1997 4.0 (L47) G-car Aurora 4T80E ENGINE *and* TRANSMISSION DIAGNOSTIC PARAMETERS

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Catalyst Low Efficiency - Bank 1	P0420	Oxygen Storage	Average deviation difference between Post coverter oxygen sensor and pre converter oxygen storage ≥ 4 mv	**Converter Warm Up Status** Predicted Catalyst Outlet Temp ≥ 344 °C **Test Enable** ECT ≥ 75 °C 12.5 ≤ Engine airflow ≤ 35 g/sec Engine load ≤ 59.4% Delta engine load ≤ 160%/sec Throttle position ≥ 2.2 deg Engine speed ≤ 3000 rpm 20 < Vehicle speed < 75 mph IAT > -28 °C A/F = 14.7 Closed loop fuel control is enabled. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1 and Bank 2 Sensor 1. Bank 1 and Bank 2 short term fuel trims operating. No MAF DTC's failing. No TP sensor DTC's failing. No ECT DTC's failing. No VS sensor DTC's failing. No Fuel Trim DTC's failing. No Purge System DTC's failing. No Misfire DTC's failing. No Oxygen Sensor (Bank 1* Sensor 1, Bank 2*Sensor 1, Bank 1*Sensor 2, or Bank 1*Sensor 3) DTC's failing.	50 test samples per completed test. Maximum of 50 test samples taken per key cycle. frequency: 12.5 ms cont. until 50 test samples taken	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Engine Misfire Detected	P0300	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging
Cylinder 1 Misfire Detected	P0301	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Cylinder 2 Misfire Detected	P0302	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging
Cylinder 3 Misfire Detected	P0303	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Cylinder 4 Misfire Detected	P0304	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging
Cylinder 5 Misfire Detected	P0305	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Cylinder 6 Misfire Detected	P0306	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging
Cylinder 7 Misfire Detected	P0307	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Cylinder 8 Misfire Detected	P0308	Crankshaft position sensor and target wheel and camshaft position sensor	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position (refer to Supporting Data section)	No TP sensor DTC's failing No MAF sensor DTC's failing No ECT DTCs failing ECT > -6.75 °C but < 131 °C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throttle position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Type B - Emission Type A - Catalyst Damaging
Evaporative Purge - Low Purge Flow	P0441	functional	Evap Purge Switch indicates low for ≥ 10 sec. cont.	No IAC DTC's failing No MAP DTC's failing No TP sensor DTC's failing No EGR DTC's failing Baro ≥ 72 kPa ECT. ≤ 125 °C Key on ECT - last key off ECT ≥ 50 °C Intake Air Temp. ≤ 99.5 °C Power up IAT ≥ 5 °C MAP ≥ 30, ≤ 60 kPa TP Sensor ≥ 0, ≤ 81.6 deg Engine Speed ≥ 500, ≤ 6375 rpm Engine Vacuum ≥ 25 kPa Purge duty cycle ≥ 65%	3 failures frequency: 100 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Evaporative Purge - High Purge Flow	P1441	functional	Evap Purge Switch indicates high for ≥ 10 sec. cont.	No IAC DTC's failing No MAP DTC's failing No TP sensor DTC's failing No EGR DTC's failing Baro ≥ 72 kPa ECT. ≤ 125 °C Key on ECT - last key off ECT ≥ 50 °C Intake Air Temp. ≤ 99.5 °C Power up IAT ≥ 5 °C MAP ≥ 30, ≤ 70 kPa TP Sensor ≥ 0, ≤ 81.6 deg Engine Speed ≥ 500, ≤ 6375 rpm Purge duty cycle ≤ 5%	3 failures frequency: 100 ms cont.	Type B
Evaporative Purge - Canister Purge Output Failure	P1645	circuit check	Output Driver Module Fault Internal Feedback indicates fault present	Engine Run Time ≥ 10 sec. Ignition Voltage ≥ 9 volts	8 test fails in 10 tests frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
EGR Flow Insufficient	P0401	functional check	Decel test: With EGR valve open, the peak increase in MAP is monitored over a time of 0.8 sec.. This value is compared with an expected map change threshold interpolated from an engine speed vs BARO table. The difference between the actual and the expected map changes is computed and the difference is statistically filtered and compared to a decision limit (12 counts if test is not currently failed and 3 counts if test is currently failed). DTC is set when the filtered difference exceeds the decision limit. (Refer to the Supporting Data section for plots of expected map change vs commanded EGR position vs engine rpm vs altitude)	Test Enable: No TP sensor DTC's failing. No MAP sensor DTC's failing. No VS sensor DTC's failing. No ECT sensor DTC's failing. No IAC DTC's failing. No LEGR pintle pos. DTC failing. 80 °C ≤ ECT ≤ 110 °C. BARO ≥ 72 kPa. 20≤ vehicle speed ≤70mph (L37, L47/3.71) 23 ≤ veh speed ≤ 70 mph (LD8, L37/3.48) IAC delta ≤ 3 counts. trans. state unchanged for 0.3 sec.. A/C state unchanged for 0.3 sec.. Purge state unchanged for 0.3 sec.. 11 volts ≤ sys. volts ≤ 15 volts. Start Test (decel): TP sensor ≤ 0.6 deg. EGR pos. ≤ 8 counts. 700≤ Engine RPM ≤ 1300. Delta MAP ≤ 1 kPa. 25 ≤ MAP ≤ 44 kPa. The above conditions must be present for 0.5 consecutive sec.. Run Test (decel): Stabilized MAP (valve closed) recorded and EGR valve ramped open (35 to 70% at a constant rate), the peak increase in MAP is recorded and the change in MAP computed. The EGR valve is ramped closed over 2.0 sec..	1 test per trip 15 tests if KAM reset decel test: 3.3 to 4.6 sec. frequency: 100 ms. cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
