2006 3.4L (LNJ) *when used in:* Equinox, Torrent

3.5L (LX9) *when used in:* G6, Malibu, Uplander, Terraza, Rendezvous, Montana, Relay

3.8L (L26, L32) *when used in:* Lucerne, LaCrosse, Allure, Grand Prix

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 (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	This DTC checks the CAM/CRANK signal correlation	Cam pulse occurred outside the 2nd and 7th medium resolution window	LNJ, LX9 • If medium resolution signal is matched, and Cam pulse occurred, and RPM < 1500, and no Cam or Crank fault exist. L26, L32 • If PCM State is run or crank and medium resolution and low resolution signals are correct and no Cam o Crank faults exist.	LNJ, LX9 Medium resolution interrupt L26, L32 Medium resolution interrupt	DTC Type B
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	• Ignition switch is in crank or run • 9 volts < Ignition Voltage < 18 volts	15 failures out of 20 samples Frequency: 100ms loop Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit	P0033 (GMX367 L32 only)	This DTC checks the Supercharcger Solenoid Control Circuit for electrical integrity	Output state invalid	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18	15 failure out of 20 samples OR chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	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
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	• Ignition switch is in crank or run • 9 volts < Ignition Voltage < 18 volts	15 failures out of 20 samples Frequency: 100ms loop Continuous	DTC Type B
O2S Heater Control Circuit Bank 2 Sensor 1	P0050 (GMX380/1 only)	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	• Ignition switch is in crank or run • 9 volts < Ignition Voltage < 18 volts	15 failures out of 20 samples Frequency: 100ms loop Continuous	DTC Type B
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Calculated Heater resistance > 9.3 Ω or < 3.13 Ω	• Coolant – IAT < 8ºC • Engine Soak Time > 10 Hours • -30ºC < Coolant Temp < 45ºC	Once per valid cold start.	DTC Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Calculated Heater resistance > 21.17 Ω or < 8.82 Ω	• Coolant – IAT < 8ºC • Engine Soak Time > 10 Hours • -30ºC < Coolant Temp < 45ºC	Once per valid cold start.	DTC Type B
O2S Heater Control Circuit Bank 2 Sensor 2	P0056 (GMX380/1 only)	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted or open	• Ignition switch is in crank or run • 9 volts < Ignition Voltage < 18 volts •	15 failures out of 20 samples Frequency: 100ms loop Continuous	DTC Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059 (GMX380/1 only)	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Calculated Heater resistance > 9.3 Ω or < 3.13 Ω	• Coolant – IAT < 8ºC • Engine Soak Time > 10 Hours • -30ºC < Coolant Temp < 45ºC •	Once per valid cold start.	DTC Type B
HO2S Heater Resistance Bank 2 Sensor2	P0060 (GMX380/1 only)	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Calculated Heater resistance > 21.17 Ω or < 8.82 Ω	• Coolant – IAT < 8ºC • Engine Soak Time > 10 Hours • -30ºC < Coolant Temp < 45ºC •	Once per valid 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
MAP/MAF – Throttle Position Correlation	P0068	Indicates that measured engine airflow does not match estimated engine airflow as established by the TP Sensor.	MAP based airflow – TP Sensor estimated airflow > 165 mg/cyl AND MAF based airflow – TP Sensor estimated airflow > 165 mg/cyl AND [(MAF failure or MAP failure) OR (NO Throttle DTC AND NO PCM-TACM serial data DTC)]	• Engine running = true. • Ignition on > 2 seconds • RPM > 600 • 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 fail counters are incremented by 2 for every error and decrement by 1 for every pass; both thresholds are 32; both fail counters must exceed threshold to set DTC. Frequency: 18.75 ms loop Continuous	DTC Type A
Manifold Absolute Pressure – Barometric Pressure Correlation	P0069 (GMX367 L32 only)	This DTC compares the Predicted Barometric Pressure to the Barometric Pressure Sensor value.	When Predicted BARO is MAP, Difference between Predicted BARO and Barometer Pressure Sensor > 5.195313 kPa When Predicted BARO is calculated, Difference Between Predicted BARO and Barometer Pressure Sensor > 60 kPa	• No Map Sensor DTC’s active • No TP Sensor DTC’s active • No ECT Sensor DTC’s active • No MAF Sensor DTC’s active • No IAT Sensor DTC’s active • No VSS DTC’s active • No BARO Sensor Shorted/Open DTC’s active • Predicted BARO must have been updated within the last 1 mile of this trip; Predicted BARO is set equal to powerup MAP at start of trip	10 failures out of 100 samples Frequency: 100ms loop Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Mass Airflow (MAF) Sensor Performance	P0101	This DTC determines if the MAF sensor is not within the normal operating range.	(Calculated Flow - Measured Flow) > cal table lookup as a function of calculated flow	• No MAF circuit DTC's failing • No MAP DTC's failing • No TP Sensor DTC's failing • No EVAP DTC's failing • No EGR DTC's failing • No TAC System DTC faults • No ECT DTC's failing • No IAT DTC's failing • PCM State = RUN • Traction Control = Not Active • EGR Flow Diag. – Not Active • EGR ≤ 100% • EGR DC ≤ 100% • EVAP Canister Purge Valve Duty Cycle ≤ 100% • Delta MAP ≤ 5.195313 kPa • Delta TP Sensor ≤ 15 % • Engine Vacuum ≤ 80 kPa • TP Sensor ≤ 100% • 9 volts ≤ Ignition Voltage ≤ 18 volts • If ignition voltage ≤ 11.5 volts then undefaulted MAF must be ≤ 40 gps • Enable Criteria Stable Time ≥ 2 seconds	320 test failures in a 400 test sample Frequency: 100 ms loop Continuous	DTC Type B
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This DTC detects a continuous short to low or open in either the signal circuit or the MAF sensor.	MAF sensor signal ≤ 1200 Hz	• Engine Run Time ≥ 0 seconds • RPM ≥ 50 • System Voltage ≥ 8 volts • Ignition is in crank or run • Indicated Throttle Position ≥3.496094 percent rotation (Vehicles with Electronic Throttle Control) (OR IAC steps ≥ 5 for vehicles without Electronic Throttle Control) • Enable Criteria Stable Time ≥ 0.5 seconds	395 test failures in a 400 test sample 1 sample on every reference pulse	DTC Type B
Mass Air Flow (MAF) Sensor Circuit High	P0103	This DTC detects a continuous short to high in either the signal circuit or the MAF sensor.	MAF sensor signal ≥ 11500 Hz	• Engine Run Time ≥ 0 seconds • RPM ≥ 50 • System Voltage ≥ 8 volts • Ignition is in crank or run • Indicated Throttle Position ≥3.496094 percent rotation (Vehicles with Electronic Throttle Control) (OR IAC steps ≥ 5 for vehicles without Electronic Throttle Control) • Enable Criteria Stable Time ≥ 0.5 seconds	395 test failures in a 400 test sample 1 sample on every reference pulse	DTC Type B

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
Manifold Absolute Pressure (MAP) Sensor Circuit Low	P0107	This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP sensor signal < 1.95%	• No TP Sensor DTC's failing • No TAC system DTC's failing • [(TP Sensor ≥ 0 & Engine Speed ≤1000) or (TP Sensor ≥ 10% & Engine Speed > 1000)]	175 test failures in a 200 test sample Continuous: 12.5 ms loop if engine is not running every reference pulse below 3200 rpm when engine is running every other reference pulse above 3200 rpm when engine is running	DTC Type B
Manifold Absolute Pressure (MAP) Sensor Circuit High	P0108	This DTC detects a continuous short to high in either the signal circuit or the MAP sensor.	MAP sensor signal > 86.21%	• No TP Sensor DTC's failing • No TAC system DTC's failing • Controller State = RUN • Engine Run Time based on power up coolant temperature: > 1 sec at ≥ 30°C >30 sec at 15°C > 45 sec at 0°C >90 sec at –15°C > 120 sec at -30° C; time is interpolated between temperature points • [(TP Sensor < 2% & Engine Speed ≤ 3000) or (TP Sensor < 30% & Engine Speed > 3000)]	175 test failures in a 200 test sample Continuous: 12.5 ms loop if engine is not running every reference pulse below 3200 rpm when engine is running every other reference pulse above 3200 rpm when engine is running	DTC Type B
Intake Air Temperature (IAT) Sensor Circuit Low	P0112	This DTC determines if the IAT sensor is shorted low by checking for an IAT sensor output voltage below a threshold	IAT sensor signal < 0.703%	• No VSS DTC's failing • No ECT DTC's failing • Vehicle speed ≥ 25.00 mph • Engine run time > 10.00 seconds • ECT < 123°C • Engine Run Time > 10 seconds	175 test failures within 1200 test sample s <u>Frequency:</u> 100 ms loop Continuous	DTC Type B
Intake Air Temperature (IAT) Sensor Circuit High	P0113	This DTC determines if the IAT sensor is shorted high or open by checking for an IAT sensor output voltage above a threshold	IAT sensor signal > 99%	• No ECT DTC's failing • No VSS DTC's failing • No MAF DTC's failing • Vehicle speed < 15.00 mph • Airflow < 10.00 g /s • ECT ≥ 60.00 °C • Engine run time> 180.00 seconds	1100 test failures within a 1200.00 test sample <u>Frequency:</u> 100 ms loop Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects if the engine coolant sensor is biased high while in range.	A failure will be reported if any of the following occur: ECT at powerup > IAT at powerup by 100°C after a minimum 8 hour soak (fast fail). ECT at powerup > IAT at powerup by 15°C after a minimum 8 hour soak and a block heater has not been detected. ECT at powerup > IAT at powerup by 15°C after a minimum 8 hour soak and the time spent cranking the engine without starting is greater than 5 seconds with the fuel level being above a minimum level of 10%.	• No VSS DTC's • No IAT DTC's • No ECT sensor shorted DTC's • ECM/PCM Internal Engine Off Timer Performance DTC not active • Non-volatile memory failure has not been detected on power-up. • Engine off time > 480 minutes (8 hours) • Test run this trip = false • Test aborted this trip = false Block heater detection: - ECT at powerup > IAT at powerup by 15°C - Powerup IAT > 15°C - Vehicle driven a minimum of 300 seconds above 25 mph and IAT drops more than 5° C from powerup IAT.	<u>Frequency:</u> Once per ignition cycle 100 ms loop	DTC Type B
Engine Coolant Temperature (ECT) Sensor Circuit Low	P0117	Thermistor Analog Voltage This DTC detects if the engine coolant sensor's analog voltage falls below a minimum expected value	ECT sensor signal < 0.5078%	• Engine run time > 3.00 seconds OR min IAT ≤ 90°C	240 test failures within a 250.00 test sample <u>Frequency:</u> 100 ms loop Continuous	DTC Type B
Engine Coolant Temperature (ECT) Sensor Circuit High	P0118	Thermistor Analog Voltage This DTC detects if the engine coolant sensor's analog voltage exceeds a maximum expected value	ECT sensor signal > 99.4921%	• Engine run time > 30.00 seconds OR min IAT ≥ 0°C	240 test failures within a 250.00 test sample <u>Frequency:</u> 100 ms loop Continuous	DTC Type B

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Throttle Position (TP) 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 indicates 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) Reference Voltage < 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. 3a). Continuous. Counter increments by 1 for every error, decrements by 1 for every pass. Threshold is 10ms. For reference voltage direct short to ground. 3b) 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 reference voltage to be 5volts +/- tolerance.	DTC Type A
Engine Coolant Temperature (ECT) Insufficient for Closed Loop Fuel Control	P0125	This DTC detects if the engine coolant temperature rises too slowly due to an ECT sensor or cooling system fault	If actual accumulated airflow is > predicted accumulated airflow before engine coolant reaches 15 °C	• No MAF DTC's • No IAT sensor DTC's • NO ECT sensor shorts DTC's • No VSS DTC's • ECT Sensor shorts tests not failing • Start up ECT < -6.99 °C • Minimum Average Airflow > 1.0 gps • Vehicle speed > 5 MPH for 0.50 miles • 30.00 sec < Engine Run Time < 1800.00 sec • IAT ≥ -7.03 °C • ECT > -40 °C • Maximum airflow added to actual accumulated airflow limited to 30 gps Note: the min IAT used above is clamped to a maximum value of 54.5°C	30 failures to set DTC <u>Frequency:</u> Once per ignition cycle 1 second loop	DTC Type B

