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 < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
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_CamPosErrorLimIc1 Deg (see Supporting Table)	DTC's are NOT active: P0010 IntkCMP B1 Circuit IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPos ErrorLimIc1 or > than (27.0 - KtPHSD_phi_CamPos ErrorLimIc1). Desired cam position cannot vary more than 5.0 Cam Deg for at least KtPHSD_t_StablePositi onTimeIc1 seconds (see Supporting Tables)	300 failures out of 400 samples 100 ms /sample	Trips 2 B Type
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 < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
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)	DTC's are NOT active: P0013 IntkCMP B1 Circuit ExhaustCamSensorTFTKO	System Voltage > 11 Volts, and System Voltage < 32 Volts	300 failures out of 400 samples	Trips 2 B Type

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					CrankSensorTFTKO CrankExhaustCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPos ErrorLimEc1 or > than (Exh21.0 - KtPHSD_phi_CamPos ErrorLimEc1). Desired cam position cannot vary more than 5.0 Cam Deg for at least KtPHSD_t_StablePositi onTimeEc1 seconds (see Supporting Tables)	 100 ms /sample	
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 No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0340, P0341 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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
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).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
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).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	6.8 < Ω < 12.8	No Active DTC's	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	2 trips Type B
					Coolant – IAT	< 8.0 ºC		
					Engine Soak Time	> 28800 seconds		
					Coolant Temp	-30.0 < ºC < 45.0		
					Ignition Voltage	< 32.0 volts		
					Engine Run time	< 0.28 seconds		
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	6.8 < Ω < 12.8	No Active DTC's	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	2 trips Type B
					Coolant – IAT	< 8.0 ºC		
					Engine Soak Time	> 28800 seconds		
					Coolant Temp	-30.0 < ºC < 45.0		
					Ignition Voltage	< 32.0 volts		
					Engine Run time	< 0.28 seconds		
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	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	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Trips: 1
						Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions		Type: A
								MIL: YES
			Absolute 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 maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 34 Ohms	Engine run time Or IAT min	> 10.0 seconds ≤ 70.3 °C	5 failures out of 10 samples 1 sec/ sample Continuous	2 trips Type B
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	Engine run time Or IAT min	> 60.0 seconds ≥ -7.0 °C	5 failures out of 10 samples 1 sec/ sample Continuous	2 trips Type B
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	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section	No Active DTC's Engine Off Soak Time Non-volatile memory initization Test complete this trip	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28800 seconds = Not occurred = False	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	= False	Test aborted this trip IAT LowFuel Condition Diag **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	= False ≥ -7 ºC = False > 20.0 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below 1b ≥ 5.3 ºC > 5 ºC Within > 60 Seconds > 1800 Seconds ≤ -7.0 ºC		
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed Thermostat)	Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference between ECT and RCT		No Active DTC's	THMR_RCT_Sensor_Ckt_FA	30 failures out of 600 samples	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		[illegible]	[illegible] is greater than 45 Deg C. When above is present for more than 5 seconds, fail counts start.			THMR_ECT_Sensor_Ckt_FA		
					Engine run time OR Engine Coolant Temp	> 300 seconds > 105.5 Deg C	1 sec/ sample	
							Continuous	
Mass Air Flow System Performance	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error 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 >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
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 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
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
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error 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)	>= 400 RPM <= 6500 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
			Engine Not Rotating Case: Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating	> 10.0 seconds	999 failures out of 0 samples 1 sample every 12.5 msec	
					No Active DTCs: No Pending DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP		
Manifold Absolute Pressure Sensor Circuit Low	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
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		320 failures out of 400 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							1 sample every 12.5 msec	
Intake Air Temperature Sensor Circuit Performance	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	> 28800 seconds < 60 deg C ECT Sensor Ckt FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
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	> 0.0 seconds	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 126840 Ohms (~-60 deg C)	Engine Run Time	> 0.0 seconds	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic 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
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	See "P0116: Fail if power up ECT exceeds IAT by these values" in	No Active DTC's	VehicleSpeedSensor_F IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid	1 failure 500 msec/ sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			lookup value after a minimum 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	the Supporting tables section = False	Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag	= Not occurred = False = False ≥ -7 ºC = False	Once per valid cold start	
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 20.0 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	> 400 Seconds with > 14.9 MPH 0.50 times the seconds with vehicle speed below 1b ≥ 5.3 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 5 ºC Within > 60 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	≤ -7 ºC		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity 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	2 trips Type B
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	2 trips Type B
Throttle Position Sensor Performance	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error 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)	>= 400 RPM <= 6500 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est See table "IFRD	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
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 > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
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 > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
Engine Coolant	P0128	This DTC detects if the engine	Engine run time is accumulated	See “P0128: Maximum	No Active DTC's	MAF_SensorFA	1 failure to set	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Temperature Below Stat Regulating Temperature		coolant temperature rises too slowly due to an ECT or Cooling system fault	when airflow is ≥ 11 grams per sec during Range #1 or #2: Range #1 (Primary) ECT reaches Commanded temperature minus 11.0 °C when IAT min is < 65.0°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches Commanded temperature minus 31.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.	Accumulated Time for IAT and Start-up ECT conditions" in the Supporting tables section	Engine not run time Engine run time Fuel Condition **Range #1 (Primary) Test** ECT at start run Average Airflow T-Stat Heater duty commanded cycle **Range #2 (Alternate) Test** ECT at start run Average Airflow T-Stat Heater duty commanded cycle	IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 3600 seconds 20 ≤ Eng Run Tme ≤ 1800 seconds Ethanol ≤ 100% -20.0 ≤ ECT ≤ 74.5 °C ≥ 11.0 gps ≤ 10 % -20.0 ≤ ECT ≤ 54.5 °C ≥ 11.0 gps ≤ 10 %	DTC 1 sec/ sample Once per ignition key cycle	
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mVolts	No Active DTC's AIR intrusive test Fuel intrusive test	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					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	0.9004 < ratio < 1.2998		
					Air Per Cylinder	50 < mgram < 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	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted		
						MAF_SensorFA		
						EthanolCompositionSensor_FA	Frequency: Continuous in 100 milli - second loop	
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 100 seconds		
					Fuel Condition	≤ 88 % Ethanol		
