

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 high voltage switch have been installed correctly.	Cam signal falling edge out of phase ± 27 degrees from crank falling edge.	Engine is running – run flag is true No crank position sensor not valid DTC	30 test failures within a 50 test sample size. Time necessary to complete sample: Varies with engine speed Every crank fall	DTC Type B
TAC SYSTEM MAF PERFORMANCE	P0068	Indicates that measured engine airflow does not match estimated engine airflow as established by the TPS.	MAP based airflow - estimated airflow > 150 mg/cyl AND MAF based airflow - estimated airflow > 150 mg/cyl	Engine running = true. Ignition on > 1 sec. RPM > 500. No Throttle Actuation DTC's. No PCM-TACM Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's No TACM Processor DTC	Both counters are incremented by 2 for every error and decrement by 1 for every pass; both thresholds are 20; both counters must exceed threshold to set DTC. Check runs every 18.75 ms.	DTC Type A For use on vehicles with ETC
MASS AIR FLOW SYSTEM PERFORMANCE (RATIONALITY)	P0101	This DTC determines if the MAF sensor is stuck within the normal operating range	Calculated Flow – Measured Flow > cal (table) Table look up as a function of calculated flow	Engine running TP sensor DTC's not active MAP sensor DTC's not active EVAP DTC's not active EGR DTC P0401 not active MAF sensor high/low DTC's not active Crank sensor DTC's not active EGR flow diagnostic not active Traction control not active System voltage > 11V but < 18V Canister Purge DC $\leq 100\%$ TP $\Delta \leq 5\%$ EGR DC $\leq 100\%$ EGR Pintle Position $\leq 100\%$ Engine vacuum ≤ 80 kPa Throttle Position $\leq 95\%$ The above must be present for a period of time greater than 1.5 seconds	40 test failures in a 100 test sample The Mass Air Flow reading and Mass Air Flow calculation are performed during the same cylinder event every 100 ms.	DTC Type B

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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 1200 Hz	<u>LOW FREQUENCY TEST</u> Engine Running Engine Speed \geq 400 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> 6 test failures in a 40 test sample. 1 sample per 100 ms Test is run at every reading of the Mass Air Flow sensor frequency	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 400 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 per 100 ms Test is run at every reading of the Mass Air Flow sensor frequency	DTC Type B
MAP SENSOR RANGE/ PERFORMANCE(RATIONALITY)	P0106	This DTC determines if the MAP sensor is stuck within the normal operation range	MAP (kPa) $>$ or $<$ predicted MAP (lookup table as a function of TPS and RPM)	Engine Running MAP sensor DTC's not active TP sensor DTC's not active MAF circuit DTC's not active EVAP DTC's not active IAC DTC's not active Traction Control not active Engine Speed Δ 125 RPM Throttle Position Δ $<$ 100% Idle Air Δ 10 g/s EGR Position Max Δ $<$ 20% Brake Switch State = no change Clutch Switch State = no change Power Steering = Stable PTO = not active AC Clutch State = no change Above stabilized for 1 second EGR DTC's not active Engine Speed \geq 500 RPM Engine Speed \leq 5000 RPM	20 test failures within a 30 test sample 1 sample/sec	DTC Type B

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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 < .04 volts (3 counts)	TP sensor DTC's not active Engine Running Throttle Position is ≥ 0% when engine speed is ≤ 800 RPM Or Throttle Position is ≥ 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 ≤ 0.996094 % when engine speed is ≤ 1200 RPM Or Throttle Position is ≤ 20 % when engine speed is > 1200 RPM	320 test failures in a 400 test sample. 1 sample/100 ms	DTC Type B
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 < .244 Volts	VS sensor DTC's not active Vehicle speed ≥ 25 mph 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 > 4.95 Volts	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 < 7 mph 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	ECT – IAT > 15°C	Soak time > 10 hours IAT > 15°C IAT drop <3°C Vehicle Speed >15mph for 400 seconds	Immediate when enable conditions are met	DTC Type B

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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.	<u>Low Resistance Pull-up</u> Raw ECT < .234 Volts <u>High Resistance Pull-up</u> Raw ECT < .035 Volts	Engine run time > 10 seconds Or Engine run time < 10 seconds IAT < 50° 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.	<u>Low Resistance Pull-up</u> Raw IAT > 4.93 Volts <u>High Resistance pull-up</u> Raw IAT > 4.95 Volts	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
THROTTLE POSITION SENSOR 1 CIRCUIT	P0120	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the TP sensor #1. OR 2) TACM indicates an invalid minimum mechanical position for the TP sensor #1. OR 3) TACM indicated reference voltage out of range.	1) Raw TP sensor signal < 0.376 V or > 4.506 V. OR 2) TP sensor minimum mechanical stop voltage < 0.376 V or > 0.714 V. OR 3) Vref out of range < 4.54 V or > 5.21 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 133. Check runs every 3 ms. 2) One occurrence. Check runs at power-up. 3) Continuous. Counter increments by 1 for every error, decrements by 1 for every pass. Threshold is 10ms. For Ref direct short to ground. 4) Second continuous counter increments by 1 for every error and decrements by 1 for every pass, threshold is 1000 msec. Verify A/D input on Ref to be 5volts +/- tolerance.	DTC Type A For use on vehicles with ETC

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TP SENSOR CIRCUIT PERFORMANCE	P0121	The DTC determines if a TPS sensor is stuck within the normal operating range	<u>Stuck high test:</u> The last throttle position value is > predicted throttle position based on engine RPM. <u>Stuck low test:</u> The last throttle position value is < predicted throttle position based on engine RPM	<u>Test Enable:</u> Engine Coolant Temp > 60° C No TP sensor short DTC's active No IAC DTC's active No MAP DTC's active No MAF DTC's active Engine run time > 120 sec BARO not defaulted MAP delta < 1.5 kPa MAP stable time > 1 sec <u>Stuck high test:</u> MAP < 43.11 kPa <u>Stuck low test:</u> MAP > 68 kPa IAC > 0 counts but < 310 counts	<u>Stuck high test:</u> 150 test failures within a 200 test sample <u>Stuck low test:</u> 150 test failures within a 200 test sample 1 sample/100ms	DTC Type B
TP SENSOR CIRCUIT LOW	P0122	This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor	TP sensor signal voltage < .149 volts (7.6 counts)	No 5v ref DTC's	90 test failures in a 100 test sample size. 1 sample/100ms	DTC Type B
TP SENSOR CIRCUIT HIGH	P0123	This DTC detects a continuous short to high in either the signal circuit or the TP sensor.	TP sensor signal voltage > 4.89 volts. (249.9 counts)	No 5v ref DTC's	90 test failures in a 100 test sample size. 1 sample/100ms	DTC Type B
CLOSED LOOP TEMPERATURE NOT ACHIEVED (ENGINE COOLANT TEMPERATURE RATIONALITY)	P0125	Under driving conditions, closed loop temperature should be achieved based on amount of cumulative air flow ingested and based on startup coolant temperature	A table defines cumulative airflow based on startup coolant temperature past which closed loop temperature is not achieved, at an acceptable rate	20 gps < airflow < 75 gps avg airflow>15gps Engine runtime < 1600 seconds before test completes Engine runtime > 120 seconds 54.5 > IAT > -7°C Vehicle speed > 5 mph for 0.5 miles ECT at startup < 28.5°C	Once per trip Time based on flow	DTC Type B
COOLANT TEMPERATURE BELOW STAT REGULATING TEMPERATURE	P0128	Under driving conditions, stat regulating 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, at which stat regulating temperature less 11° C must have been achieved	20 gps < airflow < 75 gps avg airflow>15gps Engine runtime <1600seconds before test completes Engine runtime > 120 seconds 54.5 > IAT > -7°C Vehicle speed > 5 mph for 1.5 miles ECT at startup < 70°C Stat regulating temp 86° C	Once per trip Time based on flow	DTC Type B

