Booster Vacuum sensor	Brake Booster Vacuum sensor voltage > 4.89 volts (250 counts)	System voltage is >11 & < 18 volts	320 / 400 counts 12.5 msec / count Continuous	DTC Type B on vehicles with DoD
System Voltage Low	P0562	This DTC is a check to determine if the current system voltage is below the minimum required voltage for proper ECM operation	System voltage < 6.5 volts	Ignition is "ON" Engine speed > 1000 RPM	5 fail counts / 6 sample counts 1 count per second	DTC Type C
System Voltage High	P0563	This DTC is a check to determine if the current system voltage is above the maximum allowed voltage for proper ECM operation	System voltage > 18 volts	Ignition is "ON"	5 fail counts / 6 sample counts 1 count per second	DTC Type C
ECM – FLASH EEPROM CHECKSUM ERROR	P0601	Indicates that ECM is unable to correctly read data from the flash memory.	Calculated checksum does not match expected checksum for the program.	Ignition in Run or Crank.	One occurrence. Check is performed at power-up and every 60 seconds thereafter.	DTC Type A
ECM – PROGRAMMING ERROR	P0602	Indicates that the ECM is not flashed.	ECM not flashed.	Ignition on.	1 test failure 100 ms after ECM powered-up	DTC Type A
ECM NVM Integrity	P0603	Indicates that the ECM has encountered a Long Term Memory Reset	Calculated checksum does not match expected checksum for the program	Ignition on.	1 test failure 100 ms after ECM powered-up	DTC Type B
ECM RAM FAILURE	P0604	Indicates that ECM is unable to correctly write and read data to and from RAM	Data read does not match data written	Ignition in Run or Crank	One occurrence. Check is performed at power-up and every 60 seconds thereafter.	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
PCM Processor Processor Performance Check - Throttle limiting Fault (motor processor) Processor Performance Check - ETC software is not executed in proper order Processor Performance Check Processor Performance Check - SPI failed Processor Performance Check - motor processor state of health (Main) Processor Performance Check - Learn Corruption Fault (Main motor processor) Processor Performance Check - Learn Corruption Fault MAIN & motor processor Processor Performance Check - motor processor state of health (Main) Processor Performance Check - MAIN state of health (motor processor)	P0606	Indicates that the ECM has detected an ETC internal processor integrity fault	Motor processor desired throttle limiting occurring ETC software is not executed in proper order Software tasks loops > schedule tasks loop Loss of SPI communication from the motor processor 1.5 msec < Average motor processor state of health toggle > 2.5 msec TPS or APPS minimum learned values fail compliment check TPS or APPS minimum learned values fail range check Motor processor integrity check error occurs Motor processor integrity check error of main processor occurs	Ignition in unlock/accessory, run or crank System voltage>5.23 V	99 counts continuous, 2 msec/count in the motor processor 1 count continuous; 12.5 msec/count in the main processor Error > 3 counts; 100 msec/count in the main processor 160/400 counts or 15 counts continuous; 39 counts continuous @ initialization., 12.5 msec/count in the main processor 3 counts continuous; 50 msec/count in the main processor 100 msec in the main processor 10 msec in the main processor 4 counts continuous, 50 msec /count in the main processor 2 count continuous, 12.5 msec/count in the main motor processor	DTC Type A
Control Module Accelerator Pedal Position (APP) System Performance	P060D	Verify the PCM's ability to detect a short between the APPS 1 & 2 circuits Verify that the indicated accelerator pedal position calculation is correct	APPS #2 signal voltage > 2.05V Difference between Main processor indicated accelerator pedal position and motor processor indicated accelerator pedal position > 5%	Ignitions in unlock/ accessory and run, not during TPS minimum learn active during intrusive portion of diagnostic execution System voltage > 5.23 V No PCM processor DTC Ignition in unlock, accessory, run or crank System voltage > 5.23 V No PCM processor DTC	2 counts; 156.25 msec w/immediate retest on an error, performed in the main processor 99 counts continuous; 12.5 msec/count in the motor processor	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Control Module Throttle Position (TP) System Performance	P060E	Verify the PCM's ability to detect a short between the TPS 1 & 2 circuits Verify that the throttle control system position sensor short diagnostic is functioning	TPS #2 Signal voltage > 2.05 V No detection of the sensor short diagnostic active state	System voltage > 5.23 V No PCM processor DTC Ignition in unlock/accessory or run, not during TPS minimum learn active during intrusive portion of diagnostic execution	2 counts; 156.25 msec w/immediate retest on an error, performed in the main processor No sensor short diagnostic activity for 498 msec; detected by the motor processor	DTC Type A