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Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or cooling system fault	If actual accumulated airflow is > predicted accumulated airflow before engine coolant reaches 80.00 °C	• No MAF DTC's • No IAT sensor DTC's • NO ECT sensor shorts DTC's • No VSS DTC's • ECT Sensor shorts tests not failing • Start up ECT < 75 °C • Minimum Average Airflow > 1 gps • Vehicle speed > 5 MPH for 0.50 miles • 30.00 sec < Engine Run Time < 1800.00 sec • IAT ≥ -7.03 °C • ECT > -40 °C • Maximum airflow added to actual accumulated airflow limited to 30 gps Note: the min IAT used above is clamped to a maximum value of 54.5°C	30 failures to set DTC <u>Frequency:</u> Once per ignition cycle 1 second loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low by checking for a lean condition during steady throttle and PE.	O2 sensor voltage < 78.125 millivolts or O2 sensor voltage < 600.00 millivolts in PE mode	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test= Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence ratio ≤ 1.088 • 4 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • ECT < 131°C All of the above met for at least 3 seconds For PE Test • All injectors = on • Indication that closed loop fueling is ready • Equivalence Ratio ≥ 1.088 • Engine Run Time ≥ 300 seconds All of the above met for at least 2 seconds	155 test failures in a 170.00 test sample for 3.00 sets of samples 60.00 failures in a 75.00 test sample for PE mode Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle.	O2 sensor voltage > 889.76 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test= Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence Ratio ≤ 1.088 • 3.00 % ≤ throttle position ≤ 40.00 % • Fuel_State = Closed loop All of the above met for at least 3 seconds	100.00 test failures in a 125 test sample for 6.00 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded	O2 Sensor Average Transition Time: LRA > 200.00 ms or RLA > 200.00 ms	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater driver DTCs = Not Active • Bank 2 Sensor 1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP Canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second.	90000.00 ms Frequency: Once per trip	DTC Type B

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O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor is open.	381.94 millivolts < O2 sensor < 525.17 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific_Enable_Criteria • Engine run time > 124.00 seconds • Predicted O2 temperature > 0°C	250 test failures in a 300 test sample Frequency: Continuous for pre catalyst sensors 100 ms loop rate	DTC Type B

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O2S Heater Performance Bank 1 Sensor 1	P0135	Current Monitor: This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Current Monitor: The heater full on current is < 0.3125 amps or > 1.426 amps	Current Monitor: Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Engine Run Time ≥ 100 seconds • ECT ≥ 65° C • 600 ≤ Engine Rpm ≤ 3000 • 4 gps ≤ Mass Airflow ≤ 30 gps • O2 heater not in Device control • O2 heater driver DTC not active All of the above met for at least 2 seconds	Current Monitor: 17 test failures in 20 test samples Frequency: 5 tests per trip 30 second delay between tests 1 second execution rate	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low by checking for a lean condition during steady throttle.	O2 sensor voltage < 78.125 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence ratio ≤ 1.088 • 4 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • ECT < 131°C All of the above met for at least 3 seconds	360 test failures in a 400 test sample for 3.00 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle.	O2 sensor voltage > 924.48 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic = Not Active • Catalyst monitor diagnostic = Not Active • Post Oxygen Sensor Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence Ratio ≤ 1.088 • 3.00 % ≤ throttle position ≤ 40.00 % • Fuel_State = Closed loop All of the above met for at least 3 seconds	540 test failures in a 600 test sample for 2 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor is open.	390.63 millivolts < O2 sensor < 520.83 millivolts for regular open test 381.94 millivolts < O2 sensor < 525.17 millivolts to fail the fast pass open test (must fail the regular open test in order to fail the DTC; regular open test is run if fast pass is not run or if fast pass fails)	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic = Not Active • Catalyst monitor diagnostic = Not Active • Post Oxygen Sensor Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • O2S Heater Performance Bank 1 Sensor 2 not active • O2S Heater Control Circuit Bank 1 Sensor 2 not active • PCM State = run Fast Pass: • (Engine run time ≤ 90 seconds) OR (current start <> cold start) Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C (Fast pass cannot report a fail; if Fastpass fails, the regular open test is run) Regular Open Test • Engine run time > 124 seconds • Predicted O2 temperature > 0° C • Fuel state = closed loop • Minimum of 3 occurrences of a delta TP sensor ≥ 5.2 % during diagnostic test	1080 test failures in a 1200 test sample for regular open test (sample counts – failure counts) < 180 within 90 seconds of engine run time to fail the fast pass test (regular open test is run when fast pass fails; to fail DTC the regular open test must fail) Frequency: Once/trip for post catalyst sensors 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	The heater full on current is < 0.2148438 amps or > 0.957031 amps	Current Monitor: Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test = Not Active • Catalyst monitor diagnostic Intrusive Test = Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Engine Run Time ≥ 100 seconds • ECT ≥ 65° C • 600 ≤ Engine Rpm ≤ 3000 • 4 gps ≤ Mass Airflow ≤ 30 gps • O2 heater not in Device control O2 heater driver DTC not active All of the above met for at least 2 seconds	Current Monitor: 17 test failures in 20 test samples Frequency: 5 tests per trip 30 second delay between tests 1 second execution rate	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151 (GMX380/1 only)	This DTC determines if the O2 sensor circuit is shorted to low by checking for a lean condition during steady throttle and PE.	O2 sensor voltage < 78.125 millivolts or O2 sensor voltage < 600.00 millivolts in PE mode	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test= Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence ratio ≤ 1.088 • 4 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • ECT < 131°C All of the above met for at least 3 seconds For PE Test • All injectors = on • Indication that closed loop fueling is ready • Equivalence Ratio ≥ 1.088 • Engine Run Time ≥ 300 seconds All of the above met for at least 2 seconds	155 test failures in a 170.00 test sample for 3.00 sets of samples 60.00 failures in a 75.00 test sample for PE mode Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit High Voltage Bank 2 Sensor 1	P0152 (GMX380/1 only)	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle.	O2 sensor voltage > 889.76 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test= Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence Ratio ≤ 1.088 • 3.00 % ≤ throttle position ≤ 40.00 % • Fuel_State = Closed loop All of the above met for at least 3 seconds •	100.00 test failures in a 125 test sample for 6.00 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Slow Response Bank 2 Sensor 1	P0153 (GMX380/1 only)	This DTC determines if the O2 sensor response time is degraded	O2 Sensor Average Transition Time: LRA > 200 ms or RLA > 200 ms	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater driver DTCs = Not Active • Bank 2 Sensor 1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP Canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second. •	90000.00 ms Frequency: Once per trip	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154 (GMX380/1 only)	This DTC determines if the O2 sensor is open.	381.94 millivolts < O2 sensor < 525.17 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Engine run time > 124.00 seconds • Predicted O2 temperature > 0°C •	250 test failures in a 300 test sample Frequency: Continuous for pre catalyst sensors 100 ms loop rate	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
O2S Heater Performance Bank 2 Sensor 1	P0155 (GMX380/1 only)	Current Monitor: This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Current Monitor: The heater full on current is < 0.3125 amps or > 1.426 amps	Current Monitor: Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Engine Run Time ≥ 100 seconds • ECT ≥ 65° C • 600 ≤ Engine Rpm ≤ 3000 • 4 gps ≤ Mass Airflow ≤ 30 gps • O2 heater not in Device control • O2 heater driver DTC not active All of the above met for at least 2 seconds •	Current Monitor: 17 test failures in 20 test samples Frequency: 5 tests per trip 30 second delay between tests 1 second execution rate	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157 (GMX380/1 only)	This DTC determines if the O2 sensor circuit is shorted to low by checking for a lean condition during steady throttle.	O2 sensor voltage < 78.125 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic intrusive test = Not Active • Catalyst monitor diagnostic intrusive test = Not Active • Post Oxygen Sensor Diagnostic intrusive test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence ratio ≤ 1.088 • 4 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • ECT < 131°C All of the above met for at least 3 seconds	360 test failures in a 400 test sample for 3.00 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit High Voltage Bank 2 Sensor 2	P0158 (GMX380/1 only)	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle.	O2 sensor voltage > 924.48 millivolts	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic = Not Active • Catalyst monitor diagnostic = Not Active • Post Oxygen Sensor Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.88 ≤ Equivalence Ratio ≤ 1.088 • 3.00 % ≤ throttle position ≤ 40.00 % • Fuel_State = Closed loop All of the above met for at least 3 seconds •	540 test failures in a 600 test sample for 2 sets of samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160 (GMX380/1 only)	This DTC determines if the O2 sensor is open.	390.63 millivolts < O2 sensor < 520.83 millivolts for regular open test 381.94 millivolts < O2 sensor < 525.17 millivolts to fail the fast pass open test (must fail the regular open test in order to fail the DTC; regular open test is run if fast pass is not run or if fast pass fails)	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic = Not Active • Catalyst monitor diagnostic = Not Active • Post Oxygen Sensor Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • O2S Heater Performance Bank 1 Sensor 2 not active • O2S Heater Control Circuit Bank 1 Sensor 2 not active • PCM State = run Fast Pass: • (Engine run time ≤ 90 seconds) OR (current start <> cold start) Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C (Fast pass cannot report a fail; if Fastpass fails, the regular open test is run) Regular Open Test • Engine run time > 124 seconds • Predicted O2 temperature > 0° C • Fuel state = closed loop • Minimum of 3 occurrences of a delta TP sensor ≥ 5.2 % during diagnostic test	1080 test failures in a 1200 test sample for regular open test (sample counts – failure counts) < 180 within 90 seconds of engine run time to fail the fast pass test (regular open test is run when fast pass fails; to fail DTC the regular open test must fail) Frequency: Once/trip for post catalyst sensors 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Heater Performance Bank 2 Sensor 2	P0161 (GMX380/1 only)	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	The heater full on current is < 0.2148438 amps or > 0.957031 amps	Current Monitor: Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test = Not Active • Catalyst monitor diagnostic Intrusive Test = Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Engine Run Time ≥ 100 seconds • ECT ≥ 65° C • 600 ≤ Engine Rpm ≤ 3000 • 4 gps ≤ Mass Airflow ≤ 30 gps • O2 heater not in Device control • O2 heater driver DTC not active All of the above met for at least 2 seconds	Current Monitor: 17 test failures in 20 test samples Frequency: 5 tests per trip 30 second delay between tests 1 second execution rate	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition.	The EWMA of long term fuel trim (LTM) samples ≥ 1.25 (Note: EWMA stands for "Exponentially Weighted Moving Average") Notes: 1. At least 24 seconds of data must accumulate on each trip before the EWMA of LTM samples is considered usable and at least 15 seconds of data in the current fuel trim cell must accumulate on each trip before the LTM for that cell is considered usable in the EWMA calculation.	• No Misfire DTC's • No O2 Sensor DTC's • No EVAP DTC's • No Fuel Injector DTC's • No Fuel Temperature or Composition DTC's • No IAC, MAF, or MAP DTC's • No ECT DTC's • No EGR DTC's • No A.I.R. DTC's • No TP Sensor or TAC System DTC's • Engine speed > 500 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -38.89°C but < 132°C • MAP > 5 kpa but < 105 kpa • IAT > -20.5 °C but < 150°C • Mass Airflow > 0.5 g/s but < 510 g/s • Vehicle speed < 82 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test. • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken)	Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition.	The EWMA of long term fuel trim (LTM) samples ≤ 0.765 Once the above occurs, purge is ramped off to determine if excess purge is the cause. Therefore, the following must also occur to report a failure: The EWMA of LTM samples with purge off ≤ 0.76 during 3 of 5 intrusive segments. General Notes: 1. At least 24 seconds of data must accumulate on each trip before the EWMA of LTM samples is considered usable and at least 15 seconds of data in the current fuel trim cell must accumulate on each trip before the LTM for that cell is considered usable in the EWMA calculation. Passive Note: 1. If the conditions in the General Notes above are achieved and the non-purge threshold of 0.76 has been exceeded before purge is enabled, a passive failure result will be reported and no intrusive test is run. If a passive result of "pass" is achieved, an intrusive test will be run later in the trip if and when those conditions are met. Intrusive Notes: 1. Segments can last up to 60 seconds, and are separated by the smaller of a 24 second purge-on time or enough time to purge 13 grams of vapor. 1. A maximum of 5 completed segments are allowed for each intrusive test, and up to 20 intrusive attempts allowed per trip. 2. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess	• No Misfire DTC's • No O2 Sensor DTC's • No EVAP DTC's • No Fuel Injector DTC's • No Fuel Temperature or Composition DTC's • No IAC, MAF, or MAP DTC's • No ECT DTC's • No EGR DTC's • No A.I.R. DTC's • No TP Sensor or TAC System DTC's • Engine speed > 500 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -38.89°C but < 132°C • MAP > 5 kpa but < 105 kpa • IAT > -20.5 °C but < 150°C • Mass Airflow > 0.5 g/s but < 510 g/s • Vehicle speed < 82 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test. • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) Intrusive Enable Criteria • The EWMA of long term fuel trim (LTM) samples ≤ 0.765 • RPM > 500 • Mass Airflow > 0.5 g/s but < 510 g/s • MAP > 5 kpa but < 105 kpa Temporary Intrusive Test Inhibit Criteria • If intrusive test segment exceeds 60 consecutive seconds. (in this case, purge valve is opened for the smaller of 10 seconds or enough time to purge 13 grams vapor)	If rich segment fail counter is ≥ 3 before segment pass counter ≥ 3, diagnostic fails. Frequency: Continuous 100 ms loop	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
Fuel System Too Lean Bank 2	P0174 (GMX380/1 only)	Determines if the fuel control system is in a lean condition.	The EWMA of long term fuel trim (LTM) samples ≥ 1.25 (Note: EWMA stands for "Exponentially Weighted Moving Average") Notes: 2. At least 24 seconds of data must accumulate on each trip before the EWMA of LTM samples is considered usable and at least 15 seconds of data in the current fuel trim cell must accumulate on each trip before the LTM for that cell is considered usable in the EWMA calculation.	• No Misfire DTC's • No O2 Sensor DTC's • No EVAP DTC's • No Fuel Injector DTC's • No Fuel Temperature or Composition DTC's • No IAC, MAF, or MAP DTC's • No ECT DTC's • No EGR DTC's • No A.I.R. DTC's • No TP Sensor or TAC System DTC's • Engine speed > 500 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -38.89°C but < 132°C • MAP > 5 kpa but < 105 kpa • IAT > -20.5 °C but < 150°C • Mass Airflow > 0.5 g/s but < 510 g/s • Vehicle speed < 82 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test. • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken)	Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel System Too Rich Bank 2	P0175 (GMX380/1 only)	Determines if the fuel control system is in a rich condition.	The EWMA of long term fuel trim (LTM) samples ≤ 0.765 Once the above occurs, purge is ramped off to determine if excess purge is the cause. Therefore, the following must also occur to report a failure: The EWMA of LTM samples with purge off ≤ 0.76 during 3 of 5 intrusive segments. General Notes: 1. At least 24 seconds of data must accumulate on each trip before the EWMA of LTM samples is considered usable and at least 15 seconds of data in the current fuel trim cell must accumulate on each trip before the LTM for that cell is considered usable in the EWMA calculation. Passive Note: 1. If the conditions in the General Notes above are achieved and the non-purge threshold of 0.76 has been exceeded before purge is enabled, a passive failure result will be reported and no intrusive test is run. If a passive result of "pass" is achieved, an intrusive test will be run later in the trip if and when those conditions are met. Intrusive Notes: 1. Segments can last up to 60 seconds, and are separated by the smaller of a 24 second purge-on time or enough time to purge 13 grams of vapor. 3. A maximum of 5 completed segments are allowed for each intrusive test, and up to 20 intrusive attempts allowed per trip. 4. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess	• No Misfire DTC's • No O2 Sensor DTC's • No EVAP DTC's • No Fuel Injector DTC's • No Fuel Temperature or Composition DTC's • No IAC, MAF, or MAP DTC's • No ECT DTC's • No EGR DTC's • No A.I.R. DTC's • No TP Sensor or TAC System DTC's • Engine speed > 500 rpm but < 6000 rpm • BARO > 70 kpa • ECT > -38.89°C but < 132°C • MAP > 5 kpa but < 105 kpa • IAT > -20.5 °C but < 150°C • Mass Airflow > 0.5 g/s but < 510 g/s • Vehicle speed < 82 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • EGR Flow Diagnostic Intrusive Test = Not Active • Catalyst Monitor Diagnostic Intrusive Test = Not Active • Post O2 Diagnostic Intrusive Test = Not Active • Evap diagnostic is at any stage except the "tank pull down" portion of the test. • Fuel Level > 10 % (must be < 10% for at least 10 seconds to disable; default is to enable if fuel sender is broken) Intrusive Enable Criteria • The EWMA of long term fuel trim (LTM) samples ≤ 0.765 • RPM > 500 • Mass Airflow > 0.5 g/s but < 510 g/s • MAP > 5 kpa but < 105 kpa Temporary Intrusive Test Inhibit Criteria • If intrusive test segment exceeds 60 consecutive seconds. (in this case, purge valve is opened for the smaller of 10 seconds or enough time to purge 13 grams vapor)	If rich segment fail counter is ≥ 3 before segment pass counter ≥ 3, diagnostic fails. Frequency: Continuous 100 ms loop	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
Injector 1 Control Circuit	P0201	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B
Injector 2 Control Circuit	P0202	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B
Injector 3 Control Circuit	P0203	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B
Injector 4 Control Circuit	P0204	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B
Injector 5 Control Circuit	P0205	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B
Injector 6 Control Circuit	P0206	This DTC checks the Fuel Injectors for electrical integrity	Output state is shorted or open	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Injector commanded on > 0.5 seconds	15 failures out of 20 samples Frequency: Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Position (TP) 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 indicates 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) 4.54 V < Reference voltage < 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 Reference voltage direct short to ground.	DTC Type A

