# 2006 2.2L (L61) *when used in these vehicles:* VUE, Grand Am, Chevrolet Classic

## 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 REQUIRED AND FREQUENCY | MIL ILLUM. TYPE |
|---|---|---|---|---|---|---|
| HO2S Heater Control Circuit Low Volt B1S1 | P0031 | Output state invalid | Circuit fault indicated | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active | 8 fails out of 10 samples<br><br>Continuous check | DTC Type B |
| HO2S Heater Control Circuit High Volt B1S1 | P0032 | Output state invalid | Circuit fault indicated | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active | 8 fails out of 10 samples<br><br>Continuous check | DTC Type B |
| HO2S Heater Control Circuit Low Volt B1S2 | P0037 | Output state invalid | Circuit fault indicated | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active | 8 fails out of 10 samples<br><br>Continuous check | DTC Type B |
| HO2S Heater Control Circuit High Volt B1S2 | P0038 | Output state invalid | Circuit fault indicated | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active | 8 fails out of 10 samples<br><br>Continuous check | DTC Type B |
| PCM - Airflow Modeled By TPS Performance | P0068 | Detect when measured engine airflow does not match estimated engine airflow as established by the TPS | MAP - TPS estimated MAP > 30 kPa | Engine running<br>Engine speed > 600 RPM<br>No throttle actuation DTCs<br>No TPS/Vref Circuit DTCs<br>No PCM Processor DTCs | 11 counts continuous<br>15.6 msec/count in main processor | DTC Type A |
| Manifold Pressure Sensor Rationality | P0106 | Detects a MAP that is stuck or out of range | Change in MAP > or < Table value | 600 > RPM < 6375<br>Engine run time > 40 Sec<br>Δ TCC < 1.25%<br>Δ RPM < 50 RPM<br>Δ IAC < 5 Counts<br>Δ TPS < 100%<br>Above condition met for 1.5 Sec<br>None of the following DTC's set:<br>0068, 107, 108, 116, 117, 118, 120, 122, 123, 125, 128, 130, 131, 132, 133, 171, 172, 201-204, 220, 300, 336, 340, 341, 455, 442, 446, 452, 453, 496, 502, 506, 507, 601, 602, 604, 606, 60D, 60E, 641, 651, 700, 701, 062F, 1516, 2101, 2120, 2125, 2135, 2138, 2176, U101 | 112/128 counts<br>125 msec/count<br><br>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 (11.8 kPa) | Engine speed < 1000 RPM<br>Or<br>Engine speed > 1000 RPM<br>TP > 35%<br>Throttle area due to pedal rotation > 1.2%<br>None of the following DTCs set:<br>122, 123 | 400/500 count<br>15.6 msec/count<br><br>Continuous check | DTC Type A |

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|---|---|---|---|---|---|---|
| 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) | TP < 20%<br>VSS < 1 MPH<br>Engine run time > 20 - 40 sec based on startup coolant<br>None of the following DTCs set:<br>122, 123 | 80/100 count<br>125 msec/count<br><br>Continuous check | DTC Type A |
| 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 counts (> 128°C) | VSS > 15 MPH<br>Engine run time > 320 sec<br>None of the following DTCs set:<br>502 | 50/100 counts<br>125 msec/count<br><br>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 counts (< -57°C) | VSS < 15 MPH<br>Engine run time > 320 sec<br>ECT > -40°C<br>None of the following DTCs set:<br>117, 118, 125, 502 | 50/100 counts<br>125 msec/count<br><br>Continuous check | DTC Type B |
| Engine Coolant Temperature Sensor Performance | P0116 | Detects if the coolant sensor is reading too high | ECT is > 15°C higher than IAT after 8 hours | IAT > 15 °C<br>Min drive time > 300 seconds<br>Min MPH to update drive time > 25 MPH<br>SUM and IAT difference < 5 degrees after drive time<br>None of the following DTCs set:<br>112, 113, 117, 118, 125, 128, 601, 602, 604, 606, 2610 | Once per ignition cycle | DTC Type B |
| Coolant Temperature Sensor Shorted | P0117 | Detects a continuous short to voltage or an ECT sensor signal that is out of range high | ECT < 4 counts (> 138°C) (High R)<br>Or<br>ECT < 36 counts (> 142°C) (Low R) | Engine run time > 128 sec | 50/100 counts<br>125 msec/count<br><br>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 counts (< -50°C) (High R)<br>Or<br>ECT > 252 counts (< -71°C) (Low R) | Engine run time > 60 sec | 50/100 counts<br>125 msec/count<br><br>Continuous check | DTC Type B |
| TPS 1 Circuit | P0120 | Detect a continuous or intermittent short or open in the TPS1 circuit | 0.0.300 V < TPS1 < 4.68 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0641<br>None of the following DTCs set:<br>0122, 0123 | 13/28 counts or 8 counts continuous,<br>15.6 msec/count in main processor<br><br>85/202 counts or 62 counts continuous,<br>2 msec/count in motor processor | DTC Type A |
| Throttle Position Sensor Low | P0122 | Detects if ETC TPS1 is out of range low | TPS1 < 0..300 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTC<br>No Vref DTC – P0641 | 13/28 counts or 8 counts continuous,<br>15.6 msec/count in main processor<br><br>85/202 counts or 62 counts continuous,<br>2 msec/count in motor processor | DTC Type A |
| Throttle Position Sensor High | P0123 | Detects a continuous or intermittent high voltage situation in TP sensor #1 circuit | Raw TPS sensor signal > 4.68V | Ignition in unlock/accessory, run or crank<br>Ignition Voltage > 5.23 V<br><br>No Vref Fault | 20/40 Cts<br>10 Cnts Continuous<br>12.5 ms /Ct in the MCP | DTC Type A<br>MIL |