EGR Circuit Performance	P0404	functional check	Pintle position error > 10% for 300 occurrences if ignition voltage is > 12 volts. -or- Pintle position error > 30% for 1000 occurrences if ignition voltage is < 12 volts.	Desired EGR Position > 0 cnts Code P0401 status = not in progress ∆Desired EGR Position < 10% (ign. volts > 12) or < 4% (ign. volts ≤ 12) Ignition Voltage ≥ 11 volts If ignition voltage < 12 volts then the following must be true: Engine vacuum < 50 kPa Transmission temperature < 90 °C (if trans. temp. sensor is failed then this criteria is bypassed).	300 occurrences if ignition voltage > 12 volts. 1000 occurrences if ignition voltage < 12 volts. frequency: 250 ms cont./ position error every 12.5 ms. cont.	Type A
EGR Sensor Circuit Low Voltage	P0405	Circuit check	Filtered Closed Valve Pintle Position ≤ 3.5%, or ≥ 40%	Ignition Voltage ≥ 11 volts	immediate frequency: 250 ms cont./ position error every 12.5 ms. cont.	Type A
EGR Valve Pintle Circuit	P1404	functional check	Pintle position ≥ 7.8% from learned closed position	Ignition Voltage ≥ 11 volts EGR Desired Position = 0%	4 separate failures (with pintle movement above 47% between each retest) timed at 10 sec. each failure. frequency: 250 ms cont./ position error every 12.5 ms. cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Fuel Trim System Lean - Bank 1	P0171	fuel trim limits exceeded - lean (bank 1)	short term ≥ 1.04 long term ≥ 1.12	MAF Rationality DTC not failing No MAP DTC's failing No TP sensor DTC's failing No O2 sensor DTC's failing No injector fault DTC's failing No misfire DTC's failing No knock sensor DTC's failing No EGR flow DTC's failing No Idle/IAC DTC's failing No CAM sensor DTC failing Baro > 70.5 ECT >84, < 120 °C Mass Airflow >3, < 200 g/sec MAP > 27, < 103.2 kPa Intake Air Temp >0, < 151 °C Engine Speed > 400, < 3000 rpm TP sensor < 19.8 deg. Vehicle Speed < 70 mph P0401 status = not in progress	11 test fails frequency: 250 ms cont.	Type B
Fuel Trim System Rich - Bank 1	P0172	fuel trim limits exceeded - rich (bank 1)	short term ≤ 1.008 long term ≤ 0.85	MAF Rationality DTC not failing No MAP DTC's failing No TP sensor DTC's failing No O2 sensor DTC's failing No injector fault DTC's failing No misfire DTC's failing No knock sensor DTC's failing No EGR flow DTC's failing No Idle/IAC DTC's failing No CAM sensor DTC failing Baro > 70.5 ECT >84, < 120 °C Mass Airflow >3, < 200 g/sec MAP > 27, < 103.2 kPa Intake Air Temp >0, < 151 °C Engine Speed > 400, < 3000 rpm TP sensor < 19.8 deg. Vehicle Speed < 70 mph P0401 status = not in progress	6 test fails frequency: 250 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Fuel Trim System Lean - Bank 2	P0173	fuel trim limits exceeded - lean (bank 2)	short term $\geq$ 1.04 long term $\geq$ 1.12	MAF Rationality DTC not failing No MAP DTC's failing No TP sensor DTC's failing No O2 sensor DTC's failing No injector fault DTC's failing No misfire DTC's failing No knock sensor DTC's failing No EGR flow DTC's failing No Idle/IAC DTC's failing No CAM sensor DTC failing Baro > 70.5 ECT >84, < 120 °C Mass Airflow >3, < 200 g/sec MAP > 27, < 103.2 kPa Intake Air Temp >0, < 151 °C Engine Speed > 400, < 3000 rpm TP sensor < 19.8 deg. Vehicle Speed < 70 mph P0401 status = not in progress	11 test fails frequency: 250 ms cont.	Type B
Fuel Trim System Rich - Bank 2	P0174	fuel trim limits exceeded - (bank 2)	short term $\leq$ 1.008 long term $\leq$ 0.85	MAF Rationality DTC not failing No MAP DTC's failing No TP sensor DTC's failing No O2 sensor DTC's failing No injector fault DTC's failing No misfire DTC's failing No knock sensor DTC's failing No EGR flow DTC's failing No Idle/IAC DTC's failing No CAM sensor DTC failing Baro > 70.5 ECT >84, < 120 °C Mass Airflow >3, < 200 g/sec MAP > 27, < 103.2 kPa Intake Air Temp >0, < 151 °C Engine Speed > 400, < 3000 rpm TP sensor < 19.8 deg. Vehicle Speed < 70 mph P0401 status = not in progress	6 test fails frequency: 250 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Low Voltage (bank 1 sensor 1)	P0131	range check low	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Bank 1, Sensor 1 High Voltage or No Activity Detected Failures Bank 2, Sensor 1 low voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) frequency: 100 ms cont.	Type A
HO2S Circuit High Voltage (bank 1 sensor 1)	P0132	range check high	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Bank 1, Sensor 1 Low Voltage or No Activity Detected Failures Bank 2, Sensor 1 high voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	450 test failures in a 500 test sample frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Slow Response (bank 1 sensor 1)	P0133	rationality	O2 sensor average transition time: L/R > 200 ms R/L > 200 ms	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 1*Sensor 1 Voltage DTC's not failing or failure pending not failing. DTC P0135 (O2 heater) not failing. DTC P1133 (Too Few Switches) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 3.0 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ignition volts ≤ 16 1200 ≤ Engine speed ≤ 2800 rpm 18≤ Engine Airflow≤ 35g/sec Above conditions met for 3.0 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B
HO2S Circuit Insufficient Activity (bank 1 sensor 1)	P0134	circuit continuity	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's failing No TP sensor DTC's failing ECT ≥ 72.5 °C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 99 sec. 9 ≤ Ignition voltage ≤ 16 volts	500 test failures in a 640 test sample (4.6L) 634 test failures in a 640 test sample (4.0L) frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Insufficient Switching (bank 1 sensor 1)	P1133	rationality	Number of switches in 90 sec.: L/R switches < 12 R/L switches < 12	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 1*Sensor 1 Voltage DTC's not failing or failure pending not failing. DTC P0135 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 g/sec Above conditions met for 1.2 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B