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(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 Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults active. Power Enrichment active 1 sec Fuel > 10% Ethanol % < 90 10 V < System Voltage < 18V Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults 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 > 900 mV <OR> In DFCO Oxygen sensor voltage > 540 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18V Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults active. Decel Fuel Cut Off active 2 sec Fuel > 10% 10 V < System Voltage < 18 V Ethanol % < 90 Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults 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 45 failures out of 50 samples 100 ms/sample Continuous	DTC Type B

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(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 > 255 ms R/L > 255 ms	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 20 < Air Flow < 55g/s. 10 V < System Voltage < 18V TPS > 5% Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults active.	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 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protection or Fuel Composition faults 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 AND (OOR): 3.12 Ohms < Initial Heater Resistance < 9.81 Ohms 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 > 120 sec 500 < RPM < 3000 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. AND (OOR): Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 8 failures out of 10 samples Frequency: 2 times per key cycle AND (OOR): Once per valid cold start.	DTC Type B Note: The OOR portion of this diagnostic does not apply to Corvette applications

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(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 810 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 25.4 seconds.</p>	<p>Stage1 – Passive Test: Engine runtime > 2 sec</p> <p>Stage2 – Intrusive Test: Closed Loop Fuel Control Engine runtime > 810 sec 5 < Airflow < 55 g/s 10 V < System Voltage < 18V 900 < Engine Speed < 5000 RPM 15 < Vehicle speed < 82 mph 0.90 < Short Term Integrator < 1.10 Above conditions met for 1 sec</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 25.4 sec.</p> <p>Maximum of 12 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 align="center"><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 Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.</p> <p>Power Enrichment active 2 sec Fuel > 10% 10 V < System Voltage < 18V Ethanol % < 90 Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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</p> <p>Continuous</p> <p>95 failures out of 100 samples</p> <p>100 ms/sample</p> <p>Continuous</p>	DTC Type B

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(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 Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. Decel Fuel Cut Off active 4 sec Fuel > 10% Ethanol % < 90 10 V < System Voltage < 18 V Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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

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(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 Ethanol % < 90 5% Δ TPS within 1 sec, 6 times DTC P0141 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. 10 V < System Voltage < 18 V Ethanol % < 90 Engine runtime < 200 sec DTC P0141 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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 < 3.125 A AND (OOR): 3.12 Ohms < Initial Heater Resistance < 9.81 Ohms 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 > 120 sec 500 < RPM < 3000 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. AND (OOR): Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 8 failures out of 10 samples Frequency: 2 times per key cycle AND (OOR): Once per valid cold start.	DTC Type B Note: The OOR portion of this diagnostic does not apply to Corvette applications

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(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 Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, No Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. Power Enrichment active 1 sec Fuel > 10% Ethanol % < 90 10 V < System Voltage < 18 V Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults 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
(B2S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0152	Circuit Continuity Detects a HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage > 900 mV <OR> In DFCO Oxygen sensor voltage > 540 mV	Closed Loop Fuel Control. TPS: 3-70% Fuel > 10% 10 V < System Voltage < 18 V Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow,, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. Decel Fuel Cut Off active 2 sec Fuel > 10% 10 V < System Voltage < 18 V Ethanol % < 90 Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Fuel Composition or Engine Protect faults 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 45 failures out of 50 samples 100 ms/sample Continuous	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 SLOW RESPONSE	P0153	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 > 255 ms R/L > 255 ms	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 20 < Air Flow < 55 g/s 10 V < System Voltage < 18 V TPS > 5% Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0151, P0152, P0154 and P0155 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	100 sec Once per trip.	DTC Type B
(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 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow,, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	570 failures out of 600 samples. 100 ms/sample Continuous	DTC Type B
(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 AND (OOR): 3.12 Ohms < Initial Heater Resistance < 9.81 Ohms 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 > 120 sec 500 < RPM < 3000 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow,, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. AND (OOR): Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 8 failures out of 10 samples Frequency: 2 times per key cycle AND (OOR): Once per valid cold start.	DTC Type B Note: The OOR portion of this diagnostic does not apply to Corvette applications

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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	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 810 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 25.4 seconds.</p>	<p>Stage1 – Passive Test: Engine runtime > 2 sec</p> <p>Stage2 – Intrusive Test: Closed Loop Fuel Control Engine runtime > 810 sec 5 < Airflow < 55 g/s 10 V < System Voltage < 18V 900 < Engine Speed < 5000 RPM 15 < Vehicle speed < 82 mph 0.90 < Short Term Integrator < 1.10 Above conditions met for 1 sec</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 25.4 sec.</p> <p>Maximum of 12 Stage2 attempts (aborts).</p> <p>Once per trip</p>	DTC Type B
(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 align="center"><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 Ethanol % < 90 Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.</p> <p>Power Enrichment active 2 sec Fuel > 10% Ethanol % < 90 10 V < System Voltage < 18 V Engine runtime > 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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</p> <p>Continuous</p> <p>95 failures out of 100 samples.</p> <p>100 ms/sample</p> <p>Continuous</p>	DTC Type B For use on vehicles with 4 sensors

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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% Ethanol % < 90 10 V < System Voltage < 18 V Above conditions met for 2 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. Decel Fuel Cut Off active 4 sec Fuel > 10% Ethanol % < 90 10 V < System Voltage < 18 V Engine runtime < 30 sec No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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 For use on vehicles with 4 sensors
(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 Ethanol % < 90 5% Δ TPS within 1 sec, 6 times DTC P0161 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. 10 V < System Voltage < 18 V Ethanol % < 90 Engine runtime < 200 sec DTC P0161 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults 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 For use on vehicles with 4 sensors

