1999 3.5L DOHC (LX5) W-Intrigue 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
MAF Sensor Range/Perf	P0101	0 to 231gps 1500HZ to 10500HZ	Delta of 6 to 30 gps between the actual airflow and calculated airflow	Engine Vacuum ≤ 70 kpa Delta Map < 3% TPS < 50% Delta TPS < 1.50 % EGR < 50.00 % 9.00 V < ign voltage < 18 V Engine stable = 10.0 sec	395.00 test failures out of 400.00 tests	DTC Type B
MAF Sensor Circuit Low Input	P0102	0 to 231gps 1500HZ to 10500HZ	Frequency value < 1200 HZ	RPM > 1.00 Ign voltage > 8.00 V Conditions stable > 0.50 sec TPS < 50.00 % IAC Steps > 2	395.00 test failures out of 400.00 tests	DTC Type B
MAF Sensor Circuit High Input	P0103	0 to 231gps 1500HZ to 10500HZ	Frequency value> 11500.00 HZ	RPM > 50.00 Ign voltage > 8.00 V Conditions stable > 0.50 sec TPS < 50.00 % IAC Steps > 2	395.00 test failures out of 400.00 tests	DTC Type B
MAP Sensor Circuit - Low Input	P0107	This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP < 1.95%	No TP sensor DTC's set Engine Running Throttle Position ≥ 0.00 % when Engine speed is ≤ 1000.00 RPM **or** Throttle Position is ≥ 10.00 % when Engine speed is > 1000.00 RPM	175.00 test failures within a 200.00 test sample. 12.5ms loop Continuous	DTC Type B
MAP Sensor Circuit -High Input	P0108	This DTC detects a continuous short to high in either the signal circuit or the MAP sensor.	MAP > 86%	No TP sensor DTC's set Engine Running Throttle Position ≤ 1.99 % when Engine speed is ≤ 3000 RPM	175.00 test failures within a 200.00 test sample. 12.5ms loop Continuous	DTC Type B
Intake Air Temp. Sensor Circuit -Low Input	P0112	The DTC detects a continuous short to ground in the IAT signal circuit or the IAT sensor	**Low Resistance Pull-up** Raw IAT < 7.00 counts (135 °C) **High Resistance Pull-up** Raw IAT < 7.00 counts (135 °C)	No VS sensor DTCs set. No ECT sensor DTCs set Vehicle speed ≥ 25.00 mph Engine run time > 10.00 seconds	175.00 test failures within a 200.00 test sample Continuous	DTC Type B
Intake Air Temp. Sensor Circuit - High Input	P0113	The DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	**Low Resistance pull-up** Raw IAT > 253 counts (-37 °C) **High Resistance pull-up** Raw IAT > 253 counts (-37 °C)	No ECT sensor DTC's set No VS sensor DTC's set Vehicle speed < 35.00 mph Air flow < 12.00 g /second Coolant > 60.00 °C Engine run time> 180.00 seconds	175.00 test failures within a 200.00 test sample Continuous	DTC Type B

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Engine Coolant Temperature Circuit Low Input	P0117	Thermister Analog Voltage This DTC detects if the engine coolant sensor's analog voltage falls below a minimum expected value	**Low Resistance Pull-up** Raw ECT < 37.00 counts (140 °C) **High Resistance Pull-up** Raw ECT < 37.00 counts (140 °C)	Engine run time > 15.00 seconds	240.00 test failures within a 250.00 test sample Continuous	DTC Type B
Engine Coolant Temperature Circuit High Input	P0118	Thermister Analog Voltage The DTC detects if the engine coolant sensor's analog voltage exceeds a maximum expected value	**Low Resistance pull-up** Raw ECT > 247.00 counts (-40 °C) **High Resistance pull-up** Raw ECT > 247.00 counts (-40 °C)	Engine run time > 3.00 seconds	240.00 test failures within a 250.00 test sample Continuous	DTC Type B
Throttle Position Sensor Circuit Range/Rationality	P0121	The DTC detects a "skewed" or stuck TP sensor	The last throttle position value > or < predicted throttle position. Lookup table for stuck high or low based on engine RPM.	No TP sensor DTC's set or failures flagged No MAP sensor DTC's set Engine Running MAP < 50.00 kpa (stuck high) MAP > 70.00 kpa (stuck low) ECT >75.00 °C Engine Run Time > 180 seconds Delta MAP < 5kpa Engine Stable for > 5 seconds 0 < IAC Steps < 130 steps	95 test failures within 100 test sample Continuous	DTC Type B
Throttle Position Sensor Circuit-Low Input	P0122	This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor.	TP signal < 2%	Engine running	95.00 consecutive test failures within a 100.00 test sample Continuous	DTC Type B
Throttle Position Sensor Circuit-High Input	P0123	This DTC detects a continuous short to high in either the signal circuit or the TP sensor.	TP signal > 97%	Engine running	95.00 consecutive test failures within a 100.00 test sample Continuous	DTC Type B