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|---|---|---|---|---|---|---|
| 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.<br>Min Average flow > 15 g/sec<br>Min distance traveled > .5 miles<br>Min MPH to update distance > 5 mph<br>IAT > -7°C<br>Start up ECT < 35°C<br>None of the following DTCs set:<br>0068, 106,107, 108, 112, 113, 116, 117, 118, 120, 130, 131, 132, 133, 134, 171, 172, 201, 202, 203, 204, 220, 300, 336, 442, 446, 452, 453, 480 496, 502, 506, 507, 601, 602, 604, 606, 62F, 700, 701, 1133, 2135, 2120, 2138, 2125, 0496, 2176, 2101, 1516, 0641, 0651, 060D, 060E, 2610 | 30 counts<br>1 sec/count<br><br>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.<br>Air Flow > 15 g/sec<br>Min Average flow > 15 g/sec<br>Min distance traveled > 0.5 miles<br>Min MPH to update distance > 5 mph<br>IAT > -7°C<br>Start up ECT < 75°C<br>None of the following DTCs set:<br>0068, 106,107, 108, 112, 113, 116, 117, 118, 120, 130, 131, 132, 133, 134, 171, 172, 201, 202, 203, 204, 220, 300, 336, 442, 446, 452, 453, 480 496, 502, 506, 507, 601, 602, 604, 606, 62F, 700, 701, 1133, 2135, 2120, 2138, 2125, 0496, 2176, 2101, 1516, 0641, 0651, 060D, 060E, 2610 | 30 counts<br>1 sec/count<br><br>Once per ignition cycle | DTC Type B |
| O2s 1 Closed Loop Rationality | P0130 | Detects an abnormal open loop condition due to O2 sensor signal in “not ready” range. | O2 voltage stuck between 300 and 600 mV<br><br>(Sensor becomes “not ready” after 6 seconds) | ECT > 70.3°C<br>Engine run time > 200 secs<br>1200 RPM < Engine speed < 3400 RPM<br>15% < TP < 50%<br>Partial pedal enabled<br>Above conditions met for 2 sec<br>None of the following DTCs set:<br>68,106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 171, 172, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 90/100 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| O2s 1 Lean | P0131 | Detects an O2S 1 signal that is shorted to ground. | O2S 1 < 52 mV | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Closed Loop/Stoich<br>15% < TP < 50.2%<br>MAP > 25 KPa<br>Partial pedal enabled<br>Above conditions met for 3.8 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 999/1000 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |
| O2s 1 Rich | P0132 | Detects an O2S 1 signal that is shorted to voltage. | O2S1 > 946 mV while in closed loop<br>or<br>O2S1 > 998 mV while in open loop.<br><br>(If O2S 1 > 1024 mV for 1 second straight, system goes open loop) | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Closed Loop/Stoich<br>15% < TP < 50.2%<br>MAP > 25 KPa<br>Partial pedal enabled<br>Above conditions met for 3.8 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 399/400 counts above 946 mV while in closed loop<br>or<br>350 /4 00 counts above 998 mV while in open loop<br><br>8 counts/sec<br><br>Continuous check | DTC Type B |
| O2s 1 Slow Response | P0133 | Determines if the O2S 1 is functioning properly by checking its response time | Average O2S1 response times:<br><br>R/L > 165 msec<br>L/R > 75 msec | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 170 sec<br>No intrusive CATMON test active<br>5% < TP < 60%<br>Delta TP < 18.75% per sec<br>1000 RPM < Engine speed < 3500 RPM<br>Airflow > 25 grams/second<br>Closed Loop/Stoich<br>Time in enable > 1.7 sec<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 60 sec<br><br>Once per trip | DTC Type B |

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|---|---|---|---|---|---|---|
| O2s 1 Open | P0134 | Detects an O2S 1 signal open circuit. | 400 mV < O2S1 < 500 mV | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 30 sec<br>No intrusive CATMON test active<br>15% < TP < 50%<br>MAP > 25 kPa<br>Partial pedal enabled<br>Sensor predicted warm (O2 front sensor warm flag set)<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 999/1000 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |
| O2s 1 Heater Circuit Malfunction | P0135 | Detects O2 heater current out of acceptable range. | 0.3 amps < O2S1 current < 1.5 amps | ECT > 69.5°C<br>Fuel level > 9.8%<br>Engine run time > 60 sec<br>No intrusive CATMON test active<br>11 V < system voltage < 18 V<br>Predicted oxygen sensor temperature > 845°C<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 198/200 counts<br>1 count/sec<br><br>Continuous check | DTC Type B |
| O2s 2 Lean | P0137 | Detects an O2S 2 signal that is shorted to ground. | O2S2 < 43.4 mV | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Closed Loop/Stoich<br>15% < TP <50.2%<br>MAP > 25 KPa<br>Above conditions met for 3.8 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-206, 220, 300-306, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 1199/1200 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| O2s 2 Rich | P0138 | Detects an O2S 2 signal that is shorted to voltage. | O2S2 > 1042 mV | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Closed Loop/Stoich<br>15% < TP < 50.2%<br>MAP > 25 KPa<br>Above conditions met for 3.8 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 399/400 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |
| O2s 2 Open | P0140 | Detects an O2S 2 signal open circuit. | 425 mV < O2S 2 < 473 mV | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>MAP > 25 KPa<br>15% < TP < 50%<br>Partial pedal enabled<br>Sensor predicted warm (O2 front sensor warm flag set)<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 999/1000 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |
