2002 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
HO2S Heater Control Circuit Bank 1 Sensor 1	P0030 (Does not apply to L36 or L67)	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted	• PCM State = Run or Crank • 9 volts < Ignition Voltage < 18 volts • Heater Output Driver commanded On	20.00 seconds Frequency: 100ms loop Continuous	DTC Type B
HO2S Heater Control Circuit – Bank 1 Sensor 2	P0036 (LX5 only)	This DTC checks the output driver for electrical integrity	Output state invalid	PCM state = crank or run • 9 volts < Ignition Voltage < 18 volts	30 sec. Continuous	DTC Type A
MAF Sensor Rationality	P0101	This DTC determines if the MAF sensor is stuck 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 TPS DTC's failing • No EVAP DTC's failing • No EGR DTC's failing • Controller State = RUN • Traction Control = Not Active • EGR Flow Diag. - Not Active • EGR ≤ 100% • EGR DC ≤ 100% • Canister Purge ≤ 100% • Delta MAP ≤ 5.195313 • Delta TPS ≤ 5 % • Engine Vacuum ≤ 80 kpa • TPS < 15% • Enable Criteria Stable Time ≥ 2 seconds	320 test failures in a 400 test sample 1 sample / 100 msec	DTC Type B
MAF Sensor Circuit Low Frequency	P0102	This DTC detects a continuous short to low or open in either the signal circuit or the MAF sensor.	MAF(Hz) ≤ 1200	• Engine Run Time ≥ 0 seconds • RPM ≥ 50 • System Voltage ≥ 8 volts • Ignition is in crank or run • IAC steps ≥ 5 • Enable Criteria Stable Time ≥ 0.5 seconds	395 test failures in a 400 test sample 1 sample on every reference pulse	DTC Type B
MAF Sensor Circuit High Frequency	P0103	This DTC detects a continuous short to high in either the signal circuit or the MAF sensor.	MAF(Hz) ≥ 11500	• Engine Run Time ≥ 0 seconds • RPM ≥ 50 • System Voltage ≥ 8 volts • Ignition is in crank or run • IAC steps ≥ 5 • Enable Criteria Stable Time ≥ 0.5 seconds	395 test failures in a 400 test sample 1 sample on every reference pulse	DTC Type B

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MAP Circuit Low Input	P0107	This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP(V) < 0.098	• No TPS DTC's failing • [(TPS ≥ 0 & Engine Speed ≤1000) or (TPS ≥ 10% & Engine Speed > 1000)]	175 test failures in a 200 test sample Continuous: 12.5 msec loop if engine is not running every ref pulse below 3200 rpm when engine is running every other ref pulse above 3200 rpm when engine is running	DTC Type B
MAP Circuit High Input	P0108	This DTC detects a continuous short to high or open in either the signal circuit or the MAP sensor.	MAP(V) > 4.31	• No TPS DTC's failing • Controller State = RUN • Engine Run Time > 1 sec at ≥ 30°C, 120 sec at -30° C • [(TPS < 2% & Engine Speed ≤ 1500) or (TPS < 10% & Engine Speed > 1500)]	175 test failures in a 200 test sample Continuous: 12.5 msec loop if engine is not running every ref pulse below 3200 rpm when engine is running every other ref pulse above 3200 rpm when engine is running	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	Raw IAT < 7.00 counts (123 °C)	• No VSS DTC's active Vehicle speed ≥ 25.00 mph • Engine run time > 10.00 seconds	175.00 test failures within a 1200.00 test sample Frequency: Continuous 100 ms loop	DTC Type B
Intake Air Temp. Sensor Circuit - High Input	P0113	This DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	Raw IAT > 254.00 counts (-39 °C)	• No ECT sensor DTC's • No VSS DTC's active • Vehicle speed < 5.00 mph • Air flow < 8.00 g /second • Coolant > 60.00 °C • Engine run time> 180.00 seconds	1100 test failures within a 1200.00 test sample Frequency: Continuous 100 ms loop	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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Engine Coolant Temperature Circuit 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: Raw ECT at powerup > IAT at powerup by 140°C after a minimum 8 hour soak (fast fail). Raw ECT at powerup > IAT at powerup by 20°C after a minimum 8 hour soak, the powerup IAT is > 10°C, the vehicle has been driven over 15 mph for at least 300 seconds, and IAT has not dropped more than 7°C. Raw ECT at powerup > IAT at powerup by 20°C after a minimum 8 hour soak and the time spent cranking the engine without starting is greater than 20 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 • Control Module Ignition Off Timer Performance DTC not active (P1683) • 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: - Raw ECT at powerup > IAT at powerup by 20°C - Powerup IAT > 10°C - Vehicle driven a minumu of 300 seconds above 15 mph and IAT does not drop more than 7° C from powerup IAT.	Frequency: 100 millisecond loop Continuous	DTC Type B
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	Raw ECT < 37.00 counts (140 °C)	• Engine run time > 3.00 seconds	240 test failures within a 250.00 test sample Frequency: Continuous 100ms loop	DTC Type B
Engine Coolant Temperature Circuit High Input	P0118	Thermister Analog Voltage This DTC detects if the engine coolant sensor's analog voltage exceeds a maximum expected value	RawECT > 247.00 counts (-40 °C)	• Engine run time > 15.00 seconds	240 test failures within a 250.00 test sample Frequency: Continuous 100 ms loop	DTC Type B
Throttle Position Sensor Rationality	P0121	This DTC determines if the TPS sensor is stuck within the normal operating range.	Stuck High MAP < 50 KPa & TPS > predicted TPS (lookup table as a function of RPM) or Stuck Low MAP > 70 KPa & TPS < predicted TPS (lookup table as a function of RPM)	• No TPS DTC's (P0122, P0123) • No IAC DTC's • No MAP DTC's failing • Engine runtime > 120 seconds • Engine coolant temp > 75°C • MAP delta ≤ 5 kpa for MAP Stable Time > 5 seconds • 0 ≤ IAC position ≤ 130	95 test failures in a 100 test sample Frequency: Continuous 100 ms loop	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Throttle Position Sensor Circuit-Low Input	P0122	This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor.	Raw TP sensor signal < 0.0975 volts	• PCM State = Crank or Run	95.00 consecutive test failures within a 100 test sample Frequency: Continuous 12.5 ms loop	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.	Raw TP sensor signal > 4.9 volts	• PCM State = Crank or Run	95.00 consecutive test failures within a 100 test sample Frequency: Continuous 12.5 ms loop	DTC Type B

Insufficient Coolant Temperature for Closed Loop Fuel Control	P0125	Thermister 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:
			   6.00 sec @ 50 °F
			   154.00 sec @ 20 °F
			   287.0 sec @ region 3
			and
			ECT < -10 °C
				• ECT sensor shorts test not failing
				• IAT sensor DTCs not active
				• Engine runtime > 0
				• Start up ECT ≤ 40.00 °C
				• IAT ≥ -6.99 °C
				• ECT ≥ -40.00 °C
				
				• Max Idle Time ≤ :
				   5.00 sec @ 50 °F
				   120.00 sec @ 20 °F
				   225.00 sec @ Reg 3
				
				• Min Total Engine Air ≥ :
				   676.00 grams @ 50 °F
				   2068.00 grams @ 20 °F
				   3438.00 grams @ Reg 3
					Frequency:
					Continuous
					100 ms loop
						DTC Type B

Thermostat Engine Coolant Temperature Rationality (does not fail on FTP)	P0128	Detects if engine coolant temperature rises too slowly due to an ECT or cooling system fault	If actual accumulated air flow is > predicted air flow 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 < 80 °C • Minimum Average flow > 20 g/sec • Minimum distance traveled > 3.00 miles • Minimum MPH > 15.00 mph • 200.00 sec < Engine Run Time < 1500.00 sec • IAT ≥ -6.99 °C • ECT > -40 °C	1.00 failure to set DTC Frequency: Once per ignition cycle 1 second 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
O2 S Closed Loop Rationality (Bank 1, Sensor 1)	P0130	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed loop fuel control O2 sensor Ready flag set to "Not Ready." O2 sensor voltage must be > 525 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 < 525 millivolts for > 10 seconds or the O2 Ready flag will be reset to "Not Ready."	• No TPS DTC's • No MAF DTC's • No MAP DTC's • No ECT DTC's • No Bank 1 Sensor 1 or Bank 2 Sensor 1 DTC's • Engine Run Time ≥ 200 seconds • ECT ≥ 70° C • Traction Control = Not Active • Not in Catalyst Protection Mode • 9 volts ≤ Ignition Voltage ≤ 18 volts • 550 ≤ Engine Speed ≤ 3000 • 10gps ≤ Mass Airflow ≤ 35gps • 5% ≤ TP Sensor ≤ 35% • Not in Decel Fuel Cutoff Mode • Not in Power Enrichment • Predicted O2 temp ≥ 425°C All of the above met for 5 seconds	390 test failures in a 400 test sample Frequency: Continuous 100ms loop	DTC Type B
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 < 173.61 millivolts or O2 sensor voltage < 412.33 millivolts in PE mode	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • 0.00 ≤ A/F ratio ≤ 20.00 • 5 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • Coolant < 131°C All of the above met for 5 seconds For PE Test • All injectors = on • Indication that closed loop fueling is ready • A/F Ratio ≤ 12.5 All of the above met for 12 seconds	90 test failures in a 100.00 test sample for 4.00 sets of samples 90.00 failures in a 100.00 test sample for PE mode Frequency: Continuous 100 ms loop	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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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 > 976.56 millivolts or O2 sensor voltage > 199.65 millivolts in DFCO mode	Common Enable Criteria
				• No TPS DTC's
				• No MAP DTC's
				• No ECT DTC's
				• No AIR 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
				• AIR Diagnostic = Not Active
				• 9 volts < system voltage < 18.00 volts
				• Device control = Not Active
				