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Insufficient Coolant Temperature for Closed Loop Fuel Control	P0125	Thermistor Analog Voltage This DTC detects if a stabilized minimum closed-loop coolant temperature is reached and maintained after engine start-up	If closed-loop timer is exceeded: 100 sec @ 50 °F 150 sec @ 20 °F 439 sec @ region 3 ECT < 10.00 °C	ECT sensor shorts test not failing ECT DTCs not active IAT sensor DTCs not active Start up ECT ≤ 50 °C IAT ≥ -6.99 °C ECT ≥ -40.00 °C Max Idle Time ≤ : 95.00 sec @ 50 °F 210.00 sec @ 20 °F 329.00 sec @ Reg 3 Min Total Engine Air ≥ : 1000 grams @ 50 °F 1500 grams @ 20 °F 4669 grams @ Reg 3	100 consecutive test failures (i.e. test failures * loop rate = sec) 100ms loop Continuous	DTC Type B
O2S Circuit-Low Voltage(Bank 1, Sensor 1)	P0131	This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady throttle and PE.	O2 sensor voltage < 175.01 millivolts or O2 sensor voltage < 599.99 millivolts in PE mode	No misfire DTC's No crank DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Closed loop Air/Fuel ratio ≥ 14.4 but ≤ 14.9 Throttle position > 3 % but < 40 %	90.00 test failures in a 100.00 test sample for 5.00 sets of samples 550.00 failures in a 600.00 test sample for PE mode	DTC Type B

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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 and DFCO	O2 sensor voltage > 975.00 millivolts or O2 sensor voltage > 200.00 millivolts in DFCO mode	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Closed loop Air/Fuel ratio ≥ 14.40 but ≤ 14.90 Throttle position > 3.01 % but < 40.00 %	40 test failures in a 100 test sample for 4 sets of samples. 290.00 failures in a 300.00 test sample for DFCO mode	DTC Type B
O2S Circuit-Slow Response(Bank 1, Sensor 1)	P0133	This DTC determines if the O2 sensor functioning properly by checking its response time.	O2 sensor average transition time: L/R > 220.00 msec R/L > 220.00 msec	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set Closed Loop Fuel Enabled Engine Run Time > 202 sec. Coolant temp > 75.00 C 1000.00 < RPM < 3000.00 15.00 gps < MAF < 40.00 gps Above conditions met for 3.0 seconds.	90.00 seconds Once per key cycle	DTC Type B

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O2S Circuit-No Activity Detected (Bank 1,Sensor 1)	P0134	This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 400.00 millivolts but < 499.99 millivolts	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Engine run time > 200.00 seconds	290.00 test failures in a 300.00 test sample Continuous	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± 150 millivolts from the mean O2 bias voltage. *Time based on table: Time vs Start Up Coolant Temp.	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's ECT < 40.00 °C IAT < 45.00 °C Δ ECT-IAT $\leq$ 15 °C Avg MAF < 26.00 gps 9.00 < System Voltage < 18.00 400 mvolts < Avg Bias Voltage < 500 mvolts	From cold start to a run time maximum of 100 seconds. *Time determined by table.	DTC Type B