5 Volt Reference 1 Circuit	P0641	Detects a continuous or intermittent short on the #1 5 V sensor reference circuit	Vref1 voltage -Vcc voltage > 0.125 V OR Vcc voltage -Vref1 voltage > 0.175 V	Ignition in unlock/accessory, run or crank System voltage > 5.23 V No ECM processor DTCs	20/40 counts or 200 msec continuous; 12.5 msec/count in main processor 125/250 counts or 99 counts continuous; 2 msec/count in motor processor	DTC Type A
Malfunction Indicator Lamp Control Circuit MALF (ODM)	P0650	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Ignition voltage > 10.0 volts, but < 18 volts	5 seconds. Continuous.	DTC Type B No MIL
5 Volt Reference 2 Circuit	P0651	Detects a continuous or intermittent short on the #2 5 V sensor reference circuit	Vref2 voltage -Vcc voltage > 0.125 V OR Vcc voltage -Vref2 voltage > 0.175 V	Ignition in unlock/accessory, run or crank System voltage > 5.23 V No ECM processor DTCs	20/40 counts or 200 msec continuous; 12.5 msec/count in main processor 125/250 counts or 99 counts continuous; 2 msec/count in main processor	DTC Type A
Powertrain Relay Control (ODM)	P0685	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off"	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	Ignition is "ON"	5 seconds Continuous.	DTC Type B
Powertrain Relay Feedback Circuit Low	P0689	This DTC is a check to determine if the Powertrain relay is functioning properly	Powertrain relay feedback voltage is < 8 volts	Ignition is "ON"	29 fail counts / 30sample counts 1 count per second	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly	Powertrain relay feedback voltage is > 18 volts when the relay is commanded "ON" OR The Powertrain relay feedback voltage is > 2 volts when it has been commanded "OFF" for longer than 2 seconds		9 fail counts / 10 sample counts 1 count per second	DTC Type B
TCM MIL REQUEST	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	The TCM MIL request line is active for more than 1 second.	Ignition on time > 7 seconds Ignition voltage > 11V	Continuous 100 msec	DTC Type A
Skip Shift Solenoid Circuit - ODM	P0803	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine is running	5 seconds. Continuous.	DTC Type B (Manual Only)
CLUTCH SWITCH CIRCUIT	*P0833	Clutch switch state is monitored during vehicle operation.	The PCM detects that a clutch switch state transition has not occurred when the vehicle speed has gone from 0 KPH above a threshold value and back to 0 KPH.	No VSS codes present VSS > 39kph	9 test failures in a 10 test sample size 100ms Continuous	DTC Type B (Manual Only)
PRNDL SWITCH INPUT HIGH	*P0851	Check for PRNDL switch malfunction	Park or neutral is indicated if: Engine RPM > 1000 TPS > 5.5% Torque > 75 Nm VSS > 32 kph Failcounts: 200/250 samples	Ignition voltage >6 and < 18 V No Vehicle speed DTC(s) No TP DTC(s) No Engine Torque DTC(s)	Stuck in PN 2 seconds Continuous Monitor 12.5 msec	DTC Type C

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
PRNDL SWITCH INPUT HIGH	P0852	Check for PRNDL switch malfunction	Park or neutral is indicated if: Engine RPM > 1000 TPS > 5.5% Torque > 75 Nm VSS > 32 kph Failcounts: 200/250 samples	Ignition voltage >6 and < 18 V No Vehicle speed DTC(s) No TP DTC(s) No Engine Torque DTC(s)	Stuck in PN 2 seconds Continuous Monitor 12.5 msec	DTC Type C
