2002 4-cyl and 6-cyl inline engines
2.2L *OHV* (LN2), 2.2L *flex fuel* (L43), 2.2L *DOHC* (L61), 2.4L *QUAD-4* (LD9), 4.2L *inline 6 DOHC* (LL8)
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
Cam Shaft Position Actuator Control	P0013	Detects an open or shorted control circuit by monitoring ODM fault line	Fault in the VCP control circuit is detected	Failure is present .25 seconds of 2 seconds	2/16 counts 125 ms. /ct continuous check	DTC Type B
VCP System Performance	P0014	Detects a VCP system error by comparing Desired and Actual VCP position through all operating ranges of VCP control	Actual position /desired position delta is greater than 1.5 degrees when VCP is commanded	VCP is commanded VCP is stable within .9 degrees for 1 second	50/100 counts 125ms. /ct. continuous check when VCP is commanded	DTC Type B
Manifold Pressure Sensor Rationality	P0105	Detects a MAP that is stuck or out of range	Change in MAP > or < Table value	600 > RPM > 6375 Engine run time > 40 Sec Δ TCC < 2.5% Δ RPM < 50 RPM Above condition met for 1.5 Sec None of the following DTC's set: 107, 108, 117, 118, 122, 123, 125, 128, 130, 131, 132, 171, 172, 300, 336, 340, 341, 440, 442, 446, 452, 453, 502, 507, 740, 1120, 1220, 1221, 1271, 1275, 1280, 1441, 1512, 1514, 1515, 1635, 1639, 1680, 1681	112/128 Cts 125 ms/Ct Continuous check	DTC Type B
Manifold Pressure Too Low	P0107	Detects a continuous short to ground or a MAP sensor signal that is out of range low	MAP < 0.05 V (11.2 kPa)	RPM < 1000 Or RPM > 1000 Percent throttle rotation > 28 % Pedal Postition > 1.2% None of the following DTC's set: 122, 123	400/500 Cts 15.6 ms/Ct Continuous check	DTC Type B
Manifold Pressure Too High	P0108	Detects a continuous short to voltage or a MAP sensor signal that is out of range high	MAP > 4.21 V (90 kPa)	Percent throttle rotation < 15% VSS < 1 MPH Engine run time > 20 - 60 sec None of the following DTC's set: 122, 123	80/100 Cts 125 ms/Ct Continuous check	DTC Type B
Intake Air Temperature Sensor Shorted	P0112	Detects a continuous short to voltage or an IAT sensor signal that is out of range high	IAT < 48 Cts (> 128°C)	VSS > 15 MPH Engine run time > 320 sec None of the following DTC's set: 502, 503	50/100 Cts 125 ms/Ct Continuous check	DTC Type B
Intake Air Temperature Sensor Open	P0113	Detects a continuous short to ground or an open in the IAT sensor signal	IAT > 253 Cts (< -57°C)	VSS < 15 MPH Engine run time > 320 sec ECT > -40°C None of the following DTC's set: 117, 118, 125, 502, 503	50/100 Cts 125 ms/Ct Continuous check	DTC Type B
High Sided Coolant Rationality	P0116	Detects if the coolant sensor is reading too high	ECT is > 15°C higher than IAT after 8 hours	IAT > 10 °C Min drive time > 300 seconds Min MPH to update drive time > 25 MPH SUM and IAT difference < 5 degrees after drive time None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 130, 131, 132, 171, 172, 300, 326, 327, 332, 440, 442, 446, 452, 453, 502, 503, 1441	Once per ignition cycle	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
Coolant Temperature Sensor Shorted	P0117	Detects a continuous short to voltage or an ECT sensor signal that is out of range high	ECT < 4 Cts (> 138°C) (High R) Or ECT < 36 Cts (> 142°C) (Low R)	Engine run time > 128 sec	50/100 Cts 125 ms/Ct Continuous check	DTC Type B
Coolant Temperature Sensor Open	P0118	Detects a continuous short to ground or an open in the ECT sensor signal	ECT > 251 Cts (< -50°C) (High R) Or ECT > 252 Cts (< -71°C) (Low R)	Engine run time > 60 sec	50/100 Cts 125 ms/Ct Continuous check	DTC Type B
Throttle Position Sensor Low	P0122	Detects if ETC throttle position codes are set for proper default action.	TP A/D < 0.275 V	Engine Running Following DTC's set: P1120 or P1635 & 1220	50/112 Cts 15.6 ms/Ct Continuous check	DTC Type A
Throttle Position Sensor High	P0123	Detects if ETC throttle position codes are set for proper default action.	TP A/D > 4.725 V	Engine Running Following DTC's set: P1120 or P1635 & 1220	110/220 Cts 125 ms/Ct Continuous check	DTC Type A