HO2S Circuit Transition Time Ratio (bank 1 sensor 1)	P1134	rationality	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 5.5 or < .18	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 1*Sensor 1 Voltage DTC's not failing or failure pending not set. DTC P0135 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 3.0 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1200 ≤ Engine speed ≤ 2800 rpm 18< Engine airflow <35 g/sec Above conditions met for 3.0 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Low Voltage (bank 2 sensor 1)	P0151	range check low	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Bank 2, Sensor 1 High Voltage or No Activity Detected Failures Bank 1, Sensor 1 low voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) frequency: 100 ms cont.	Type A
HO2S Circuit High Voltage (bank 2 sensor 1)	P0152	range check high	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Bank 2, Sensor 1 Low Voltage or No Activity Detected Failures Bank 1, Sensor 1 high voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 1 short term fuel trim operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	450 test failures in a 500 test sample frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Slow Response (bank 2 sensor 1)	P0153	rationality	O2 sensor average transition time: L/R > 200 ms R/L > 200 ms	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 2*Sensor 1 Voltage DTC's not failing or failure pending not set. DTC P0155 (O2 heater) not failing. DTC P1153 (Too Few Switches) not failing. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle position ≥ 3.0 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1200 ≤ Engine speed ≤ 2800 rpm 18< Engine airflow <35 g/sec Above conditions met for 3.0 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B
HO2S Circuit Insufficient Activity (bank 2 sensor 1)	P0154	circuit continuity	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's failing No TP sensor DTC's failing ECT ≥ 72.5 °C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 99 sec. 9 ≤ Ignition voltage ≤ 16 volts	500 test failures in a 640 test sample (4.6L) 634 test failures in a 640 test sample (4.0L) frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Insufficient Switching (bank 2 sensor 1)	P1153	rationality	Number of switches in 90 sec.: L/R switches < 12 R/L switches < 12	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 2*Sensor 1 Voltage DTC's not failing or failure pending not set. DTC P0155 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ignition voltage ≤ 16 1000 < Engine speed < 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 g/sec Above conditions met for 1.2 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B
HO2S Circuit Transition Time Ratio (bank 2 sensor 1)	P1154	rationality	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 5.5 or < .18	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 2*Sensor 1 Voltage DTC's not failing or failure pending not set. DTC P0155 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle postion ≥ 3.0 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1200 < Engine speed < 2800 rpm 18< Engine airflow <35 g/sec Above conditions met for 3.0 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Low Voltage (bank 1 sensor 2)	P0137	range check low	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Misfire DTC failing Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's not failing or failure pending not set. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 2. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) frequency: 100 ms cont.	Type B
HO2S Circuit High Voltage (bank 1 sensor 2)	P0138	range check high	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's failing No ECT sensor DTC's failing No TP sensor DTC's failing No MAF sensor DTC's failing No Misfire DTC failing Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's not failing or failure pending not set. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 2. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 72.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 sec..	450 test failures in a 500 test sample frequency: 100 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Slow Response (bank 1 sensor 2)	P0139	rationality	O2 sensor average transition time: L/R > 150 ms R/L > 150 ms	No MAF DTC's failing No TP sensor DTC's failing No ECT DTC's failing Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not failing or failure pending not set. No Fuel Trim DTC's failing. No Misfire DTC failing. DTC P0141 (O2 heater) not failing. DTC P1139 (Too Few Switches) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1200 ≤ Engine speed ≤ 2800 rpm 18 < Engine airflow < 35 gram/sec Above conditions met for 3.0 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test is completed	Type B
