

1998 5.7L (LS1) Y-car Corvette 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
MASS AIR FLOW SYSTEM PERFORMANCE (RATIONALITY)	P0101	Rationality Under conditions when the two should match, the Mass Air Flow reading should match calculated Mass Air Flow (based on speed density). If delta Mass Air Flow is too large, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency > 50% different from speed density calculation.	No MAF, MAP or TPS DTC's System Voltage > = 10 volts System Voltage < = 16 volts TP < 50% when engine vacuum > 65 kpa Delta TP over 100 msec < 3% All above condition's are stable for 2 seconds.	50 test failures in a 100 test sample 100 ms/test Continuous.	B
MASS AIR FLOW SENSOR CIRCUIT LOW FREQUENCY	P0102	Circuit Continuity Detects Mass Air Flow frequency readings outside normal operating range. If the frequency is outside a calibrated range, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency < 10 Hz	Engine Speed > = 300 RPM System Voltage > = 8 volts Above conditions met for >= 0 seconds.	4 test failures in a 12 test sample. Reference interrupt loop Continuous.	A
MASS AIR FLOW SENSOR CIRCUIT HIGH FREQUENCY	P0103	Circuit Continuity Detects Mass Air Flow frequency readings outside normal operating range. If the frequency is outside a calibrated range, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency > 11,250 Hz	Engine Speed > = 300 RPM System Voltage > = 8 volts Above conditions met for >= 0 seconds.	6 test failures in a 12 test sample. Reference interrupt loop Continuous.	A
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW	P0107	Circuit Continuity This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < 0.10 Volts	No TP sensor DTC's set Engine Running Throttle Position is <= 0% when engine speed is <= 1200 RPM or Throttle Position is <= 20 % when engine speed is > 1200 RPM	150 test failures in a 300 test sample. 12.5 ms/test (Every MAP read) Continuous	A
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH	P0108	Circuit Continuity This DTC detects a continuous short to high in either the signal circuit or the MAP sensor.	Raw MAP > 4.3 Volts	No TP sensor DTC's set Engine Running Throttle Position is < 5 % when engine speed is <= 1000 RPM or Throttle Position is < 18 % when engine speed is > 1000 RPM	250 test failures in a 300 test sample. 12.5 ms/test (Every MAP read) Continuous	A

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INTAKE AIR TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0112	Circuit Continuity This DTC detects a continuous short to ground in the IAT signal circuit or the IAT sensor	<u>Low, High Resistance Pull-up</u> Raw IAT < 0..24 Volts	No MAF sensor DTC's set No ECT sensor DTC's set No VS sensor DTC's set Vehicle Speed >= 25 mph Engine Run Time > 30 seconds	45 test failures in a 50 test sample 100 ms/test Continuous	B
INTAKE AIR TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0113	Circuit Continuity This DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	<u>Low, High Resistance Pull-up</u> Raw IAT > 4.96 Volts	No MAF sensor DTC's set No ECT sensor DTC's set No VS sensor DTC's set Coolant Temperature > 0 deg. C Air Flow < 15 g/sec Vehicle Speed < 7 mph	45 test failures in a 50 test sample. 100 ms/test Continuous	B
ENGINE COOLANT TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0117	Circuit Continuity This DTC detects a continuous short to ground in the ECT signal circuit or the ECT sensor.	<u>Low Resistance Pull-up</u> Raw ECT < 1.12 Volts <u>High Resistance Pull-up</u> Raw ECT < 0.039 Volts	Engine run time > 10 seconds	100 test failures in a 200 test sample. 100 ms/test Continuous	A
ENGINE COOLANT TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0118	Circuit Continuity This DTC detects a continuous short to high or open in the ECT signal circuit or the ECT sensor.	<u>Low, High Resistance Pull-up</u> Raw ECT > 4.9 Volts	Engine run time > 60 seconds	100 test failures in a 200 test sample. 100 ms/test Continuous	A
ENGINE COOLANT TEMP EXCESSIVE TIME TO CLOSED LOOP	P0125	Rationality This DTC detects if a stabilized minimum closed loop is reached and maintained after engine startup.	Minimum stabilized ECT >33.6 deg C	Engine running -36 deg. C > = Start up ECT < 40 deg. C (test must run once for a hot start) No ECT, IAT DTC's set IAT >= -7 deg. C VS >= 1 mph 2300g/s > accum air > 20250g/s 140 sec < Closed Loop timer < 1350 secs (depends on start-up temp)	2 consecutive test failures Every 100 ms	B

