1997 5.7L (L31) C/K-truck, G-van Light Duty (< 8500 GVW) - ENGINE DIAGNOSTIC PARAMETERS

97t57R_LD_yE.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
Mass Air Flow Sensor Circuit - Range/ Rationality	P0101	0kHz - 13 kHz 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, such as a "skewed" sensor.	MAF $\Delta \geq$ a table value determined by the difference between the MAF sensor reading and the speed density calculation.	Engine Running TP sensor DTC's not active. MAP sensor DTC's not active. Evap. DTC's not active EGR DTC P0401 not active MAF sensor high / low DTC's not active. System voltage > 10V but < 17V Canister Purge DC $\leq$ 99.6% TP $\Delta \leq$ 3.9% EGR DC $\leq$ 89.8% EGR Pintle Position $\leq$ 89.8% Engine vacuum $\leq$ 90 kPa Throttle Position $\leq$ 89.8% The above must be present for a period of time greater than 2 seconds.	50 test failures within a 100 test sample. Time necessary to complete sample: 10 sec The Mass Air Flow reading and Mass Air Flow calculation are performed during the same cylinder event every 100 ms.	DTC Type A
Mass Air Flow Sensor Circuit - Low Input	P0102	0kHz - 13 kHz This DTC will determine if the MAF frequency is too low.	MAF $\leq$ 100 Hz	Engine Running Engine Run Time $\geq$ 0.4 seconds System Voltage $\geq$ 8 Volts The above must be present for a period of time greater than 0 seconds.	4 test failures within a 10 test sample. Time necessary to complete sample: 1 sec Test is run at every reading of the Mass Air Flow sensor frequency.	DTC Type A
Mass Air Flow Sensor Circuit - High Input	P0103	0kHz - 13 kHz This DTC will determine if the MAF frequency is too high.	MAF $\geq$ 10400 Hz	Engine Running Engine Run Time $\geq$ 0.4 seconds System Voltage $\geq$ 8 Volts The above must be present for a period of time greater than 0 seconds.	8 test failures within a 10 test sample. Time necessary to complete sample: 1 sec Test is run at every reading of the Mass Air Flow sensor frequency.	DTC Type A
MAP Sensor Range/Rationality	P0106	.3V to 5.0V A change in MAP must be preceded by a significant change in throttle angle and RPM. If not, a faulty MAP condition such as a "skewed" sensor exists.	Raw MAP Δ > 0.68 Volts within 12.5ms (35 counts)	TP sensor DTC's not active Engine Running Engine Speed Δ < 100 RPM Throttle Position Δ < 1.95% Idle Air Δ < 100 steps EGR Flow Rate Δ < 10% Brake Switch State = no change Clutch Switch State = no change Power Steering State = no change AC Clutch State = no change Above stabilized for 0.5 seconds	20 test failures within a 100 test sample. Time necessary to complete sample: 10 sec Continuous	DTC Type B

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MAP Sensor Circuit - Low Input	P0107	.3V to 5.0V This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < 0.25 Volts (13 counts)	TP sensor DTC's not active Engine Running Throttle Position ≥ 0% when Engine speed is ≤ 1000 RPM **or** Throttle Position is ≥ 10.1% when Engine speed is > 1000 RPM	20 test failures within a 100 test sample. Time necessary to complete sample is based on engine speed. At 1600 RPM, the time would be 938 ms. Continuous	DTC Type A
MAP Sensor Circuit -High Input	P0108	.3V to 5.0V This DTC detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	Raw MAP > 4.9 Volts (252 counts)	Cold Start Run Time - Table value in seconds based on Powerup Coolant Temperature. ***Run Test*** TP sensor DTC's not active Throttle Position ≤ 96.8% when Engine speed is ≤ 1000 RPM **or** Throttle Position is ≤ 89.8% when Engine speed is > 1000 RPM	20 test failures within a 100 test sample. Time necessary to complete sample is based on engine speed. At 1600 RPM, the time would be 938 ms. Continuous	DTC Type A
Intake Air Temp. Sensor Circuit -Low Input	P0112	.24V to 5.0V The DTC detects a continuous short to ground in the IAT signal circuit or the IAT sensor	**Low Resistance pull-up** Raw IAT < 0.82 Volts **High Resistance pull-up** Raw IAT < 0.07 Volts	ECT sensor DTC's not active MAF sensor DTC's not active VS sensor DTC's not active Vehicle speed ≥ 2 mph Engine run time > 100 seconds	40 test failures within a 100 test sample Time necessary to complete sample: 12.5 sec Continuous	DTC Type A
Intake Air Temp. Sensor Circuit - High Input	P0113	.24V to 5.0V The DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	**Low Resistance pull-up** Raw IAT > 5.0 Volts **High Resistance pull-up** Raw IAT > 4.9 Volts	ECT sensor DTC's not active VS sensor DTC's not active MAF sensor DTC's not active Vehicle speed < 2 mph Mass Air flow < 250 g /s Coolant Temperature > 84.7°C Engine run time > 100 seconds	40 test failures within a 100 test sample Time necessary to complete sample: 12.5 sec Continuous	DTC Type A
Engine Coolant Temp. Sensor Circuit-Low Input	P0117	.24V to 5.0V The DTC detects a continuous short to ground in the ECT signal circuit or the ECT sensor	**Low Resistance pull-up** Raw ECT < 0.25 Volts **High Resistance pull-up** Raw ECT < 0.25 Volts	Engine run time > 5 seconds	40 test failures within a 100 test sample Time necessary to complete sample: 50 sec Continuous	DTC Type A