					No Active DTC's	MAP_SensorFA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 0.9004 ≤ ratio ≤ 1.2998 Air Per Cylinder 50.0 ≤ mgram ≤ 500.0 Fuel Control State not = Power Enrichment **All of the above met for** > 5.0 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 Tables tab.		No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P0132 P0134		
					System Voltage	10.0 < Volts < 32.0		
					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, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					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 ≤ grams per second ≤ 45		
					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		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					All of the above met for	> 2.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 100 seconds ≤ 88 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B
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.	Heater Current	0.3 < Amps < 2.5	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**	ECT_Sensor_FA 10.0 < Volts < 32.0 = 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	2 trips Type B
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					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	0.9004 ≤ ratio ≤ 1.2998		
					Air Per Cylinder	50 ≤ mgrams ≤ 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	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Fuel Condition	≤ 88 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	0.9004 ≤ ratio ≤ 1.2998		
					Air Per Cylinder	50 ≤ mgrams ≤ 500		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 5.0 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	200 failures out of 250 samples. Frequency: Continuous	2 trips Type B
					System Voltage	10.0 <Volts < 32.0		
					AFM Status	= All Cylinders active	100msec loop	
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 100 seconds		
					Fuel	≤ 88 % Ethanol		
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.	Heater Current	0.3 > amps > 2.5	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples Frequency: 2 tests per trip	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	30 seconds delay between tests and 1 second execution rate.	
					B1S1 O2S Heater Duty Cycle	> zero		
					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	>= 1.290	Engine speed	400 <rpm< 6100	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
					BARO	> 70 kPa		
					Coolant Temp	-38 <°C< 130		
					MAP	15 <kPa< 255		
					Inlet Air Temp	-20 <°C< 150		
					MAF	1.0 <g/s< 512.0		
					Fuel Level	> 10 % or if fuel sender is faulty	Development data indicates that the Fuel Adjustment System Diagnostic	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Term Fuel Trim data accumulation:	> 35.0 seconds of data must accumulate on each trip, with at least 15.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	(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.	
					fuel trim diagnosed during decels? No			
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs:			
					IAC_SystemRPM_FA MAP SensorFA MAF SensorFA MAF SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. The Intrusive test is described below:	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric	<= 0.775 (a Passive Test decision cannot be made when Purge is enabled)		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop 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.	2 Trip(s) Type B
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= 0.785				
			AND The filtered Non-Purge Long Term Fuel Trim metric	<= 0.775 for 2 out of 3 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <= 0.785, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge Long Term Fuel Trim metric > 0.785, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. Performing intrusive tests too	Segment Def'n: Segments can last up to 35 seconds and are separated by the lesser of 30 seconds of purge-on time or enough time to purge 18 grams of vapor. A maximum of 3 completed segments or 25 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 150 seconds, indicating that the canister has been purged.					
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 ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
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 > 6.41 and	79/159 counts; 57 counts continuous; 3.125 ms /count in	Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	the ECM main processor	Type: A MIL: YES
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. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	**(>**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) ≥ 2.00% P0300 ≥ 2.00% emission >"Catalyst Damaging Misfire Percentage" Table: **Unless** ≤ 1500 rpm AND ≤ 40% load AND ≥ 180 counts on one cylinder	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 125ºC < -7ºC 21ºC < ECT < 125ºC 9.00<volts<32.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
					Engine Speed	500 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6500 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO	4 cycle delay	
						If Monitor Rough Road = 1 and Source = TOSS as below in RR section: Transmission Output Shaft Angular Velocity Validity (Auto Trans only) Clutch Sensor FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						(ManualTrans only) TransmissionEngaged State_FA (Auto Trans ***** end If Monitor Rough Road = 1 and Source = TOSS as below in RR section *****		
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelConditionDiagnostic	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 mode	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** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 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% > 318 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00%	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.	5 engine cycles after misfire		
					Filter Driveline ring:	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 > 3.125 mph = 5 consecutive cyls		
					Misfire Pattern Recognition Enabled: Validates misfire vs. false detection Engine Speed Veh Speed Final fail conditions within:	0 (1 = Enabled) Between > 700 RPM and < 3000 RPM > 0.625 mph > 0.8 < 2.0 of misfire threshold for a given engine speed and load		
					Rough Road Section:			
					Monitor Rough Road	0 (1=Yes)		
					RoughRoadSource	TOSS		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IF Monitor Rough Road = 1 then ONE of three following sections is used depending on RoughRoadSource		
					RoughRoad	not detected (TOSS)		
					ABS/TCS system	not active (WheelSpeedInECM)		
					RoughRoad	not detected (WheelSpeedInECM)		
					ABS/TCS system	not active (FromABS)		
					RoughRoad	not detected (FromABS)		
					END Rough Road Section			
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 knock sensor performance out of the normal expected range due to: 1) Excessive knock **and** 2) Abnormal engine noise on a per cylinder basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			Specific Enable Criteria and Thresholds					
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfCylKnockIntFilt	> 5.0000	Engine Speed Engine running	≥ 750 RPM ≥ 1.0 seconds	Weight Coefficient = 0.0200 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise)	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 1.5 seconds	Weight Coefficient = 0.0100	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			VaKNKD_k_PerfCylAbnFiltIntnsity				Updated each engine event	
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[0])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 600 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
							Weight Coefficient = 0.0100 Updated each engine event	
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
					Engine running	≥ 5.0 seconds		
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank/sensor basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 2.7000	Engine Speed Engine running	≥ 750 RPM ≥ 4.0 seconds	Weight Coefficient = 0.0100 Updated each engine event	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 1.5 seconds	Weight Coefficient = 0.0100 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	< 0.40 Volts				
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	> 1.95 Volts				
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	 >= 3.0 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:	 = 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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 2 failures out of 10 samples 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	 < 25.0 seconds >= 0.4 seconds >= 3.0 seconds	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	 >= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB FA = FALSE = FALSE = FALSE > 3.0 grams/second))	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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 > 65	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	
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 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)	>= 5.5 seconds >= 4.0 seconds > 2.3 seconds	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	= FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA 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	Type B 2 trips