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(B1S1) HEATED OXYGEN SENSOR CIRCUIT LOW	P0131	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage below 200 mv <OR> Oxygen sensor voltage below 360 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Power Enrichment active .5 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	A
(B1S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0132	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 775 mv <OR> Oxygen sensor voltage above 540 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Decel Fuel Cut Off active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	A
(B1S1) HEATED OXYGEN SENSOR CIRCUIT SLOW RESPONSE	P0133	Response Detects slow rich to lean and lean to rich HO2S signal transition rates.	The oxygen sensor transitions between rich and lean states. HO2S sensor average transition time: L/R > 100 ms R/L > 100 ms	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B

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(B1S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0138	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 930 mv <OR> Oxygen sensor voltage above 480 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Decel Fuel Cut Off active 3 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	380 test failures in a 400 test sample and polling the front HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	B
(B1S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0140	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 409-489 mv. (1450 out of 1500 samples).	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	1450 test failures in a 1500 test sample 100 ms/test Continuous	B
(B1S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0141	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B

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(B2S1) HEATED OXYGEN SENSOR CIRCUIT LOW	P0151	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage below 200 mv <OR> Oxygen sensor voltage below 360 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Power Enrichment active .5 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	A
(B2S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0152	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 775 mv <OR> Oxygen sensor voltage above 540 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Decel Fuel Cut Off active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	A
(B2S1) HEATED OXYGEN SENSOR CIRCUIT SLOW RESPONSE	P0153	Response Detects slow rich to lean and lean to rich HO2S signal transition rates.	The oxygen sensor transitions between rich and lean states. HO2S sensor average transition time: L/R > 100 ms R/L > 100 ms	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B

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(B2S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0158	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 930 mv <OR> Oxygen sensor voltage above 480 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Decel Fuel Cut Off active 3 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	380 test failures in a 400 test sample and polling the front HO2S sensor twice. 100 ms/test Continuous 45 test failures in a 50 test sample 100 ms/test Continuous	B
(B2S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0160	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 409-489 mv.	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	1450 test failures in a 1500 test sample 100 ms/test Continuous	B
(B2S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0161	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B

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BANK 1 FUEL TRIM SYSTEM LEAN	P0171	Determines if the fuel control system is in a lean condition	The normalized weighted long term fuel trim parameter > +24%	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Fuel Level > 10%	6 seconds Continuous	B
BANK 1 FUEL TRIM SYSTEM RICH	P0172	Determines if the fuel control system is in a rich condition	The normalized weighted long term fuel trim parameter < -13% and no excessive purge vapors present	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Excess Purge Test: 30 g/s > MAF > 10 g/s Purge Duty Cycle > 12% RPM > 800	40 seconds Continuous	B
BANK 2 FUEL TRIM SYSTEM LEAN	P0174	Determines if the fuel control system is in a lean condition	The normalized weighted long term fuel trim parameter > +24%	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Fuel Level > 10%	6 seconds Continuous	B

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BANK 2 FUEL TRIM SYSTEM RICH	P0175	Determines if the fuel control system is in a rich condition	The normalized weighted long term fuel trim parameter < -13% and no excessive purge vapors present	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Excess Purge Test: 30 g/s > MAF > 10 g/s Purge Duty Cycle > 12% RPM > 800	40 seconds Continuous	B
FUEL PUMP CONTROL CIRCUIT	P0230	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	A
ENGINE MISFIRE DETECTED	P0300	These DTC's will determine if a multiple or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index vs Engine speed vs Load with Engine position FTP Threshold - 1.5% I/M Threshold - 1.5% Catalyst Damage - 3.1% to 11.9% Fuel level > 10% (Does not disable if a Fuel System DTC is active.)	No MAF DTC's No Cam Position Sensor DTC's No Crank Position Sensor DTC's No Vehicle Speed Sensor DTC's No Engine Coolant Sensor DTC's No Throttle Position Sensor DTC's No Camel Mode DTC's Engine speed > 450 RPM but < 3001 RPM System voltage > 11 volts but < 16 volts + Throttle position D < 2.0% / 100 ms - Throttle position D < 1.0% / 100 ms Engine run time > 20 revs ECT > -7C but < 130C Not a Rough Road - ABS	Emission Level: 10 failed 200 revolution blocks out of 16 Catalyst Damaging Level: 4 failed 200 revolution blocks out of 16 Continuous	B Catalyst Damaging (Flashes)
KNOCK SENSOR MODULE CIRCUIT	P0325	Check knock detector integrated circuit.	Delta filtered noise level greater than a defined value or instantaneous knock signal greater than a defined value for a defined time.	To run delta noise test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.5% Engine run time > 20 sec MAP < 60 kPa. To run instantaneous knock signal test: MAP > 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B