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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	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 AND (OOR): 3.12 Ohms < Initial Heater Resistance < 9.81 Ohms 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.)	Current Monitor: 10 V < System Voltage < 18 V Coolant > 50 °C 3 g/s < Airflow < 40 g/s Device control not active Engine runtime > 120 sec 500 < RPM < 3000 Ethanol % < 90 No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active. AND (OOR): Coolant – IAT < 8°C Engine Soak Time > 10 Hours -30°C < Coolant Temp < 45°C	Current Monitor: 8 failures out of 10 samples Frequency: 2 times per key cycle AND (OOR): Once per valid cold start.	DTC Type B For use on vehicles with 4 sensors Note: The OOR portion of this diagnostic does not apply to Corvette applications
Incorrect Fuel Composition	P0169	Detects a fuel composition of > 85% ethanol.	Determination of fuel composition based on a lookup table of fuel sensor frequency as a function of IAT temperature.	No Fuel Composition Sensor DTC(s) present. No Ignition Off Timer DTC(s) present No IAT DTC(s) present. Engine off time > 500 minutes. Engine has been running ≥ 30 seconds. System voltage between 11 and 18 volts.	25/30 counts 1 count/500msec. Once per ignition cycle.	DTC Type C
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 %	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, Fuel Composition, Fuel Temperature, EGR Control, EGR Sensor, Air flow, or AIR DTC's BARO > 74 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -7°C 6500 rpm > Engine speed > 400 rpm Closed Loop Reset (NOT) Active VS < 82 mph Fuel Level > 10% For Y-car LS1/LS6 only: 152°C > IAT Minimum IAT > 0°C	Continuous	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 < -18% and no excessive purge vapors present	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, Fuel Compositon, Fuel Temperature, EGR Control, EGR Sensor, Air flow, or AIR DTC's BARO > 74 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -7°C 6500 rpm > Engine speed > 400 rpm Closed Loop Reset (NOT) Active VS < 82 mph Fuel Level > 10% For Y-car LS1/LS6 only: 152°C > IAT Minimum IAT > 0°C	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, Fuel Compositon, Fuel Temperature, EGR Control, EGR Sensor, Air flow, or AIR DTC's BARO > 74 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -7°C 6500 rpm > Engine speed > 400 rpm Closed Loop Reset (NOT) Active VS < 82 mph Fuel Level > 10% For Y-car LS1/LS6 only: 152°C > IAT Minimum IAT > 0°C	Continuous	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 2 FUEL TRIM SYSTEM RICH	P0175	Determines if the fuel control system is in a rich condition	The normalized long term fuel trim parameter < -18% and no excessive purge vapors present	No Idle Air, Throttle, Purge control, Purge Circuit, Misfire, MAP, Oxygen Sensor, Fuel Injector, Fuel Composition, Fuel Temperature, EGR Control, EGR Sensor, Air flow, or AIR DTC's BARO > 74 kPa 139°C > ECT > -40°C 250 g/s > MAF > 1 g/s 105 kPa > MAP > 15 kPa 152°C > IAT > -7°C 6500 rpm > Engine speed > 400 rpm Closed Loop Reset (NOT) Active VS < 82 mph Fuel Level > 10% For Y-car LS1/LS6 only: 152°C > IAT Minimum IAT > 0°C	Continuous	DTC Type B
Fuel Composition Sensor Circuit Low Fault	P0178	Determines if the Fuel Composition Sensor is in an out of range low condition	Fuel composition sensor frequency is < 45 Hertz.	Engine has been running longer than 30 seconds. System voltage between 11 and 18 volts.	360/420 counts 1 count/500 msec. Continuous check.	DTC Type B
Fuel Composition Sensor Circuit High Fault	P0179	Determines if the Fuel Composition Sensor is in an out of range high condition	Fuel composition sensor frequency is > 155 Hertz.	Engine has been running longer than 30 seconds. System voltage between 11 and 18 volts.	100/200 counts 1 count/500 msec. Continuous check	DTC Type B
Injector Control Circuit (ODM)	P0200	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM 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

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 SENSOR 2 CIRCUIT	P0220	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the TP sensor #2. OR 2) TACM indicates an invalid minimum mechanical position for the TP sensor #2. OR 3) TACM indicated reference voltage out of range.	1) Raw TP sensor signal < 0.282 V or > 4.60 V. OR 2) TP sensor minimum mechanical stop voltage < 0.282 V or > 0.813V OR 3) Vref > 0.5 V	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 133. Check runs every 3 ms. 2) One occurrence. Check runs at power-up. 3) Continuous. Counter increments by 1 for every error, decrements by 1 for every pass. Threshold is 10ms. For Ref direct short to ground.	DTC Type A For use on vehicles with ETC
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 PCM 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	2.5 seconds Continuous.	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 Engine speed Vs Load and Camshaft Position	<ul style="list-style-type: none"> • Engine run time > 2 crankshaft revolutions. • DTCs not active for VSS, CKP, TP, MAP, ECT, 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. • 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 < 5600 RPM. • 11 volts < System voltage < 18 volts. • + Throttle position delta < 30% per 100 ms. • - Throttle position delta < 30% 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 = 6100 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 > 1 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) 	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					
Cylinder 2 Misfire Detected	P0302		Emission Failure Threshold = 1.38%			
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					

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 3.001 or less than 2.9989	OBID Manufacturer Enable Counter = 0	100 ms/test	DTC Type A
KNOCK SENSOR CIRCUIT	P0325	Check knock detector integrated circuit.	Instant noise level greater than a defined value or instantaneous knock signal greater than 254 counts for a defined time.	To run test: Engine run time > 10 sec Ignition voltage > 10 Volts	24 failed tests within 30 tests. Each test is 500 msec.	DTC Type B
KNOCK SENSOR 1 CIRCUIT LOW	P0327	Check knock sensor filtered noise level - front knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20	To run test: No Coolant Sensor DTC's No TP sensor DTC's 1500 < engine rpm < 3000 Coolant temp > 60° C Engine run time > 10 sec MAP < 45 kPa. Ignition voltage > 10 Volts	24 failed tests within 30 tests. Each test is 100 msec.	DTC Type B
KNOCK SENSOR 2 CIRCUIT LOW	P0332	Check knock sensor filtered noise level - rear knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20	To run test: No Coolant Sensor DTC's No TP sensor DTC's 1500 < engine rpm < 3000 Coolant temp > 60° C Engine run time > 10 sec MAP < 45 kPa. Ignition voltage > 10 Volts	24 failed tests within 30 tests. Each test is 100 msec. Continuous check	DTC Type B For use on 2 sensor applications
CRANKSHAFT POSITION SENSOR CIRCUIT	P0335	3X signal This diagnostic will detect if there is no output from the crankshaft position sensor.	No output (~0 volts) from the crankshaft position sensor.	Cam is transitioning Sensed mass airflow ≥ 2.8984 No Cam Position Sensor DTC's No Airflow DTC's PCM state = READY or CRANK	30 test failures in a 40 test sample. 100 ms/test Continuous	DTC Type B
CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0336	3X signal This diagnostic will detect occurrences when engine position is no longer known.	Crank position sensor signal missing for a time ≥ .5 seconds	PCM state = CRANK or RUN	50 test failures in a 3120 test sample. 50 ms/test Continuous	DTC Type B
CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0341	Monitor for cam position state change when expected at crankshaft sync.	Evaluated at crankshaft position synchronization.	Engine Running	15 Failures out of 100 100 ms/test Continuous	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 LOW	P0342	Monitor for continuous low state when state should be high.	Evaluated at crankshaft position synchronization	Engine Running	15 Failures out of 50 100 msec / test Continuous	DTC Type B
CAMSHAFT POSITION SENSOR CIRCUIT HIGH	P0343	Monitor for continuous high state when state should be low.	Evaluated at crankshaft position synchronization	Engine Running	15 Failures out of 50 100 msec / test 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 Only used on LU3
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 Not used on LU3
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 Not used on LU3

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 Not used on LU3
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 Not used on LU3
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 Not used on LU3
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 Not used on LU3