| O2s 2 Heater Circuit Malfunction | P0141 | Detects O2 heater current out of acceptable range. | 0.221 A < O2S2 current < 1.6 A | ECT > 69.5°C<br>Fuel level > 9.8%<br>No intrusive CATMON test active<br>Engine run time > 60 sec<br>11 < System voltage < 18 volts<br>Predicted oxygen sensor temperature > 805°C<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 198/200 counts<br>1 count/sec<br><br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| Fuel Trim Lean | P0171 | Monitors fuel control system for a lean failure | Fuel Trim Index > 155 | Closed loop<br>No interfering diagnostics in progress<br>BARO > 72 kPa<br>60°C < ECT < 125°C<br>-25°C < IAT < 150°C<br>MAP > 26 kPa<br>400 RPM < Engine speed < 5700 RPM<br>VSS < 82 MPH<br>Fuel level > 10%<br>None of the following DTCs set:201.202.203.204,106,107,108,112,113,117,118,122,123,125,131,132,133,134,1133,300,336,341,340,455,496,442,446,452,453,481,502,506,601,602,62F,130,128,701,604,606,120,135,220,2135,2120,2138,2125,60D,60E,068,2101,641,651,1516,2176,700,C073,C101 | Continuous check | DTC Type B |
| Fuel Trim Rich | P0172 | Monitors fuel control system for a rich failure | Fuel Trim Index < 82 | Closed loop<br>No interfering diagnostics in progress<br>BARO > 72 kPa<br>60°C < ECT < 125°C<br>-25°C < IAT < 150°C<br>MAP > 26 kPa<br>400 RPM < Engine speed < 5700 RPM<br>VSS < 82 MPH<br>None of the following DTCs set:<br>201.202.203.204,106,107,108,112,113,117,118,122,123,125,131,132,133,134,1133,300,336,341,340,455,496,442,446,452,453,481,502,506,601,602,62F,130,128,701,604,606,120,135,220,2135,2120,2138,2125,60D,60E,068,2101,641,651,1516,2176,700,C073,C101 | Continuous check | DTC Type B |
| Injector Circuit Problem | P0201<br>P0202<br>P0203<br>P0204 | Monitors fuel injectors for proper electrical operation | Injector Current < 4 Amps | Engine running<br>System voltage >11 V | 1 sec<br><br>Continuous check | DTC Type B |
| TPS 2 Circuit | P0220 | Detect a continuous or intermittent short or open in the TPS2 circuit. | 0.3125 V < TPS2 < 4.7 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTC<br>No Vref DTC – P0651<br>None of the following DTCs set:<br>0222, 0223 | 11/26 counts or 8 counts continuous, 15.6 msec/count in main processor<br><br>85/202 counts or 62 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Throttle Position Sensor 2 Low Voltage | P0222 | Detects if ETC TPS2 is out of range low | TPS2 < 0.3125 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTC<br>No Vref DTC – P0651 | 11/26 counts or 8 counts continuous, 15.6 msec/count in main processor<br><br>85/202 counts or 62 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Throttle Position Sensor 2 High Voltage | P0223 | Detects if ETC TPS2 is out of range high | TPS2 > 4.7 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTC<br>No Vref DTC – P0651 | 11/26 counts or 8 counts continuous, 15.6 msec/count in main processor<br><br>85/202 counts or 62 counts continuous, 2 msec/count in motor processor | DTC Type A |

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| Random Misfire<br><br>Cylinder 1 Misfire<br>Cylinder 2 Misfire<br>Cylinder 3 Misfire<br>Cylinder 4 Misfire | P0300<br><br>P0301<br>P0302<br>P0303<br>P0304 | These DTC s will determine if a random misfire or a cylinder specific misfire is occurring by monitoring crankshaft velocity. | Deceleration index<br>Vs<br>Engine Speed<br>Vs<br>Load and Camshaft Position<br><br>Emission Failure Threshold = 1%<br><br>Catalyst Damage Threshold = 1.5% through 22.5% depending on engine speed and engine load. | Engine run time > 1 engine cycle<br>437.5 RPM < Engine speed < 6406 RPM<br>-7°C < ECT < 123 C<br>If startup ECT < -7°C, then disable until ECT > 21°C.<br>Fuel level > 10%.<br>System voltage > 9 V.<br>Fuel cutoff not active<br>Power management is not active<br>Brake torque management not active<br>No rough road<br>No TCS active<br>Positive or zero torque<br>Camshaft sensor is in sync with crank sensor<br><br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 171, 172, 220, 326, 327, 336, 502, 506, 507, 601, 602, 604, 606, 641, 651, 700, 701, 1133, 1134, 315, 1516, 2101, 2120, 2125,2135, 2138, 2176, MC101, 62F, 60D, 60E<br><br>The following are not currently utilized (N/A):<br>Power Take Off is disabled –N/A.<br>EGR Intrusive test not active – N/A.<br>AIR Intrusive test not active – N/A<br>Automatic transmission is not shifting – N/A.<br>Misfire Diag is not requesting to disable TCC when transmission is in hot mode – 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.<br><br>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.<br><br>Continuous check. | DTC Type B Emission<br><br>DTC Type A Catalyst Damage |
| Crankshaft Position System Variation Not Learned (CASE) | P0315 | Determines if the Crankshaft Position System Variation has not been learned. | Sum of compensation factors between 65404 and 65667 | Manufacturers Enable Counter must be zero.<br>None of the following DTCs set:<br>336, 340, 341. | 0.5 Sec<br><br>Once per ignition cycle. | DTC Type A |