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KNOCK SENSOR 1 CIRCUIT LOW	P0327	Check knock sensor filtered noise level - front knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20 or > 254	To run test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.05% Engine run time > 20 sec MAP < 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B
KNOCK SENSOR 2 CIRCUIT LOW	P0332	Check knock sensor filtered noise level - rear knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20 or > 254	To run test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.5% Engine run time > 20 sec MAP < 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B
CRANKSHAFT POSITION SENSOR CIRCUIT	P0335	24X signal This diagnostic will detect if there is no output from the crankshaft position sensor.	No output (~0 volts) from the crankshaft position sensor.	5 Volts < Ignition Voltage < 17 Volts Cam is transitioning Sensed mass airflow >= 2.8984 No Cam Position Sensor DTC's No Airflow DTC's PCM state = READY or CRANK	15 test failures in a 30 test sample. 100 ms/test Continuous	A
CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0336	24X signal This diagnostic will detect occurrences when engine position is no longer known.	The "Match" signal from the Ignition Control I.C. falling to a low voltage level (~0 volts).	5 Volts < Ignition Voltage < 17 Volts PCM state = CRANK or RUN	50 test failures in a 3120 test sample. 50 ms/test Continuous	A
CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0341	Monitor for cam position state change when expected at crankshaft sync.	Evaluated at crankshaft position synchronization.	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 100 100 ms/test Continuous	B
CAMSHAFT POSITION SENSOR CIRCUIT LOW	P0342	Monitor for continuous low state when state should be high.	Evaluated at crankshaft position synchronization	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 50 100 msec / test Continuous	B
CAMSHAFT POSITION SENSOR CIRCUIT HIGH	P0343	Monitor for continuous high state when state should be low.	Evaluated at crankshaft position synchronization	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 50 100 msec / test Continuous	B
IGNITION CONTROL #1 CIRCUIT	P0351	Monitor EST channel A (Cylinder 1)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A

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IGNITION CONTROL #2 CIRCUIT	P0352	Monitor EST channel D (Cylinder 2)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #3 CIRCUIT	P0353	Monitor EST channel H (Cylinder 3)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #4 CIRCUIT	P0354	Monitor EST channel G (Cylinder 4)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #5 CIRCUIT	P0355	Monitor EST channel F (Cylinder 5)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #6 CIRCUIT	P0356	Monitor EST channel E (Cylinder 6)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #7 CIRCUIT	P0357	Monitor EST channel C (Cylinder 7)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #8 CIRCUIT	P0358	Monitor EST channel B (Cylinder 8)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is \geq 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A

