SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
MAF Sensor - Range/Rationality	P0101	Digital	1135 Hz to 11000 Hz. This DTC compares MAF sensor reading to a speed/density-type air flow calculation. It detects a skewed MAF sensor reading or certain air leaks.	Actual MAF reading - Calculated MAF Reading > Allowable delta	No MAP, TP, or other MAF sensor DTC's set DTC P0401 test not active Ignition voltage ≥ 10V and ≤ 16V Fuel control in closed loop Throttle angle ≤ 50 degrees 100ms Δ MAP ≤ 5 kPa MAP ≥ 24 kPa If ignition voltage ≤ 11.5V, actual MAF reading ≤ 50 gm/sec Traction control not active EGR test (P0401) not active	25 test failures within a 50 test sample 100 ms loop Continuous	Hot wire air meter	DTC Type A
MAF Sensor - Low Input	P0102	Digital	1135 Hz to 11000 Hz This DTC detects a low MAF sensor reading. It will catch opens or shorts in MAF sensor wiring and certain MAF sensor failures.	MAF Sensor Frequency < 1135 Hz	Engine running Ignition voltage ≥ 10.5V Time since ign. 1 present ≥ 200 ms(4.6L) Time since ign. 1 present ≥ 0 ms (4.0L)	3 test failures within a 5 test sample Reference interrupt loop Continuous	Hot wire air meter	DTC Type A
MAF Sensor - High Input	P0103	Digital	1135 Hz to 11000 Hz This DTC detects a high MAF sensor reading. It will catch certain MAF sensor failures.	MAF Sensor Frequency > 11000 Hz	Ignition voltage ≥ 10.5V Throttle angle ≤ 50 degrees Time since ign. 1 present > 200 ms(4.6L) Time since ign. 1 present > 0 ms (4.0L)	10 test failures within a 15 test sample Reference interrupt loop Continuous	Hot wire air meter	DTC Type A

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
MAP Sensor Range/Rationality	P0106	Analog	.3V to 5.0V A change in MAP must be preceded by a significant change in throttle angle or engine speed. If not, a faulty MAP condition exists.	Raw MAP Δ > 10 kPa within 12.5 ms.	No TP sensor DTC's set Engine speed ≥ 500 RPM All of the following remain true for 1 second: Engine speed varies < 4 RPM Throttle angle varies < 1 degree EGR fuel compensation varies < 4 % A/C clutch does not transition Engine over-temperature protection not active Traction Control not active	8 test failures within a 10 test sample 50 ms loop Continuous	Pressure Differential Sensor	DTC Type A
MAP Sensor Circuit - Low Input	P0107	Analog	.1V to 5.0V This DTC detects a Continuous short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < .08 Volts	No TP Sensor DTC's set Engine speed ≤ 700 RPM and throttle angle ≤ 18 degrees or engine speed ≤ 1800 and throttle angle ≥ 13 degrees	3 test failures within a 5 test sample 50 ms loop Continuous	Pressure Differential Sensor	DTC Type A
MAP Sensor Circuit - High Input	P0108	Analog	.1V to 5.0V This DTC detects a Continuous short to high in either the signal circuit or the MAP sensor.	Raw MAP > 5.06 Volts	No TP Sensor DTC's set Engine running Throttle angle ≤ 20.5 degrees	3 test failures within a 5 test sample 50 ms loop Continuous	Pressure Differential Sensor	DTC Type A
IAT Sensor Circuit - Low Input	P0112	Analog	.1V to 5.0V This DTC detects a Continuous short to ground in the IAT signal circuit or the IAT sensor.	Raw IAT < .08V	No ECT Sensor DTC's set ECT ≤ 110° C Vehicle speed ≥ 15 MPH	3 test failures within a 5 test sample 250 ms loop Continuous	Thermistor	DTC Type A

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
IAT Sensor Circuit - High Input	P0113	Analog	.1V to 5.0V This DTC detects a Continuous open or short to high in the IAT signal circuit or the IAT sensor.	Raw IAT > 5.02V	No MAF, ECT, or VS Sensor DTC's set Engine speed ≥ 500 RPM for 20 seconds Vehicle speed > 7 MPH for 5 seconds Vehicle speed < 50 MPH Air flow < 60 g/sec ECT > 0° C or ECT - IAT ≥ 27° C	3 test failures within a 5 test sample 250 ms loop Continuous	Thermistor	DTC Type A
Engine Coolant Temp. Sensor - Low Input	P0117	Analog	.1V to 5.0V This DTC detects a Continuous short to ground in the ECT signal circuit or the ECT sensor.	Raw ECT < .08V	No IAT sensor DTC's set and IAT ≤ 100° C or No TP sensor DTC's set and Engine running for 210 seconds with throttle angle ≥ 5 degrees and ≤ 35 degrees	3 test failures within a 5 test sample 1 second loop Continuous	Thermistor	DTC Type A
Engine Coolant Temp. Sensor - Low Input	P0118	Analog	.1V to 5.0V This DTC detects a Continuous open or short to high in the ECT signal circuit or the ECT sensor.	Raw ECT > 5.04V	No IAT sensor DTC's set and IAT ≥ -5° C or No TP sensor DTC's set and Engine running for 210 seconds with throttle angle ≥ 7 degrees	3 test failures within a 5 test sample 1 second loop Continuous	Thermistor	DTC Type A
Throttle Position Sensor Circuit - Range/Rationality	P0121	Analog	.5V to 4.9V The DTC detects a skewed or stuck TP sensor.	Throttle position > predicted throttle position based on engine speed.	No TP sensor DTC's set 100 ms TP sensor Δ ≤ .6 degrees Engine speed ≥ 400 RPM MAP ≤ 60 kPa Traction control not active All injectors enabled Engine over-temperature protection not active	7 test failures within a 10 test sample 100 ms loop Continuous	Potentiometer	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
Throttle Position Sensor Circuit - Low Input	P0122	Analog	.5V to 4.9V This DTC detects a Continuous short to low or open in either the signal circuit or the TP sensor.	Raw TP sensor signal < .1V	None	3 test failures within a 5 test sample 100 ms loop Continuous	Potentiometer	DTC Type A
Throttle Position Sensor Circuit - High Input	P0123	Analog	.5V to 4.9V This DTC detects a Continuous short to high in either the signal circuit or the TP sensor.	Raw TP sensor signal > 4.96V	Engine speed ≤ 3000 RPM	3 test failures within a 5 test sample 100 ms loop Continuous	Potentiometer	DTC Type A
Minimum coolant temperature to allow closed loop operation not achieved	P0125	Analog	.1V to 5.0V The DTC detects if a stabilized minimum closed loop is reached and maintained after engine start.	Minimum stabilized ECT < 5° C.	No ECT or IAT sensor DTC's set Engine running Vehicle speed ≥ 10 MPH, cont. IAT > 0° C	255 seconds 1 second loop Continuous	Thermistor	DTC Type A