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Engine Coolant Temp. Sensor Circuit-High Input	P0118	.24V to 5.0V The DTC detects a continuous short to high or open in the ECT signal circuit or the ECT sensor	**Low Resistance pull-up** Raw ECT > 4.9 Volts **High Resistance pull-up** Raw ECT > 4.9 Volts	Engine run time > 5 seconds	40 test failures within a 100 test sample Time necessary to complete sample: 50 sec Continuous	DTC Type A
Throttle Position Sensor Circuit Range/Rationality	P0121	.5V to 5.0V The DTC detects a "skewed" or stuck TP sensor	***Stuck high test:*** The last throttle position value is > predicted throttle position based on engine RPM. ***Stuck low test:*** The last throttle position value is < predicted throttle position based on engine RPM.	***Test Enable:*** No TP sensor short DTC's active No IAC DTC's active No MAP DTC's active Engine running BARO not defaulted TP Δ < 1.9% ***Stuck high test:*** MAP < 50 kPa ***Stuck low test:*** Stuck high test has passed MAP > 60 kPa IAC > 10 counts but < 340 counts	***Stuck high test:*** 50 test failures within a 100 test sample ***Stuck low test:*** 50 test failures within a 100 test sample Time necessary to complete each sample: 50 sec Continuous	DTC Type B
Throttle Position Sensor Circuit-Low Input	P0122	.5V to 5.0V This DTC detects a continuous short to low or open in either the signal circuit or the TP sensor.	TP sensor signal voltage < .25 volts (13 counts)	Engine running	5 consecutive test failures within a 10 test sample Time necessary to complete sample: 1 sec Continuous	DTC Type A
Throttle Position Sensor Circuit-High Input	P0123	.5V to 5.0V This DTC detects a continuous short to high in either the signal circuit or the TP sensor.	TP sensor signal voltage > 4.7 volts (242 counts)	Engine running	5 consecutive test failures within a 10 test sample Time necessary to complete sample: 1 sec Continuous	DTC Type A

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Min. Cool. Temp. to Allow C.L. Op. Not Achieved Without Excess. Time	P0125	.24V to 5.0V The DTC detects if a stabilized minimum closed-loop is reached and maintained after engine start-up.	Minimum stabilized ECT < 20°C after 300 seconds. Minimum stabilized ECT < 20°C after 120 seconds.	***Diagnostic Enable*** Engine running ECT sensor short tests not failing or DTC's not active IAT sensor DTC's not active IAT> - 9°C ECT > - 9°C Start-up ECT ≤ 40°C *Closed Loop Test:* For a vehicle saturated at -7°C (20°F) Accumulated air flow since start > 5600 grams Accumulated Idle time < 225 seconds For a vehicle saturated at 10°C (50°F) Accumulated air flow since start > 2000 grams **Accumulated Idle time < 90 seconds**	10 consecutive test failures Continuous	DTC Type B
O2S Circuit-Low Voltage (Bank 1, Sensor 1)	P0131	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady state throttle and during power enrichment (PE).	***Lean test:*** O2 sensor voltage < 86 mV or ***PE Lean Test:*** O2 sensor voltage < 598 mV	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 lean tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Lean test):*** Closed loop low MAP not active Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 3.5% but < 99% Above met for 5 seconds ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 1 sec.	***Lean Test:*** 500 test failures in a 600 test sample Time necessary to complete sample: 60 sec Continuous or ***PE Lean Test***: 300 test failures in a 500 test sample. Time necessary to complete sample: 50 sec	DTC Type A

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O2S Circuit-High Voltage (Bank 1, Sensor 1)	P0132	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle and Decel fuel cutoff (DFCO)	***RichTest:*** O2 sensor voltage > 976mV or ***DFCO Rich Test:*** O2 sensor voltage > 468 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 rich tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Rich Test):*** Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 0% but < 50% Above met for 5 seconds ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec.	***Rich Test:*** 400 test failures in a 500 test sample Time necessary to complete sample: 50 sec Continuous or ***DFCO Rich Test:*** 300 test failures in a 500 test sample Time necessary to complete sample: 50 sec	DTC Type A
O2S Circuit-Slow Response (Bank 1, Sensor 1)	P0133	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by checking its response time.	O2 sensor average transition time: L/R > 85 millisec. R/L > 85 millisec. **O2 voltage < 300 mV = lean* **O2 voltage > 600 mV = rich*	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0131, P0132, P0134 and P0135 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per ignition cycle	DTC Type B

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O2S Circuit- No Activity Detected (Bank 1,Sensor 1)	P0134	.1V to 1.0V This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 299 mV but < 598 mV	***O2 Diagnostic Enable**: (the following criteria must be met to enable the O2 open test)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***O2 Sensor Open Test Enable:*** O2 Sensor Temperature Test = True DTC P0135 not active	600 test failures with in a 1000 test sample Time necessary to complete sample: 100 sec Continuous	DTC Type A
O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135	11.5V to 14.5V This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± .150V from the mean O2 bias voltage. *Time based on table: Time Vs Average Air Flow	System Voltage > 9V but < 17V *(NOTE: If voltage remains outside this window for 4 consecutive seconds, the test is void for this cold start.)* Air Flow < 27 g/sec Engine run time > 2 seconds ECT < 32°C IAT < 32°C Δ ECT-IAT ≤ 5°C	From cold start to a maximum time of 110 seconds. *Time determined by table.	DTC Type B

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O2S Circuit-Low Voltage (Bank 1, Sensor 2)	P0137	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady state throttle and during power enrichment (PE).	***Lean test:*** O2 sensor voltage < 26 mV or ***PE Lean Test:*** O2 sensor voltage < 399 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 lean tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Lean test):*** Closed loop low MAP not active Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 3.5% but < 99% Above met for 5 seconds ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 2 sec.	***Lean Test:*** 1100 test failures in a 1300 test sample Time necessary to complete sample: 130 sec Continuous or ***PE Lean Test***: 400 test failures in a 500 test sample. Time necessary to complete sample: 50 sec	DTC Type B
O2S Circuit-High Voltage (Bank 1, Sensor 2)	P0138	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle and Decel fuel cutoff (DFCO)	***Rich Test:*** O2 sensor voltage > 993 mV or ***DFCO Rich Test:*** O2 sensor voltage > 468 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 rich tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Rich Test):*** Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 0% but < 50% Above met for 5 seconds ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec.	***Rich Test:*** 1100 test failures in a 1500 test sample Time necessary to complete sample: 150 sec Continuous or ***DFCO Rich Test:*** 400 test failures in a 500 test sample Time necessary to complete sample: 50 sec	DTC Type B