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O2S Circuit-Low Voltage(Bank 1, Sensor 2)	P0137	This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady throttle and PE.	O2 sensor voltage < 10.00 millivolts or O2 sensor voltage < 599.99 millivolts in PE mode	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Closed loop Air/Fuel ratio ≥ 14.40 but ≤ 14.90 Throttle position > 3.01 % but < 40.00 %	560.00 test failures in a 600.00 test sample for 4.00 sets of samples 900.00 failures in a 1000.00 test sample for PE mode	DTC Type B
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 and DFCO	O2 sensor voltage > 999.99 millivolts or O2 sensor voltage > 200.00 millivolts in DFCO mode	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Closed loop Air/Fuel ratio ≥ 14.40 but ≤ 14.90 Throttle position > 3.01 % but < 40.00 %	560.00 test failures in a 600.00 test sample for 4.00 sets of samples. 900.00 failures in a 1000.00 test sample for DFCO mode	DTC Type B
O2S Circuit-No Activity Detected (Bank 1,Sensor 2)	P0140	This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 424.99 millivolts but < 475.00 millivolts	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's Engine run time > 200.00 seconds	1400 test failures in a 1500 test sample Continuous	DTC Type B

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O2S Heater Circuit Malfunction (Bank 1, Sensor 2)	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± 150 millivolts from the mean O2 bias voltage. *Time based on table: Time vs Start Up Coolant Temp.	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 2 voltage DTC's ECT < 40 °C IAT < 45 °C Δ ECT-IAT ≤ 15 °C Avg MAF < 26 gps 9.00 < System Voltage < 18.00 400 mvolts < Avg Bias Voltage < 500 mvolts	From cold start to a maximum time of 200 seconds. *Time determined by table.	DTC Type B
System Too Lean (Bank 1)	P0171	Determines if the system is in a lean condition.	The average of short term fuel trim samples ≥ 1.05 and The average of adaptive index multiplier samples ≥ 1.14	The following DTC's are not set: VSS DTCs EST DTCs Crank sensor DTCs CAM sensor DTCs TPS DTC's Misfire DTC's IAC DTC's Injector DTC's MAF DTC's O2 sensor DTC's MAP DTC's EGR DTC's Evap. DTC's ECT DTC's IAT DTC's Throttle position < 50.00 % Engine speed > 600.00 rpm but < 4000.00 rpm Baro > 70.00 kpa (8500 ft) ECT > 20.00 °C but < 110.00 °C MAP > 15.00 kpa but < 85.00 kpa IAT > -18.01 °C but < 70.00 °C Air flow > 3.00 g/s < 150.00 g/s Vehicle speed < 83.00 mph	If lean counter is ≥5.00 tests Continuous	DTC Type B

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System Too Rich (Bank 1)	P0172	Determines if the system is in a rich condition.	The average of short term fuel trim samples ≤ 1.00 and The average of adaptive index multiplier samples ≤ 0.86	The following DTC's are not set: VSS DTCs EST DTCs Crank sensor DTCs CAM sensor DTCs TPS DTC's Misfire DTC's IAC DTC's Injector DTC's MAF DTC's O2 sensor DTC's MAP DTC's EGR DTC's Evap. DTC's ECT DTC's IAT DTC's Throttle position < 50.00 % Engine speed > 600.00 rpm but < 4000.00 rpm Baro > 70.00 kpa (8500 ft) ECT > 20.00 °C but < 110.00 °C MAP > 15.00 kpa but < 85.00 kpa IAT > -18.01 °C but < 70.00 °C Air flow > 3.00 g/s < 150.00 g/s Vehicle speed < 83.00 mph	If lean counter is ≥5.00 tests Continuous	DTC Type B
Injector Circuit Fault - Cylinder 1	P0201	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B
Injector Circuit Fault - Cylinder 2	P0202	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B
Injector Circuit Fault - Cylinder 3	P0203	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B
Injector Circuit Fault - Cylinder 4	P0204	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B
Injector Circuit Fault - Cylinder 5	P0205	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B