				Specific Enable Criteria
				• $0.00 \leq$ A/F ratio ≤ 20.00
				• $3.00 \% \leq$ throttle position $\leq 40.00 \%$
				• Fuel_State = Closed loop
				
				   All of the above met for 3 seconds
				
				For DFCO Test
				• Fuel state = DFCO
				• Indication that closed loop fueling is ready
				   All of the above met for 2 seconds
					90.00 test failures in a 100 test sample for 5.00 sets of samples
					
					290.00 failures in a 300.00 test sample for PE mode
					
					Frequency:
					Continuous
					100 ms loop
						DTC Type B

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O2S Circuit-Slow Response (Bank 1, Sensor 1)	P0133	This DTC determines if the O2 sensor response time is degraded	O2 Sensor Average Transition Time: LRA > 100.00 msec or RLA > 195.00 msec	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Bank 1 Sensor1 circuit and heater DTCs (P0131, P0132, P0134, P0135) = False • Bank 2 Sensor1 circuit and heater DTCs (P0151, P0152, P0154, P0155) = False • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle $\geq$ 0.00 % • 13.00 gps $\leq$ MAF $\leq$ 30.00 gps • 1000.00 $\leq$ RPM $\leq$ 3000.00 • Throttle position $\geq$ 4.00 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for 2 seconds	100000.00 milliseconds Frequency: Once per trip	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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O2S Circuit-No Activity Detected (Bank 1,Sensor 1)	P0134	This DTC determines if the O2 sensor is open.	399.31 millivolts < O2 sensor < 499.13 millivolts	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific_Enable_Criteria • Engine run time > 200.00 seconds • Predicted O2 temperature > 425°C	270 test failures in a 300 test sample Frequency: Continuous for pre catalyst sensors 100 msec loop rate	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135 (runs on the following engine rpo's: LA1, LG8, LX5) (not on this application)	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	The heater current is < 0.234375 amps or > 0.8984375 amps	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable_Criteria • Engine Run Time ≥ 180 seconds • ECT ≥ 70° C • 650 ≤ Engine Rpm ≤ 2500 • 4 gps ≤ Mass Airflow ≤ 26 gps • O2 heater not in Device control • O2 heater commanded on • O2 heater overtemp control not active All of the above met for 3 seconds	20 test failures in a 25 test sample Frequency: 6 tests per trip 1 second execution rate	DTC Type B

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O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135 (Runs on the following Engine RPO's: L36, L67)	This DTC determines if the O2 sensor heater is degraded.	The elapsed time to obtain ± 150 millivolts from the mean O2 bias voltage. * Time based on table: Time vs average engine airflow during warm-up period. Offset to maximum time based on start-up coolant temperature.	• No O2 sensor DTC's for Bank 1 Sensor 1 set (P0131, P0132, P0134) • Device control = Not Active • Current start = cold start • 399.31 mV< start-up bias voltage < 499.13 mV • 9 volts < system voltage < 18.00 volts Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C	One test/trip	DTC Type B
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 < 60.764 millivolts or O2 sensor voltage < 412.33 millivolts in PE mode	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active • Specific Enable Criteria • 0.0 ≤ A/F ratio ≤ 20.0 • 5.00 % ≤ throttle position ≤ 40.00 % • Fuel state = closed loop • All fuel injectors = ON • Coolant Temp < 131° C • Traction Control = not active All of the above met for 3 seconds For PE Test • Fuel state = PE • All fuel injectors = on • A/F Ratio ≤ 12.5 All of the above met for 12 seconds	370.00 test failures in a 400.00 test sample for 3.00 sets of samples 90.00 failures in a 100.00 test sample for PE mode Frequency: Continuous 100 ms loop	DTC Type B

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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 > 998.26 millivolts or O2 sensor voltage > 199.65 millivolts in DFCO mode	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • $0.00 \leq$ A/F ratio ≤ 20.00 • $3\% \leq$ throttle position $\leq 40.00\%$ • Fuel_State = Closed loop All of the above met for 3 seconds For DFCO Test • Fuel state = DFCO • Time not in PE with A/F Ration ≤ 13.5 must exceed time in PE with A/F Ratio ≤ 13.5 • Indication that closed loop fueling is ready All of the above met for 2 seconds	450.00 test failures in a 500.00 test sample for 5.00 sets of samples 900.00 failures in a 1000.00 test sample for DFCO mode Frequency: Continous 100 ms loop	DTC Type B

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O2S Circuit-No Activity Detected (Bank 1,Sensor 2)	P0140	This DTC determines if the O2 sensor is open.	412.33 millivolts < O2 sensor < 490.45 millivolts for regular open test
			
			299.48 millivolts < O2 sensor < 598.96 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 TPS DTC's
				• No MAP DTC's
				• No ECT DTC's
				• No AIR 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
				• AIR Diagnostic = Not Active
				• 9 volts < system voltage < 18.00 volts
				• Device control = Not Active
				
				Specific_Enable_Criteria
				Fast Pass:
				• (Engine run time ≤ 100 seconds) OR (current start = cold start and 399.31 mV< start-up bias voltage < 499.13 mV)
				• PCM State = run
				• DTC P0141 Not Active
				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 > 200 seconds
				• Predicted O2 temperature > 425° C
				• Fuel state = closed loop
				• DTC P0141 Not Active
				• PCM State = run
				• Minimum of 6 occurrences of a delta TP sensor ≥ 1.4% during diagnostic test
					850 test failures in a 1000 test sample for regular open test
					
					(sample counts – failure counts) < 350 within 100 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

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O2S Heater Circuit Malfunction (Bank 1, Sensor 2)	P0141	This DTC determines if the O2 sensor heater is degraded.	The elapsed time to obtain ± 150 millivolts from the mean O2 bias voltage.
			
			*Time based on table: Time vs Start Up Coolant Temp.
				• No O2 sensor DTC's for Bank 1 Sensor 2 set (P0137, P0138, P0140)
				• Device control = Not Active
				• Current start = cold start
				• 399.31 mV< start-up bias voltage < 499.13 mV
				• 9 volts < system voltage < 18.00 volts
				
				Cold start determination:
				  Powerup ECT < 35° C
				  Powerup IAT < 35° C
				  Powerup ECT – Powerup IAT < 6° C
					One test/trip	DTC Type B

