COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 18 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips MIL:YES
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 5.0 Cam Deg for at least	300 failures out of 400 samples 100 ms /sample	Type B 2 trips MIL: YES
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 18 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips MIL: YES
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0013 ExhCMP B1 Circuit P0365, P0366, Exh B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 5.0 Cam Deg for at least	300 failures out of 400 samples 100 ms /sample	Type B 2 trips MIL: YES
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than -10 crank degrees before or 10 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position		2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs: Time since last execution of diagnostic	P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than -10 crank degrees before or 10 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	Type B 2 trips MIL: YES
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips MIL: YES
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 6.8 ohms -OR- Calculated Heater Resistance > 12.8 ohms	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ < 18.0 volts <= 0.20 seconds	Once per valid cold start	Type B 2 trips MIL: YES
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 6.8 ohms -OR- Calculated Heater Resistance > 12.8 ohms	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ < 18.0 volts >= 0.20 seconds	Once per valid cold start	Type B 2 trips MIL: YES
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Type: A MIL:YES TRIPS:1
			2) Difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or battery voltage < 10.0 volts, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables				
Radiator Coolant Temp	P00B3	This DTC detects a short to	RCT Resistance	< 34 Ohms	No Active DTC's	IAT_SensorFA	5 failures out of 10	Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Sensor Circuit Low Voltage		ground in the RCT signal circuit or the RCT sensor.	(@ 150ºC)		Engine run time Or IAT min	 > 10.0 seconds ≤ 70.3 °C	samples 1 sec/sample Continuous	2 trips MIL: YES
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 260000 Ohms	No Active DTC's Engine run time Or IAT min	IAT_SensorFA > 60.0 seconds ≥ -7.0 °C	5 failures out of 10 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail). 2) Absolute difference between ECT at power up & RCT at power up is > by 20.0 C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 20.0 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelConditionDiag Diagnostic is aborted when Block Heater is detected. Block Heater is detected when the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time 3) Power up IAT 4a) Vehicle drive time 4b) Vehicle speed 4c) IAT drops from power up IAT	VehicleSpeedSensor_F IAT_SensorFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunni > 28800 seconds = Not occurred = False = False ≥ -7 ºC = False > 20.0 ºC < 10.0 Seconds > -7 ºC > 400 Seconds > 14.9 MPH ≥ 5.3 ºC	1 failure 500 msec/sample Once per valid cold start	Type B 2 trips MIL: YES
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed	Engine Coolant Temp (ECT) is greater than 117 Deg C and		No Active DTC's	RCT_Sensor_Ckt_FA THMR_ECT_Sensor_F	30 failures out of 600 samples	Type B 2 trips MIL:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Thermostat)	Difference between ECT and RCT is greater than 45 Deg C. When above is present for more than 5 seconds, fail counts start.		Engine run time OR Engine Coolant Temp	 > 300 seconds > 105.5 Deg C	 1 sec/sample Continuous	YES
Mass Air Flow System Performance	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 16 grams/sec > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6500 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C < 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight MAP Model 2 multiplied by MAP2 Residual Weight Factor based See table "IFRD Residual Weighting MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FA IAT_SensorFA IAT_SensorFP CylDeacSystemTFTKO	Continuous Calculation are performed every 12.5 msec	Type B 2 trips MIL: YES
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 900 Hertz (~ 0.00 gm/sec)	Engine Run Time Engine Speed Ignition Voltage	> 1.0 seconds >= 300 RPM >= 10.0 Volts	200 failures out of 250 samples	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Above criteria present for a period of time	>= 1.0 seconds	1 sample every cylinder firing event	
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 11000 Hertz (~ 178.86 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips MIL: YES
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 20.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6500 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C < 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor MAP Model 1 multiplied by MAP1 Residual Weight Factor based MAP Model 2 multiplied by MAP2 Residual Weight Factor based See table "IFRD Residual Weighting MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance MAF_SensorCircuitFA GetEPSR_b_CrankSns ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO	Continuous Calculations are performed every 12.5 msec	Type B 2 trips MIL: YES
Manifold Absolute Pressure Sensor Circuit Low (sensor with deadbands)	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips MIL: YES
Manifold Absolute Pressure	P0108	Detects an open sensor ground or	MAP Voltage	> 90.0 % of 5 Volt Range (4.5	Continuous		320 failures out of	Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Sensor Circuit High (sensor with deadbands)		continuous short to high in either the signal circuit or the MAP sensor.		Volts = 115.0 kPa)			400 samples 1 sample every 12.5 msec	2 trips MIL: YES
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 62 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 KPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorEr	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips MIL: YES
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects an open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 126840 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds > -40 deg C <= 512 KPH <= 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorEr MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips MIL: YES
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects an intermittent IAT signal circuit or IAT sensor	Change in IAT reading between consecutive 100 millisecond samples Change in IAT is multiplied by IAT Intermittent Weight Factor based on Filtered IAT. Filtered IAT = 0.10 * Current IAT + 0.90 * Filtered IAT from 100 milliseconds before	> 10 DegC	Continuous		20 failures out of 200 samples 1 sample every 100 msec	Type B 2 trips MIL: YES
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initization	VehicleSpeedSensor_F IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunni = Not occurred	1 failure 500 msec/sample Once per valid cold start	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 20.0 C after a minimum 28800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 20.0 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	Test complete this trip Test aborted this trip IAT LowFuelConditionDiag Diagnostic is aborted when Block Heater is detected. Block Heater is detected when the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time 3) Power up IAT 4a) Vehicle drive time 4b) Vehicle speed 4c) IAT drops from power up IAT	= False = False ≥ -7 ºC = False > 20.0 ºC < 10.0 Seconds > -7 ºC > 400 Seconds > 14.9 MPH ≥ 5.3 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 34 Ohms			5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 260000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ 0.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Throttle Position Sensor Performance	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 250 kPa*(g/s) > 16 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6500 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C < 0.50	Continuous Calculation are performed every 12.5 msec	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	Filtered Throttle Model multiplied by TPS Residual Weight Factor Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight See table "IFRD Residual Weighting MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance MAF_SensorCircuitFA GetEPSR_b_CrankSns ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3	79/159 counts; 57 counts continuous; 3.125 msec /count in the ECM main processor	Type: A MIL:YES TRIPS:1
TPS1 Circuit High	P0123	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3	79/159 counts; 57 counts continuous; 3.125 msec /count in the ECM main processor	Type: A MIL:YES TRIPS:1
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 11 grams per sec during Range #1 or #2: Range #1 (Primary)	See “P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions“ in the Supporting tables section	No Active DTC's Engine run time Fuel Condition	MAF_SensorFA IAT_SensorFA THMR_ECT_Sensor_F THMR_ECT_Sensor_C 20 ≤ Eng Run Tme ≤ 1370 seconds Ethanol ≤ 100%	1 failure to set DTC 1 sec/sample Once per ignition key cycle	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			ECT reaches Commanded temperature minus 11.0 °C when IAT min is < 65.0°C and ≥ 10.0°C.		Range #1 (Primary) Test ECT at start run Average Airflow T-Stat Heater duty commanded cycle	 -20.0 ≤ ECT ≤ 54.5 °C ≥ 11.0 gps ≤ 50 %		
			Range #2 (Alternate) ECT reaches Commanded temperature minus 31.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Range #2 (Alternate) Test ECT at start run Average Airflow T-Stat Heater duty commanded cycle	 -20.0 ≤ ECT ≤ 54.5 °C ≥ 11.0 gps ≤ 50 %		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSnsr FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False 0.9 <= equiv. ratio <= 50 ≤ APC ≤ 500 = Closed Loop = TRUE Enabled (On) Ethanol <= 88% DFCO not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	Open Test Criteria		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips MIL: YES
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 100 seconds		
					Fuel Condition	<= 88 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSnsr FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel Condition	<= 88 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 10.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 5.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9 <= equiv. ratio <=		
					Air Per Cylinder	50 ≤ APC ≤ 500		
					Fuel Control State	not = Power		
					All of the above met for			
					Time	> 5 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to “P0133 - O2S Slow Response Bank 1 Sensor 1" Pass/Fail Threshold table in the Supporting		No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault_No	Sample time is 60 seconds Frequency: Once per trip	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Tables tab.			MAF_SensorFA EvapPurgeSolenoidCirrge_FA EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSnsr FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected = P0131, P0132 or P0134	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 23 gps for ~~120000~~ 60,000grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Bank 1 Sensor 1 DTC's not active			
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 180 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 1.0 seconds		
					Time since Purge Off to On change	> 2.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	10 gps <= engine airflow <= 45 gps		
					Engine speed	1100 <= RPM <= 3500		
					Fuel	< 88 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	>= 150 mGrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Baro Fuel Control State Fuel State Commanded Proportional Gain All of the above met for Time	= Not Defaulted not = Power DFCO not active >= 0.0 % > 1.0 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	1700 mvolts < Oxygen Sensor signal	No Active DTC's System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 volts < system voltage< 18.0 volts = All Cylinders active = Complete = Warmed Up > 5 seconds > 100 seconds <= 88 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100msec loop	Type B 2 trips MIL: YES
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for Time	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	Type B 2 trips MIL: YES
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSnsr FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9 <= equiv. ratio <=		
					Air Per Cylinder	50 ≤ APC ≤ 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 88%		
					Fuel State	DFCO not active		
					All of the above met for Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	Open Test Criteria		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips MIL: YES
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSe nsor_FA		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 100 seconds		
					Fuel Condition	<= 88 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTankPressureSnsr FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State All of the above met for Time	= False <= 88 % Ethanol > 10.0 seconds when engine soak time > 28800 seconds > 5.0 seconds when engine soak time ≤ 28800 seconds 0.9 <= equiv. ratio <= 50 ≤ APC ≤ 500 not = Power > 5 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	1700 mvolts < Oxygen Sensor signal	No Active DTC's System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 volts < system voltage< 18.0 volts = All Cylinders active = Complete = Warmed Up > 5 seconds > 100 seconds <= 88 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100msec loop	Type B 2 trips MIL: YES
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 volts = Complete = Not active > zero	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for Time	 > 120 seconds		
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	≥ Long Term Trim Lean Table	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level Long Fuel Trim data accumulation:	400 <rpm< 6100 > 70 kPa -38 <°C< 130 15 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 < 318 mph > 10 % or if fuel sender > 35 seconds of data must accumulate on each trip, with at least 20 seconds of data in the current fuel trim cell before a pass or fail	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 70% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	Type B 2 trips MIL: YES
					Closed loop fueling Enabled			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp(°C)		
				disable conditions:	Engine speed Fuel Level EGR Flow Diag. Intrusive Test Active Catalyst Monitor Diag. Intrusive Test Active Post O2 Diag. Intrusive Test Active Device Control Active EVAP Diag. “tank pull down” portion of the test Active fuel trim metric updated during decels? YES No active DTCs:	rpm< 400 or rpm> 6100 < 10 % for at least 30 IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSens orCircuit FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected EGRValvePerformance EGRValveCircuit_FA MAP_EngineVacuumSt AmbientAirDefault_NA		
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition,			BARO Coolant Temp	> 70 kPa -38 <°C< 130		Type B 2 trips MIL:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		based on the filtered long-term fuel trim metric. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			MAP IAT MAF VSS Fuel Level Long Fuel Trim data accumulation:	15 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 < 318 mph < 10 % for at least 30 > 35 seconds of data must accumulate on each trip, with at least 20 seconds of data in the current fuel trim cell before a pass or fail		YES