HO2S Circuit Insufficient Activity (bank 1 sensor 2)	P0140	circuit continuity	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's failing. No TP sensor DTC's failing. ECT ≥ 72.5 °C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 255 sec. 9 ≤ Ignition voltage ≤ 16 volts	420 test failures in a 640 test sample. frequency: 100 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Insufficient Switching (bank 1 sensor 2)	P1139	rationality	Number of switches in 90 sec.: L/R switches < 10 R/L switches < 10	No MAF DTC's failing. No TP sensor DTC's failing. No ECT DTC's failing. Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not failing or failure pending not set. No Fuel Trim DTC's failing. No Misfire DTC failing. DTC P0141 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion $\geq$ 2.2 deg A/F = 14.7 Engine run time > 202 sec. ECT $\geq$ 75 °C 9 $\leq$ Ign. volts $\leq$ 16 1000 $\leq$ Engine speed $\leq$ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 18 < Engine airflow < 35 gram/sec Above conditions met for 1.5 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Transition Time Ratio (bank 1 sensor 2)	P1140	rationality	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 4 or < .33	No MAF DTC's failing. No TP sensor DTC's failing. No ECT DTC's failing. Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not failing or failure pending not set. No Fuel Trim DTC's failing. No Misfire DTC failing. DTC P0141 (O2 heater) not failing. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 sec. ECT ≥ 75 °C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 18 < Engine airflow < 35 gram/sec Above conditions met for 1.5 sec.	90 sec. Once per key cycle frequency: 12.5 ms cont. until test completed	Type B

Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Low Voltage (bank 1 sensor 3)	P0143	range check low	O2 sensor voltage ≤ .049 volts	No MAP sensor DTC's failing. No ECT sensor DTC's failing. No TP sensor DTC's failing. No MAF sensor DTC's failing. No Misfire DTC failing. No Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's failing. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 3. Closed loop is enabled. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 75.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 5 sec..	1000 test failures in a 1200 test sample (4.6L) 1188 test failures in a 1200 test sample (4.0L) frequency: 100 ms cont.	Type A
HO2S Circuit High Voltage (bank 1 sensor 3)	P0144	range check high	O2 sensor voltage ≥ .952 volts	No MAP sensor DTC's failing. No ECT sensor DTC's failing. No TP sensor DTC's failing. No MAF sensor DTC's failing. No Misfire DTC failing. No Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's failing. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 3. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 75.5 °C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 5 sec..	1000 test failures in a 1200 test sample (4.6L) 1188 test failures in a 1200 test sample (4.0L) frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Circuit Insufficient Activity (bank 1 sensor 3)	P0146	circuit continuity	.360 volt < O2 sensor voltage < .538 volt	No ECT sensor DTC's failing. No TP sensor DTC's failing. ECT ≥ 75 °C 2.2 deg ≤ Throttle position ≤ 81.6 deg 800 ≤ Engine speed ≤ 3000 rpm. Engine run time ≥ 255 sec. 9 ≤ Ignition voltage ≤ 16 volts	2500 test failures in a 3000 test sample (4.6) 2800 test failures in a 3000 test sample (4.0L) frequency: 100 ms cont.	Type B
HO2S Heater Circuit (bank 1 sensor 1)	P0135	rationality	The elapsed time to obtain +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature. (Refer to Supporting Data section)	No ECT DTC's failing. No MAF sensor DTC's failing. DTC P0134 (no activity) not failing. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 25 g/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined (test pass only) Cold start determination: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 sec. of engine running. Test run only on cold starts.. frequency: 25 ms cont. until test completed	Type B
HO2S Heater Circuit (bank 2 sensor 1)	P0155	rationality	The elapsed time to obtain +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature. (Refer to Supporting Data section)	No ECT DTC's failing. No MAF sensor DTC's failing. DTC P0154 (no activity) not failing. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 28 g/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined (test pass only) Cold start determination Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 sec. of engine running. Test run only on cold starts. frequency: 25 ms cont. until test completed	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
HO2S Heater Circuit (bank 1 sensor 2)	P0141	rationality	The elapsed time to obtain +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature. (Refer to Supporting Data section)	No ECT DTC's failing. No MAF sensor DTC's failing. DTC P0140 (no activity) not failing. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 30 g/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined (test pass only) Cold start determination: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 sec. of engine running. Test run only on cold starts. frequency: 25 ms cont. until test completed	Type B
HO2S Heater Circuit (bank 1 sensor 3)	P0147	rationality	The elapsed time to obtain +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature. (Refer to Supporting Data section)	No ECT DTC's failing. No MAF sensor DTC's failing. DTC P0146 (no activity) not failing. .351 ≤ Mean O2 bias voltage ≤.547 volts Average engine airflow during warmup period ≤ 32 g/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined (test pass only) Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 sec. of engine running. Test run only on cold starts. frequency: 25 ms cont. until test completed	Type B