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O2S Circuit- No Activity Detected (Bank 1,Sensor 2)	P0140	.1V to 1.0V This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 351 mV but < 473 mV	***O2 Diagnostic Enable**: (the following criteria must be met to enable the O2 open test)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***O2 Sensor Open Test Enable:*** O2 Sensor Temperature Test = True DTC P0141 not active Closed Loop	800 test failures with in a 1000 test sample Time necessary to complete sample: 100 sec Continuous	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 2)	P0141	11.5V to 14.5V This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± .150V from the mean O2 bias voltage. *Time based on table: Time Vs Average Air Flow	System Voltage > 9V but < 17V *(NOTE: If voltage remains outside this window for 4 consecutive seconds, the test is void for this cold start.)* Air Flow < 27 g/sec Engine run time > 2 seconds ECT < 32°C IAT < 32°C Δ ECT-IAT ≤ 5°C	From cold start to a maximum time of 255 seconds. *Time determined by table.	DTC Type B

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O2S Circuit-Low Voltage (Bank 2, Sensor 1)	P0151	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady state throttle and during power enrichment (PE).	***Lean test:*** O2 sensor voltage < 86 mV or ***PE Lean Test:*** O2 sensor voltage < 598 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 lean tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Lean test):*** Closed loop low MAP not active Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 3.5% but < 99% Above met for 5 seconds ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 1 sec.	***Lean Test:*** 500 test failures in a 600 test sample Time necessary to complete sample: 60 sec Continuous or ***PE Lean Test***: 300 test failures in a 500 test sample. Time necessary to complete sample: 50 sec	DTC Type B
O2S Circuit-High Voltage (Bank 2, Sensor 1)	P0152	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle and Decel fuel cutoff (DFCO)	***RichTest:*** O2 sensor voltage > 976 mV or ***DFCO Rich Test:*** O2 sensor voltage > 468 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 rich tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Rich Test):*** Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 0% but < 50% Above met for 5 seconds ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec.	***Rich Test:*** 400 test failures in a 500 test sample Time necessary to complete sample: 50 sec Continuous or ***DFCO Rich Test:*** 300 test failures in a 500 test sample Time necessary to complete sample: 50 sec	DTC Type B

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O2S Circuit-Slow Response (Bank 2, Sensor 1)	P0153	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by checking its response time.	O2 sensor average transition time: L/R > 85 millisec. R/L > 85 millisec. **O2 voltage < 300 mV = lean* **O2 voltage > 600 mV = rich*	***O2 Diagnostic Enable**: (the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0131, P0132, P0134 and P0135 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per ignition cycle	DTC Type B
O2S Circuit- No Activity Detected (Bank 2,Sensor 1)	P0154	.1V to 1.0V This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 299 mV but < 598 mV	***O2 Diagnostic Enable**: (the following criteria must be met to enable the O2 open test)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***O2 Sensor Open Test Enable:*** O2 Sensor Temperature Test = True DTC P0147 not active	600 test failures with in a 1000 test sample Time necessary to complete sample: 100 sec Continuous	DTC Type B

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O2S Heater Circuit Malfunction (Bank 2, Sensor 1)	P0155	11.5V to 14.5V This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± .150V from the mean O2 bias voltage. *Time based on table: Time Vs Average Air Flow	System Voltage > 9V but < 17V *NOTE: If voltage remains outside this window for 4 consecutive seconds, the test is void for this cold start.)* Air Flow < 27 g/sec Engine run time > 2 seconds ECT < 32°C IAT < 32°C ∆ ECT-IAT ≤ 5°C	From cold start to a maximum time of 110 seconds. *Time determined by table.	DTC Type B
O2S Circuit-Low Voltage (Bank 2, Sensor 2)	P0157	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to low by checking for a lean condition during steady state throttle and during power enrichment (PE).	***Lean test:*** O2 sensor voltage < 26 mV or ***PE Lean Test:*** O2 sensor voltage < 399 mV	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 lean tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Lean test):*** Closed loop low MAP not active Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 2sec.	***Lean Test:*** 1100 test failures in a 1300 test sample Time necessary to complete sample: 130 sec Continuous or ***PE Lean Test***: 400 test failures in a 500 test sample. Time necessary to complete sample: 50 sec	DTC Type A