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O2S Circuit - Low Voltage (Bank 1, Sensor 1)	P0131	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a low voltage by checking for a lean condition during steady throttle conditions.	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Bank 1, Sensor 1 High Voltage or No Activity Detected Failures Bank 2, Sensor 1 low voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - High Voltage (Bank 1, Sensor 1)	P0132	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a high voltage by checking for a rich condition during steady throttle conditions.	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Bank 1, Sensor 1 Low Voltage or No Activity Detected Failures Bank 2, Sensor 1 high voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	450 test failures in a 500 test sample 100 ms loop * Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Slow Response (Bank 1, Sensor 1)	P0133	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking its response time.	O2 sensor average transition time: L/R > 119 msec R/L > 119 msec	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0135 (O2 heater) not set. DTC P1133 (Too Few Switches) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ignition volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71 and L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11 and L47/3.48) 15≤ Engine Airflow≤ 35grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
O2S Circuit - No Activity Detected (Bank 1, Sensor 1)	P0134	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit has developed an open circuit.	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's. No TP sensor DTC's. ECT ≥ 72.5 deg C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 99 seconds 9 ≤ Ignition voltage ≤ 16 volts	500 test failures in a 640 test sample (4.6L) 634 test failures in a 640 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Heater Circuit Malfunction (Bank 1, Sensor 1)	P0135	Analog	0 V to1.1V The 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 +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature.	No ECT DTC's. No MAF sensor DTC's. DTC P0134 (no activity) not set. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 25 grams/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 seconds of engine running. Test run only on cold starts.	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Low Voltage (Bank 1, Sensor 2)	P0137	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a low voltage by checking for a lean condition during steady throttle conditions.	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Misfire DTC. Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's not set or failure pending not set. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 2. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - High Voltage (Bank 1, Sensor 2)	P0138	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a high voltage by checking for a rich condition during steady throttle conditions.	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Misfire DTC. Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's not set or failure pending not set. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 2. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	450 test failures in a 500 test sample 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC_Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Slow Response (Bank 1, Sensor 2)	P0139	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking its response time.	O2 sensor average transition time: L/R > 150 msec R/L > 150 msec	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not set or failure pending not set. No Fuel Trim DTC's set. No Misfire DTC set. DTC P0141 (O2 heater) not set. DTC P1139 (Too Few Switches) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 18 < Engine airflow < 35 gram/sec Above conditions met for 1.5 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test is completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - No Activity Detected (Bank 1, Sensor 2)	P0140	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit has developed an open circuit.	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's. No TP sensor DTC's. ECT ≥ 72.5 deg C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 255 seconds 9 ≤ Ignition voltage ≤ 16 volts	420 test failures in a 640 test sample. Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 2)	P0141	Analog	0 V to1.1V The 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 +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature.	No ECT DTC's. No MAF sensor DTC's. DTC P0140 (no activity) not set. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 30 grams/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 seconds of engine running. Test run only on cold starts.	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Low Voltage (Bank 1, Sensor 3)	P0143	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a low voltage by checking for a lean condition during steady throttle conditions.	O2 sensor voltage ≤ .049 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Misfire DTC. No Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 3. Closed loop is enabled. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 75.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ ignition voltage ≤ 16 volts Above conditions met for 5 seconds.	1000 test failures in a 1200 test sample (4.6L) 1188 test failures in a 1200 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - High Voltage (Bank 1, Sensor 3)	P0144	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a high voltage by checking for a rich condition during steady throttle conditions.	O2 sensor voltage ≥ .952 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Misfire DTC. No Bank 1, Sensor 1 or Bank 2 Sensor 1 DTC's. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1, Bank 2 Sensor 1, and Bank 1 Sensor 3. Bank 1 and Bank 2 short term fuel trims operating. ECT ≥ 75.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 5 seconds.	1000 test failures in a 1200 test sample (4.6L) 1188 test failures in a 1200 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - No Activity Detected (Bank 1, Sensor 3)	P0146	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit has developed an open circuit.	.360 volt < O2 sensor voltage < .538 volt	No ECT sensor DTC's. No TP sensor DTC's. ECT ≥ 75 deg C 2.2 deg ≤ Throttle position ≤ 81.6 deg 800 ≤ Engine speed ≤ 3000 rpm. Engine run time ≥ 255 seconds 9 ≤ Ignition voltage ≤ 16 volts	2500 test failures in a 3000 test sample (4.6) 2800 test failures in a 3000 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
O2S Heater Circuit Malfunction (Bank 1, Sensor 3)	P0147	Analog	0 V to1.1V The 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 +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature.	No ECT DTC's. No MAF sensor DTC's. DTC P0146 (no activity) not set. .351 ≤ Mean O2 bias voltage ≤.547 volts Average engine airflow during warmup period ≤ 32 grams/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 seconds of engine running. Test run only on cold starts. 25 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Low Voltage (Bank 2, Sensor 1)	P0151	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit is shorted to a low voltage by checking for a lean condition during steady throttle conditions.	O2 sensor voltage ≤ .249 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Bank 2, Sensor 1 High Voltage or No Activity Detected Failures Bank 1, Sensor 1 low voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1. Bank 1 short term fuel trim operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	400 test failures in a 500 test sample (4.6L) 450 test failures in a 500 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - High Voltage (Bank 2, Sensor 1)	P0152	Analog	0 V to 1.1V The DTC determines if the O2 sensor or its circuit is shorted to a high voltage by checking for a rich condition during steady throttle conditions.	O2 sensor voltage ≥ .654 volts	No MAP sensor DTC's. No ECT sensor DTC's. No TP sensor DTC's. No MAF sensor DTC's. No Bank 2, Sensor 1 Low Voltage or No Activity Detected Failures Bank 1, Sensor 1 high voltage failure not pending. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 1 short term fuel trim operating. ECT ≥ 72.5 deg C 2.2 deg ≤ Throttle position ≤ 20.2 deg Engine speed ≥ 800 rpm MAP > 32 kPa 9 ≤ Ignition voltage ≤ 16 volts Above conditions met for 3 seconds.	450 test failures in a 500 test sample 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Circuit - Slow Response (Bank 2, Sensor 1)	P0153	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking its response time.	O2 sensor average transition time: L/R > 119 msec R/L > 119 msec	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 2 Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0155 (O2 heater) not set. DTC P1153 (Too Few Switches) not set. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
O2S Circuit - No Activity Detected (Bank 2, Sensor 1)	P0154	Analog	0 V to1.1V The DTC determines if the O2 sensor or its circuit has developed an open circuit.	.303 volt < O2 sensor voltage < .601 volt	No ECT sensor DTC's. No TP sensor DTC's. ECT ≥ 72.5 deg C 1 deg ≤ Throttle position ≤ 81.6 deg Engine speed ≥ 800 rpm. Engine run time ≥ 99 seconds 9 ≤ Ignition voltage ≤ 16 volts	500 test failures in a 640 test sample (4.6L) 634 test failures in a 640 test sample (4.0L) 100 ms loop Continuous	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type A