Inlet Airflow System Performance	P1101	This DTC detects flaws with all Inlet Airflow sensors suggesting a major inlet flow problem.	(Measured Flow – Modeled air Flow) Filtered > 9.5 or (Measured MAP - Manifold Model 1 pressure) filtered > 15 and (Measured MAP – Manifold Model 2 pressure) filtered > 15 and (The calculated throttle residual from the MAF model and the Manifold Model) filtered > 250 For DoD applications also can set as follows: Manifold model 2 Lag – Manifold model 2 Lag in DoD > 8 and Manifold model 2 Lag < -8 while in DoD	Engine rpm =>550 and <= 6800 MAP sensor high/low DTC's not active EGR DTC's P0401,,P0405, and P1404 not active MAF sensor high/low DTC's not active Crank sensor DTC's not active Engine Coolant DTC's not active Intake Air Temp. DTC's not active Engine Coolant > 70 deg C and < 125 deg C Intake Air Temp > -7 deg C and < 125 deg C	Continuous Evaluated every 12.5 ms For DoD Applications: 100 Failures out of 200 samples where a sample is a 100 ms loop while in DoD mode.	DTC Type B
HO2S SYSTEM -TOO FEW R/L OR L/R SWITCHES (B1S1)	P1133	Detects sensors that are initially slow to respond to changes in commanded A/F (but have normal transition times) by monitoring the number of R/L and L/R switches.	S/T: The oxygen sensor switches between 250 – 625 mV. H/C: The oxygen sensor crosses above and back below 500 mV, or below and back above 400 mV Number of switches: ST < 1 HC < 30	Closed Loop Fuel Control Engine runtime > 160 sec 1000 < RPM < 3000 18 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0 0 °C < Predicted Oxygen Sensor Temp < 2048 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	100 sec Once per trip.	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
HO2S TRANSITION TIME DIFFERENCE (B1S1)	P1134	Detects slow asymmetrical faults by monitoring the difference between R/L and L/R average response times.	<p>The oxygen sensor transitions between 250 – 625 mV.</p> <p>HO2S sensor average transition time difference (R/L minus L/R):</p> <p>Max +110 ms Min -110 ms</p>	<p>Closed Loop Fuel Control Engine runtime > 160 sec 1000 < RPM < 3000 18 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0</p> <p>0°C < Predicted Oxygen Sensor Temp < 2048 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.</p>	100 sec Once per trip.	DTC Type B
HO2S SYSTEM -TOO FEW R/L AND L/R SWITCHES (B2S1)	*P1153	Detects sensors that are initially slow to respond to changes in commanded A/F (but have normal transition times) by monitoring the number of R/L and L/R switches.	<p>S/T: The oxygen sensor switches between 250 – 625 mV. H/C: The oxygen sensor crosses above and back below 500 mV, or below and back above 400 mV</p> <p>Number of switches: S/T < 1 H/C < 30</p>	<p>Closed Loop Fuel Control Engine runtime > 160 sec 1000 < RPM < 3000 18 < Air Flow < 55 g/s. 10 V < System Voltage < 18 V TPS > 5% Fuel > 10% ECT > 60 °C CCP > 0</p> <p>0°C < Predicted Oxygen Sensor Temp < 2048 °C Above conditions met for 1 sec DTC's P0151, P0152, P0154 and P0155 not set No AIR, EGR, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.</p>	100 sec Once per trip.	DTC Type B 4 Sensor Systems

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
HO2S TRANSITION TIME DIFFERENCE (B2S1)	*P1154	Detects slow asymmetrical faults by monitoring the difference between R/L and L/R average response times	The oxygen sensor transitions between 250 – 625 mV. HO2S sensor average transition time difference (R/L minus L/R): Max +110 ms Min -110ms	Closed Loop Fuel Control Engine runtime > 160 sec 1000 < RPM < 3000 18 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0 0 °C < Predicted Oxygen Sensor Temp < 2048 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, IAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	100 sec Once per trip.	DTC Type B
ENGINE PROTECTION MODE ACTIVE	P1258	Monitor for engine protection mode active.	Coolant temperature >= 129.4°C for more than 10 seconds.	No coolant sensor DTC's.	Set immediately upon engine protection mode active.	DTC Type A
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 ECM indicating that a failure has occurred in the ABS module	Engine Speed <6600 Engine Load < 60 % VSS > 8 KPH	40 failures out of 80samples	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	Engine Speed <6600 Engine Load < 60 % VSS > 8 KPH	40 failures out of 80samples	DTC Type C (DTC sets when a P0300 is active)
Cooling Fan Speed Output Circuit (ODM)	*P1482	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off"	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	Engine speed greater than 400 rpm Ignition voltage > 10 volts, but < 18 volts	5 seconds Continuous	DTC Type B For use on vehicles with PWM or EV fan