| Esc System Diagnostic | P0326 | Detects a ESC System fault | Instantaneous signal < 0.01 V<br>Or<br>Instantaneous signal > 4.99 V | 1800 RPM < Engine speed < 6400 RPM<br>ECT > 70°C<br>MAP > 34.8 kPa<br>Engine run time > 20 sec<br>0 kPa < Vacuum < 40 kPa<br>None of the following DTCs set:<br>117, 118, 122, 123, 327 | 60/80 counts<br><br>Continuous check | DTC Type B |
| Esc Sensor 1 | P0327 | Detects a and disconnected or faulty sensor | Max voltage – Min voltage < 0.0586 V | 1800 RPM < Engine speed < 6400 RPM<br>ECT > 70°C<br>MAP > 34.8 kPa<br>Engine run time > 20 sec<br>0 kPa < Vacuum < 40 kPa<br>None of the following DTCs set:<br>117, 118, 122, 123 | 60/80 counts<br><br>Continuous check | DTC Type B |
| Crank Sensor Position | P0336 | Detects too many resyncs in the crank sensor circuit | Resync Counter > 15 Counts | Engine running | 125 ms / Count<br>256 Seconds<br><br>Continuous check | DTC Type B |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME REQUIRED AND FREQUENCY | MIL ILLUM. TYPE |
|---|---|---|---|---|---|---|
| Cam Sensor 1 Missing | P0340 | Detects an open / missing Cam sensor signal | No change in cam activity> 70 cycles<br>As compared to crankshaft events | Engine running | 125 ms / Count<br>70 cycles<br><br>Continuous 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 / Count<br>256 Seconds<br><br>Continuous Check | DTC Type B |
| Catalyst Monitor | P0420 | Detects a catalytic converter with unacceptable amounts of oxygen storage capabilities | Oxygen Storage Capability (OSC) Time Difference > 0.103sec<br><br>OSC Time Difference = OSC Worst Pass Thresh - OSC Compensation Factor * (O2S 2 Response Time - O2S 1 Response Time)<br><br>OSC Worst Pass Thresh = 1.4 sec | Engine speed ≥1000 RPM for minimum of 48 sec since end of last idle period<br>Engine run time > 530 sec<br>VSS < 3 MPH<br>465°C < Predicted catalyst temp < 675°C<br>BARO ≥ 73.8 kPa<br>-20.5°C < IAT < 80°C<br>69.5°C < ECT < 125°C<br>System voltage > 11 V<br>Idle time ≤ 47 sec<br>Flow < 10 grams/second<br>Δ IAC < 35 counts<br>Δ Engine speed < 80 RPM<br>-225 RPM ≤ (Engine speed–Desired speed) ≤ 225 RPM<br>Purge duty cycle < 97% PWM<br>Purge learn multiplier > 70% (180 counts)<br>Short term FT deviation < 27% (35 counts)<br>-23% < Short term FT average < +16%<br>Test attempted this trip ≤ 12<br>Closed loop<br>Fan clutch is stable<br>Rapid Step Response Enable Criteria<br>OSC Time Difference Step > .335 sec<br>OSC Time Difference ≥ 0.00 sec<br><br>None of the following DTCs set:<br>68, U101, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, , 137, 138, 140, 141, 171, 172, 201, 202, 203, 204, , 220, 300, 326, 327, 336, 340, 341, 442, 446, 452, 453, 455, 496, 502, 506, 507, 601, 602, 604, 606, 641, 651,700, 701, 1133, 1134, 1137, 1138, 1516, 2101, 2120, 2125, 2135, 2138, 2176, 060D, 060E, 062F | Maximum 1 test attempt per idle period<br><br>Minimum of 1 test per trip<br><br>Maximum of 6 tests per trip<br><br>Maximum of 6 trips to detect failure when Rapid Step Response is enabled<br><br>15.6 Msec/Count | DTC Type A<br><br>EWMA |

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|---|---|---|---|---|---|---|
| Evap System Small Leak Detected | P0442 | Checks for a small leak in the fuel vapor handling system | EWMA value > 19.53 (unit less index) | BARO > 74 kPa<br>4°C < Startup ECT < 30°C<br>4°C < Startup IAT < 30°C<br>Startup ECT – Startup IAT < 8°C<br>15% < Fuel level < 85%<br>7% < TP < 35%<br>VSS < 85 MPH<br>11 V < System voltage < 18 V<br>Purge enabled<br>Δ Vacuum slosh < 0.112 – 0.932 inches of $H_2O$<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 220, 452, 453, 502, 601, 602, 604, 606, 641, 1133, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | Test must complete within cold test time limit = 330 sec<br><br>Individual test time = 15 sec<br><br>Once per trip<br><br>EWMA ARL = 9 | DTC Type A<br><br>(Behaves as Type B) |
| Evap Canister Vent Blocked | P0446 | Checks for excessively high vacuum in the vapor handling system | Fuel tank vacuum < 12 inches of $H_2O$ when the integrated vacuum timer reaches 5 integral seconds<br><br>8 sec < Canister vent test timer < 100 sec | BARO > 74 kPa<br>4°C < Startup ECT < 30°C<br>4°C < Startup IAT < 30°C<br>Startup ECT – Startup IAT < 8°C<br>15% < Fuel level < 85%<br>7% < TP < 35%<br>VSS < 85 MPH<br>11 V < System voltage < 18 V<br>Purge enabled<br>Δ Vacuum slosh < 0.112 – 0.932 inches of $H_2O$<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 220, 452, 453, 502,601, 602, 604, 606, 641, 1133, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 100 sec<br><br>Once per trip | DTC Type A<br><br>(Behaves as Type B) |
| Evap Tank Vacuum Sensor Low | P0452 | Detects a continuous short to ground or a disconnected tank vacuum sensor | Tank vacuum transducer < 0.1 V | Engine running | 25 sec<br><br>Continuous check | DTC Type B |
| 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<br><br>Continuous check | DTC Type B |
| Evap System Large Leak Detected | P0455 | Checks for adequate vacuum being held in the fuel tank when applied | Fuel tank vacuum < 10 inches of $H_2O$ when the integrated vacuum timer reaches 30 integral seconds | BARO > 74 kPa<br>4°C < Startup ECT < 30°C<br>4°C < Startup IAT < 30°C<br>Startup ECT – Startup IAT < 8°C<br>15% < Fuel level < 85%<br>7% < TP < 35%<br>VSS < 85 MPH<br>11 V < System voltage < 18 V<br>Purge enabled<br>Δ Vacuum slosh < 0.112 – 0.932 inches of $H_2O$<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 220, 452, 453, 502, 601, 602, 604, 606, 641, 1133, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | Max total run time = 330 sec from purge enable<br><br>Once per trip | DTC Type A<br><br>(Behaves as Type B) |