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 Not used on LU3
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 Not used on LU3
AIR INJECTION SYSTEM	P0410	HO2S sensors indicate lean condition present when AIR pump is turned on with 11% additional offset fuel being added during closed loop operation	Fails when: HO2S sensors are not < 222 mv for ≥ 1.5 seconds AND fuel integrator deltas are not ≥ 24% for each respective bank when pump turns on during closed loop operation	No MAF, MAP, MAT, ECT, TPS, HO2S, Purge, Engine Protection, Fuel Trim, Fuel Injector, EST, Crank sensor or Misfire DTCs set. Engine run > 30 sec Veh Speed ≥ 15 mph Baro ≥ 75kPa Air flow < 22 g/s A/F Ratio = 14.7:1 Engine Load < 40% of full engine load Ignition voltage > 11 PE, DFCO, COT not active Engine run ≥ 15 sec after closed loop operation Fuel integrator >96% & < 104% Powerup Coolant Temp < 70°C RPM > 850 ECT ≥ -10°C ECT < 110 °C IAT > -10 °C and IAT < 100°C In BLM cells 1,2,3,4, & 5	3.5 seconds Up to 3 times	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
AIR INJECTION SYSTEM SOLENOID CONTROL CIRCUIT MALF (ODM)	P0412	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off"	The PCM 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 > 6.0 volts, but < 18 volts	5 seconds Continuous	DTC Type B
AIR INJECTION SYSTEM RELAY CONTROL CIRCUIT MALF (ODM)	P0418	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM 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 > 6.0 volts, but < 18 volts	5 seconds Continuous.	DTC Type B
CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0420	Oxygen Storage.	<p><u>OSC Time Difference</u> ≥ .</p> <p>B1 = 0.185663</p> <p>B2 = 0.185438</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> =</p> <p>B1 = 2.052727sec</p> <p>B2 = 1.861115 sec</p>	<p><u>Trip Enable Criteria</u></p> <p>No VSS, EGR Control, Throttle, Purge control, Purge Circuit, Oxygen sensor, Misfire, MAT, 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></p> <p>Engine Speed ≥ 750 rpm for minimum of 39 sec since end of last idle period</p> <p><u>Test Enable Conditions</u></p> <p>Predicted Catalyst Temperature ≥ B1 =572</p> <p>B2 = 520</p> <p>Min engine runtime for stable BLM & PLM ≥ 600 sec</p> <p>Barometric Pressure ≥ 74 kPa</p> <p>-7 ≤ IAT ≤ 85°C</p> <p>70°C ≤ ECT ≤ 120°C</p> <p>0 < Idle Period ≤ 60 sec</p> <p>Tests Attempted this trip ≤ 6</p> <p>Tests Attempted this idle period < 1</p> <p>-100 rpm ≤ (Engine Speed - Desired Speed) ≤ +200 rpm</p> <p>AC Clutch is stable</p> <p><u>Rapid Step Response Enable Criteria</u></p> <p>OSC Time Difference Step ≥ B1 = 0.606965sec</p> <p>B2 = 0.606228sec</p> <p>OSC Time Difference ≥ 0.000 sec</p> <p>All 2003 applications for small block trucks – use material burnoff delay algorithm. Diagnostic will not enable until the next ignition cycle after the following has been met, predicted catalyst temperature ≥ 572° C for 1 hour (non-continuously). (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle)</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

2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS

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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> ≥ . B1 = 0.185663 B2 = 0.185438</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> = B1 = 2.052727sec B2 = 1.861115 sec</p>	<p>No VSS, EGR Control, Throttle, Purge control, Purge Circuit, Oxygen sensor, Misfire, MAT, 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 ≥ 750 rpm for minimum of 39 sec since end of last idle period</p> <p><u>Test Enable Conditions</u> Predicted Catalyst Temperature ≥ B1 = 572 B2 = 520 Min engine runtime for stable BLM & PLM ≥ 600 sec Barometric Pressure ≥ 74 kPa -7 ≤ IAT ≤ 85°C 70°C ≤ ECT ≤ 120°C 0 < Idle Period ≤ 60 sec Tests Attempted this trip ≤ 6 Tests Attempted this idle period < 1 -100 rpm ≤ (Engine Speed - Desired Speed) ≤ +200 rpm AC Clutch is stable</p> <p><u>Rapid Step Response Enable Criteria</u> OSC Time Difference Step ≥ B1 = 0.606965sec B2 = 0.606228sec OSC Time Difference ≥ 0.000 sec</p> <p>All 2003 applications for small block trucks – use material burnoff delay algorithm. Diagnostic will not enable until the next ignition cycle after the following has been met, predicted catalyst temperature ≥ 572° C for 1 hour (non-continuously). (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle)</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>	<p>DTC Type A</p> <p>For use on Dual Converter applications</p>

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
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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
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 DTC will also be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to test phase-1 or test phase-2. The DTC will also be set if the refueling rationality test is failed.	<p><u>SMALL LEAK TEST FAIL:</u></p> Engine Off Natural Vacuum The total pressure change achieved during the test is normalized against a target value that is based upon fuel level and ambient temperature. (values range between 1.5'' water and 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. Fail threshold = 0.617 Re-Pass threshold = 0.444 Vacuum sensor out of range <1.3 volts or >1.7 volts. Vacuum sensor out of range is reported as a perfect fail to the EWMA.	<p><u>TEST ENABLE :</u></p> VS Sensor DTC's not active Coolant Sensor DTC's not active IAT Sensor DTC's not active EVAP Vac Sensor Performance DTC not active. EVAP CCP stuck open DTC not active. EVAP large leak DTC not active. Ignition off timer DTC not active. Fuel Level >15.0% but < 85.0% Valid Cold Start ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temp $\Delta^{\circ}\text{C}(\text{ECT-IAT}) < 8.25^{\circ}\text{C}$ if ECT > IAT BARO > 74.0 kPa Estimated ambient temperature at end of drive > 0°C but < 33°C. Drive time ≥ 10 minutes. Drive length ≥ 3 miles. Coolant $\geq 70^{\circ}\text{C}$. No fuel filling (fuel level increment $\geq 10\%$).	Once per cold start, 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