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
O2S Circuit-High Voltage (Bank 2, Sensor 2)	P0158	.1V to 1.0V This DTC determines if the O2 sensor or circuit is shorted to high by checking for a rich condition during steady throttle and Decel fuel cutoff (DFCO)	***Rich Test:*** O2 sensor voltage > 993 mV or ***DFCO Rich Test:*** O2 sensor voltage > 468 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 rich tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Test Enable (Rich Test):*** Closed loop Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec.	***Rich Test:*** 1100 test failures in a 1500 test sample Time necessary to complete sample: 150 sec Continuous or ***DFCO Rich Test:*** 400 test failures in a 500 test sample Time necessary to complete sample: 50 sec	DTC Type A
O2S Circuit- No Activity Detected (Bank 2,Sensor 2)	P0160	.1V to 1.0V This DTC determines if the O2 sensor or the O2 sensor circuit has developed an open.	O2 sensor > 399 mV but < 473 mV	***O2 Diagnostic Enable****: (the following criteria must be met to enable the O2 open test)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***O2 Sensor Open Test Enable:*** O2 Sensor Temperature Test = True DTC P0155 not active Closed Loop	800 test failures with in a 1000 test sample Time necessary to complete sample: 100 sec Continuous	DTC Type A
O2S Heater Circuit Malfunction (Bank 2, Sensor 2)	P0161	11.5V to 14.5V This DTC determines if the O2 sensor heater is functioning properly by monitoring the amount of time necessary for the O2 sensor to become active after start - up.	The elapsed time to obtain ± .150V from the mean O2 bias voltage. *Time based on table: Time Vs Average Air Flow	System Voltage > 9V but < 17V *(NOTE: If voltage remains outside this window for 4 consecutive seconds, the test is void for this cold start.)* Air Flow < 27 g/sec Engine run time > 2 seconds ECT < 32°C IAT < 32°C Δ ECT-IAT ≤ 5°C	From cold start to a maximum time of 255 seconds. *Time determined by table.	DTC Type B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
System Too Lean (Bank 1)	P0171	Determines if the system is in a lean condition.	The average of short term fuel trim samples ≥ 1.0 and The average of adaptive index multiplier samples ≥ 1.20	***Test Enable:*** IAC / Idle DTC's not active O2 sensor DTC's not active TP sensor DTC's not active MAP DTC's not active EGR DTC's not active Evap. DTC's not active ECT DTC's not active MAF DTC's not active IAT DTC's not active VS sensor DTC's not active Misfire DTC's not active Throttle position < 69.9% Engine speed > 575 rpm but < 4500 rpm Baro > 70 kPa ECT > 60°C but < 99.7°C MAP > 20 kPa but < 98.9 kPa IAT > -20 °C but < 69.7°C Air flow > 3 g/s < 150 g/s Vehicle speed < 85 mph	If lean counter is ≥ 6 counts 1 count ≅ 200 ms Continuous	DTC Type B
System Too Rich (Bank 1)	P0172	Determines if the system is in a rich condition.	The average of short term fuel trim samples ≤ 1.0 and If adaptive lag factor < 0.859375 and the purge duty cycle > 26.172 then purge valve is commanded closed. If the integrator exceeds 1.03 or the integrator rises more than 0.15625 within 10 seconds, the diagnostic is turned OFF for 300 seconds to enable the Evap. canister to purge. If the integrator does not exceed 1.03 or the integrator does not rise more than 0.15625 within 10 seconds, a fault is present.	***Test Enable:*** IAC / Idle DTC's not active O2 sensor DTC's not active TP sensor DTC's not active MAP DTC's not active EGR DTC's not active Evap. DTC's not active ECT DTC's not active MAF DTC's not active IAT DTC's not active VS sensor DTC's not active Misfire DTC's not active Throttle position < 69.9% Engine speed > 575 rpm but < 4500 rpm Baro > 70 kPa ECT > 60°C but < 99.7°C MAP > 20 kPa but < 98.9 kPa IAT > -20 °C but < 69.7°C Air flow > 3 g/s < 150 g/s Vehicle speed < 85 mph	If rich counter is ≥ 6 counts 1 count ≅ 200 ms Continuous	DTC Type B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
System Too Lean (Bank 2)	P0174	Determines if the system is in a lean condition.	The average of short term fuel trim samples ≥ 1.0 and The average of adaptive index multiplier samples ≥ 1.20	***Test Enable:*** IAC / Idle DTC's not active O2 sensor DTC's not active TP sensor DTC's not active MAP DTC's not active EGR DTC's not active Evap. DTC's not active ECT DTC's not active MAF DTC's not active IAT DTC's not active VS sensor DTC's not active Misfire DTC's not active Throttle position < 69.9% Engine speed > 575 rpm but < 4500 rpm Baro > 70 kPa ECT > 60°C but < 99.7°C MAP > 20 kPa but < 98.9 kPa IAT > -20 °C but < 69.7°C Air flow > 3 g/s < 150 g/s Vehicle speed < 85 mph	If lean counter is ≥ 6 counts 1 count ≅ 200 ms Continuous	DTC Type B
System Too Rich (Bank 2)	P0175	Determines if the system is in a rich condition.	The average of short term fuel trim samples ≤ 1.0 and If adaptive lag factor < .859375 and the purge duty cycle > 26.172, then purge valve is commanded closed. If the integrator exceeds 1.03 or the integrator rises more than 0.15625 within 10 seconds, the diagnostic is turned OFF for 300 seconds to enable the Evap. canister to purge. If the integrator does not exceed 1.03 or the integrator does not rise more than 0.15625 within 10 seconds, a fault is present.	***Test Enable:*** IAC / Idle DTC's not active O2 sensor DTC's not active TP sensor DTC's not active MAP DTC's not active EGR DTC's not active Evap. DTC's not active ECT DTC's not active MAF DTC's not active IAT DTC's not active VS sensor DTC's not active Misfire DTC's not active Throttle position < 69.9% Engine speed > 575 rpm but < 4500 rpm Baro > 70 kPa ECT > 60°C but < 99.7°C MAP > 20 kPa but < 98.9 kPa IAT > -20 °C but < 69.7°C Air flow > 3 g/s < 150g/s Vehicle speed < 85 mph	If rich counter is ≥6 counts 1 count ≅ 200 ms Continuous	DTC Type B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	This DTC will determine if a misfire is occurring on all cylinders in the engine. If a misfire is occurring on only one cylinder, then a single cylinder misfire is occurring and the corresponding cylinder specific DTC will be activated by the executive.	Deceleration index Vs Engine Speed Vs Load and Camshaft Position FTP Threshold - 1.85% I/M Threshold - 1.85% Catalyst Damaging - see speed/load chart	***TEST Enable:*** TP sensor DTC's not active MAP sensor DTC's not active Camshaft Position sensor DTC's not active Crank sensor DTC's not active ECT ≥ -7°C System voltage ≥ 9 volts but ≤ 14 volts Engine speed ≥ 600 RPM but ≤ 5600 RPM + Throttle position Δ < 4.9%/100ms - Throttle position Δ < 2.9%/100ms	Emission Level 10 failed 200 revolution blocks out of 16 Cat. Damaging Level 4 failed 200 revolution block Continuous	DTC Type B *EMISSION* DTC Type A *CATALYST DAMAGING*
Knock Sensor 1 Circuit - Malfunction	P0325	0V - 5V This diagnostic will detect excessive noise on the knock sensor circuit.	***SNEF STUCK LOW TEST:*** Knock is detected for excessive amount of time.	***SNEF STUCK LOW TEST:*** DTC P0327 not active Engine Run Time ≥ 120 seconds System voltage > 10 V but ≤ 17.1 V	***SNEF STUCK LOW TEST:*** 10 test failures within a 100 test sample. Time necessary to complete sample: 50 sec	DTC Type B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
Knock Sensor 1 Circuit - Low Input	P0327	0V - 5V This diagnostic will detect a lack of noise on the knock sensor circuit.	***KNOCK SENSOR UPDATE TEST*** Learned Minimum noise Value updated with the filtered value every 50 msec. ***SNEF STUCK LOW TEST:*** Knock is detected for excessive amount of time. ***ACTIVE NOISE CHANNEL TEST:*** Knock sensor noise ≤ 50 A/D counts or > 200 A/D counts. (ESC noise - Minimum Noise Value)	***KNOCK SENSOR UPDATE TEST:*** Timing retard ≤ 0 ° System voltage > 10 V but ≤ 17.1 V ECT ≥ 60° C Engine Run Time ≥ 120 seconds Engine speed > 500 RPM but ≤ 900 RPM Knock sensor noise < 3 counts ***SNEF STUCK LOW TEST:*** Engine Run Time ≥ 120 seconds System voltage > 10 V but ≤ 17.1 V ***ACTIVE NOISE CHANNEL TEST:*** ECT DTC's not active TP sensor DTC's not active Knock sensor update test complete ECT ≥ 60° C Engine speed > 2000 RPM but ≤ 3000 RPM Throttle position ≥ 5.9%°	***SNEF STUCK LOW TEST:*** 10 test failures within a 100 test sample. Time necessary to complete sample: 50 sec ***ACTIVE NOISE CHANNEL TEST:*** Noise counter ≥ 20 counts. 1 count ≅ 100 msec.	DTC Type B
Crankshaft Position Sensor Circuit- Low Input	P0337	4X Signal This diagnostic will detect a low duty cycle from the crankshaft position sensor.	Crank sensor duty cycle High Ref / Low Ref < .3125	Engine speed < 4000 RPM Air Flow ≥ 5 g/second	15 Ref pulse failures within a 20 sample limit. Time necessary to complete sample: Varies with engine speed. Once every TDC	DTC Type B
Crankshaft Position Sensor Circuit-Intermittent Input	P0339	4X Signal This diagnostic will detect an intermittent crankshaft position signal.	The calculated instantaneous engine speed Δ ≥ 1000 RPM or The calculated instantaneous engine speed = 0 RPM and 4 or more cam cycles have occurred for a period of 1 count (2 to 3 seconds)	Air Flow ≥ 5 g/second	10 test failures within a 400 sample limit. Time necessary to complete sample: 5 sec	DTC Type B
Camshaft Position Sensor Circuit Malfunction	P0340	1X Signal This diagnostic will detect if the Cam Sensor signal is present.	Cam Sensor reference pulse is not seen once every 8 cylinders .	Engine Running	If Cam signal is not detected within 1.75 seconds, test has failed. Once every TDC	DTC Type B