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|---|---|---|---|---|---|---|
| Fuel Level Sensor Circuit Performance | P0461 | Fuel sender rationality check | Fuel level delta <1.5% after 120 miles | 11 V< System voltage < 18 V | Continuous check | DTC Type C |
| Fuel Level Sensor Circuit Low Input | P0462 | Detects a fuel sender failed to a low voltage level | Output voltage amplitude < 0.2V | 11 V< System voltage < 18 V | 30 secs<br>12.5 msec loop<br><br>Continuous check | DTC Type C |
| Fuel Level Sensor Circuit High Input | P0463 | Detects a fuel sender failed to a high voltage level | Output voltage amplitude >4.9 V | 11 V< System voltage < 18 V | 30 secs<br>12.5 msec loop<br><br>Continuous check | DTC Type C |
| Low Speed Fan Fault | P0480 | Checks commanded fan state against output to fan relay | Battery voltage > 9.5 V | | 50/100 Cts<br><br>Continuous check | DTC Type B |
| High Speed Fan Fault | P0481 | Checks commanded fan state against output to fan relay | Battery voltage > 9.5 V | | 50/100 Cts<br><br>Continuous check | |
| Evap Purge Valve Leaking | P0496 | Checks for a stuck open purge solenoid | Fuel tank vacuum > 7 inches of $H_2O$ when the integrated vacuum timer reaches 8 integral seconds<br><br>10 sec < Purge solenoid leak timer < 120 sec | BARO > 74 kPa<br>4°C < Startup ECT < 30°C<br>4°C < Startup IAT < 30°C<br>Startup ECT – Startup IAT < 8°C<br>15% < Fuel level < 85%<br>7% < TP < 35%<br>VSS < 85 MPH<br>11 V < System voltage < 18 V<br>1st failure: Purge enabled<br>2nd failure: Purge does not need to be enabled<br>Δ Vacuum slosh < 0.112 – 0.932 inches of $H_2O$<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 122, 123, 125, 128, 130, 131, 132, 133, 134, 135, 220, 452, 453, 502, 601, 602, 604, 606, 641, 1133, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | Max run time = 120 sec<br><br>Once per trip | DTC Type A<br><br>(Behaves as Type B) |
| ECM – Vehicle Speed Performance | P0502 | Detect an error in the Vehicle Speed Signal – Manual Transmission Application | Vehicle Speed < 2 mph | 1700 > RPM > 3600<br>1.95% < TPS < 23%<br>80 kPa < Manifold Vacuum < 60 kPA<br>Throttle area due to pedal rotation < 1.2% | 6 seconds | DTC Type B (Manual) |
| Idle Control System – RPM Lower Than Expected | P0506 | Detect an idle speed which is less than a delta from desired speed | Idle speed > 75 RPM below desired speed | Engine run time > 2 sec<br>BARO > 75 kPa<br>ECT > -40°C<br>Commanded IAC position > 400 Steps<br>Idle stabilized for 5 sec<br>System voltage > 11 V<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 130, 171, 172, 201-204, 220, 222, 223, 300, 336, 442, 446, 452, 453, 455, 496, 502, 606, 641, 651, 1516, 2101, 2176 | 18.75 sec<br><br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| Idle Control System – RPM Higher Than Expected | P0507 | Detect an idle speed which is greater than a delta from desired speed | Idle speed > 150 RPM above desired speed | Engine run time > 2 sec<br>BARO > 75 kPa<br>ECT > -40°C<br>Commanded IAC position < 2 steps<br>Idle stabilized for 5 sec<br>System voltage > 11 V<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 130, 171, 172, 201-204, 220, 222, 223, 300, 336, 442, 446, 452, 453, 455, 496, 502, 606, 641, 651, 1516, 2101, 2176 | 15 sec<br><br>Continuous check | DTC Type A |
| PCM Has Eeprom Flash Error | P0601 | Checks for an incorrect checksum or Program ID failure | Checksum detection incorrect | Ignition in unlock/accessory, run, or crank.<br>System voltage > 5.23 V | 3 counts continuous<br><br>Continuous check | DTC Type A |
| PCM Eeprom Not Programmed | P0602 | Checks for a PCM that is not programmed | Unprogrammed EEPROM | Ignition in unlock/accessory, run, or crank.<br>System voltage > 5.23 V | Immediately<br><br>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.<br>System voltage > 5.23 V | One occurrence<br><br>Check is performed at powerup and every 60 seconds thereafter | DTC Type A |
| PCM - Processor Performance Check | P0606 | Indicates that the PCM has detected an ETC internal processor integrity fault | Any of the following:<br><br>1. Motor processor desired throttle limiting occurring,<br>2. ETC software is not executed in proper order,<br>3. Software tasks loops exceed schedule tasks loop,<br>4. Loss of serial peripheral interface communication from the motor processor,<br>5. 1.45 msec < Average motor processor state of health toggle < 2.42 msec,<br>6. TPS or APPS minimum learned values fail compliment check,<br>7. TPS or APPS minimum learned values fail range check,<br>8. Main processor integrity check error occurs,<br>9. Motor processor integrity check error occurs,<br>10. Motor processor integrity check error of main processor occurs | Ignition in unlock/accessory, run, or crank.<br>System voltage > 5.23 V | 1. 99 counts continuous, 2 msec/count in the motor processor,<br>2. 1 count continuous, 15.6 msec/count in the main processor<br>3. Error > 3 counts per software tasks loops<br>4. 101/254 counts or 24 counts continuous or 37 counts continuous at initialization, 7.8 msec/count in main processor<br>5. 3 counts continuous, 62.5 msec/count<br>6. 13 counts continuous, 15.6 msec/count in main processor<br>7. 13 counts continuous;15.6 msec/count in main processor<br>8. 2 count continuous, check is performed at powerup and every 60 seconds thereafter<br>9. 2 count continuous.;15.6 msec/count in main processor<br>10. 1 count continuous, 15.6 msec/count in motor processor | DTC Type A |