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AIR INJECTION SYSTEM	P0410	<p>Passive: HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p>Active: HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p>Passive: HO2S sensor < approx. 400 mv during open loop operation</p> <p>Active: HO2S sensor < 222 mv for >= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p>Passive: No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run > 2 sec. Air flow < 30 g/s ECT < 109 deg C A/F Ratio > 13:1 Engine Load < 25% of full engine load) Ignition voltage > 11.7V PE, DFCO, COT not active</p> <p>Active Same as above except: MBV test fail will not disable Engine run >= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator >123 & < 136 RPM > 600 ECT > = 70 Deg C Engine load < 25% Air flow <= 22 g/s IAT >10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p>Passive: During open loop operation. Once per trip.</p> <p>Active: 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B
AIR INJECTION SYSTEM SOLENOID CONTROL CIRCUIT MALF (ODM)	P0412	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	B
AIR INJECTION SYSTEM RELAY CONTROL CIRCUIT MALF (ODM)	P0418	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
BANK 1 CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0420	Comparing rear HO2S sensor signal amplitude to the front HO2S sensor signal amplitude thereby measuring the oxygen storage capability of the catalytic converter.	Rear HO2S amplitude approaches a calibrated threshold (approx. 90% of front HO2S amplitude)	Catalyst predicted temperature $\geq 400^{\circ}\text{C}$ Δ engine load $< 2\%/sec$ ECT $> 65^{\circ}\text{C}$ IAT $> -30\text{C}$ Vehicle speed: 20 $<$ MPH $<$ 85 TPS $> 2\%$ Engine Speed: 800 $<$ RPM $<$ 3000 14 g/s $<$ Air flow $<$ 40 g/s 25 kPa $<$ MAP $<$ 80 kPa Closed loop No VSS, Transmission, Throttle, Purge control, Oxygen sensor, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Cam sensor, Air flow, AIR, IAC, or Fuel trim DTC's	50 acceptable HO2S samples collected at a 12.5 ms rate. Once per trip	A
BANK 2 CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0430	Comparing rear HO2S sensor signal amplitude to the front HO2S sensor signal amplitude thereby measuring the oxygen storage capability of the catalytic converter.	Rear HO2S amplitude approaches a calibrated threshold (approx. 90% of front HO2S amplitude)	Catalyst predicted temperature $\geq 400^{\circ}\text{C}$ Δ engine load $< 2\%/sec$ ECT $> 65^{\circ}\text{C}$ IAT $> -30\text{C}$ Vehicle speed: 20 $<$ MPH $<$ 85 TPS $> 2\%$ Engine Speed: 800 $<$ RPM $<$ 3000 14 g/s $<$ Air flow $<$ 40 g/s 25 kPa $<$ MAP $<$ 80 kPa Closed loop No VSS, Transmission, Throttle, Purge control, Oxygen sensor, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Cam sensor, Air flow, AIR, IAC, or Fuel trim DTC's	50 acceptable HO2S samples collected at a 12.5 ms rate. Once per trip	A
EVAP VACUUM SWITCH CIRCUIT LOW (DURING PURGE)	P0441	Detects a purge solenoid stuck closed by monitoring the EVAP. Purge Vacuum Switch state when purge is commanded. The vacuum switch state should change to high (open) if there is vacuum (solenoid open) applied to the system.	EVAP. purge vacuum switch state = low (closed) for a period > 5 seconds.	No Vacuum Switch DTC No IAT, MAP, ECT, or TPS DTC No Purge Solenoid ODM Baro > 75 kPa ECT < 115 Deg C IAT > 3 Deg C @ power-up; < 80 Deg C run ECT/IAC Delta < 10 Deg C @ power-up Purge Duty Cycle $> 90\%$ Manifold. VAC. > 15 kpa TPS $> 6\%$ but $< 60\%$ Engine RPM > 800 but < 3000	For 5 test failures Continuous	B

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EVAP CANISTER PURGE SOLENOID VALVE CIRCUIT (ODM)	P0443	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. continuous.	B
PRIMARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P0480	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. Continuous.	B
SECONDARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P481	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. Continuous.	B
VEHICLE SPEED SENSOR SYSTEM PERFORMANCE (MANUAL TRANS)	P0500	This DTC detects a missing signal from the vehicle speed sensor in a manual transmission vehicle.	Vehicle speed = 0 when enable conditions met	Manual VSS diagnostic enabled No MAP DTC's set No TPS DTC's set No ECT DTC's set No idle system DTC's set No IAC valve DTC's set Coolant >= 35 deg. C Engine speed > 1000 rpm 5 % < throttle position < 100 % A/C off: 40 kpa < MAP < 100 kpa A/C on: 45 kpa < MAP < 100 kpa Above conditions met > 2 seconds to enable diagnostic	500 test failures in a 1000 test sample 100 ms/test Continuous	B
IDLE SYSTEM - LOW ENGINE SPEED	P0506	Determines if a low idle is a result of an engine mechanical problem. Low RPM is 100 RPM below desired	Idle > 100 RPM low from desired	Passive: No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT >= 60 Deg C Baro > 65 kPa IGN. voltage > 9 & < 17 volts IAT > -10 deg C TP < 1% VS <= 1 MPH Time > 5 seconds to fail. > 8 seconds to pass	Passive: Must be outside the fail criteria continuously for 5 seconds. Must be within pass criteria for 8 seconds continuously.	B