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Actuator Control (TAC) Module - Throttle Actuator Position Performance	P1516	Detect a throttle positioning error. Detect a throttle positioning error. Detect excessive current draw on the actuator circuit. Determine if the actuator has been miswired.	$ \text{throttle error} \geq 2\%$ after > 5 sec stability with no change in error sign, after 4 sec stable command. $ \text{throttle error} > 6\%$ $I(\text{actuator}) > 9\text{A}$ $\text{TPS1} < 1.648\text{V}$	1-3. Ignition in run or crank [RPM>0 or (RPM=0 and not in battery saver mode)]. No airflow actuation, throttle actuation DTCs Engine running = true or System voltage > 6.5 V 4. Minimum TPS learn active state	249 counts continuous; 2 msec/count in the motor processor 99 counts continuous; 2 msec/count in the motor processor 50 counts continuous; 2 msec/count in the motor processor 99 counts continuous; 2 msec/count in the motor processor	DTC Type A
Powerdown NVM Integrity	P1621	Indicates that the NVM Error flag has not been cleared	Calculated checksum does not match expected checksum for the program	Ignition on.	1 test failure 100 ms after ECM powered-up	DTC Type A
Ignition Correlation	P1682	Detect a continuous or intermittent OOC in the Run/Crank Ignition Voltage & ETC Run/Crank Ignition Voltage	$ \text{Run/Crank} - \text{ETC Run/Crank} > 3\text{ V}$	Ignition in unlock/accessory, run or crank System voltage > 5.23 V & Powertrain Relay Commanded on.	1.92 Sec in the secondary processor	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Control Module Throttle Actuator Position Performance	P2101	Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position > 6%	Ignition in run or crank [RPM>0 or (RPM=0 and not in battery saver mode)] No airflow actuation, throttle actuation DTC.s Engine running or System voltage > 11 V	Positive error counter Increments by 1 if TP error > 6%; decrements by 1 if 0% < TP error < 6%; decrements by 1 if -6% < TP error < 0%; Increments by 1 if TP error < -6%. Negative error counter Increments by 1 if TP error < -6%; decrements by 1 if -6% < TP error < 0%; decrements by 1 if 0% < TP error < 6%; Increments by 1 if TP error > 6%. Thresholds are 15 Check runs every 12.5 msec in the main processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 1	P2120	Detect a continuous or intermittent short or open in the APP sensor #1	0.3625 V < Raw APP 1 < 2.6V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1	Raw APP 1 < 0.3625V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1	Raw APP 1 > 2.6V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Accelerator Pedal Position (APP) Sensor 2	P2125	Detect a continuous or intermittent short or open in the APP sensor #2	0.3625 V < Raw APP 1 < 4.225V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2	Raw APP 2 < 0.3625 V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2	Raw APP 2 > 4.225V	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, 5 V reference DTCs	20/40 counts or 10 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TP sensors #1 and #2	Difference between (raw min. learned TPS#1 voltage - raw min. TPS#1 voltage) and (raw TPS#2 voltage - raw min. learned TPS#2 voltage) < 6.44% offset at min. throttle position with an increasing to 10% at max. throttle position	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, TPS circuit DTCs	15/35 counts or 12 counts continuous; 12.5 msec/count in the main processor 92/217 counts or 67 counts continuous; 2 msec/count in the motor processor	DTC Type A
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detect an invalid minimum mechanical position correlation between APP sensor #1 and #2 Detect a short between APP sensors #1 and #2 circuits.	Difference between (raw min. learned PPS#1 voltage - raw min. PPS#1 voltage) and (raw PPS#2 voltage - raw min. learned PPS#2 voltage) < 5% offset at min. throttle position with an increasing to 10% at max. throttle position	Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor, APP sensor, 5 V reference DTCs Ignition in unlock/accessory, run or crank System voltage >5.23 V No PCM processor DTCs	15/35 counts or 12 counts continuous, 12.5 msec/count in the main processor 92/217 counts or 80 counts continuous, 2 msec/count in the motor processor 2 counts 156.25 msec w/ immediate test on an error, performed in the main processor	DTC Type A