					Closed loop fueling Enabled			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp(°C)		
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Non-Purge Long Term Fuel Trim metric	≤ Non Purge Rich Limit Table			> 100 ms Frequency: Continuous	
		Intrusive Test- When the Purge Long Term fuel trim metric is ≤ the Purge Rich Limit Table, Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table the test passes without checking	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ Purge Rich Limit Table ≤ Non Purge Rich Limit Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.	
			Segment Definition -					
				disable conditions:	Engine speed EGR Flow Diag. Intrusive Test Not Active ~~Fuel Level~~ Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” portion of the test Not Active fuel trim metric updated during decels? YES No active DTCs:	rpm< 400 or rpm> 6100 ~~< 10 % for at least 30~~ IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCir EvapFlowDuringNonPu EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSens orCircuit_FA Ethanol Composition Sensor FA	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 70% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelInjectorCircuit_FA EngineMisfireDetected EGRValvePerformance EGRValveCircuit_FA MAP_EngineVacuumSt AmbientAirDefault_NA		
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips MIL: YES
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips MIL: YES
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips MIL: YES
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips MIL: YES
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.25		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3	79/159 counts; 57 counts continuous; 3.125 msec /count in the ECM main processor	Type: A MIL: YES Trips: 1
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.59		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3	79/159 counts; 57 counts continuous; 3.125 msec /count in the ECM main processor	Type: A MIL:YES TRIPS:1
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			circuit do not match.				Continuous	
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	(>Idle SCD AND > Idle SCD ddt Tables) OR (>SCD Delta AND > SCD Delta ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) OR (>Cyl Mode AND > Cyl Mode ddt Tables) OR (>Rev Mode Table) OR (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft -7ºC < ECT < 125ºC < -7ºC 21ºC < ECT < 125ºC 9.00<volts<18.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = (5) failed 200 rev blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 rev block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. 2nd and 3rd Catalyst Exceedence = (1) 200 rev block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP.	Type B 2 trips MIL: YES (Mil Flashes with Catalyst Damaging Misfire)
			Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	≥ 2.00% P0300 ≥ 2.00% emission >"Catalyst Damaging Misfire Percentage" Table	Engine Speed	450 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed	Continuous	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO n IAT_SensorTFTKO ECT_Sensor_Ckt_TFT	4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						5VoltReferenceB_FA CrankSensorTestFailed CrankSensorFaultActiv CrankIntakeCamCorrel CrankExhaustCamCorr elationFA CrankCamCorrelationT AnyCamPhaser_FA AnyCamPhaser_TFTK		
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelConditionDiag	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in decel index	4 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	
					Below zero torque: TPS Veh Speed	 ≤ 2% > 512 KPH	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 95.00%	4 cycle delay 7 cycle delay	
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring: Stop filter early:	 5 engine cycles after misfire 3 Engine cycles after misfire		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 3 % > 1000 rpm > 5 kph = 5 consecutive cyls = 2 consecutive cyls		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	= 0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components on a per Cylinder basis	Knock Intensity VeKNKC_k_ReportedKnockIntsty	> 0.2100	Diagnostic Enabled (1 = Enabled) Engine Air Flow Engine Speed	= 1 ≥ 40 mg/cylinder and ≤ 2000 mg/cylinder ≥ 600 RPM	50 Fails out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output VaKNKD_k_KnockIntDiagCyl	> OpenCktThrshMin and < OpenCktThrshMax See Supporting Tables for OpenCktThrshMax	Diagnostic Enabled (1 = Enabled) Engine Speed Engine Air Flow	= 1 ≥ 600 RPM and ≤ 2900 RPM ≥ 40 mg/cylinder	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy			Diagnostic Enabled (1 = Enabled) Engine Air Flow	= 1 ≥ 40 mg/cylinder and	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		engine components on a per Bank basis	Knock Intensity VeKNKC_k_ReportedKnockIntsty	> 0.2100	Engine Speed	≤ 2000 mg/cylinder ≥ 600 RPM	100 msec rate	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line or Sensor Return Signal Line	< 2.0 * (51 / 720) Volts < 2.0 * (5 / 100) Volts	Diagnostic Enabled (1 = Enabled) Engine Speed	= 1 > 600 RPM and < 8500 RPM	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line or Sensor Return Signal Line	< 39.0 * (51 / 720) Volts < 39.0 * (5 / 100) Volts	Diagnostic Enabled (1 = Enabled) Engine Speed	= 1 > 600 RPM and < 8500 RPM	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received <u>Time-Based Crankshaft Test:</u> No crankshaft pulses received <u>Event-Based Crankshaft Test:</u> No crankshaft pulses received	 >= 1.5 seconds >= 1.0 seconds	<u>Engine-Cranking Crankshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Crankshaft Test:</u> Engine is Running Starter is not engaged No DTC Active: <u>Event-Based Crankshaft Test:</u> Engine is Running OR Starter is engaged	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceB_FA	<u>Engine-Cranking Crankshaft Test:</u> Continuous every 100 msec <u>Time-Based Crankshaft Test:</u> Continuous every 12.5 msec <u>Event-Based Crankshaft Test:</u> 2 failures out of 10 samples	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 20 or more crank re-synchronizations occur Time-Based Crankshaft Test: No crankshaft synchronization gap found Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 25.0 seconds >= 0.4 seconds >= 1.5 seconds < 51 > 65	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active: Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB_FA = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test: Continuous every 12.5 msec Engine Start Test during Crank: Continuous every 100 msec Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received		Engine Cranking Camshaft Test: Starter engaged AND		Engine Cranking Camshaft Test: Continuous every 100 msec	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	>= 5.5 seconds >= 4.0 seconds > 2.3 seconds = 0	(cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active: Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	= FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Test: Continuous every MEDRES event Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	No DTC Active: Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	 >= 5.5 seconds >= 4.0 seconds > 2.3 seconds = 0	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active: Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Test: Continuous every MEDRES event Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Performance Bank 1	P0366	Determines if a performance fault exists with the cam position bank	Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	Type: B MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Sensor B		1 sensor B signal	The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle) <u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active: <u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every MEDRES event <u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	Trips: 2
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	*<u>Valid Idle Period Criteria</u>*		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction:	Type: A MIL:YES TRIPS 1
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts The Catalyst Monitoring Test is done during idle. Several conditions			Driver must be off the accel pedal. This checks that the Vehicle Speed Engine speed	< *2.00 Kph* > 975 RPM for a minimum of 15 seconds since end of		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine run time	≥ MinimumEngineRunTime, This is a function of Coolant Temperture.		
					Tests attempted this trip	< 24		
					The catalyst diagnostic has not yet completed for the			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s):	Not Active		
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*46 < ° C < 140*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 2 Kph and the drivers foot is off accel pedal and the idle speed control system is active as identified in the		
					Short Term Fuel Trim	*0.80 < ST FT < 1.30*		
					Predicted catalyst temp > MinCatTemp table (degC) (refer			
					Closed loop fueling Enabled			
					PRNDL			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle			
					MAF	*1.00 < g/s < 10.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from			
					Number of pre-O2 switches	> 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg <*		
					Rapid Step Response (RSR) feature will initiate multiple			
					If the difference between current EWMA value and the			
					Maximum of 24 RSR tests to detect failure when RSR is			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions			
					The diagnostic will not be enabled until the following has			
					Predicted catalyst temperature > 550 ° C for 3600			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAF_SensorTFTKO			
					AmbientAirDefault_NoSnsr			
					IAT_SensorCircuitFA			
					IAT_SensorCircuitTFTKO			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ECT_Sensor_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA FuelTrimSystemB1_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EvapPurgeSolenoidCircuit_FA IAC_SystemRPM_FA EGRValvePerformance_FA EGRValveCircuit_FA CamSensorAnyLocationFA CrankSensor_FA TPS_Performance_FA EnginePowerLimited VehicleSpeedSensor_FA GetPTOR_b_PTO_Active			
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum)/pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Fuel Level Drive Time Drive length ECT Baro Odometer Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 3.1 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to "P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature table" in Supporting Tables ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A 1 trip EWMA MIL:YES Average run length is 6 under normal conditions Run length is 3 to 6 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.50 (EWMA Fail Threshold) ≤ 0.35 (EWMA Re-Pass Threshold)				
					Conditions for Estimate of Ambient Air Temperature to be			
					1. Cold Start Startup delta deg C (ECT-IAT) OR	≤ 8 °C		
					2. Short Soak and Previous EAT Valid Previous time since engine off OR	≤ 7200 seconds		
					3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab. OR	≤ 7200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec		
					4. Not a Cold Start and greater than a Short Soak Previous time since engine off AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.	> 7200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec		
					Conditions for Estimate of Ambient Air Temperature to be			
					1. Cold Start Startup delta deg C (ECT-IAT) OR	≤ 8 °C		
					2. Short Soak and Previous EAT Valid Previous time since engine off OR	≤ 7200 seconds		
					3. Time since EAT Valid Time since EAT valid OR	≤ 7200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					4. Not a Cold Start and greater than a Short Soak			
					Previous time since engine off AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.	> 7200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec		
				Abort Conditions:	1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented.	 > -5		
					OR 2. Vacuum Refueling Detected See P0454 Fault Code for information on vacuum refueling algorithm.			
					OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling.			
					OR 4. Vacuum Out of Range and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR 6. Vent Valve Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	 0.50 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR 7. Key up during EONV test No active DTCs:	 FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_F IgnitionOffTimeValid AmbientAirDefault_No P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms /sample Continuous with solenoid operation	Type: B MIL: YES Trips: 2
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum or Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time.	< -623 Pa > 1245 Pa > 2989 Pa ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 4 °C ≤ Temperature ≤ ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_F IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	Type: B MIL: YES Trips: 2
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous with	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.					solenoid operation	
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	 0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A 1 trip EWMA MIL:YES Average run length: 6 Run length is 2 trips after code clear or non-volatile reset
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up	is 0.10 seconds	80 failures out of 100 samples	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).		ECM State ≠ crank		100 ms / sample Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	Type: B MIL: YES Trips: 2
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. The abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	112 Pa < Vacuum < 249 Pa of 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 1 out of 3 samples are failures.	Type: A MIL:YES
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow	Purge volume BEFORE Tank vacuum 2 liters of fuel must be consumed	> 10 liters ≤ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 ≥ 70 kPa ≥ 2.00 % MAP_SensorFA TPS_FA	Once per cold start Time is dependent on driving conditions	Type: B MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		purge flow) and vent valve is commanded closed.	after setting the DTC active the first time to set the DTC active the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2740 Pa	Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Temperature Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	VehicleSpeedSensor_F IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ ≤ 35 °C	Maximum time before test abort is 1000 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the	
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel	Delta Fuel Volume change over an accumulated 149 miles.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_F	250 ms / sample Continuous	Type: B MIL: YES
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type: B MIL: YES Trips: 2
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type: B MIL: YES Trips: 2
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to	Type: A MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							complete. The test will report a failure if 1 out of 3 samples are failures.	
			An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	by 10 % > 10 %				
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 100 ms / sample Continuous with fan operation	Type B 2 trips MIL: YES Not used on systems with Mechanical Fan)