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IDLE SYSTEM - HIGH ENGINE SPEED	P0507	Determines if a high idle is a result of an engine mechanical problem. High RPM is 200 RPM above desired	Passive: Idle > 200 RPM high from desired	Passive: No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT >= 60 Deg C Baro > 65 kPa IGN. voltage > 9 & < 17 volts IAT > -10 deg C TP < 1% VS <= 1 MPH Time > 5 seconds to fail. > 8 seconds to pass	Passive: Must be outside the fail criteria continuously for 5 seconds. Must be within pass criteria for 8 seconds continuously.	B
PCM - FLASH EEPROM CHECKSUM ERROR	P0601	Indicates that PCM is unable to correctly read data from the flash memory.	Calculated checksum does not match expected checksum for the program.	Ignition in Run or Crank.	One occurrence. Check is performed at power-up and every 60 seconds thereafter.	A
PCM - PROGRAMMING ERROR	P0602	Indicates that the PCM is not flashed.	PCM not flashed.	Ignition on.	1 test failure 100 ms after PCM powered-up	A
PCM RAM FAILURE	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 Run or Crank	One occurrence. Check is performed at power-up and every 60 seconds thereafter.	A

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PCM - INTERNAL COMM. INTERRUPTED	P0606	Indicates that the PCM has detected an internal processor integrity fault	1) Redundant desired throttle position calculations differ by > than 5%. OR 2) ETC software is not executed in proper order. OR 3) COP1 fails to halt processor < 14 ms after toggle. OR 4) COP2 fails to halt peripheral devices < 24 ms after toggle. OR 5) Peripheral device reset line is stuck low. OR 6) 6.25 ms interrupt does not occur within 5.65 ms to 6.75 ms. OR 7) Clock control registers are not programmed correctly.	Ignition in Run or Crank.	1) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 60. Check runs every 18.75 ms. 2) One occurrence or Continuous error for immediate 200 ms after a reset. Check runs every 18.75 ms. 3) & 4) One occurrence. Checked every other power-down. 5) One occurrence. Checked every power-up. 6) & 7) Fault counter increments by 10 for every error, decrements by 1 for every pass; threshold = 60. Check runs every 6.25 ms.	A
CLUTCH SWITCH CIRCUIT	P0704	Clutch switch state is monitored during vehicle operation.	The PCM detects that a clutch switch state transition has not occurred when the vehicle speed has gone from 0 MPH above a threshold value and back to 0 MPH.	No VSS codes present VSS > 24 MPH	7 test failures in an 8 test sample size 100ms Continuous	B (Manual Only)
2ND AND 3RD GEAR BLOCKOUT RELAY CIRCUIT MALF (ODM)	P0803	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. Continuous.	B

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THROTTLE POSITION SENSOR 1 CIRCUIT	P1120	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the TP sensor #1. OR 2) TACM indicates an invalid minimum mechanical position for the TP sensor #1.	1) Raw TP sensor signal < 0.13 V or > 4.87 V. OR 2) TP sensor minimum mechanical stop voltage < 0.33 V or > 0.67 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 122. Check runs every 3 ms. 2) One occurrence. Check runs at power-up.	A
ACCELERATOR PEDAL POSITION SYSTEM	P1125	PCM determines a limp home mode of operation due to multiple accelerator pedal sensor faults.	This DTC is set when: 1) 2 or more APP sensors are out of range, OR 2) all 3 APP sensors disagree, OR 3) one APP sensor is out of range AND the other 2 APP sensors disagree.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	One occurrence. Check runs every 18.75 ms.	A
HO2S SYSTEM -TOO FEW HO2S R/L AND L/R SWITCHES (BANK 1, SENSOR 1)	P1133	The DTC determines if the HO2S sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 30 R/L switches < 30	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B
HO2S TRANSITION TIME RATIO (BANK 1, SENSOR 1)	P1134	Monitors the ratio between rich to lean and lean to rich transition times	The ratio of rich to lean and lean to rich oxygen sensor transitions. .5625 < Ratio < 3	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B