O2 S Closed Loop Rationality (Bank 1, Sensor 1)	P0150 (F Car 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 TPS DTC's • No MAF DTC's • No MAP DTC's • No ECT DTC's • No Bank 1 Sensor 1 or Bank 2 Sensor 1 DTC's • Engine Run Time ≥ 200 seconds • ECT ≥ 70° C • Traction Control = Not Active • Not in Catalyst Protection Mode • 9 volts ≤ Ignition Voltage ≤ 18 volts • 550 ≤ Engine Speed ≤ 3000 • 10gps ≤ Mass Airflow ≤ 35gps • 5% ≤ TP Sensor ≤ 35% • Not in Decel Fuel Cutoff Mode • Not in Power Enrichment • Predicted O2 temp ≥ 450°C All of the above met for 5 seconds	390 test failures in a 400 test sample Frequency Continuous 100ms 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
O2S Circuit-Low Voltage (Bank 2, Sensor 1)	P0151 (F car only)	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 < 173.61 millivolts or O2 sensor voltage < 598.96 millivolts in PE mode	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • $0 \leq$ A/F ratio ≤ 20 • $5\% \leq$ throttle position $\leq 40.00\%$ • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • Coolant < 131°C All of the above met for 3 seconds For PE Test • Fuel state = PE • All injectors = on • Indication that closed loop fueling is ready All of the above met for 2 seconds	90 test failures in a 100.00 test sample for 4.00 sets of samples 90.00 failures in a 100.00 test sample for PE mode 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
O2S Circuit-High Voltage (Bank 2, Sensor 1)	P0152 (F car only)	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 > 976.56 millivolts or O2 sensor voltage > 199.65 millivolts in DFCO mode	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • $0.00 \leq$ A/F ratio ≤ 20.00 • 3.00 % $\leq$ throttle position ≤ 40.00 % • Fuel_State = Closed loop All of the above met for 3 seconds For DFCO Test • Fuel state = DFCO • Indication that closed loop fueling is ready All of the above met for 2 seconds	90.00 test failures in a 100 test sample for 5.00 sets of samples 290.00 failures in a 300.00 test sample for PE mode 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
O2S Circuit-Slow Response (Bank 2, Sensor 1)	P0153 (F car only)	This DTC determines if the O2 sensor response time is degraded	LRA > 60.00 msec RLA > 140.00 msec	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable Criteria • Bank 2 Sensor1 circuit and heater DTCs (P0131, P0132, P0134, P0135) = False • Bank 2 Sensor1 circuit and heater DTCs (P0151, P0152, P0154, P0155) = False • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle ≥ 0.00 % • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ 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 3 seconds	100000.00 milliseconds Frequency: 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
O2S Circuit-No Activity Detected (Bank 2,Sensor 1)	P0154 (F car only)	This DTC determines if the O2 sensor is open.	399.31 millivolts < O2 sensor < 499.13 millivolts	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific_Enable_Criteria • Engine run time > 200.00 seconds • Predicted O2 temperature > 440°C	270 test failures in a 300 test sample Frequency: Continuous for pre catalyst sensors 100 msec loop rate	DTC Type B
O2S Heater Circuit Malfunction (Bank 2, Sensor 1)	P0155 (F car only)	This DTC determines if the O2 sensor heater is degraded.	The elapsed time to obtain ± 150 millivolts from the mean O2 bias voltage. * Time based on table: Time vs average engine airflow during warm-up period. Offset to maximum time based on start-up coolant temperature.	• No O2 sensor DTC's for Bank 2 Sensor 1 set (P0151, P0152, P0154) • Device control = Not Active • Current start = cold start • 399.31 mV< start-up bias voltage < 499.13 mV • 9 volts < system voltage < 18.00 volts Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C	One test/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
System Too Lean (Bank 1)	P0171	Determines if the system is in a lean condition.	The average of long term fuel trim samples ≥ 1.1641 And The average of short term fuel trim samples ≥ 0.00	• No TPS DTC's • No Misfire DTC's • No IAC DTC's • No Fuel Injector DTC's • No MAF DTC's • No O2 sensor DTC's • No MAP DTC's • No EGR DTC's • No EVAP DTC's • No AIR DTC's • Engine speed > 600 .00 rpm but < 4000.00 rpm • Baro > 70.00 kpa (8500 ft) • ECT > 20.00 ºC but < 110.00 °C • MAP > 15.0 kpa but < 105.00 kpa • IAT > -18.01 °C but < 70.00 °C • Air flow > 5.0 g/s but < 150.00 g/s • Vehicle speed < 82.00 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • AIR Diagnostic = Not Active • EGR Flow Diagnostic = Not Active • Catalyst Monitor Diagnostic = Not Active • Evap Diagnostic = Done • Fuel Level > 10 % (must be < 10% for 10 seconds to disable; default is to enable if fuel sender is broken)	If lean counter is ≥ 5.00 failures 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
System Too Rich (Bank 1)	P0172	Determines if the system is in a rich condition.	The average of long term fuel trim samples ≤ 0.82813 And The average of short term fuel trim samples ≤ 1.8984 The change in (ltm + stm + plm) < 0.1015625 in 4 seconds (purge is ramped from a higher to a lower value and the change in fueling is evaluated to decide if excess purge is present or if the system is failing rich) Note: If the intrusive portion of the test does not fail, the diagnostic will be disabled for 10 seconds to allow the canister time to clean itself.	• No TPS DTC's • No Misfire DTC's • No IAC DTC's • No Fuel Injector DTC's • No MAF DTC's • No O2 sensor DTC's • No MAP DTC's • No EGR DTC's • No EVAP DTC's • No AIR DTC's • Engine speed > 600 .00 rpm but < 4000.00 rpm • Baro > 70.00 kpa (8500 ft) • ECT > 20.00 ºC but < 110.00 °C • MAP > 15.0 kpa but < 105.00 kpa • IAT > -18.01 °C but < 70.00 °C • Air flow > 5.0 g/s but < 150.00 g/s • Vehicle speed < 82.00 mph • Closed Loop Fueling • Long Term Fuel Trim Learning enabled • Not in Device Control • AIR Diagnostic = Not Active • EGR Flow Diagnostic = Not Active • Catalyst Monitor Diagnostic = Not Active • Evap Diagnostic = Done Intrusive Enable Criteria • Average of long term fuel trim samples ≤ 0.82813 • Average of short term fuel trim samples ≤ 1.8984 • RPM > 1000 • 5 gps < Mass Airflow < 80 gps • CCP Duty Cycle must be > 30 % for 8 seconds • Must be in the normal, purge on cell or the high flow, purge on cell	If rich counter is ≥ 3.00 failures 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
System Too Lean (Bank 2) (F car only)	P0174	Determines if the system is in a lean condition.	The average of long term fuel trim samples ≥ 1.17 And The average of short term fuel trim samples ≥ 0	• No VSS DTC's • No EST DTC's • No Crank Sensor DTC's • No CAM Sensor DTC's • No TPS DTC's • No Misfire DTC's • No IAC DTC's • No Fuel Injector DTC's • No MAF DTC's • No O2 Sensor DTC's • No MAP DTC's • No EGR DTC's • No EVAP DTC's • No ECT DTC's • No IAT DTC's • No AIR DTC's • Engine speed >600 rpm but < 4000.00 rpm • Baro > 70.00 kpa (8500 ft) • ECT > 20.00 $^{\circ}$C but < 110.00 °C • MAP > 15 kpa but < 85 kpa • IAT > -18.01 °C but < 70.00 °C • Air flow > 3.0 g/s but < 150.00 g/s • Vehicle speed < 82.00 mph • TPS < 90% • Not in Device Control • AIR Diagnostic = Not Active • EGR Flow Diagnostic = Not Active • Catalyst Monitor Diagnostic = Not Active • Closed Loop Fueling • Long Term Fuel Trim Learning enabled	If lean counter is ≥ 5.00 failures <u>Frequency:</u> Continuous 100 millisecond loop	DTC Type B

2002 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
System Too Rich (Bank 2)	P0175 (F car only)	Determines if the system is in a rich condition.	The average of long term fuel trim samples ≤ 0.82 And The average of short term fuel trim samples ≤ 1.90 After 5 rich fails are counted, purge is ramped off. A change in ltm of < 0.02 and a change in sti of < 1.98 in 45 seconds will cause a failure to be logged. Note: If the intrusive portion does not fail, the diagnostic will be disabled for 100 seconds to allow the canister a chance to clean itself.	• No VSS DTC's • No EST DTC's • No Crank Sensor DTC's • No CAM Sensor DTC's • No TPS DTC's • No Misfire DTC's • No IAC DTC's • No Fuel Injector DTC's • No MAF DTC's • No O2 Sensor DTC's • No MAP DTC's • No EGR DTC's • No EVAP DTC's • No ECT DTC's • No IAT DTC's • No AIR DTC's • Engine speed >600 rpm but < 4000.00 rpm • Baro > 70.00 kpa (8500 ft) • ECT > 20.00 °C but < 110.00 °C • MAP > 15 kpa but < 85 kpa • IAT > -18.01 °C but < 70.00 °C • Air flow > 3.0 g/s but < 150.00 g/s • Vehicle speed < 82.00 mph • TPS < 90% • Not in Device Control • AIR Diagnostic = Not Active • EGR Flow Diagnostic = Not Active • Catalyst Monitor Diagnostic = Not Active • Closed Loop Fueling • Long Term Fuel Trim Learning enabled Intrusive enable criteria: • All of general enable criteria above • Rich counter = 5	If rich counter is ≥5.00 failures Frequency: Continuous 100 millisecond loop	DTC Type B
Fuel Injector Circuit Fault Cylinder 1	P0201	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second loop Continuous	DTC Type B
Fuel Injector Circuit Fault - Cylinder 2	P0202	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second loop Continuous	DTC Type B

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3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
Fuel Injector Circuit Fault - Cylinder 3	P0203	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second loop Continuous	DTC Type B
Fuel Injector Circuit Fault - Cylinder 4	P0204	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second loop Continuous	DTC Type B
Fuel Injector Circuit Fault - Cylinder 5	P0205	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second loop Continuous	DTC Type B
Fuel Injector Circuit Fault - Cylinder 6	P0206	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	• Engine is running	30.00 seconds Frequency: 1 second 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
Random Misfire Detected	P0300	This DTC 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 = 1.17% Catalyst Damage Threshold = 1.00% to 16.0% misfire, depending on engine speed and engine load	• No VSS DTC's • No Crank Sensor DTC's • No TPS DTC's • No MAP DTC's • No ECT DTC's • No CAM Sensor dTC's • No MAF DTC's • P1336 - Crankshaft Position System Variation Not Learned not set OR RPM < 1200 if P1336 is active • Fuel cutoff not active • Power management not active • Brake torque management not active • Fuel level > 10 (disablement ends 100.00 seconds after a low fuel level condition ceases and fuel disable does not occur with a fuel sensor DTC) • $-6.99\ °C \le ECT \le 125.00\ °C$ • If ECT at startup < -6.99 °C, then disable until ECT > 21.09 °C • $475.00\ RPM \le$ Engine speed $\le 5850.00\ RPM$ • 9.00 volts $\le$ System voltage ≤ 18.00 volts • + Throttle position $\Delta < 6.25\ \%\ /\ 100ms$ • - Throttle position $\Delta < 1.56\ \%/100ms$ • Misfire Diag is not requesting to disable TCC when transmission is in hot mode. • No abnormal engine speed. • Filtered engine speed is not changing rapidly • No ABS rough road. • No excessive drive wheel slip (drive wheel slip occurs if {Non Drive Wheel Speed > 255 MPH} and {Drive Wheel Speed - Non Drive Wheel Speed > 255 MPH} and {wheel speed data is valid}) • No ABS or TCS active. • AC compressor has not just engaged or disengaged. • Positive or zero torque. • EGR Intrusive test not active. • AIR Intrusive test not active. • Camshaft sensor is in sync with crank sensor. • Automatic transmission is not shifting. • No Abusive Engine Speed (Abusive engine speed is > 12000 rpm, delay occurs 0 engine cycles after abusive engine speed ceases)	Emission Exceedence = (5) failed 200 revolution blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 revolution block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = Number of 200 revolution blocks as data supports for catalyst damage. 2nd and 3rd Catalyst Exceedence = (1) 200 revolution block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP. Frequency: Continuous	DTC Type B EMISSION DTC Type B CATALYST DAMAGING