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Injector Circuit Fault - Cylinder 6	P0206	This DTC checks the injectors for electrical integrity	Output state is invalid	PCM state = run	30 seconds 1 second loop Continuous	DTC Type B
Random Misfire Detected	P0300	This DTC will determine if a misfire is occurring by monitoring crankshaft velocity.	Deceleration index vs Engine Speed vs Load and Camshaft Position	Engine run time > 0 No VSS DTC's No crank sensor DTC's No TP sensor DTC's No EST sensor DTC's No ECT sensor DTC's No CAM sensor DTC's No transmission DTC's No mass airflow sensor DTCs Fuel cutoff not active Brake torque management not active Fuel level > 10% ECT > -6.99 °C but < 131.00 ° C Engine speed > 400.00 RPM but < 6500.00 RPM System voltage > 9.00 volts but < 18.00 volts + Throttle position Δ < 0.566 % / 100ms - Throttle position Δ < 0.566 %/100ms Rough Road- Ratio of consecutive positive peak delta ref times to nonconsecutive peaks < 20.	10 failed 200 revolution blocks out of 16 Emission Level 4 failed 200 revolution blocks out of 16 Catalyst damaging Level Continuous	DTC Type B *EMISSION* DTC Type A CATALYST DAMAGING
Knock Sensor Circuit Fault	P0325	This diagnostic is based on normal variation in the knock sensor output. If the output stays relatively constant then there is a problem. If the output is a high voltage the problem is within the knock sensor integrated circuit.	Knock sensor average voltage $\geq$ 4.8 volts and variation of the output signal from the average voltage is within $\pm$ .039 volts.	No VSS DTC's set No TP sensor DTC's set No ECT sensor DTC's set No Crank DTC's set No CAM DTC's set No AIR flow DTC's set Engine Run time > 30 sec. System Voltage $\geq$ 9 V TPS $\geq$ 15% Coolant $\geq$ 65°C 1000 RPM $\leq$ Engine Speed $\leq$ 3000 RPM Engine Load $\geq$ 45% Spark Retard $\leq$ 15 deg.	480 fails in 500 samples. Continuous	DTC Type B

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Knock Sensor Input Fault	P0327	This diagnostic is based on normal variation in the knock sensor output. If the output stays relatively constant then there is a problem. If the output is a low voltage the problem is within the knock sensor or wiring.	Knock sensor average voltage < 4.8 volts and variation of the output signal from the average voltage is within ± .039 volts.	No VSS DTC's set No TP sensor DTC's set No ECT sensor DTC's set No Crank DTC's set No CAM DTC's set No AIR flow DTC's set Engine Run time > 30 sec. System Voltage ≥ 9 V TPS ≥ 15% Coolant ≥ 65°C 1000 RPM ≤ Engine Speed ≤ 3000 RPM Engine Load ≥ 45% Spark Retard ≤ 15 deg.	480 fails in 500 samples. Continuous	DTC Type B
Crankshaft Position Sensor A Circuit Fault	P0335	24X Signal This diagnostic determines whether a fault exists with crank position sensor circuit A signal	The number of medium resolution reference pulses with or without CAM present ≤ 46 or ≥ 50.	PCM state = crank or run MAF > 2.29 gps 20 RPM ≤ CAM RPM Cranking ≤ 400 RPM 20 RPM ≤ CAM RPM Cranking ≤ 6000 RPM 20 RPM ≤ Med. Res. RPM Crank ≤ 400 RPM 20 RPM ≤ Med. Res. RPM Crank ≤ 6000 RPM	No CAM faults present: Crank > 1 fail count Run > 1 fail count CAM fault present: Crank > .7 sec. Run > .1 sec. 12.5 msec Continuous	DTC Type B
Camshaft Position Sensor Circuit Fault	P0340	1X Signal This diagnostic will detect if a fault exists on the camshaft position sensor signal.	Checks for correct number of low res. pulses per cam, checks for correct CAM position and CAM signal present.	PCM state = crank or run A: Low Res. pulse in falling CAM region = 6 B: CAM sequence in falling region ≥ 3 or ≤ 6 CAM sequence RPM ≤ 3000 RPM	A: 1.5 seconds without CAM signal detected. B: 5 CAM failures out of 100 sample limit 12.5 msec Continuous	DTC Type B
Crankshaft Position Sensor B Circuit Fault	P0385	24X Signal This diagnostic determines whether a fault exists with crank position sensor circuit B signal	The number of medium resolution reference pulses with or without CAM present ≤ 46 or ≥50.	PCM state = crank or run MAF > 2.29 gps 20 RPM ≤ CAM RPM Cranking ≤ 400 RPM 20 RPM ≤ CAM RPM Cranking ≤ 6000 RPM 20 RPM ≤ Med. Res. RPM Crank ≤ 400 RPM 20 RPM ≤ Med. Res. RPM Crank ≤ 6000 RPM	No CAM faults present: Crank > 1 fail count Run > 1 fail count CAM fault present: Crank > .7 sec. Run > .1 sec. 12.5 msec Continuous	DTC Type B