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SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S Heater Circuit Malfunction (Bank 2, Sensor 1)	P0155	Analog	0 V to1.1V The 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 +/- .151 volts from the mean O2 bias voltage. *Time based on table: Time vs Average engine airflow during warmup period. Offset to maximum time based on startup coolant temperature.	No ECT DTC's. No MAF sensor DTC's. DTC P0154 (no activity) not set. .351 ≤ Mean O2 bias voltage ≤ .547 volts Average engine airflow during warmup period ≤ 28 grams/sec Average ignition voltage during warmup period ≥ 11 volts Cold start determined: Based on last engine running ECT - startup ECT ≥ delta temperature (table lookup based on startup coolant temperature	First 255 seconds of engine running. Test run only on cold starts.	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
System Too Lean - Bank 1	P0171	Software	This DTC determines if the engine system is operating in a lean condition	The average of short term fuel trim samples >= 1.04 and the average of long term adaptive learn fuel trim samples >= 1.12.	MAF Rationality DTC not set. No MAP DTC's set. No TP sensor DTC's set. No O2 sensor DTC's set. No injector fault DTC's set. No misfire DTC set. No Knock sensor DTC's set. No EGR flow DTC's set. No Idle or IAC DTC's set. No CAM sensor DTC set. BARO > 70.5 Kpa. 84 deg. C < ECT < 120 deg. C. 3 g/sec < airflow < 200 g/sec. 27 kpa < MAP < 103.2 0 deg C < IAT < 151 deg C. 400 < engine RPM < 3000 RPM. TP sensor < 19.8 deg. Vehicle speed < 70 mph EGR diag. steady state flow test not in stab. period	lean counter >= 11 frequency: 250 msec cont.	Short term fuel trim, long term adaptive learn multiplier, O2 sensor.	DTC Type B

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System Too Rich - Bank 1	P0172	Software	This DTC determines if the engine system is operating in a rich condition	The average of short term fuel trim samples <= 1.008 and the average of long term adaptive learn fuel trim samples <= 0.85	MAF Rationality DTC not set. No MAP DTC's set. No TP sensor DTC's set. No O2 sensor DTC's set. No injector fault DTC's set. No misfire DTC set. No Knock sensor DTC's set. No EGR flow DTC's set. No Idle or IAC DTC's set. No CAM sensor DTC set. BARO > 70.5 Kpa. 84 deg. C < ECT < 120 deg. C. 3 g/sec < airflow < 200 g/sec. 27 kpa < MAP < 103.2 0 deg C < IAT < 151 deg C. 400 < engine RPM < 3000 RPM. TP sensor < 19.6 deg.. Vehicle speed < 70 mph EGR diag: steady state flow test not in stab. period	rich counter >= 6 frequency: 250 msec cont.	Short term fuel trim, long term adaptive learn multiplier, O2 sensor.	DTC Type B

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System Too Lean - Bank 2	P0174	Software	This DTC determines if the engine system is operating in a lean condition	The average of short term fuel trim samples >= 1.04 and the average of long term adaptive learn fuel trim samples >= 1.12	MAF Rationality DTC not set. No MAP DTC's set. No TP sensor DTC's set. No O2 sensor DTC's set. No injector fault DTC's set. No misfire DTC set. No Knock sensor DTC's set. No EGR flow DTC's set. No Idle or IAC DTC's set. No CAM sensor DTC set. BARO > 70.5 Kpa. 84 deg. C < ECT < 120 deg. C. 3 g/sec < airflow < 200 g/sec. 27 kpa < MAP < 103.2 0 deg C < IAT < 151 deg C. 400 < engine RPM < 3000 RPM. TP sensor < 19.8 deg.. Vehicle speed < 70 mph EGR diag. steady state flow test not in stab. period	lean counter >= 11 frequency: 250 msec cont.	Short term fuel trim, long term adaptive learn multiplier, O2 sensor.	DTC Type B

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System Too Rich - Bank 2	P0175	Software	This DTC determines if the engine system is operating in a rich condition	The average of short term fuel trim samples <= 1.008 and the average of long term adaptive learn fuel trim samples <= 0.85	MAF Rationality DTC not set. No MAP DTC's set. No TP sensor DTC's set. No O2 sensor DTC's set. No injector fault DTC's set. No misfire DTC set. No Knock sensor DTC's set. No EGR flow DTC's set. No Idle or IAC DTC's set. No CAM sensor DTC set. BARO > 70.5 Kpa. 84 deg. C < ECT < 120 deg. C. 3 g/sec < airflow < 200 g/sec. 27 kpa < MAP < 103.2 0 deg C < IAT < 151 deg C. 400 < engine RPM < 3000 RPM. TP sensor < 19.6 deg. Vehicle speed < 70 mph EGR diag. steady state flow test not in stab. period	rich counter >= 6 frequency: 250 msec cont.	Short term fuel trim, long term adaptive learn multiplier, O2 sensor.	DTC Type B

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Injector Circuit Malfunctions	P0201 - P0208	Digital	These DTC's detect a short or open on injector A-H drive circuits by monitoring the fault feedback lines from the injector driver.	Injector driver feedback indicating a fault on an injector circuit.	Ignition voltage ≥ 10V and ≤ 16V ALDL mode $AE not active	5 failures 250 ms loop Continuous	Internal feedback	DTC Type A
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	Digital	These DTCs will determine if a random misfire or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration Index vs Engine Speed vs Engine load and Camshaft Position	No TP sensor DTC's No MAF sensor DTC's No ECT DTCs ECT > -6.75 C but < 131 C Engine Speed > 400 RPM but < 2400 RPM (see chart) System Voltage > 9 volts but < 16 volts +throtte position delta < 1 deg/12.5 ms or <1.28 deg/100 ms "-throttle position delta < 1 deg/12.5 ms or < 1.28 deg/100 ms Rough road table value based on ABS wheel sensor input vs. vehicle speed.	5 failed 200 revolution blocks out of 16 emission level. 1 failed 200 revolution block catalyst damaging level. frequency:100 ms cont.	Crankshaft position sensor and target wheel and camshaft position sensor	DTC Type B - Emission DTC Type A - Catalyst Damaging
Knock Sensor Circuit Malfunction	P0325	Analog	0V - 5V This diagnostic will detect problems with the range of the knock sensor.	Knock sensor indicating knock activity for > 100 ms	Ignition 1 voltage > 11 volts Power-up timer > 5 seconds	Conditions are met for 3 seconds 250 ms loop Continuous	Piezoelectric Knock Sensor	DTC Type B