2002 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
Knock Sensor Circuit Fault	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 TPS DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CAM Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage $\geq$ 9 volts • Throttle position $\geq$ 10.00 % • Coolant temperature $\geq$ 60.00 °C • Engine speed between 1000 & 2500 RPM • Cylinder air mass $\geq$ 40.00 % • Spark retard $\leq$ 15.01 degrees Determine Fault Region • (Instantaneous voltage – average voltage is too small; delta from average $\leq$ .0390625 OR Average voltage – instantaneous voltage is too small; delta from average $\leq$ 0.0390625) AND the average voltage $\geq$ 4.8 volts	Frequency: Every combustion event Continuous 260 test failures out of 300 samples	DTC Type B
Knock Sensor 1 Input Fault	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 TPS DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CAM Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage $\geq$ 9 volts • Throttle position $\geq$ 10.00 % • Coolant temperature $\geq$ 60.00 °C • Engine speed between 1000 & 2500 RPM • Cylinder air mass $\geq$ 40.00 % • Spark retard $\leq$ 15.01 degrees Determine Fault Region • Instantaneous voltage - average voltage is too small; delta from average $\leq$ .0390625 AND average voltage < 4.8 volts	Every combustion event Continuous 260 test failures out of 300 samples	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
Knock Sensor 2 Input Fault	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 TPS DTC's • No ECT DTC's • NO Crank Sensor DTC's • No CAM Sensor DTC's • No MAF DTC's • Engine running longer than 30 seconds • Ignition voltage ≥ 9 volts • Throttle position ≥ 10.00 % • Coolant temperature ≥ 60.00 °C • Engine speed between 1000 & 2500 RPM • Cylinder air mass ≥ 40.00 % • Spark retard ≤ 15.01 degrees Determine Fault Region Average voltage – instantaneous voltage is too small; delta from average < .0390625 AMD average voltage < 4.8 volts	Every combustion event Continuous 260 test failures out of 300 samples	DTC Type B
Crankshaft Position Sensor A Circuit Fault	P0335 (LX5 only)	24X Signal This diagnostic determines whether a fault exists with crank position sensor circuit A signal	In Crank: If normal timing (P0385 not set), then number of medium resolution reference pulses with or without CAM present > 46 and < 50. If P0385 is set (timing is based on crankshaft position sensor circuit A), then number of medium resolution reference pulses with or without CAM present ≤ 46 or ≥ 50. Engine running: No Match has occurred or match has been lost for too long of a time. (Match occurrs when the input position signals match.)	• General Enable: If Crankshaft Position Sensor B Circuit Fault is active this key, then Match must have occurred for at least 2.5 seconds. • If Camshaft Position Sensor Circuit Fault is Active this Key, then –Ignition Switch not in Crank: 20 < RPM from Med Res < 6000 PCM State = Run MAF > 2.3 gps – Ignition Switch is in Crank: PRNDL in park or neutral Starter Relay is commanded on 20 < RPM from Med Res < 400 • If at least one CAM has occurred since last time through the diagnostic and Camshaft Position Sensor Circuit Fault is not Active this Key then – Ignition Switch not in Crank: 20 < RPM from CAM < 6000 PCM State = Run MAF > 2.3 gps – Ignition Switch is in Crank: PRNDL in park or neutral Starter Relay is commanded on 20 < RPM from CAM < 400	CAM fault present: In Crank > .7 sec. In Run > .1 sec. No CAM faults present: In Crank > 1 fail count In Run > 1 fail count 12.5 msec 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
Crankshaft Position Sensor Circuit-Range/Perf	P0336	18X Signal This diagnostic will detect an incorrect signal from the crankshaft sensor.	If in one engine cycle 36 med. res. pulses are not seen, but 6 low res pulses and 1 Cam pulse are seen.	• Engine run time > 3.00 sec	290.00 failures within 300.00 sample limit. Frequency: Continuous 100msec loop	DTC Type B

Camshaft Position Sensor Circuit Fault	P0340
	
	(LX5 only)
		1X Signal
		
		This diagnostic will detect if a fault exists on the camshaft position sensor signal.
			A. Engine is cranking and the engine speed from CAM is 0 for more than 1.5 seconds
			OR
			B. Ref pulse logic saw more than 7 reference pulses and the medium res logic did not see 1 CAM pulse
			OR
			C. Medium res logic saw at least one CAM but did not see the correct amount of low res pulses
			OR
			D. CAM sequence in falling region $\geq$ 3 or $\leq$ 6
				A. Ignition Switch is in crank
				   PRNDL is in park or neutral
				   Starter relay is commanded on
				
				B. Ignition switch is in run or crank
				
				C. Ignition switch is in run or crank
				   Match has already occurred
				
				D: Ignition switch is in run or crank
				   Match has already occurred
				   Low Res. pulse in falling CAM region = 6
				   RPM < 3000 RPM
					A. 1.5 seconds without CAM signal detected.
					12.5 msec continuous
					
					B. Rref pulse logic saw more than 7 ref pulses and the medium res logic did not see one CAM pulse
					Continuous every reference pulse
					
					C. 5 failures in a 100 sample limit
					Continuous every Medium reference pulse
					
					D. 5 failures in a 100 sample limit
					Continuous every medium reference pulse
						DTC Type B

Camshaft Position Sensor Circuit Range/Perf	P0341	1X Signal This diagnostic will detect if the Cam Sensor signal is present.	If in one engine cycle, one Cam Sensor reference pulse is not seen but 36 med res pulses are seen and 6 low res pulses are seen.	• Engine runtime > 3.00 sec	If Cam signal is not detected 290.00 out of 300.00 test samples. Frequency: Continuous 100 msec 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

Crankshaft Position Sensor B Circuit Fault	P0385
	
	(LX5 only)
		24X Signal
		
		This diagnostic determines whether a fault exists with crank position sensor circuit B signal
			In Crank:
			The number of medium resolution reference pulses with or without CAM present ≤ 46 or ≥ 50.
			.
			
			Engine running:
			No Match has occurred or match has been lost for too long of a time.
			
			(Match occurrs when the input position signals match.)
				• General Enable:
				If Crankshaft Position Sensor B Circuit Fault is active this key, then Match must have occurred for at least 2.5 seconds.
				
				• If Camshaft Position Sensor Circuit Fault is Active this Key, then
				–Ignition Switch not in Crank:
				  20 < RPM from Med Res < 6000
				  PCM State = Run
				  MAF > 2.3 gps
				– Ignition Switch is in Crank:
				  PRNDL in park or neutral
				  Starter Relay is commanded on
				  20 < RPM from Med Res < 400
				
				• If at least one CAM has occurred since last time through the diagnostic and Camshaft Position Sensor Circuit Fault is not Active this Key then
				– Ignition Switch not in Crank:
				  20 < RPM from CAM < 6000
				  PCM State = Run
				  MAF > 2.3 gps
				– Ignition Switch is in Crank:
				  PRNDL in park or neutral
				  Starter Relay is commanded on
				  20 < RPM from CAM < 400
					CAM fault present:
					In Crank > .7 sec.
					In Run > .1 sec.
					
					No CAM faults present:
					In Crank > 1 fail count
					In Run > 1 fail count
					
					12.5 msec 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
Exhaust Gas Recirculation - Insufficient Flow Detected (Classic Flow test)	P0401 (Runs on all applications except C L36, W L36 and H L36)	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 VSS DTC's • No TPS DTC's • No Misfire DTC's • No IAT DTC's • No MAP DTC's • No IAC DTC's • No Fuel Injector DTC's • No EGR Sensor DTC's • No ECT DTC's • No Crank Sensor DTC's • No MAF DTC's • No ETC DTC's • Engine Run Time > cal table based on startup coolant temperature • ECT > 75.00 ° C • Baro > 70.00 kpa (8500 ft) • IAT ≤ 80°C • 10 ≤ Ignition voltage ≤ 18 • IAC Δ < 7.00 counts • Throttle Position < 1.5% • AC clutch status is unchanged • Transmission status is unchanged • Transmission is not in Park or Neutral • Not in Power Enrichment • Not in Catalyst Protection Mode • Traction contol is not active • Vehicle Speed ≥ 30 mph • RPM ≥ 800 • ECT < 131° C • EGR Icing is not possible • EGR is not in device control • AC Clutch status is not changed • Clutch is not depressed (manual trans only) • Not in Decel Fuel Cut off (LA1, LG8 only) • DFCO status is unchanged **_Start Test_** • EGR Position < 1.5% • Engine Speed > 1050.00 rpm but < 1400.00 rpm • MAP Δ < 1.80 kpa • MAP > 15.00 kpa but < 70.00 kpa All of the above met for 0.4 seconds **_Run Test_** • RPM Δ < 350 RPM • MPH Δ < 5.00 • Stabilized MAP (valve closed) recorded and EGR valve "ramped" open over a time interval and peak MAP value recorded and MAP Δ computed.	Frequency: 100 msec loop Once per trip	DTC Type A