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Exhaust Gas Recirculation - Insufficient Flow Detected	P0401	This diagnostic will determine if there is a reduction in EGR flow.	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.	***Test Enable*** No injector DTCs set No crank DTCs set No TP sensor DTC's set No MAP DTC's set No VS sensor DTC's set No IAT sensor DTC's set No ECT sensor DTC's set No IAC DTC's set No Linear EGR Pintle Position DTC set No Misfire DTC's set No MAF DTC's set MAP Δ < 1.00 kpa - RPM Δ < 400 + RPM Δ < 200 MPH Δ < 9.00 ECT >80.00 ° C Baro > 77.00 kpa Vehicle Speed > 25.00 mph IAC Δ < 5.00 counts AC clutch status is unchanged Transmission status is unchanged ***Start Test*** Throttle Position < 1.3% EGR Position < 1% Engine Speed > 900.00 rpm but < 1300.00 rpm MAP Δ < 1.00 kPa Compensated MAP > 20.00 kpa but < 40.00 kpa ***Run Test*** Stabilized MAP (valve closed) recorded and EGR valve "ramped" open over a time interval and peak MAP value recorded and MAP Δ computed. EGR valve "ramped" closed over a time interval.	1 second Once per trip	DTC Type A

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Exhaust Gas Recirculation - Insufficient Flow Detected	P0401 (cont.)	This diagnostic will determine if there is a reduction in EGR flow.	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.	***Rapid Step Response Test*** IF the difference between the current EWMA and the current map diff > 3 kpa AND current map diff > 2 kpa THEN 5 tests will be run per trip until 25 tests have been met	1 second Once per trip	DTC Type A
Linear EGR Circuit Fault	P0403	This DTC checks the Linear EGR circuit for electrical integrity	Output state invalid	PCM state = crank or run 9 V $\leq$ Ignition Voltage $\leq$ 18V	20.00 seconds 100ms loop Continuous	DTC Type B
EGR Valve Circuit Performance	P0404	This diagnostic detects if the pintle position error is too large	Pintle position error [absolute value of (desired position - actual position)] > 20.00 %	Desired EGR position > 0% Code P0401 status = not in progress EGR valve icing or over temperature not occurring Δ Desired EGR position < 30.00 % Ignition voltage $\geq$ 10.00 volts	100.00 loops 100ms loop Continuous	DTC Type B
EGR Valve Position Sensor Circuit Low Voltage	P0405	This diagnostic detects if the pintle position feedback circuit is open or shorted to ground	EGR feedback sensor signal < 6.00 counts	EGR valve icing or over temperature not occurring Ignition voltage $\geq$ 10.00 volts	2.00 seconds 100ms loop Continuous	DTC Type B

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AIR Injection System Malfunction	P0410	***Passive***: HO2S sensors indicate lean condition present during open loop operation. Verifies proper operation of AIR pump. ***Active:*** HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation	***Passive:*** HO2S sensor > approx. 650 mv during open loop operation at idle. ***Active:*** HO2S sensor > 300 mv for > 4 seconds or fuel integrator delta of.05 when pump turned on during closed loop operation and CCP commanded at idle.	***Passive:*** No MAF DTC's set No MAP DTC's set No IAT DTC's set No ECT DTC's set No TP sensor DTC's set No HO2S DTC's set No Injector DTC's set No Misfire DTC's set No CKP DTC's set No EGR DTC's set No Fuel Trim DTC's set No IAC DTC's set No AIR pump relay DTC's set No AIR Solenoid DTC's set No EVAP DTC's set HO2S mid bias volt test passed Engine run > 3 seconds Air Flow < 35 gps ECT < 110 °C A/F ratio > 13:1 Engine load < 80% Ignition Voltage > 11.5 volts Engine Speed > 400 RPM Engine at idle IAT > 10 °C delta TPS from start of test < 5% PE, DFCO, COT not active ***Active*** Same as above and Engine run ≥ 300 sec. after closed loop operation A/F = 14.7:1 Fuel integrator > 0.97 & < 1.09 ECT ≥ 10 °C In BLM cell 0	***Passive:*** During open loop operation. Once per trip. ***Active:*** 5 seconds Up to 4 times per trip if passive test fails or is inconclusive.	DTC Type B
AIR Solenoid Circuit Fault	P0412	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B
AIR Pump Relay Circuit Fault	P0418	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B