Mass Air Flow Sensor System Performance	P0101	rationality	Actual MAF - Predicted MAF > interpolated allowable delta (refer to Supporting Data section for information regarding allowable delta MAF values)	No MAP DTC's failing No TP sensor DTC's failing No other MAF sensor DTC's failing Ignition voltage ≥ 10, ≤ 16 volts TP sensor ≤ 50 deg. MAP ≥ 24 kPa 100 ms MAP delta ≤ 5 kPa Mass Air flow ≤ 50 if ignition voltage ≤ 11.5 volts P0401 status = inactive Traction control status = inactive Fuel control status = closed loop	25 fails in 50 tests frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Mass Air Flow Sensor Circuit Low Voltage	P0102	range check - min	MAF sensor frequency ≤ 1135 Hz	Engine run state = running Ignition voltage ≥ 10.5 volts Time since ign. 1 present ≥ 200 ms (4.6L) or ≥ 0 ms (4.0L)	3 fails in 5 tests frequency: ref. interrupt cont.	Type A
Mass Air Flow Sensor Circuit High Voltage	P0103	range check - max	MAF sensor frequency ≥ 11000 Hz	Ignition voltage ≥ 10.5 volts Time since ign. 1 present ≥ 200 ms (4.6L) or ≥ 0 ms (4.0L) TP sensor ≤ 50 deg.	10 fails in 15 tests frequency: ref. interrupt cont.	Type A
MAP Sensor Circuit Insufficient Activity	P0105	rationality	ΔMAP < 4 kPa within 1 second of throttle angle change and MAP is not within 17 kPa of calculated MAP	No TP sensor DTC's failing No MAF sensor DTC's failing No other MAP sensor DTC's failing MAP > 22 kPa Engine Vacuum > 12 kPa 500 ms Δthrottle angle > 3 deg. No change in the state of the A/C clutch, power steering pressure switch, high electrical load, or park/neutral load	5 fails in 255 tests frequency: 500 ms cont.	Type A
Manifold Air Pressure Sensor System Performance	P0106	rationality	Raw MAP delta within 12.5 ms. > 10 kPa	No TP sensor DTC's failing Engine Speed ≥ 500 rpm Per 1 second block: Engine Speed variation ≤ 4 rpm TP sensor variation ≤ 1 deg. EGR Fuel comp. variation ≤ 4% A/C clutch state = unchanged Traction control state = inactive Engine overtemp protection state = inactive	8 fails in 10 tests frequency: 50 ms cont.	Type A
Manifold Air Pressure Sensor Circuit Low Voltage	P0107	range check - min	Raw MAP A/D signal ≤ 0.08 volts	No TP sensor DTC's failing Engine Speed ≤ 700 rpm TP sensor ≤ 18 deg. or Engine Speed ≤ 1800 TP sensor ≥ 13 deg.	3 fails in 5 tests frequency: 50 ms cont.	Type A
Manifold Air Pressure Sensor Circuit High Voltage	P0108	range check - max	Raw MAP A/D signal ≥ 5.06 volts	No TP sensor DTC's failing Engine Run state = Running TP sensor ≤ 20.5 deg.	3 fails in 5 tests frequency: 50 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
BARO to Manifold Air Pressure Sensor Comparison too High	P1108	rationality	Difference between MAP and Baro ≤ 11 kPa	No TP sensor DTC's failing No other MAP DTC's failing Throttle switch state = closed Baro ≥ 75 kPa Engine Speed ≥ 400 rpm TP sensor ≤ 18 deg.	15 sec. frequency: 250 ms cont.	Type A
Intake Air Temp. Sensor Circuit Low Voltage	P0112	range check - min	Raw IAT A/D signal ≤ 0.08 volts	No ECT Sensor DTC's failing ECT ≤ 110 °C Vehicle speed ≥ 15 mph	3 fails in 5 tests frequency: 250 ms cont.	Type A
Intake Air Temp. Sensor Circuit High Voltage	P0113	range check - max	Raw IAT A/D signal ≥ 5.02 volts	No MAF DTC's failing No ECT Sensor DTC's failing No VS Sensor DTC's failing Engine Speed ≥ 500 rpm for 20 sec. Vehicle speed ≤ 50 mph and ≥ 7 for 5 sec. Mass Air Flow ≤ 60 g/sec ECT ≥ 0 °C or ECT- IAT ≥ 27 °C	3 fails in 5 tests frequency: 250 ms cont.	Type A
Coolant Temp Sensor Circuit Low Voltage	P0117	range check - min	Raw ECT A/D signal ≤ 0.08 volts	No IAT DTC's failing IAT ≤ 100 °C or Engine run time ≥ 210 sec. TP sensor ≤ 5, ≤ 35 deg.	3 fails in 5 tests frequency: 1 sec. cont.	Type A
Coolant Temp Sensor Circuit High Voltage	P0118	range check - max	Raw ECT A/D signal > 5.04 volts	No IAT DTC's failing IAT ≥ -5 °C or Engine run time ≥ 210 sec. TP sensor ≥ 7 deg.	3 fails in 5 tests frequency: 1 sec. cont.	Type A
Coolant Temp Sensor Excessive Time to Closed Loop Fuel Control	P0125	rationality	Time to reach/maintain ECT ≥ 5 °C > desired time (see desired time vs minimum IAT read)	No IAT DTC's failing No other ECT DTC's failing Engine run state = running Percent of time at closed throttle ≤ 75% IAT > -16 °C	3 sec. frequency: 1 sec. cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Throttle Position Sensor Performance	P0121	rationality	MAP ≤ 55 kPa and TP sensor > predicted (refer to Supporting Data section for map of predicted TP sensor vs engine speed) or MAP ≥ 65 kPa and IAC position ≤ 100 counts and TP sensor < predicted (refer to Supporting Data section for map of predicted TP sensor vs engine speed)	No MAP DTC's failing No IAC DTC's failing No other TP sensor DTC's failing TP sensor delta ≤ .6 deg Engine speed ≥ 400 rpm Traction control status = not active Injector status = all enabled Engine Over-temp protection status = not active	5 fails in 20 tests frequency: 100 ms cont.	Type A
Throttle Position Sensor Circuit Low Voltage	P0122	range check - min.	Raw TP sensor A/D value ≤ .1 volts	None	3 fails in 5 tests frequency: 100 ms cont.	Type A
Throttle Position Sensor Circuit High Voltage	P0123	range check - max.	Raw TP sensor A/D value ≥ 4.96 volts	Engine Speed ≤ 3000 rpm	3 fails in 5 tests frequency: 100 ms cont.	Type A
Fuel Injector 1 Control Circuit	P0201	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 2 Control Circuit	P0202	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 3 Control Circuit	P0203	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 4 Control Circuit	P0204	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 5 Control Circuit	P0205	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Fuel Injector 6 Control Circuit	P0206	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 7 Control Circuit	P0207	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