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Knock Sensor Circuit Range	P0327	Analog	0V - 5V This DTC will detect an open or short in the knock sensor circuit.	Knock sensor background noise - learned minimum noise < .5V	Ignition 1 voltage feed present ECT ≥ 40° C Battery voltage ≥ 11V Throttle angle ≥ 5 degrees Engine speed ≥ 3000 RPM	Conditions are met for 1 second 250 ms loop Continuous	Piezoelectric Knock Sensor	DTC Type B
No CAM Reference Signal	P0340	Digital	This DTC determines if a CAM reference signal is not being received when 4X reference pulses are being received	No CAM signal	4X reference pulses being received Engine speed < 1600 RPM	Failure present for 5.25 seconds. Frequency: 250 ms cont.	Software	DTC Type A
Too Many 24X reference pulses	P0371	Digital	This DTC determines if too many 24X reference pulses are being received every CAM pulse.	8 4X reference pulses received between CAM pulses and number of 24X reference pulses > 49	Engine Speed > 496 RPM and < 3500 RPM. CAM pulses being received. Number of CAM edges since key-on >=7	Test failed 4 times out of 10. Frequency: 250 ms cont.	Software	DTC Type A
Too Few 24X reference pulses	P0372	Digital	This DTC determines if too few 24X reference pulses are being received every CAM pulse.	8 4X reference pulses received between CAM pulses and number of 24X reference pulses < 47	Engine Speed > 496 RPM and < 3500 RPM. CAM pulses being received. Number of CAM edges since key-on >=7	Test failed 4 times out of 10. Frequency: 250 ms cont.	Software	DTC Type A

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Exhaust Gas Recirculation - Insufficient Flow Detected	P0401	Analog	This diagnostic determines if there is a reduction in EGR flow.	Decel test: With EGR valve open, the peak increase in MAP is monitored over a time of 0.8 sec.. This value is compared with a threshold from an 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: No TP sensor DTC's set. No MAP sensor DTC's set. No VS sensor DTC's set. No ECT sensor DTC's set. No IAC DTC's set. No LEGR pintle pos. DTC set. 80 deg. C <= ECT <= 110 deg. C. BARO >= 72 kpa. 20mph<= vehicle speed <=70mph. IAC delta <= 3 counts. trans. state unchanged for 0.3 sec.. A/C state unchanged for 0.3 sec.. Purge state unchanged for 0.3 sec.. 11 volts <= sys. volts <= 15 volts. Start Test (decel): TPS <= 0.6 deg. EGR pos. <= 8 counts. 700<= Engine RPM <= 1300. Delta MAP <= 1 kpa. 25 <= MAP <= 44 kpa. The above conditions must be present for 0.5 consecutive seconds. Run Test (decel): Stabilized MAP (valve closed) recorded and EGR valve ramped open (35 to 70% at a constant rate), the peak increase in MAP is recorded and the change in MAP computed. The EGR valve is ramped closed over 2.0 seconds.	1 test per trip 15 tests if KAM reset decel test: 3.3 to 4.6 sec. freq. = 100 msec.	Delta Manifold Absolute Pressure 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 ≥ 4 mv from Bank 1 Sensor 3	***Converter Warm Up Status*** Predicted Catalyst Outlet Temp ≥ 344 deg C ***Test Enable*** ECT ≥ 75 deg C 12.5 ≤ Engine airflow ≤ 35 grams/sec Engine load ≤ 59.4% Delta engine load ≤ 160%/sec Throttle position ≥ 2.2 deg Engine speed ≤ 3000 rpm 20 < Vehicle speed < 75 mph IAT > -28 deg C A/F = 14.7 Closed loop fuel control is enabled. Closed loop fuel control O2 ready test passed for Bank 1 Sensor 1 and Bank 2 Sensor 1. Bank 1 and Bank 2 short term fuel trims operating. No MAF DTC's set. No TPS DTC's set. No ECT DTC's set. No VS sensor DTC's set. No Fuel Trim DTC's set. No Purge System DTC's set. No Misfire DTC's set. No Oxygen Sensor (Bank 1* Sensor 1, Bank 2*Sensor 1, Bank 1*Sensor 2, or Bank 1*Sensor 3) DTC's set.	50 test samples per trip 12.5 ms loop continuous until 50 test samples taken	Exhaust Oxygen Sensors: Bank 1 Sensor 2 and Bank 1 Sensor 3	DTC Type A

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EVAP. Emission Control System - Incorrect Purge Flow	P0441	Digital	0V - 5V This diagnostic detects a purge solenoid stuck closed by monitoring the Evap. purge vac. switch state when the Evap. purge solenoid duty cycle is >= 60 %. The vac. switch state should change to high (open) if there is vacuum applied to the system	Evap. Purge Vacuum Switch state = low (closed) vacuum for a period 10 seconds continuous. DTC is set if the above condition occurs 3 times.	Evap. Purge Solenoid Vacuum switch DTC not set. No IAC DTC's set. No MAP DTC's set. No TP sensor DTC's set. No EGR DTC's set. Baro >= 72 kpa. ECT <= 125 deg. C IAT <= 99.5 deg. C Power up IAT >= 5 deg. C 30 <= rescaled MAP <= 80 kpa Difference between last key off ECT and key on ECT >= 50 deg. C. 0 deg. <= TPS <= 81.6 deg. 500 <= Engine RPM <= 6375 Engine Vacuum >= 25 Kpa Canister purge duty cycle > 65%	3 test failures 100 msec continuous	Evap. Purge Vacuum Switch	DTC Type B
Vehicle Speed Sensor-Low Input	P0502	Analog	This DTC detects a low vehicle speed when the vehicle has a large turbine speed in a drive gear range	Vehicle speed <= 5 mph	Gear range is D4, D3, D2, or D1 No PSA DTC set No TPS DTC set No MAF DTC set No ISS DTC set Throttle position >= 12.8 degrees Delivered Torque >= 80 ft-lbs Input turbine speed >= 2000 RPM	2 seconds Continuous	AC voltage generating Vehicle Speed Sensor	DTC TYPE A
Vehicle Speed Sensor - Intermittent	P0503	Analog	This DTC detects unrealistically large changes in vehicle speed.	Drop in vehicle speed >= 11 mph and delta turbine speed <= 100 RPM within 0.125 sec	Traction control is not active Time since key on >= 2 sec No TPS DTC set No MAF DTC set No ISS DTC set Throttle position >= 12.8 degrees Delivered Torque >= 80 ft-lbs Engine Speed >= 500 RPM Time since manual lever change is >= 3 sec	10 times in 10 seconds Continuous	AC voltage generating Vehicle Speed Sensor	DTC TYPE A