Closed Loop Engine Coolant Temperature Rationality	P0125	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 40°C	30 sec < engine runtime < 30 min. Air Flow > 15 g/sec Min Average flow > 20 g/sec Min distance traveled > .5 miles Min MPH to update distance > 25 mph IAT > -7°C Start up ECT < 35°C None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123 ,130, 131, 132, 171, 172, 201, 202, 203, 204, 205, 206, 300, 326, 327, 332, 440, 442, 446, 452, 453, 502, 503, 1441	60 Cts 1 sec/Ct Once per ignition cycle	DTC Type B
Thermostat Engine Coolant Temperature Rationality	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°C	30 sec < engine runtime < 30 min. Air Flow > 15 g/sec Min Average flow > 20 g/sec Min distance traveled > 1.5 miles Min MPH to update distance > 25 mph IAT > -7°C Start up ECT < 75°C None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123 ,130, 131, 132, 171, 172, 201, 202, 203, 204, 205, 206, 300, 326, 327, 332, 440, 442, 446, 452, 453, 502, 503, 1441	60 Cts 1 sec/Ct Once per ignition cycle	DTC Type B
O2S 1 Closed Loop Rationality	P0130	Detects when a vehicle goes open loop or will not remain closed loop	Not in Closed Loop	Engine runtime > 100 secs Coolant temp > 80°C 1200 < RPM < 3400 15% < Percent throttle rotation < 50% Throttle area due to pedal rotation > 1.2% Above conditions met for 5 sec. None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 131, 132, 133, 134, 201, 202, 203, 204, 205, 206, 300, 336, 1133	90/100 125 ms/Ct Continuous check	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
O2S 1 Lean	P0131	Detects an O2S 1 signal which is below the range considered lean	O2S 1 < 52 mV	ECT > 69.5°C Fuel Level > 9.9% In Closed Loop 15% < Percent throttle rotation < 50.2% for 3.8 seconds Throttle area due to pedal rotation > 1.2% MAP > 25 kPa None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	999/1000 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 1 Rich	P0132	Detects an O2S 1 signal which is above the range considered rich	O2S 1 > 946 mV or O2S 1 > 1042 mV for 2.5 sec while in DFCO	ECT > 69.5°C Fuel Level > 9.9% In Closed Loop 15% < Percent throttle rotation < 50.2% for 3.8 seconds Throttle area due to pedal rotation > 1.2% MAP > 25 kPa None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	399/400 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 1 Slow Response	P0133	Determines if the O2S 1 is functioning properly by checking its response time	Avg. O2S 1 Response Times: R/L > 918 ms L/R > 1136 ms R/L + L/R > 2100	Engine run time > 200 sec Percent throttle rotation between 18% & 30% RPM between 1300 & 1900 Evap > 10% PWM ECT > 69.5°C PLM > 200 Fuel > 9.9% Engine operating in Closed Loop None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	30 sec Once per ignition cycle	DTC Type B
O2S 1 Open	P0134	Detects an O2S 1 signal that is not switching at bias voltage	399 mV < O2S 1 < 499 mV	ECT > 69.5°C Fuel Level > 9.9% Engine run time > 30 sec ECT > 80°C Air flow > 7 g/sec Above conditions met for 20 sec 15% < Percent throttle rotation < 50.2% Throttle area due to pedal rotation >1.2% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	999/1000 Cts 125 ms/Ct Continuous check	DTC Type B

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O2S 1 Heater Circuit Malfunction	P0135	Checks for sensor activity within a given period of time after cold start	0.25 A < O2S1 current < 1.22 A	Engine run time < 60 sec None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	198/200 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 2 Lean	P0137	Detects an O2S 2 signal which is below the range considered lean	O2S 2 < 43 mV	ECT > 69.5°C Fuel Level > 9.9% In Closed Loop 15% < Percent throttle rotation <50.2% for 3.8 sec Throttle area due to pedal rotation >1.2% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	1199/1200 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 2 Rich	P0138	Detects an O2S 2 signal which is above the range considered rich	O2S 2 > 1042 mV	ECT > 69.5°C Fuel Level > 9.9% In Closed Loop 15 % < Percent throttle rotation < 50.2% for 3.8 sec Throttle area due to pedal rotation >1.2% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	399/400 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 2 Open	P0140	Detects a signal that is not switching at bias voltage	425 mV < O2S 2 < 475 mV	ECT > 69.5°C Fuel Level > 9.9% Engine run time > 30 sec ECT > 40°C Air flow > 10 g/sec Above conditions met for 140 sec 15% < Percent throttle rotation < 56% Throttle area due to pedal rotation >1.2% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	999/1000 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 2 Heater Circuit Malfunction	P0141	Checks for sensor activity within a given period of time after cold start	0.25 A < O2S2 current < 1.26 A	Engine run time < 60 sec None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	198/200 Cts 125 ms/Ct Continuous check	DTC Type B