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Camshaft Position Sensor Circuit Range/Rationality	P0341	1X Signal This diagnostic will determine if the Cam Sensor is synchronized correctly.	Cam Sensor reference pulse is not detected at the correct interval every 8 cylinders.	Engine Running	40 failed tests within a 100 test sample. Time necessary to complete sample: Varies with engine speed. Once every TDC	DTC Type B
Exhaust Gas Recirculation - Insufficient Flow Detected	P0401	This diagnostic will determine if there is a reduction in EGR flow.	With EGR valve open, the peak + MAP Δ is monitored over a time of 2 seconds. This value is compared with a threshold from Engine Speed Vs Baro table and the difference computed. The result is statistically filtered (EWMA) and compared to a decision limit. DTC is set when the filtered result exceeds the decision limit.	***Test Enable*** TP sensor DTC's not active MAP DTC's not active VS sensor DTC's not active IAT sensor DTC's not active ECT sensor DTC's not active IAC DTC's not active Linear EGR Pintle Position DTC not active Misfire DTC's not active CCP DTC's not active ECT > 69.8° C Baro > 70 kPa Vehicle Speed > 27 mph IAC Δ < 6 counts (*Automatic Transmission*) IAC Δ < 10 counts (*Manual Transmission*) AC clutch status is unchanged Transmission status is unchanged ***Start Test*** Throttle Position < 1.2% EGR Position < 1% Engine Speed > 1000 rpm but < 1900 rpm *(Manual Transmission)* Engine Speed > 800 rpm but < 1600 rpm *(Automatic Transmission)* MAP Δ < 1 A/D count Compensated MAP > 20 kPa but < 32 kPa Not in DFCO *(Automatic Transmission)* No change in DFCO state *(Manual Transmission)* ***Run Test*** Stabilized MAP (valve closed) recorded and EGR valve "ramped" open over a time interval and peak MAP value recorded and MAP Δ computed. EGR valve closed	2 seconds Once per trip	DTC Type A