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 100 ms / sample Continuous with fan operation	Type B 2 trips MIL: YES Not used on systems with Mechanical Fan)
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Temperature Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 ≥ 70 kPa 4 °C ≤ Temperature ≤ ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_F IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453	Once per cold start Cold start: max time is 1000 seconds	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P0454		
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM	Maximum Engine Torque Minimum Engine Torque Minimum Throttle opening Minimum Engine Speed Maximum Engine Speed Disable P0502 if PTO Active Maximum Ignition Voltage Minimum Ignition Voltage	<= 8192 N-m >= 90 N-m >= 8.0 % Effective >= 1500 RPM <= 6500 RPM = 0 Boolean <= 18 volts >= 11 volts	>= 4.5 sec	Type B 2 trips MIL: YES
				Disable Conditions:	MIL not Illuminated for DTC's:	ECM: P0068, P006E, P0101, P0102, P0103, P0104, P0107, P0108, P0120, P0122, P0123, P012C, P012D, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0209, P020A, P020B, P020C, P020D, P020E, P020F, P0220, P0222, P0223, P0300, P0400, P0401, P0402, P0403, P0404, P0405, P0406, P042E, P042F, P0489, P0490, P049D, P0716, P0717, P0851, P0852, P1106, P1107, P1120, P1122, P1123, P1220, P1221, P1183, P1184, P1185, P1186, P1400, P1404, P1407, P1512, P1514,		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM	Raw Output Speed Time above raw Output Speed Positivie Output Speed change Time for Positive Output Speed Change Time since 4WD Range Change Disable P0503 if PTO Active Maximum Ignition Voltage	>= 200 RPM >= 2 sec <= 150 RPM >= 2 sec >= 6 sec = 0 Boolean <= 18 volts	>= 3.25 sec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum Ignition Voltage	>= 11 volts ECM: P0562 TCM: P0716, P0717, P0750, P0751, P0752, P0753, P0754, P0755, P0756, P0757, P0758, P0759, P075A, P075B, P075C, P075D, P075E, P075F, P0760, P0761, P0762, P0763, P0764, P0765, P0766, P0767, P0768, P0769, P076A,		
				Disable Conditions:	MIL not Illuminated for DTC's:			
Low Engine Speed Idle system	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 91.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec PTO not active Transfer Case not in 4WD LowState Output control state Output control state instrumentation AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA EGRValvePerformance IAT_SensorCircuitFA EvapFlowDuringNonPu FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EngineMisfireDetected IgnitionOutputDriver_F EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_F FuelLevelDataFault LowFuelConditionDiag ClchPstnEmisFA ClchToT_TypedABC		
High Engine Speed Idle system	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error filter coefficient	> -182.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec PTO not active Transfer Case not in 4WD LowState Output control state Output control state instrumentation AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA EGRValvePerformance IAT_SensorCircuitFA EvapFlowDuringNonPu FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected IgnitionOutputDriver_F EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_F FuelLevelDataFault	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	Type B 2 trips MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						LowFuelConditionDiag ClchPstnEmisFA ClchToT_TypedABC		
Thermostat Heater Control Open Circuit	P0597	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit). Fault present state for Open circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Open Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Thermostat Heater Control Circuit Low	P0598	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit). Fault present state for Ground Short circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Ground Short Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Thermostat Heater Control Circuit High	P0599	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage high during driver closed state (indicates short-to-power). Fault present state for Power Short circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Power Short Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/sample Continuous	Type B 2 trips MIL: YES
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	1) Calculated checksum does not match the stored checksum value. Covers the all software and calibrations.	1) 1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			1) Diagnostic runs continuously in the background	Type: A MIL:YES TRIPS 1
			2) The Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	2) 5 failures detected via Error Correcting Code			2) Diagnostic runs continuously via the flash hardware	
			3) The calculated checksum does not match the stored checksum value for a selected subset of the calibrations	3) 2 consecutive failures detected or 2 total failures detected.			3) Diagnostic runs continuously. Will report a detected fault within 200 ms.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				In all cases, the failure count is cleared when controller shuts down				
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid	PCM is identified through calibration as a Service PCM			Diagnostic runs at powerup	Type: A MIL:YES TRIPS 1
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type: A MIL:YES TRIPS 1
ECM RAM Failure	P0604	Indicates that the secondary controller is unable to correctly read data from or write data to RAM	Data read does not match data written				Should finish within 30 seconds at all engine conditions.	Type: A MIL:YES TRIPS 1
ECM Processor	P0606	Indicates that the ECM has detected an internal processor integrity fault						Type: A MIL:YES TRIPS 1
Secondary Processor Stack Fault		Checks for stack over or underflow in secondary processorby looking for corruption of known pattern at stack boundaries	Checks number of stack over/under flow since last powerup reset >=	79		KeMEMD_b_StackLimitTestEnbl == 1	variable, depends on length of time to corrupt stack	
Secondary processor received incorrect Keys		MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary	Checks number of incorrect keys received > or Secondary processor has not received a new within time limit	2 incorrect seeds within 8 messages, 0.200 seconds		ignition in Run or Crank	150 ms for one seed continually failing	
MAIN processor did not receive seed within time limit		MAIN processor did not receive seed within time limit	Time >	0.500 seconds		always running	0.500 seconds	
MAIN processor receives seed in wrong order		MAIN processor test for seeds to arrive in a known sequence	X out of Y	3 out of 17		always running	3* 50 ms	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Secondary processor ALU check		Verify secondary processor correctly performs know calculation. Verify the integrity of all general purpose registers	2 fails in a row			KePISD_b_ALU_TestEnbld == 1	12.5 ms	
Secondary processor configuration register check		Verify secondary processor configuration register masks versus known good data	2 fails in a row			KePISD_b_ConfigRegTestEnbld == 1	12.5 to 25 ms	
MAIN processor discrete fault		Secondary processor fails to detect the toggling of a hardware discrete line controlled by the MAIN processor	number of discrete changes >= or <= over time window(50ms)	15 9		KePISD_b_MainCPU_SOH_FltEnbld == 1 time from initialization >= 0.488 seconds	50 ms	
MAIN detected corruption in throttle or pedal critical RAM data		Test for critical vaules versus dual stores and for values in correct range	Continuous error for time >	0.10 seconds			0.10 seconds	
Processor Performance Check - ETC software is not executed in proper order			Software tasks loops > schedule tasks loop	1.00 seconds, See supporting tables		KePISD_b_SeedUpdKeyStorFltEnblC== 1 see supporting table	Error > 5 times of loop time; loop times are 6.25, 12.5, 25 ms in the main processor	
Processor Performance Check - ETC software is not completing background task			Software background task first pass time to complete >	360.000 seconds	Powertrain relay	> 6.00 V	30 s	
MAIN processor ALU check		Verify MAIN processor correctly performs know calculation. Verify the integrity of all general purpose registers	2 fails in a row			KePISD_b_ALU_TestEnbld == 1	12.5 ms	
MAIN processor configuration register check		Verify secondary processor configuration register masks versus known good data	2 fails in a row			KePISD_b_ConfigRegTestEnbld == 1	12.5 to 25 ms	
MAIN Stack Fault		Checks for stack over or underflow in MAIN processor by looking for corruption of known pattern at stack boundaries	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1	variable, depends on length of time to corrupt stack	
MAIN processor ADC test		A test Voltage of known value is read by the MAIN proocessor via an ADC channel	Voltage deviation >	9		KePISD_b_A2D_CnvrtrTestEnbld == 1	3 / 8 counts or 0.150 seconds continuous; 50 msec/count in main processor	
Starter Relay Control Circuit	P0615	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous	Special Type:C 1 Trip MIL: NO
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete				1 test failure Diagnostic runs once at powerup	Type A MIL: YES TRIPS: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks VIN is correctly written	At least one of programed VIN's digit	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A MIL: YES TRIPS: 1
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 >	4.432 4.659		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main processor	Type: A MIL:YES TRIPS 1
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous	Type B 2 trips NO MIL
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 >	4.432 4.659		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main processor	Type: A MIL:YES TRIPS 1
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	8 failures out of 10 samples 250 ms / sample Continuous	Type B 2 trips MIL:YES
Powertrain Relay Feedback Circuit Low	P0689	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is	≤ 5 volts	Powertrain relay commanded “ON” No active DTCs:	PowertrainRelayStateO	5 failures out of 6 samples 1second / sample	Type B 2 trips MIL:YES
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded ‘OFF’	≥ 18 volts > 2 volts	Powertrain relay commanded “ON” No active DTCs:	PowertrainRelayStateO	5 failures out of 6 samples 1second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 2 seconds	Type B 2 trips MIL:YES
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref3 <	4.432		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main processor	Type: A MIL:YES TRIPS 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			or ECM Vref3 >	4.659				
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 <	4.432		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main processor	Type: A MIL:YES TRIPS 1
			or ECM Vref4 >	4.659				
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used for the Open Circuit Diagnostic	Gated FFT Diagnostic Output VeKNKD_k_KnockIntDiag	> OpenTestThreshLo and < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled (1 = Enabled) Engine Speed Engine Air Flow	= 1 > 600 RPM ≥ 40 mg/cylinder and ≤ 2000 mg/cylinder	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type: A MIL:YES TRIPS 1
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear.	> 5 %	N/V Ratio must Match Actual Gear (i.e. vehicle in gear) Transfer Case not in 4WD Low range Engine Torque Clutch Pedal Position Vehicle Speed	 > EngTorqueThreshold < > > 3.1 MPH	25 ms loop Continuous	Type: A MIL:YES TRIPS 1
				disable conditions:	No active DTCs:	ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA TransOutputSpeedSensor Error		
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 5 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	200 failures out of 250 samples	Type: A MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				disable conditions:	No active DTCs:	5VoltReferenceB_FA	25 ms loop Continuous	TRIPS 1
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short toHigh	Clutch Position Sensor Circuit	> 95 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	> 9.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	Type: A MIL:YES TRIPS 1
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OBD Manufacturer Enable Counter	= 0 = 0	Clutch Pedal Position Not Learned		250 ms loop Continuous	Special Type:C 1 Trip MIL: NO
Inlet Airflow System Performance (naturally aspirated applications)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model AND (ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 16 grams/sec > 20.0 kPa) > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6500 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C < 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight MAP Model 1 multiplied by MAP1 Residual Weight Factor based MAP Model 2 multiplied by MAP2 Residual Weight Factor based See table "IFRD Residual Weighting MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance MAF_SensorCircuitFA GetEPSR_b_CrankSns ECT_sensor_FA	Continuous Calculation are performed every 12.5 msec	Type B 2 trips MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 5, or S/T R/L switches < 5	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance Engine Coolant IAT Engine run Accum Time since any AFM status change Time since Purge On to Off change Time since Purge Off to On change Purge duty cycle Engine airflow Engine speed	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault_No MAF_SensorFA EvapPurgeSolenoidCirrge_FA EvapVentSolenoidCirc EvapSmallLeak_FA EvapEmissionSystem_ FuelTankPressureSnsr FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected = P0131, P0132 or P0134 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False = Not Valid >= 40 seconds = Valid > 60 ºC > -40 ºC > 180 seconds > 2.0 seconds > 1.0 seconds > 2.0 seconds >= 0 % duty cycle 10 gps <= engine airflow <= 45 gps 1100 <= RPM <= 3500	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 23 gps for ~~120000~~ 60,000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	Type B 2 trips MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Baro Air Per Cylinder Low Fuel Condition Diag Fuel Control State Closed Loop Active LTM fuel cell Transient Fuel Mass Baro Fuel Control State Fuel State Commanded Proportional Gain All of the above met for Time	< 88 % Ethanol > 70 kpa >= 150 mGrams = False = Closed Loop = TRUE = Enabled <= 100.0 mgrams = Not Defaulted not = Power DFCO not active >= 0.0 % > 1.0 seconds		
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -6.50 KJ/s (high RPM failure mode) > 3.25 KJ/s (low RPM failure mode)	Cold Start Emission Reduction Strategy Is Active. To enable the cold start emission reduction strategy the catalyst temperature must be < 350.00 degC and the engine coolant must be > -10.00 degC. The Cold Start Emission Reduction strategy will exit when Vehicle Speed Driver must be off the accel pedal. This checks that the A change in throttle position (tip-in/tip-out) will initiate a For Manual Transmission vehicles, the clutch must be fully Idle Speed Control System is Active *General Enable* DTC's Not Set AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA CrankSensorFaultActive FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA Clutch Sensor FA IAC_SystemRPM_FA	 < 2 kph	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 14 seconds of accumulated qualified data.	Type: A MIL:YES TRIPS 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqureInaccurate			