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Catalyst Low Efficiency Bank 1	P0420	Oxygen Storage	OSC time difference ≥ 0.0986seconds OSC time difference = OSC worst pass threshold - OSC compensation factor * (post cat O2 resp time - pre cat O2 resp time) OSC worst pass thresh = 1.275 seconds	No EST DTC's set No EGR DTC's set No MAT DTC's set No IAC DTC's set No injector DTC's set No VS sensor DTC's set No TP sensor DTC's set No O2 sensor DTC's set No Misfire DTC's set No MAP sensor DTC's set No Fuel Trim DTC's set No ECT sensor DTC's set ***Valid Idle Period Criteria*** Engine speed ≥ 1000 RPM for a minimum of 37 sec. Min engine run time of 344 sec for stabilized BLM ***Test Enable Conditions*** Predicted catalyst temperature ≥ 483.00 Closed loop fuel control Barometric pressure ≥ 75.00 kpa -18.00 ≤ IAT ≤ 80 °C 75.00 ≤ ECT ≤ 120.00 °C 0 < Idle period ≤ 180.00 seconds Tests attempted this trip ≤ 12.00 Delta engine speed ≤ 120 RPM ***Rapid Step Response Enable Criteria*** OSC time difference step ≥ 0.32 sec OSC time difference ≥ 0.00 sec	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 tests per trip Maximum of 6 trips to detect failure when Rapid Step Response is enabled. Frequency: 12.5 ms continuous	Type A

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Evap. Emission Control System - Malfunction	P0440	This diagnostic will detect a missing gas cap or a "gross" leak in the evap system.	Evap leak > 0.080"	No MAT DTC's set No MAP DTC's set No TP sensor DTC's set No Air flow DTC's set No O2 DTC's set No VSS DTC's set No Misfire DTC's set No Fuel Trim/Fuel Injector DTC's set No EGR DTC's set No Coolant DTC's set No AIR DTC's set Baro > 75.20 kPa (8000 ft) 4.41 ° ≤ Powerup ECT ≤ 30.00 °C 4.41 ° ≤ Powerup IAT ≤ 30.00 °C ECT-IAT no more than 8.01 °C IAT-ECT no more than 1.99 °C 15.00 % < Fuel Level < 85.10 % 5.00 V < System Voltage < 16.00 V	Test runs once per cold trip if all conditions are met. Test begins at 180s after start and ends when tank vacuum reaches 7.9" H2O or timer expires (35.0s).	DTC Type A
Evap. Emission System Leak Detection	P0442	This diagnostic will detect a small leak in the evap system. Test begins after "gross" leak test and monitors the vacuum decay in the system. If vacuum decay slope exceeds threshold, system monitors for fuel vapor generation	Evap system leak between 0.040" and 0.080"	No MAT DTC's set No MAP DTC's set No TP sensor DTC's set No Air flow DTC's set No O2 DTC's set No VSS DTC's set No Misfire DTC's set No Fuel Trim/Fuel Injector DTC's set No EGR DTC's set No Coolant DTC's set No AIR DTC's set Baro > 75.20 kPa (8000 ft) 4.41 ° ≤ Powerup ECT ≤ 30.00 °C 4.41 ° ≤ Powerup IAT ≤ 30.00 °C ECT-IAT no more than 8.01 °C IAT-ECT no more than 1.99 °C 15.00 % < Fuel Level < 85.10 % 5.00 V < System Voltage < 16.00 V	Test runs once per cold trip if all conditions are met. Test begins after "gross" leak test and monitors the vacuum decay in the system. If vacuum decay slope is too great, system monitors for fuel vapor generation.	DTC Type A
Canister Purge Circuit Fault	P0443	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec 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
Evap. Emission Control System - Air Vent Circuit Fault	P0446	This diagnostic will detect a blockage in the evap system which would keep the system from venting. Test begins after small leak test and monitors tank vacuum for a period of time.	Tank Vacuum > 10" H2O	No MAT DTC's set No MAP DTC's set No TP sensor DTC's set No Air flow DTC's set No O2 DTC's set No VSS DTC's set No Misfire DTC's set No Fuel Trim/Fuel Injector DTC's set No EGR DTC's set No Coolant DTC's set No AIR DTC's set Baro > 75.20 kPa (8000 ft) 4.41 ° ≤ Powerup ECT ≤ 30.00 °C 4.41 ° ≤ Powerup IAT ≤ 30.00 °C ECT-IAT no more than 8.01 °C IAT-ECT no more than 1.99 °C 15.00 % < Fuel Level < 85.10 % 5.00 V < System Voltage < 16.00 V	Test runs once per cold trip if all conditions are met. Test begins after small leak test and monitors tank vacuum for a period of time. If tank vacuum exceeds 10" H2O for 4 seconds, test fails.	DTC Type A
Fuel Tank Vent Circuit Fault	P0449	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B
Evap. Emission Control System - Fuel Tank Pressure Sensor Circuit Low	P0452	This diagnostic will detect a fuel tank pressure sensor short circuit.	Fuel tank Pressure sensor circuit voltage < 0.06 volts	Evap diagnostic is enabled	Fails if tank pressure sensor signal fails low for 5 consecutive seconds. Continuous	DTC Type B
Evap. Emission Control System - Fuel Tank Pressure Sensor Circuit High	P0453	This diagnostic will detect a fuel tank pressure sensor open circuit.	Fuel tank Pressure sensor circuit voltage > 4.9 volts	Evap diagnostic is enabled	Fails if tank pressure sensor signal fails high for 5 consecutive seconds. Continuous	DTC Type B
Fan 1 Relay Circuit Fault	P0480	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B
Fan 2 Relay Circuit Fault	P0481	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B