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Catalyst System Efficiency Below Threshold - (Bank 1)	P0420	This diagnostic will determine the efficiency of the catalytic converter.	Deviation Difference Average = 39 mV from O2 sensor (Bank1,Sensor 1)	***Converter Warm Up Status*** Engine in closed loop Commanded Air/Fuel ratio = 14.7:1 Air flow > 15 g/sec Predicted catalyst warm up temperature >450°C ***Test Enable*** Converter Warm Up Test Passed IAT ≥ -15° C ECT > 75° C Air Flow > 15 g/sec but ≤ 50 g/sec Δ engine load ≤ 8.9% Vehicle Speed ≥ 20 mph but ≤ 85 mph(≥ 0 mph with scan tool installed) Engine air load ≤ 99% Engine speed ≤ 4900 rpm Throttle Position ≥ 1.9% VS sensor DTC's not active TP sensor DTC's not active O2 sensor DTC's not active Misfire DTC's not active MAP sensor DTC's not active Fuel Trim DTC's not active IAT sensor DTC's not active MAF DTC's not active	50 tests per trip Time necessary to complete sample: 173 sec Continuous	DTC Type A
Catalyst System Efficiency Below Threshold - (Bank 2)	P0430	This diagnostic will determine the efficiency of the catalytic converter.	Deviation Difference Average =39 mV from O2 sensor (Bank2,Sensor 1)	***Converter Warm Up Status*** Engine in closed loop Commanded Air/Fuel ratio = 14.7:1 Air flow > 15 g/sec Predicted catalyst warm up temperature >450°C ***Test Enable*** Converter Warm Up Test Passed IAT ≥ -15° C ECT > 75° C Air Flow > 15 g/sec but ≤ 50 g/sec Δ engine load ≤ 8.9% Vehicle Speed ≥ 20 mph but ≤ 85 mph(≥ 0 mph with scan tool installed) Engine air load ≤ 99% Engine speed ≤ 4900 rpm Throttle Position ≥ 1.9% VS sensor DTC's not active TP sensor DTC's not active O2 sensor DTC's not active Misfire DTC's not active MAP sensor DTC's not active Fuel Trim DTC's not active IAT sensor DTC's not active MAF DTC's not active	50 tests per trip Time necessary to complete sample: 173 sec Continuous	DTC Type A

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Evap. Emission Control System - Incorrect Purge Flow	P0441	0V-5V This diagnostic will detect a purge solenoid stuck closed by monitoring the Evap. Purge Vacuum switch state when the Evap. Purge solenoid duty cycle is 100%. 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) vacuum for a period > 5 seconds	***Test Enable:*** TP sensor DTC's not active IAT sensor DTC's not active MAP sensor DTC's not active ECT sensor DTC's not active Baro > 75 kPa ECT ≤ 114.7 °C Powerup IAT > 3°C IAT ≤ 80.25 °C ECT/IAT Δ ≤ 9.75°C Inhibit timer > 5 seconds ***Solenoid ON Test:*** Purge DC ≥ 90% Manifold Vacuum ≥ 15 kPa but < 75 kPa Throttle Position ≥ 5.8% but ≤ 60% Engine Speed ≥ 800 RPM but ≤ 3000 RPM Above present > 5 seconds	For 5 test failures Continuous	DTC Type B
Vehicle Speed (VS) Sensor Signal Missing	P0500	The DTC detects a missing speed signal between a combination of the rear and front speed sensors.	Vehicle Speed = 0 MPH	MAP sensor DTC's not active MAP < 20 kPa Coolant Temperature > 60° C Engine > 1400 RPM but < 4400 RPM Throttle Position < 3.125 %	Failing > 5 seconds Continuous	DTC Type A
Idle Control System RPM Lower Than Expected	P0506	This DTC will determine if a low idle is the result of a IAC valve or circuit. A low idle is defined as 75 RPM below the desired idle.	Air flow Δ < 3 g/s	***Test Enable: (non - intrusive)*** TP sensor DTC's not active VS sensor DTC's not active ECT DTC's not active MAP DTC's not active IAT DTC's not active Cam sensor DTC's not active Misfire DTC's not active CATMON DTC's not active EST DTC's not active ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa TP < 1% VS < 2 MPH Above met for a time > 3 seconds to enable diagnostic. If non-intrusive test fails, intrusive test is run. ***Run Test: (intrusive)*** Air Flow > 17.5 g/sec but < 50 g/sec VS > 25 MPH but < 85 MPH TP Δ < 1% Engine Speed Δ < 50 RPM IAC motor commanded 10 %/ 100 msec.	10 seconds Continuous after enable	DTC Type B

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Idle Control System RPM Higher Than Expected	P0507	This DTC will determine if a high idle is the result of a IAC valve or circuit. A high idle is defined as 100 RPM above the desired idle.	Air flow Δ < 3 g/s	***Test Enable: (non - intrusive)*** TP sensor DTC's not active VS sensor DTC's not active ECT DTC's not active MAP DTC's not active Cam position DTC's not active CATMON DTC's not active Misfire DTC's not active IAT DTC's not active EST DTC's not active ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70kPa TP < 1% VS < 2 MPH Above met for a time > 3 seconds to enable diagnostic. If non-intrusive test fails, intrusive test is run. ***Run Test: (intrusive)*** Air Flow > 17.5 g/sec but < 50 g/sec VS > 25 MPH but < 85 MPH TP Δ < 1% Engine Speed Δ < 50 RPM IAC motor commanded 10 %/ 100 msec.	10 seconds Continuous after enable	DTC Type B
Transmission Clutch Switch Input Malfunction (Manual Trans. Only)	P0704	This DTC will determine if the Transmission Clutch Switch has failed but looking for a clutch transition within a range from 0 MPH to some higher speed.	No clutch transitions detected	VS sensor DTC's not active Vehicle Speed > 50 mph	5 consecutive test failures Time necessary to complete sample: 500 msec	DTC Type B