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Actuator System Sudden Airflow Detected	P2172	This DTC determines if a gross high airflow exists during idle conditions	Engine Speed > 1500 RPM above desired idle RPM	No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, , VSS or Purge DTC Baro > 60 kPa Engine Coolant Temp > 60° C Engine Run Time > 10 seconds Intake Air Temp > -40° C Idle conditions present > 2 seconds	100 msec loop rate 20 fail counts out of 30 sample counts	DTC Type B
Minimum Throttle Position Not Learned	P2176	TP minimum learning not completed	TPS > 0.77 V	Minimum TPS learn active state Stable throttle position reading for 40 msec Ignition in run or crank No TPS circuit DTCs	3 secs	DTC Type A
SOAK TIMER (IGNITION OFF TIMER)	P2610	Monitor soak timer for proper increments in positive time at correct rate	1) Initial soak timer value is not between 0 to 5 seconds 2) After initial 4.0 second delay, the soak timer does not increase by 1 second increments 3) Each 1 second increment of the soak timer is not within 1.0 +/- 0.2 seconds 4) The soak timer value decrements by any amount 5) The soak timer does not increment for 1.5 seconds	ECM is powered down DTC sets on next key cycle if failure detected -7°C ≤ IAT ≤ 75°C	Every key down 12.5ms loop rate 8 failures out of 10 samples	DTC Type B

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Four Wheel Drive Low - Switch Input Malfunction	*P2771	<p>This DTC detects the continuous open in the Four Wheel Drive Low Switch Circuit</p> <p style="text-align: center;">-OR-</p> <p>This DTC detects the continuous short to ground in the Four Wheel Drive Low Switch Circuit</p>	<p>For Switch Stuck Off (Open): 4WD Lo Switch indicates OFF and Measured Transfer Case Ratio >2.39 and < 2.90 in two different gears.</p> <p>Measured Transfer case ratio = NI / NO / commanded gear ratio</p> <p>w/ TCC Applied</p> <p style="text-align: center;">-OR-</p> <p>For Switch Stuck On (Grounded): 4WD Lo Switch indicates ON and Measured Transfer Case Ratio =>0.80 and <= 1.75 in any one gear.</p> <p>Measured Transfer case ratio = NI / NO / commanded gear ratio</p> <p>W/TCC applied.</p>	<p>Engine is running 1000< RPM<4500 > 30 seconds. No VSS DTC's No PSA DTC's No Shift Solenoid Electrical or Performance DTC's Shift Sol Perf counters are clear No Shift Solenoid or TCC PWM Electrical DTC's PRNDL = D4</p> <p>Vehicle Speed => 20 KPH</p> <p>1000< RPM <4500 10 % < TPS >99% +20C < TFT < +130C</p>	<p>For Switch Stuck Off (Open): => 5.0 seconds in two different commanded gears. (Fail counts = 2 for two different gears.)</p> <p>1st Occurrence</p> <p style="text-align: center;">-OR-</p> <p>For Switch Stuck On (Grounded): > 5.0 seconds in any one gear.</p> <p>(Usually 4th gear)</p> <p>2ND Occurrence</p>	<p>DTC Type</p> <p style="text-align: center;">Federal & California B</p>
Cylinder 1 Deac Solenoid Open	P3401	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".q	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 400 RPM Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous	DTC Type B DoD Applications only
Cylinder 4 Deac Solenoid Open	P3425	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 400 RPM Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous	DTC Type B DoD Applications only
Cylinder 6 Deac Solenoid Open	P3441	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 400 RPM Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous	DTC Type B DoD Applications only

2006 5.3L (LS4) when used in: Grand Prix, Impala, Monte Carlo
5.3L (LH6) when used in: Trailblazer, Envoy, Rainier, Saab 9-7, Isuzu Ascender
6.0L (LS2) when used in: GTO, SSR, Trailblazer SS

ENGINE DIAGNOSTIC PARAMETERS

2006file10.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Cylinder 7 Deac Solenoid Open	P3449	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 400 RPM Ignition voltage > 10.0 volts, but < 18 volts	5 seconds Continuous	DTC Type B DoD Applications only
Control Module Communication Bus Off	U0001	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver has reported that it has entered a bus-off state.	None	5 seconds	DTC Type B
ECM TO TCM MODULE SERIAL DATA CIRCUIT	U0101	Detects when we stop receiving data from the TCM	Monitor one periodic message from the TCM and will set the code if the periodic message is not received within 2.5 times the transmit period for that message	Power Mode = RUN 9<Ignition voltage<16 for >3 Seconds	3.5 Sec Continuous	DTC Type B