1996 4.3L (L35) C/K Truck, G-Van (<8500GVW) Engine Diagnostic Parameters

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PRIMARY MALF DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS AND CONDITIONS	MONITORING TIME LENGTH AND FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE AND MIL ILLUMINATION
Mass Air Flow Sensor Circuit - Range/ Rationality	P0101	Analog	0.5 kHz - 12 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. Canister Purge DC $\leq$ 99% TPS $\Delta \leq$ 3.9% System voltage $\geq$ 10V but < 17V 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. The Mass Air Flow reading and Mass Air Flow calculation are performed during the same cylinder event every 100 ms.	Hot Film Element	DTC Type A
Mass Air Flow Sensor Circuit - Low Input	P0102	Analog	0.5 kHz - 12 kHz This DTC will determine if the MAF frequency is too low.	***Powerup Test:*** MAF $\leq$ 60 Hz or > 11kHz ***LOW FREQUENCY TEST:*** MAF $\leq$ .3 kHz	***Powerup Test:*** Engine "OFF" Ignition "ON" for 2 seconds ***LOW FREQUENCY TEST:*** Engine Speed $\geq$ 300 RPM Engine Run Time $\geq$ 2 seconds System Voltage $\geq$ 10 Volts Throttle Position < 89.8% The above must be present for a period of time greater than 2 seconds.	***Powerup Test:*** 20 failures within a 25 test sample. Test is run every 12.5 ms until "Engine Run" flag is seen. ***LOW FREQUENCY TEST:*** 40 test failures within a 100 test sample. Test is run at every reading of the Mass Air Flow sensor frequency.	Hot Film Element	DTC Type A

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Mass Air Flow Sensor Circuit - High Input	P0103	Analog	0.5 kHz - 12 kHz This DTC will determine if the MAF frequency is too high.	***Powerup Test:*** MAF ≥ 11 kHz ***HIGH FREQUENCY TEST:*** MAF ≥ 10.44 kHz	***Powerup Test:*** Engine "OFF" Ignition "ON" for .7 seconds ***HIGH FREQUENCY TEST:*** Engine Speed ≥ 300 RPM Engine Run Time ≥ 2 seconds System Voltage ≥ 10 Volts Throttle Position < 89.8% The above must be present for a period of time greater than 2 seconds.	***Powerup Test:*** 20 failures within a 25 test sample. Test is run every 12.5 ms until "Engine Run" flag is seen. ***HIGH FREQUENCY TEST:*** 40 test failures within a 100 test sample. Test is run at every reading of the Mass Air Flow sensor frequency.	Hot Film Element	DTC Type A
MAP Sensor Range/Rationality	P0106	Analog	.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 > .18 Volts within 12.5ms (10 counts)	TP sensor DTC's not active IAC DTC's not active EGR DTC's not active Engine Running Engine Speed Δ < 100 RPM Throttle Position Δ < 1.95% Idle Air Δ < 5 counts EGR Flow Rate Δ < 5% Brake Switch State = no change Clutch Switch State = no change Power Steering State = no change AC Clutch State = no change Above stabilized for 2.0 seconds	24 test failures within a 100 test sample. Continuous	Pressure Differential Sensor	DTC Type B
MAP Sensor Circuit - Low Input	P0107	Analog	.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 < .05 Volts (3 counts)	TP sensor DTC's not active Engine Running Throttle Position ≥ 0% when Engine speed is ≤ 800 RPM **or** Throttle Position is ≥ 12.5% when Engine speed is > 800 RPM	40 test failures within a 100 test sample. Continuous	Pressure Differential Sensor	DTC Type A