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 CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	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 (There are 12 MEDRES events per engine cycle)		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:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	 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	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.
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2	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	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	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 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
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:	 >= 5.5 seconds >= 4.0 seconds	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:	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Fewer than 4 camshaft pulses received in a time <u>Fast Event-Based Camshaft Test:</u> No camshaft pulses received during first 12 MEDRES events (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	> 2.3 seconds = 0	Engine is Running Starter is not engaged No DTC Active: <u>Fast Event-Based Camshaft Test:</u> 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 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Camshaft Test:</u> Continuous every 100 msec <u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event <u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	<u>Fast Event-Based Camshaft Test:</u> 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>Fast Event-Based Camshaft Test:</u> Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		<u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event	Type B 2 trips

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 CrankSensor_FA		
			<u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	 < 398 > 402	<u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	
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: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 975 RPM for a minimum of 15 seconds since end of last idle period.		
					Engine run time	<u>></u> MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		
					Tests attempted this trip	< 24		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Other vehicle functions: Power Take Off	Not Active		
					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	< 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.80 < ST FT < 1.30*		
					Predicted catalyst temp > 348 degC AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 15 seconds with a closed throttle time < 90 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 15 cal value), either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					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 between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.510 and the current OSC Normalized Ratio value is < 0.260			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			
					Predicted catalyst temperature > 550 ° C for 3600 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAF_SensorTFTKO			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					IAT_SensorCircuitTFTKO			
					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_TFTKO			
					FuelTrimSystemB2_FA			
					FuelTrimSystemB2_TFTKO			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensorAnyLocationFA			
					CrankSensor_FA			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
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	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	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA 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.
					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 hours 0 °C ≤ Temperature ≤ 34 °C		
		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 valid:** **1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **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.**	 ≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR **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		
				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. 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	< -5		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 OR **7. Key up during EONV test** No active DTCs:	0.50 seconds FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_F IgnitionOffTimeValid AmbientAirDefault P0443		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
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 After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for 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 ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA 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	2 trips Type B
Evaporative	P0449	This DTC checks the circuit for	The ECM detects that the		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32	20 failures out of	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Emission (EVAP) Vent Solenoid Control Circuit (ODM)		electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank voltage goes to 0 volts at key off	volts	25 samples 250 ms / sample Continuous with 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	0.2 volts 0.2 volts > 0.73	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.	1 trip Type A EWMA Average run length: 6 Run length is 2 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.
			, 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.	(EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)				
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 The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
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 Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
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		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.	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	>112 Pa < 249 Pa of 10 %			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 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed.	
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 flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	> 10 liters ≤ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 2.00 %	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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 Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 149 miles.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
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 Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1	P0463	This DTC will detect a fuel sender	Fuel level Sender % of 5V range		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32	100 failures out of	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Circuit High Voltage		stuck out ofrange high in the primary fuel tank.		> 60 % Run/Crank voltage goes to 0 volts at key off		volts	125 samples 100 ms / sample Continuous	
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. An intermintant change in fuel level is defined as: The fuel level changes by 10 % and does not remain > 10 % for 30 seconds during a 600 second refueling rationality test.	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 2 out of 3 samples are failures. 100 ms / sample	1 trips Type A
Cooling Fan 1 Relay	P0480	This DTC checks the circuit for	The ECM detects that the		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32	20 failures out of	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Circuit (ODM)		electrical integrity during operation.	commanded state of the driver and the actual state of the control circuit do not match.		Engine Speed	volts ≥ 400 RPM	25 samples 25 ms / sample Continuous with fan operation	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 ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 25 ms / sample Continuous with fan operation	2 trips Type B 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 Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B