Fuel Injector 8 Control Circuit	P0208	circuit continuity	Injector Driver feedback indication = fault	Ignition voltge > 10, < 16 volts ALDL mode $AE state = inactive	5 failures frequency: 250 ms cont.	Type A
IC Module 4X Reference Circuit - No Frequency	P0322	circuit continuity	4X reference signal not received	Ignition Ground Circuit not failed Camshaft Position Sensor Circuit not failed CAM pulse received within 4 sec.	Immediate frequency: 4 sec. cont.	Type A
Knock Sensor Circuit	P0325	rationality	Knock activity $\geq$ 100 ms	Ignition 1 voltage $\geq$ 11 volts Time since PCM powered $\geq$ 5 sec. Engine speed $\geq$ 400 rpm Engine run time $\geq$ 5 sec.	3 sec. frequency: 250 ms cont.	Type B
Knock Sensor Circuit Low Voltage - Bank 1	P0327	range check	Knock sensor background noise - learned min. noise $\leq$ .5V	Ignition voltage Present ECT. $\geq$ 40 °C Ignition 1 Voltage $\geq$ 11V Throttle Angle $\geq$ 5deg. Engine Speed $\geq$ 3000 RPM	1 sec frequency: 250 ms cont.	Type B
Camshaft Position Sensor Circuit	P0340	circuit continuity	CAM reference signal not received	4X reference pulses = received Engine speed < 1600 rpm	5.25 sec. frequency: 250 ms cont.	Type A
Crankshaft Position Sensor - Too Many 24X Reference Pulses	P0371	rationality - high	8 4X reference pulses received between CAM pulses and the number of 24X pulses $\geq$ 49 pulses.	Ignition Ground Circuit not failed Engine Speed $\geq$ 496, $\leq$ 3500 rpm CAM pulses currently received Number of CAM edges since key-on $\geq$ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A
Crankshaft Position Sensor - Too Few 24X Reference Pulses	P0372	rationality - low	8 4X reference pulses received between CAM pulses and the number of 24X pulses $\leq$ 47 pulses.	Ignition Ground Circuit not failed Engine Speed $\geq$ 496, $\leq$ 3500 rpm CAM pulses currently received Number of CAM edges since key-on $\geq$ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Crankshaft Position Sensor 4X Reference Signal Interrupt	P1320	circuit continuity	Number of 4X reference pulses = 0	Ignition Ground Circuit not failed Engine Speed ≥ 568 rpm	0.4 sec. frequency: 100 ms cont.	Type A
Crankshaft Position Sensor - No 24X Reference Signal	P1323	circuit continuity	Number of 24X reference pulses = 0	Ignition Ground Circuit not failed Camshaft Position Sensor not failed Engine Speed ≥ 496 rpm CAM pulses currently received Number of CAM edges since key-on ≥ 7	1 fail in 10 tests frequency: 4 sec. cont.	Type A
Crankshaft Position Sensor - Too Many 4X Reference Pulses	P1370	rationality - high	48 24X reference pulses received between CAM pulses and number of 4X pulses > 8	Ignition Ground Circuit not failed Engine Speed ≥ 496 rpm CAM pulses currently received Number of CAM edges since key-on ≥ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A
Crankshaft Position Sensor - Too Few 4X Reference Pulses	P1371	rationality - low	48 24X reference pulses received between CAM pulses and number of 4X pulses < 8.	Ignition Ground Circuit not failed Engine Speed ≥ 496 rpm CAM pulses currently received Number of CAM edges since key-on ≥ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A
Crankshaft Position Sensor - No Crank Sensor A or B Signal or 24X Shorted High	P1375	range check - high	State of 24X reference line = high with more than 8 4X reference pulses received.	Ignition Ground Circuit not failed Engine Speed ≥ 496 rpm Number of CAM edges since key-on ≥ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A
Ignition Ground Circuit	P1376	range check - high or low	1.04V ≤ reference low voltage ≤ 3.98V	Ignition voltage ≥ 9V	1 sec. frequency: 250 ms cont.	Type A
Crankshaft Position Sensor - CAM to Reference Correlation Problem	P1377	rationality	Number of 4X reference signals per CAM cycle for 2 CAM cycles not equal to 16	Ignition Ground Circuit not failed Engine Speed ≥ 496 rpm Number of CAM edges since key-on ≥ 7	4 fails in 10 tests frequency: 250 ms cont.	Type A
EST/Bypass Problem	P1350	rationality	Bypass mode number of EST pulses > 0 EST mode number of EST pulses =0	Ignition Ground Circuit not failed Reference pulses detected > 1 Reference pulses detected >2	0.8 sec. frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Idle System Low	P0506	functional check	Idle rpm > 96 rpm below desired rpm	General Test Enable: No MAF DTC's failing. No MAP DTC's failing. No IAT DTC's failing. No ECT DTC's failing. No TP sensor DTC's failing. No injector fault DTC's failing. No VS sensor DTC's failing. No EGR pintle pos. DTC failing. No purge flow DTC's failing. No 4x reference DTC's failing. EGR diag. test not in progress. 10.5 ≤ System volt ≤15 volts. IAT ≥ -40 °C BARO ≥ 65 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 10 sec. Closed loop fueling enabled 2 g/sec ≤ airflow ≤ 35 g/sec Purge duty cycle ≤ 0% Idle test: General conditions met. vehicle speed ≤ 0 mph. TP sensor ≤ 0.3 deg. Time since a transition to or from park/neutral > 64 sec.. if idle test fails, intrusive test is run	idle test - 20 sec. frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Idle System High	P0507	functional check	Idle rpm > interpolated error value above desired rpm (function of coolant temperature). See below. Idle Error — Coolant 200 rpm — -40°C 200 rpm — -16°C 200 rpm — 8°C 192 rpm — 32°C 192 rpm — 56°C 184 rpm — 80°C 184 rpm — 104°C 184 rpm — 128°C 184 rpm — 152°C	General Test Enable: No MAF DTC's failing. No MAP DTC's failing. No IAT DTC's failing. No ECT DTC's failing. No TP sensor DTC's failing. No injector fault DTC's failing. No VS sensor DTC's failing. No EGR pintle pos. DTC failing. No purge flow DTC's failing. No 4x reference DTC's failing. EGR diag. test not in progress. 10.5 ≤ System volt ≤15 volts. IAT ≥ -40 °C BARO ≥ 65 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 10 sec. Closed loop fueling enabled 2 g/sec ≤ airflow ≤ 35 g/sec Purge duty cycle ≤ 0% Idle test: General conditions met. vehicle speed ≤ 0 mph. TP sensor ≤ 0.3 deg. Time since a transition to or from park/neutral > 64 sec.. if idle test fails, intrusive test is run	idle test - 23 sec. frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