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6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
EVAP SYSTEM SMALL LEAK DETECTED (Pontiac GTO only)	P0442	This DTC will detect a small leak in the EVAP system between the fuel fill cap and up to but not including the purge solenoid.	<p><u>SMALL LEAK TEST FAIL:</u> If tank vacuum stays above 11”H2O for a period of time (depending on fuel level and application), then the test passes.</p> <p>If tank vacuum goes below 11”H2O, then the rate of vacuum decay will be monitored. The slope {(start vacuum - final vacuum) / time period} will be compared to a calibration (dependent on fuel level, intake air temperature and application). If the slope is too high, then the slope is considered failing. Another slope measurement will then be taken. Up to 4 slopes may be measured. If the final slope is too high (failing), then the small leak test will execute a pressure correction test (adjusts for high fuel RVP). If the final “pressure corrected slope” is too high, then the small leak test will fail. If the slope measurement is below the calibration, then the small leak test passes.</p> <p>If at any time during the slope measurement period (5 to 15 seconds) the vacuum very quickly drops to a value less than 1.0 “H2O, then the small leak test will fail. This test scenario handles leaks sizes in the 0.060” to 0.090” range.</p>	<p><u>TEST ENABLE :</u> MAP DTC’s not active Volt-DTC’s not active TP Sensor DTC’s not active VS Sensor DTC’s not active O2 Sensor DTC’s not active Coolant Sensor DTC’s not active IAT Sensor DTC’s not active Fuel Level >15.0% but < 85.0% PLM > .89 System Voltage > 10V but < 18V</p> <p><u>COLD START TEST:</u> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temp Δ°C(ECT - IAT)<8.25°C if ECT > IAT BARO > 75.0 kPa</p> <p><u>FUEL SLOSH TEST:</u> Tank Vacuum Δ ≤ value and Fuel Level Δ ≤ value each based on fuel level.</p> <p><u>WEAK VACUUM TEST (Stage I) :</u> Throttle position < 75% Vehicle speed < 90 mph Tank Vacuum ≥ 13 in. H₂O within 19 integral seconds</p>	Once per cold start Test must complete within 380, seconds from when purge is enabled	DTC Type A (Behaves as a Type B)
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 PCM 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

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
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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
EVAP CANISTER VENT BLOCKED	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filter, vent hose or canister.	<p><u>EXCESS VACUUM TEST - STAGE I:</u> Vent solenoid commanded OPEN Fuel Tank Vacuum \geq 7 in. H₂O for 2 seconds(monitored during initial purge ramp)</p> <p align="center">OR</p> <p><u>EXCESS VACUUM TEST - STAGE II:</u> Vent solenoid commanded OPEN during normal purge. Fuel Tank Vacuum \geq 9.0 in. H₂O for a time \geq 23 seconds</p> <p align="center">OR</p> <p>Vented Vacuum \leq -2.5 in. H₂O or Vented Vacuum \Rightarrow 5.0 in H₂O For 3 seconds after cold-start key-up.</p>	<p><u>TEST ENABLE :</u> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active Coolant Sensor DTC's not active O2 Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% PLM > .89 System Voltage > 10V but < 18V</p> <p><u>COLD START TEST:</u> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temp Δ°C(ECT - IAT)<8.25°C if ECT > IAT BARO > 75.0 kPa</p> <p><u>WEAK VACUUM TEST -Stage I:</u> Tank Vacuum \geq 9 in. H₂O within a value 40 integral seconds.</p>	<p><u>EXCESS VACUUM TEST - STAGE II :</u> 180 seconds</p> <p>Once per cold start at:</p> <ul style="list-style-type: none"> • Power-up • Excess Vac. Stage I • Excess Vac. Stage II <p>Test must complete within 360, 420 ,460, 525, or 600 seconds from when purge is enabled, Depending on application</p>	DTC Type A (Behaves as a 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 PCM 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
EVAP SYSTEM PRESSURE LOW	P0452	This DTC will detect a vacuum sensor stuck low	tank vacuum raw voltage < 0.1 volt for 5 seconds	<u>runs continuously after a 1 second delay for sensor warm-up</u>		DTC Type B
EVAP SYSTEM PRESSURE HIGH	P0453	This DTC will detect a vacuum sensor stuck hi	tank vacuum raw voltage >4.90 volt for 5 seconds	<u>runs continuously after a 1 second delay for sensor warm-up</u>		DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
EVAP. Emission Control System Malfunction	P0455	This DTC will detect a weak vacuum condition (large leak or restriction) in the EVAP. system.	<u>WEAK VACUUM TEST- STAGE I (Cold Test):</u> Tank Vacuum < 11 in. H ₂ O for a time greater than (30-80 integral seconds) depending on application. <u>WEAK VACUUM TEST- STAGE II PASS CRITERIA(Warm Test):</u> Stage I test failed previous trip and this trip. Passes if Tank Vac. > 11 in. H ₂ O Note: Stage II can only report a pass	<u>TEST ENABLE :</u> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active Coolant Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% Power-up Vacuum Test Fail = False PLM > .89 System Voltage > 10V but < 18V <u>COLD START TEST:</u> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temp Δ°C(ECT - IAT)<8.25°C if ECT > IAT BARO > 75.0 kPa	<u>WEAK VACUUM TEST- STAGE I (Cold Test):</u> Fault present for an integral time ≥ 50, or 70sec. depending on application. Test must complete within 360, 420 ,460, 525, or 600 seconds from when purge is enabled, Depending on application <u>WEAK VACUUM TEST- STAGE II (Warm Test):</u> Fault present for a time ≥ 1400 sec. This is the maximum test time length. Once per cold start	DTC Type A (Behaves as a Type B)
Fuel Level No Change, Stuck in Range	P0461	This DTC will detect a fuel sender stuck in range .	IF Delta Fuel Volume change less than 3 liters over a accumulated 105 miles. OR IF Transfer pump ON and at Idle delay =20 seconds then IF timer > 120 sec. AND Primary tank not increase by 4 liters. AND Secondary did Decrease > 4 liters OR If Primary is FULL and Secondary is EMPTY for > 275 miles.	runs continuously		DTC Type C No Light
Fuel Level Stuck Low	P0462	This DTC will detect a fuel sender stuck out of range low	Fuel level A/D counts less than 20 A/D counts for 100 seconds	runs continuously		DTC Type C No Light
Fuel Level Stuck High	P0463	This DTC will detect a fuel sender stuck out of	Fuel level A/D counts more than 150 A/D counts for 100 seconds	runs continuously		DTC Type C No Light

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6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
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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
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 PCM 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 electric or EV fan
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 PCM 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 electric fan
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 > 1000 RPM.	No EV Cooling Fan Sensor Circuit DTC present. Engine is running. System voltage > 8.5 volts. IAT > -7°C. EV Fan is commanded on. Commanded fan speed is stable for 10 seconds. Engine RPM is < 3200 RPM Engine speed not changing more than 250 RPM.	100/125 counts 1 count/second Continuous	DTC Type B For use on vehicles with EV fan