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Idle Control System RPM Lower than Expected	P0506	Software	This DTC will determine if a low idle is the result of an engine mechanical problem. A low idle is defined as 96 RPM below the desired idle. If a low idle is determined an intrusive test (defined inder P1508 is run)	Idle rpm > 96 rpm below desired rpm	General Test Enable: No MAF DTC's set. No MAP DTC's set. No IAT DTC's set. No ECT DTC's set. No TP sensor DTC's set. No injector fault DTC's set. No VS sensor DTC's set. No EGR pintle pos. DTC set. No purge flow DTC's set. No 4x reference DTC's set. EGR diag. test not in progress. 10.5 <= System volt <=15 volts. IAT >= -40 deg. C BARO >= 65 kpa -40 deg. C <= ECT<= 110 deg. C Engine run time >= 10 seconds Closed loop fueling enabled 2 g/sec <= airflow <= 35 g/sec Purge duty cycle <= 0% Idle test: General conditions met. vehicle speed <= 0 mph TP sensor <= 0.3 deg. Time since a transition to or from park/neutral > 64 seconds. If idle test fails, intrusive test is run	idle test - 20 sec. frequency: 250 msec cont.	Software and Stepper Motor	DTC Type A

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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 an engine mechanical problem. A high idle is defined as 184 to 200 RPM (function of coolant temp.) above the desired idle. If a high idle is detected, an intrusive test is run (defined under P1509)	Idle rpm > 184 to 200 rpm above desired rpm (function of coolant temperature).	General Test Enable: No MAF DTC's set. No MAP DTC's set. No IAT DTC's set. No ECT DTC's set. No TP sensor DTC's set. No injector fault DTC's set. No VS sensor DTC's set. No EGR pintle pos. DTC set. No purge flow DTC's set. No 4x reference DTC's set. EGR diag. test not in progress. 10.5 <= System volt <=15 volts. IAT >= -40 deg. C BARO >= 65 kpa -40 deg. C <= ECT<= 110 deg. C Engine run time >= 10 seconds Closed loop fueling enabled 2 g/sec <= airflow <= 35 g/sec Purge duty cycle <= 0% Idle test: General conditions met. vehicle speed <= 0 mph. TP sensor <= 0.3 deg. Time since a transition to or from park/neutral > 64 seconds. If idle test fails intrusive test is run.	idle test - 23 sec. frequency: 250 msec cont.	Software and Stepper Motor	DTC Type A

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Input Speed Sensor Circuit-Range/Perf	P0716	Analog	This DTC detects unrealistically large changes in input speed.	Input speed drop is >= 1000 RPM in 0.075 sec	No SSA and SSB sol. DTC set No VSS DTC set No TPS DTC set No MAF DTC set No ISS DTC set Throttle position >= 12.8 degrees Vehicle speed >= 7 mph Engine running for >= 5 sec Not in fuel cut-off.	10 times in 10 seconds Continuous	AC voltage generating Vehicle Speed Sensor	DTC TYPE A
Input Speed Sensor Circuit-No signal	P0717	Analog	This DTC detects a low input speed when the vehicle has large Vehicle and Engine Speeds	Input Speed <= 50 RPM	No PSA DTC set No VSS DTC set No TPS DTC set PSA indicating not in P/N Vehicle speed >= 10 mph Engine running for >= 5 sec Not in fuel cut-off.	2 seconds Continuous	AC voltage generating Vehicle Speed Sensor	DTC TYPE A
TCC System Stuck-OFF	P0741	Software	This DTC detects high torque converter slip when the TCC is commanded on	Slip >= TCTSTSLP TCTSTSLP / Torque 48 / 0 72 / 32 88 / 64 200 / 96 248 / 128 256 / 160 272 / 192 280 / 224 280 / 256	No PSA DTC set No VSS DTC set No TPS DTC set No MAF sensor DTC set No ISS DTC set No TCC control sol. DTC set No TCC Stuck on DTC set TCC is commanded ON Trans is in D4 according to PSA 2nd, 3rd, or 4th gear ratio seen Throttle position >= 8 degrees 20 <= Trans. fluid Temp <= 120 C 32 <= Delivered Torque <= 150 ft-lbs Engine running for >= 5 sec Not in fuel cut-off.	5 seconds Continuous	Software calculates TCC slip using engine speed and turbine speed.	DTC TYPE A

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TCC System Stuck-ON	P0742	Software	This DTC detects low torque converter slip when the TCC is commanded off	Slip speed >= 67 rpm or slip speed <= -5 rpm	No PSA DTC set No VSS DTC set No TPS DTC set No MAF sensor DTC set No ISS DTC set No TCC control sol. DTC set No TCC stuck off DTC set TCC is commanded OFF Trans is in D4 according to PSA 2nd, 3rd, or 4th gear ratio seen Throttle position >= 11.8 degrees 100 <= Delivered Torque <= 200 ft-lbs Engine running for >= 5 sec Not in fuel cut-off.	6.4 seconds Continuous	Software calculates TCC slip using engine speed and turbine speed.	DTC TYPE A
Shift Solenoid A Performance	P0751	Software	This DTC detects incorrect gear ratio when a gear is commanded.	1. Commanded Gear = 1 Ratio = 2nd Del. Torque >= 60 ft-lb. 2. Commanded Gear = 2 Ratio = 1st Del. Torque >= 70 ft-lbs 3. Commanded Gear = 3 Ratio = 4th Del. Torque >= 60 ft-lbs 4. Commanded Gear = 4 Ratio = 3rd Del. Torque >= 70 ft-lbs (1&4) or (2&3) fails	No PSA DTC set No VSS DTC set No TPS DTC set No MAF sensor DTC set No ISS DTC set No Shift Sol. Electrical Codes Vehicle Speed >= 4 mph Trans is in D4, D3, D2, OR D1 Trans Temp >= 30 degree C Throttle position >= 11.0 degrees Engine running for >= 5 sec Not in fuel cut-off. A shift is not in progress	1. 1.0 seconds 2. 3.0 seconds 3. 3.0 seconds 4. 5.0 seconds Continuous	Software calculates Ratio using Turbine Speed and Vehicle speed	DTC TYPE A
Shift Solenoid A Electrical	P0753	Analog	This DTC detects a continuous open or short to ground in the SS A circuit or solenoid	Fail Counter >= 17	No ODM B DTC set Engine Running >= 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 msec	5 seconds Continuous	Analog output to Shift solenoid	DTC TYPE A