IAC Low	P1508	functional check	Change in Airflow during commanded IAC movement ≥ 1.5 g/sec.	General Test Enable: No MAF DTC's failing. No MAP DTC's failing. No IAT DTC's failing. No ECT DTC's failing. No TP sensor DTC's failing. No injector fault DTC's failing. No VS sensor DTC's failing. No EGR pintle pos. DTC failing. No purge flow DTC's failing. No 4x reference DTC's failing. EGR diag. test not in progress. 10.5 ≤ System volt ≤15 volts. IAT ≥ -40 °C BARO ≥ 65 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 10 sec. Closed loop fueling enabled 2 g/sec ≤ airflow ≤ 35 g/sec Purge duty cycle ≤ 0% Intrusive test: 30mph ≤vehicle speed≤ 45mph 10 ≤ comm. IAC ≤ 300 counts 2 g/sec ≤ airflow ≤ 30 g/sec change in TP sensor from start of test ≤ 1 deg. to continue test. change in engine speed from start of test ≤ 75 rpm to continue test.	intrusive test - 2 sec. frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
IAC High	P1509	functional check	Change in Airflow during commanded IAC movement ≥ 1.5 g/sec.	General Test Enable: No MAF DTC's failing. No MAP DTC's failing. No IAT DTC's failing. No ECT DTC's failing. No TP sensor DTC's failing. No injector fault DTC's failing. No VS sensor DTC's failing. No EGR pintle pos. DTC failing. No purge flow DTC's failing. No 4x reference DTC's failing. EGR diag. test not in progress. 10.5 ≤ System volt ≤15 volts. IAT ≥ -40 °C BARO ≥ 65 kPa -40 °C ≤ ECT≤ 110 °C Engine run time ≥ 10 sec. Closed loop fueling enabled 2 g/sec ≤ airflow ≤ 35 g/sec Purge duty cycle ≤ 0% Intrusive test: 30mph ≤vehicle speed≤ 45mph 10 ≤ comm. IAC ≤ 300 counts 2 g/sec ≤ airflow ≤ 30 g/sec change in TP sensor from start of test ≤ 1 deg. to continue test. change in engine speed from start of test ≤ 75 rpm to continue test.	intrusive test - 2 sec. frequency: 250 ms cont.	Type A
PCM Memory	P0601	functional check	Computed EPROM checksum not equal to expected	Code P0601 has never previously failed	1 failure Background loop cont.	Type A
PCM not Programmed	P0602	functional check	Calibration parameter not equal to expected value	None	1 failure 250 ms cont.	Type A
Ignition 1 Supplement Fault	P1633	rationality	Ignition 1 supplement voltage discrete not present	Engine run state = Running Ignition 1 ≥ 5.5 volts	1 sec. frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Ignition 1 Power Circuit Low Voltage	P1634	rationality	Ignition 1 voltage - Ignition 0 voltage ≥ 6 volts	Engine run state = Running	20 sec. frequency: 100 ms cont.	Type A
Output Driver Module A Failure	P1640	circuit continuity	Output Driver Module internal fault indication status = fault present	Time since engine run ≥ 10 sec. Ingition 1 voltage ≥ 9 volts	8 fails in 10 tests frequency: 250 ms cont.	Type A
Output Driver Module B Failure	P1650	circuit continuity	Output Driver Module internal fault indication status = fault present	Time since engine run ≥ 10 sec. Ingition 1 voltage ≥ 9 volts	8 fails in 10 tests frequency: 250 ms cont.	Type A
Quad Driver Module 1 Output Failure	P1660	circuit continuity	Quad Driver Module internal fault feedback status = fault present	Engine Run State = Running Ignition voltage ≥10, ≤ 16 volts Fuel control state = closed loop	10 fails frequency: 250 ms cont.	Type A
Engine Metal Overtemperature Protection	P1258	activity check	Engine Overtemperature mode activity status = active	None	2 sec. frequency: 500 ms cont.	Type A
Vehicle Speed Sensor Circuit Low	P0502	circuit check - low input	Vehicle Speed ≤ 5 mph	No PSA DTC failing No TP sensor DTC failing No MAF DTC's failing No ISS DTC's failing Gear Range = D4, D3, D2 or D1 TP sensor ≥ 12.8 deg. Delivered Torque ≥ 80 ft-lbs Input Speed ≥ 2000 rpm	2 sec. frequency: 25 ms cont.	Type B
Vehicle Speed Sensor Intermittent Performance	P0503	rationality	Vehicle speed delta > 11 mph Input speed delta (in 12.5 ms) < 100 rpm	No TP sensor DTC's failing No MAF DTC's failing No ISS DTC's failing No PSA DTC failing fuel cut-off state = inactive TP sensor ≥ 12.8 deg. Delivered Torque ≥ 80 ft-lbs Input speed ≥ 500 rpm Traction control state = inactive Time since engine running ≥ 2 sec Time since manual lever change ≥ 3 sec	10 times in 10 sec. frequency: 25 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Trans Fluid Temperature Sensor Circuit - Range/Performance	P0711	Rationality	1 - Trans temp has not changed □ 1.5□C (absolute value) since start up 2 - Trans temp changes > 20□C (absolute value) in 200 msec.	No ECT sensor DTC's failing No ISS DTC's failing No VSS DTC's failing 10V ≤ System Voltage ≤ 17V -37°C ≤ Trans Temp ≤ 149°C Engine running □ 300 sec Vehicle speed □ 15 mph continuously for □ 150 sec at least once this ignition cycle. Torque converter slip □ 4 rpm continuously for □ 1 sec at least once this ignition cycle. Trans temp at start up between -40 and 21□C Coolant temp □ 70□C Coolant temp has changed by □ 50□C since start up	1 - 254 seconds 2 - 14 times in 7 sec frequency 250ms cont.	Type B