Steady State Actuation Fault	P1516	1) Detect an inablity to maintain a steady state throttle position	Difference between measured throttle position and desired throttle position > Throttle is considered to be steady state when: Change in throttle position over 12.5 msec has not exceeded for this amount of time	7.53 percent 0.25 percent 4.00 second	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be 11 5.5	0.49 ms	Type: A MIL:YES TRIPS 1
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – ETC Run/Crank| >	3.00 Volts	Powertrain commanded on and Run/crank voltage > or ETC Run/crank voltage >	Table, f(IAT). See supporting tables 5.5	240/480 counts , 12.5msec loop time, in main processor	Type: A MIL:YES TRIPS 1
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures						Type: A MIL:YES TRIPS 1
			Desired engine torque request greater than redundant calculation plus threshold	57.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Engine min capacity above threshold	57.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 108 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	3.41m/s		Ignition in unlock/accessory, run or crank	Up/down timer 68 ms continuous, 0.5 down time multipier	
			1) Absolute difference of redundant calculated engine speed above threshold 2)Time between lores events and its dual store do not equal	KeEPSD_n_LoresSecurBndry 589 RPM		Engine speed greater than 0 rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not equal	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 108 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	753.00%		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	2.19 kpa/s		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	0.00026Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 29.00Nm Low Threshold -29.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy does not match	High Threshold 58.00Nm Low Threshold -58.00Nm Rate of change threshold 3.63Nm/loop		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 0.00026Nm Low Threshold -0.00026Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50% Low Threshold -0.50%		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.00026 Low Threshold -0.00026		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 1.00Nm Low Threshold -1.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 58.00Nm Low Threshold 0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit.	Low Threshold 0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 1.00Nm Low Threshold -1.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Generator friction torque is out of bounds given by threshold range	High Threshold 58.00Nm Low Threshold 0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 58.00Nm Low Threshold 0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy does not match	High Threshold 58.00Nm Low Threshold -58.00Nm Rate of change threshold 3.63Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 58.00Nm Low Threshold 0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 2.10Nm Low Threshold -0.65Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1) Difference of reserve torque value and its redundant calculation exceed threshold 2) Reserve request does not agree with operating conditions 2) Difference of final predicted torque and its redundant calculation exeed threshold 3) Rate of change of reserve torque exceeds threshold, increasing direction only 4) Reserve engine torque above allowable capacity by the	1) 57.00Nm 2) NA 3) 57.00Nm 4) 57.00Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 58.00Nm 3&4) Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation greater than threshold	19.36 degrees		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Engine Torque). See supporting tables		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calc'ed limit.	Table, f(Engine Oil Temp). See supporting tables		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		DoD not changing from Active to Inactive and preload torque not changing and one loop after React command	Up/down timer 1988 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 0.50s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	19.36 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	19.36 degrees		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque and its dual store are not match	58.00Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	58.00Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Commanded Engine Torque from Hybrid control module and its dual store are not equal	N/A		Ignition in unlock/accessory, run or crank	255/6 counts; 12.5msec/count	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	19.36 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	58.00Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder and its dual store do not match	69.64g/s		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100ms		Engine speed > 500rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	79.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range 2) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal 3) Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1) 5.00% 2) NA 3) NA		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Commanded axle torque is greater than its redundant calculation by threshold	632.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-474.00Nm		Ignition in unlock/accessory, run or crank Redundant commanded axle	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to fast actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Signed filtered defaulted output speed calculated from TOS and its dual store do not equal	NA		Hybrid control module only Ignition in	255/6 counts; 25.0msec/count	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.200		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	NA		Engine speed < 7000.00 or 7200.00 rpm (hysteresis pair)	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	NA		Time since first CAN message with vehicle	4/8 counts; 25.0msec/count	
			Throttle progression mode and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	69.64mg		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	19.36degrees		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Equivance Ratio torque compensation exceeds threshold	-58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given bt threshold	58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 632.00Nm Low Threshold -948.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Zero pedal learn offset Torque is out of bounds given by threshold range	High Threshold 10.00Nm Low Threshold -10.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit			Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit			Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	7.53 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be 11 5.5	15 counts; 12.5 msec/count in the primary processor	Type: A MIL:YES TRIPS 1
			Difference between measured throttle position and modeled throttle position <	7.53 percent				
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Thottle Position >	38.37 percent	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	
			Thottle Position >	37.37 percent	Reduced Power is True Powertrain relay voltage	> 6.00 Volts		
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.647	Throttle de-energized	Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	0.4969sec	Special Type: C Trips:1 MIL: NO
			AND TPS2 Voltage >	1.757	No TPs circuit faults PT Relay Voltage >	No 5V reference error No 5 V reference DTCs 5.5		
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.463		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	19/39counts or 15counts continuous; 12.5 msec/count in the main processor	Type: A MIL:YES TRIPS 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						No 5V reference error for # 4 5V reference No P06A3		
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage >	4.75	Run/crank voltage Powertrain relay voltage	Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3	1. 19/39counts or 15counts continuous; 12.5 msec/count in the main processor	Type:
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 3 5V reference No P0697	1. 19/39counts or 15counts continuous; 12.5 msec/count in the main processor	Type: A MIL:YES TRIPS 1
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 3 5V reference No P0697	1. 19/39counts or 15 counts continuous; 12.5 msec/count in the main processor	Type: A MIL:YES TRIPS 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TP sensors #1 and #2 on Main processor 2. Detects a continuous or intermittent correlation fault between TP sensors #1 and #2 on MHC processor	1. Difference between TPS1 displaced and TPS2 displaced > 2. Difference between (raw min TPS1) and (raw_min TPS2) >	7.022% offset at min. throttle position with an increasing to 10% at max. throttle position 5.000 % of Vref		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be No 5V reference error for # 4 5V reference No P06A3 No TPS sensor faults	1. 79/159 counts or 58 counts continuous; 3.125 msec/count in the main processor	Type: A MIL:YES TRIPS 1
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2	1. the difference between APP 1 displaced and APP 2 displaced is > 2. Difference between the learned PPS1 min and PPS2 min >	9.990% offset at min. throttle position with an increasing to 10% (0.5v)at max. throttle position for Main processor. 5.000% Vref	No APP sensor faults P2122, P2123,P2127, P2128 No 5 V reference DTCs P06A3,P0697	Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	1. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the main processor	Type: A MIL:YES TRIPS 1
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum. Number of learn attempts >	During TPS min learn on the Main processor, TPS Voltage > 10counts	0.955		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be	1.8secs	Type: A MIL:YES TRIPS 1
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 0. When above is present for more than 5 seconds, fail counts start. Engine total airgrams is accumulated when 11 ≤ AirFlow ≤ 100 grams per second.		No Active DTC's Engine run time Fuel Condition ECT at Power Up IAT min T-Stat Heater duty commanded cycle Airflow	MAF_SensorFA IAT_SensorFA THMR_ECT_Sensor_F THMR_ECT_Sensor_C 70 ≤ Time ≤ 1200 Ethanol ≤ 100% -20.0 ≤ ECT ≤ 74.5 °C -7°C ≤ IAT ≤ 60°C. ≤ 50 % 11.0 ≤ Airflow ≤ 100.0	160 failures out of 400 samples 1 sec/sample Once per ignition key cycle	Type B 2 trips MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 800.0 grams.					
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 760 mvolts AND 2) Accumulated air flow during stuck lean test > 38 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to enable test Engine Speed to disable test Engine Airflow Vehicle Speed to enable test Vehicle Speed to disable test Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 1100 <= RPM <= ~~3250~~3500 ~~1000~~ 950 <= RPM <= ~~3000~~3650 ~~0~~ 2 gps <= Airflow <= 28.0 mph <= Veh Speed <= 80.8 mph 12.4 mph <= Veh Speed <= 46.6 mph 0.84 <= C/L Int <= 1.30 = TRUE not in control of purge not in estimate mode = enabled	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed. Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 23 gps for ~~120000~~ 60,000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled	Type B 2 trips MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State	= not active = not active >= 80.0 sec 450 ºC <= Cat Temp <= 1000 ºC = DFCO possible	when the vehicle is new and cannot be enabled in service	
					All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > 150 mvolts AND 2) Accumulated air flow during stuck rich test > 26 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 1100 <= RPM <= ~~3250~~ 0 2 gps <= Airflow <= ~~25~~ 30 gps 28.0 mph <= Veh Speed <= 80.8 mph 0.84 <= C/L Int <= 1.30 = TRUE not in control of purge not in estimate mode = enabled = not active = not active	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed. <u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 23 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle).	Type B 2 trips MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All post sensor heater delays	= not active	Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	450 ºC <= Cat Temp <= 1000 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message - ($150 - PTEI2, $199 - PTEI3)	Message <> two's complement of message			>= 16 Protect errors during key cycle	Type B 2 trips MIL:YES
			OR					
			Rolling count error - Serial Communication message ($150 - PPEI2, $199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Diagnostic enabled/disabled	Enabled	>= 6 Rolling count errors out of ten samples	
			OR		Power Mode	= Run		
			RAM Error - Serial Communication message ($150 - PPEI2, $199 - PPEI3)	Trans torque reduction or type request portion of message 2's complement values <>	Engine Running	= True	>= 3 RAM errors this key cycle	
			OR		Run/Crank Active	> 0.50 Sec		
			TCM Requested Torque Increase message $199	> -4096 Nm			>= 3 out of 10 samples	
			OR					
			Multi-transition - Trans torque intervention type request change	Request change from not min limit to min limit			>= 3 multi-transitions out of 5 samples	
			OR					
			Serial communication from TCM	Loss of communication			> 0.20 seconds	
							Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): Runs a mirror timer to the HWIO timer. The mirror timer is started when the Engine Mode Not Run Timer is started. When the engine starts or when a controller shutdown is requested, the HWIO timer and mirror timer are compared.	Count Up Test: Time difference between the current read and the previous read of the Timer Range Test: The variation of the HWIO timer and mirror timer is at controller shutdown.	> 1.50 seconds > 25 %	IAT Temperature No active DTCs: Count Up Test: Ignition key off OR Engine off Range Test: ECM is powering down	-40 °C ≤ Temperature ≤ 80 °C IAT_SensorFA	Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous from key off or engine off until controller shutdown. Range Test: One time when the controller is powered down.	2 trips Type B MIL:YES DTC sets on next key cycle if failure detected.
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag A) O2S signal must be O2S signal To set Closed Loop ready flag Closed Loop O2S ready flag B) Once set to ready O2S cannot be O2S signal for time	= False < 1100 mvolts = True = True > 1100 mvolts > 5.0 seconds	No Active DTC's System Voltage Engine Speed Engine Airflow Engine Coolant	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152 10.0 volts < system voltage< 18.0 volts 1000 RPM <= Engine speed <= 3400 RPM 4.0 gps <= Engine Airflow<= 30.0 gps >= 70.0 ºC	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B MIL:YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Then set Closed Loop ready flag	= False	Engine Metal Overtemp Active Converter Overtemp Active	= False = False		
					Fuel State AFM Status	DFCO not active = All Cylinders active		
					Predicted Exhaust Temp (B1S1) Engine run time Fuel Enrichment	>= 0.0 ºC > 100 seconds = Not Active		
					All of the above met for Time	 > 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures out of these samples	≥ 4 counts ≥ 5 counts	CAN hardware is bus OFF for	≥ 0.1125 seconds	Diagnostic runs in 1000 ms loop	2 trips Type B MIL:YES
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module A	Message is not received from ECM/PCM A for this many seconds	10 seconds	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for A message has been selected to monitor.	11 volts ≤ Voltage ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	2 trips Type B MIL:YES