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	Engine Torque Minimum Throttle opening Engine Speed Ignition voltage PTO	90.0 ≤ N-M ≤ 8191.8 ≥ 8.0 % 1500 ≤ RPM ≤ 6500 11.0 ≤ Volts ≤ 32.0 not active	≥ 4.5 sec	Type B 2 trips
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected_FA		
					P0503	Not failed this key cycle		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	≥ 350 RPM	Raw Output Speed Output Speed change Time since transfer case range change Ignition voltage Engine Speed Vehicle Speed PTO	> 200 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 6.0 sec 11.0 ≤ Volts ≤ 32.0 200 ≤ RPM ≤ 7500 for ≥ 5.0 seconds ≤ 124 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type B 2 trips
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP) Switch	P0520	When criteria are met that assure no oil pressure should be present, read state of oil pressure switch circuit	State of Engine Oil Pressure (EOP) switch circuit	Detecting.a.ground.will.set.a.fault	Run/Crank powermode active Engine movement detected Key in crank position Power down engine coolant Powertrain relay voltage Run/Crank Ignition voltage	= True = False = False > 80 Deg C >= 11 and <= 32 Volts >= 11 and <= 32 Volts	Fail detected for >= 5.0 Sec.	1 trip(s) Type C
					AND			
					Time since engine last running Timer for time since engine last running validity	> 3600 Seconds = True	250 msec loop Continuous	
					OR			
					Engine coolant at power up	< (Power down engine coolant) minus 10 Deg C		
					Diagnostic enabled/ disabled No active DTC's	Enabled Fault bundles: ECT_Sensor_Ckt_FA		
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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Above is true and			
					Last Open Circuit Test	= not Indeterminate	Continuous	
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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B
					Above is true and			
					Last Ground Short Circuit Test	= not Indeterminate	Continuous	
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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B
					Above is true and			
					Last Power Short Circuit Test	= not Indeterminate	Continuous	
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.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	Trips: 1 Type: A MIL: YES
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			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.
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	
				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 State	= crank or run	Diagnostic runs at powerup and once per second continuously after that	Type A 1 trips
						PCM is identified through calibration as a Service PCM		
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	Type A 1 trips
							Diagnostic reports a fault if 1 failure occurs	
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault:						Trips: 1
								Type: A
		Primary Processor System RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	MIL: YES
		Primary Processor Cache RAM Fault					Will finish first memory scan within 30 seconds at all engine conditions -	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts				
		Primary Processor TPU RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
		Primary Processor Update Dual Store RAM Fault	Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.46000 seconds			When dual store updates occur.	
		Primary Processor Write Protected RAM Fault	Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65534 counts			Diagnostic runs continuously (background loop)	
		Secondary Processor RAM Fault	Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions, diagnostic runs continuously (background loop)	
Internal ECM	P0606	Indicates that the ECM has						Trips:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Processor Integrity Fault		detected an internal processor integrity fault:						1 Type: A MIL: YES
		Primary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was recieved by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved		Run/Crank voltage >= 9.00 or Run/Crank voltage >= 11.00, else the failure will be reported for all conditions	In the primary processor, 159/399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20/200 counts intermittent or 0.1750 counts continuous; 0.4750 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		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 >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		MAIN processor did not receive seed within time limit	Time new seed not received exceeded			always running	0.500 seconds	
		MAIN processor test for seeds to arrive in a known sequence	MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main	
		Secondary processor ALU check	2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1.	25 ms	
		Secondary processor register configuration check	2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1.	12.5 to 25 ms	
		MAIN processor discrete fault:	Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes >= or <= over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 time from initialization >= 0.488 seconds Value of KePISD_b_ConfigRegTestEnbld is: 1.	50 ms	
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. KePISD_b_12p5msSeqTestEnbld== 1 Value of KePISD_b_12p5msSe	Error > 5 times of loop time; loop times are 6.25, 12.5, 25 ms in the main processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		MAIN Processor Performance Check	Software background task first pass time to complete exceeds		Powertrain relay	> 6.41 V	360.000 seconds	
		MAIN processor ALU check	2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1.	25 ms	
		MAIN processor configuration register check	2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1.	12.5 to 25 ms	
		MAIN Stack Fault	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1.	variable, depends on length of time to corrupt stack	
		MAIN processor ADC test	Voltage deviation >	0.495		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1.	3 / 8 counts or 0.150 seconds continuous; 50 ms/count in main processor	
		Flash ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5(results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1.	variable, depends on length of time to access flash with corrupted memory	
		RAM ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1.	variable, depends on length of time to access flash with corrupted memory	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		MAIN DMA transfer check	MAIN processor DMA transfer from Flask to RAM has 1 failure			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 0.	variable, depends on length of time to write flash to RAM	
Fuel Pump Relay Control Circuit Open	P0627	This DTC checks for an open and shorted high circuit while the device is commanded off.	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 ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B
Fuel Pump Relay Control Circuit Low Voltage	P0628	This DTC checks for a shorted low circuit while the device is commanded on.	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 ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device on	2 trips Type B
Fuel Pump Relay Control Circuit High Voltage	P0629	This DTC checks for an open and shorted high circuit while the device is commanded off.	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 ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	The next write to NVM will not succeed or the assembly calibration integrity check failed.		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
VIN Not Programmed	P0630	This DTC checks VIN is correctly	At least one of programed VIN's	= 00 or FF	OBD Manufacturer Enable	= 0	250 ms / test	Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
or Mismatched - Engine Control Module (ECM)		written	digit		Counter		Continuous	1 trips
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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 ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B 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 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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 ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
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:	≥ 18 volts	Powertrain relay commanded "ON" No active DTCs:	 PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			PT Relay feedback voltage is when commanded 'OFF'	> 2 volts			Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref3 < or ECM Vref3 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 < or ECM Vref4 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter [0])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled? Engine Speed Engine Air Flow Engine running	Enabled > 600 RPM and < 4250 RPM ≥ 40 mg/cylinder and ≤ 2000 mg/cylinder ≥ 5.0 seconds	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	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 1 trips MIL: NO