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Fuel Trim Lean	P0171	Monitors fuel control system during normal operating range of FTI 110 < FTI < 145	Fuel Trim Index > 157	Closed loop fueling active Baro > 72 kPa ECT > 60°C & < 115°C IAT > -25°C & < 115 °C MAP > 28 kPa RPM between 550 & 3600 VSS < 82 MPH None of the following DTC's set: 13, 14, 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 201, 202,. 203, 204, 205, 206, 300, 326, 327, 332, 335, 336, 341, 446, 502, 503, 507, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1345, 1441,1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	Continuous check	DTC Type B
Fuel Trim Rich	P0172	Monitors fuel control system during normal operating range of FTI 110 < FTI < 145	Fuel Trim Index < 73	Closed loop fueling active Baro > 72 kPa ECT > 60°C & < 115°C IAT > -25°C & < 115 °C MAP > 28 kPa RPM between 550 & 3600 VSS < 82 MPH None of the following DTC's set: 13, 14, 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 201, 202,. 203, 204, 205, 206, 300, 326, 327, 332, 335, 336, 341, 446, 502, 503, 507, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1345, 1441,1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	Continuous check	DTC Type B
Injector Circuit Problem	P0201 P0202 P0203 P0204 P0205 P0206	Monitors fuel injectors for proper electrical operation	Injector Current < 4 Amps	Engine running Ignition Voltage > 9 V	1 sec Continuous check	DTC Type B

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Random Misfire Cylinder 1 Misfire Cylinder 2 Misfire Cylinder 3 Misfire Cylinder 4 Misfire Cylinder 5 Misfire Cylinder 6 Misfire	P0300 P0301 P0302 P0303 P0304 P0305 P0306	These DTC 's will determine if a random misfire or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index Vs Engine Speed Vs Load and Camshaft Position Emission Failure Threshold = 1.42% Catalyst Damage Threshold = 4.2%-14.6%, depending on engine speed and engine load.	Engine run time > 0 sec. RPM Between 438 & 6250. -7°C < ECT < 121°C. If start up ECT < -7°C, then disable until ECT > 21°C. Fuel level > 0%. Ignition voltage > 9 V. Fuel cutoff not active. Power management is not active. Brake torque management not active. No ABS rough road. No ABS or TCS active. AC compressor has not just engaged or disengaged. Positive or zero torque. Camshaft sensor is in sync with crank sensor. + Throttle position Δ < 7% . - Throttle position Δ < 5%. Misfire Diag is not requesting to disable TCC when transmission is in hot mode. None of the following DTC's set: 13, 14, 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 131, 132, 133, 134, 171, 172, 326, 327, 332, 335, 336, 340, 341, 502, 503, 507, 601, 602, 604, 606, 740, 742, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1336, 1345, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681 The following are not currently utilized (N/A): Power Take Off is disabled –N/A. No abnormal engine speed – N/A. Filtered engine speed is not changing rapidly – N/A. No excessive drive wheel slip – N/A. EGR Intrusive test not active – N/A. AIR Intrusive test not active – N/A. Automatic transmission is not shifting – N/A. No Abusive Engine Speed – N/A.	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. Continuous check.	DTC Type B EMISSION DTC Type A CATALYST DAMAGING
ESC System Diagnostic	P0326	Detects a ESC System fault	Inst Volt < 0.01V or Inst. Volt > 4.99V	2000 < RPM < 6400 ECT > 70°C MAP > 34.8 kPa Engine run time > 20 sec 0 < Vacuum < 40 None of the following DTC's set: 122, 123	60/80 Cts Continuous check	DTC Type B