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MAP Sensor Circuit - High Input	P0108	Analog	.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 > 4.34 Volts (222 counts)	Cold Start Run Time - Table value in seconds based on Powerup Coolant Temperature. *Run Test* TP sensor DTC's not active Throttle Position ≤ .4% when Engine speed is ≤ 1200 RPM or Throttle Position is ≤ 19.9% when Engine speed is > 1200 RPM	40 test failures within a 100 test sample. Continuous	Pressure Differential Sensor	DTC Type A
Intake Air Temp. Sensor Circuit -Low Input	P0112	Analog	.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 < .82 Volts High Resistance pull-up Raw IAT < .07 Volts	VS sensor DTC's not active Vehicle speed ≥ 2 mph Engine run time > 100 seconds	40 test failures within a 100 test sample 100ms/test Continuous	Thermistor	DTC Type A
Intake Air Temp. Sensor Circuit - High Input	P0113	Analog	.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 100ms/test Continuous	Thermistor	DTC Type A
Engine Coolant Temp. Sensor Circuit-Low Input	P0117	Analog	.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 < .78 Volts High Resistance pull-up Raw ECT < .078 Volts	Engine run time > 5 seconds	40 test failures within a 100 test sample 100ms/test Continuous	Thermistor	DTC Type A
Engine Coolant Temp. Sensor Circuit-High Input	P0118	Analog	.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 > 5.0 Volts High Resistance pull-up Raw ECT > 4.9 Volts	Engine run time > 5 seconds	40 test failures within a 100 test sample 100ms/test Continuous	Thermistor	DTC Type A
Throttle Position Sensor Circuit Range/Rationality	P0121	Analog	.5V to 5.0V The DTC detects a "skewed" or stuck TP sensor	The last throttle position value is > predicted throttle position based on engine RPM.	MAP sensor DTC's not active Engine Running MAP < 60 kPa TP sensor Δ < 2%	50 test failures within a 100 test sample 12.5ms/test Continuous	Potentiometer	DTC Type B

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Throttle Position Sensor Circuit-Low Input	P0122	Analog	.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 < .15 volts (8 counts)	Engine running	40 consecutive test failures within a 100 test sample 12.5ms/test Continuous	Potentiometer	DTC Type A
Throttle Position Sensor Circuit-High Input	P0123	Analog	.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 > 4.9 volts (249 counts)	Engine running	40 consecutive test failures wilhin a 100 test sample 12.5ms/test Continuous	Potentiometer	DTC Type A
Min. Cool. Temp. to Allow C.L. Op. Not Achieved Without Excess. Time	P0125	Analog	.24V to 5.0V The DTC detects if a stabilized minimum closed-loop is reached and maintained after engine start-up.	Minimum stabilized ECT < 20.25°C	ECT sensor short tests not failing or DTC's not active IAT sensor DTC's not active Vehicle speed > 5 mph IAT> - 3.75°C ECT > 5.25°C Start-up ECT <21.75°C Closed loop timer ≥ a value between 240 and 1000 seconds which is determined by IAT.	100 consecutive test failures Continuous	Thermistor	DTC Type B

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O2S Circuit-Low Voltage (Bank 1, Sensor 1)	P0131	Analog	.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 *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 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 No fuel injectors are turned "OFF" Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds Related O2 sensor DTC's not active since code clear *Test Enable (PE Lean test):* Closed loop Power Enrichment mode active High speed fuel cutoff not active Related O2 sensor DTC's not active since code clear Time elapsed since test enable ≥ 1 sec.	100ms/test *Lean Test:* 500 test failures in a 600 test sample Continuous *PE Lean Test:* 300 test failures in a 500 test sample.	Exhaust Oxygen Sensor	DTC Type A

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O2S Circuit-High Voltage (Bank 1, Sensor 1)	P0132	Analog	.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 ***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 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 Related O2 sensor DTC's not active since code clear ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Related O2 sensor DTC's not active since code clear Time elapsed since test enable ≥ 2 sec.	100ms/test ***Rich Test:*** 400 test failures in a 500 test sample Continuous ***DFCO Rich Test:*** 300 test failures in a 500 test sample	Exhaust Oxygen Sensor	DTC Type A

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O2S Circuit-Slow Response (Bank 1, Sensor 1)	P0133	Analog	.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 > 100 millisec. (L35) R/L > 100 millisec. (L35) L/R > 110 millisec. (L30) R/L > 110 millisec. (L30) *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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit- No Activity Detected (Bank 1,Sensor 1)	P0134	Analog	.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 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 sensor Open test enable:*** Engine Run Time ≥ 120 seconds O2 Sensor Temperature Test = True DTC P0135 not active Closed Loop	600 test failures with in a 1000 test sample 100ms/test Continuous	Exhaust Oxygen Sensor	DTC Type A