2002 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
Exhaust Gas Recirculation - Insufficient Flow Detected (Classic Flow Test)	P0401 (cont.) (Runs on all applications except C L36, W L36 and H L36)	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 > 7.00 kpa AND current map diff > 2.00 kpa THEN 4.00 tests will be run per trip until 24.00 tests have been met	<u>Frequency:</u> 100 msec loop Once per trip	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
Exhaust Gas Recirculation - Insufficient Flow Detected (Quick Flow test)	P0401 (Runs on only C L36, W L36 and H L36)	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 TPS DTC's • No MAF DTC's • No MAP DTC's • No IAT DTC's • No VSS DTC's • No ECT DTC's • No IAC DTC's • No 5 Volt Reference DTC's • No EGR Sensor DTC's • No ETC DTC's • Engine Run Time > cal table based on startup coolant temperature • EGR Icing is not possible • Transmission in 3rd or 4th gear • $75°C \le ECT \le 123.9844°C$ • 29 mph $\le VSS \le 70$ mph • 11 volts $\le$ ignition voltage ≤ 18 volts • Not in Power Enrichment • $-20°C \le IAT \le 140°C$ • IAC $\Delta \le 3.00$ counts • MAF $\Delta \le 2$ gps • AC clutch status is unchanged for at least 1 second • Transmission status is unchanged for at least 1.5 seconds • No EST A DTC's • Baro ≥ 70 kpa • DFCO is either inactive or at a commanded spark value of 0 (mode 2) for at least 6.25 milliseconds • Throttle Position $\le 1.09\%$ for 0.4 seconds *Start Test* • EGR Position < 1% • $1100 \le$ rpm ≤ 1475 • MAP $\Delta \le 0.898$ kpa • MAF $\Delta \le 1.2$ gps • 17 kpa $\le MAP \le 43$ kpa *Run Test* • + RPM $\Delta \le 100$ • - RPM $\Delta \le 200$ • MPH $\Delta \le 3.00$ • Stabilized MAP (valve closed) recorded and 100% duty cycle applied to EGR valve over a time interval and peak MAP value recorded and MAP Δ computed • EGR valve closed.	Frequency: 6.25 msec loop Once per trip	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
Exhaust Gas Recirculation - Insufficient Flow Detected (Quick Flow Test)	P0401 (cont.) (Runs on only C L36, W L36 and H L36)	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 > 2.02 kpa AND current map diff > 0.3 kpa THEN 3.00 tests will be run per trip until 18.00 tests have been met	Frequency: 6.25 msec loop 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 volts < Ignition Voltage < 18 volts	20.00 seconds Frequency: 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)] > 15.00 %	• Desired EGR position > 0% • Code P0401 status = not in progress • EGR valve icing or over temperature not occurring • Maximum Δ Desired EGR position < 30.00 % • Ignition voltage $\geq$ 11.00 volts • Sensor supply is valid (P1635 not failing)	200.00 loops Frequency: 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 < 2.74 % of full range	• EGR valve icing or over temperature not occurring • Ignition voltage $\geq$ 11.00 volts • Sensor supply is valid (P1635 not failing)	20.00 seconds Frequency: 100ms loop Continuous	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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AIR Injection System Malfunction	P0410	This diagnostic will detect an Air Pump that is not flowing the correct amount of air into the exhaust system.	Non-Intrusive Test Test is run at engine start up before closed loop is achieved. Note: The non-intrusive test is cal'd out on this application The oxygen sensor voltage is above 598.96 mvolts for a rich time ratio of 1 to fail non-ntrusive test part 1 (must be below 0 mvolts for a lean time ratio of 1 to pass) The oxygen sensor voltage is below 598.96 millivolts for a minimum of 5 seconds after the pump is turned off to fail non-intrusive test part 2 (must be above 598 mvolts for 25 samples to pass) Intrusive Test The Air Pump will be turned on to force a change in the Oxygen Sensor signal or a change in a short term fuel integrator value. Short term integrator must shift > 0.07 OR the Oxygen Sensor signal must be forced continuously below 73.785mV for > 1.5 seconds to pass. If neither of the above occurs within 3 seconds, the diagnostic counts a failure.	Common Test Enable Conditions • No TPS DTC's • No EVAP DTC's • No O2 Sensor DTC's • No Misfire DTC's • No IAT DTC's • No MAP DTC's • No IAC DTC's • No Fuel Trim DTC's • No ECT DTC's • No MAF sensor DTC's • Baro ≥ 75 kpa • 4.4°C < IAT < 70° C • 4.4° C < ECT < 110° C • Ignition voltage > 10 volts • Engine Runtime ≥ 10 seconds Non-Intrusive Test Enable Conditions • Decel fuel cutoff mode not active • Engine load > 24.00 % • TPS Delta ≤ 6.99 % • 40.00 gps ≤ Airflow < 20.00 gps • A/F Equivalence Ratio ≤ 1.5 • Engine Load < 50% • Engine vacuum ≥ 35 kpa • O2 fuel control sensor state = ready Intrusive Test Enable Conditions • Air fuel ratio = 14.7:1 • Engine speed > 800 rpm • 5%≤ Engine load < 30 % • 2 ≤ Air flow < 25 gps • VSS ≥ 25 mph • Engine vacuum ≥ 35 kpa • Closed Loop Fueling • Must be in purge on decel cell for 3 seconds minimum with long term learning enabled • EGR Flow Diagnostic = not active • Catalyst Monitor Diagnostic = not active • Evap Diagnostic = done • Fuel Trim Diagnostic (intrusive portion) = not active	Frequency: 1 pass per trip 3.00 failures consecutive in one trip (intrusive and non-intrusive tests are combined) 100 ms loop rate	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
AIR Solenoid Relay Circuit Fault	P0412	This DTC checks the output driver for electrical integrity	Output state invalid	• PCM state = crank or run • 9 volts < Ignition Voltage < 18 volts	30.00 sec Frequency: Continuous 100 msec loop	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 volts < Ignition Voltage < 18 volts	30.00 sec 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
Catalyst Low Efficiency Bank 1	P0420	Oxygen Storage	OSC time difference $\geq$ 0.328125 OSC time difference = OSC worst pass threshold - OSC compensation factor * (post cat O2 resp time - pre cat O2 resp time) OSC worst pass thresh = 3.0875	• No VSS DTC's • No TPS DTC's • No EVAP DTC's • No O2 Sensor DTC's • No Misfire DTC's • No IAT DTC's • No MAP DTC's • No IAC DTC's • No Fuel Trim DTC's • No Fuel Injector DTC's • No EST DTC's • No EGR Sensor or Control DTC's • No ECT DTC's • No Crank Sensor Faults • No CAM Faults • No MAF Faults ***Valid Idle Period Criteria*** • Engine speed $\geq$ 1000 .00 RPM for a minimum of 38 seconds since end of last idle period. Min engine run time for stable BLM $\geq$ 600 seconds. ***Test Enable Conditions*** • 475°C $\leq$ Predicted catalyst temperature $\leq$ 765°C • Closed loop fuel control • Barometric pressure $\geq$ 75.00 kpa • -20.00 $\leq$ IAT $\leq$ 100.00 °C • 75.00 $\leq$ ECT $\leq$ 123.98 °C • 0 < Idle period $\leq$ 60.00 seconds • Tests attempted this trip $\leq$ 18.00 • Tests attempted this idle period $\leq$ 1 • Delta engine speed $\leq$ 150 • • Diagnostic will not enable until the next ignition cycle after the following has been met : predicted catalyst temperature $\geq$ 475° C for 1 hour (non-continuously) (note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle) ***Rapid Step Response Enable Criteria*** OSC time difference step $\geq$ 1.072266 sec OSC time difference $\geq$ 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. <u>Frequency:</u> 12.5 ms Continuous	DTC Type A

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Evap. Emission Control System - Malfunction	P0440	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the Evap system.	Purge volume > 3.00 liters BEFORE Tank vacuum < 8 "H_2O	General Test Enable • No MAP DTC's • No TPS DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Vacuum Sensor DTC's • No Purge solenoid DTC's • No 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 • Engine coolant temp < 30 °C • Baro > 75.00 kPa (8000 ft) Cold Start Test • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 8 °C if IAT>ECT < 8 °C if ECT > IAT • Cold Test Timer < 780 seconds	Once per cold start Time is dependent on driving conditions Max. before test abort is 780 seconds	DTC Type B