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Idle Control System RPM Lower Than Expected	P0506	This DTC will determine if a low idle is the result of a IAC valve or circuit. A low idle is defined as 175 RPM below the desired idle. (Desired RPM range 725 to 800)	Engine speed < (Desired RPM -100)	***Test Enable:*** No CCP DTC's set No misfire DTC's set No EGR DTC's set No TP sensor DTC's set No VS sensor DTC's set No ECT DTC's set No MAP DTC's set No IAT DTCs set No Fuel Trim DTC's set No Injector DTCs set No Crank sensor DTCs set No MAF DTC's set ECT > 70.00 °C System Voltage > 9.00 V but < 18.00 V IAT > -18.01 °C Engine run time > 120.00 seconds Baro > 65.00 kPa (12000 ft) TP < 1.5 % VS < 3.00 MPH Above met for a time > 15.00 seconds to enable diagnostic.	15.00 seconds Continuos after enable	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
Idle Control System RPM Higher Than Expected	P0507	This DTC will determine if a high idle is the result of a IAC valve or circuit. A high idle is defined as 275 RPM above the desired idle. (Desired RPM range 725 to 800)	Engine speed > (Desired RPM + 175)	***Test Enable:*** No CCP DTC's set No misfire DTC's set No EGR DTC's set No TP sensor DTC's set No VS sensor DTC's set No ECT DTC's set No MAP DTC's set No IAT DTCs set No Fuel Trim DTC's set No Injector DTCs set No Crank sensor DTCs set No MAF DTC's set ECT > 70.00 °C System Voltage > 9.00 V but < 18.00 V IAT > -18.01 °C Engine run time > 120.00 seconds Baro > 65.00 kPa (12000 ft) TP < 1.5% VS < 3.00 MPH Above met for a time > 15.00 seconds to enable diagnostic.	15.00 seconds Continuos after enable	DTC Type B
Check Sum Error	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid	PCM state = crank or run	Within 2 seconds at Powerup; background checksum after power up 50 ms loop Continuous	DTC Type B
PCM Programming Error	P0602	This DTC will be stored if the PCM has been replaced and has not been programmed	Output state invalid	PCM state = crank	Test is run at Powerup 100ms loop Continuous	DTC Type B
SES Light Circuit Fault	P0650	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run 9 V < Ignition Voltage < 18 V	30 sec Continuous	DTC Type B