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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
AIR INJECTION SYSTEM BANK 1	P0491	HO2S sensors indicate lean condition present when AIR pump is turned on with 11% additional offset fuel being added during closed loop operation	<u>Fails</u> when: Bank 1 HO2S sensor is not < 222 mv for ≥ 1.5 seconds AND Bank 1 fuel integrator delta is not ≥ 24% while a passing value occurs for bank 2 when pump turns on during closed loop operation	No MAF, MAP, MAT, ECT, TPS, HO2S, Purge, Engine Protection, Fuel Trim, Fuel Injector, EST, Crank sensor or Misfire DTCs set. Engine Runtime > 30 sec Veh Speed ≥ 15 mph Baro ≥ 75 kPa Engine run > 2 sec Air flow < 22 g/s A/F Ratio = 14.7:1 Engine Load < 40% of full engine load Ignition voltage > 11 V PE, DFCO, COT not active Engine run ≥ 15 sec after closed loop operation Fuel integrator >96% & < 104% Powerup Coolant temp < 70°C RPM > 850 ECT ≥ -10 °C ECT < 110 °C IAT > -10°C and IAT < 100°C In BLM cells 1,2,3,4,5	3.5 seconds Up to 3 times	DTC Type B
AIR INJECTION SYSTEM Bank 2	P0492	HO2S sensors indicate lean condition present when AIR pump is turned on with 11% additional offset fuel being added during closed loop operation	<u>Fails</u> when: Bank 2 HO2S sensor is not < 222 mv for ≥ 1.5 seconds AND bank 2 fuel integrator delta is not ≥ 24% while a passing value occurs for bank 1 when pump turns on during closed loop operation	No MAF, MAP, MAT, ECT, TPS, HO2S, Purge, Engine Protection, Fuel Trim, Fuel Injector, EST, Crank sensor or Misfire DTCs set. Veh Speed ≥ 15 mph Baro ≥ 75 kPa Engine run > 30 sec Air flow < 22 g/s A/F Ratio = 14.7:1 Engine Load < 40% of full engine load Ignition voltage > 11 V PE, DFCO, COT not active Engine run ≥ 15 sec after closed loop operation Fuel integrator >96% & < 104% Powerup Coolant Temp < 70°C RPM > 850 ECT ≥ -10 °C ECT < 110 °C IAT > -10 °C and IAT < 100°C In BLM cells 1,2,3,4,&5	3.5 seconds Up to 3 times	DTC Type B

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
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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 > 640 Hertz (approx. 6400 fan RPM).	Engine is running	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 > 1600 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
EVAP SYSTEM FLOW DURING NON-PURGE	P0496	This DTC will determine if the purge solenoid is leaking.	<u>PURGE VALVE LEAK TEST:</u> Purge Valve closed TP > 0% but < 99.6% Engine Vacuum ≥ 10 kPa Tank Vacuum ≥ 12 in. H ₂ O for 2 sec within ≤ 37.5 seconds after 30 second delay.	<u>TEST ENABLE :</u> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active Coolant Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% PLM > .89 System Voltage > 10V but < 18V <u>COLD START TEST:</u> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temp Δ°C(ECT - IAT)<8.25°C if ECT > IAT BARO >75.0 kPa <u>EXCESS VACUUM TEST -STAGE I :</u> Vent solenoid commanded OPEN Fuel Tank Vacuum < 7 in. H ₂ O <u>WEAK VACUUM TEST -Stage I :</u> Throttle position < 75% Vehicle speed < 65 mph Tank Vacuum ≥ 9 in. H ₂ O within a value 40 integral seconds...	<u>PURGE VALVE LEAK TEST:</u> 180 seconds Max. Once per cold start	DTC Type B

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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 SYSTEM PERFORMANCE (MANUAL TRANS)	P0500	This DTC detects a missing signal from the vehicle speed sensor in a manual transmission vehicle.	Vehicle speed = 0 when enable conditions met	Manual VSS diagnostic enabled No MAP DTC's set No TPS DTC's set No ECT DTC's set No idle system DTC's set No IAC valve DTC's set Coolant $\geq 35^{\circ}$ C Engine speed > 1000 rpm 5% < throttle position < 100% A/C off: 40 kPa < MAP < 100 kPa A/C on: 45 kPa < MAP < 100 kPa Above conditions met > 2 seconds to enable diagnostic	500 test failures in a 600 test sample 100 ms/test Continuous	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, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT $\geq 60^{\circ}$ 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, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT $\geq 60^{\circ}$ 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

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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 < 40 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
PCM – FLASH EEPROM CHECKSUM ERROR	P0601	Indicates that PCM 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
PCM – PROGRAMMING ERROR	P0602	Indicates that the PCM is not flashed.	PCM not flashed.	Ignition on.	1 test failure 100 ms after PCM powered-up	DTC Type A
PCM RAM FAILURE	P0604	Indicates that PCM 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
PCM INTEGRITY	P0606	Indicates that the PCM has detected an ETC internal processor integrity fault	ETC has process sequencing error, dual path consistency error, clock error, or computer is not operating properly	Ignition in Run/Crank or during key-off	Fault sets within 200 msec Runs every 18.75 msec	DTC Type A
5 VOLT REFERENCE A CIRCUIT	P0641	Determines if the supply voltage for the 5 volt reference is within an acceptable limit.	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	DTC Type B
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 PCM 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 > 10.0 volts, but < 18 volts	5 seconds. Continuous.	DTC Type B No MIL

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ENGINE DIAGNOSTIC PARAMETERS**

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5 VOLT REFERENCE B CIRCUIT	P0651	Determines if the supply voltage for the 5 volt reference is within an acceptable limit	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	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
PRNDL SWITCH	P0706	Check for PRNDL switch malfunction	Start run is achieved if reverse or drive is indicated; or if in park or neutral if: TPS > 5% Torque > 50 ftlbs VSS > 20 mph Failcounts: 100/150 samples	Ignition voltage >6 and < 18 V Gear > 3	Stuck in drive immediately upon start Stuck in PN 10 seconds Continuous Monitor	DTC Type C
TCM MIL REQUEST CONTROL CIRCUIT	P0802	Integrity check for the TCM MIL request line	TCM MIL request line is never active during integrity check.	Ignition on time < 7 seconds Ignition voltage > 11 V	Ignition on time < 7 seconds 100 msec	DTC Type A
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 MPH above a threshold value and back to 0 MPH.	No VSS codes present VSS > 24 MPH	7 test failures in a 8 test sample size 100ms Continuous	DTC Type B (Manual Only)

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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
Manifold Absolute Pressure Sensor Circuit Intermittent High	P1106	This DTC detects an open sensor ground or intermittent 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 ≤ 0.4 % when engine speed is ≤ 1200 RPM or Throttle Position is ≤ 20 % when engine speed is > 1200 RPM	640 test failures in a 4000 test sample. 1 sample/100 ms	DTC Type C
Manifold Absolute Pressure Sensor Circuit Intermittent Low	P1107	This DTC detects a intermittent short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < .04 volts (3 counts)	TP sensor DTC's not active Engine Running Throttle Position is ≥ 0% when engine speed is ≤ 800 RPM or Throttle Position is ≥ 12.5 % when engine speed is > 800 RPM No 5v ref. DTC's	640 test failures in a 4000 test sample. 1 sample/100 ms	DTC Type C
IAT Sensor Circuit Intermittent High Voltage	P1111	This DTC determines if the IAT sensor is shorted high intermittently by checking for an IAT sensor output voltage above a threshold	IAT Voltage > 4.95 V	No MAF DTC's No IAT Sensor High DTC's ECT ≥ 60° C VSS < 7 mph MAF < 15 g/s Engine Run Time > 120 seconds	50 test failures in a 1000 test sample 1 sample/sec	DTC Type C
IAT Sensor Circuit Intermittent Low Voltage	P1112	This DTC determines if the IAT sensor is shorted low intermittently by checking for an IAT sensor output voltage below a threshold	IAT Voltage < 0.244 V	No IAT Sensor Low DTC's ECT < 125° C VSS ≥ 25 mph Engine Run Time > 45 seconds	50 test failures in a 1000 test sample 1 sample/sec	DTC Type C
ENGINE COOLANT TEMP SENSOR CIRCUIT INTERMITTENT LOW (HIGH TEMP)	P1114	This DTC detects a continuous short to ground in the ECT signal circuit or the ECT sensor.	<u>Low Resistance Pull-up</u> Raw ECT < .234 Volts <u>High Resistance Pull-up</u> Raw ECT < .035 Volts	Engine run time > 10 seconds Or Engine run time < 10 seconds IAT < 50° C	55 test failures in a 1000 test sample. 1 sample/sec	DTC Type C

