

**2003 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 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 (Applies only to LA1 and LG8)	This DTC checks the Heater Output Driver circuit for electrical integrity	Output state shorted	<ul style="list-style-type: none"> • 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
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	<ul style="list-style-type: none"> • 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% • 9 volts ≤ Ignition Voltage ≤ 18 volts • If igniton voltage ≤ 11.5 volts then undefaulted MAF must be ≤ 40 gps • Enable Criteria Stable Time ≥ 2 seconds 	320 test failures in a 400 test sample 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> No TPS DTC's failing Controller State = RUN Engine Run Time based on power up coolant temperature: > 1 sec at ≥ 30°C >30 sec at 15°C > 45 sec at 45°C >90 sec at -15°C > 120 sec at -30° C; time is interpolated between temperature points [(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)	<ul style="list-style-type: none"> 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 <u>Frequency:</u> 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)	<ul style="list-style-type: none"> 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 <u>Frequency:</u> Continuous 100 ms loop	DTC Type B

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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 100°C after a minimum 8 hour soak (fast fail). Raw ECT at powerup > IAT at powerup by 15°C after a minimum 8 hour soak, the powerup IAT is > 15°C, the vehicle has been driven over 15 mph for at least 300 seconds, and IAT has not dropped more than 5°C. Raw ECT at powerup > IAT at powerup by 15°C after a minimum 8 hour soak and the time spent cranking the engine without starting is greater than 5 seconds with the fuel level being above a minimum level of 10%.	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Raw ECT at powerup ≥ IAT at powerup by 15°C Powerup IAT > 15°C Vehicle driven a minimum of 300 seconds above 15 mph and IAT does not drop more than 5° 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)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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.	<u>Stuck High</u> MAP < 50 KPa & TPS > predicted TPS (lookup table as a function of RPM) or <u>Stuck Low</u> MAP > 70 KPa & TPS < predicted TPS (lookup table as a function of RPM)	<ul style="list-style-type: none"> 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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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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 (this logic used on L67 and L36)	Thermister Analog Voltage This DTC detects if a stabilized minimum closed-loop coolant temperature is reached and maintained after engine start-up	If actual accumulated air flow is > predicted air flow before engine coolant reaches -10.00 °C	<ul style="list-style-type: none"> 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 < -10 °C Minimum Average flow > 3 g/sec Minimum distance traveled > 0.50 miles Minimum MPH > 15.00 mph 120.00 sec < Engine Run Time < 1500.00 sec IAT ≥ -6.99 °C ECT > -40 °C . 	30 failures to set DTC Frequency: Once per ignition cycle 1 second loop	DTC Type B
Insufficient Coolant Temperature for Closed Loop Fuel Control	P0125 (this logic used on LG8 and LA1)	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: 120 sec @ 44 °F 300.00 sec @ 24 °F to 44°F 439.0 sec @ region 3 and ECT < 15 °C (59°F)	<ul style="list-style-type: none"> ECT sensor shorts test not failing IAT sensor DTCs not active Engine runtime > 0 Start up ECT ≤ 10.00 °C IAT ≥ -6.99 °C ECT ≥ -40.00 °C Max Idle Time ≤ : 95.00 sec @ 44 °F 210.00 sec @ 24°F to 44 °F 329.00 sec @ Reg 3 Min Total Engine Air ≥ : 1252.00 grams @ 44 °F 1908.00 grams @ 24 °F to 44°F 4669.00 grams @ Reg 3 	Frequency: Continuous 100 ms loop	DTC Type B

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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	<ul style="list-style-type: none"> • 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 • 120.00 sec < Engine Run Time < 1500.00 sec • IAT ≥ -6.99 °C • ECT > -40 °C 	<p>30 failures to set DTC</p> <p><u>Frequency:</u> Once per ignition cycle 1 second loop</p>	DTC Type B
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.	<p>Closed loop fuel control O2 sensor Ready flag set to "Not Ready."</p> <p>O2 sensor voltage must be > 525 millivolts or < 300 millivolts to set closed loop fuel O2 Ready flag.</p> <p>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."</p>	<ul style="list-style-type: none"> • 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 	<p>390 test failures in a 400 test sample</p> <p><u>Frequency:</u> Continuous 100ms loop</p>	DTC Type B