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O2 Sys. Fault - Too Few O2S R/L or L/R Switches, Insufficient Activity (Bank 1, Sensor 1)	P1133	This DTC determines if the O2 sensor functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 90.00 seconds: L/R switches < 5 R/L switches < 5 O2 voltage between 300 millivolts and 600 millivolts	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set Closed Loop Fuel Enabled Engine Run Time > 202 sec. Coolant temp > 75.00 C 1000.00 < RPM < 3000.00 15.00 gps < MAF < 40.00 gps Above conditions met for 3.0 seconds.	90 seconds after closed loop enable Once per key cycle	DTC Type B
O2S Incorrect Ratio (Bank 1, Sensor 1)	P1134	This DTC diagnoses degraded slow rich to lean or lean to rich response times.	Ratio of average response times. Ratio > 4.0 or < 0.33 O2 voltage between 300 millivolts and 600 millivolts	No misfire DTC's No crank sensor DTC's No injector DTC's No MAF DTC's No TP sensor DTC's No Evap. DTC's No IAT sensor DTC's No MAP DTC's No Fuel trim DTC's No EGR DTC's No ECT sensor DTC's No AIR DTC's No Bank 1 Sensor 1 Voltage DTC's DTC P0135 (O2 Heater) not set Closed Loop Fuel Enabled Engine Run Time > 202 sec. Coolant temp > 75.00 C 1000.00 < RPM < 3000.00 15.00 gps < MAF < 40.00 gps Above conditions met for 3.0 seconds.	90 seconds after closed loop enable Once per key cycle	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
Crank Angle Sensor Learned Error	P1336	The DTC will determine if the matching tolerance in the crankshaft system has been learned by the vehicle	Sum of compensation factors not within range	PCM state = run	0.50 sec 100ms loop continuous	DTC type A
EST A Open Circuit Fault	P1351	This DTC checks the EST A circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST B Open Circuit Fault	P1352	This DTC checks the EST B circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST C Open Circuit Fault	P1353	This DTC checks the EST C circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST D Open Circuit Fault	P1354	This DTC checks the EST D circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST E Open Circuit Fault	P1355	This DTC checks the EST E circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST F Open Circuit Fault	P1356	This DTC checks the EST F circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST A Short Circuit Fault	P1361	This DTC checks the EST A circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B

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EST B Short Circuit Fault	P1362	This DTC checks the EST B circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST C Short Circuit Fault	P1363	This DTC checks the EST C circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST D Short Circuit Fault	P1364	This DTC checks the EST D circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST E Short Circuit Fault	P1365	This DTC checks the EST E circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
EST F Short Circuit Fault	P1366	This DTC checks the EST F circuit for electrical integrity	Voltage state invalid	PCM state = crank or run	50 failures within 100 Every engine cycle Continuous	DTC Type B
Occasional Resync	P1372	This DTC determines when an occasional loss of synch over a period of time has occurred.	Loss of synch.	20 RPM $\leq$ Med. Res RPM Crank $\leq$ 400 RPM Med. Res. RPM Running > 20 RPM	Crank: 3 failures within 15 seconds. Running: 3 failures within 300 seconds. 100 msec Continuous	DTC Type B
EGR Valve Circuit Performance - Actual Position > Commanded Position	P1404	This diagnostic detects if the valve is stuck open when commanded closed.	Actual pintle position > 25.00 counts from closed position	EGR valve icing or over temperature not occurring Ignition voltage $\geq$ 10.00 volts	4.00 separate failures for 20.00 seconds (with pintle movement > 40.00 % for 1.00 seconds opening time between tests) 100ms loop Continuous	DTC Type B

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Evap. Emission Control System Open Purge Flow	P1441	This diagnostic will detect a purge solenoid stuck open. Test begins after Vent Circuit test and monitors tank vacuum after the system is sealed.	Tank Vacuum > 11" H2O within 30 sec	No MAT DTC's set No MAP DTC's set No TP sensor DTC's set No Air flow DTC's set No O2 DTC's set No VSS DTC's set No Misfire DTC's set No Fuel Trim/Fuel Injector DTC's set No EGR DTC's set No Coolant DTC's set No AIR DTC's set Baro > 75.20 kPa (8000 ft) 4.41 ° ≤ Powerup ECT ≤ 30.00 °C 4.41 ° ≤ Powerup IAT ≤ 30.00 °C ECT-IAT no more than 8.01 °C IAT-ECT no more than 1.99) °C 15.00 % < Fuel Level < 85.10 % 5.00 V < System Voltage < 16.00 V	Test runs once per cold trip if all conditions are met	DTC Type B
V5BA Voltage Circuit Fault	P1635	5 Volts	Voltage state invalid	PCM state = run	10.00 sec 100ms loop Continuous	DTC Type B
V5BB Voltage Circuit Fault	P1639	5 Volts	Voltage state invalid	PCM state = run	10.00 sec 100ms loop Continuous	DTC Type B

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