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ENGINE COOLANT TEMP SENSOR CIRCUIT INTERMITTENT HIGH (LOW TEMP)	P1115	Circuit Continuity This DTC detects a continuous short to high or open in the ECT signal circuit or the ECT sensor.	<u>Low Resistance Pull-up</u> Raw IAT > 4.93 Volts <u>High Resistance pull-up</u> Raw IAT > 4.95 Volts	Engine run time > 60 seconds Or Engine run time < 60 seconds IAT > 0° C	55 test failures in a 1000 test sample. 1 sample/sec	DTC Type C
THROTTLE POSITION SENSOR CIRCUIT INTERMITTENT HIGH	P1121	This DTC detects a intermittent short to high or open in either the signal circuit or the TP sensor	TPS (V) > 4.89 v (250 counts)	No 5V Ref. DTC's	101 test failures in a 2000 test sample size. 1 sample/100 ms	DTC Type C
THROTTLE POSITION SENSOR CIRCUIT INTERMITTENT LOW	P1122	This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor	TP sensor signal voltage < .149 volts (7.6 counts)	No 5v ref DTC's	101 test failures in a 2000 test sample size. 1 sample/100ms	DTC Type C
ACCELERATOR PEDAL POSITION SYSTEM	P1125	PCM determines a limp home mode of operation due to multiple accelerator pedal sensor faults.	This DTC is set when: 1) 2 or more APP sensors are out of range, OR 2) all 3 APP sensors disagree, OR 3) one APP sensor is out of range AND the other 2 APP sensors disagree.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	One occurrence. Check runs every 18.75 ms.	DTC Type A For use on vehicles with ETC
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.	The oxygen sensor switches between 250 – 625 mV. Number of switches: L/R switches < 55 R/L switches < 57	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 20 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	100 sec Once per trip.	DTC Type B

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HO2S TRANSITION TIME DIFFERENCE (B1S1)	P1134	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 +90 ms Min -172 ms	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 20 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	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.	The oxygen sensor switches between 250 – 625 mV. Number of switches: L/R switches < 53 R/L switches < 53	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 18 < Air Flow < 55 g/s. 10 V < System Voltage < 18 V TPS > 5% Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0151, P0152, P0154 and P0155 not set No AIR, EGR, Throttle, MAT, Injector, Coolant, Air Flow, Purge Control, Misfire, MAP, Engine Protect or Fuel Composition faults active.	100 sec Once per trip.	DTC Type B

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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 +90 ms Min -167ms	Closed Loop Fuel Control Engine runtime > 160 sec 1200 < RPM < 3000 20 < Air Flow < 55 g/s. TPS > 5% 10 V < System Voltage < 18 V Fuel > 10% ECT > 60 °C CCP > 0 Ethanol % < 90 -1280 °C < Predicted Oxygen Sensor Temp < 1280 °C Above conditions met for 1 sec DTC's P0131, P0132, P0134 and P0135 not set No AIR, EGR, Throttle, MAT, 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 \geq 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 PCM indicating that a failure has occurred in the ABS module	none	450 failures out of 500 samples	DTC Type C (DTC sets when a P0300 is active)
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS module. When this occurs, misfire will STILL run.	Serial data messages are lost	none	450 failures out of 500 samples	DTC Type C (DTC sets when a P0300 is active)

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COMMAND vs ACTUAL THROTTLE PERF. (TAC MODULE)	P1516	Indicates that the TAC Module has detected a throttle positioning error OR Either Processor cannot determine throttle positioning OR Both TP Sensors are invalid	ABS (throttle error): a) ≥ 2 degrees for >200 ms with no change in error sign. OR b) ≥ 2 degrees for >500 ms for throttle command changes ≥ 2 degrees. OR c) ≥ 5 degrees for >200 ms for throttle command changes ≥ 5 degrees. OR d) ≥ 5 degrees for > 300 ms with no change in error sign. OR 2) PCM processor DTC's. OR 3) TACM processor DTC. OR 4) both TPS Circuit DTC's are set. OR 5) PCM-TACM Serial Data DTC w/ any APP Sensor DTC or TP Sensor DTC. [Throttle error = Measured throttle position - commanded throttle position]	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. Not in battery saver mode.	One occurrence. Check runs every 3 ms.	DTC Type A For use on vehicles with ETC
Fuel Level No Change, Stuck in Range Secondary Tank	P2066	This DTC will detect a fuel sender stuck in range	IF Delta Fuel Volume change less than 3 liters over a accumulated 65 miles. OR IF Transfer pump ON and at Idle delay ≈ 20 seconds then IF timer > 120 sec. AND Secondary tank not decrease by 4 liters AND Primary DID Increase > 4 liters. OR If Primary is FULL and Secondary is EMPTY for > 275 miles.	Fuel level greater than 30 liters		DTC Type C No Light For use on vehicles with duel fuel tank

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Fuel Level Stuck Low Secondary Tank	P2067	This DTC will detect a fuel sender stuck out of range low	Fuel level A/D counts less than 20 A/D counts for 100 seconds	runs continuously		DTC Type C No Light For use on vehicles with dual fuel tank
Fuel Level Stuck High Secondary Tank	P2068	This DTC will detect a fuel sender stuck out of range high	Fuel level A/D counts more than 150 A/D counts for 100 seconds	runs continuously		DTC Type C No Light For use on vehicles with dual fuel tank
COMMAND vs ACTUAL THROTTLE PERF. (PCM)	P2101	Indicates that the PCM has detected a throttle positioning error	ABS (throttle error) > 5%. [Throttle error = Measured throttle position - modeled throttle position]	Ignition in Run or Crank TACM determines PCM Desired Throttle Position is valid. Not in battery saver mode. No Airflow Actuation DTC. (Engine Running = true) OR (Ignition Voltage > 8.5 volts). No Throttle Actuation DTC. No PCM-TACM Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's. No TACM Processor DTC.	High counter increments by 2 for every throttle error > 5%; decrements by 1 if %<t.e.<5%; decrements by 5 if -5%<t.e.<0%; clears if t.e. < -5%. Check runs every 18.75 ms with TACM - PCM valid message received. Low counter increments by 2 for every throttle error < -5%; decrements by 1 if -5%<t.e.<0%; decrements by 5 if 0%<t.e.<5%; clears if t.e. > 5%. Check runs every 18.75 ms with TACM - PCM valid message received.	DTC Type A For use on vehicles with ETC