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Shift Solenoid B Performance	P0756	Software	This DTC detects incorrect gear ratio when a gear is commanded.	1. Commanded Gear = 1 Ratio = 4th Del. Torque >= 60 ft-lbs 2. Commanded Gear = 2 Ratio = 3rd Del. Torque >= 60 ft-lbs 3. Commanded Gear = 3 Ratio = 2nd Del. Torque >= 60 ft-lbs 4. Commanded Gear = 4 Ratio = 1st Del. Torque >= 16 ft-lbs (1&2) or (3&4) fails	No PSA DTC set No VSS DTC set No TPS DTC set No MAF sensor DTC set No ISS DTC set No Shift Sol. Electrical Codes Vehicle Speed >= 4 mph Trans is in D4, D3, D2, OR D1 Trans Temp >= 30 degree C Throttle position >= 11.0 degrees Engine running for >= 5 sec Not in fuel cut-off. A shift is not in progress	1. 1.0 seconds 2. 0.5 seconds 3. 4.0 seconds 4. 1.0 seconds Continuous	Software calculates Ratio using Turbine Speed and Vehicle speed	DTC TYPE A
Shift Solenoid B Electrical	P0758	Analog	This DTC detects a continuous open or short to ground in the SS B circuit or solenoid	Fail Counter >= 17	No ODM B DTC set Engine Running >= 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 msec	5 seconds Continuous	Analog output to Shift solenoid	DTC TYPE A
MAP to Baro Correlation	P1108	Analog	3V to 5.0V At low throttle angles, MAP should be well below barometric pressure. If MAP is close to Baro. for too long, a faulty MAP condition exists.	MAP-Baro ≤ 11 kPa	No TP sensor or other MAP sensor DTC's set Throttle switch closed Baro ≥ 75 kPa Engine speed ≥ 400 RPM Throttle angle ≤ 18 degrees	Failure must exist for 15 seconds 250 ms loop Continuous	Pressure Differential Sensor	DTC Type A

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O2S System - Too Few O2S R/L and L/R Switches (Bank 1, Sensor 1)	P1133	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 90 seconds: L/R switches < 12 R/L switches < 12	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0135 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

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O2S Circuit - Transition Switch Time Ratio Malfunction (Bank 1, Sensor 1)	P1134	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking the ratio of the average transition times.	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 3 or < .33	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0135 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 Bank 1 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE & RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS & CONDITIONS	MONITORING TIME LENGTH & FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE & MIL ILLUMINATION
O2S System - Too Few O2S R/L and L/R Switches (Bank 1, Sensor 2)	P1139	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 90 seconds: L/R switches < 10 R/L switches < 10	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not set or failure pending not set. No Fuel Trim DTC's set. No Misfire DTC set. DTC P0141 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 18 < Engine airflow < 35 gram/sec Above conditions met for 1.5 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

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O2S Circuit - Transition Switch Time Ratio Malfunction (Bank 1, Sensor 2)	P1140	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking the ratio of the average transition times.	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 3 or < .33	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 1*Sensor 1 or Bank 2*Sensor 1 DTC's not set or failure pending not set. No Fuel Trim DTC's set. No Misfire DTC set. DTC P0141 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 1, Sensor 1 and Bank 2, Sensor 1. Bank 1 and 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 ≤ Engine speed ≤ 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 18 < Engine airflow < 35 gram/sec Above conditions met for 1.5 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

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O2S System - Too Few O2S R/L and L/R Switches (Bank 2, Sensor 1)	P1153	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 90 seconds: L/R switches < 12 R/L switches < 12	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 2*Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0155 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ignition voltage ≤ 16 1000 < Engine speed < 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B

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O2S Circuit - Transition Switch Time Ratio Malfunction (Bank 2, Sensor 1)	P1154	Analog	0 V to1.1V The DTC determines if the O2 sensor is functioning properly by checking the ratio of the average transition times.	Ratio of average response times (Rich-Lean/Lean-Rich): Ratio > 3 or < .33	No MAF DTC's. No TP sensor DTC's. No ECT DTC's. Bank 2*Sensor 1 Voltage DTC's not set or failure pending not set. DTC P0155 (O2 heater) not set. Closed loop fuel control O2 ready test passed for Bank 2, Sensor 1 Bank 2 short term fuel trim operating. Throttle postion ≥ 2.2 deg A/F = 14.7 Engine run time > 202 seconds ECT ≥ 75 deg C 9 ≤ Ign. volts ≤ 16 1000 < Engine speed < 2750 rpm (L37/3.71, L47/3.71) 1000 < Engine speed < 2500 rpm (LD8/3.11, L47/3.48) 15< Engine airflow <35 grams/sec Above conditions met for 1.2 seconds	90 seconds Once per key cycle 12.5 ms loop continuous until test completed	Exhaust Oxygen Sensor PCM Interface Circuit	DTC Type B
Engine Over-temperature Protection Active	P1258	Digital	.1V to 5.0V The DTC detects if the engine over-temperature protection mode is active.	Engine over-temperature protection mode is active.	None	2 seconds 500 ms loop Continuous	Thermistor	DTC Type A
Direct Ignition System 4X Reference Signal Interrupt	P1320	Digital	This DTC determines if there has been a sudden loss of 4X reference pulses	No 4X reference signal	Engine Speed > 568 RPM	Failure must exist for 0.4 seconds. Frequency: 100 ms cont.	Software	DTC Type A

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No 24X Reference Signal	P1323	Digital	This DTC determines if there are no 24X reference pulses received with 4X reference pulses being received.	No 24X reference signal	Engine Speed > 496 RPM Number of CAM edges since key-on > 7 CAM pulses being received.	Fail if failed 1 out of 10 times. Frequency: 4 sec. cont./monitored every CAM pulse	Software	DTC Type A
EST/Bypass Problem	P1350	Digital	This DTC determines if the Electronic Spark Timing (EST)/bypass circuitry is operating correctly	EST pulses detected in bypass mode or no EST pulses detected in EST mode	More than 1 or 2 (depending on operating conditions) reference pulses detected since last loop.	Failure must exist for > 0.8 seconds Frequency: 100 ms cont.	Software	DTC Type A
Too Many 4X Reference Pulses	P1370	Digital	The DTC determines if there are too many 4X reference pulses being received every CAM cycle.	48 24X reference pulses have occurred between CAM pulses and 4X pulses between CAM pulses > 8.	Engine Speed >496 RPM CAM pulses being received Number of CAM edges since key-on > 7	4 test failures out of 10 test samples. Frequency: 250 ms cont.	Software	DTC Type A
Too Few 4X reference Pulses	P1371	Digital	The DTC determines if there are too few 4X reference pulses being received every CAM cycle.	48 24X reference pulses have occurred between CAM pulses and 4X pulses between CAM pulses < 8.	Engine Speed >496 RPM CAM pulses being received Number of CAM edges since key-on > 7	4 test failures out of 10 test samples. Frequency: 250 ms cont.	Software	DTC Type A