LOOK-UP TABLES

P0442: EONV Pressure Threshold Table (in Pascals)

X axis is fuel level in %
Y axis is temperature in deg C

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
-4.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
1.2500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
6.8750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
12.5000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
18.1250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
23.7500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
29.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
35.0000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
40.6250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
46.2500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
51.8750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
57.5000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
63.1250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
68.7500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
74.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
80.0000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358

P0442: Estimate of Ambient Temperature Valid Conditioning Time

EAT Valid Conditioning Time (in seconds)
Axis is Ignition Off Time (in seconds)

Axis	Curve
0	155
600	490
1200	490
1800	490
2400	490
3000	490
3600	370
4200	366
4800	361
5400	357
6000	353
6600	348
7200	344
7800	340
8400	335
9000	331
9600	327
10200	322
10800	318
11700	312
12600	305
13500	299
14400	292
15300	289
16200	286
17100	282
18000	279
19200	275
20400	270
21600	266
22800	257
24000	249
25200	240

P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Engine Off Time Before Vehicle Off Maximum Table (in seconds)
Axis is Estimated Ambient Coolant in Deg C

Axis	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
Curve	20	20	20	60	120	160	200	250	250	250	120	160	200	250	250	250	250

P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level

Purge Valve Leak Test Engine Vacuum Test Time (in seconds)
Axis is Fuel Level in %

Axis	Curve	
0	100	
6	100	
12	80	
19	75	
25	70	
31	65	
37	60	<= 0.20 seconds
44	60	
50	60	
56	60	
62	60	
69	55	
75	50	
81	45	
87	40	
94	30	
100	30	
53	10	
56	10	
59	10	
63	10	
66	10	
69	10	

72	10	
75	10	
78	10	
81	10	
84	10	
88	10	
91	10	
94	10	
97	10	
100	10	

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	30
3	35
6	40
9	45
13	50
16	55
19	60
22	65
25	70
28	85
31	90
34	95
38	135
41	135
44	160
47	160
50	260
53	260
56	360
59	360
63	360
66	360
69	360
72	460
75	460
78	460
81	460
84	460
88	460
91	460
94	460
97	460
100	460

P0016: Cam Correlation Oil Temperature Threshold

X axis is Engine Oil Temperature in Deg C

Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
	300.0	300.0	160.0	18.0	18.0	18.0	18.0	10.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table — **AXIS is Percent Clutch Petal Position, 0 = bottom of trave**

Axis	**0**	**6.2485**	**12.497**	**18.7455**	**24.994**	**31.2425**	**37.491**	**43.7395**	**49.988**	**56.2365**	**62.485**	**68.7335**	**74.982**	**81.2305**	**87.479**	**93.7275**	**99.976**
Curve	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

P0806 — Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference between ECT and RCT is greater than 45 Deg C. When above is present for more than 5 seconds, fail counts start.

ResidualErrorEnableLow Table — **AXIS is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	17.0	17.0	17.0	17.0	20.0	0.0	17.0	0.0

P0806

ResidualErrorEnableHigh Table — **AXIS is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	46.0	46.0	46.0	46.0	46.0	0.0	46.0	0.0

Tables supporting AIR Diagnostics

P0411

SL Threshold Bank 1 Table — **axis is average engine airflow during test in gm/sec**

Axis	**0.0**	**3.0**	**6.0**	**9.0**	**12.0**	**15.0**	**18.0**	**21.0**	**24.0**	**27.0**	**30.0**	**33.0**	**36.0**	**39.0**	**42.0**	**45.0**	**48.0**
Curve	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0

P0411

Phase 1 Baro Test Weight Factor — **axis is Baro in Kpa**

Axis	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
Curve	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	0.0

P0411

Phase 1 MAF Test Weight Factor — **axis is engine airflow in gm/sec**

Axis	**0.0**	**3.0**	**6.0**	**9.0**	**12.0**	**15.0**	**18.0**	**21.0**	**24.0**	**27.0**	**30.0**	**33.0**	**36.0**	**39.0**	**42.0**	**45.0**	**48.0**
Curve	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0411

Phase 1 System Volt Test Weight Factor — **axis is engine airflow in gm/sec**

Axis	**5.0**	**6.0**	**7.0**	**8.0**	**9.0**	**10.0**	**11.0**	**12.0**	**13.0**	**14.0**	**15.0**	**16.0**	**17.0**	**18.0**	**19.0**	**20.0**	**21.0**
Curve	0.0	0.0	0.0	0.0	0.0	0.3	0.7	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0

P0411

Phase 1 Amb Temp Test Weight Factor — **axis is Deg C**

Axis	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
Curve	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0

P02431	**P02440**																	
	Baro Skewed Sensor Weight Factor				**axis is distance traveled from last Baro update in Km**													
Axis	**0.0**	**2.0**	**4.0**	**6.0**	**8.0**	**10.0**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**	**26.0**	**28.0**	**30.0**	**32.0**	
Curve	1.0	0.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P02440																		
	Bank 1 Valve Pressure Error				**axis weighted time in seconds**													
Axis	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**									
Curve	0.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	-3.0									
P02440																		
	Phase 2 Baro Test Weight Factor				**axis is Baro in Kpa**													
Axis	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**									
Curve	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	0.0									
P02440																		
	Phase 2 MAF Test Weight Factor				**axis is engine airflow in gm/sec**													
Axis	**0.0**	**3.0**	**6.0**	**9.0**	**12.0**	**15.0**	**18.0**	**21.0**	**24.0**	**27.0**	**30.0**	**33.0**	**36.0**	**39.0**	**42.0**	**45.0**	**48.0**	
Curve	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P02440																		
	Phase 2 System Volt Test Weight Factor				**axis is engine airflow in gm/sec**													
Axis	**5.0**	**6.0**	**7.0**	**8.0**	**9.0**	**10.0**	**11.0**	**12.0**	**13.0**	**14.0**	**15.0**	**16.0**	**17.0**	**18.0**	**19.0**	**20.0**	**21.0**	
Curve	0.0	0.0	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	
P02440																		
	Phase 2 Amb Temp Test Weight Factor				**axis is Deg C**													
Axis	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**									
Curve	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0									
P02444																		
	Bank 1 Pump Pressure Error				**axis weighted time in seconds**													
Axis	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**									
Curve	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
FASD Section_Ian MacEwen		FASD_CombFuelTrimLeanThreshold0																
P0171 & P0174 (LONG TERM ONLY)	**Long Term Trim Lean**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Long Term Fuel Trim Lean Threshold	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	
P0172 & P0175 (LONG TERM ONLY)	**Non Purge Rich Limit**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Long Term Fuel Non-Purge Rich Threshold	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	
P0172 & P0175 (LONG TERM ONLY)	**Purge Rich Limit**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Long Term Fuel Purge Rich Threshold	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	
P0171 & P0174 (COMB TERM ONLY)	**Combined Fuel Trim Lean Threshold**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Comb Fuel Trim Lean Threshold	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	
P0172 & P0175 (COMB TERM ONLY)	**Combined Non Purge Rich Limit**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Comb Fuel Trim Non-Purge RichThreshold	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	
P0172 & P0175 (COMB TERM ONLY)	**Combined Purge Rich Limit**																	
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	
Comb Fuel Trim Purge Rich Threshold	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	
							The following tables define when the engine goes closed loop											
P0171, P0172, P0174 & P0175	**Closed Loop Enable Time vrs Coolant Temp**																	
Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152	
Close Loop Enable Time	185	155	135	60	19	16	15	14	13	11	2	2	2	2	2	2	2	
CATD Section Rob Genslak																		
MinimumEngineRunTime																		
Coolant Temp	40	50	60	70	80													
Engine Run Time	100	100	100	100	100													
MinCatTemp																		
X axis pts	0	1	2	3	4	5												
Cat temp (DegC)	450	450	450	450	450	450												
MinAirflowToWarmCatalyst																		
Engine Coolant	0	45	90															
MinAirFlowToWrmCat	12	10	6															
							Define Close Loop											
KtFSTA_t_ClosedLoopTime																		
Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152	
Close Loop Enable Time	185	155	135	60	19	16	15	14	13	11	2	2	2	2	2	2	2	
Tables supporting Engine Oil Temperature Sensor																		
P0196																		
	FastFailTempDiff				**AXIS is Engine Coolant Temperature at ECM Power-up, Degrees C**													
Axis	**-40**	**-28**	**-16**	**-4**	**8**	**20**	**32**	**44**	**56**	**68**	**80**	**92**	**104**	**116**	**128**	**140**	**152**	
Curve	79.5	79.5	79.5	60.0	60.0	39.8	39.8	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
	TotalAccumulatedFlow				**Axis is Power up Engine Oil temperature, Curve is accumulated engine grams airflow**													
Axis	**-40**	**-28**	**-16**	**-4**	**8**	**20**	**32**	**44**	**56**	**68**	**80**	**92**	**104**	**116**	**128**	**140**	**152**	
Curve	15000	14000	13000	12000	11000	10000	9000	8000	7000	6000	5000	4000	5000	4000	3000	3000	3000	

P0521

EngSpeedWeightFactorTable					AXIS is Engine RPM, Curve is Weight Factor				
Axis	700	1000	1500	1700	1800	2000	2500	3000	3500
Curve	0	0	0	1	1	1	0	0	0

EngOilTempWeightFactorTable					AXIS is Engine Oil Temp Deg C, Curve is Weight Factor				
Axis	70	85	95	100	105	110	120	130	150
Curve	0	0	0	1	1	1	0	0	0

EngLoadStabilityWeightFactorTable					AXIS is Engine RPM, Curve is Weight Factor				
Axis	0	0	0	0	0	0	0	0	0
Curve	0	0	0	1	1	1	0	0	0

EngOilPredictionWeightFacotrTable					AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor Ratio				
Axis	0	20	35	40	45	55	65	85	110
Curve	0	0	0	1	1	1	0	0	0

P0300-P0308: Idle SCD (decel index (> Idle SCD AND > Idle SCD ddt Tables

		600	700	800	900	1000	1100	1200	1300	1400
load	**0**	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load	**8**	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767
	14	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767
	16	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767
	18	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767
	21	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767
	24	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767
	27	32767	32767	32767	32767	32767	32767	32767	32767	32767
	100	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

		600	700	800	900	1000	1100	1200	1300	1400
load	**0**	32767	32767	32767	32767	32767	32767	32767	32767	32767
	8	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767
	14	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767
	16	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767
	18	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767
	21	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767
	24	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767
	27	32767	32767	32767	32767	32767	32767	32767	32767	32767
	100	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta **OR** (decel index >SCD Delta **AND** > SCD Delta ddt Tables)