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O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135	Software	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 130 seconds. *Time determined by table.	Exhaust Oxygen Sensor	DTC Type B
O2S Circuit-Low Voltage (Bank 1, Sensor 2)	P0137	Analog	.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 ***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 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 No fuel injectors are turned "OFF" Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds Related O2 sensor DTC's not active since code clear ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Related O2 sensor DTC's not active since code clear Time elapsed since test enable ≥ 1 sec.	100ms/test ***Lean Test:*** 600 test failures in a 800 test sample Continuous ***PE Lean Test***: 300 test failures in a 500 test sample.	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit-High Voltage (Bank 1, Sensor 2)	P0138	Analog	.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 > 976 mV ***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 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 Related O2 sensor DTC's not active since code clear ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec. Related O2 sensor DTC's not active since code clear	100ms/test ***Rich Test:*** 600 test failures in a 800 test sample Continuous ***DFCO Rich Test:*** 300 test failures in a 500 test sample	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit- No Activity Detected (Bank 1,Sensor 2)	P0140	Analog	.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 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 sensor Open test enable:*** Engine Run Time ≥ 120 seconds O2 Sensor Temperature Test = True DTC P0141 not active Closed Loop	600 test failures with in a 1000 test sample 100ms/test Continuous	Exhaust Oxygen Sensor	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 2)	P0141	Software	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 160 seconds. *Time determined by table.	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit-Low Voltage (Bank 1, Sensor 3)	P0143	Analog	.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 ***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 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 No fuel injectors are turned "OFF" Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds Related O2 sensor DTC's not active since code clear ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 2 sec. Related O2 sensor DTC's not active since code clear	100ms/test ***Lean Test:*** 1100 test failures in a 1500 test sample Continuous ***PE Lean Test:*** 400 test failures in a 500 test sample.	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit-High Voltage (Bank 1, Sensor 3)	P0144	Analog	.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 > 993 mV ***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 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 Related O2 sensor DTC's not active since code clear ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec. Related O2 sensor DTC's not active since code clear	100ms/test ***Rich Test:*** 1100 test failures in a 1500 test sample Continuous ***DFCO Rich Test:*** 400 test failures in a 500 test sample	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit- No Activity Detected (Bank 1,Sensor 3)	P0146	Analog	.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 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 sensor Open test enable:*** Engine Run Time ≥ 120 seconds O2 Sensor Temperature Test = True DTC P0147 not active Closed Loop	1100 test failures with in a 1500 test sample 100ms/test Continuous	Exhaust Oxygen Sensor	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 3)	P0147	Software	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 130 seconds. *Time determined by table.	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit-Low Voltage (Bank 2, Sensor 1)	P0151	Analog	.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 ***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 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 No fuel injectors are turned "OFF" Air/Fuel ratio ≥ 14.5 but ≤ 14.8 Throttle position > 5% but < 99% Above met for 5 seconds Related O2 sensor DTC's not active since code clear ***Test Enable (PE Lean test):*** Closed loop Power Enrichment mode active High speed fuel cutoff not active Time elapsed since test enable ≥ 1 sec. Related O2 sensor DTC's not active since code clear	100ms/test ***Lean Test:*** 300 test failures in a 600 test sample Continuous ***PE Lean Test***: 300 test failures in a 500 test sample.	Exhaust Oxygen Sensor	DTC Type A

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O2S Circuit-High Voltage (Bank 2, Sensor 1)	P0152	Analog	.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 > 976 mV ***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 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 Related O2 sensor DTC's not active since code clear ***Test Enable (DFCO Rich Test):*** Decel Fuel Cutoff mode active Closed loop Time elapsed since test enable ≥ 2 sec. Related O2 sensor DTC's not active since code clear	 100ms/test ***Rich Test:*** 400 test failures in a 500 test sample Continuous ***DFCO Rich Test:*** 300 test failures in a 500 test sample	Exhaust Oxygen Sensor	DTC Type A