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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. Gear determination is made by verifying that engine RPM/ Trans Output Speed (N/TOS) ratio represents a valid gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 5 %	N/TOS Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop Continuous	1 Trip(s) Type A
					Transfer Case	Not in 4WD Low range		
					vehicle speed	> 5 MPH		
					Engine Torque Clutch Pedal Position	> **EngTorqueThreshold** Table < **ResidualErrEnableLow** Table		
					OR			
					Clutch Pedal Position	> ***ResidualErrEnableHigh*** *Table*		
					No Active DTCs:			
					ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA Trans Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA			
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s) Type A
			for	200 counts out of 250 samples	No active DTCs:	5VoltReferenceB_FA		
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s) Type A
			for	200 counts out of 250 samples	No active DTCs:	5VoltReferenceB_FA		
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 7.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s) Type C
			OR					
			Fully Applied Learn Position	> 33.0 %				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model Error 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 > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
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 Slope Time L/R Switches OR Slope Time R/L Switches	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) < 5 < 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	Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0131, P0132 or P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					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 ≤ 45		
					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		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					All of the above met for Time	> 2.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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)	< -32.00 KJ/s (high RPM failure mode) > 4.25 KJ/s (low RPM failure mode)	**To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:**		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 1 Trip(s)
					Catalyst Temperature	< 350.00 degC		
					AND			
					Engine Coolant	> -10.00 degC		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 420.00 degC		
					AND			
					Engine Run Time	>= 30.00 seconds		
					OR			
					Engine Run Time	> 90.00 seconds		
					OR			
					Engine Coolant	>= 35.00 degC		
					Other Enable Criteria			
					Vehicle Speed	< 1.24 MPH		
					Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the			
					OBD Manufacturer Enable Counter	0		
					Pedal Close Delay Timer	> 5.00 seconds		
					the diagnostic will continue the calculation.			
					Clutch Pedal Top of Travel Achieved and Clutch Pedal Bottom of Travel Achieved. **Refer to the "Clutch Pedal Top of Travel Achieved criteria"** and **"Clutch Pedal Bottom of Travel Achieved criteria"** section of the "Supporting Tables" tab criteria			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Speed Control System	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			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			
					5VoltReferenceMAP_OOR_Flt			
					TransmissionEngagedState_FA			
					EngineTorqueInaccurate			
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	Throttle is considered to be steady state when: Change in throttle position over 12.5 msec is <	0.25 percent 4.00 seconds		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.49 ms	Trips: 1 Type: A MIL: YES
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED) **OR** **Rolling count error** - Serial Communication message ($3ED) rolling count value	Message <> two's complement of message Message <> previous message rolling count value + one	Vehicle Requested Speed Limit	< 135 mph	>= 10 Password Protect errors out of 10 samples >= 10 Rolling count errors out of 10 samples	1 trip(s) Type C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Performed every 25 msec	
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 > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240/480 counts or 0.1750sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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	57.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	58.00 Nm		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	3.41 m/s		Ignition in unlock/accessory, run or crank	Up/down timer 68 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.
			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 628 RPM		Engine speed greater than 0rpm	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	
			Speed Control's Preditcted Torque Request 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 348 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	7.53 percent		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		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	58.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	58.00 Nm		Ignition in unlock/accessory, run or crank	*Up/down timer 475 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 29.00 Nm Low Threshold -29.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 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.
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy does not match	High Threshold 54.38 Nm Low Threshold -58.00 Nm Rate of change threshold 3.63 Nm/loop		Ignition in unlock/accessory, run or crank	Up/down timer 475 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 58.00 Nm Low Threshold -58.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 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 475 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 58.00Nm Low Threshold -58.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 58.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit.	High Threshold 40.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 58.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 58.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 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.
			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 58.00 Nm Low Threshold -58.00 Nm Rate of change threshold 3.63 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 58.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 2.10 Nm Low Threshold -0.65 Nm		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 threshold	1) 57.00 Nm 2) NA 3) 57.00 Nm 4) 57.00 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 58.00 Nm 3&4) Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation greater than threshold	20.94 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	
			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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm		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 + 58.00 Nm		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 475 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 Engine speed >0rpm	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 > 1.50s	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	20.94 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	20.94 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	58.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	58.00 Nm		Engine speed >0rpm	Up/down timer 475 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.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	20.94 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 58.00 Nm	Up/down timer 448 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	58.00 Nm		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	93.02 mg		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: 100 ms		Engine speed > 750rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	79.00 Nm		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 475 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	632.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-65535.00 Nm		Ignition in unlock/accessory, run or crank Redundant commanded axle torque < --65535.00 Nm	Up/down timer 475 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 475 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 475 ms continuous, 0.5 down time multipier	
			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 475 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 speed >= 0.500sec	10/20 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 475 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	3 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24 No fuel injector faults active	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	58.00 Nm		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	58.00 Nm		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	93.02 mg		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	20.94 degrees		Engine speed >0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Desired Throttle Area calculated does not equal its redundant calculation	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Equivance Ratio torque compensation exceeds threshold	-58.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given bt threshold	58.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 475 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.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 632.00 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 10.00 Nm Low Threshold -10.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed >750rpm	Up/down timer 448 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 58.00 Nm		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	Table, f(Engine, Oil Temp). See supporting tables + 58.00 Nm		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 without reserves exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 58.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	632.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (12.5ms based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 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.
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 >)	Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1. 15 counts; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
						11		
			Difference between modeled throttle position and measured throttle position >	7.53 percent	Ignition voltage failure is false (P1682)	5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	38.37 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	37.37 percent	Reduced Power is True			
					Powertrain relay voltage	> 6.41 Volts		
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage > AND TPS2 Voltage >	1.647 1.757	Throttle de-energized No TPS circuit faults	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.4969 sec	Trips: 1 Type: C MIL: NO
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
					PT Relay Voltage >	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 > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
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 > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
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 > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	1. Difference between TPS1 displaced and TPS2 displaced > 2. Difference between	1. 7.022% offset at min. throttle position with a linear threshold to 9.622% at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 79/159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(normalized min TPS1) and (normalized min TPS2) >	2. 5.000 % Vref		No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	1. Difference between APP1 displaced and APP2 displaced >	1. 9.990% offset at min. pedal position with a linear threshold to 9.990% at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 19/39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
			2. Difference between (normalized min APP1) and (normalized min APP2) >	2. 5.000% Vref		No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)		
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage >	0.955		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	2.0 secs	Trips: 1 Type: A MIL: YES
			Number of learn attempts >	10 counts				
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 0.045. When above is present for more than 5.000 seconds, fail counts start.		No Active DTC's	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	320 failures out of 400 samples 1 sec/ sample	2 trips Type B
					Engine not run time	≥ 7200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine run time	70 ≤ Time ≤ 1200 seconds	Once per ignition key cycle	
					Fuel Condition	Ethanol ≤ 100%		
			Engine total airgrams is accumulated when 11 ≤ AirFlow ≤ 100 grams per second.		ECT at Power Up	-20.0 ≤ ECT ≤ 45.0 °C		
					IAT min	-7°C ≤ IAT ≤ 60°C.		
					T-Stat Heater duty cycle commanded	≤ 10 %		
					Airflow	11.0 ≤ Airflow ≤ 100.0 GPS		
			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 signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 760 mvolts > 60 grams	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F, P2270 or		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P2271		
					System Voltage	10.0 < Volts < 32.0		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1100 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	950 ≤ RPM ≤ 3650		
					Engine Airflow	2 ≤ gps ≤ 30		
					Vehicle Speed to initially enable test	46.6 ≤ MPH ≤ 74.6		
					Vehicle Speed range to keep test enabled (after initially enabled)	42.3 ≤ MPH ≤ 77.7 mph		
					Closed loop integral	0.84 ≤ C/L Int ≤ 1.15		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 80.0 sec		
					Predicted Catalyst temp	450 ≤ ºC ≤ 1000		
					Fuel State	= DFCO possible		
					All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 150 mvolts > 26 grams	No Active DTC's B1S2 Failed this key cycle System Voltage 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_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False 1100 ≤ RPM ≤ 3500 2 ≤ gps ≤ 30 46.6 ≤ MPH ≤ 74.6 0.84 ≤ C/L Int ≤ 1.15 = 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.	2 trips Type B