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
load	**0**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load	**8**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
load	**0**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle Cyl Mode — **OR** (decel index (>Idle Cyl Mode **AND** > Idle Cyl Mode ddt Tables)

		600	700	800	900	1000	1100	1200	1300	1400
load	0	1499	1233	980	920	650	480	360	280	200
Load	8	1499	1233	980	920	Run Tme ≤ 137	480	360	280	200
	9	1478	1230	980	920	650	480	360	280	200
	12	1722	1372	980	920	650	480	360	280	200
	13	1845	1438	900	880	700	480	380	280	200
	14	1923	1482	950	900	720	490	390	290	210
	15	2006	1526	950	940	-20.0 ≤ ECT ≤ 54.5 °C	550	400	310	220
	16	2103	1573	1000	1000	780	600	410	320	230
	17	2218	1624	1050	1050	800	620	440	330	220
	18	2383	1900	1150	1150	840	680	480	360	240
	19	2585	2000	1250	1220	880	700	510	400	290
	21	2869	2150	1350	1300	920	750	550	410	300
	22	3114	2250	1450	1400	960	800	580	450	320
	24	3240	2400	1550	1450	-20.0 ≤ ECT ≤ 54.5 °C	900	600	480	380
	25	3403	2850	1650	1550	1100	950	610	510	440
	27	3556	2900	1750	1650	1250	1050	650	580	480
	100	4085	3000	1850	1750	1550	1200	700	650	520

P0300-P0308: Idle Cyl Mode ddt

		600	700	800	900	1000	1100	1200	1300	1400
load	0	2059	1563	1300	1100	900	610	490	450	400
	8	2059	1563	1300	1100	900	610	490	450	400
	9	1968	1513	1300	1100	900	610	490	450	400
	12	2194	1639	1300	1100	900	610	490	450	400
	13	2306	1683	1350	1200	900	610	490	450	400
	14	2394	1780	1450	1300	1000	710	580	500	420
	15	2497	1840	1500	1380	1080	790	650	600	460
	16	2613	1950	1650	1550	1150	940	730	660	480
	17	2734	2100	1800	1550	1300	1000	800	740	490
	18	2869	2600	2200	1780	1450	1100	900	800	500
	19	3001	2900	2550	1900	1500	1160	920	810	510
	21	3180	3000	2700	2000	1600	1200	940	820	520
	22	3266	3350	2850	2500	1950	1300	960	830	550
	24	3414	3440	3000	2800	2100	1400	1040	840	575
	25	3563	3530	3513	2900	2200	1580	1100	860	600
	27	3711	3650	3600	3200	2400	1750	1180	910	630
	100	4824	4500	3800	3500	2600	1900	1250	970	660

P0300-P0308: Cyl Mode — **OR** (decel index > Cyl Mode AND > Cyl Mode ddt Tables)

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
load	0	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43	36	25	19	14	12	10	9	7	7	7
Load	8	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43	36	25	19	14	12	10	9	7	7	7
	9	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43	36	25	19	14	12	10	9	7	7	7
	12	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43	36	25	19	14	12	10	9	7	7	7
	13	2200	2200	2150	1850	1480	1200	750	480	400	210	110	120	100	65	50	45	40	28	21	14	12	9	8	7	7	7
	15	2300	2300	2250	1950	1500	1200	750	520	460	260	140	130	110	70	56	50	43	30	22	16	13	9	8	7	7	7
	17	2600	2600	2550	2200	1600	1300	800	650	500	300	180	150	118	78	62	54	45	33	23	18	15	10	9	8	8	8
	19	2730	2730	2680	2300	1700	1450	860	750	590	350	220	170	125	85	70	58	48	36	24	20	17	11	10	9	9	9
	22	2830	2830	2780	2400	1800	1550	900	800	650	400	260	190	135	90	73	62	52	40	25	22	19	12	12	10	10	10
	25	2900	2900	2850	2500	1900	1650	1050	850	700	420	280	210	150	103	83	68	55	45	28	24	20	13	13	11	11	11
	29	3010	3010	2960	2600	2100	1700	1100	930	700	480	320	240	160	125	98	78	66	54	36	28	21	15	14	12	12	12
	33	3140	3140	3090	2700	2600	1750	1150	1000	780	520	360	280	190	138	110	90	77	62	42	34	23	17	15	13	13	13
	38	3170	3170	3120	2920	2820	1950	1250	1271	920	580	420	320	210	155	132	115	88	72	50	38	28	20	17	14	14	14
	42	3250	3250	3200	3000	2920	2150	1350	1350	1100	620	450	340	230	180	142	112	103	86	63	45	31	22	18	15	15	15
	48	3330	3330	3280	3080	3050	2550	1550	1450	1350	703	500	360	240	200	165	128	117	102	74	50	36	25	20	16	16	16
	54	3400	3400	3350	3150	3090	2650	1750	1650	1550	768	550	380	280	220	185	145	130	110	86	57	39	29	23	17	17	17
	63	3500	3500	3450	3250	3150	2750	1950	1780	1650	950	750	450	320	280	240	170	150	130	98	64	41	32	25	19	19	19

P0300-P0308: Cyl Mode ddt

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
load	0	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55	45	34	24	22	19	14	12	10	10	10
	8	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55	45	34	24	22	19	14	12	10	10	10
	9	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55	45	34	24	22	19	14	12	10	10	10
	12	2250	2250	2200	1900	1600	1300	880	600	480	350	220	160	130	95	82	55	45	34	24	22	19	14	12	10	10	10
	13	2350	2350	2300	2000	1700	1400	990	700	510	360	220	180	140	105	80	60	48	36	25	22	19	14	10	9	9	9
	15	2450	2450	2400	2100	1800	1400	1100	700	580	400	230	185	150	115	90	68	56	40	29	24	21	15	11	10	10	10
	17	2650	2650	2600	2400	2000	1500	1200	780	570	490	270	200	170	118	98	75	65	52	34	26	23	16	12	11	11	11
	19	2800	2800	2750	2650	2400	1800	1200	960	800	520	320	250	195	140	105	80	72	57	40	29	25	17	13	13	13	13
	22	2950	2950	2900	2700	2500	2000	1250	1100	900	600	370	287	205	152	115	95	75	68	46	31	27	19	14	14	14	14
	25	3000	3000	2950	2850	2700	2300	1300	1210	1000	650	410	310	240	165	130	105	92	80	55	36	29	20	15	15	15	15
	29	3130	3130	3080	2920	2850	2300	1350	1280	1100	760	480	360	265	205	155	120	102	90	66	40	31	23	17	16	16	16
	33	3200	3200	3150	3050	2900	2450	1500	1430	1250	810	550	401	300	220	164	137	120	100	78	52	37	26	20	16	16	16
	38	3250	3250	3200	3100	2950	2600	1800	1700	1500	900	600	466	330	240	190	162	130	118	85	58	40	30	24	18	18	18
	42	3350	3350	3300	3150	3000	2650	2000	1900	1750	1200	700	540	380	288	220	175	160	130	100	65	45	33	26	20	20	20
	48	3430	3430	3380	3180	3080	2750	2400	2000	1800	1400	920	600	400	310	240	198	168	145	110	72	50	39	28	24	24	24
	54	3510	3510	3460	3260	3160	2850	2500	2100	1850	1500	1020	670	500	360	259	219	188	163	120	80	54	45	32	26	26	26
	63	3600	3600	3550	3350	3250	2950	2600	2250	1900	1600	1080	750	600	420	350	280	220	187	130	88	59	52	38	30	30	30

P0300-P0308: Rev Mode Table — **OR** (decel index > Rev Mode Table)

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
load	0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: AFM Mode Table

OR (decel index > AFM Table if active fuel management

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
load	**0**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load	**8**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

RPM	Pct load
400	11.00
500	11.00
600	9.80
700	8.90
800	8.30
900	8.30
1000	8.30
1100	8.40
1200	8.60
1400	8.80
1600	8.80
1800	8.80
2000	8.80
2200	8.80
2400	8.90
2600	9.20
2800	9.50
3000	10.00
3500	11.98
4000	13.97
4500	15.95
5000	17.94
5500	19.92
6000	21.91
6500	23.89
7000	25.88

KcMISF_OneCylNoCatDamLvl

Catalyst Damaging Misfire Percentage

	0	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**
load	**0**	23	23	23	14	13	7	5	5
Load	**10**	23	23	23	14	13	7	5	5
	20	20	20	18	13	10	7	5	5
	30	19	19	16	8	7	5	5	5
	40	15	15	13	7	5	5	5	5
	50	13	13	9	5	5	5	5	5
	60	10	10	7	5	5	5	5	5
	70	8	8	6	5	5	5	5	5
	80	8	8	5	5	5	5	5	5
	90	8	8	5	5	5	5	5	5
	100	8	8	5	5	5	5	5	5

KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

KtPHSD_phi_CamPosErrorLimEc1

		X axis is Deg C															
		Y axis is RPM															
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500

KtPHSD_phi_CamPosErrorLimIc2

		X axis is Deg C															
		Y axis is RPM															
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

KtPHSD_phi_CamPosErrorLimEc2

		X axis is Deg C															
		Y axis is RPM															
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

KtPHSD_t_StablePositionTimeIc1

		X axis is Deg C															
		Y axis is RPM															
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	51.500	41.500	11.500	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

KtPHSD_t_StablePositionTimeEc1

		X axis is Deg C															
		Y axis is RPM															
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

2400	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	100.000	80.000	20.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	51.500	41.500	11.500	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

KtPHSD_t_StablePositionTimeIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

KtPHSD_t_StablePositionTimeEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

P0133 - O2S Slow Response Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
0.0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
1.0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
2.0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
3.0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
4.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
5.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
6.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
7.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
8.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
9.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
10.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
11.0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
12.0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
13.0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
14.0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
15.0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

P0153 - O2S Slow Response Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
0.0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1.0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
2.0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
3.0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
4.0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
5.0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
6.0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0

7.0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
8.0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	
9.0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	
10.0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	
11.0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	
12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for L/R HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	26	26	26	26	26
6.3	26	26	26	26	26
12.5	26	26	26	26	26
18.8	26	26	26	26	26
25.0	26	26	26	26	26
31.3	26	26	26	26	26
37.5	26	26	26	26	26
43.8	26	26	26	26	26
50.0	26	26	26	26	26
56.3	26	26	26	26	26
62.5	26	26	26	26	26
68.8	26	26	26	26	26
75.0	26	26	26	26	26
81.3	26	26	26	26	26
87.5	26	26	26	26	26
93.8	26	26	26	26	26
100.0	26	26	26	26	26

P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	26	26	26	26	26
6.3	26	26	26	26	26
12.5	26	26	26	26	26
18.8	26	26	26	26	26
25.0	26	26	26	26	26
31.3	26	26	26	26	26
37.5	26	26	26	26	26
43.8	26	26	26	26	26
50.0	26	26	26	26	26
56.3	26	26	26	26	26
62.5	26	26	26	26	26
68.8	26	26	26	26	26
75.0	26	26	26	26	26
81.3	26	26	26	26	26
87.5	26	26	26	26	26
93.8	26	26	26	26	26
100.0	26	26	26	26	26

P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for L/R HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30
12.5	30	30	30	30	30
18.8	30	30	30	30	30
25.0	30	30	30	30	30
31.3	30	30	30	30	30
37.5	30	30	30	30	30
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30