ESC Sensor 1	P0327	Detects a and disconnected or faulty sensor	Max – Min Voltage < 0.0586V	2000 < RPM < 6400 ECT > 70°C MAP > 34.8 kPa Engine run time > 20 sec 0 < Vacuum < 40 None of the following DTC's set: 122, 123	60/80 Cts Continuous check	DTC Type B

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ESC Sensor 2	P0332	Detects a and disconnected or faulty sensor	Max – Min Voltage < 0.0586V	2000 < RPM < 6400 ECT > 70°C MAP > 34.8 kPa Engine run time > 20 sec 0 < Vacuum < 40 None of the following DTC's set: 122, 123	60/80 Cts Continuous check	DTC Type B
Crankshaft Position Sensor	P0335	Detects an open/ missing crank sensor signal	Signal missing for 1 of 2 events	Engine running	125 ms / ct Continuous check	DTC Type B
Crank Sensor Position	P0336	Detects too many resynns in the crank sensor circuit	Resync counter > 30 counts	Engine running	125 ms / ct 256 seconds Continuos check	DTC Type B
Cam Sensor 1 Missing	P0340	Detects an open / missing Cam sensor signal	No change in cam activity>30 cycles As compared to crankshaft events	Engine running	125 ms / ct 30 cycles Continuos check	DTC Type B
Cam Sensor 1 Resync Too Often	P0341	Detects too many resyncs in the cam sensor circuit	Can Resync counter >30 counters	Engine running	125 ms / ct 256 seconds Continuos Check	DTC Type B
Catalyst Monitor	P0420	Detects a catalytic converter with unacceptable amounts of oxygen storage capabilities	Oxygen Storage Capability (OSC) Time Difference $\geq$ 0.253 sec OSC Time Difference = OSC Worst Pass Thresh - OSC Compensation Factor * (O2S 2 Response Time - O2S 1 Response Time) OSC Worst Pass Thresh = 2.240 sec	Engine speed $\geq$ 1000 RPM for minimum of 34 sec since end of last idle period Predicted catalyst temp $\geq$ 501°C, < 750°C Baro $\geq$ 72.3 kPa IAT between -20.5°C & 80°C ECT between 69.5°C & 125°C Idle $\leq$ 47 sec MPH < 3 Test attempted this trip $\leq$ 12 -75 RPM $\leq$ (Engine Speed - Desired Speed) $\leq$ 150 RPM Engine run time > 530 sec Ignition voltage > 9 V Flow < 15.00 g/sec Rapid Step Response Enable Criteria OSC Time Difference Step $\geq$ 0.830 sec OSC Time Difference Step $\geq$ 0.00 sec None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 131, 132, 133, 134, 135, 137, 138, 140, 141, 171, 172, 201, 202, 203, 204, 205, 206, 300, 326, 327, 332, 336, 340, 341, 440, 442, 442, 446, 452, 453, 495, 502, 503, 507, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1441, 1481, 1482, 1484, 1512, 1514, 1515, 1516, 16211635, 1639, 1680, 1681	Maximum 1 test attempt per 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 15.6 Ms/Ct	DTC Type A

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Evap System Large Leak Detected	P0440	Checks for adequate vacuum being held in the fuel tank when applied	Vac > 1.0 V	Baro > 75 kPa SUC and SUM between 4°C & 30°C SUC - SUM < 8°C Fuel Level between 15% - 85% 10% < Percent throttle rotation < 35% MPH < 70 Purge Solenoid enabled None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 452, 453, 502, 503, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1512, 1514, 1515, 1516, 1621, 1635, 1680, 1681	330 sec Once per ignition cycle	DTC Type A
Evap System Small Leak Detected	P0442	Checks for a small leak in the fuel vapor handling system	0.13 – 0.19 volts / sec (0.020 criteria) 0.31 – 0.39 volts / sec (0.040 criteria)	Baro > 75 kPa SUC and SUM between 4°C & 30°C SUC - SUM < 8°C Fuel Level between 15% - 85% 10% < Percent throttle rotation < 35% MPH < 70 Purge Solenoid enabled None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 452, 453, 502, 503, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1512, 1514, 1515, 1516, 1621, 1635, 1680, 1681	15 sec Once per ignition cycle	DTC Type A
Evap Canister Vent Blocked	P0446	Checks for excessively high vacuum in the vapor handling system	Vac < 0.7 V	Baro > 75 kPa SUC and SUM between 4°C & 30°C SUC - SUM < 8°C Fuel Level between 15% - 85% 10% < Percent throttle rotation < 35% MPH < 70 Purge Solenoid enabled None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 452, 453, 502, 503, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1512, 1514, 1515, 1516, 1621, 1635, 1680, 1681	100 sec Once per ignition cycle	DTC Type A