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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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> • $0.00 \leq \text{A/F ratio} \leq 20.00$ • $5\% \leq \text{throttle position} \leq 40.00\%$ • Fuel state = closed loop • All fuel injectors = ON • Traction Control = not active • Coolant < 131°C <p>All of the above met for 3 seconds</p> <p><u>For PE Test</u></p> <ul style="list-style-type: none"> • All injectors = on • Indication that closed loop fueling is ready • A/F Ratio ≤ 12.5 <p>All of the above met for 12 seconds</p>	<p>90 test failures in a 100.00 test sample for 4.00 sets of samples</p> <p>90.00 failures in a 100.00 test sample for PE mode</p> <p><u>Frequency:</u> Continuous 100 ms loop</p>	DTC Type B

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O2S Circuit-High Voltage (Bank 1, Sensor 1)	P0132	This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle and DFCO	O2 sensor voltage > 976.56 millivolts or O2 sensor voltage > 199.65 millivolts in DFCO mode	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> • 0.00 ≤ A/F ratio ≤ 20.00 • 3.00 % ≤ throttle position ≤ 40.00 % • Fuel_State = Closed loop <p>All of the above met for 3 seconds</p> <p><u>For DFCO Test</u></p> <ul style="list-style-type: none"> • Fuel state = DFCO • Indication that closed loop fueling is ready <p>All of the above met for 2 seconds</p>	<p>90.00 test failures in a 100 test sample for 5.00 sets of samples</p> <p>290.00 failures in a 300.00 test sample for DFCO mode</p> <p><u>Frequency:</u> Continuous 100 ms loop</p>	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	<u>Common Enable Criteria</u> <ul style="list-style-type: none"> • 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 <u>Specific Enable Criteria</u> <ul style="list-style-type: none"> • 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 ≥ 0.00 % • 13.00 gps ≤ MAF ≤ 30.00 gps • 1000.00 ≤ RPM ≤ 3000.00 • Throttle position ≥ 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 <u>Frequency:</u> Once per trip	DTC Type B

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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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> Engine run time > 200.00 seconds Predicted O2 temperature > 425°C 	270 test failures in a 300 test sample <p align="center"><u>Frequency:</u> Continuous for pre catalyst sensors 100 msec loop rate</p>	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135 (this logic applies to LA1 and LG8 only)	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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> 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 <p align="center">All of the above met for 3 seconds</p>	20 test failures in a 25 test sample <p align="center"><u>Frequency:</u> 6 tests per trip 1 second execution rate</p>	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 is too large. * Time based on table: Time vs average engine airflow during warm-up period. Offset to maximum time based on start-up coolant temperature.	<ul style="list-style-type: none"> 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 <p>Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C</p> <p>Note: Cannot report a pass if average airflow ≥ 17 grams per second</p>	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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> 0.0 \leq A/F ratio \leq 20.0 5.00 % \leq throttle position \leq 40.00 % Fuel state = closed loop All fuel injectors = ON Coolant Temp < 131° C Traction Control = not active <p>All of the above met for 3 seconds</p> <p><u>For PE Test</u></p> <ul style="list-style-type: none"> Fuel state = PE All fuel injectors = on A/F Ratio \leq 12.5 <p>All of the above met for 12 seconds</p>	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 <u>Frequency:</u> 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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> • $0.00 \leq \text{A/F ratio} \leq 20.00$ • $3\% \leq \text{throttle position} \leq 40.00\%$ • Fuel_State = Closed loop <p>All of the above met for 3 seconds</p> <p><u>For DFCO Test</u></p> <ul style="list-style-type: none"> • Fuel state = DFCO • Time not in PE with A/F Ratio ≤ 13.5 must exceed time in PE with A/F Ratio ≤ 13.5 • Indication that closed loop fueling is ready <p>All of the above met for 2 seconds</p>	<p>450.00 test failures in a 500.00 test sample for 5.00 sets of samples</p> <p>900.00 failures in a 1000.00 test sample for DFCO mode</p> <p><u>Frequency:</u> Continuous 100 ms loop</p>	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.	<p>412.33 millivolts < O2 sensor < 490.45 millivolts for regular open test</p> <p>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)</p>	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <p><u>Fast Pass:</u></p> <ul style="list-style-type: none"> • (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 <p>Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C</p> <p>(Fast pass cannot report a fail; if Fastpass fails, the regular open test is run)</p> <p><u>Regular Open Test</u></p> <ul style="list-style-type: none"> • 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 	<p>850 test failures in a 1000 test sample for regular open test</p> <p>(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)</p> <p><u>Frequency:</u></p> <p>Once/trip for post catalyst sensors 100 ms loop</p>	DTC Type B