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O2 Sys. Fault - Too Few O2S R/L or L/R Switches, Insufficient Activity (Bank 1, Sensor 1)	P1133	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 50 R/L switches < 50	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0131, P0132, P0134 and P0135 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per key cycle	DTC Type B
O2S Circuit - Transition Time Ratio Malfunction (Bank 1,Sensor 1)	P1134	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by checking the ratio of average response time.	Ratio of average response times: Ratio > 3.5 or < .5 **O2 voltage < 300 mV = lean* **O2 voltage > 600 mV = rich*	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0131, P0132, P0134 and P0135 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per ignition cycle	DTC Type B

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O2 Sys. Fault - Too Few O2S R/L or L/R Switches, Insufficient Activity (Bank 2, Sensor 1)	P1153	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 50 R/L switches < 50	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0151, P0152, P0154 and P0155 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per key cycle	DTC Type B
O2S Circuit - Transition Time Ratio Malfunction (Bank 2,Sensor 1)	P1154	.1V to 1.0V This DTC determines if the O2 sensor functioning properly by checking the ratio of the average response time.	Ratio of average response times: Ratio > 3.5 or < .5 **O2 voltage < 300 mV = lean* **O2 voltage > 600 mV = rich*	***O2 Diagnostic Enable***: *(the following criteria must be met to enable the O2 Response tests)* TP sensor DTC's not active Evap. DTC's not active IAT sensor DTC's not active MAP DTC's not active ECT sensor DTC's not active MAF sensor DTC's not active Misfire DTC's not active No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active DTC's P0151, P0152, P0154 and P0155 not active Closed loop ECT > 57°C Engine run time > 75 seconds Air flow ≥ 15 g/s but ≤ 55 g/s Engine speed ≥ 1100 rpm but ≤ 3000 rpm Canister Purge Duty Cycle ≥ 0% Above present for > 2 seconds	100 seconds after closed loop enable Once per ignition cycle	DTC Type B
Camshaft Sensor Misinstalled	P1345	1X Signal This diagnostic will determine if the Cam sensor and high voltage switch have been installed correctly.	Cam signal falling edge out of phase ± 15°from crank falling edge.	----------	30 test failures within a 50 test sample size. Time necessary to complete sample: Varies with engine speed Every crank fall	DTC Type A

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EST Output High	P1351	0 V-1V This diagnostic will determine if a failure has occurred due to an open circuit.	EST voltage >4.9 V	EST Enabled Engine speed < 250 RPM	20 test failures Time necessary to complete sample: Executed during crank, approximately 3 sec Once per ignition cycle	DTC Type A
EST Not Toggling After Enable	P1361	0 V-1V This diagnostic will determine if a failure has occurred due to a grounded circuit.	EST voltage <1.5V	EST Enabled Engine speed < 250 RPM	20 test failure Time necessary to complete sample: Executed during crank, approximately 3 sec Once per ignition cycle	DTC Type A
Exhaust Gas Recirculation System- Pintle Position Error	P1406	0V - 5V This diagnostic will detect three conditions: 1. An open or short 2. Closed valve position too high 3. Position error too high	1. Pintle position < 6 A/D counts for 10 seconds 2. Pintle position > 10 A/D counts from learned closed valve position for 10 seconds for 5 debris purging subroutines. 3. Deviation between actual position and desired position > 10% for 10 seconds	Ignition voltage > 9 volts	All three tests must pass before a "test passed" is reported to the executive. Continuous	DTC Type A
Evap. Emission Control System - Continuous Open Purge Flow	P1441	0V-5V This diagnostic will detect a purge solenoid stuck open by monitoring the Evap. Purge Vacuum switch state when the Evap. Purge solenoid duty cycle is 0%. 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 vacuum for a period > 5 seconds	***Test Enable:*** TP sensor DTC's not active IAT sensor DTC's not active MAP sensor DTC's not active ECT sensor DTC's not active Baro > 75 kPa ECT ≤ 114.7 °C Powerup IAT > 3°C IAT ≤ 80.25 °C ECT/IAT Δ ≤ 9.75°C Inhibit timer > 5 seconds ***Solenoid OFF Test:*** Purge DC ≤ 0% Manifold Vacuum ≥ 20 kPa but < 80 kPa Throttle Position ≥ 0% but ≤ 50% Engine Speed ≥ 500 RPM but ≤ 2500 RPM Above present > 5 seconds	For 5 test failures Continuous	DTC Type B

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA & THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME REQUIRED & FREQUENCY	MIL ILLUM. TYPE
Idle Air Control - Low	P1508	This DTC will determine if a low idle is the result of an engine mechanical problem. A low idle is defined as 75 RPM below the desired idle.	Air flow Δ > 3 g/s	***Test Enable: (non - intrusive)*** TP sensor DTC's not active VS sensor DTC's not active ECT DTC's not active MAP DTC's not active Cam sensor DTC's not active CATMON DTC's not active Misfire DTC's not active IAT DTC's not active EST DTC's not active ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa TP < 1% VS < 2 MPH Above met for a time > 3 seconds to enable diagnostic. If non-intrusive test fails, intrusive test is run. ***Run Test: (intrusive)*** Air Flow > 17.5 g/sec but < 50 g/sec VS > 25 MPH but < 85 MPH TP Δ < 1% Engine Speed Δ < 50 RPM IAC motor commanded 10 %/ 100 msec.	10 seconds Continuous after enable	DTC Type B
Idle Air Control - High	P1509	This DTC will determine if a high idle is the result of an engine mechanical problem. A high idle is defined as 100 RPM above the desired idle.	Air flow Δ > 3 g/s	***Test Enable: (non - intrusive)*** TP sensor DTC's not active VS sensor DTC's not active ECT DTC's not active MAP DTC's not active Cam sensor DTC's not active CATMON DTC's not active Misfire DTC's not active IAT DTC's not active EST DTC's not active ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa TP < 1% VS < 2 MPH Above met for a time > 3 seconds to enable diagnostic. If non-intrusive test fails, intrusive test is run. ***Run Test: (intrusive)*** Air Flow > 17.5 g/sec but < 50 g/sec VS > 25 MPH but < 85 MPH TP Δ < 1% Engine Speed Δ < 50 RPM IAC motor commanded 10 %/ 100 msec.	10 seconds Continuous after enable	DTC Type B