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		
					O2S Heater on Time	≥ 80.0 sec		
					Predicted Catalyst temp	450 ≤ ºC ≤ 1000		
					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 - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 16 Protect errors during key cycle. Performed every 12.5 msec	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one			>= 6 Rolling count errors out of ten samples. Performed every 12.5 msec	Type B
					Power Mode	= Run		
			OR					
			RAM error - Serial Communication message ($199 - PPEI3)	Transmission torque request value or request type dual store not equal	Engine Running	= True	>= 3 RAM errors out of 6 samples. Performed every 12.5 msec	
					Run/Crank Active	> 0.50 Sec		
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 25 Nm			>= 6 out of 10 samples. Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 6 multi-transitions out of 5 samples. Performed every 200 msec	
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	-256 °C ≤ Temperature ≤ 256 °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 DTC sets on next key cycle if failure detected.

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	= False	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152	200 failures out of 250 samples. Frequency: Continuous	2 trips Type B
			A) O2S signal must be To set Closed Loop ready flag	< 1100 mvolts = True	System Voltage Engine Speed Engine Airflow Engine Coolant Engine Metal Overtemp Active Converter Overtemp Active Fuel State AFM Status Predicted Exhaust Temp (B1S1) Engine run time Fuel Enrichment	10.0 < Volts < 32.0 1000 ≤ RPM ≤ 3400 4.0 ≤ gps ≤ 30.0 ≥ 60.0 ºC = False = False DFCO not active = All Cylinders active ≥ 0.0 ºC > 50 seconds = Not Active	100msec loop	
			Closed Loop O2S ready flag	= True				
			B) Once set to ready O2S cannot be for Then set Closed Loop ready flag	> 1100 mvolts > 5.0 seconds = False	**All of the above met for**	> 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 4 counts	CAN hardware is bus OFF for	> 0.1125 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

P0011
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	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
1200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
1600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
3200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
3600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
5200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
5600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000

P0014
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	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
1200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
1600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
2800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
3200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
3600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
5200	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
5600	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6400	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
6800	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000

P0011
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

P0014
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

P0420, P0430

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	100	100	100	100	100

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	12	10	6

P0300-P0308: Idle SCD

(decel index (> Idle SCD AND > Idle SCD ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
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
14	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
16	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
18	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
21	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
24	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
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
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
14	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
16	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
18	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
21	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
24	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
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta

OR (decel index >SCD Delta **AND** > SCD Delta ddt Tables))

load Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
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: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
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))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
0	1499	1499	1499	1233	980	920	650	480	360	280	200	200	200
8	1499	1499	1499	1233	980	920	650	480	360	280	200	200	200
9	1478	1478	1478	1230	980	920	650	480	360	280	200	200	200
12	1722	1722	1722	1372	980	920	650	480	360	280	200	200	200
13	1845	1845	1845	1438	900	880	700	480	380	280	200	200	200
14	1923	1923	1923	1482	950	900	720	490	390	290	210	210	210
15	2006	2006	2006	1526	950	940	760	550	400	310	220	220	220
16	2103	2103	2103	1573	1000	1000	780	600	410	320	230	230	230
17	2218	2218	2218	1624	1050	1050	800	620	440	330	220	220	220
18	2383	2383	2383	1900	1150	1150	840	680	480	360	240	240	240
19	2585	2585	2585	2000	1250	1220	880	700	510	400	290	290	290
21	2869	2869	2869	2150	1350	1300	920	750	550	410	300	300	300
22	3114	3114	3114	2250	1450	1400	960	800	580	450	320	320	320
24	3240	3240	3240	2400	1550	1450	1000	900	600	480	380	380	380
25	3403	3403	3403	2850	1650	1550	1100	950	610	510	440	440	440
27	3556	3556	3556	2900	1750	1650	1250	1050	650	580	480	480	480
100	4085	4085	4085	3000	1850	1750	1550	1200	700	650	520	520	520