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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
Engine Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306	These DTC's will determine if a random misfire or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index vs Engine Speed vs Load and Camshaft Position Emission Failure Threshold = 1.0% Catalyst Damage Threshold = 5% Misfire depending on engine speed and engine load	• DTCs not active for VSS, CKP, CMP, TP, MAP, ECT, MAF, TAC system sensors. • P0315 (Crankshaft Position System Variation Not Learned) not active or engine speed < 1200. • Any Fuel cutoff not active. • Power management is not active. • Brake torque management not active. • Fuel level > 10% (disablement ends 500 engine cycles, after a low fuel level condition ceases, and fuel disable does not occur with a fuel sensor DTC). • -6.99 °C < ECT < 123.9844 ° C. • If ECT at startup < -6.99 °C, then disable until ECT > 21.09 °C. • 525.00 RPM < Engine speed < 5800.00 RPM. • 9.00 volts < System voltage < 18 volts. • + Throttle position delta < 100 % per 50 ms. • - Throttle position delta < 100 % per 50 ms. • Abnormal engine speed is not present. • ABS rough road not detected. • Excessive drive wheel slip is not detected (enablement occurs if {Non Drive Wheel Speed > 255 MPH} or {Drive Wheel Speed - Non Drive Wheel Speed > 255 MPH} and {wheel speed data is valid}) • ABS is not active, TCS is not active. • Positive and zero torque (except the CARB approved 3000 rpm to redline triangle). Positive and zero torque is detected when both is true: 1) engine load > zero torque cal (cal a function of engine speed), and 2) TP Sensor > 1.4% or VSS < 20 MPH. • Detectable engine speed and engine load region. • EGR Intrusive test not active. • CMP sensor is in sync with CKP sensor. • Automatic transmission is not shifting or automatic transmission is shifting and TPS ≤ 95% • PRNDL indication did not change (not used). • Misfire Diagnostic is not requesting to disable TCC when transmission is in hot mode. • Abusive Engine Speed is not used. • 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 (this number is 1 in this application). 2nd and subsequent Catalyst Exceedences = (1) 200 revolution block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP. Frequency: Continuous	DTC Type B (MIL Flashes with Catalyst Damaging Misfire)

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Crankshaft Position System Variation Not Learned (CASE)	P0315	Determines if the Crankshaft Position System Variation has not been learned.	Sum of Compensation Factors are ≤ 2.997 or ≥ 3.0043	• Manufacturers Enable Counter must be zero.	0.50 seconds Frequency: Continuous 100 ms loop	DTC Type A
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic will detect a failed internal PCM component associated with knock control	Output voltage is high and stays relatively constant	Enable Conditions • No VSS DTC's • No TP Sensor DTC's • No TAC System DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CMP Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage ≥ 9 volts • Throttle position ≥ 10.00 % • ECT ≥ 60.00 °C • Engine speed between 1000 & 5000 RPM • Cylinder air mass ≥ 45.00 % • Ignition Control Spark retard ≤ 15.01 degrees Determine Fault Region • (Instantaneous voltage – average voltage is too small; delta from average ≤ .03125 OR Average voltage – instantaneous voltage is too small; delta from average ≤ 0.03125) AND the average voltage ≥ 4.8 volts	Frequency: Every combustion event Continuous 480 test failures out of 500 samples	DTC Type B

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Knock Sensor (KS) Circuit Low Frequency Bank 1	P0327	This diagnostic will detect a wiring fault with knock sensor 1	Output voltage amplitude is low and stays relatively constant	Enable Conditions • No VSS DTC's • No TP Sensor DTC's • No TAC System DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CMP Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage ≥ 9 volts • Throttle position ≥ 10.00 % • ECT ≥ 60.00 °C • Engine speed between 1000 & 5000 RPM • Cylinder air mass ≥ 45.00 % • Ignition Control Spark retard ≤ 15.01 degrees Determine Fault Region • (Instantaneous voltage – average voltage is too small; delta from average ≤ .03125 OR Average voltage – instantaneous voltage is too small; delta from average ≤ 0.03125) AND the average voltage < 4.8 volts	Every combustion event Continuous 480 test failures out of 500 samples	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Knock Sensor (KS) Circuit Low Frequency Bank 2	P0332	This diagnostic will detect a wiring fault with knock sensor 2	Output voltage amplitude is low an stays relatively constant	Enable Conditions • No VSS DTC's • No TP Sensor DTC's • No TAC System DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CMP Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage ≥ 9 volts • Throttle position ≥ 10.00 % • ECT ≥ 60.00 °C • Engine speed between 1000 & 5000 RPM • Cylinder air mass ≥ 45.00 % • Ignition Control Spark retard ≤ 15.01 degrees Determine Fault Region • (Instantaneous voltage – average voltage is too small; delta from average ≤ .03125 OR Average voltage – instantaneous voltage is too small; delta from average ≤ 0.03125) AND the average voltage < 4.8 volts	Every combustion event Continuous 480 test failures out of 500 samples	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Crankshaft Position (CKP) Sensor A Circuit	P0335	This diagnostic determines whether a fault exists with crank position sensor circuit signal	LNJ, LX9 If Camshaft Position (CMP) Sensor Circuit is Active this Key, then if match has been lost longer than 2 seconds and there were no medium resolution pulses between cam pulses. If Camshaft Position (CMP) Sensor Circuit is not Active this Key then the number of medium resolution pulses seen per cam pulse is 0. L26, L32: If 6 low res pulses have been seen and 0 med res pulses have been seen AND 1 cam has been seen and 0 med res pulses have been seen from the low res interrupt point of view.	LNJ, LX9 • If Camshaft Position sensor circuit or Camshaft Position sensor Performance fault = ATK, then –Ignition Switch not in Crank: 20 < RPM from medium resolution < 5850 PCM State = Run MAF > 2 gps – Ignition Switch is in Crank: Starter Relay is commanded on 20 < RPM from medium resolution < 400 MAF > 2 gps • If at least one CAM has occurred since last time through the diagnostic and if Camshaft Position sensor circuit or Camshaft Position sensor Performance fault does not = ATK, then – Ignition Switch not in Crank: 20 < RPM from CAM < 5950 PCM State = Run MAF > 2 gps – Ignition Switch is in Crank: Starter Relay is commanded on 20 < RPM from CAM < 400 L26, L32: • Engine run time > 3 seconds • The engine has rotated at least 3 times in the CAM sensor's view (1.5 engine cycles)	LNJ, LX9 Match lost while in Crank > 2 sec. Match lost while in Run > 2 sec. Frequency: 12.5 ms continuous In Crank > 2 fail count In Run > 2 fail count Frequency: 12.5 ms Continuous L26, L32: Low res interrupt - for low res check 100 ms - for cam check L26, L32: 40 failures out of 50 samples	DTC Type A (For LNJ only) DTC Type B for all others