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No Crank Sensor A or B Signal to D.I.S. or 24X Shorted High	P1375	Digital	The DTC determines if the 24X reference signal is shorted high. This could be due to a short or the D.I.S. detects a missing crank sensor input.	24X reference signal high and number of 4X reference pulses since line went high > 8.	Engine Speed > 496 RPM More than 7 cam edges detected since key on	1 test failure out of 10 test samples. Frequency: 250 ms cont.	Software/ Crank sensor	DTC Type A
CAM to Reference Correlation Problem	P1377	Digital	This DTC determines if the cam and reference signals are synchronized correctly	4X reference pulses received per cam cycle not equal to 16 for 2 cam cycles	Engine Speed > 496 RPM More than 7 CAM edges detected since key on	4 test failures out of 10 samples. Frequency: 250 ms cont.	Software	DTC Type A
Exhaust Gas Recirculation - 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. Filtered Closed Valve Pintle Position <= 9, or >= 103 counts 2. Pintle pos.error > 25 for 300 times if ign. volt > 12 volts. -or- Pintle pos.error > 75 for 1000 times if ign. volt < 12 volts. 3. Pintle pos. > 20 counts from learned closed position.	All cases: Ignition Voltage >= 11 volts Case 2: If ignition voltage < 12 volts then the following must be true: Engine vacuum < 50 kpa Transmission temperature < 90 deg. C (if trans. temp. sensor is failed then this criteria is bypassed).	1. Immediate 2. 300 occurrences if ignition voltage > 12 volts. 1000 occurrences if ignition voltage < 12 volts. 3. 2 fails (with pintle movement above 47% between each fail) timed at 10 sec. each fail. 250 msec / position error every 12.5 msec.	Potentiometer	DTC Type A

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Evap. Emission Control System - Continuous Open Purge Flow	P1441	Digital	0V - 5V This diag. detects a purge solenoid stuck open by monitoring the Evap. purge vac. switch state when the Evap. purge solenoid duty cycle is <= 5 %. The vac. switch state should change to low (closed) if there is no vacuum applied to the system	Evap. Purge Vacuum Switch state = high (open) vacuum for a period 10 seconds continuous. DTC is set if the above condition occurs 3 times.	Evap. Purge Solenoid Vacuum switch DTC not set. No IAC DTC's set. No MAP DTC's set. No TP sensor DTC's set. No EGR DTC's set. Baro >= 72 kpa. ECT <= 125 deg. C IAT <= 99.5 deg. C Power up IAT >= 5 deg. C 30 <= rescalad MAP <= 70 kpa Difference between last key off ECT and key on ECT >= 50 deg. C. 0 deg. <= TPS <= 81.6 deg. 500 <= Engine RPM <= 6375 Canister purge duty cycle < 5%.	3 test failures 100 msec continuous	Evap. Purge Vacuum Switch	DTC Type B

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Purge Solenoid Diagnostic Vacuum Switch Malfunction	P1442	Digital	0v - 5v This diagnostic will detect a diagnostic vacuum switch stuck in the open (high vacuum) position.	Engine Running Test: Vacuum Switch open (high vacuum) for 255 consecutive seconds. Power Up Test: Vacuum switch open (high vacuum) for 2 tests out of 3.	Engine Running Test: No IAC DTC's set. No MAP DTC's set. No TP sensor DTC's set. No EGR flow DTC set. No MAF DTC's set. No Purge Driver failure DTC set Baro >= 72 kpa. ECT <= 125 deg. C IAT <= 99.5 deg. C Power up IAT >= -25 deg. C 20.2 <= rescaled MAP <= 100 kpa Power Up Test not failed. Engine Vacuum <= 1 kpa. Power Up Test: No IAT DTC's set. Reference pulses not being received. Difference between last key off ECT and key on ECT >= 50 deg. C. Engine not run this ignition cycle	Engine running - 255 seconds Power up test - 2 test failures out of 3 tests Frequency: one second/ switch state at power up - 12.5 msec. Power up test - once per ignition cycle	Purge vacuum switch	DTC Type B

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Idle Air Control - Low	P1508	Software	This DTC will determine if a low idle is the result of an IAC valve or circuit. A low idle is defined as 96 RPM below the desired idle.	Change in Airflow during commanded IAC movement >= 1.5 grams/sec.	General Test Enable: No MAF DTC's set. No MAP DTC's set. No IAT DTC's set. No ECT DTC's set. No TP sensor DTC's set. No injector fault DTC's set. No VS sensor DTC's set. No EGR pintle pos. DTC set. No purge flow DTC's set. No 4x reference DTC's set. EGR diag. test not in progress. 10.5 <= System volt <=15 volts. IAT >= -40 deg. C BARO >= 65 kpa -40 deg. C <= ECT<= 110 deg. C Engine run time >= 10 seconds Closed loop fueling enabled 2 g/sec <= airflow <= 35 g/sec Purge duty cycle <= 0% Idle test: General conditions met. vehicle speed <= 0 mph. TP sensor <= 0.6 deg. if idle test fails intrusive test is run. Intrusive test: 30mph <=vehicle speed<= 45mph 10 <= comm. IAC <= 300 counts 2 g/sec <= airflow <= 30 g/sec change in TPS from start of test <= 1 deg. to continue test. change in engine speed from start of test <= 75 rpm to continue test.	Idle test - 15 sec. Intrusive test - 2 sec. frequency: 250 msec cont.	Software and Stepper Motor	DTC Type A