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O2S Circuit-Slow Response (Bank 2, Sensor 1)	P0153	Analog	.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 > 100 millisec. (L35) R/L > 100 millisec. (L35) L/R > 110 millisec. (L30) R/L > 110 millisec. (L30) *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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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 > 2 seconds	100 seconds after closed loop enable Once per ignition cycle	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit- No Activity Detected (Bank 2,Sensor 1)	P0154	Analog	.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 Sensor Temperature Test:*** Engine Running Not in DFCO ECT ≥ 80°C Air Flow ≥ 15 g/s ***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts Engine Run Time ≥ 120 seconds ***O2 sensor Open test enable:*** Engine Run Time ≥ 120 seconds O2 Sensor Temperature Test = True DTC P0155 not active Closed Loop	600 test failures with in a 1000 test sample 100ms/test Continuous	Exhaust Oxygen Sensor	DTC Type A

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O2S Heater Circuit Malfunction (Bank 2, Sensor 1)	P0155	Software	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 130 seconds. *Time determined by table.	Exhaust Oxygen Sensor	DTC Type B
System Too Lean (Bank 1)	P0171	Software	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 (10,300 ft) 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 Continuous	Short term fuel trim ,adaptive index multiplier and O2 sensor	DTC Type B

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System Too Rich (Bank 1)	P0172	Software	Determines if the system is in a rich condition.	The average of short term fuel trim samples ≤ 1.0 and If adaptive lag factor < .88, then purge valve is commanded closed. If the integrator exceeds 1.03 within 10 seconds, the diagnostic is turned OFF for 300 seconds to enable the Evap. canister to purge. I f the integrator does not exceed 1.03 with 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 (10,300 ft) 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 Continuous	Short term fuel trim ,adaptive index multiplier and O2 sensor	DTC Type B
System Too Lean (Bank 2)	P0174	Software	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 (10,300 ft) 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 Continuous	Short term fuel trim ,adaptive index multiplier and O2 sensor	DTC Type B

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System Too Rich (Bank 2)	P0175	Software	Determines if the system is in a rich condition.	The average of short term fuel trim samples ≤ 1.0 and If adaptive lag factor < .88, then purge valve is commanded closed. If the integrator exceeds 1.03 within 10 seconds, the diagnostic is turned OFF for 300 seconds to enable the Evap. canister to purge. I f the integrator does not exceed 1.03 with 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 (10,300 ft) 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 Continuous	Short term fuel trim ,adaptive index multiplier and O2 sensor	DTC Type B

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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 (L30 Only) Cylinder 8 Misfire Detected (L30 Only)	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	Digital	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	***TEST Enable:*** ECT ≥ 30°C but ≤ 129.7°C System voltage ≥ 9 volts but ≤ 14 volts Engine speed ≥ 700 RPM but ≤ 5600 RPM TP sensor DTC's not active MAF sensor DTC's not active ECT sensor DTC's not active VS sensor DTC's not active Camshaft position sensor DTC's not active Crank sensor DTC's not active + Throttle position Δ < 4.9%/100ms - Throttle position Δ < 2.9%/100ms	5 failed 200 revolution blocks out of 16 Emission Level 1 failed 200 revolution block Cat. damaging Level Continuous	Crankshaft position sensor and target wheel and camshaft position sensor	DTC Type B *EMISSION* DTC Type A *CATALYST DAMAGING*
Knock Sensor 1 Circuit Malfunction	P0325	Analog	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 > 10V but ≤ 17.1V	***SNEF STUCK LOW TEST:*** 10 test failures within a 100 test sample. Test is run every 500 msec.	Piezoelectric Knock Sensor and SNEF	DTC Type B