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 (CKP) Sensor A Performance	P0336	This diagnostic determines whether a performance fault exists with crank position sensor signal	LNJ, LX9 If Camshaft Position (CMP) Sensor Circuit is Active this Key, then if match has been lost longer than 2 seconds. If Camshaft Position (CMP) Sensor Circuit is not Active this Key then the number of medium resolution pulses seen per cam pulse is ≤ 47 or ≥ 49. Match lost 20 times within 2 sec. L26, L32: If 6 low res pulses have been seen and a number of med res pulses other than 0 or 36 have been seen AND 1 cam has been seen and a number of med res pulses other than 0 or 36 have been seen.	LNJ, LX9 • If Camshaft Position sensor circuit or Camshaft Position sensor Performance fault = ATK, then –Ignition Switch not in Crank: 20 < RPM from medium resolution < 5850 PCM State = Run MAF > 2 gps – Ignition Switch is in Crank: Starter Relay is commanded on 20 < RPM from medium resolution < 400 MAF > 2 gps • If at least one CAM has occurred since last time through the diagnostic and if Camshaft Position sensor circuit or Camshaft Position sensor Performance fault = ATK, then – Ignition Switch not in Crank: 20 < RPM from CAM < 5950 PCM State = Run MAF > 2 gps • – Ignition Switch is in Crank: Starter Relay is commanded on 20 < RPM from CAM < 400If PCM state = Run, then If engine speed >20 and above conditions are not met, then Match lost 20 times within 2 sec. • If PCM state = crank, then If engine speed >20 and < 400, and above conditions are not met, then Match lost 20 times within 2 sec L26, L32: • Engine run time > 3 seconds • The engine has rotated at least 3 times in the CAM sensors view (1.5 engine cycles)	LNJ, LX9 Match lost while in Crank > 2 sec. Match lost while in Run > 2 sec. Frequency: 12.5 ms continuous Camshaft Position (CMP) Sensor Circuit is not active this key or Camshaft Position sensor Performance fault = ATK In Crank > 2 fail count In Run > 2 fail count Frequency: 12.5 ms Continuous Frequency: 100 ms Continuous L26, L32: Low res interrupt - for low res check 100 ms - for cam check 40 failures out of 50 samples	DTC Type B

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Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	1X Signal This diagnostic will detect if a fault exists on the camshaft position sensor signal.	LNJ, LX9 A. Engine is cranking and the engine speed from CMP Sensor =0 for more than 10 seconds OR B. Reference pulse logic saw more than 7 reference pulses between CMP Sensor pulses L26, L32: If 36 med res pulses have been seen and 0 cam pulses have been seen AND 6 low res pulses have been seen and 0 cam pulses have been seen.	LNJ, LX9 A. Ignition Switch is in crank Starter relay is commanded on MAF > 2 gps B. Ignition switch is in run or crank L26, L32: • Engine run time > 3 seconds • Engine Speed > 100 • Cam pulse seen OR 6 low res pulses seen • The engine run time criteria is not required if PCM State is crank.	LNJ, LX9 A. 10 seconds without CMP Sensor signal detected. 12.5 ms continuous B. continuous every reference pulse L26, L32: Med res interrupt - for med res check Low res interrupt - for low res check 40 failures out of 50 samples	DTC Type B
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	1X Signal This diagnostic will detect if the CMP Sensor signal. Performance is correct	LNJ, LX9 Ref pulse logic saw less then 6 reference pulses between CMP sensor pulses L26, L32: If 36 med res pulses have been seen and 2 or more cam pulses have been seen AND 6 low res pulses have been seen and 2 or more cam pulses have been seen.	LNJ, LX9 Ignition switch is in run or crank One CAM or 6 Low Res has occurred since the engine began rotating L26, L32: • Engine run time > 3 seconds • Engine Speed > 100 • Cam pulse seen OR 6 low res pulses seen	LNJ, LX9 Continuous every reference pulse L26, L32: Med res interrupt - for med res check Low res interrupt - for low res check 40 failures out of 50 samples	DTC Type B
Ignition Coil Circuit	P0350 (This applies to RPO's L26 & L32)	This diagnostic detects an open or short on the Electronic Spark Timing (EST) output circuits.	Fault is detected	• Engine is running or cranking	90 failure out of 100 samples <u>Frequency:</u> Continuous 100 ms loop Once the fault logic detects a failure, the diagnostic is turned off for the rest of the trip.	DTC Type B

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Ignition Coil 1 Control Circuit	P0351 (This applies to RPO's LX9 & LNJ)	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	90 failures out of 100 samples Frequency: Every engine cycle Continuous	DTC Type B
Ignition Coil 2 Control Circuit	P0352 (This applies to RPO's LX9 & LNJ)	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	90 failures out of 100 samples Frequency: Every engine cycle Continuous	DTC Type B
Ignition Coil 3 Control Circuit	P0353 (This applies to RPO's LX9 & LNJ)	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	90 failures out of 100 samples Frequency: Every engine cycle Continuous	DTC Type B
Crankshaft Position (CKP) Sensor B Circuit	P0385 (This applies to RPO's L26 & L32)	This diagnostic determines whether a circuit fault exists with the low res sensor signal	L26, L32: If 36 med res pulses have been seen and 0 low res pulses have been seen AND 1 cam pulse has been seen and 0 low res pulses have been seen.	L26, L32: • Engine run time > 3 seconds 3. Engine Speed > 100 4. Cam pulse seen OR 6 low res pulses seen	L26, L32: Med res interrupt - for med res check 100 ms - for cam check 40 failures out of 50 samples	DTC Type B
Crankshaft Position (CKP) Sensor B Performance	P0386 (This applies to RPO's L26 & L32)	This diagnostic determines whether a performance fault exists with the low res sensor signal	L26, L32: If 36 med res pulses have been seen and a number of low res pulses other than 0 or 6 have been seen AND 1 cam pulse has been seen and a number of low res pulses other than 0 or 6 have been seen.	L26, L32: • Engine run time > 3 seconds • Engine Speed > 100 • Cam pulse seen OR 6 low res pulses seen	L26, L32: Med res interrupt - for med res check 100 ms - for cam check 40 failures out of 50 samples	DTC Type B

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Exhaust Gas Recirculation (EGR) Flow Insufficient (Quick Test)	P0401	During a closed throttle decel condition, the EGR valve is normally closed. This diagnostic opens the valve to a pre-determined position, and the change in MAP is computed. This change in MAP correlates to the flow rate of the EGR system.	With EGR valve open, the peak + MAP Δ is monitored over a period of time. This value is compared with a threshold from Engine Speed vs BARO table and the difference computed. The result is statistically filtered (EWMA) and compared to a decision limit. DTC is set when the filtered result exceeds the decision limit of 0.7275 kPa.	Test Enables No fuel injector DTCs set, No CKP DTCs set, No TP sensor DTC's set, No MAP DTC's set, No VSS DTC's set, No ETC DTC's set, No 5 volt reference DTC's set, No IAT sensor DTC's set No ECT sensor DTC's set, No IAC DTC's set, No EGR Pintle Position DTC set, No Misfire DTC's set No MAF DTC's set, No CPP (Clutch) DTC's set, Not in device control, EGR valve icing not occurring, EGR Engine run time expired, Not in Power Enrichment, ECT > 75° C ECT < 151.9531° C BARO > 74 kPa (8,000 ft) BARO data is valid IAT < 100° C IAT > 5° C Ignition Voltage < 18 volts Ignition Voltage > 11 volts Transmission is in 3rd, 4th or (5th – LNJ only) gear Decel Fuel Cutoff is either inactive (mode 0) or at a commanded spark value of 0 (mode 2) for at least 6.25 ms. Vehicle speed < 70 MPH Vehicle Speed > 28 MPH Throttle Position is < 0.9% Transmission status is unchanged for 1.5 seconds. Throttle Area Delta < 100 % **Stability Mode Enables** EGR Position < 1% 1000 RPM < Engine Speed < 1800 RPM MAP Δ < 1.294 kpa 17 kpa < Compensated MAP < 43 kpa Throttle Area Delta < 100% Difference between desired & actual airflow < 1.2 Grams/sec. **Intrusive Mode Enables** Vehicle Speed Δ < 3 MPH + RPM Δ < 100 RPM - RPM Δ < 200 RPM Max EGR Position > 75 % Max EGR Position < 95 % EGR Duty Cycle On Time < 20 Throttle Area Delta < 100%	Test Time 800 ms Frequency 6.26 ms loop Once per trip (typically) **Rapid Step Response feature will initiate multiple tests:** IF the difference between the current EWMA and the current map difference is > 1.751 to 2.864 kPa (depends on Baro) AND current map difference is > 0.558 to 0.872 kPa (depends on Baro) THEN 5 tests (depends on Baro) may be run per trip until 25 to 30 tests (depends on Baro) have been completed Fast Initial Response feature will initiate multiple tests upon code clear or a non-volatile memory failure: Several tests per trip will run until 13 to 16 tests (depends on Baro) have been completed.	DTC Type A

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Exhaust Gas Recirculation (EGR) Solenoid Control Circuit	P0403	This DTC checks the Linear EGR circuit for electrical integrity	Output state invalid	• Ignition switch is in crank or run • 9 volts < Ignition Voltage < 18 volts • Desired EGR = 0	20.00 seconds OR chip protection logic indicates a short failure 1 time Frequency: Continuous 100 ms loop Chip protection logic: 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B
Exhaust Gas Recirculation (EGR) Open Position Performance	P0404	This diagnostic detects if the pintle position error is too large	Pintle position error [absolute value of (desired position - actual position)] > 20.00 %	Enable Stability Limit Time > 0.2 sec. 5 Volt reference DTC's not active Engine is running Off-board device not active Pintle cleaning not active P0401 not intrusive Ignition voltage ≥ 11 volts EGR valve icing or over temperature not occurring EGR is enabled Desired EGR position > 0% Δ Desired EGR position < 30.00 % for 1 sec.	Frequency: 850 fail counts out of 1000 sample counts 100ms loop Continuous	DTC Type B
Exhaust Gas Recirculation (EGR) Position Sensor A Circuit Low Voltage	P0405	This diagnostic detects if the pintle position feedback circuit is open or shorted to ground	EGR feedback sensor signal < 4.0% of 5 volt reference voltage	Enable Stability Limit Time > 0.2 sec. 5 Volt reference DTC's not active Engine is running Off-board device not active Pintle cleaning not active P0401 not intrusive Ignition voltage ≥ 11 volts EGR valve icing or over temperature not occurring.	Frequency: 50 fail counts out of 55 sample counts 100ms loop Continuous	DTC Type B