**2003 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
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ENGINE DIAGNOSTIC PARAMETERS**

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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 \pm 150 millivolts from the mean O2 bias voltage. *Time based on table: Time vs Start Up Coolant Temp.	<ul style="list-style-type: none"> 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 <p>Cold start determination: Powerup ECT < 35° C Powerup IAT < 35° C Powerup ECT – Powerup IAT < 6° C</p> <p>Note: Cannot report a pass if average airflow \geq 26 grams per second</p>	One test/trip	DTC Type B
System Too Lean (Bank 1)	P0171	Determines if the system is in a lean condition.	The average of long term fuel trim samples \geq 1.1641 And The average of short term fuel trim samples \geq 0.00	<ul style="list-style-type: none"> 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 > 74.00 kpa (8500 ft) ECT > 20.00 °C 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 \geq 5.00 failures <u>Frequency:</u> Continuous 100 ms loop	DTC Type B

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System Too Rich (Bank 1)	P0172	Determines if the system is in a rich condition.	<p>The average of long term fuel trim samples ≤ 0.82813 And The average of short term fuel trim samples ≤ 1.8984</p> <p>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)</p> <p>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.</p>	<ul style="list-style-type: none"> • 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 > 74.00 kpa (8500 ft) • ECT > 20.00 °C 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 <p>Intrusive Enable Criteria</p> <ul style="list-style-type: none"> • Average of long term fuel trim samples ≤ 0.82813 • Average of short term fuel trim samples ≤ 1.8984 • RPM > 1000 • 5 g/s $<$ Mass Airflow < 80 g/s • CCP Duty Cycle must be $> 30\%$ for 8 seconds • Must be in the normal, purge on cell or the high flow, purge on cell 	<p>If rich counter is ≥ 3.00 failures</p> <p><u>Frequency:</u> Continuous 100 ms loop</p>	DTC Type B
Fuel Injector Circuit Fault Cylinder 1	P0201	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	<ul style="list-style-type: none"> • Engine is running 	<p>30.00 seconds</p> <p><u>Frequency:</u> 1 second loop Continuous</p>	DTC Type B
Fuel Injector Circuit Fault - Cylinder 2	P0202	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	<ul style="list-style-type: none"> • Engine is running 	<p>30.00 seconds</p> <p><u>Frequency:</u> 1 second loop Continuous</p>	DTC Type B

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Fuel Injector Circuit Fault - Cylinder 3	P0203	This DTC checks the Fuel Injectors for electrical integrity	Output state is invalid	<ul style="list-style-type: none"> Engine is running 	30.00 seconds <u>Frequency:</u> 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	<ul style="list-style-type: none"> Engine is running 	30.00 seconds <u>Frequency:</u> 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	<ul style="list-style-type: none"> Engine is running 	30.00 seconds <u>Frequency:</u> 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	<ul style="list-style-type: none"> Engine is running 	30.00 seconds <u>Frequency:</u> 1 second loop Continuous	DTC Type B

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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 = 5.00% to 16.0% misfire, depending on engine speed and engine load	<ul style="list-style-type: none"> • 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 ≤ ECT ≤ 125.00 °C • If ECT at startup < -6.99 °C, then disable until ECT > 21.09 °C • 475.00 RPM ≤ Engine speed ≤ 5850.00 RPM • 9.00 volts ≤ System voltage ≤ 18.00 volts • + Throttle position Δ < 100 % / 50ms • - Throttle position Δ < 100 %/50ms • 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. • . • Positive or zero torque. • EGR 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 1 st (16) 200 revolution block, or (4) Exceedences thereafter. 1 st Catalyst Exceedence = Number of 200 revolution blocks as data supports for catalyst damage. 2 nd and 3 rd Catalyst Exceedence = (1) 200 revolution block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP. <u>Frequency:</u> Continuous	DTC Type B EMISSION DTC Type B CATALYST DAMAGING