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Knock Sensor 1 Circuit - Low Input	P0327	Analog	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. ***ACTIVE NOISE CHANNEL TEST:*** Knock sensor noise ≤ 3 A/D counts or > 255 A/D counts. (ESC noise - Minimum Noise Value)	***KNOCK SENSOR UPDATE TEST:*** Timing retard ≤ 0 ° System voltage > 10V but ≤ 17.1V ECT ≥ 60° C Engine Run Time ≥ 120 seconds Engine speed > 500 RPM but ≤ 900 RPM ***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 ≥ 5.8% Engine run time ≥ 120 seconds System voltage > 10V but ≤ 17.1V Timing retard ≤ 0°	***ACTIVE NOISE CHANNEL TEST:*** Noise counter ≥ 100 counts. 100 msec.	Piezoelectric Knock Sensor	DTC Type B
Crankshaft Position Sensor Circuit- Low Input	P0337	Digital	3X Signal (L35) 4X Signal (L30) This diagnostic will detect a low duty cycle from the crankshaft position sensor.	Crank sensor duty cycle < 50% (or the ratio High Ref/Low Ref < .1875)	Engine speed < 4000 RPM Air Flow ≥ 5 g/second	15 Ref pulse failures within a 20 sample limit. Once every TDC	Hall Effect Crankshaft Sensor	DTC Type B
Crankshaft Position Sensor Circuit- Intermittent Input	P0339	Digital	3X Signal (L35) 4X Signal (L30) 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 500 sample limit. 12.5 msec	Hall Effect Crankshaft Sensor	DTC Type B
Camshaft Position Sensor Circuit Malfunction	P0340	Digital	1X Signal This diagnostic will detect if the Cam Sensor signal is present.	Cam Sensor reference pulse is not seen once every 6 cylinders (L35) or 8 cylinders (L30).	Engine Running	If Cam signal is not detected within 1.75 seconds, test has failed. Once every TDC	Hall Effect Cam Sensor	DTC Type B

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Camshaft Position Sensor Circuit Range/Rationality	P0341	Digital	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 6 cylinders (L35) or 8 cylinders (L30).	Engine Running	40 failed tests within a 100 test sample. Once every TDC	Hall Effect Cam Sensor	DTC Type B
Exhaust Gas Recirculation - Insufficient Flow Detected	P0401	Analog	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 1.2 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 Transmission DTC's not active Misfire DTC's not active ECT > 78° C Baro > 70 kPa (10,300 ft) Vehicle Speed > 27 mph IAC Δ < 8 counts AC clutch status is unchanged Transmission status is unchanged ***Start Test*** Throttle Position < 1% EGR Position < 1% Engine Speed > 1000 rpm but < 1600 rpm *(Automatic Transmission)* Engine Speed > 900 rpm but < 1900 rpm *(Manual Transmission)* MAP Δ < 1 A/D count (.39 kPa) Compensated MAP > 20 kPa but < 32 kPa Not in DFCO *(Automatic Trans. Only and 5.0 L with Manual Trans.)* or No change in DFCO state *(Manual Trans. Only , Except 5.0L)* ***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	1.2 seconds Once per trip	Manifold Absolute Pressure Δ and software	DTC Type A

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Catalyst System Efficiency Below Threshold - (Bank 1)	P0420	Analog	This diagnostic will determine the efficiency of the catalytic converter.	Deviation Difference Average = 8 mV from O2 sensor (Bank 1, Sensor 3)	***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 ≥ -9.75° C ECT > 75° C Air Flow ≤ 50 g/sec Δ engine load ≤ 8.9% Vehicle Speed ≥ 20 mph but ≤ 70 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 Continuous	O2 sensor (Bank 2, Sensor 1) and (Bank 1, Sensor 3)	DTC Type A
Evap. Emission Control System - Incorrect Purge Flow	P0441	Digital	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 > 4 seconds	Evap. Purge Solenoid Diagnostic Vacuum Switch DTC not active IAC DTC's not active MAP DTC's not active TP sensor DTC's not active EGR DTC's not active Baro > 75 kPa (8300 ft) ECT ≤ 110 °C Powerup IAT > -18°C IAT ≤ 90 °C ECT/IAT Δ ≤ 90°C Purge DC ≥ 99% Manifold Vacuum ≥ 20 kPa Throttle Position ≥5% but ≤ 60% Engine Speed ≥ 800 RPM but ≤ 3000 RPM	For 5 test failures Continuous	Evap. Purge Vacuum Switch	DTC Type B

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Vehicle Speed (VS) Sensor Signal Missing	P0500	Variable Frequency	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	Variable Reluctance Transducers	DTC Type A
Idle Control System RPM Lower Than Expected	P0506	Software	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 counts	***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 ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa (10000 ft) 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	Software and Stepper Motor	DTC Type B