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Exhaust Gas Recirculation (EGR) Position Sensor A Circuit High Voltage	P0406	This diagnostic detects if the pintle position feedback circuit is shorted to high voltage or the 5V return is open.	EGR feedback sensor signal > 94.7% of 5 volt reference voltage	Enable Stability Limit Time > 0.2 sec. 5 Volt reference DTC's not active Engine is running Off-board device not active Pintle cleaning not active P0401 not intrusive Ignition voltage ≥ 11 volts EGR valve icing or over temperature not occurring.	3600 fail counts out of 4000 sample counts 100ms loop Continuous	DTC Type B
AIR System Incorrect Flow	P0411 (GMX365/7 L26 SULEV only)	Detects an AIR system insufficient flow condition. This test is run during the phase 1 (pump on, control valve open) portion of the Secondary Air Injection Diagnostic (SAI D).	AIR normalized pressure error > 3.5 kPa (higher than predicted pressure) during SAID phase 1 test OR AIR normalized pressure error < -4.2 kPa (lower than predicted pressure) during SAID phase 1 test	No active AIR pressure sensor circuit DTCs set. No active AIR pressure sensor performance DTCs set. No active MAP sensor DTCs set. No active AIR pump relay circuit DTC set. No active AIR control valve relay circuit DTC set. No active MAF sensor DTCs set. No active 5 volt reference DTCs set. No active IAT sensor DTCs set. No active ECT sensor DTCs set. No active Misfire DTCs set. No active catalyst monitor DTCs set. No active fuel injector DTCs set. No active EST DTCs set. No active DTC P0606 set. AIR pressure sensor circuit fault pending = False. AIR operation is allowed this start. BARO > 65 kPa. 3 g/sec < Mass Air Flow < 26 g/sec. 18 volts > System voltage > 10 volts.	SAID phase 1 conditional test weight > 7 seconds Conditional test weight is based on Baro, Mass air flow & System voltage. Once per trip where AIR pump operation is requested at startup.	DTC Type B

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AIR Solenoid Relay Control Circuit	P0412 (GMX365/7 L26 SULEV only)	This DTC checks the output driver for electrical integrity	Output state is invalid	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Pump must be commanded on >0.5 seconds	15 failure out of 20 samples OR chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B

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AIR Pump Relay Control Circuit	P0418 (GMX365/7 L26 SULEV only)	This DTC checks the output driver for electrical integrity	Output state is shorted, open or over temperature	• Ignition switch is in crank or run 9< Ignition Voltage < 18	15 failure out of 20 samples for open or over temperature chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B

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Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	OSC time difference ≥ 0.1015625 (EWMA filtered) OSC time difference = OSC worst pass threshold - OSC compensation factor * (post cat O2 resp time - pre cat O2 resp time) OSC worst pass thresh = 0.9625 seconds	*General Enable* • No EVAP, TAC system, MAF, CAM, ECT, CKP, EGR, BARO, AIR, EST, Fuel Injector, Fuel Trim, Idle Air, MAP, IAT, Misfire, O2 Sensor, TP Sensor, VSS or Engine Overtemp Protection Mode DTC's • IAT > -20° C • Green Converter Delay = not active ***Valid Idle Period Criteria*** • Engine speed ≥ 1100 RPM for a minimum of 21.5 seconds since end of last idle period. • Engine Speed < 1100 RPM • Engine run time ≥ 600 seconds. • Vehicle Speed ≤ 2 mph • FASD and/ or POS Diagnostic Intrusive Test and/or AIR Diagnostic Intrusive Test not Active • Tests attempted this trip ≤ 6.00 *Idle conditions Met Criteria* General Enable met; Valid Idle Period met • 0 ≤ short term fuel trim ≤ 2 • Δ short term fuel trim since valid idle conditions met ≤ 2 • 540°C ≤ predicted catalyst temperature ≤ 775°C for at least 60 seconds with a closed throttle time ≤ 60 seconds consecutively (closed throttle ⇒ TPS < 1.503906%) • Closed loop fueling • Long term fuel trim learning enabled • Barometric pressure > 70 kPa • 75°C ≤ ECT ≤ 123°C • System voltage > 10.7 volts • 0 < Idle period ≤ 60 seconds ⇒ Idle time is incremented if: Vehicle Speed ≤ 2 mph and Throttle Position ≤ 1.503906% • IAT < 100°C • PRNDL is in Drive Range ***Test Enable Conditions; must hold true from 5 seconds after idle conditions are met to end of test*** • Delta IAC ≤ 5 steps Delta RPM ≤ 500 • 3 gps ≤ MAF ≤ 10 gps CCP DC Multiplier ≤ 1 • RPM – Desired RPM ≤ 150 Desired RPM – RPM ≤ 225 • Tests attempted this idle period < 1 • Load change: If during test enable, conditions the engine load changes more than 5.0%, the test starts over. If during the intrusive portion of the test, the load changes by more than9.4%, then the test is aborted for that idle period. *Engine Fueling Criteria at Beginning of Idle Period* • Must be met from between 4 and 7 seconds after idle conditions have been met for at least 5 seconds • Number of pre-O2 switches ≥ 4 • Average BPW is within a window based on a table defined by airflow (see table) • 0.96≤ average short term fuel trim ≤ 1.03 • After engine fueling criteria has been met: 96.5 ≤ short term fuel trim ≤ 102.5 within 2.5 seconds.	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 tests per trip Frequency: • 12.5 ms Continuous **Rapid Step Response feature will initiate multiple tests:** If the difference between current EWMA value and the current OSC time difference ≥ 0.33 seconds and OSC time difference ≥ 0.00 seconds Maximum of 6 tests per trip. Maximum of 11 tests to detect failure when rapid step response is enabled. *Green Converter Delay Criteria* • The diagnostic will not be enabled until the next ignition cycle after the following has been met: Predicted catalyst temperature ≥ 525° C for 3600 seconds 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) • Note: this feature is only enabled when the vehicle is new and cannot be enabled in service	DTC Type A

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
Catalyst System Low Efficiency Bank 2	P0430 (GMX380/1 only)	Oxygen Storage	OSC time difference ≥ 0.07910156 (EWMA filtered) OSC time difference = OSC worst pass threshold - OSC compensation factor * (post cat O2 resp time - pre cat O2 resp time) OSC worst pass thresh = 0.9 seconds	*General Enable* • No EVAP, TAC system, MAF, CAM, ECT, CKP, EGR, BARO, AIR, EST, Fuel Injector, Fuel Trim, Idle Air, MAP, IAT, Misfire, O2 Sensor, TP Sensor, VSS or Engine Overtemp Protection Mode DTC's • IAT > -20° C • Green Converter Delay = not active ***Valid Idle Period Criteria*** • Engine speed ≥ 1100 RPM for a minimum of 21.5 seconds since end of last idle period. • Engine Speed < 1100 RPM • Engine run time ≥ 600 seconds. • Vehicle Speed ≤ 2 mph • FASD Test and/ or POS Diagnostic Intrusive Test and/or AIR Diagnostic Intrusive Test not Active • Tests attempted this trip ≤ 6.00 *Idle conditions Met Criteria* General Enable met; Valid Idle Period met • 0 ≤ short term fuel trim ≤ 2 • Δ short term fuel trim since valid idle conditions met ≤ 2 • 540°C ≤ predicted catalyst temperature ≤ 775°C for at least 60 seconds with a closed throttle time ≤ 60 seconds consecutively (closed throttle ⇒ TPS < 1.503906%) • Closed loop fueling • Long term fuel trim learning enabled • Barometric pressure > 70 kPa • 75°C ≤ ECT ≤ 123°C • System voltage > 10.7 volts • 0 < Idle period ≤ 60 seconds ⇒ Idle time is incremented if: Vehicle Speed ≤ 2 mph and Throttle Position ≤ 1.503906% • IAT < 100°C • PRNDL is in Drive Range ***Test Enable Conditions; must hold true from 5 seconds after idle conditions are met to end of test*** • Delta IAC ≤ 45 steps Delta RPM ≤ 500 • 3 gps ≤ MAF ≤ 10 gps CCP DC Multiplier ≤ 1 • RPM – Desired RPM ≤ 150 Desired RPM – RPM ≤ 225 • Tests attempted this idle period < 1 • Load change: If during test enable, conditions the engine load changes more than 5.0%, the test starts over. If during the intrusive portion of the test, the load changes by more than 22.0%, then the test is aborted for that idle period. *Engine Fueling Criteria at Beginning of Idle Period* • Must be met from between 4 and 7 seconds after idle conditions have been met for at least 5 seconds • Number of pre-O2 switches ≥ 4 • Average BPW is within a window based on a table defined by airflow (see table) • 0.96≤ average short term fuel trim ≤ 1.03 After engine fueling criteria has been met: 96.5 ≤ short term fuel trim ≤ 102.5 within 2.5 seconds.	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 tests per trip Frequency: • 12.5 ms Continuous **Rapid Step Response feature will initiate multiple tests:** If the difference between current EWMA value and the current OSC time difference ≥ 0.33 seconds and OSC time difference ≥ 0.00 seconds Maximum of 6 tests per trip. Maximum of 11 tests to detect failure when rapid step response is enabled. *Green Converter Delay Criteria* • The diagnostic will not be enabled until the next ignition cycle after the following has been met: Predicted catalyst temperature ≥ 525° C for 3600 seconds 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) • Note: this feature is only enabled when the vehicle is new and cannot be enabled in service	DTC Type A

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Small Leak Detected (EONV)	P0442	This DTC will detect a small leak (>= 0.020") in the EVAP system between the fuel fill cap and the purge solenoid.	***SMALL LEAK TEST FAIL:*** Engine Off Natural Vacuum (EONV) 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 from 1.85" water to 2.75" 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. Malibu Maxx and G6 Fail threshold = 0.6515 Re-Pass threshold = 0.3793 Malibu Sedan Fail Threshold = 0.6500 Re-Pass Threshold = 0.4500	***TEST ENABLE :*** VS Sensor DTC's not active No Fuel Tank Pressure Sensor DTC's No EVAP Canister Purge Solenoid DTC's No EVAP Canister Vent Solenoid DTC's Coolant Sensor DTC's not active IAT Sensor DTC's not active EVAP Vacuum 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% No thermostat rationality DTC's No Fuel level DTC's (for LX9, L26 or L32) Valid Cold Start Startup ECT > 4°C but < 30° C Startup IAT > 4°C but < 30° C Startup Δ°C(ECT-IAT) < 8°C if ECT > IAT Estimated ambient temperature at end of drive > 2°C but < 32°C. Drive time >= 600 seconds. Drive length >= 5.2 miles. Coolant >= 70°C. No fuel filling (fuel level increment >= 10%) During EONV test. BARO > 74.0kPa OR Hot Restart Sufficient drive length to get accurate estimate of ambient air temperature. (EONV_EstAmbientAirTemp_Valid must equal true)	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 Average run length: 7