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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	<u>Enable Conditions</u> <ul style="list-style-type: none"> • 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 % • ESC Spark retard \leq 15.01 degrees <u>Determine Fault Region</u> <ul style="list-style-type: none"> • (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 	<u>Frequency:</u> 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	<u>Enable Conditions</u> <ul style="list-style-type: none"> • 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 % • ESC Spark retard \leq 15.01 degrees <u>Determine Fault Region</u> <ul style="list-style-type: none"> • 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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Knock Sensor 2 Input Fault	P0332	This diagnostic will detect a wiring fault with knock sensor 2	Output voltage amplitude is low and stays relatively constant	<u>Enable Conditions</u> <ul style="list-style-type: none"> • 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 % • ESC Spark retard \leq 15.01 degrees <u>Determine Fault Region</u> 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 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.	<ul style="list-style-type: none"> • Engine run time > 3.00 sec 	290.00 failures within 300.00 sample limit. <u>Frequency:</u> Continuous 100msec loop	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.	<ul style="list-style-type: none"> • Engine runtime > 3.00 sec 	If Cam signal is not detected 290.00 out of 300.00 test samples. <u>Frequency:</u> Continuous 100 msec loop	DTC Type B

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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.	<p><u>Test Enable</u></p> <ul style="list-style-type: none"> • No VSS, TPS, Misfire, IAT, MAP, IAC DTC's • No Fuel Injector DTC's • No EGR Sensor DTC's • No ECT DTC's • No Crank Sensor DTC's • No MAF, ETC DTC's • Engine Run Time > cal table based on startup coolant temperature • ECT > 75.00 ° C • Baro > 74.00 kpa (8500 ft) • 0°C ≤ 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 control 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 <p><u>Start Test</u></p> <ul style="list-style-type: none"> • 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 <p><u>Run Test</u></p> <ul style="list-style-type: none"> • 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. • EGR valve "ramped" closed over a time interval. 	<p><u>Frequency:</u> 100 msec loop Once per trip</p>	DTC Type A

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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.	<i>Rapid Step Response Test</i> 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	Frequency: 100 msec loop Once per trip	DTC Type A

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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.	<p><u>Test Enable</u></p> <ul style="list-style-type: none"> • No TPS, MAF, MAP, IAT, VSS, ECT, 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 ≤ ECT ≤ 123.9844°C • 29 mph ≤ VSS ≤ 70 mph • 11 volts ≤ ignition voltage ≤ 18 volts • Not in Power Enrichment • -40°C ≤ IAT ≤ 100°C • IAC Δ ≤ 3.00 counts • MAF Δ ≤ 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 ≥ 74 kpa • DFCO is either inactive or at a commanded spark value of 0 (mode 2) for at least 6.25 milliseconds • Throttle Position ≤ 1.09% for 0.4 seconds <p><u>Start Test</u></p> <ul style="list-style-type: none"> • EGR Position < 1% • 1100 ≤ rpm ≤ 1475 • MAP Δ ≤ 0.898 kpa • MAF Δ ≤ 1.2 gps • 17 kpa ≤ MAP ≤ 43 kpa <p><u>Run Test</u></p> <ul style="list-style-type: none"> • + RPM Δ ≤ 100 • - RPM Δ ≤ 200 • MPH Δ ≤ 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. 	<p align="center"><u>Frequency:</u> 6.25 msec loop Once per trip</p>	DTC Type A

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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.	<i>Rapid Step Response Test</i> 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	<u>Frequency:</u> 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	<ul style="list-style-type: none"> PCM state = crank or run 9 volts < Ignition Voltage < 18 volts 	20.00 seconds <u>Frequency:</u> 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 %	<ul style="list-style-type: none"> 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 <u>Frequency:</u> 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	<ul style="list-style-type: none"> EGR valve icing or over temperature not occurring Ignition voltage \geq 11.00 volts Sensor supply is valid (P1635 not failing) 	20.00 seconds <u>Frequency:</u> 100ms loop Continuous	DTC Type B