Evap Tank Vacuum Sensor Low	P0452	Detects a continuous short to ground or a disconnected tank vacuum sensor	Tank vacuum transducer < .1 V	Engine running	25 sec Continuous check	DTC Type A
Evap Tank Vacuum Sensor High	P0453	Detects a tank vacuum sensor that is shorted to voltage	Tank vacuum transducer > 4.9 V	Engine running	25 sec Continuous check	DTC Type A
EV Fan Speed Too High	P0495	Detects an EV Fan that is turning too fast when EV Fan is not requested	EV Fan RPM > 1600 RPM	Engine Running Ignition Voltage > 8.5 Volts IAT >-7°C EV Fan not commanded Engine RPM > 1800 RPM for 120 seconds	650/2500 Cts 125 msec/Ct.	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
Idle Control System – RPM Higher than Expected	P0507	Detect an idle speed which is greater than a delta from desired	Idle Speed > 100 RPM above desired speed	Engine run time > 2 sec Baro > 65 kPa ECT > -40°C Commanded IAC Position < 2 Steps Idle stabilized for 5 sec Ignition voltage > 9 V, < 17.1 V None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 130, 171, 172, 201, 202, 203, 204, 205, 206, 300, 336, 440, 442, 446, 452, 453, 502, 503, 606, 1120, 1220, 1221, 1441, 1512, 1514, 1515, 1516, 1635, 1639	15 seconds Continuous check	DTC Type A
PCM Has EE PROM Flash Error	P0601	Checks for an incorrect checksum or Program ID failure	Checksum Detection Incorrect	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V	3 Cnts Continuous Continuous check	DTC Type A
PCM EE PROM Not Programmed	P0602	Checks for a PCM that is not programmed	Unprogrammed EE PROM	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V	Immediately Once per key cycle	DTC Type A
PCM – RAM PERFORMANCE TEST	P0604	Indicates that PCM is unable to correctly write and read data to and from RAM	Data read does not match data written.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V	One occurence. Check is performed at powerup and every 60 seconds thereafter.	DTC Type A

2002 4-cyl and 6-cyl inline engines
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PCM - PROCESSOR PERFORMANCE CHECK	P0606	Indicates that the PCM has detected an ETC internal processor integrity fault	1) MCP Desired Throttle Limiting occuring, OR, 2) ETC software is not executed in proper order. OR, 3) Software Tasks loops > Schedule Tasks Loop. OR, 4) Loss of SPI communication from the MCP. OR, 5) Average MCP SOH Toggle: 1.45 ms < x < 2.42 ms . OR, 6) TPS or APPS Minimum Learned Values fail compliment check. OR, 7) TPS or APPS Minimum Learned Values fail range check. OR, 8) Main µP Integrity Check Error occurs. OR, 9) MCP Integrity Check Error occurs. OR, 10) MCP Integrity Check Error of Main µP occurs.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V	1) 99 Cnts Continuous 2 ms/Ct in the MCP, 2) 1 Cnt Continuous 15.6 ms/Cnt in the Main µP. 3) Error > 3 Cnts Per Software Tasks loops 4) 101/254 Cts or 24 Cnts Continuous 37 Cnts Continuous @ Init. 7.8 ms/Ct in the Main µP. 5) 3 Cnts Continuous 62.5 ms/Cnt. 6) 13 Cnts Continuous 15.6 ms/Ct in the Main µP. 7) 13 Cnts Continuous 15.6 ms/Ct in the Main µP. 8) 2 Cnt Continuous. Check is performed at powerup and every 60 seconds thereafter. 9) 2 Cnt Continuous. 15.6 ms/Ct in the Main µP. 10) 1 Cnt Continuous. 15.6 ms/Ct in the MCP	DTC Type A
TPS 1 CIRCUIT	P1120	Detect a continuous or intermittent short or open in the TP sensor #1 circuit.	Raw TP sensor signal < 0.27 V or > 4.67 V.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. No Vref DTC – P1635	1a) 13/28 Cts or 8 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 85/202 Cts or 62 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A

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O2S 1 Not Enough Switches	P1133	Determines if the O2S 1 is functioning properly by checking the number of switches	O2S 1 Switch Numbers L/R < 2 Cts R/L < 2 Cts	Engine run time > 200 sec Percent throttle rotation between 18% & 30% RPM between 1300 & 1900 Evap > 10% PWM ECT > 69.5°C PLM > 200 Fuel > 9.9% Engine operating in Closed Loop None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	30 sec Once an ignition cycle	DTC Type B