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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
TAC MODULE PROCESSOR	P2108	<p>Indicates that TAC Module is unable to correctly read data from the flash memory.</p> <p>Indicates that TAC Module is unable to correctly write and read data to and from RAM.</p> <p>Indicates that the TAC Module has detected an internal processor integrity fault.</p>	<p>1) Power-up test fails to read/write data OR</p> <p>2) Max. allowed Running Resets exceeded OR</p> <p>3) ROM checksum does not match expected checksum OR</p> <p>4) RAM data read does not match data written OR</p> <p>5) Failure of Interrupt process flag to match expected value. OR</p> <p>6) Program is not executed in the proper order OR</p> <p>7) Primary and Redundant RAM variables disagree OR</p> <p>8) Primary and Redundant Indicated Pedal Position calculation difference = 0.0%. OR</p> <p>9) Math/Logic test fails to equate to a predetermined value. OR</p> <p>10) Internal Register data read does not match data written. OR</p> <p>11) Internal Timer fails to increment OR</p> <p>12) Watchdog Timer fails to increment OR</p> <p>13) Failure of Processor Stack pointer to zero at Main Loop.</p>	<p>Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data.</p>	<p>1) One occurrence Check runs at Reset initialization</p> <p>2) 10 occurrences during ignition cycle Check runs at Reset initialization</p> <p>3) One occurrence. Check runs at power up and every 60 seconds thereafter.</p> <p>4) One occurrence. Check runs at power up and every 800 milliseconds thereafter</p> <p>5) - 13) One occurrence. Check runs every 3 milliseconds. Second Watchdog timer runs in 10 millisecond loop.</p>	<p>DTC Type A</p> <p>For use on vehicles with ETC</p>

**2004 4.3L (LU3), 4.8L (LR4), 5.3L (LM7), 5.3L (L59) flex fuel, 5.3L (LM4), 5.7L (LS1), 5.7L (LS6),
6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
APP SENSOR 1 CIRCUIT	P2120	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the APP sensor #1. OR 2) TACM indicates an invalid minimum mechanical position for the APP sensor #1. OR 3) TACM indicated reference voltage out of range.	1) Raw APP sensor signal < 0.235 V or > 4.487 V. OR 2) APP sensor minimum mechanical stop voltage < 0.235 V. OR 3) Vref out of range < 4.54 V or > 5.21 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) & 2) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 133. Check runs every 3 ms.	DTC Type C For use on vehicles with ETC
APP SENSOR 1 PERFORMANCE	P2121	1) TACM indicates a continuous or intermittent correlation fault between APP sensors #1 and #2 AND #1 and #3. OR 2) TACM indicates an invalid minimum mechanical position correlation between APP sensor #1 and #2 AND #1 and #3. OR 3) PPS1 signal short to PPS2 signal, any reference, or ground.	1)ABS(raw APP sensor #2 voltage - raw APP sensor #1 voltage) > 0.269 V. OR 2) PPS1 to PPS2 > 0.05V when PPS2 reference is 0.0 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 180 Check runs every 3 ms. 2) Counter increments by 4 for ever error, decrements by 1 for every pass: threshold is 1333 Check runs every 3ms..	DTC Type C For use on vehicles with ETC

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6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
APP SENSOR 2 CIRCUIT	P2125	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the APP sensor #2. OR 2) TACM indicates an invalid minimum mechanical position for the APP sensor #2. OR 3) TACM indicated reference voltage out of range.	1) Raw APP sensor signal < 0.235 V or > 4.487 V. OR 2) APP sensor minimum mechanical stop voltage > 0.235 V. OR 3) Vref out of range < 4.54 V or > 5.21 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) & 2) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 180. Check runs every 3 ms.	DTC Type C For use on vehicles with ETC
APP SENSOR 2 PERFORMANCE	P2126	1) TACM indicates a continuous or intermittent correlation fault between APP sensors #1 and #2 AND #2 and #3. OR 2) TACM indicates an invalid minimum mechanical position correlation between APP sensor #1 and #2 AND #2 and #3.	ABS(5 V - raw APP sensor #2 voltage - raw APP sensor #1 voltage) > 0.20 V. AND ABS{5 V - [(raw APP sensor #3 voltage - 0.61 V) * 53 / 32] - (5 V - raw APP sensor #2 voltage)} > 0.26 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 1 for every error, decrements by 1 for every pass; threshold is 167. Check runs every 3 ms.	DTC Type C
APP SENSOR 3 CIRCUIT	P2130	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the APP sensor #3. OR 2) TACM indicates an invalid minimum mechanical position for the APP sensor #3.	1) Raw APP sensor signal < 1.63 V or > 4.38 V. OR 2) APP sensor minimum mechanical stop voltage > 4.28 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) & 2) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 106. Check runs every 3 ms.	DTC Type C

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6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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
APP SENSOR 3 PERFORMANCE	P2131	1) TACM indicates a continuous or intermittent correlation fault between APP sensors #1 and #3 AND #2 and #3. OR 2) TACM indicates an invalid minimum mechanical position correlation between APP sensor #1 and #3 AND #2 and #3.	ABS{5 V - [(raw APP sensor #3 voltage - 0.61 V) * 53 / 32] - raw APP sensor #1 voltage} > 0.26 V. AND ABS{5 V - [(raw APP sensor #3 voltage - 0.61 V) * 53 / 32] - (5 V - raw APP sensor #2 voltage)} > 0.26 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 1 for every error, decrements by 1 for every pass; threshold is 167. Check runs every 3 ms.	DTC Type C
THROTTLE POSITION SENSOR 1, 2 RANGE/PERF.	P2135	1) TACM indicates a continuous or intermittent correlation fault between TP sensors #1 and #2. OR 2) TACM indicates an invalid minimum mechanical position correlation between TP sensor #1 and #2. OR 3) TPS1 signal short to TPS2 signal, Any reference, or ground.	1) ABS(TPS1 raw – TPS2 raw) < 6.0%. OR 2) TPS1 sig to TPS2 sig > 0.05V when TPS2 reference = 0.0 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 180. Check runs every 3 ms. 2) One occurrence. Check runs at power-up 3) Counter increments by 4 for ever error, decrements by 1 for every pass: threshold is 1333 Check runs every 3ms..	DTC Type A For use on vehicles with ETC
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 +/- 0.3 seconds 4) The soak timer value decrements by any amount	PCM is powered down DTC sets on next key cycle if failure detected	Every key down	DTC Type B

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6.0L (LQ4), 6.0L (LQ9), 8.1L (L18)
ENGINE DIAGNOSTIC PARAMETERS**

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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 TO TAC MODULE SERIAL DATA CIRCUIT	U0107	Indicates that the serial data line between the PCM and TACM has intermittently or continuously failed.	PCM: No message for 18.75 ms. Corrupted data in the message. Invalid message protocol. PCM processor DTC's. TACM processor DTC. TAC Module: No message for 25 ms. Corrupted data in the message. Invalid message protocol. PCM processor DTC's. TACM processor DTC. Throttle Authority Limit Exceeded.	(Ignition in Run or Crank) AND engine not in crank state. Time since power-up > 0. Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data.	PCM and TACM continuous No valid message received for 500 ms. PCM Intermittent: Invalid or missing message increments counter by 10; valid message received decrements counter by 1; threshold is 254. TACM Intermittent: Invalid or missing message increments counter by 6; valid message received decrements counter by 1; threshold is 200. Check for invalid messages runs every 18.75 ms. Check for missing messages runs every 25 ms. Throttle Authority Limit Exceeded > 300 ms	DTC Type A For use on vehicles with ETC