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|---|---|---|---|---|---|---|
| PCM – Apps Performance Check | P060D | Any of the following:<br>1. Verify the PCM's ability to detect a short between the APPS1 and 2 circuits<br>2. Verify that the indicated accelerator pedal position calculation is correct | 1. APPS2 > 1.75 V<br>2. \| Main processor indicated APP – motor processor indicated APP \| > 0.142 V | System voltage > 5.23 V<br>No PCM processor DTCs<br>1. Ignition in unlock/accessory and run<br>Not during TPS minimum learn active<br>During intrusive portion of diagnostic execution<br>2. Ignition in unlock, accessory, run, or crank | 1. 2 counts, 154 msec/count, immediate retest on an error performed in main processor<br>2. 25 counts continuous, 15.6 msec/count in motor processor | DTC Type A |
| PCM - TPS Performance Check | P060E | Any of the following:<br>1. Verify the PCM's ability to detect a short between the TPS1 and TPS2 circuits<br>2. Verify that the throttle control system position sensor short diagnostic is functioning | 1. TPS2 > 1.75 V<br>2. No detection of the sensor short diagnostic active state | System voltage > 5.23 V<br>No PCM processor DTCs<br>Ignition in unlock/accessory and run<br>Not during TPS minimum learn active<br>During intrusive portion of diagnostic execution | 1. 2 counts, 154 msec/count, immediate retest on an error performed in main processor<br>2. No sensor short diagnostic activity for 500 msec detected by motor processor | DTC Type A |
| PCM - Eeprom General Failure | P062F | Checks for a write error | Incorrect checksum | Ignition in unlock/accessory, run, or crank.<br>System voltage > 5.23 V | Immediately on next key up if flagged on previous key down<br><br>Once at key down | DTC Type A |
| PCM – V5b1 Circuit | P0641 | 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<br>System voltage > 5.23 V<br>No PCM processor DTC | 1. 16/32 counts or 11 counts continuous, 15.6 msec/count in main processor<br>2. 125/250 counts or 99 counts continuous, 2 msec/count in motor processor | DTC Type A |
| PCM – V5b2 Circuit | P0651 | 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<br>System voltage > 5.23 V<br>No PCM processor DTC | 1. 16/32 counts or 11 counts continuous, 15.6 msec/count in main processor<br>2. 125/250 counts or 99 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Transmission MIL Request Circuit | P0700 | Detect the presence of a transmission fault that is stored in the TCM | 1) Transmission fault active in TCM | | Continuous check | DTC Type A |
| ECM - Transmission System Range / Performance | P0701 | Detect an error in the Transmission Control Module Serial Data to the ECM | 2) Loss of Communication from the TCM<br>OR,<br>3) Invalid serial data from the TCM<br>OR,<br>4) Loss of the State of Health Message form the TCM<br>OR,<br>5) Active Vehicle Speed Malf in the TCM<br>OR,<br>6) Other Active Malf in the TCM that requires ECM intervention | 1&2) Ignition in Unlock/Accessory, Run, or Crank.<br>Engine Run Time > 1 second<br>Ignition voltage > 9 V<br>3) Ignition voltage > 9 V<br>Ignition On Time > 3 seconds<br>4&5) Ignition in Unlock/Accessory, Run, or Crank<br>Valid TCM Message | 1&2) 1 second continuous<br>4&5) 3/10 Cnts<br>1 Cnt / message<br>4&5) 1Cnt<br>1 Cnt / message | 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<br><br>Slope-time method (for calculation of avg response times)<br>L/R < 2 counts<br>R/L < 2 counts<br><br>Half-cycle method (for checking initial response to fuel change)<br>L/R < 40<br>R/L < 40 | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>No intrusive CATMON test active<br>Engine run time > 170 sec<br>5% < TP < 60%<br>1000 RPM < engine speed < 3500 RPM<br>Delta TP < 18.75% per sec<br>Airflow > 25 grams/second<br>Closed Loop/Stoich<br>Time in enable > 1.7 sec<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 60 sec<br><br>Once per trip | DTC Type B |
| O2s 1 Switching Ratio | P1134 | Determines if the O2S1 is functioning properly by check the average switch time ratio R-L/L-R | O2S1 Switch Ratio<br>0 < ratio < 16 | Engine run time > 200 sec<br>Percent throttle rotation between 5% & 40%<br>RPM between 1000 & 3500<br>Q113CNT > 20<br>Delta TPS < 800 % per sec<br>Evap > 35.5% PWM<br>ECT > 69.5°C<br>PLM > 0<br>Fuel > 9.9%<br>Engine operating in Closed Loop<br>Time in enable > 0.75 sec<br>None of the following DTC's set:<br>107, 108, 112, 113, 117, 118, 122, 123, 125, 201, 202, 203, 204, 336, 455, 496, 442, 446, 452, 453, 506, 507, 601, 602, 062F | 60 sec<br><br>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<br>O2S 2 < 400 | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Vehicle operating in PE<br>Safety fuel cut-off not active<br>Closed Loop<br>Sensor predicted warm (O2 rear sensor warm flag set)<br>Above conditions met for 5 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 76/80 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| 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 > 647 | ECT > 69.5°C<br>Fuel level > 9.8%<br>System voltage > 11 V<br>Engine run time > 10 sec<br>No intrusive CATMON test active<br>Vehicle operating in DFCO or FCO<br>Closed Loop<br>Sensor predicted warm (O2 rear sensor warm flag set)<br>Above conditions met for 7 seconds<br>None of the following DTCs set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 201-204, 220, 315, 336, 442, 446, 452, 453, 455, 483, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | 76/80 counts<br>8 counts/sec<br><br>Continuous check | DTC Type B |