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Evap. Emission Control System Leak Detected (small leak)	P0442	This DTC will detect a small leak in the evap system between the fuel fill cap and up to the purge solenoid	0.04" EWMA Value > 0.032227 in. dia. OR 0.02" EWMA Value > 0.015015 in. dia.	General Test Enable • No MAP DTC's • No TPS DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Vacuum Sensor DTC's • No Purge solenoid DTC's • No 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 • Engine coolant temp < 30 °C • Baro > 75.00 kPa (8000 ft) • VSS < 100.00 mph (0.02" leak only) • 35 % < Fuel level < 85 % (0.02" leak only) • Δ Vacuum Slosh < 0.44 – 0.95 "H2O based on fuel level OR Δ Fuel Slosh < 2.0 – 3.9 % based on fuel level (if occurs, test will try to run, again) • Δ Vacuum Slosh < 0.22 – 0.47 "H2O based on fuel level OR Δ Fuel Slosh < 1.7 – 3.3 % based on fuel level (If these occur, the 0.020" EWMA will not be updated) Cold Start Test • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 8 °C if IAT>ECT < 8 °C if ECT > IAT • Cold Test Timer < 780 seconds	Once per cold start Time is dependent on driving conditions Max. before test abort is 780 seconds	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 volts < Ignition voltage < 18volts	30 sec Frequency: Continuous 100ms loop	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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Evap. Emission Control System – Vent Control Malfunction	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or canister	Tank Vacuum > 10.00 "H2O for 5 seconds BEFORE Purge Volume > 4 liters OR Vented Vacuum < -2.5 in. H20 or Vented Vacuum > 5 in. H20 for 15 seconds	General Test Enable • No MAP DTC's • No TPS DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Vacuum Sensor DTC's • No Purge solenoid DTC's • No 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 • Engine coolant temp < 30 °C • Baro > 75.00 kPa (8000 ft)	Once per trip Time is dependent on driving conditions Max. before test abort is 780 seconds	DTC Type B
Fuel Tank Vent Circuit Fault	P0449	This DTC checks the output driver for electrical integrity	Output state invalid	• PCM state = crank or run • 9 volts < ignition voltage < 18 volts	30 sec Frequency: Continuous 100ms loop	DTC Type B
Evap. Fuel Tank Pressure Sensor Circuit Low Voltage	P0452	This DTC will detect a vacuum sensor signal that is too low out of range.	Tank vacuum voltage < 0.1 volts	• 0.10 second delay after sensor power up for sensor warm-up • PCM State <> crank	1.5 seconds Frequency: Continuous 100ms loop	DTC Type B
Evap. Fuel Tank Pressure Sensor Circuit High Voltage	P0453	This DTC will detect a vacuum sensor signal that is too high out of range.	Tank vacuum voltage < 4.90 volts	• 0.10 second delay after sensor power up for sensor warm-up • PCM state <> crank	1.5 seconds Frequency: Continuous 100ms loop	DTC Type B

Fuel Level Sensor Circuit Low Input	P0462	This diagnostic will detect a fuel sender failed to a low voltage level.	Discrete:
			Fuel level input ≤ 28 counts
			
			Class 2 (applies to this application):
			Fuel sendor module sends information that the sender is out of range
			Note: If communication with fuel sender is lost, default action for diagnostic occurs
				PCM is powered up.
				
				• Default to gauge: 0.00 %
				• Default to evap :
				  40 vapor volume = 50 liters
				  20 vapor volume = 46 liters
				• Default to misfire and fuel trim: Run diagnostic ignoring fuel level
					Frequency:
					12.5 ms
					Continuous
					
					Discrete:
					Failed for 10.00 consecutive seconds
					
					Class 2 (applies to this application): Fuel sender sends failed message after seeing failure for 10 consecutive seconds
						DTC Type
						C

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ENGINE DIAGNOSTIC PARAMETERS

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Fuel Level Sensor Circuit High Input	P0463	This diagnostic will detect a fuel sender failed to a high voltage level.	Discrete: Fuel level input $\geq$ 150 counts Class 2 (applies to this application): Fuel sender module sends information that the sender is out of range Note: If communication with fuel sender is lost, default action for diagnostic occurs	PCM is powered up. • Default to gauge: 0.00 % • Default to evap : 40 vapor volume = 50 liters 20 vapor volume = 46 liters • Default to misfire and fuel trim: Run diagnostic ignoring fuel level	<u>Frequency:</u> 12.5 ms Continuous Discrete: Failed for 25.00 consecutive seconds Class 2 (applies to this application): Fuel sender sends failed message after seeing failure for 60 consecutive seconds	DTC Type C
Fan 1 Relay Circuit Fault	P0480	This DTC checks the output driver for electrical integrity	Output state invalid	• PCM state = crank or run • 9 volts < Ignition voltage < 18 volts	<u>30 sec.</u> <u>Frequency:</u> Continuous 100ms loop	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 volts < Ignition voltage < 18 volts	<u>30 sec.</u> <u>Frequency:</u> Continuous 100 ms loop	DTC Type B
Manual Transmission Vehicle Speed Sensor	P0500 (F car with manual transmission only)	This diagnostic will detect a failed vehicle speed sensor on manual transmissions	Engine_Speed > 1250.00 RPM AND Vehicle Speed < 3 .00 MPH	• Engine Running • Transmission is in gear • Cylinder Air Mass between 2560 mg/cyl and 200 mg/cyl • Engine Acceleration between 500 RPM/sec and – 200 RPM/sec All of the above for 1.00 seconds	Fault present for 20.00 seconds <u>Frequency:</u> 100ms loop Continuously	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 100 RPM below the desired idle. (Desired RPM range 625 to 850)	RPM < (Desired RPM – 100)	***Test Enable:*** • No CCP Valve Stuck Open DTC • No Purge Solenoid Control Circuit DTC • No ECT DTC's • No Fuel Injector DTC's • No EGR Flow or Sensor DTC's • No ETC DTC's • No IAT DTC's • No Fuel Trim DTC's • No MAF DTC's • No TPS DTC's • No Misfire DTC's • No VSS DTC's • ECT $\geq$ 70.00 °C • System Voltage $\geq$ 9.00 V but $\leq$ 18.00 V • IAT $\geq$ -18.01 °C • Engine run time $\geq$ 120.00 seconds • Baro $\geq$ 70.00 kPa (12000 ft) • TPS $\leq$ 1.3 1% • VS $\leq$ 3.00 MPH • Catalyst Diagnostic = not active • AIR Diagnostic = not active • EGR Flow Diagnostic = not active • Transmission state hasn't changed in last 0.1 seconds • Above met for a time $\geq$ 2 seconds to enable diagnostic.	8.00 seconds per test 5 tests to fail; must leave enable criteria between each test Frequency: Continuous after enable 100ms loop	DTC Type B

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ENGINE DIAGNOSTIC PARAMETERS

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Idle Control System RPM Higher Than Expected	P0507	This DTC will determine if a high idle is the result of an IAC valve or circuit. A high idle is defined as 175 RPM above the desired idle. (Desired RPM range 625 to 850) Also sets if an ETC fault results in a high idle (F car only). Results in Limited Authority Mode if vehicle has ETC (F car only)	RPM > (Desired RPM + 175)	***Test Enable:*** • No CCP Valve Stuck Open DTC • No Purge Solenoid Control Circuit DTC • No ECT DTC's • No Fuel Injector DTC's • No EGR Flow or Sensor DTC's • No ETC DTC's • No IAT DTC's • No Fuel Trim DTC's • No MAF DTC's • No TPS DTC's • No Misfire DTC's • No VSS DTC's • ECT ≥ 70.00 °C • System Voltage ≥ 9.00 V but ≤ 18.00 V • IAT ≥ -18.01 °C • Engine run time ≥ 120.00 seconds • Baro ≥ 70.00 kPa (12000 ft) • TPS ≤ 1.3 1% • VS ≤ 3.00 MPH • Catalyst Diagnostic = not active • AIR Diagnostic = not active • EGR Flow Diagnostic = not active • Transmission state hasn't changed in last 0.1 seconds • Above met for a time ≥ 2 seconds to enable diagnostic.	8.00 seconds per test 5 tests to fail; must leave enable criteria between each test Frequency: Continuous after enable 100ms loop	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 • Ignition voltage ≥ 5 volts • Engine speed < 5000	Frequency: 50 ms loop Continuous	DTC Type A
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 or run	Test is run at Powerup Test also runs: Frequency: 100ms loop Continuous	DTC Type A
PCM Memory (RAM)	P0604 (F car only)	functional	Bad Ram Location Found	• DTC P0604 not failed	1) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 20. 100 msec continuous	DTC Type A