O2S 2 Lean in PE	P1137	Detects and O2S 2 signal which is below the range considered lean while in power enrichment	O2S 1 > 700 O2S 2 < 400	Vehicle operating in PE Engine operating in Closed Loop Fuel level > 9.9% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	48/80 Cts 125 ms/Ct Continuous check	DTC Type B
O2S 2 Rich in DFCO	P1138	Detects and O2S 2 signal which is above the range considered rich while in a fuel cutoff condition	O2S 2 > 648	Vehicle operating in DFCO or FCO Engine operating in Closed Loop Fuel Level > 9.9% None of the following DTC's set: 105, 107, 108,112, 113, 117, 118, 122, 123, 201, 202, 203, 204, 205, 206, 300, 336, 440, 446, 452, 453, 507, 601, 602, 604, 606, 1120, 1220, 1221, 1271, 1275, 1280, 1484, 1512, 1514, 1515, 1516, 1621, 1635, 1639, 1680, 1681	48/80 Cts 125 ms/Ct Continuous check	DTC Type B
TPS 2 CIRCUIT	P1220	Detect a continuous or intermittent short or open in the TP sensor #2 circuit.	Raw TP sensor signal < 0.3125 V or > 4.7 V.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. No Vref DTC – P1639	1a) 11/26 Cts or 8 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 85/202 Cts or 62 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A

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TPS 1/2 PERFORMANCE	P1221	1) Detect a continuous or intermittent correlation fault between TP sensors #1 and #2. OR, 2) Detect an invalid minimum mechanical position correlation between TP sensor #1 and #2. OR, 3) Detect a short between the TPS 1 & 2 Circuits.	1) |(raw minimum learned TP sensor #1 voltage - raw TP sensor #1 voltage) – (raw TP sensor #2 voltage – raw minimum learned TP sensor #2 voltage)| > 0.193 V at Minimum Throttle Position with an increasing value to 0.386 V at the Maximum Throttle Position. OR, 2) |5 V - raw learned minimum TP sensor #2 voltage - raw learned minimum TP sensor #1 voltage| > 0.25 V OR, 3) Δ TPS1 < 1 V	1 & 2) Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. None of the following DTC's set: 1120,1220, 1635, 1639 3) Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC.	1 & 2 a) 12/27 Cts or 9 Cnts Continuous 15.6 ms/Ct in the Main µP 1 & 2b) 93/210 Cts or 70 Cnts Continuous 2 ms/Ct in the MCP 3) 2 cts. 154 ms/ct, immediate retest on an error performed in the Main µP.	DTC Type A
APPS 1/2 PERFORMANCE	P1271	1) Detect a continuous or intermittent correlation fault between APP sensors #1 and #2. OR, 2) Detect an invalid minimum mechanical position correlation between APP sensor #1 and #2. OR, 3) Detect a short between the APPS 1 & 2 Circuits.	1) |(raw minimum learned APP sensor #2 voltage - raw APP sensor #2 voltage) – (raw APP sensor #1 voltage – raw minimum learned APP sensor #1 voltage)| > 0.142 V at Minimum Accelerator Position with an increasing value to 0.284 V at the Maximum Accelerator Position. OR, 2) |5 V - raw learned minimum APP sensor #2 voltage - raw learned minimum APP sensor #1 voltage| > 0.25 V OR, 3) Δ APPS1 < 1 V	1 & 2) Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. None of the following DTC's set: 1275,1280, 1635, 1639 3) Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC.	1 & 2a) 12/27 Cts or 9 Cnts Continuous 15.6 ms/Ct in the Main µP 1 & 2b) 93/210 Cts or 70 Cnts Continuous 2 ms/Ct in the MCP 3) 2 cts. 154 ms/ct, immediate retest on an error performed in the Main µP.	DTC Type A
APPS 1 CIRCUIT	P1275	Detect a continuous or intermittent short or open in the APP sensor #1.	Raw APP sensor signal < 0.13 V or > 4.87 V.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. No Vref DTC – P1639	1a) 12/27 Cts or 9 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 93/210 Cts or 70 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A
APPS 2 CIRCUIT	P1280	Detect a continuous or intermittent short or open in the APP sensor #2.	Raw APP sensor signal < 0.13 V or > 4.87 V.	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC. No Vref DTC – P1635	1a) 12/27 Cts or 9 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 93/210 Cts or 70 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A

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Crankshaft Position System Variation Not Learned (CASE)	P1336	Determines if the Crankshaft Position System Variation has not been learned.	Sum of compensation factors between 98172 and 98435.	Manufacturers Enable Counter must be zero. None of the following DTC's: 335, 336, 340, 341.	.5 sec. Once per ignition cycle.	DTC Type A