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) Purge Solenoid Control Circuit	P0443	This DTC checks the Purge Solenoid Control Circuit for electrical integrity	Output state is invalid	• Ignition switch is in crank or run • 11< Ignition Voltage < 18	15 failure out of 20 samples OR Chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister	Tank Vacuum > 10.00 "H2O for 5 seconds BEFORE Purge Volume > 6 liters OR Vented Vacuum < -2.5 in. H20 or Vented Vacuum > 5 in. H20 for 15 seconds 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time.	<u>General Test Enable</u> • No MAP DTC's • No TP Sensor DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Fuel Tank Pressure Sensor DTC's • No Evap Canister Purge solenoid DTC's • No EVAP Canister Vent Solenoid DTC's • No Thermostat Rationality DTC's • 15 % < Fuel Level < 85. % • 10.00 V < System Voltage < 18.00 V • 4 °C < IAT < 30°C • ECT < 30 °C • BARO > 74.00 kPa (8000 ft)	Once per trip Time is dependent on driving conditions Max. before test abort is 675 seconds	DTC Type B
Evaporative Emission (EVAP) Vent Solenoid Control Circuit	P0449	This DTC checks the output driver for electrical integrity	Output state is invalid	• Ignition switch is in crank or run • 11< Ignition Voltage < 18	15 failures out of 20 samples <u>Frequency:</u> Continuous 100 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test...	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) upper voltage threshold (voltage addition above the nominal voltage): 0.2 volts lower voltage threshold (voltage subtraction below the nominal voltage): 0.2 volts The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). Once EWMA exceeds the fail threshold, the DTC light is illuminated. The DTC light can be turned off if the EWMA falls below the re-pass threshold for 3 consecutive trips. Fail threshold = 0.730 Re-Pass threshold = 0.400	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes	This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test which can take up to 600 seconds to complete.	DTC Type A average run length: 6
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal < 0.1 volts produces a failing sample. Otherwise, the sample is considered passing. If 80 samples fail out of 100 samples total, then a fail will be reported to the DTC.	• 0.10 second delay after sensor power up for sensor warm-up • PCM State <> crank	Frequency: Continuous 100ms loop	DTC Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal > 4.90 volts produces a failing sample. Otherwise, the sample is considered passing. If 80 samples fail out of 100 samples total, then a fail will be reported to the DTC.	• 0.10 second delay after sensor power up for sensor warm-up • PCM state <> crank	Frequency: Continuous 100ms loop	DTC Type B

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

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the Evap system.	Purge volume > 15.00 liters BEFORE Tank vacuum < 7 inH_2O 2 liters of fuel must be consumed after setting the DTC active the first time to the DTC active the second time. Weak Vacuum Followup Test Weak Vacuum Test failed previous trip and this trip. Passes if tank vacuum > 7 in. H2O. Note: Weak vacuum Followup Test can only report a pass.	General Test Enable • No MAP DTC's • No TP Sensor DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Fuel Tank Pressure Sensor DTC's • No Evap Canister Purge solenoid DTC's • No EVAP Canister Vent Solenoid DTC's • No Thermostat Rationality DTC's • 15 % < Fuel Level < 85. % • 10.00 V < System Voltage < 18.00 V • 4 °C < IAT < 30°C • ECT < 30 °C • BARO > 74.00 kPa (8000 ft) Cold Start Test • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 150 °C if IAT>ECT < 8 °C if ECT > IAT • Cold Test Timer < 675 seconds	Once per cold start Time is dependent on driving conditions Max. before test abort is 675 seconds	DTC Type B
Fuel Level Sensor Circuit Low	P0462	This DTC will detect a fuel sender stuck out of range low.	Fuel level A/D counts less than 19 A/D counts for 10 seconds	• runs continuously		DTC Type B
Fuel Level Sensor Circuit High	P0463	This DTC will detect a fuel sender stuck out of range high.	Fuel level A/D counts more than 143 A/D counts for 25 seconds	• runs continuously		DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. The refuel event is defined as a change of 10.0 % fuel level during the engine-off test. A refueling event is confirmed if the fuel level has a persistent change of 10.0 % for 30 seconds. The test will report a failure if 2 out of 3 samples are failures.	• This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes	This test is executed during an engine-off natural vacuum small leak test. The test can only execute once per engine-off period. The length of the test is determined by the refueling rationality test which can take up to 600 seconds to complete.	DTC Type A

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
Cooling Fan 1 Control Circuit	P0480	This DTC checks the output driver for electrical integrity	Output state is invalid	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Fan must be commanded on >0.5 seconds	15 failure out of 20 samples OR chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Cooling Fan 2 Control Circuit	P0481	This DTC checks the output driver for electrical integrity	Output state is invalid	• Ignition switch is in crank or run • 9 < Ignition Voltage < 18 • Fan must be commanded on >0.5 seconds	15 failure out of 20 samples OR chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.	Tank Vacuum > 10 ”H2O for 5.00 sec BEFORE Test time > 60 seconds (cold start)	General Test Enable • No MAP DTC’s • No TP Sensor DTC’s • No VSS DTC’s • No IAT DTC’s • No ECT DTC’s • No Fuel Tank Pressure Sensor DTC’s • No EVAP canister purge valve solenoid DTC’s • No EVAP Canister Vent Solenoid DTC’s • No Thermostat Rationality DTC’s • 15 % < Fuel Level < 85. % • 10.00 V < System Voltage < 18.00 V • 4 °C < IAT < 30°C • ECT < 30 °C • BARO > 74.00 kPa (8000 ft) Cold Start Test • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 150 °C if IAT>ECT < 8 °C if ECT > IAT • Cold Test Timer < 675 seconds	Once per cold start. Cold start: max time is 675 seconds	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Idle Air Control (IAC) System - RPM Too Low	P0506	This DTC will determine if a low idle exists.	RPM < (Desired RPM – a value from a look up table based on ECT) ECT value -40 300 -28 300 -16 300 -4 300 8 300 20 300 32 100 44 100 56 100 68 100 80 100 92 100 104 100 116 100 128 100 140 100 152 100	***Test Enable:*** • No EVAP Canister Purge Valve Stuck Open DTC • No EVAP Canister Purge Solenoid Control Circuit DTC • No ECT DTC's • No Fuel Injector DTC's • No EGR Flow or Sensor DTC's • No TAC system DTC's • No IAT DTC's • No Fuel Trim DTC's • No MAF DTC's • No TP Sensor DTC's • No Misfire DTC's • No VSS DTC's • No MAP DTC's • ECT ≥ -40.00 °C • System Voltage ≥ 9.00 V but ≤ 18.00 V • IAT ≥ -40.00 °C • Engine run time ≥ 1.00 seconds • BARO ≥ 60.00 kPa • TP Sensor ≤ 0.80% • VSS ≤ 3.00 MPH • Catalyst Diagnostic Intrusive Test = not active • EGR Flow Diagnostic Intrusive Test = not active • Post O2 Diagnostic Intrusive Test = not active • Transmission state hasn't changed in last 0.1 seconds • Above met for a time ≥ 5 seconds to enable diagnostic.	8.00 seconds per test 4 tests to fail; must leave enable criteria between each test Frequency: Continuous after enable 100ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Idle Air Control (IAC) System - RPM Too High	P0507	This DTC will determine if a high idle exists. Results in Limited Authority Mode if vehicle has Electronic Throttle Control	RPM > (Desired RPM + value from look up table based on ECT) ECT / value -40 300 -28 300 -16 300 -4 300 8 300 20 300 32 200 44 200 56 200 68 175 80 175 92 175 104 175 116 175 128 175 140 175 152 175	***Test Enable:*** • No EVAP Purge Valve Stuck Open DTC • No EVAP Canister Purge Solenoid Control Circuit DTC • No ECT DTC's • No Fuel Injector DTC's • No EGR Flow or Sensor DTC's • No TAC system DTC's • No IAT DTC's • No Fuel Trim DTC's • No MAF DTC's • No TP Sensor DTC's • No Misfire DTC's • No VSS DTC's • No MAP DTC's • ECT ≥ -40.00 °C • System Voltage ≥ 9.00 V but ≤ 18.00 V • IAT ≥ -40.00 °C • Engine run time ≥ 1.00 seconds • BARO ≥ 60.00 kPa • TP Sensor ≤ 0.80% • VSS ≤ 3.00 MPH • Catalyst Diagnostic Intrusive Test = not active • EGR Flow Diagnostic Intrusive Test = not active • Post O2 Diagnostic Intrusive Test = not active • Transmission state hasn't changed in last 0.1 seconds • Above met for a time ≥ 5 seconds to enable diagnostic.	8.00 seconds per test 4 tests to fail; must leave enable criteria between each test Frequency: Continuous after enable 100ms loop	DTC Type A
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid	• PCM state = crank or run • Ignition voltage ≥ 5 volts • Engine speed < 5000	1 failure Frequency: 50 ms loop Continuous	DTC Type A
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid	• PCM state = crank or run • PCM is identified through calibration as a Service PCM	Test is run at Powerup Test also runs: Frequency: 100ms loop Continuous	DTC Type A

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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
Control Module Random Access Memory (RAM)	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	1) One failure at key-up initialization. This check is on all GMPX RAM. OR 2) Fault counter increments by 10 for every error, decrements by 1 for every pass; fail threshold = 20. This check is on the Desired Throttle Position RAM location and runs 12.5 ms continuous OR 3) Fault counter increments by 10 for every error, decrements by 1 for every pass; fail threshold = 20. This check is on all GMPX RAM and runs 100 ms continuous	DTC Type A
ECM/PCM Processor	P0606	Indicates that the PCM has detected a TACM internal processor integrity fault	TACM 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 1 Circuit	P0641	This DTC detects if the 5 Volt supply is too high or too low	Voltage state invalid (Voltage > 4.7 volts or voltage < 4.39 volts)	• PCM state = run	Failed for 10.00 sec <u>Frequency:</u> 100ms loop Continuous	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
Malfunction Indicator Lamp (MIL) Control Circuit	P0650	This DTC checks the output driver for electrical integrity	Output state is shorted, open or over temperature	• Ignition switch is in crank or run • 9< Ignition Voltage < 18	15 failure out of 20 samples for open or over temperature chip protection logic indicates a short failure 1 time <u>Frequency:</u> Continuous 100 ms loop <u>Chip protection logic:</u> 5 failures out of 10 samples indicate a short Frequency of this logic is 12.5 ms loop Continuous Once the chip protection logic detects 5 failures out of 10 samples, the driver is turned off for the rest of the trip.	DTC Type B No MIL
5 Volt Reference 2 Circuit	P0651	This DTC detects if the 5 Volt supply is too high or too low	Voltage state invalid (Voltage > 4.7 volts or voltage < 4.4 volts)	• PCM state = run	Failed for 10.00 sec <u>Frequency:</u> 100ms loop Continuous	DTC Type B
Transmission Control Module (TCM) Requested MIL Illumination	P0700 (GMT19 1/2 LNJ only)	ECM determines when CAN signals from TCM should be processed	Trans_Emis_Related_Malf_Active = TRUE and DGDM_TCM_DTC_Fault_Detected <> 0 signals are received	• No sooner than 3.0 seconds after engine start	Once per ignition cycle	DTC Type A
Accelerator Pedal Position (APP) System	P1125	PCM determines a limp home mode of operation due to multiple accelerator pedal sensor faults.	This DTC is set when: 1) 1 or more APP sensors are out of range, OR 2) Both 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