1997 5.7L (L31) C/K, G (< 8500 GVW) ENGINE DIAGNOSTIC PARAMETERS

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Crankshaft Position Sensor Circuit- Range	P0336	4X Signal This diagnostic will detect a loss of crank sensor signal or long time constant intermittent that would result in a " no start" condition.	Crank Position Sensor Signal missing for a time ≥ .5 seconds.	Engine Cranking 4 or more Cam Shaft Position Signals Present	≥ 3 seconds During engine crank.	DTC Type D
Crankshaft Position Sensor Circuit-High Input	P0338	4X Signal This diagnostic will detect a high duty cycle from the crankshaft position sensor.	Crank sensor High Ref/Low Ref > .6875	Engine speed < 4000 RPM Air Flow ≥ 5 g/second	15 Ref pulse failures within a 20 sample limit. Once every TDC	DTC Type D
MAP Sensor Circuit -High Input (Intermittent)	P1106	.3V to 5.0V This DTC detects an intermittent open sensor ground or intermittent short to high in either the signal circuit or the MAP sensor.	Raw MAP > 4.9 Volts (252 counts)	Cold Start Run Time - Table value in seconds based on Powerup Coolant Temperature. ***Run Test*** TP sensor DTC's not active Throttle Position ≤ 96.8% when Engine speed is ≤ 1000 RPM **or** Throttle Position is ≤ 89.8% when Engine speed is > 1000 RPM	50 test failures within a 2000 test sample. Continuous	DTC Type D
MAP Sensor Circuit - Low Input (Intermittent)	P1107	.3V to 5.0V This DTC detects an intermittent short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < .25 Volts (13 counts)	TP sensor DTC's not active Engine Running Throttle Position ≥ 0% when Engine speed is ≤ 1000 RPM **or** Throttle Position is ≥ 10.1% when Engine speed is > 1000 RPM	50 test failures within a 2000 test sample. Continuous	DTC Type D
Intake Air Temp. Sensor Circuit - High Input (Intermittent)	P1111	.24V to 5.0V The DTC detects an intermittent open or short to high in the IAT signal circuit or the IAT sensor	**Low Resistance pull-up** Raw IAT > 5.0 Volts **High Resistance pull-up** Raw IAT > 4.9 Volts	ECT sensor DTC's not active VS sensor DTC's not active MAF sensor DTC's not active Vehicle speed < 2 mph Mass Air flow < 250 g /s Coolant Temperature > 84.7°C Engine run time > 100 seconds	5 test failures within a 2000 test sample Continuous	DTC Type D
Intake Air Temp. Sensor Circuit - Low Input (Intermittent)	P1112	.24V to 5.0V The DTC detects an intermittent short to ground in the IAT signal circuit or the IAT sensor	**Low Resistance pull-up** Raw IAT < .82 Volts **High Resistance pull-up** Raw IAT < .07 Volts	ECT sensor DTC's not active MAF sensor DTC's not active VS sensor DTC's not active Vehicle speed ≥ 2 mph Engine run time > 100 seconds	5 test failures within a 2000 test sample Continuous	DTC Type D
Engine Coolant Temp. Sensor Circuit-Low Input (Intermittent)	P1114	.24V to 5.0V The DTC detects an intermittent short to high or open in the ECT signal circuit or the ECT sensor	**Low Resistance pull-up** Raw ECT < .25 Volts **High Resistance pull-up** Raw ECT < .25 Volts	Engine run time > 5 seconds	5 test failures within a 40 test sample Continuous	DTC Type D

Engine Coolant Temp. Sensor Circuit-High Input (Intermittent)	P1115	.24V to 5.0V The DTC detects an intermittent short to high or open in the ECT signal circuit or the ECT sensor	**Low Resistance pull-up** Raw ECT > 4.9 Volts **High Resistance pull-up** Raw ECT > 4.9 Volts	Engine run time > 5 seconds	5 test failures within a 40 test sample Continuous	DTC Type D
Throttle Position Sensor Circuit-High Input (Intermittent)	P1121	.5V to 5.0V This DTC detects an intermittent short to high in either the signal circuit or the TP sensor.	TP sensor signal voltage > 4.7 volts (242 counts)	Engine running	5 test failures within a 10 test sample Continuous	DTC Type D
Throttle Position Sensor Circuit-Low Input (Intermittent)	P1122	.5V to 5.0V This DTC detects an intermittent short to low or open in either the signal circuit or the TP sensor.	TP sensor signal voltage < .25 volts (13 counts)	Engine running	5 test failures within a 10 test sample Continuous	DTC Type D
ABS Rough Road Error	P1380	This diagnostic will determine if the ABS system is capable of detecting a rough road situation .	Measured vehicle wheel acceleration (deceleration) = a table value based on engine speed and Misfire DTC is active and requesting the MIL.	Vehicle Speed $\geq$ 1 MPH Engine Speed $\leq$ 5600 RPM Engine Load $\leq$ 90%	100 test failures within a 1000 test sample size. Whenever Rough Road is received from the ABS.	DTC Type D
Serial Link Failure Preventing Rough Road	P1381	This diagnostic will detect a serial data malfunction which could inhibit the transfer of ABS Rough Road information the controller.	If Misfire DTC is active and requesting MIL and no Rough Road ABS information is available.	----------	100 test failures within a 1000 test sample Whenever Misfire DTC is active and requesting MIL.	DTC Type D