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Idle Control System RPM Higher Than Expected	P0507	Software	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 .\ < 3 counts	***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 ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run lime > 30 seconds Baro > 70 kPa (10000 ft) 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 .\ < 1% Engine Speed .\ < 50 RPM IAC motor commanded 10 %/ 100 msec.	10 seconds Continuous after enable	Software and Stepper Motor	DTC Type B
Transmission Clutch Switch Input Malfunction (Manual Trans. Only)	P0704	Digital	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 > 40 mph	2 consecutive test failures 100 msec.	Clutch Pedal Switch	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	Analog	.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 (L35) R/L switches < 50 (L35) L/R switches < 40 (L30) R/L switches < 40 (L30)	***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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	Exhaust Oxygen Sensor	DTC Type B

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O2S Circuit - Transition Time Ratio Malfunction (Bank 1,Sensor 1)	P1134	Analog	.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 > 3.75 or < .50 (L35) Ratio > 3.75 or <.375 (L30) **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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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	Exhaust Oxygen Sensor	DTC Type B

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PRIMARY MALF DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS AND CONDITIONS	MONITORING TIME LENGTH AND FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE AND MIL ILLUMINATION
O2 Sys. Fault - Too Few O2S R/L or L/R Switches, Insufficient Activity (Bank 2, Sensor 1)	P1153	Analog	.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 (L35) R/L switches < 50 (L35) L/R switches < 40 (L30) R/L switches < 40 (L30)	***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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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	Exhaust Oxygen Sensor	DTC Type B

1996 4.3L (L35) C/K Truck, G-Van (<8500GVW) Engine Diagnostic Parameters

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O2S Circuit - Transition Time Ratio Malfunction (Bank 2,Sensor 1)	P1154	Analog	.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 > 3.75 or < .50 **(L35)** Ratio > 3.75 or <.375 **(L30)** **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 No intrusive tests in progress No device controls active System Voltage ≥ 9 Volts ***Response Test Enable:*** Closed loop low MAP not active Closed loop Mode 0 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	Exhaust Oxygen Sensor	DTC Type B

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Camshaft Sensor Misinstalled	P1345	Digital	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 ±26 degrees (L35) or ± 15°(L30) from crank falling edge.	----------	30 test failures within a 50 test sample size. Every crank fall	Hall Effect Cam Sensor	DTC Type A
EST Output High	P1351	Digital	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 failure Once per ignition cycle	Software	DTC Type A
EST Not Toggling After Enable	P1361	Digital	0 V-1V This diagnostic will determine if a failure has occurred due to a grounded circuit.	EST voltage <.04V	EST Enabled Engine speed < 250 RPM	20 test failure Once per ignition cycle	Software	DTC Type A
Exhaust Gas Recirculation System- Pintle Position Error	P1406	Analog	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 3 seconds for 3 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	Potentiometer	DTC Type A

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Evap. Emission Control System - Continuous Open Purge Flow	P1441	Digital	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 > 4 seconds	Evap. Purge Solenoid Diagnostic Vacuum Switch DTC not active IAC DTC's not active MAP DTC's not active TP sensor DTC's not active EGR DTC's not active Baro > 75 kPa (8300 ft) ECT ≤ 110 °C Powerup IAT > -18°C IAT ≤ 90 °C ECT/IAT Δ ≤ 90°C Purge DC ≤ 0% Manifold Vacuum ≥ 20 kPa Throttle Position ≥5% but ≤ 60% Engine Speed ≥ 800 RPM but ≤ 3000 RPM	For 3 test failures Continuous	Evap. Purge vacuum switch	DTC Type B
Idle Air Control - Low	P1508	Software	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 counts	***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 ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa (10000 ft) 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	Software and Stepper Motor	DTC Type B

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Idle Air Control - High	P1509	Software	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 counts	*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 ECT > 50°C System Voltage > 10V but < 16 V IAT > -25°C Engine run time > 30 seconds Baro > 70 kPa (10000 ft) 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	Software and Stepper Motor	DTC Type B