| PCM (Mcp) - Desired Tp To Tp Sensor Performance | P1516 | Any of the following:<br><br>1. Detect a throttle positioning error<br>2. Detect excessive current draw on the Actuator Circuit<br>3. Determine if the Actuator has been miswired | 1. \|TP Error\| >=2 % with no change in error sign, after > 5 sec stable command<br>2. \|TP Error\| >=2 % for a throttle command step change >= \|2 %\|<br>3. \|TP Error\| >=+7% or <= -10% for a throttle command step change >= \|5%\|<br>4. \|TP Error\| >=+7% or <= -10% for throttle command change >= \|10 %\|<br>5. Actuator current > 9 amps<br>6. TPS1 < 3.6 V | 1. Ignition in run or crank<br>Engine speed >0 RPM or engine speed = 0 RPM and not in battery saver mode<br>Engine running or system voltage > 8.0 V<br>No airflow actuation DTCs<br>No throttle actuation DTCs<br>2. Same as 1<br>3. Same as 1<br>4. Same as 1<br>5. Same as 1<br>6. Minimum TPS learn active state | 1. 249 counts continuous, 2 msec/count in motor processor<br>2. 249 counts continuous, 2 msec/count in motor processor<br>3. 99 counts continuous, 2 msec/count in motor processor<br>4. 149 counts continuous, 2 msec/count in motor processor<br>5. 49 counts continuous, 2 msec/count in motor processor<br>6. 99 count continuous, 2 msec/count in motor processor | DTC Type A |
| Output Driver 1 Fault | P1640 | Detects if an output driver is shorted high or if an overtemp/overvoltage condition exists | Battery voltage > 11.0 V<br>Low Oil/Hotlight timer is > 5 secs<br>Open, short, overtemp/overvoltage condition detected | Accessory must be in correct commanded state | 9/10 Cts.<br>15.6 mSec/ct.<br>Continuous check | DTC Type B |
| Output Driver 2 Fault | P1650 | Detects if an output driver is shorted high or if an overtemp/overvoltage condition exists | Battery voltage > 11.0 V<br>Low Oil/Hotlight timer is > 5 secs<br>Open, short, overtemp/overvoltage condition detected | Accessory must be in correct commanded state | 9/10 Cts.<br>15.6 mSec/ct.<br>Continuous check | DTC Type B |
| Output Driver 4 Fault | P1670 | Detects if an output driver is shorted high or if an overtemp/overvoltage condition exists | Battery voltage > 11.0 V<br>Low Oil/Hotlight timer is > 5 secs<br>Open, short, overtemp/overvoltage condition detected | Accessory must be in correct commanded state | 9/10 Cts.<br>15.6 mSec/ct.<br>Continuous check | DTC Type B |

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|---|---|---|---|---|---|---|
| PCM (Main Processor) – TP Model To TPS Performance | P2101 | Any of the following:<br>1. Detect a throttle positioning error<br>2. Detect a short on the actuator circuit<br>3. Determine if the actuator has been miswired | 1. \|TP error\| > 6.5 %, [Throttle error = measured throttle position - modeled throttle position]<br>2. ETC ignition > 4 V during powerdown sequence check<br>3. TPS1 < 3.2 V | 1. Ignition in run or crank<br>Engine speed > 0 RPM or engine speed = 0 RPM and not in battery saver mode<br>Engine Running or system voltage > 8 V<br>No airflow actuation DTCs<br>No throttle actuation DTCs<br>2. Powerdown state (Ignition voltage = 0 V)<br>3. Minimum TPS learn active state | 1. Positive error counter: increments by 3 when TP error > 6.5%, decrements by 2 when 0% < TP error <6.5%, decrements by 5 when -6.5% <TP error< 0%, clears if TP error< -6.5%<br><br>Negative error counter: increments by 3 when TP error < -6.5%, decrements by 2 when -6.5% < TP error < 0%, decrements by 5 when 0% < TP error < 6.5%, clears if TP error > 6.5%<br><br>Thresholds are 39<br>Check runs every 15.6 msec main processor.<br>2. 1 count check at key on<br>3. 11 count continuous, 15.6 msec/count in main processor | DTC Type A |
| Apps 1 Circuit | P2120 | Detect a continuous or intermittent short or open in the APPS1 | 0.800V < APPS1< 4.700 V. | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0651<br>None of the following DTCs set:<br>2122, 2123 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Apps 1 Voltage Low | P2122 | Detects if APPS1 is out of range low | APPS1 < 0.800 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0651 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Apps 1 Voltage High | P2123 | Detects if APPS1 is out of range high | APPS1 > 4.700 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0651 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Apps 2 Circuit | P2125 | Detect a continuous or intermittent short or open in the APPS2 | 2.6500 V < APPS2 < 4.6875 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0641<br>None of the following DTCs set:<br>2127, 2128 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |