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Idle Air Control - High	P1509	Software	This DTC will determine if a high idle is the result of an IAC valve or circuit. A high idle is defined as 128 RPM above the desired idle.	Change in Airflow during commanded IAC movement >= 1.5 grams/sec.	General Test Enable: No MAF DTC's set. No MAP DTC's set. No IAT DTC's set. No ECT DTC's set. No TP sensor DTC's set. No injector fault DTC's set. No VS sensor DTC's set. No EGR pintle pos. DTC set. No purge flow DTC's set. No 4x reference DTC's set. EGR diag. test not in progress. 10.5 <= System volt <=15 volts. IAT >= -40 deg. C BARO >= 65 kpa -40 deg. C <= ECT<= 110 deg. C Engine run time >= 10 seconds Closed loop fueling enabled 2 g/sec <= airflow <= 35 g/sec Purge duty cycle <= 0% Idle test: General conditions met. vehicle speed <= 0 mph. TP sensor <= 0.6 deg. if idle test fails intrusive test is run. Intrusive test: 30mph <=vehicle speed<= 45mph 10 <= comm. IAC <= 300 counts 2 g/sec <= airflow <= 30 g/sec change in TPS from start of test <= 1 deg. to continue test. change in engine speed from start of test <= 75 rpm to continue test.	idle test - 15 sec. intrusive test - 2 sec. frequency: 250 msec cont.	Software and Stepper Motor	DTC Type A

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Ignition 1 Supplement Fault	P1633	Analog	This DTC detects a loss of Ignition 1 supplement feed to the PCM by comparing it to the state of the Ignition 1 feed.	Ignition 1 supplement voltage not present.	Engine running Ignition 1 ≥ 5.5 volts	Failure must exist for 1 second. 100 ms Continuous	Internal feedback	DTC Type A
Ignition 1 Input Fault	P1634	Analog	This DTC detects a loss of Ignition 1 feed to the PCM by comparing it to the state of the Ignition 0 feed while the engine is running.	The difference between Ignition 1 voltage and Ignition 0 voltage is ≥ 6 volts	Engine running	Failure must exist for 20 seconds. 100 ms Continuous	Internal feedback	DTC Type A
Output Driver Module A Failure	P1640	Digital	This DTC detects an over-temperature or over-current condition on output driver module A by monitoring the fault feedback line from the driver.	Output driver module feedback indicating a fault.	Engine run time ≥ 10 seconds Ignition voltage > 9 volts	8 test failures within a 10 test sample 250 ms loop Continuous	Internal feedback	DTC Type A
Canister Purge Output Failure	P1645	Digital	This DTC detects a short or open on the canister purge solenoid drive circuit by monitoring the fault feedback line from the output driver module.	Output driver module feedback indicating a fault on the canister purge solenoid circuit.	Output driver module A failure not set Engine run time ≥ 10 seconds Ignition Voltage > 9 volts	8 test failures within a 10 test sample 250 ms loop Continuous	Internal feedback	DTC Type A
Output Driver Module B Failure	P1650	Digital	This DTC detects an over-temperature or over-current condition on output driver module A by monitoring the fault feedback line from the driver.	Output driver module feedback indicating a fault.	Engine run time ≥ 10 seconds Ignition voltage > 9 volts	8 test failures within a 10 test sample 250 ms loop Continuous	Internal feedback	DTC Type A

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Quad Driver Module 1 Output Failure	P1660	Digital	This DTC detects a short or open on the cooling fan drive circuits by monitoring the fault feedback line from the quad driver module.	Quad driver module feedback indicating a fault on either cooling fan drive circuit.	Engine run time ≥ 10 seconds Ignition voltage ≥ 10V and ≤ 16V Closed loop fuel control enabled	10 test failures 250 ms loop Continuous	Internal feedback	DTC Type A
PSA Circuit Malfunction (Fail Case 1)	P1810	Digital	This DTC detects an invalid state of PSA sensor or the PSA circuit by deciphering the PSA inputs.	Illegal Range is true	No MAF DTC set No TPS DTC set No VSS DTC set No ISS DTC set Engine running for >= 5 sec 10 <= Ign. volts <= 17. Not in fuel cut-off.	5 seconds Continuous	Digital input from PSA	DTC TYPE B
PSA Circuit Malfunction (Fail Case 2)	P1810	Digital	This DTC detects an invalid state of PSA sensor or the PSA circuit by deciphering the PSA inputs.	PSA indicates P/N when Ratio indicate Drive or Reverse Gear	No MAF DTC set No TPS DTC set No VSS DTC set No ISS DTC set Vehicle Speed >= 7 mph Throttle position >= 11.0 degrees 80 <= Del. Torque <= 200 ft-lbs 10 <= Ign. Voltage <= 17 Volts Engine running for >= 5 sec Not in fuel cut-off.	4 seconds Continuous	Digital input from PSA	DTC TYPE B
PSA Circuit Malfunction (Fail Case 3)	P1810	Digital	This DTC detects an invalid state of PSA sensor or the PSA circuit by deciphering the PSA inputs.	PSA indicates Reverse when Ratio indicate Drive Gear	No MAF DTC set No TPS DTC set No VSS DTC set No ISS DTC set Vehicle Speed >= 7 mph Throttle position >= 11.0 degrees 80 <= Del. Torque <= 200 ft-lbs 10 <= Ign. Voltage <= 17 Volts Engine running for >= 5 sec Not in fuel cut-off.	4 seconds Continuous	Digital input from PSA	DTC TYPE B

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PSA Circuit Malfunction (Fail Case 4)	P1810	Digital	This DTC detects an invalid state of PSA sensor or the PSA circuit by deciphering the PSA inputs.	PSA indicates D4, D3, D2, or D1 when Ratio Indicates Reverse Gear	No MAF DTC set No TPS DTC set No VSS DTC set No ISS DTC set Vehicle Speed >= 7 mph Throttle position >= 12.0 degrees 10 <= Ign. Voltage <= 17 Volts Engine running for >= 5 sec Not in fuel cut-off.	5 seconds Continuous	Digital input from PSA	DTC TYPE B
PSA Circuit Malfunction (Fail Case 5)	P1810	Digital	This DTC detects an invalid state of PSA sensor or the PSA circuit by deciphering the PSA inputs.	PSA indicates D2 before engine run flag is set and PSA does not indicate P/N >= 4.95 sec	No MAF DTC set No TPS DTC set No VSS DTC set No ISS DTC set Vehicle speed <= 5 mph Running Reset has not occurred 10 <= Ign. Voltage <= 17 Volts Engine Run flag set for <= 5 sec	4.95 seconds Continuous	Digital input from PSA	DTC TYPE B
TCC control Solenoid Electrical	P1860	Analog	This DTC detects a continuous open or short to ground in the TCC control solenoid or circuit	Fail Counter >= 17	PWM duty cycle >=85 or <= 10 No ODM B DTC set Engine Running >= 5 sec Increment fail counter if output state is invalid 17 out of 20 possible times in 250 msec	5 seconds Continuous	Analog output to TCC control solenoid	DTC TYPE A