VCP Crank/Cam Correlation Error	P1345	Detects out of range base engine cam timing	Crank degrees as compared to cam degrees is > 74.7 Degrees or < 56.7 degress	VCP commanded to 0 for 16 seconds Engine running	125 ms / ct 10/ 20 counts Continuos Check	DTC Type B
Evap Purge Valve Leaking	P1441	Checks for a stuck open purge solenoid	Vac < 2.0 V	Baro > 75 kPa SUC and SUM between 4°C & 30°C SUC - SUM < 8°C Fuel Level between 15% - 85% 10% < Percent throttle rotation < 35% MPH < 70 Engine running None of the following DTC's set: 105, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 452, 453, 502, 503, 601, 602, 604, 606, 1120, 1133, 1220, 1221, 1271, 1275, 1280, 1512, 1514, 1515, 1516, 1621, 1635, 1680, 1681	90 sec Once per ignition cycle	DTC Type A
EV Fan Speed Input Circuit	P1481	Detects a continuous short or open in the EV Fan Speed Input circuit(s)	No EV Fan Speed Input activity is detected	Engine Running Ignition Voltage > 8.5 Volts	90/100 Cts. 125 msec/ Ct.	DTC Type B
EV Fan Control CKT Fault	P1482	Monitors the control circuit for the EV Fan	Fault on the EV Fan Control circuit is detected	Engine Running 9< Ignition voltage < 18 volts None of the following DTC's set: P0562	50/100 cts. 125 ms/Ct.	DTC Type B
EV Fan Performance	P1484	Detects an EV Fan that is not operating close enough to the desired fan RPM when EV fan is requested	Actual EV Fan RPM is 1000 RPM > Desired EV Fan RPM	Engine Running Ignition Voltage > 8.5 Volts IAT >-7°C Engine RPM < 3200 RPM Δ Engine RPM < 250 RPM for 5 seconds EV Fan commanded KOPTEN14 bit 7 = TRUE	800/1000 Cts 125 msec/Ct.	DTC Type A
TPS Minimum Learning	P1512	Throttle Position Minimum Learning not completed	TP > 0.92 Volts	Minimum TPS Learn Active State Stable Throttle Position Reading for 40ms Ignition in Run or Crank No P1120 & 1220 DTC's	1.5 seconds	DTC Type A
PCM - AIRFLOW MODELED BY TPS PERFORMANCE.	P1514	Detect when measured engine airflow does not match estimated engine airflow as established by the TPS.	MAP - TPS estimated MAP > 30 kPa	Engine running = true. RPM > 600. No Throttle Actuation DTC's. Both TPS/Vref Circuit DTC's are not set. No PCM Processor DTC's	11 Cnts Continuous 15.6 ms/Ct in the Main µP	DTC Type A

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PCM (MAIN µP) – TP MODEL TO TP SENSOR PERFORMANCE.	P1515	1) Detect a throttle positioning error OR, 2) Detect a short on the Actuator Circuit OR, 3) Determine if the Actuator has been miswired	1) |throttle error| > 10 %. [Throttle error = Measured throttle position - modeled throttle position] OR, 2) ETC Ignition > 4 V during powerdown sequence check OR, 3) TPS1 < 3.2 V	1) Ignition in Run or Crank [RPM>0 or (RPM = 0 AND not in Battery Saver Mode)]. No Airflow Actuation DTC. (Engine Running = true OR Ignition Volts > 8.0). No Throttle Actuation DTC. 2) Powerdown State (Ignition = 0 V) 3) Minimum TPS Learn Active State	1a) Positive error counter: increments by 3 if t.e.> 7%; decrements by 2 if 0%<t.e.<7%; decrements by 5 if -7%<t.e.<0%; clears if t.e.< -7%. 1b) Negative error counter: increments by 3 if t.e.< -7%; decrements by 2 if -7%< t.e.< 0%; decrements by 5 if 0%< t.e. < 7%; clears if t.e. > 7%. Thresholds are 45 Check runs every 15.6 ms the Main µP. 2) 1 Cnt Check at Key On 3) 11 Cnt Continuous 15.6 ms/Ct in the Main µP.	DTC Type A
PCM (MCP) - DESIRED TP TO TP SENSOR PERFORMANCE.	P1516	1) Detect a throttle positioning error OR, 2) Detect excessive current draw on the Actuator Circuit OR, 3) Determine if the Actuator has been miswired	1) |throttle error|: a) >=2 % with no change in error sign, after > 5 sec. stable command. OR, b1) >=2 % for a throttle command step change >= |2 %|. b2) >=+7% or <= -10% for a throttle command step change >= |5%|. OR, c) >=+7% or <= -10% for throttle command change >= |10 %|. OR, 2) I(actuator) > 9 Amps OR, 3) TPS1 < 3.6 V	1 & 2) Ignition in Run or Crank [RPM>0 or (RPM = 0 AND not in Battery Saver Mode)]. No Airflow Actuation DTC. (Engine Running = true OR Ignition Volts > 8.0). No Throttle Actuation DTC. 3) Minimum TPS Learn Active State	1a) 249 Cnts Continuous 2 ms/Ct in the MCP 1b1) 249 Cnts Continuous 2 ms/Ct in the MCP 1b2) 99 Cnts Continuous 2 ms/Ct in the MCP 1c) 149 Cnts Continuous 2 ms/Ct in the MCP 2) 49 Cnts Continuous 2 ms/Ct in the MCP 3) 99 Cnt Continuous 2 ms/Ct in the MCP	DTC Type A