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Catalyst Low Efficiency Bank 1	P0420	Oxygen Storage	OSC time difference ≥ 0.1699219 OSC time difference = OSC worst pass threshold - OSC compensation factor * (post cat O2 resp time - pre cat O2 resp time) OSC worst pass thresh = 1.8	<ul style="list-style-type: none"> • No VSS, TPS, EVAP, O2 Sensor, Misfire DTC's • No IAT, MAP, 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 <p><u>Valid Idle Period Criteria</u></p> <ul style="list-style-type: none"> • Engine speed ≥ 1000.00 RPM for a minimum of 38 seconds since end of last idle period. Min engine run time for stable BLM ≥ 600 seconds. <p><u>Test Enable Conditions</u></p> <ul style="list-style-type: none"> • $475^{\circ}\text{C} \leq$ Predicted catalyst temperature $\leq 765^{\circ}\text{C}$ • Closed loop fuel control • Barometric pressure ≥ 74.00 kpa • $-20.00 \leq$ IAT ≤ 100.00 °C • $75.00 \leq$ ECT ≤ 123.98 °C • $0 <$ Idle period ≤ 60.00 seconds • Tests attempted this trip ≤ 18.00 • Tests attempted this idle period < 1 • $-200 \text{ rpm} \leq (\text{Engine Speed} - \text{Desired Speed}) \leq 200$ rpm • Diagnostic will not enable until the next ignition cycle after the following has been met : predicted catalyst temperature $\geq 475^{\circ}\text{C}$ for 1 hour (non-continuously) (note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle) <p><u>Rapid Step Response Enable Criteria</u></p> OSC time difference step ≥ 0.5556641 sec OSC time difference ≥ 0.00 sec	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 tests per trip Maximum of 6 trips to detect failure when Rapid Step Response is enabled. <u>Frequency:</u> 12.5 ms Continuous	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
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 ₂ O	<u>General Test Enable</u> <ul style="list-style-type: none"> • 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 > 74.00 kPa (8000 ft) <p align="center">Cold Start Test</p> <ul style="list-style-type: none"> • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 150 °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

**2003 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.8L (L36), 3.8L (L67) supercharged
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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.	<u>General Test Enable</u> <ul style="list-style-type: none"> • 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 > 74.00 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 <p align="center">OR</p> <ul style="list-style-type: none"> Δ Fuel Slosh < 2.0 – 3.9 % based on fuel level (if occurs, test will try to run, again) <ul style="list-style-type: none"> • Δ Vacuum Slosh < 0.22 – 0.47 "H2O based on fuel level <p align="center">OR</p> <ul style="list-style-type: none"> Δ Fuel Slosh < 1.7 – 3.3 % based on fuel level (If these occur, the 0.020" EWMA will not be updated) <p align="center">Cold Start Test</p> <ul style="list-style-type: none"> • IAT < 30°C • Cold temperature Δ(ECT-IAT): < 150 °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	<ul style="list-style-type: none"> • PCM state = crank or run • 9 volts < Ignition voltage < 18volts 	30 sec <u>Frequency:</u> Continuous 100ms loop	DTC Type B

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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. H2O or Vented Vacuum > 5 in. H2O for 15 seconds	<u>General Test Enable</u> <ul style="list-style-type: none"> • 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 > 74.00 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	<ul style="list-style-type: none"> • PCM state = crank or run • 9 volts < ignition voltage < 18 volts 	30 sec <u>Frequency:</u> 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	<ul style="list-style-type: none"> • 0.10 second delay after sensor power up for sensor warm-up • PCM State <> crank 	5 seconds <u>Frequency:</u> 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	<ul style="list-style-type: none"> • 0.10 second delay after sensor power up for sensor warm-up • PCM state <> crank 	5 seconds <u>Frequency:</u> 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 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. <ul style="list-style-type: none"> • 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 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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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. <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

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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)	<u>Test Enable:</u> <ul style="list-style-type: none"> • 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 ≥ 74.00 kPa • 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 <u>Frequency:</u> Continuous after enable 100ms loop	DTC Type B

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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)	<u>Test Enable:</u> <ul style="list-style-type: none"> • 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 ≥ 74.00 kPa • 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 <u>Frequency:</u> 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	<ul style="list-style-type: none"> • PCM state = crank or run • Ignition voltage ≥ 5 volts • Engine speed < 5000 	<u>Frequency:</u> 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	<ul style="list-style-type: none"> • PCM state = crank or run 	Test is run at Powerup Test also runs: <u>Frequency:</u> 100ms loop Continuous	DTC Type A
Service Engine Soon Light Circuit Fault	P0650	This DTC checks the output driver for electrical integrity	Output state invalid	<ul style="list-style-type: none"> • PCM state = crank or run • 9 volts < ignition voltage < 18 volts 	<u>Frequency:</u> Continuous 100ms loop	DTC Type B No MIL

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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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p>All of the above met for 2 seconds</p>	100000.00 milliseconds <u>Frequency:</u> Once per trip	DTC Type B