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
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Half cycle L/R switches < 55 OR Half cycle R/L switches <55 OR Slope Time L/R switches < 4 OR Slope Time R/L switches < 4	<u>Common Enable Criteria</u> • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test= Not Active • Catalyst monitor diagnostic Intrusive Test= Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active <u>Specific Enable Criteria</u> • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater drive DTCs = Not Active • Bank 2 Sensor1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second.	90000.00 ms <u>Frequency:</u> Once per trip	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Transition Time Ratio Bank 1 Sensor 1	P1134	This DTC determines if the O2 sensor transition time between rich to lean and lean to rich is degraded	Transition time difference < -60 OR Transition time difference > 70	Common Enable Criteria • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test = Not Active • Catalyst monitor diagnostic Intrusive Test = Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater drive DTCs = Not Active • Bank 2 Sensor1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second.	90000.00 ms Frequency: Once per trip	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Insufficient Switching Bank 2 Sensor 1	P1153 (GMX380/1 only)	This DTC determines if the O2 sensor is no longer sufficiently switching.	Half cycle L/R switches < 55.00 OR Half cycle R/L switches < 55.00 OR Slope Time L/R switches < 4.00 OR Slope Time R/L switches < 4.00	<u>Common Enable Criteria</u> • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test= Not Active • Catalyst monitor diagnostic Intrusive Test= Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active <u>Specific Enable Criteria</u> • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater drive DTCs = Not Active • Bank 2 Sensor1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second. •	90000.00 ms <u>Frequency:</u> Once per trip	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2S Transition Time Ratio Bank 2 Sensor 1	P1154 (GMX380/1 only)	This DTC determines if the O2 sensor transition time between rich to lean and lean to rich is degraded	Transition time difference < -60 OR Transition time difference > 70	<u>Common Enable Criteria</u> • No TP Sensor DTC's • No MAP DTC's • No ECT DTC's • No MAF DTC's • No IAT DTC's • No Evap DTC's • No Fuel Injector DTC's • EGR flow diagnostic Intrusive Test = Not Active • Catalyst monitor diagnostic Intrusive Test = Not Active • Post Oxygen Sensor Diagnostic Intrusive Test = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active <u>Specific Enable Criteria</u> • O2 Heater on for ≥ 0 seconds • Bank 1 Sensor1 circuit and heater and heater drive DTCs = Not Active • Bank 2 Sensor1 circuit and heater and heater driver DTCs = Not Active • In one of the following four fueling cells: Purge off, normal; purge off, high flow; purge on, normal; purge on, high flow • Misfire DTC = Not Active • ECT > 65.00 °C • Engine run time > 60.00 seconds • EVAP canister purge duty cycle ≥ 0.00 % • 15.00 gps ≤ MAF ≤ 30.00 gps • 1300.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 2.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for at least 1 second. •	90000.00 ms <u>Frequency:</u> Once per trip	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
Engine Coolant Over Temperature - Protection Mode Active	P1258	This DTC indicates that the engine is or has been in camel mode, where the coolant has gotten so hot that the engine is being run first on one bank of injectors, and then on the other bank, in an effort to save the engine.	Injectors are turned off due to ECT > 131°C	• ECT shorts tests not failing • Engine is running • Engine run time > 5 seconds	Frequency: 1 second Continuous	DTC Type A
Bypass Line Monitor	P1350 (This applies to RPO's L26 & L32)	This diagnostic detects an open or short on the Electronic Spark Timing (EST) output circuits.	Fault is detected	Engine is running or cranking	90 failure out of 100 samples Frequency: Continuous 100 ms loop Once the fault logic detects a failures, the diagnostic is turned off for the rest of the trip.	DTC Type B
Cold Start Emissions Reduction System Fault	P1400	Model based test computes exhaust thermal energy from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered thermal energy being out of range.	(Average desired accumulated exhaust energy - Average measured accumulated exhaust energy) < -8 kJ/s OR (Average desired accumulated exhaust energy - Average measured accumulated exhaust energy) > 0.2 kJ/s	• Cold start emission reduction strategy is active. • Vehicle speed < 2 mph. • Throttle position < 2%. • Airflow per cylinder > 40 mg. • No DTC's set for the following systems: MAP, MAF, IAT, ECT, Misfire, Electronic Spark Timing, Crank sensor, Idle, Fuel Injection, TP sensor, VSS, 5 volt reference, PCM Memory.	100 ms loop Runs once per trip when the cold start emission reduction strategy is active. Test completes after 15 seconds of accumulated qualified data.	DTC Type A
Exhaust Gas Recirculation (EGR) Closed Position Performance	P1404	This diagnostic detects if the valve is stuck open when commanded closed.	Actual pintle position >= 5.5% of 5 volt reference voltage from learned closed position	Enable Stability Limit Time > 0.2 sec. 5 Volt reference DTC's not active Engine is running Off-board device not active Pintle cleaning not active P0401 not intrusive Ignition voltage ≥ 11 volts EGR valve icing or over temperature not occurring. EGR is enabled Desired EGR position = 0%, for 1 sec.	4 failure detections of: 360 fail counts out of 400 sample counts (with pintle movement between failure detections of 40% for at least 1 second open time) Frequency: 100ms loop Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Actuator Control (TAC) Module Throttle Actuator Position Performance	P1516	1) Indicates that the TAC Module has detected a throttle positioning error OR 2) TACM cannot determine throttle positioning OR 3) Both TP Sensors are invalid	1) Absolute value of the throttle error: a) ≥2 degrees for >200 ms with no change in Commanded Throttle Position. 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 as commanded throttle changes continuously (no step change) e)commanded DTP has been stable for 5 seconds, and TACM can not hold +/- 2 degree tolerance for 200ms. [Throttle error = Measured throttle position - commanded throttle position] OR 2a) PCM processor DTC's. OR 2b) TACM processor DTC. OR 3a) both TP Sensor Circuit DTC's are set. OR 3b) PCM-TACM Serial Data DTC with 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

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Control Module Throttle Actuator Position Performance	P2101	Indicates that the PCM has detected a throttle positioning error	Absolute value of the throttle error > 6%. [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 TP Sensor Circuit DTC's are not set. • No PCM Processor DTC's. • No TACM Processor DTC.	High counter increments by 2 for every throttle error > 6%; decrements by 1 if 0% < throttle error <5%; decrements by 5 if -6% < throttle error <0%; clears if throttle error < -6%. Check runs every 18.75 ms with TACM - PCM valid message received. Low counter increments by 2 for every throttle error < -6%; decrements by 1 if -6%<throttle error <0%; decrements by 5 if 0%<throttle error <6%; clears if throttle error > 6%. Check runs every 18.75 ms with TACM - PCM valid message received.	DTC Type A

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Actuator Control (TAC) Module Performance	P2108	Indicates that TAC Module is unable to correctly read data from the flash memory. Indicates that TAC Module is unable to correctly write and read data to and from RAM. Indicates that the TAC Module has detected an internal processor integrity fault.	1) Power-up test fails to read/write data OR 2) Maximum allowed Running Resets exceeded OR 3) ROM checksum does not match expected checksum OR 4) RAM data read does not match data written OR 5) Failure of Interrupt process flag to match expected value. OR 6) Program is not executed in the proper order OR 7) Primary and Redundant RAM variables disagree OR 8) Primary and Redundant Indicated Pedal Position calculation difference > 0.0%. OR 9) Math/Logic test fails to equate to a predetermined value. OR 10) Internal Register data read does not match data written. OR 11) Internal Timer fails to increment OR 12) Watchdog Timer fails to increment OR 13) Failure of Processor Stack pointer to zero at Main Loop.	• Ignition in Run or Crank. • Ignition voltage > 5.23 V. • Valid TACM - PCM serial data.	1) One occurrence Check runs at Reset initialization 2) 10 occurrences during ignition cycle Check runs at Reset initialization 3) One occurrence. Check runs at power up and every 60 seconds thereafter. 4) One occurrence. Check runs at power up and every 800 milliseconds thereafter 5) - 13) One occurrence. Check runs every 3 milliseconds. Second Watchdog timer runs in 10 millisecond loop.	DTC Type A

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Accelerator Pedal Position (APP) Sensor 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 indicates 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) Reference Voltage < 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 A
Accelerator Pedal Position (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 indicates 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) Reference voltage < 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 A

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Position (TP) Sensor 1-2 Correlation	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.	1) Absolute value of (TP Sensor 1 raw – TP Sensor 2 raw) >6.0%. OR 2) Absolute value of (TP Sensor 1 min learnt – TP Sensor 2 min learnt) >6.0%.	• 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 every error, decrements by 1 for every pass: threshold is 133 Check runs every 3ms..	DTC Type A
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	1) TACM indicates a continuous or intermittent correlation fault between APP sensors #1 and #2 OR 2) TACM indicates an invalid minimum mechanical position correlation between APP sensor #1 and #2.	1)Absolute value of (normalized APP sensor #2 - normalized APP sensor #1) > OR 2) absolute value of (APP sensor 1 min learnt - APP sensor 2 min learnt) >	• 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 every error, decrements by 1 for every pass: threshold is 1333 Check runs every 3ms..	DTC Type A
Barometric Pressure (BARO) Sensor Performance	P2227 (GMX367 L32 engine only)	This DTC detects a BARO Sensor reading that is rapidly changing (unstable).	BARO Sensor has changed more than 10 kPa since the last time read.	• No Map Sensor DTC's active • No TP Sensor DTC's active • No ECT Sensor DTC's active • No MAF Sensor DTC's active • No IAT Sensor DTC's active • No VSS DTC's active • No BARO Sensor Shorted/Open DTC's active • Engine run time > 10 seconds • Vehicle Speed < 255.9844	80 failures out of 100 samples Frequency: 100 ms loop continuous	DTC Type B
Barometric Pressure (BARO) Sensor Circuit Low Voltage	P2228 (GMX367 L32 engine only)	This DTC detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Sensor Voltage < 0.25 volts		80 failures out of 100 samples Frequency: 100 ms loop Continuous	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Barometric Pressure (BARO) Sensor Circuit High Voltage	P2229 (GMX367 L32 engine only)	This DTC detects a continuous short to high in either the signal circuit or the BARO sensor.	BARO Sensor Voltage > 4.33 volts		80 failures out of 100 samples Frequency: 100 ms loop Continuous	DTC Type B
AIR System Pressure Sensor A Circuit	P2430 (GMX365/7 L26 SULEV only)	Detects a stuck-in-range AIR pressure sensor signal.	Stuck in Range Average Error < 0.5 AND Stuck in Range Variance < 1.0	No active DTC P0412 set. No active DTC P0418 set. No active DTC P0606 set. No active DTC P2432 set. No active DTC P2433 set. No active 5 volt reference DTCs set. AIR pressure sensor circuit fault pending = False. AIR pump is commanded ON	Stuck in Range Cumulative Info > 5 sec. Once per trip where AIR pump operation is requested at startup.	DTC Type B
AIR System Pressure Sensor A Performance	P2431 (GMX365/7 L26 SULEV only)	Detects a skewed or drifting AIR pressure sensor signal	Difference between AIR Pressure Sensor and Barometric pressure > 10 kPa with AIR pump commanded OFF. OR Difference between AIR Pressure Sensor and Barometric pressure > 50 kPa with AIR pump commanded ON.	No active DTC P0606 set. No active DTC P0412 set. No active DTC P0418 set. No active DTC P2432 set. No active DTC P2433 set. No active 5 volt reference DTCs set. No active MAP sensor DTCs set. AIR pressure sensor circuit fault pending = False.	Air Pressure Sensor Performance cumulative info > 30 seconds. Cumulative info is updated at a rated determined by Barometric pressure reading quality. Baro quality is determined by distance traveled since last key-on or part throttle Baro update. Continuous, 100ms loop.	DTC Type B
AIR System Pressure Sensor A Circuit Low	P2432 (GMX365/7 L26 SULEV only)	Detects a low out-of-range AIR pressure sensor signal	AIR Pressure Sensor signal < 5% of 5V ref.	No active DTC P0606 set. No active 5 volt reference DTCs set.	400 fail counts out of 1000 sample counts. Continuous, 12.5 ms loop.	DTC Type B
AIR System Pressure Sensor A Circuit High	P2433 (GMX365/7 L26 SULEV only)	Detects a high out-of-range AIR pressure sensor signal	AIR Pressure Sensor signal > 95% of 5V ref.	No active DTC P0606 set. No active 5 volt reference DTCs set.	400 fail counts out of 1000 sample counts. Continuous, 12.5 ms loop.	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
AIR System Switch / Valve Stuck Open	P2440 (GMX365/7 L26 SULEV only)	Detects an AIR system control valve stuck open condition. This test is run during the phase 2 (pump on, control valve shut) portion of the SAI diagnostic.	AIR normalized pressure error < -3 kPa (lower than predicted pressure) during SAID phase 2 test	No active AIR pressure sensor circuit DTCs set. No active AIR pressure sensor performance DTCs set. No active MAP sensor DTCs set. No active AIR pump relay circuit DTC set. No active AIR control valve relay circuit DTC set. No active MAF sensor DTCs set. No active 5 volt reference DTCs set. No active IAT sensor DTCs set. No active ECT sensor DTCs set. No active Misfire DTCs set. No active catalyst monitor DTCs set. No active fuel injector DTCs set. No active EST DTCs set. No active DTC P0411 set. No active DTC P0606 set. AIR pressure sensor circuit fault pending = False. AIR operation is allowed this start. BARO > 65 kPa. 3 g/sec < Mass Air Flow < 26 g/sec. 18 volts > System voltage > 10.5 volts.	SAID phase 2 conditional test weight > 1.5 seconds Conditional test weight is based on Baro, Mass air flow & System voltage. Once per trip where AIR pump operation is requested at startup.	DTC Type B
AIR System Pump Stuck On	P2444 (GMX365/7 L26 SULEV only)	Detects an AIR pump stuck ON condition. This test is run during the phase 3 (pump off) portion of the SAI diagnostic.	AIR normalized pressure error > 1.5 kPa (higher than predicted pressure) during SAID phase 3 test	No active AIR pressure sensor circuit DTCs set. No active AIR pressure sensor performance DTCs set. No active MAP sensor DTCs set. No active AIR pump relay circuit DTC set. No active AIR control valve relay circuit DTC set. No active MAF sensor DTCs set. No active 5 volt reference DTCs set. No active IAT sensor DTCs set. No active ECT sensor DTCs set. No active Misfire DTCs set. No active catalyst monitor DTCs set. No active fuel injector DTCs set. No active EST DTCs set. No active DTC P0411 set. No active DTC P0606 set.bb No active DTC P2440 set. AIR pressure sensor circuit fault pending = False. AIR operation is allowed this start. SAID post control time < 14 seconds	Within 5 seconds of the AIR pump being commanded OFF. Once per trip where AIR pump operation is requested at startup.	DTC Type A