PCM - EEPROM General Failure	P1621	Checks for a write error	Incorrect Checksum	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V	Immediately on next key up if flagged on previous key down Once at key down	DTC Type A

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PCM – V5B1 Circuit	P1635	Detect a continuous or intermittent short on the #1 5 Volt Sensor Reference Circuit	| Vref1 voltage - Vcc Voltage | > 0.125 V	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC.	1a) 16/32 Cts or 11 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 125/250 Cts or 99 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A
PCM – V5B2 Circuit	P1639	Detect a continuous or intermittent short on the #2 5 Volt Sensor Reference Circuit	| Vref2 voltage - Vcc Voltage | > 0.125 V	Ignition in Unlock/Accessory, Run, or Crank. Ignition voltage > 5.23 V. No PCM processor DTC.	1a) 16/32 Cts or 11 Cnts Continuous 15.6 ms/Ct in the Main µP 1b) 125/250 Cts or 99 Cnts Continuous 2 ms/Ct in the MCP	DTC Type A
PCM - APPS PERFORMANCE CHECK	P1680	1) Verify the PCM's ability to detect a short between the APPS 1 & 2 Circuits. OR, 2) Verify that the Indicated Accelerator Pedal Position Calculation is correct.	1) APPS #2 Signal Voltage > 1.75 V OR, 2) | Main µP Indicated Accelerator Pedal Position – MCP Indicated Accelerator Pedal Position | > 0.142 V	Ignition voltage > 5.23 V No PCM processor DTC &: 1) Ignition in Unlock/Accessory and Run, Not during TPS Minimum Learn Active 2) Ignition in Unlock, Accessory, Run, or Crank.	1) 2 cts. 154 ms/ct, immediate retest on an error performed in the Main µP. 2) 25 Cnts Continuous 15.6 ms/Ct in the MCP	DTC Type A
PCM - TPS PERFORMANCE CHECK	P1681	1) Verify the PCM's ability to detect a short between the TPS 1 & 2 Circuits. OR, 2) Verify that the Throttle Control System Position Sensor Short Diagnostic is functioning.	1) TPS #2 Signal Voltage > 1.75 V OR, 2) No detection of the Sensor Short Diagnostic Active State.	Ignition voltage > 5.23 V No PCM processor DTC &: Ignition in Unlock/Accessory and Run, Not during TPS Minimum Learn Active	1) 2 cts. 154 ms/ct, immediate retest on an error performed in the Main µP. 2) No Sensor Short Diagnostic Activity for 500 ms. Detected by the MCP.	DTC Type A

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Secondary AIR Injection System AMT	*P0410	Detects secondary air system failures	Active: Lean time > than 1 second during 3 second active test compared to O2 voltage threshold of 50 mV during 3 attemps	AIR system commanded on >20 sec 1°C < IAT < 151°C 5°C < CLT < 114.5°C Battery voltage > 11.7 V Vacuum > 29.7 Kpa Engine speed ≥ 1150 RPM Engine run time > 200 sec Flow > 11 gps Accumulated flow > 240 cts Active specific: BLM cell of 16,17 BPW > 1.2 ms Fuel Trim between 110 & 138 TPS delta < 5% Stabilization time > 0.5 seconds Test time of 3 seconds None of the following DTC's set: 105, 107, 108, 112, 112, 117, 118, 122, 123, 130, 131, 132, 133, 1133, 134, 171, 172, 177, 178, 179, 181, 182, 183, 200, 300, 336, 340, 341, 506, 507, 601, 602, 1621	Active: 3 sec maximum of 3 attemps	DTC Type B
Secondary AIR Injection System SMT	*P0410	Detects secondary air system failures	Active: Lean time > than 1 second during 3 second active test compared to O2 voltage threshold of 50 mV during 3 attemps	AIR system commanded on >20 sec 1°C < IAT < 151°C 5°C < CLT < 114.5°C Battery voltage > 11.7 V Vacuum > 29.7 Kpa Engine speed ≥ 1000 RPM Engine run time > 200 sec Flow > 11 gps Accumulated flow > 240 cts Active specific: BLM cell of 2,3,17 BPW > 1.2 ms Fuel Trim between 110 & 138 TPS delta < 5% Stabilization time > 0.5 seconds Test time of 3 seconds None of the following DTC's set: 105, 107, 108, 112, 112, 117, 118, 122, 123, 130, 131, 132, 133, 1133, 134, 171, 172, 177, 178, 179, 181, 182, 183, 200, 300, 336, 340, 341, 506, 507, 601, 602, 1621	Active: 3 sec maximum of 3 attemps	DTC Type B