P0300-P0308: Idle Cyl Mode ddt

load

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

P0300-P0308: Cyl Mode

OR (decel index > Cyl Mode AND > Cyl Mode ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43
8	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43
9	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43
12	2100	2100	2050	1750	1450	1100	750	500	450	240	180	160	120	80	66	43
13	2200	2200	2150	1850	1480	1200	750	480	400	210	110	120	100	65	50	45
15	2300	2300	2250	1950	1500	1200	750	520	460	260	140	130	110	70	56	50
17	2600	2600	2550	2200	1600	1300	800	650	500	300	180	150	118	78	62	54
19	2730	2730	2680	2300	1700	1450	860	750	590	350	220	170	125	85	70	58
22	2830	2830	2780	2400	1800	1550	900	800	650	400	260	190	135	90	73	62
25	2900	2900	2850	2500	1900	1650	1050	850	700	420	280	210	150	103	83	68
29	3010	3010	2960	2600	2100	1700	1100	930	700	480	320	240	160	125	98	78
33	3140	3140	3090	2700	2600	1750	1150	1000	780	520	360	280	190	138	110	90
38	3170	3170	3120	2920	2820	1950	1250	1271	920	580	420	320	210	155	132	115
42	3250	3250	3200	3000	2920	2150	1350	1350	1100	620	450	340	230	180	142	112
48	3330	3330	3280	3080	3050	2550	1550	1450	1350	703	500	360	240	200	165	128
54	3400	3400	3350	3150	3090	2650	1750	1650	1550	768	550	380	280	220	185	145
63	3500	3500	3450	3250	3150	2750	1950	1780	1650	950	750	450	320	280	240	170

P0300-P0308: Cyl Mode (Con't)

OR (decel index > Cyl Mode AND > Cyl Mode ddt Tables))

load
Load

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	36	25	19	14	12	10	9	7	7	7
8	36	25	19	14	12	10	9	7	7	7
9	36	25	19	14	12	10	9	7	7	7
12	36	25	19	14	12	10	9	7	7	7
13	40	28	21	14	12	9	8	7	7	7
15	43	30	22	16	13	9	8	7	7	7
17	45	33	23	18	15	10	9	8	8	8
19	48	36	24	20	17	11	10	9	9	9
22	52	40	25	22	19	12	12	10	10	10
25	55	45	28	24	20	13	13	11	11	11
29	66	54	36	28	21	15	14	12	12	12
33	77	62	42	34	23	17	15	13	13	13
38	88	72	50	38	28	20	17	14	14	14
42	103	86	63	45	31	22	18	15	15	15
48	117	102	74	50	36	25	20	16	16	16
54	130	110	86	57	39	29	23	17	17	17
63	150	130	98	64	41	32	25	19	19	19

P0300-P0308: Cyl Mode ddt

load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55
8	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55
9	2250	2250	2200	1900	1600	1200	800	580	480	350	220	160	120	87	82	55
12	2250	2250	2200	1900	1600	1300	880	600	480	350	220	160	130	95	82	55
13	2350	2350	2300	2000	1700	1400	990	700	510	360	220	180	140	105	80	60
15	2450	2450	2400	2100	1800	1400	1100	700	580	400	230	185	150	115	90	68
17	2650	2650	2600	2400	2000	1500	1200	780	570	490	270	200	170	118	98	75
19	2800	2800	2750	2650	2400	1800	1200	960	800	520	320	250	195	140	105	80
22	2950	2950	2900	2700	2500	2000	1250	1100	900	600	370	287	205	152	115	95
25	3000	3000	2950	2850	2700	2300	1300	1210	1000	650	410	310	240	165	130	105
29	3130	3130	3080	2920	2850	2300	1350	1280	1100	760	480	360	265	205	155	120
33	3200	3200	3150	3050	2900	2450	1500	1430	1250	810	550	401	300	220	164	137
38	3250	3250	3200	3100	2950	2600	1800	1700	1500	900	600	466	330	240	190	162
42	3350	3350	3300	3150	3000	2650	2000	1900	1750	1200	700	540	380	288	220	175
48	3430	3430	3380	3180	3080	2750	2400	2000	1800	1400	920	600	400	310	240	198
54	3510	3510	3460	3260	3160	2850	2500	2100	1850	1500	1020	670	500	360	259	219
63	3600	3600	3550	3350	3250	2950	2600	2250	1900	1600	1080	750	600	420	350	280

load

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	45	34	24	22	19	14	12	10	10	10
8	45	34	24	22	19	14	12	10	10	10
9	45	34	24	22	19	14	12	10	10	10
12	45	34	24	22	19	14	12	10	10	10
13	48	36	25	22	19	14	10	9	9	9
15	56	40	29	24	21	15	11	10	10	10
17	65	52	34	26	23	16	12	11	11	11
19	72	57	40	29	25	17	13	13	13	13
22	75	68	46	31	27	19	14	14	14	14
25	92	80	55	36	29	20	15	15	15	15
29	102	90	66	40	31	23	17	16	16	16
33	120	100	78	52	37	26	20	16	16	16
38	130	118	85	58	40	30	24	18	18	18
42	160	130	100	65	45	33	26	20	20	20
48	168	145	110	72	50	39	28	24	24	24
54	188	163	120	80	54	45	32	26	26	26
63	220	187	130	88	59	52	38	30	30	30

P0300-P0308: Rev Mode Table

OR (decel index > Rev Mode Table)

load	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

load	3000	3500	4000	4500	5000	5500	6000	6500	7000
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
15	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: AFM Mode Table