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HO2S SYSTEM -TOO FEW HO2S R/L AND L/R SWITCHES (BANK 2, SENSOR 1)	P1153	The DTC determines if the HO2S sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 30 R/L switches < 30	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B
HO2S TRANSITION TIME RATIO (BANK 2, SENSOR 1)	P1154	Monitors the ratio between rich to lean and lean to rich transition times	The ratio of rich to lean and lean to rich oxygen sensor transitions. .5625 < Ratio < 3	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec Once per trip.	B
THROTTLE POSITION SENSOR 2 CIRCUIT	P1220	1) TACM indicates a continuous or intermittent short or open in either the signal circuit or the TP sensor #2. OR 2) TACM indicates an invalid minimum mechanical position for the TP sensor #2.	1) Raw TP sensor signal < 0.13 V or > 4.87 V. OR 2) TP sensor minimum mechanical stop voltage < 4.31 V or > 4.69 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 122. Check runs every 3 ms. 2) One occurrence. Check runs at power-up.	A
THROTTLE POSITION SENSOR 1, 2 RANGE/PERF.	P1221	1) TACM indicates a continuous or intermittent correlation fault between TP sensors #1 and #2. OR 2) TACM indicates an invalid minimum mechanical position correlation between TP sensor #1 and #2.	ABS(5 V - raw TP sensor #2 voltage - raw TP sensor #1 voltage) > 0.29 V.	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. No TACM processor DTC.	1) Counter increments by 4 for every error, decrements by 1 for every pass; threshold is 126. Check runs every 3 ms. 2) One occurrence. Check runs at power-up.	A
ENGINE PROTECTION MODE ACTIVE	P1258	Monitor for engine protection mode active.	Coolant temperature >= 132C for more than 10 seconds.	No coolant sensor DTC's.	Set immediately upon engine protection mode active.	A

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AIR INJECTION SYSTEM	P1415	<p>Passive: HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p>Active: HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p>Passive: HO2S sensor < approx. 400 mv during open loop operation</p> <p>Active: HO2S sensor < 222 mv for >= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p>Passive: No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run > 2 sec. Air flow < 30 g/s ECT < 109 deg C A/F Ratio > 13:1 Engine Load < 25% of full engine load) Ignition voltage > 11.7V PE, DFCO, COT not active</p> <p>Active Same as above except: MBV test fail will not disable Engine run >= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator >123 & < 136 RPM > 600 ECT > = 70 Deg C Engine load < 25% Air flow <= 22 g/s IAT >10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p>Passive: During open loop operation. Once per trip.</p> <p>Active: 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B

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AIR INJECTION SYSTEM	P1416	<p>Passive: HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p>Active: HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p>Passive: HO2S sensor < approx. 400 mv during open loop operation</p> <p>Active: HO2S sensor < 222 mv for >= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p>Passive: No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run > 2 sec. Air flow < 30 g/s ECT < 109 deg C A/F Ratio > 13:1 Engine Load < 25% of full engine load) Ignition voltage > 11.7V PE, DFCO, COT not active</p> <p>Active Same as above except: MBV test fail will not disable Engine run >= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator >123 & < 136 RPM > 600 ECT > = 70 Deg C Engine load < 25% Air flow <= 22 g/s IAT >10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p>Passive: During open loop operation. Once per trip.</p> <p>Active: 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B
EVAP VACUUM SWITCH CIRCUIT HIGH (DURING NON-PURGE)	P1441	Detects a purge solenoid stuck open by monitoring the EVAP. Purge Vacuum Switch state when no purge is commanded. The vacuum switch state should change to low (closed) if there is no vacuum (solenoid closed) applied to the system.	EVAP. purge vacuum switch state = high (open) for a period > 5 seconds.	<p>No Vacuum Switch DTC No IAT, MAP, ECT, or TPS DTC No Purge Solenoid ODM Baro >75 kPa ECT < 115 Deg C IAT > 3 Deg C @ power-up; <80 Deg C run ECT/IAC Delta < 10 Deg C @ power-up Purge Duty Cycle = 0% Manifold Vacuum > 20 kpa & < 80 kpa TPS > 0% & < 50% Engine RPM > 500 but < 2500</p>	For 5 test failures	B

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TAC SYSTEM MAF PERFORMANCE	P1514	Indicates that measured engine airflow does not match estimated engine airflow as established by the TPS.	MAP based airflow - estimated airflow > 150 mg/cyl AND MAF based airflow - estimated airflow > 150 mg/cyl	Engine running = true. Ignition on > 1 sec. RPM > 500. No Throttle Actuation DTC's. No PCM-TACM Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's No TACM Processor DTC	Both counters are incremented by 2 for every error and decremented by 1 for every pass; both thresholds are 20; both counters must exceed threshold to set DTC. Check runs every 18.75 ms.	A
COMMAND vs ACTUAL THROTTLE PERF. (PCM)	P1515	Indicates that the PCM has detected a throttle positioning error	ABS (throttle error) > 5%. [Throttle error = Measured throttle position - modeled throttle position]	Ignition in Run or Crank TACM determines PCM Desired Throttle Position is valid. Not in battery saver mode. No Airflow Actuation DTC. (Engine Running = true) OR (Ignition Voltage > 8.5 volts). No Throttle Actuation DTC. No PCM-TACM Serial Data DTC. Both TPS Circuit DTC's are not set. No PCM Processor DTC's. No TACM Processor DTC.	High counter increments by 2 for every throttle error > 5%; decrements by 1 if %<t.e.<5%; decrements by 5 if -5%<t.e.<0%; clears if t.e. < -5%. Check runs every 18.75 ms with TACM - PCM valid message received. Low counter increments by 2 for every throttle error < -5%; decrements by 1 if -5%<t.e.<0%; decrements by 5 if 0%<t.e.<5%; clears if t.e. > 5%. Check runs every 18.75 ms with TACM - PCM valid message received.	A