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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	<p><u>Common Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p><u>Specific Enable Criteria</u></p> <ul style="list-style-type: none"> • 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 <p>All of the above met for 2 seconds</p>	100000.00 milliseconds <u>Frequency:</u> Once per trip	DTC Type B
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	<ul style="list-style-type: none"> • PCM state = run 	0.50 sec <u>Frequency:</u> 100ms loop Continuous	DTC type A
EST Open Circuit Fault	P1351	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	<ul style="list-style-type: none"> • PCM state = crank or run 	290.00 failures within 300.00 <u>Frequency:</u> Every engine cycle Continuous	DTC Type B
EST Short Circuit Fault	P1352	This DTC checks the EST circuit for electrical integrity	Voltage state invalid	<ul style="list-style-type: none"> • PCM state = crank or run 	290.00 failures within 300.00 <u>Frequency:</u> Every engine cycle Continuous	DTC Type B

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Bypass Open Circuit Fault	P1361	This DTC checks the Bypass circuit for electrical integrity	Voltage state invalid	<ul style="list-style-type: none"> PCM state = crank or run 	290.00 failures within 300.00 <u>Frequency:</u> Every engine cycle Continuous	DTC Type B
Bypass Short Circuit Fault	P1362	This DTC checks the Bypass circuit for electrical integrity	Voltage state invalid	<ul style="list-style-type: none"> PCM state = crank or run 	290.00 failures within 300.00 <u>Frequency:</u> Every engine cycle 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.	<ul style="list-style-type: none"> Engine runtime > 3 sec 	290.00 out of 300.00 test samples <u>Frequency:</u> Continuous 100 msec loop	DTC Type B
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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 > 5.507813 % from closed position	<ul style="list-style-type: none"> 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) <u>Frequency:</u> 100ms loop Continuous	DTC Type B

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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 > 10 "H2O for 5.00 sec BEFORE Test time > 60 seconds (cold start)	<u>General Test Enable</u> <ul style="list-style-type: none"> • No MAP DTC's • No 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 > 74.00 kPa (8000 ft) 	Once per trip Cold start: max time is 65 seconds	DTC Type B
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)	<ul style="list-style-type: none"> • PCM state = run 	Failed for 10.00 sec <u>Frequency:</u> 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)	<ul style="list-style-type: none"> • PCM state = run 	Failed for 10.00 sec <u>Frequency:</u> 100ms loop Continuous	DTC Type B

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Control Module Ignition Off Timer Performance	P1683	This DTC determines if the ignition off timer has failed.	<p>A failure will be reported if any of the following occur:</p> <p>Ignition Off Time < 0 seconds</p> <p>Ignition Off Time > 8 seconds</p> <p>Sample Counter > 25</p> <p>Ignition Off Time < Old Ignition Off Time</p> <p><u>On positive timer transition</u> Sample Counter < 7</p> <p>or</p> <p>Sample Counter > 13</p> <p>or</p> <p>(Ignition Off Time - Old Ignition Off Time) ≠ 1 second</p> <p>note: Sample Counter is incremented if Ignition Off Time = Old Ignition Off Time</p>	<p>Test Run This Trip = FALSE</p> <p>Ignition Off Timer Enabled = TRUE (PCM State = Poweroff; Time in poweroff ≥ 1.6 seconds)</p>	<p>Frequency: 100 ms loop Continuous</p>	DTC Type B

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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		

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3.1L (LG8), 3.4L (LA1), 3.8L (L36), 3.8L (L67) supercharged
ENGINE DIAGNOSTIC PARAMETERS**

2003file4.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			100 Grams_Per_Second	130	177	

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

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 3.1L (LG8), 3.4L (LA1), 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
			1200 RPM	0		
			1600 RPM	3.496094		
			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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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
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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

**2003 cars with 60-degree V6 and 90-degree V6 engines, and vans with 3.4L (LA1) engine
3.1L (LG8), 3.4L (LA1), 3.8L (L36), 3.8L (L67) supercharged
ENGINE DIAGNOSTIC PARAMETERS**

2003file4.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
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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%	5.00%	5.00%	7.50%
30 Load_In_Percent	15.83%	15.83%	15.83%	12.17%	10.00%	5.00%	5.00%	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%	5.00%	5.00%	14.17%
80 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	5.00%	5.00%	14.17%
90 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	5.00%	5.00%	14.17%
100 Load_In_Percent	15.83%	15.83%	11.67%	6.67%	6.67%	5.00%	5.00%	14.17%