12.5	30	30	30	30	30														
18.8	30	30	30	30	30														
25.0	30	30	30	30	30														
31.3	30	30	30	30	30														
37.5	30	30	30	30	30														
43.8	30	30	30	30	30														
50.0	30	30	30	30	30														
56.3	30	30	30	30	30														
62.5	30	30	30	30	30														
68.8	30	30	30	30	30														
75.0	30	30	30	30	30														
81.3	30	30	30	30	30														
87.5	30	30	30	30	30														
93.8	30	30	30	30	30														
100.0	30	30	30	30	30														
P0101, P0106, P0121, P1101: IFRD Residual Weighting Factors																			
	TPS Residual Weight Factor based on RPM																		
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000		
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
	MAF Residual Weight Factor based on RPM																		
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000		
	1.000	1.000	1.000	1.000	0.861	0.840	1.000	1.000	0.833	0.740	0.733	0.679	0.679	0.679	0.679	0.679	0.679		
	MAF Residual Weight Factor Based on MAF Estimate																		
gm/sec	0.0	40.0	47.0	56.0	67.0	79.0	93.0	111.0	131.0	156.0	184.0	218.0	259.0	307.0	363.0	431.0	510.0		
	1.000	1.000	0.950	0.910	0.850	0.791	0.726	0.642	0.551	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
	MAP1 Residual Weight Factor based on RPM																		
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000		
	1.000	0.714	0.714	0.805	0.960	1.000	0.960	0.924	0.947	1.000	1.000	0.984	0.924	0.833	0.833	0.833	0.833		
	MAP2 Residual Weight Factor based on RPM																		
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000		
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.901	0.901	0.901	0.901		
P0108: MAP Cold Run Time Threshold																			
		X axis is Engine Coolant Temperature in Deg C																	
Temp	-30	-15	0	15	30														
	0.0	0.0	0.0	0.0	0.0														
P0114: IAT Intermittent Weight Factor																			
		X axis is Filtered Intake Air Temperature in Deg C																	
Temp	-40	0	40	80	120	160	200												
	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
P0324 Abnormal Noise Thresholds:																			
	Abnormal Hi Threshold = VeKNKD_k_PerfNoiseNormalLimitHi = Average Noise + **KeKNKD_k_PerfStdvsNormalNoiseHi** * Standard Deviation)																		
	Abnormal Low Threshold = VeKNKD_k_PerfNoiseNormalLimitLo = Average Noise - **KeKNKD_k_PerfStdvsNormalNoiseLo** * Standard Deviation)																		
P0325/P0330																			
	Engine Speed (RPM):	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	
	OpenCktThrshMin:	0.6400	0.6400	0.6400	0.6400	0.6500	0.6900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Engine Speed (RPM):	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	
	OpenCktThrshMax:	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	0.0450	0.0520	0.0940	0.1260	0.1490	0.1840	0.1848	0.1856	0.1856	0.1856	0.1856	
P06B6/P06B7																			
	Engine Speed (RPM):	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	
	OpenTestThreshLo	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	
	Engine Speed (RPM):	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	
	OpenTestThreshHi	0.0825	0.0825	0.0825	0.0825	0.0825	0.0825	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	0.0375	
P0068: MAP / MAF / TPS Correleation																			
		X-axis is TPS (%)																	
		Data is MAP threshold (kPa)																	
X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985										
Data	36.0000	44.2734	31.1016	37.1016	40.2969	25.8672	255.0000	255.0000	255.0000										
		X axis is TPS (%)																	
		Data is MAF threshold (grams/sec)																	
X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985										
Data	10.9766	19.8984	13.5391	17.0703	25.1016	29.6016	511.9922	511.9922	511.9922										
P1682: Ignition Voltage Correleation																			
		X-axis is IAT (DegC)																	
		Data is Voltage threshold (V)																	
X-axis	23.0000	85.0000	95.0000	105.0000	125.0000														
Data	7.0000	8.6992	9.0000	9.1992	10.0000														
P606	**Processor Performance Check - ETC software is not executed in proper order**																		
	X-axis is task loop time																		
	Data is threshold (seconds)																		

X-axis	CePISR_e_6p 25msSeq	CePISR_e_ 12P5msSeq	CePISR_e_ 25msSeq
Data	0.1750	0.1750	0.1750

X-axis is task loop time
Data is threshold (seconds)

X-axis	CePISR_e_6p 25msSeq	CePISR_e_ 12P5msSeq	CePISR_e_ 25msSeq
Data	0.1750	0.1750	0.1750

X-axis is task loop time
Data indicates if feature is enabled

X-axis	CePISR_e_6p 25msSeq	CePISR_e_ 12P5msSeq	CePISR_e_ 25msSeq
Data	1.0000	1.0000	1.0000

P00B6: Fail if power up ECT exceeds RCT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0116: Fail if power up ECT exceeds IAT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions

Z axis is the accumulated time failure threshold (seconds)
X axis is ECT Temperature at Power up (° C)
Y axis is IAT min during test (° C)

	IAT Range												
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	65.0 ° C	1250	1078	1020	790	733	670	638	605	573	475	410
Alternate	-7.0 ° C	10.0 ° C	920	748	690	518	460	390	358	325	293	195	130

FAULT BUNDLE DEFINITIONS

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
Genslak		CATR	GetCATR_b_CatSysEffLoB1_FA	CatalystSysEfficiencyLoB1_FA	P0420											
			GetCATD_b_CatSysEffLoB2_FA	CatalystSysEfficiencyLoB2_FA	P0430											
		CSED	**No fault bundle produced that is consumed by other rings**													
Hall	Evap	EVPR	GetEVPR_b_Purg1SlndCkt_FA	EvapPurgeSolenoidCircuit_FA	P0443											
			GetEVPR_b_FlowDurNonPurg_FA	EvapFlowDuringNonPurge_FA	P0496											
			GetEVPR_b_VentSlndCkt_FA	EvapVentSolenoidCircuit_FA	P0449											
			GetEVPR_b_SmallLeak_FA	EvapSmallLeak_FA	P0442											
			GetEVPR_b_EmissionSys_FA	EvapEmissionSystem_FA	P0455	P0446										
			GetEVPR_b_FTP_Circuit_FA	FuelTankPressureSnsrCkt_FA	P0452	P0453										
Hall	Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495											
Hall	Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
Hall	Engine Interface	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682											
			GetPMDR_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685											
			GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685											
			GetPMDR_b_IgnOffTmeFA	IgnitionOffTimer_FA	P2610											
			GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610											
			GetEPSR_TmSinceEngRunningValid	TimeSinceEngineRunningValid	P2610											
Hall	Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723								
			GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502	P0503	P0722	P0723								
MacEwan		FADD	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171	P0172										
			GetFADR_b_FuelTrimSysB1_TFTKO	FuelTrimSystemB1_FA	P0171	P0172										
			GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174	P0175										
			GetFADR_b_FuelTrimSysB2_TFTKO	FuelTrimSystemB2_FA	P0174	P0175										
		AFIM	CeDFIR_e_FuelTrimCylBalB1	A/F Imbalance Bank1	P1174											
			CeDFIR_e_FuelTrimCylBalB2	A/F Imbalance Bank2	P1175											
MacEwen	Secondary Air	AIRR	GetAIRR_b_AIR_PresSensorFault	AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438				
			GetAIRR_b_AIR_Sys_FA	AIR System FA	P0411	P2440	P2444									
			GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1)	AIRValveControlCircuit FA	P0412											
			GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1)	AIRPumpControlCircuit FA	P0418											
MacEwen	Clutch	MTCR	GetMTCR_b_ClchPstnSnsrFlt	Clutch Sensor FA	P0806	P0807	P0808									
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo)	ClutchPositionSensorCktLo FA	P0807											
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)	ClutchPositionSensorCktHi FA	P0808											
MacEwen	Closed Loop Fuel	E85R	GetE85R_b_FFS_CompFA	EthanolCompositionSensor_FA	P0178	P0179										
Mathews	Misfire PDT	MSFR	GetMSFR_b_EngMisfDtctd_TFTKO	EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
			GetMSFR_b_EngMisfDtctd_FA	EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
Sawdon	Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333				
Sawdon	Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				
Siekkinen	O2 PDT	OXYR	VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank1]	O2S_Bank_1_TFTKO	P0131	P0132	P0134	P2A00								
			VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank2]	O2S_Bank_2_TFTKO	P0151	P0152	P0154	P2A03								
			NeOXYI_b_Bank1Snsr1_FA	O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133				
			NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	
			NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153				
			NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	
		ECTI	NeECTI_b_ECT_SnsrCktFA	ECT_Sensor_Ckt_FA	P0117	P0118										
		ECTI	NeECTI_b_ECT_SnsrCktTPTKO	ECT_Sensor_Ckt_TPTKO	P0117	P0118										
		ECTI	NeECTI_b_ECT_SnsrCktTFTKO	ECT_Sensor_Ckt_TFTKO	P0117	P0118										
		ECTI	NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125								
		ECTI	NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128							
		ECTI	NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125								
		ECTI	NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116											
		ECTI	VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117	P0118										
		ECTI	GetECTI_b_ECT_SnsrCktHiFP	ECT_Sensor_Ckt_High_FP	P0118											
		ECTI	GetETCI_b_ECT_SnsrCktLoFP	ECT_Sensor_Ckt_Low_FP	P0117											
Wiggins	Air Measurement	AAPR	GetAAPR_b_AAP_SnsrCktFA (baro/TIAP sensor)	AmbientAirPressCktFA	P2228	P2229										
			GetAAPR_b_AAP_SnsrCktFA (no baro/TIAP sensor)	AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108									
			GetAAPR_e_AmbPresDfltdStatus (baro/TIAP sensor, nat aspir)	AmbientAirDefault_NA	P0106	P0107	P0108	P2227	P2228	P2229						
			GetAAPR_e_AmbPresDfltdStatus (baro/TIAP sensor, SupCharged)	AmbientAirDefault_SC	P012B	P012C	P012D	P2227	P2228	P2229						