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COMMAND vs ACTUAL THROTTLE PERF. (TAC MODULE)	P1516	Indicates that the TAC Module has detected a throttle positioning error OR Either Processor cannot determine throttle positioning OR Both TP Sensors are invalid	ABS (throttle error): a) >=2 degrees for >200 ms with no change in error sign. OR b) >=2 degrees for >500 ms for throttle command changes >= 2 degrees. OR c) >=5 degrees for >200 ms for throttle command changes >= 5 degrees. OR d) >= 5 degrees for > 300 ms with no change in error sign. OR 2) PCM processor DTC's. OR 3) TACM processor DTC. OR 4) both TPS Circuit DTC's are set. OR 5) PCM-TACM Serial Data DTC w/ any APP Sensor DTC or TP Sensor DTC. [Throttle error = Measured throttle position - commanded throttle position]	Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data. Not in battery saver mode.	One occurrence. Check runs every 3 ms.	A

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TAC MODULE PROCESSOR	P1517	<p>Indicates that TAC Module is unable to correctly read data from the flash memory.</p> <p>Indicates that TAC Module is unable to correctly write and read data to and from RAM.</p> <p>Indicates that the TAC Module has detected an internal processor integrity fault.</p>	<p>1) Power-up test fails to read/write data OR</p> <p>2) Max allowed Running Resets exceeded OR</p> <p>3) ROM checksum does not match expected checksum OR</p> <p>4) RAM data read does not match data written OR</p> <p>5) Failure of Interrupt process flag to match expected value. OR</p> <p>6) Program is not executed in the proper order OR</p> <p>7) Primary and Redundant RAM variables disagree OR</p> <p>8) Primary and Redundant Indicated Pedal Position calculation difference > 7.1%. OR</p> <p>9) Math/Logic test fails to equate to a predetermined value. OR</p> <p>10) Internal Register data read does not match data written. OR</p> <p>11) Internal Timer fails to increment OR</p> <p>12) Watchdog Timer fails to increment OR</p> <p>13) Failure of Processor Stack pointer to zero at Main Loop.</p>	<p>Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data.</p>	<p>1) One occurrence Check runs at Reset initialization</p> <p>2) 12 occurrences during ignition cycle Check runs at Reset initialization</p> <p>3) One occurrence. Check runs at power up and every 24 seconds thereafter.</p> <p>4) One occurrence. Check runs at power up and every 153 milliseconds thereafter</p> <p>5) - 13) One occurrence. Check runs every 3 milliseconds</p>	A
PCM TO TAC MODULE SERIAL DATA CIRCUIT	P1518	<p>Indicates that the serial data line between the PCM and TACM has intermittently or continuously failed.</p>	<p>PCM: No message for 18.75 ms. Corrupted data in the message. Invalid message protocol. PCM processor DTC's. TACM processor DTC. TAC Module: No message for 25 ms. Corrupted data in the message. Invalid message protocol. PCM processor DTC's. TACM processor DTC.</p>	<p>(Ignition in Run or Crank) AND engine not in crank state. Time since power-up > 0. Ignition in Run or Crank. Ignition voltage > 5.23 V. Valid TACM - PCM serial data.</p>	<p>No valid message received for 500 ms. Invalid or missing message increments counter by 10; valid message received decrements counter by 1; threshold is 254.</p> <p>Check for invalid messages runs every 18.75 ms. Check for missing messages runs every 25 ms.</p>	A

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5 VOLT REFERENCE A CIRCUIT	P1635	Determines if the supply voltage for the 5 volt reference is within an acceptable limit.	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	B
5 VOLT REFERENCE A CIRCUIT	P1639	Determines if the supply voltage for the 5 volt reference is within an acceptable limit	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	B