| Apps 2 Voltage Low | P2127 | Detects if APPS2 is out of range low | APPS2 < 2.6500 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0641 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |

## 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 REQUIRED AND FREQUENCY | MIL ILLUM. TYPE |
|---|---|---|---|---|---|---|
| Apps 2 Voltage High | P2128 | Detects if APPS2 is out of range high | APPS2 > 4.6875 V | Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>No Vref DTC – P0641 | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>2. 93/210 counts or 70 counts continuous, 2 msec/count in motor processor | DTC Type A |
| TPS 1/2 Performance | P2135 | Any of the following:<br>1. Detect a continuous or intermittent correlation fault between TPS1 and TPS2<br>2. Detect an invalid minimum mechanical position correlation between TPS1 and TPS2<br>3. Detect a short between the TPS1 and TPS2 circuits | 1. \|(Raw minimum learned TPS1 voltage - raw TPS1 voltage) – (raw TPS2 voltage – raw minimum learned TPS2 voltage)\| > 0.250 V at minimum throttle position with an increasing value to 0.500V at the maximum throttle position.<br>2. \|5 V – raw learned minimum TPS2 voltage - raw learned minimum TPS1 voltage\| > 0.25 V<br>3. Δ TPS1 < 1 V | 1. Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>None of the following DTCs set:<br>0120, 0122, 0123,0220, 0222, 0223, 0641, 0651<br>2. Same as 1<br>3. Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>93/210 counts or 70 counts continuous, 2 msec/count in motor processor<br>2. Same as 1<br>3. 2 counts 154 msec/count, immediate retest on an error performed in main processor | DTC Type A |
| Apps 1/2 Performance | P2138 | Any of the following:<br>1. Detect a continuous or intermittent correlation fault between APPS1 and APPS2<br>2. Detect an invalid minimum mechanical position correlation between APPS1 and APPS2<br>3. Detect a short between the APPS1 and APPS2 circuits | 1. \|(Raw minimum learned APPS2 voltage - raw APPS2 voltage) – (raw APPS1 voltage – raw minimum learned APPS1 voltage)\| > 0.325 V at minimum accelerator position with an increasing value to 0.500 V at the maximum accelerator position.<br>2. \|5 V – raw learned minimum APPS2 voltage - raw learned minimum APPS1 voltage\| > 0.25 V<br>3. Δ APPS1 < 1 V | 1. Ignition in unlock/accessory, run, or crank<br>System voltage > 5.23 V<br>No PCM processor DTCs<br>None of the following DTCs set:<br>2120, 2122, 2123,2125, 2127, 2128, 0641, 0651<br>2. Same as 1<br>3. Ignition in unlock/accessory, run, or crank.<br>System voltage > 5.23 V<br>No PCM processor DTCs | 1. 12/27 counts or 9 counts continuous, 15.6 msec/count in main processor<br>93/210 counts or 70 counts continuous, 2 msec/count in motor processor<br>2. Same as 1<br>3. 2 counts, 154 msec/count, immediate retest on an error performed in main processor | DTC Type A |
| TPS Minimum Learning | P2176 | Throttle position minimum learning not completed | TPS > 0.92 V | Minimum TPS learn active state<br>Stable throttle position reading for 40msec<br>Ignition in run or crank<br>None of the following DTCs set:<br>120, 122, 123, 220, 222 223 | 1.5 seconds | DTC Type A |

## 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 REQUIRED AND FREQUENCY | MIL ILLUM. TYPE |
|---|---|---|---|---|---|---|
| O2s 2 Post Oxygen Sensor Diagnostic (Posd) | P2A01 | Detects Post O2 sensor that has insufficient range to detect degraded catalyst or to provide closed loop fuel correction | 300 mV < O2S2 < 750 mV<br><br>Pre-catalyst sensor voltage must have been above 600 mV for post sensor to fail stage 2 rich test and below 300 mV for post sensor to fail stage 2 lean test | Stage 1 (Passive portion):<br>Engine run time > 2 sec<br><br>Stage 2 (Intrusive portion):<br>Stage 1 enabled time > 720 sec<br>Stage 1 not passed<br>System voltage > 11 V<br>15 grams/second <MAF < 100 grams/second<br>-20% < Short term FT < +20%<br>No short term FT resets during intrusive test<br>1000 RPM < Engine speed < 5000 RPM<br>20 MPH < Vehicle speed < 80 MPH<br>Above conditions must be met for 1 sec<br>The following DTCs not set:<br>68, 106, 107, 108, 112, 113, 117, 118, 120, 122, 123, 125, 128, 130, 131, 132, 137, 138, 140, 141, 171, 172, 201-204, 220, 315, 366, 442, 446, 452, 453, 455, 496, 506, 507, 601, 602, 604, 606, 641, 651, 1516, 062F, 060D, 060E, 2101, 2120, 2125, 2135, 2138, 2176 | Stage 1 (Passive portion):<br>Once per trip<br><br>Stage 2 (Intrusive portion):<br>Lean test - 10 sec<br>Rich test - 10 sec<br><br>Once per trip | DTC Type B |
| CAN Number Of Controllers | U0002 | Checks ECM ability to communicate | Fails if no messages for > 250msec | Ignition on > 3 sec<br>Ignition voltage > 9 volts | Continuous check | DTC Type B |
| Can Bus Reset | U0073 | Detects hardware bus resets | Fails if reset count > 64 | Ignition on > 3 sec<br>Ignition voltage > 9 volts | Continuous check | DTC Type B |
| Can Bus Error TCM | U0101 | Detects no message from TCM | Fails if no message from TCM for > 250msec | Ignition on > 3 sec<br>Ignition voltage > 9 volts | Continuous check | DTC Type A |
| Can Bus Error BCM | U0140 | Detects no message from BCM | Fails if no message from BCM for > 250msec | Ignition on > 3 sec<br>Ignition voltage > 9 volts | Continuous check | DTC Type B |