A/T Input Speed Sensor Circuit Performance	P0716	rationality	Input speed delta in 0.075 sec. ≥ 1000 RPM	No SSA and SSB sol. DTC's failing No VSS DTC's failing No TP sensor DTC's failing No MAF DTC's failing No ISS DTC's failing Throttle Position ≥ 12.8 deg. Vehicle speed ≥ 7 mph Time since Engine run ≥ 5 sec fuel cut-off state = inactive	10 times in 10 sec. frequency: 25 ms cont.	Type B
A/T Input Speed Sensor Circuit No Activity	P0717	range check - low	Input speed ≤ 50 rpm	No PSA DTC failing No VSS DTC's failing No TP sensor DTC's failing Vehicle speed > 10 mph Time since engine run > 5 sec P/N status = not P/N fuel cut-off state = inactive	2 sec. frequency: 100 ms cont.	Type B

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Torque Converter Clutch System Performance - Stuck Off	P0741	rationality	Torque converter slip ≥ interpolated table look up f(torque). See below: Slip (RPM) / Torque 48 / 0 72 / 32 88 / 64 200 / 96 248 / 128 256 / 160 272 / 192 280 / 224 280 / 256	No PSA DTC failing No VSS DTC failing No TP sensor DTC failing No MAF sensor DTC failing No ISS DTC failing No TCC control sol. DTC failing No TCC Stuck on DTC failing TCC is commanded ON Trans is in D4 according to PSA 2nd, 3rd, or 4th gear ratio seen Throttle position ≥ 8 degrees -18 ≤ Trans. fluid Temp ≤ 130°C 32 ≤ Delivered Torque ≤ 150 ft-lbs Engine running for ≥ 5 sec fuel cut-off state = inactive	5 sec. frequency: 100 ms cont.	Type B
Torque Converter Clutch System Performance - Stuck On	P0742	rationality	-5 rpm ≤ Slip speed ≤ 80 rpm	No PSA DTC failing No VSS DTC failing No TP sensor DTC failing No MAF sensor DTC failing No ISS DTC failing No TCC control sol. DTC failing No TCC Stuck on DTC failing TCC is commanded OFF Trans is in D4 according to PSA 2nd, 3rd, or 4th gear ratio seen Throttle position ≥ 11.8 degrees 100 ≤ Delivered Torque ≤ 200 ft-lbs Engine running for ≥ 5 sec fuel cut-off state = inactive	6 sec. frequency: 100 ms cont.	Type B
Shift Solenoid A Performance	P0751	rationality	1. Commanded Gear = 1 Ratio = 2nd Del. Torque ≥ 60 ft-lb 2. Commanded Gear = 2 Ratio = 1st Del. Torque ≥ 70 ft-lbs 3. Commanded Gear = 3 Ratio = 4th Del. Torque ≥ 60 ft-lbs 4. Commanded Gear = 4 Ratio = 3rd Del. Torque ≥ 70 ft-lbs	No PSA DTC failing No VSS DTC failing No TP sensor DTC failing No MAF sensor DTC failing No ISS DTC failing No TCC Sol. Electrical DTC failing No Shift Sol. Electrical DTC failing Vehicle Speed ≥ 4 mph Trans is in D4, D3, D2, OR D1 Trans Temp ≥ -18 degree C Throttle position ≥ 11.0 degrees Engine running for ≥ 5 sec fuel cut-off state = inactive A shift is not in progress	1. 1.0 sec. 2. 3.0 sec. 3. 3.0 sec. 4. 5.0 sec. frequency: 100 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
Shift Solenoid A Circuit	P0753	circuit check	ODM state fail counter ≥ 17	No ODM B DTC failing Engine Running ≥ 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 ms	5 sec. frequency: 250 ms cont.	Type A
Shift Solenoid B Performance	P0756	rationality	1. Commanded Gear = 1 Ratio = 4th Del. Torque ≥ 60 ft-lb 2. Commanded Gear = 2 Ratio = 3rd Del. Torque ≥ 60 ft-lbs 3. Commanded Gear = 3 Ratio = 2nd Del. Torque ≥ 60 ft-lbs 4. Commanded Gear = 4 Ratio = 1st Del. Torque ≥ 12 ft-lbs	No PSA DTC failing No VSS DTC failing No TP sensor DTC failing No MAF sensor DTC failing No ISS DTC failing No TCC Sol. Electrical DTC failing No Shift Sol. Electrical DTC failing Vehicle Speed ≥ 4 mph Trans is in D4, D3, D2, OR D1 Trans Temp ≥ -18 degree C Throttle position ≥ 11.0 degrees Engine running for ≥ 5 sec fuel cut-off state = inactive A shift is not in progress	1. 1.0 sec. 2. 0.5 sec. 3. 4.0 sec. 4. 1.0 sec. frequency: 100 ms cont.	Type A
Shift Solenoid B Circuit	P0758	circuit check	ODM state fail counter ≥ 17	No ODM B DTC failing Engine Running ≥ 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 ms	5 sec. frequency: 250 ms cont.	Type A

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Sensed Parameter	Fault Code	Monitor Strategy Description	Malfunction Criteria & Threshold Value(s)	Secondary Parameters & Enable Conditions	Time Required & Frequency	MIL Illum. Type
A/T Range Pressure Assembly Switch Circuits	P1810	rationality	1. Illegal Range is True 2. PSA indicates P/N when Ratio indicate Drive or Reverse Gear 3. PSA indicates reverse when ratio indicates drive gear. 4. PSA indicates D4, D3, D2 or D1 when ratio indicates Reverse Gear. 5. PSA indicates D2 before engine run flag is set and PSA does not indicate P/N ≥ 4.95 sec,	General conditions (Case 1- 5) No MAF DTC failing No TP sensor DTC failing No VSS DTC failing No ISS DTC failing 10 ≤ Ign. Voltage ≤ 17 Volts Engine running for ≥ 5 sec fuel cut-off state = inactive Case 1 specific: None Case 2 specific: Vehicle Speed ≥ 5 mph Throttle position ≥ 11.0 degrees 80 ≤ Del. Torque ≤ 200 ft-lbs Case 3 specific: Vehicle Speed ≥ 5 mph Throttle position ≥ 11.0 degrees 80 ≤ Del. Torque ≤ 200 ft-lbs Case 4 specific: Vehicle Speed ≥ 5 mph Throttle position ≥ 7.0 degrees 30 ≤ Del. Torque ≤ 150 ft-lbs Case 5 specific: Vehicle speed ≤ 5 mph Running reset has not just occurred. Trans. temp. ≥ -18°C	Case 1 - 4sec. Case 2 - 4 sec. Case 3 - 4 sec. Case 4 - 3 sec. Case 5 - 5 sec. frequency: 100 ms cont.	Type A
Torque Converter Clutch PWM Solenoid Control Circuit	P1860	circuit check	ODM state fail counter ≥ 17	PWM duty cycle ≥ 85 or ≤ 10 No ODM B DTC failing Engine Running ≥ 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 ms	5 sec. frequency: 250 ms cont.	Type A