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ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the ignition off timer has failed.	A failure will be reported if any of the following occur: Ignition Off Time < 0 seconds Ignition Off Time > 8 seconds Sample Counter > 25 Ignition Off Time < Old Ignition Off Time <u>On positive timer transition</u> Sample Counter < 7 or Sample Counter > 13 Or (Ignition Off Time - Old Ignition Off Time) ≠ 1 second note: Sample Counter is incremented if Ignition Off Time = Old Ignition Off Time	Test Run This Trip = FALSE Ignition Off Timer Enabled = TRUE (PCM State = Poweroff; Time in poweroff ≥ 1.6 seconds)	<u>Frequency:</u> 100 ms loop Continuous	DTC Type B

2006 3.4L (LNJ) *when used in:* Equinox, Torrent

3.5L (LX9) *when used in:* G6, Malibu, Uplander, Terraza, Rendezvous, Montana, Relay

3.8L (L26, L32) *when used in:* Lucerne, LaCrosse, Allure, Grand Prix

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O2 Sensor Circuit Range/Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed loop fuel control O2 sensor Ready flag set to "Not Ready." O2 sensor voltage must be > 600 millivolts or < 300 millivolts to set closed loop fuel O2 Ready flag. Once set to "Ready," the O2 sensor voltage cannot be > 300 millivolts and < 600 millivolts for > 10 seconds or the O2 Ready flag will be reset to "Not Ready."	• No TP Sensor DTC's • No MAF DTC's • No MAP DTC's • No ECT DTC's • No Bank 1 Sensor 1 or Bank 2 Sensor 1 O2 DTC's • Engine Run Time ≥ 180 seconds • ECT ≥ 65° C • Traction Control = Not Active • Not in Catalyst Protection Mode • 9 volts ≤ Ignition Voltage ≤ 18 volts • 602 ≤ Engine Speed ≤ 3000 • 8gps ≤ Mass Airflow ≤ 38gps • 3% ≤ TP Sensor ≤ 35% • Not in Decel Fuel Cutoff Mode • Not in Power Enrichment • Predicted O2 temp ≥ 0°C All of the above met for 3 seconds	300 test failures in a 360 test sample Frequency: Continuous 100ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2 Sensor Circuit Range/Performance Bank 1 Sensor 2 **(Intrusive test runs on unified cycle)**	P2A01	This DTC determines if the post catalyst O2 sensor is stuck in a normal voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic includes a passive (stage 1) test and an intrusive (stage 2) test. The stage 2 increases or reduces delivered fuel to achieve the required rich or lean threshold.	Post catalyst O2 sensor cannot achieve voltage ≥ 685.76 millivolts and voltage ≤ 290.8 millivolts	Common Enable Criteria • No O2 circuit, heater, response or heater driver DTC's active • No TP Sensor DTC's • No MAF DTC's • No ECT DTC's • No MAP DTC's • No IAT DTC's • No EVAP DTC's • No Fuel Injector DTC's • 9 volts ≤ system voltage ≤ 18 volts • Engine Runtime ≥ 6 seconds Stage 2 Specific Enable Criteria: • Stage 1 portion of test not passed • Must be in one of the following fuel cells: Purge, normal; Purge, high flow • 1000 rpm ≤ Engine Speed ≤ 3000 rpm • 15 gps ≤ Airflow ≤ 45 gps • 20 mph ≤ Vehicle Speed ≤ 80 mph • EGR Flow diagnostic intrusive test not active • 94.7 ≤ Short term fuel trim ≤ 105.2 All of the above met for at least 2 seconds, and then: • Fuel state = closed loop EVAP diagnostic not in control of purge	Stage 1: Up to 380 seconds Stage 2: Up to 12.4 seconds for the lean threshold and up to 10.4 seconds for the rich threshold. Frequency: One test per trip	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2 Sensor Circuit Range/Performance Bank 2 Sensor 1	P2A03 (GMX380/1 only)	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed loop fuel control O2 sensor Ready flag set to "Not Ready." O2 sensor voltage must be > 600 millivolts or < 300 millivolts to set closed loop fuel O2 Ready flag. Once set to "Ready," the O2 sensor voltage cannot be > 300 millivolts and < 600 millivolts for > 10 seconds or the O2 Ready flag will be reset to "Not Ready."	• No TP Sensor DTC's • No MAF DTC's • No MAP DTC's • No ECT DTC's • No Bank 1 Sensor 1 or Bank 2 Sensor 1 O2 DTC's • Engine Run Time ≥ 180 seconds • ECT ≥ 65° C • Traction Control = Not Active • Not in Catalyst Protection Mode • 9 volts ≤ Ignition Voltage ≤ 18 volts • 602 ≤ Engine Speed ≤ 3000 • 8gps ≤ Mass Airflow ≤ 38gps • 3% ≤ TP Sensor ≤ 35% • Not in Decel Fuel Cutoff Mode • Not in Power Enrichment Predicted O2 temp ≥ 0°C All of the above met for 3 seconds	300 test failures in a 360 test sample <u>Frequency:</u> Continuous 100ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
O2 Sensor Circuit Range/Performance Bank 2 Sensor 2 **(Intrusive test runs on unified cycle)**	P2A04 (GMX380/1 only)	This DTC determines if the post catalyst O2 sensor is stuck in a normal voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic includes a passive (stage 1) test and an intrusive (stage 2) test. The stage 2 increases or reduces delivered fuel to achieve the required rich or lean threshold.	Post catalyst O2 sensor cannot achieve voltage ≥ 685.76 millivolts and voltage ≤ 290.8 millivolts	Common Enable Criteria • No O2 circuit, heater, response or heater driver DTC's active • No TP Sensor DTC's • No MAF DTC's • No ECT DTC's • No MAP DTC's • No IAT DTC's • No EVAP DTC's • No Fuel Injector DTC's • 9 volts ≤ system voltage ≤ 18 volts • Engine Runtime ≥ 6 seconds Stage 2 Specific Enable Criteria: • Stage 1 portion of test not passed • Must be in one of the following fuel cells: Purge, normal; Purge, high flow • 1000 rpm ≤ Engine Speed ≤ 3000 rpm • 15 gps ≤ Airflow ≤ 45 gps • 20 mph ≤ Vehicle Speed ≤ 80 mph • EGR Flow diagnostic intrusive test not active • 94.7 ≤ Short term fuel trim ≤ 105.2 All of the above met for at least 2 seconds, and then: • Fuel state = closed loop • EVAP diagnostic not in control of purge	Stage 1: Up to 380 seconds Stage 2: Up to 12.4 seconds for the lean threshold and 10.4 seconds for the rich threshold. Frequency: One test per trip	DTC Type B

P0101: (Calculated Flow – Measured Flow) Lookup Table: 3.5L (LX9) GMX380/1

Calculated Airflow	Airflow Delta
Grams_Air_0	10
Grams_Air_40	15
Grams_Air_80	20
Grams_Air_120	400
Grams_Air_160	400

Grams_Air_200	400
Grams_Air_240	400
Grams_Air_280	400
Grams_Air_320	400
Grams_Air_360	400
Grams_Air_400	400

P0300: Catalyst Damaging Misfire Percentages as a Function of Engine Speed and Load Table: LX9 GMX380/1

Eng. Load ↓ / Eng. RPM →	0 RPM	1000 RPM	2000 RPM	3000 RPM	4000 RPM	5000 RPM	6000 RPM	7000 RPM
0 Load_In_Percent	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%
10 Load_In_Percent	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%	31.875%
20 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
30 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
40 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
50 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
60 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
70 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
80 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
90 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
100 Load_In_Percent	31.875%	31.875%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

P0401: Engine Run Time as a Function of Coolant Temperature Table: 3.5L (LX9) GMX380/1

Coolant Temperature at Startrun	Engine Run Time (seconds)
Deg_C_m40	360
Deg_C_m30	300
Deg_C_m20	240
Deg_C_m10	180
Deg_C___0	160
Deg_C__10	140
Deg_C__20	120
Deg_C__30	90
Deg_C__40	80
Deg_C__50	70
Deg_C__60	60
Deg_C__70	50
Deg_C__80	35
Deg_C__90	20
Deg_C_100	20
Deg_C_110	20
Deg_C_120	20
Deg_C_130	20
Deg_C_140	20

P0420: Average Base Pulse Width Maximum Allowed Value as a Function of Airflow Table: 3.5L (LX9) GMX380/1

Airflow in gps	Average BPW in milliseconds
0	100.0029
1	100.0029
2	100.0029
3	100.0029
4	100.0029
5	100.0029
6	100.0029
7	100.0029
8	100.0029
9	100.0029
10	100.0029
11	100.0029
12	100.0029
13	100.0029
14	100.0029
15	100.0029
16	100.0029

P0420: Average Base Pulse Width Minimum Allowed Value as a Function of Airflow Table: 3.5L (LX9) GMX380/1

Airflow in gps	Average BPW in milliseconds
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0

P0430: Average Base Pulse Width Maximum Allowed Value as a Function of Airflow Table: 3.5L (LX9) GMX380 / 381 only uses this additional table

Airflow in gps	Average BPW in milliseconds
0	100.0029
1	100.0029
2	100.0029
3	100.0029
4	100.0029
5	100.0029
6	100.0029
7	100.0029
8	100.0029
9	100.0029
10	100.0029
11	100.0029
12	100.0029
13	100.0029
14	100.0029
15	100.0029
16	100.0029

P0430: Average Base Pulse Width Minimum Allowed Value as a Function of Airflow Table: 3.5L (LX9) GMX380 / 381 only uses this additional table

Airflow in gps	Average BPW in milliseconds
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0