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PCM - PERFORMANCE CHECK	P0606 (F car only)	Indicates that the PCM has detected an ETC internal processor integrity fault	1) Redundant desired throttle position calculations differ by > 5%. OR 2) ETC software is not executed in proper order. OR 3) Watchdog1 fails to halt processor < 25 ms after toggle. OR 4) Watchdog2 fails to halt peripheral devices < 50 ms after toggle. OR 5) ROM checksum fails OR 6) P604 set OR 7) ETC software not executed at proper periodicity OR 8) PCM internal registers not properly configured	• Ignition in Run or Crank	1) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 60. Check runs every 18.75 ms. 2) One occurance. Check runs every 18.75 ms. 3) & 4) One occurrence Check runs once per ignition cycle 5) One Occurance 6) One occurance 7) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 20. Check runs every 100 msec 8) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 20. Check runs every 100 msec	DTC Type A
Service Engine Soon Light Circuit Fault	P0650	This DTC checks the output driver for electrical integrity	Output state invalid	• PCM state = crank or run • 9 volts < ignition voltage < 18 volts	Frequency: Continuous 100ms loop	DTC Type B No MIL
TPS 1 CIRCUIT	P1120 (F Car only)	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.	1) Raw TP sensor signal < 0.291 V or > 3.724 V. OR 2)TP sensor minimum mechanical stop voltage < 0.291 V or > 0.587 V.	Ignition in Run or Crank. Valid ETC 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 occurence. Check runs at powerup.	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
APP SYSTEM	P1125 (F Car only)	PCM enables an engine power management limphome mode that utilizes individual cylinder fuel shutoff and spark retard features.	This DTC is set when: An engine power management limphome mode is enabled due to loss of redundant accelerator pedal driver intent indication.	Ignition in Run or Crank. Valid ETC serial data. No TACM processor DTC.	One occurence. Check runs every 18.75 ms.	DTC Type A
Oxygen Sensor Circuit - Too Few O2S R/L and L/R Switches (Bank 1, Sensor 1)	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	L/R switches < 50.00 OR R/L switches < 55.00	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable_Criteria • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle > 0.00 % • No O2 Circuit faults for B1S1 or B2S1 (open, lean, rich, heater) • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 4 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for 2 seconds	100000.00 milliseconds Frequency: 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
Oxygen Sensor Circuit - Transition Switch Time Ratio Malfunction (Bank 1, Sensor 1)	P1134	This DTC determines if the O2 sensor response ratio is degraded	RLA/LRA < 0.40625 OR RLA/LRA > 3.5	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable_Criteria • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle > 0.00 % • No O2 Circuit faults for B1S1 or B2S1 (open, lean, rich, heater) • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 4 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for 2 seconds	100000.00 milliseconds Frequency: 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
Oxygen Sensor Circuit - Too Few O2S R/L and L/R Switches (Bank 2, Sensor 1) Doesn't apply to this application	P1153 (F car only)	This DTC determines if the O2 sensor is no longer sufficiently switching.	L/R switches < 46 OR R/L switches < 50	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable_Criteria • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle > 0.00 % • No O2 Circuit faults for B1S1 or B2S1 (open, lean, rich, heater) • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 1.99 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for 3 seconds	100000.00 milliseconds Frequency: 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
Oxygen Sensor Circuit - Transition Switch Time Ratio Malfunction (Bank 2, Sensor 1) Doesn't apply to this application	P1154 (F car only)	This DTC determines if the O2 sensor response ratio is degraded	RLA/LRA < 0.40625 OR RLA/LRA > 3.0	Common Enable Criteria • No TPS DTC's • No MAP DTC's • No ECT DTC's • No AIR 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 • AIR Diagnostic = Not Active • 9 volts < system voltage < 18.00 volts • Device control = Not Active Specific Enable_Criteria • Misfire DTC (P0300) = False • Coolant temp > 50.00 °C • Engine run time > 60.00 seconds • Canister purge duty cycle > 0.00 % • No O2 Circuit faults for B1S1 or B2S1 (open, lean, rich, heater) • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 1.99 % • Fuel state = closed loop • Transmission (automatic) not in Park, Reverse or Neutral All of the above met for 3 seconds •	100000.00 milliseconds Frequency: Once per trip	DTC Type B
TPS 2 CIRCUIT	P1220	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.	1) Raw TP sensor signal < 0.211 V or > 3.804 V. OR 2) TP sensor minimum mechanical stop voltage < 0.211 V or > 669 V.	Ignition in Run or Crank. Valid ETC 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 occurence. Check runs at powerup.	DTC Type A

2002 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.5L (LX5), 3.8L (L36), 3.8L (L67) *supercharged*
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
TPS 1/2 PERFORMANCE	P1221	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.	|5 V - raw TP sensor #2 voltage - raw TP sensor #1 voltage| > 0.167 V.	Ignition in Run or Crank. Valid ETC 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 occurence. Check runs at powerup.	DTC Type A
Engine Overtemperature Protection (LX5 only)	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 coolant temperature > 131°C	• ECT shorts tests not failing • Engine is running • Engine run time > 5 seconds	Frequency: 1 second Continuous	DTC Tyoe A
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 Frequency: 100ms loop Continuous	DTC type A
EST Open Circuit Fault	P1351	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	290.00 failures within 300.00 Frequency: Every engine cycle Continuous	DTC Type B
EST Short Circuit Fault	P1352	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	290.00 failures within 300.00 Frequency: Every engine cycle Continuous	DTC Type B
EST C Open Circuit Fault	P1353 (LX5 only)	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 (LX5 only)	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 (LX5 only)	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

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ENGINE DIAGNOSTIC PARAMETERS

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EST F Open Circuit Fault	P1356 (LX5 only)	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
Bypass Open Circuit Fault	P1361	This DTC checks the Bypass circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	290.00 failures within 300.00 Frequency: Every engine cycle Continuous	DTC Type B
Bypass Short Circuit Fault	P1362	This DTC checks the Bypass circuit for electrical integrity	Voltage state invalid	• PCM state = crank or run	290.00 failures within 300.00 Frequency: Every engine cycle Continuous	DTC Type B
EST C Short Circuit Fault	P1363 (LX5 only)	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 (LX5 only)	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 (LX5 only)	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 (LX5 only)	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 (LX5 only)	This DTC determines when an occasional loss of synch over a period of time has occurred.	Loss of synch.	• Ignition switch = run or crank • PCM State = run: RPM > 20 • PCM State <> run (cranking): 20 < RPM < 400	PCM State = run: 3 failures within 300 seconds. PCM State <> run (cranking): 3 failures within 15 seconds. 100 msec Continuous	DTC Type B
Crank to Low Res Correlate	P1374	3X signal This diagnostic will detect if the 3X signal is missing.	In one engine cycle 6 low res pulses are not seen, but 1 cam pulse and 36 medium res pulses are seen.	• Engine runtime > 3 sec	290.00 out of 300.00 test samples Frequency: Continuous 100 msec loop	DTC Type B

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ABS Rough Road Malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault. When this occurs, misfire will STILL run.	ABS controller sends a message to PCM indicating that a failure has occurred in the ABS module	• none	50.00 failures out of 60.00 samples	DTC Type C (DTC sets when a P0300 is active – misfire diagnostic ignores rough road information if ABS signal fails)
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS module. When this occurs, misfire will STILL run.	Serial data messages are lost for 5.00 seconds	• none	60.00 failures out of 70.00 samples	DTC Type C (DTC sets when a P0300 is active – misfire diagnostic ignores rough road information if ABS signal fails)
EGR Valve Circuit Performance - Actual Position > Commanded Position	P1404	This diagnostic detects if the valve is stuck open when commanded closed.	Actual pintle position > 3.91 % from closed position	• EGR valve icing or over temperature not occurring • Ignition voltage ≥ 11.00 volts • Sensor supply is valid (P1635 not failing) • Desired EGR = 0 %	4.00 separate failures for 20 seconds (with pintle movement > 40.00 % for 0.50 seconds opening time between tests) Frequency: 100ms loop Continuous	DTC Type B
Evap. Emission Control System – Continuous Open Purge Flow	P1441	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.	Tank Vacuum > 7 – 10 ”H2O based on vapor volume (cold start) for 3.00 sec BEFORE Test time > 120 seconds (cold start)	General Test Enable • No MAP DTC's • No TPS DTC's • No VSS DTC's • No IAT DTC's • No ECT DTC's • No Vacuum Sensor DTC's • No Purge solenoid DTC's • No 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 • Engine coolant temp < 30 °C • Baro > 75.00 kPa (8000 ft)	Once per trip Cold start: max time is 120 seconds	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
PCM - AIRFLOW MODELED BY TPS PERFORMANCE	P1514 (F car only)	Indicates that measured engine airflow does not match estimated engine airflow as established by the TPS.	MAP based airflow - TPS estimated airflow > 165 mg/cyl, AND, MAF based airflow - TPS estimated airflow > 165 mg/cyl	Engine running > 0.5 sec. Ignition on > 2 sec. RPM > 600. No Throttle Actuation DTC's. No ETC Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's No TACM Processor DTC	Both MAP and MAF based counters are incremented by 2 for every error and decremented by 1 for every pass; both thresholds are 32; both counters must exceed threshold to set DTC. Check runs every 18.75 ms.	DTC Type A
PCM - TP MODEL TO TP SENSOR PERFORMANCE	P1515 (F car only)	Indicates that the PCM has detected a throttle positioning error	|throttle error| > 6%. [Throttle error = Measured throttle position - modeled throttle position]	Ignition in Run or Crank [RPM>0 OR (RPM = 0 AND not in Battery Saver Mode)]. TACM detects PCM Desired Throttle Position is valid. No Airflow Actuation DTC. (Engine Running = true OR Ignition Volts > 8.5). No Throttle Actuation DTC. No ETC Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's. No TACM Processor DTC	Positive error counter increments by 2 for every t.e.> 6%; decrements by 1 if 0%<t.e.<6%; decrements by 5 if -6%<t.e.<0%; clears if t.e.< -6%. Threshold is 22 Check runs every 18.75 ms with ETC valid message received. Negative error counter increments by 2 for every t.e. < -6%; decrements by 1 if -6%< t.e.< 0%; decrements by 5 if 0%< t.e. < 6%; clears if t.e. > 6%. Threshold is 22 Check runs every 18.75 ms with ETC valid message received.	DTC Type A