			GetAAPR_e_AmbPresDfltdStatus (no baro/TIAP sensor)	AmbientAirDefault_NoSnsr	P0106	P0107	P0108										
Wiggins	Air Measurement	EITR	GetEITI_b_IAT_SnsrCktTFTKO	IAT_SensorCircuitTFTKO	P0112	<= 0.20 seconds											
			GetEITI_b_IAT_SnsrCktFA	IAT_SensorCircuitFA	P0112	P0113											
			GetEITR_b_IAT_SnsrCktFP	IAT_SensorCircuitFP	P0112	P0113											
			GetEITI_b_IAT_SnsrTFTKO	IAT_SensorTFTKO	P0111	P0112	P0113										
			GetEITI_b_IAT_SnsrFA	IAT_SensorFA	P0111	P0112	P0113										
			GetEITI_b_IAT_2_SnsrCktTFTKO (IAT2 Present)	IAT2_SensorCktTFTKO	P0097	P0098											
			GetEITI_b_IAT_2_SnsrCktTFTKO (IAT2 Not Present)	IAT2_SensorCktTFTKO_NoSnsr	P0112	P0113											
			GetEITI_b_IAT_2_SnsrCktFA (IAT2 Present)	IAT2_SensorCircuitFA	P0097	P0098											
			GetEITI_b_IAT_2_SnsrCktFA (IAT2 Not Present)	IAT2_SensorCircuitFA_NoSnsr	P0112	P0113											
			GetEITR_b_IAT_2_SnsrCktFP (IAT2 Present)	IAT2_SensorcircuitFP	P0097	P0098											
			GetEITR_b_IAT_2_SnsrCktFP (IAT2 Not Present)	IAT2_SensorcircuitFP_NoSnsr	P0112	P0113											
			GetEITI_b_IAT_2_SnsrTFTKO (IAT2 Present)	IAT2_SensorTFTKO	P0096	P0097	P0098										
			GetEITI_b_IAT_2_SnsrTFTKO (IAT2 Not Present)	IAT2_SensorTFTKO_NoSnsr	P0111	P0112	P0113										
			GetEITI_b_IAT_2_SnsrFA (IAT2 Present)	IAT2_SensorFA	P0096	P0097	P0098										
			GetEITI_b_IAT_2_SnsrFA (IAT2 Not Present)	IAT2_SensorFA_NoSnsr	P0111	P0112	P0113										
Wiggins	Air Measurement	IFRR	GetIFRR_b_ChgrBypVlvFault	SuperchargerBypassValveFA	P2261												
			GetIFRR_b_CylDeacSys_TFTKO	CylDeacSystemTFTKO	P3400												
			GetIFRR_b_MAF_SnsrPerfFault	MAF_SensorPerfFA	P0101												
			GetIFRR_b_MAF_SnsrPerf_TFTKO	MAF_SensorPerfTFTKO	P0101												
			GetIFRR_b_MAP_SnsrPerfFault	MAP_SensorPerfFA	P0106												
			GetIFRR_b_MAP_SnsrPerf_TFTKO	MAP_SensorPerfTFTKO	P0106												
			GetIFRR_b_SCIAP_SnsrPerfFault	SCIAP_SensorPerfFA	P012B												
			GetIFRR_b_SCIAP_SnsrPerf_TFTKO	SCIAP_SensorPerfTFTKO	P012B												
			GetIFRR_b_TP_SnsrPerfFault	ThrottlePositionSnsrPerfFA	P0121												
			GetIFRR_b_TP_SnsrPerf_TFTKO	ThrottlePositionSnsrPerfTFTKO	P0121												
Wiggins	Air Measurement	MAFR	GetMAFR_b_MAF_SnsrFA	MAF_SensorFA	P0101	P0102	P0103										
			GetMAFR_b_MAF_SnsrTFTKO	MAF_SensorTFTKO	P0101	P0102	P0103										
			GetMAFR_b_MAF_SnsrFP	MAF_SensorFP	P0102	P0103											
			GetMAFR_b_MAF_SnsrCktFA	MAF_SensorCircuitFA	P0102	P0103											
			GetMAFR_b_MAF_SnsrCktTFTKO	MAF_SensorCircuitTFTKO	P0102	P0103											
Wiggins	Air Measurement	MAPR	GetMAPR_b_MAP_SnsrTFTKO	MAP_SensorTFTKO	P0106	P0107	P0108										
			GetMAPR_b_MAP_SnsrFA	MAP_SensorFA	P0106	P0107	P0108										
			GetMAPR_b_SCIAP_SnsrFA	SCIAP_SensorFA	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrTFTKO	SCIAP_SensorTFTKO	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrCktFP	SCIAP_SensorCircuitFP	P012C	P012D											
			GetMAPR_b_AfterThrotBlade_FA (naturally aspirated)	AfterThrottlePressureFA_NA	P0106	P0107	P0108										
			GetMAPR_b_AfterThrotBlade_FA (supercharged)	AfterThrottlePressureFA_SC	P012B	P012C	P012D										
			GetMAPR_b_AftThrotVacSnsr_TFTKO (naturally aspirated)	AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108										
			GetMAPR_b_AftThrotVacSnsr_TFTKO (supercharged)	AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012C	P012D											
			GetMAPR_b_AftThrotPresSnsrTFTKO (naturally aspirated)	AfterThrottlePressTFTKO_NA	P0106	P0107	P0108										
			GetMAPR_b_AftThrotPresSnsrTFTKO (supercharged)	AfterThrottlePressTFTKO_SC	P012B	P012C	P012D										
			GetMAPR_b_MAP_SnsrCktFA	MAP_SensorCircuitFA	P0107	P0108											
			GetMAPR_e_EngVacStatus() == CeMAPR_e_Defaulted	MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending												
Wiggins	Engine Positioning	EPSR	GetEPSR_b_CkpToCamCorr_TFTKO	CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019									
			GetEPSR_b_CrankSnsr_FA	CrankSensorFA	P0335	P0336											
			GetEPSR_b_CrankSnsr_TFTKO	CrankSensorTFTKO	P0335	P0336											
			GetEPSR_b_CamSnsr_FA	CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CamSnsr_TFTKO	CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CkpToCamCorrInt_FA	CrankIntakeCamCorrelationFA	P0016	P0018											
			GetEPSR_b_CkpToCamCorrExh_FA	CrankExhaustCamCorrelationFA	P0017	P0019											
			GetEPSR_b_CamSnsrIntake_TFTKO	IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_CamSnsrIntake_FA	IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_CamSnsrExhaust_TFTKO	ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_CamSnsrExhaust_FA	ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_IntakeSnsrFaultActive	IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_IntakeSnsrTestFailTKO	IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_ExhSnsrFaultActive	ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_ExhSnsrTestFailTKO	ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_CkpToCamCorrInt	CrankIntakeCamCorrFA	P0016	P0018											
			GetEPSR_b_CkpToCamCorrExh	CrankExhaustCamCorrFA	P0017	P0019											
			GetEPSR_b_CrankSnsrFaultActive	CrankSensorFaultActive	P0335	P0336											
			GetEPSR_b_CrkSnsrFA	CrankSensor_FA	P0335	P0336											
			GetEPSR_b_CrankSnsrTestFailTKO	CrankSensorTestFailedTKO	P0335	P0336											
			GetEPSR_b_CrkSnsrTFTKO	CrankSensor_TFTKO	P0335	P0336											
			GetEPSR_b_CamSnsrFaultActive	CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CamSnsrLctnAnyFA	CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CamSnsrTestFailTKO	CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
York	Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagFA	AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024					
York	Dilution PDT		GetPHSR_b_PhaserBndlFlagTFTKO	AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024					
York	Dilution PDT		GetPHSR_b_IcPhaserBndlFlagFA	IntkCamPhaser_FA	P0010	P0011	P0020	P0021									

York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerf_FA	EGRValvePerformance_FA	P0401	P042E										
York	Dilution PDT		GetEGRR_b_EGR_ValveCkt_FA	EGRValveCircuit_FA	P0403	P0404	P0405	P0406								
York	Dilution PDT		Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference betw	EGRValve_FP	P0405	P0406	P042E									
York	Dilution PDT		GetEGRR_b_EGR_ValveCktTFTKO	EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406								
York	Dilution PDT		GetEGRR_b_EGR_ValvePerfTFTKO	EGRValvePerformance_TFTKO	P0401	P042E										
Harnack		ACCR	GetACCR_b_AC_FailedOn	A/C_FailedOn	P0645											
Jess	Oil Attributes PDT	If sensor application	GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197	P0198										
Jess	Oil Attributes PDT	if modeled	GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Sensor_FA or IAT_SensorCircuitFA											
Jess	Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522	P0523										
Jess	Oil Attributes PDT		GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521	P0522	P0523									
			VeTRGI_b_TransEngdStEmisFlt	see Trans Summary Tables												
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449					
Kaiser	AFM PDT	BTRR	GetBTRR_b_BrkBstrSnsrFlt	BrakeBoosterSensorFA	P0556	P0557	P0558									
		If sensor application	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556	P0557	P0558									
		if modeled	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleSpeedSensorError or MAP_SensorFA											
Miller		FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
			GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
Kurnik		MEMR	GetMEMR_b_ECM_PCM_ProcPerf_FA	ControllerProcessorPerf_FA	P0606											
			GetMEMR_b_CM_RAM_ErrFA	ControllerRAM_Error_FA	P0604											
Bauerle		TPSR	GetTPSR_PerfFaultActive_TPS	TPS_Performance_FA	P0068	P0121	P1516	P2101								
Bauerle		SRAR	GetSRAR_b_EnginePowerLimited	EnginePowerLimited	P0068	P0606	P0122	P0123	P0222	P0223	P0697	P160F	P1682	P16F3		
					P2101	P2122	P2123	P2127	P2128	P2135	P2138	P2176	U0293	U1817	U0074	
					P0AC4	P0601	P0604	P0A1D	P15F2	P215B						
			TPS1_OutOfRange_Composite	TPS1_OutOfRange_Composite	P0120	P0122	P0123									
			TPS2_OutOfRange_Composite	TPS2_OutOfRange_Composite	P0220	P0222	P0223									
			GetTPSR_FaultActive_TPS	TPS_FA	P2135	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)										
			GetTPSR_FaultPending_TPS	TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag											
			GetTPSR_ThrotAuthDefault	TPS_ThrottleAuthorityDefaulted	P0068	P0606	P1516	P2101	P2135	P2176	V5B_OutOfRange_Composite					
					(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)											
					(MAP_OutOfRange_Composite and MAF_OutOfRange_Composite)											
			GetTPSR_b_AccelEffPstnValid	AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE											
Bauerle		VLTR	GetVLTR_b_V5A_FA	5VoltReferenceA_FA	P0641											
			GetVLTR_b_V5B_FA	5VoltReferenceB_FA	P0651											
			GetVLTR_b_MAP_OOR_Flt	5VoltReferenceMAP_OOR_Flt	P0697											
Kar		SPDR	GetSPDR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506	P0507										
Pellerito	Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaulted	P182E	P1915										
		TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	P182E	P1915										
		TOSR	GetTOSR_b_TOS_Error	TransOutputSpeedSensor_Error	P0722	P0723										
Dholakia		FWDR	GetFWDR_b_FourWhlDrvLowStateVld	FourWheelDriveLowStateValid	P2771											
		ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqureInaccurate	EngineMisfireDetected_FA or											
			GetETQR_b_EngTorqInaccurate		FuelInjectorCircuit_FA or											
					FuelInjectorCircuit_TFTKO or											
					FuelTrimSystemB1_FA or											
					FuelTrimSystemB2_FA or											
					MAF_SensorTFTKO or											
					MAP_SensorTFTKO or											
					EGRValvePerformance_FA											
Bolstrum		APSR	GetAPSR_b_PedalFailure	AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0697	P06A3					
			Short Name:	**Long Name**	**Short Name**											
				Bank	B											
				Brake	Brk											
				Circuit	Ckt											
				Engine	Eng											
				Fault Active	FA											
				Fault	Flt											
				Intake	Intk											

				Naturally Aspirated	NA												
				Out of Range	OOR												
				Performance	Perf												
				Position	Pstn												
				Pressure	Press												
				Sensor	Snsr												
				Supercharged	SC												
				System	Sys												
				Test Failed This Key On	TFTKO												
			Other Definitions														
Hall	Evap	FLVD	GetFLVR_b_LowFuelConditionDiag	LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 %												
					AND												
					No Active DTCs:		FuelLevelDataFault										
							P0462										
							P0463										
					for at least 30 seconds.												
		FLVD	GetFLVC_b_FuelPump2_StOn	Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters												
					AND												
					Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters												
					AND												
					Transfer Pump on Time < **TransferPumpOnTimeLimit** Table												
					AND												
					Transfer Pump had been Off for at least 0.0 seconds												
					AND												
					Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running												
					AND												
					Engine Running												