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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
TAC MODULE - TP MODEL TO TP SENSOR PERFORMANCE.	P1516 (F car only)	Indicates that the TAC Module has detected a throttle positioning error OR PCM AND TACM Processor cannot determine throttle positioning OR Both TP Sensors are invalid	1) |throttle error|: a) >=2 deg. for >200 ms with no change in error sign, after > 5 sec. stable command. OR b) >=2 deg. for >500 ms for throttle command change >= 2 degrees. OR c) >=5 deg. for >200 ms for throttle command change >= 5 degrees. OR d) >= 5 deg. for > 300 ms with no change in error sign. OR 2) PCM processor DTC's. OR 3) TACM processor DTC. OR 4) both TPS Circuit DTC's are set. OR 5) PCM-TACM Serial Data DTC w/ any APP Sensor DTC or TP Sensor DTC	Ignition in Run or Crank. Valid ETC serial data. Ignition On > 0.5 sec	One occurance. Check runs every 3 ms	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
TAC MODULE PROCESSOR	P1517 (F car only)	Indicates that TAC Module is unable to correctly read data from the ROM, OR Indicates that TAC Module is unable to correctly write and read data to and from RAM, OR Indicates that the TAC Module has detected an ETC internal processor integrity fault.	1) Powerup test fails to read/write data OR 2) Max 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%. 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) Either Watchdog Timer fails to increment. OR 13) Failure of Processor Stack pointer to zero at Main Loop. OR 14) A/D Read sequence incorrect	Ignition in Run or Crank. Valid ETC serial data	1) One occurance Check runs at Reset initialization 2) Counter increments by 10 for every error, decrements by 1 each minute; threshold is 50. 3) Same as 2). Check runs at power up and every 60 seconds thereafter. 4) Same as 2). Check runs at power up and every 200 milliseconds thereafter 5) - 6) Same as 2). Check runs between 1 - 123 ms 7) - 8) Same as 2). Check runs every 3 milliseconds. 9) Same as 2). Check runs between 1 - 123 ms 10) Same as 2). Check runs at power up and every 200 milliseconds thereafter 11) -12) Same as 2) Internal Watchdog > 11 ms, External Watchdog > 123.2 ms 13) Same as 2). Check runs every 50 ms. 14) Same as 2).	DTC Type A

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ENGINE DIAGNOSTIC PARAMETERS

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PCM - TACM SERIAL DATA CIRCUIT	P1518 (F car only)	Indicates that the serial data line between the PCM and TACM has intermittently or continuously failed.	PCM invalid Serial Data message: No message for 18.75 ms, OR Corrupted data in the message, OR Invalid message protocol, OR PCM processor DTC's, OR TACM processor DTC. TAC Module invalid Serial Data message: No message for 26 ms, OR Corrupted data in the message, OR Invalid message protocol, OR PCM processor DTC's, OR TACM processor DTC.	(Ignition in Run or Crank) AND engine not in crank state. Time since powerup > 0. Ignition in Run or Crank. Valid ETC serial data. Ignition On > 0.5 seconds	No valid message received for 500 ms, OR 20% of messages received in 10 sec. are invalid, OR 50% of messages received in 5 sec. are invalid. Check runs every 18.75 ms. No valid message received for 500 ms, OR Invalid message increments counter by 6; valid message decrements counter by 1; threshold is 1000. Check for invalid messages runs every 3 ms. Check for missing messages runs every 26 ms.	DTC Type A
V5BA Voltage Circuit Fault	P1635	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 Frequency: 100ms loop Continuous	DTC Type B
V5BB Voltage Circuit Fault	P1639	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 Frequency: 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
Control Module Ignition Off Timer Performance	P1683	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 > 23 Ignition Off Time < Old Ignition Off Time On positive timer transition Sample Counter < 7 or Sample Counter > 12 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 ≥ 0 seconds)	Frequency: 100 ms 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

P0101: (Calculated Flow – Measured Flow) Lookup Table: 3.8L (L36) C Car

Calculated Airflow	Airflow Delta
Grams_Air_0	10
Grams_Air_40	15
Grams_Air_80	21.39063
Grams_Air_120	25.90625
Grams_Air_160	28.52344
Grams_Air_200	29.9375
Grams_Air_240	30.53125
Grams_Air_280	31.21094
Grams_Air_320	31.71094
Grams_Air_360	32.21094
Grams_Air_400	32.54688

P0135, P0141: Lookup Tables for Fail Times: 3.8L (L36) C Car
P0135 – Bank 1, Sensor 1, P0141 – Bank 1, Sensor 2

Additional Fail Time (Add this amount at this Startup Coolant Temperature)		
	Bank 1, Sensor 1	Bank 1, Sensor 2
-40 Degrees_C	30	30
-28 Degrees_C	25	25
-16 Degrees_C	15	15
-4 Degrees_C	10	10
8 Degrees_C	5	5
20 Degrees_C	2	2
32 Degrees_C	0	0
44 Degrees_C	0	0
56 Degrees_C	0	0

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			68 Degrees_C	0	0		
			80 Degrees_C	0	0		
			92 Degrees_C	0	0		
			104 Degrees_C	0	0		
			116 Degrees_C	0	0		
			128 Degrees_C	0	0		
			140 Degrees_C	0	0		
			152 Degrees_C	0	0		
			Unadjusted Fail Time				
				Bank 1, Sensor 1	Bank 1, Sensor 2		
			0 Grams_Per_Second	132	400		
			5 Grams_Per_Second	104	349		
			10 Grams_Per_Second	76	283		
			15 Grams_Per_Second	48	188		
			20 Grams_Per_Second	48	135		
			25 Grams_Per_Second	130	113		
			30 Grams_Per_Second	130	110		
			35 Grams_Per_Second	130	119		
			40 Grams_Per_Second	130	134		
			45 Grams_Per_Second	130	151		
			50 Grams_Per_Second	130	176		
			55 Grams_Per_Second	130	177		
			60 Grams_Per_Second	130	177		
			65 Grams_Per_Second	130	177		
			70 Grams_Per_Second	130	177		
			75 Grams_Per_Second	130	177		
			80 Grams_Per_Second	130	177		
			85 Grams_Per_Second	130	177		
			90 Grams_Per_Second	130	177		
			95 Grams_Per_Second	130	177		
			100 Grams_Per_Second	130	177		

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P0121: Stuck High TPS Lookup Table: 3.8L (L36) C Car

Engine RPM	Max TPS Value
400 RPM	15
800 RPM	20
1200 RPM	25
1600 RPM	29.60938
2000 RPM	32.79297
2400 RPM	35.99609
2800 RPM	39.19922
3200 RPM	42.40234
3600 RPM	45.60547
4000 RPM	48.80859
4400 RPM	51.99219
4800 RPM	60
5200 RPM	100
5600 RPM	100
6000 RPM	100
6400 RPM	100

P0121: Stuck Low TPS Lookup Table: 3.8L (L36) C Car

Engine RPM	Min TPS Value
400 RPM	0
800 RPM	0
1200 RPM	0
1600 RPM	3.496094

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			2000 RPM	5.996094			
			2400 RPM	6.992188			
			2800 RPM	9.492188			
			3200 RPM	13.49609			
			3600 RPM	15.99609			
			4000 RPM	19.00391			
			4400 RPM	21.50391			
			4800 RPM	23.00781			
			5200 RPM	24.00391			
			5600 RPM	25			
			6000 RPM	25			
			6400 RPM	25			

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P0401: Engine Run Time as a Function of Coolant Temperature Table: 3.8L (L36) C Car

Coolant Temperature at Startrun	Engine Run Time (seconds)
Deg_C_m40	510
Deg_C_m30	510
Deg_C_m20	475
Deg_C_m10	250
Deg_C___0	150
Deg_C__10	65
Deg_C__20	55
Deg_C__30	50
Deg_C__40	50
Deg_C__50	50
Deg_C__60	50
Deg_C__70	45
Deg_C__80	35
Deg_C__90	35
Deg_C_100	35
Deg_C_110	45
Deg_C_120	55
Deg_C_130	65
Deg_C_140	65

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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

P0300: Catalyst Damaging Misfire Percentages as a Function of Engine Speed and Load Table: 3.8L (L36) C Car

Eng. Load ↓ / Eng. RPM →	0 RPM	1000 RPM	2000 RPM	3000 RPM	4000 RPM	5000 RPM	6000 RPM	7000 RPM
0 Load_In_Percent	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%
10 Load_In_Percent	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%	15.83%
20 Load_In_Percent	15.83%	15.83%	15.83%	15.83%	14.00%	3.33%	3.33%	7.50%
30 Load_In_Percent	15.83%	15.83%	15.83%	12.17%	10.00%	4.17%	4.17%	7.50%
40 Load_In_Percent	15.83%	15.83%	15.83%	8.25%	6.00%	5.00%	5.00%	7.50%
50 Load_In_Percent	15.83%	15.83%	13.50%	8.00%	6.00%	5.50%	5.50%	14.67%
60 Load_In_Percent	15.83%	15.83%	11.00%	7.67%	6.00%	6.00%	6.00%	14.17%
70 Load_In_Percent	15.83%	15.83%	11.33%	7.17%	6.67%	4.17%	4.17%	14.17%
80 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	1.00%	1.00%	14.17%
90 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	1.00%	1.00%	14.17%
100 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	1.00%	1.00%	14.17%