OR (decel index > AFM Table if active fuel management)

load Load	400	500	600	700	800	900	1000	1100	1200	1400
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: AFM Mode Table (Con't)

OR (decel index > AFM Table if active fuel management)

load
Load

	1600	1800	2000	2200	2400	2600	2800	3000	3500
0	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

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

Baro KPa	Multiplier
65	0.82
70	0.85
75	0.88
80	0.90
85	0.93
90	0.95
95	0.97
100	1.00
105	1.03

Zero Torque: Active Fuel Management (AFM)

RPM	Pct load
400	200.00
500	200.00
600	200.00
700	200.00
800	200.00
900	200.00
1000	200.00
1100	200.00
1200	200.00
1400	200.00
1600	200.00
1800	200.00
2000	200.00
2200	200.00
2400	200.00
2600	200.00
2800	200.00
3000	200.00
3500	200.00
4000	200.00
4500	200.00
5000	200.00
5500	200.00
6000	200.00
6500	200.00
7000	200.00

Note: Zero torque is adjusted for Baro. Misfire thresholds are relative to (maximum air density PID $1188 SAE xxx) and do not shift appreciably with altitude compared to (current density as defined PID $04 SAE1979)

Catalyst Damaging Misfire Percentage

load
Load

	0	1000	2000	3000	4000	5000	6000	7000
0	22.5	22.5	22.5	14.0	12.5	6.5	5.0	5.0
10	22.5	22.5	22.5	14.0	12.5	6.5	5.0	5.0
20	20.0	20.0	18.0	12.8	10.3	6.5	5.0	5.0
30	18.5	18.5	15.5	8.0	6.5	5.0	5.0	5.0
40	15.0	15.0	12.5	6.5	5.0	5.0	5.0	5.0
50	13.0	13.0	8.5	5.0	5.0	5.0	5.0	5.0
60	10.0	10.0	6.5	5.0	5.0	5.0	5.0	5.0
70	8.0	8.0	5.5	5.0	5.0	5.0	5.0	5.0
80	8.0	8.0	5.0	5.0	5.0	5.0	5.0	5.0
90	8.0	8.0	5.0	5.0	5.0	5.0	5.0	5.0
100	8.0	8.0	5.0	5.0	5.0	5.0	5.0	5.0

RoughRoadSource = CeRRDR_e_TOSS
Rough Road Threshold

Trans Speed \ Engine Speed	600	800	1000	1200	1400	1600	1800	2000	2200	2400
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Trans Speed \ Engine Speed	2600	2800	3000	3500	4000	4500	5000	5500	6000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

Kph	0	12	24	36	48	60	72	84	96	108	120	132	144	158	170	181	194
Accel	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.13	0.13	0.13	0.13	0.25	0.25	0.25	0.25	0.25

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

P0101, P0106, P0121, P012B, P0236, 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
	0.000	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

MAP3 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

TIAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2700	3100	3200	3300	3500	3700	4000	4200	4500	5000	5250	5500	8000
	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

SCIAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	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

SCIAP2 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	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

Boost Residual Weight Factor based on % of Boost

% Boost	0.00	0.06	0.13	0.19	0.25	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00
	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

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	17.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	1.5	3.5	6.0	9.0	12.0	16.0	20.0	25.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	5.0	9.0	13.0	16.0	20.0	24.0	28.0	31.0	32.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Supercharger Intake Flow Rationality Diagnostic Failure Matrix						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
F	F	F	F	F	F	No DTC
F	F	F	F	F	T	No DTC
F	F	F	F	T	F	No DTC
F	F	F	F	T	T	P012B
F	F	F	T	F	F	No DTC
F	F	F	T	F	T	P1101
F	F	F	T	T	F	P1101
F	F	F	T	T	T	P1101
F	F	T	F	F	F	No DTC
F	F	T	F	F	T	P1101
F	F	T	F	T	F	P1101
F	F	T	F	T	T	P1101
F	F	T	T	F	F	P0106
F	F	T	T	F	T	P1101
F	F	T	T	T	F	P1101
F	F	T	T	T	T	P1101
F	T	F	F	F	F	No DTC
F	T	F	F	F	T	P0101
F	T	F	F	T	F	No DTC
F	T	F	F	T	T	P0101, P012B
F	T	F	T	F	F	P1101
F	T	F	T	F	T	P0101
F	T	F	T	T	F	P1101
F	T	F	T	T	T	P0101, P012B
F	T	T	F	F	F	P1101
F	T	T	F	F	T	P1101
F	T	T	F	T	F	P1101
F	T	T	F	T	T	P1101
F	T	T	T	F	F	P1101
F	T	T	T	F	T	P1101
F	T	T	T	T	F	P1101
F	T	T	T	T	T	P1101
T	F	F	F	F	F	P0121
T	F	F	F	F	T	No DTC
T	F	F	F	T	F	P0121
T	F	F	F	T	T	P1101
T	F	F	T	F	F	P1101
T	F	F	T	F	T	P1101
T	F	F	T	T	F	P1101
T	F	F	T	T	T	P1101
T	F	T	F	F	F	P0121
T	F	T	F	F	T	P1101
T	F	T	F	T	F	P0121
T	F	T	F	T	T	P1101
T	F	T	T	F	F	P1101
T	F	T	T	F	T	P1101
T	F	T	T	T	F	P1101
T	F	T	T	T	T	P1101
T	T	F	F	F	F	P0121
T	T	F	F	F	T	P1101
T	T	F	F	T	F	P0121
T	T	F	F	T	T	P1101
T	T	F	T	F	F	P1101
T	T	F	T	F	T	P1101
T	T	F	T	T	F	P1101
T	T	F	T	T	T	P1101
T	T	T	F	F	F	P0121

Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
T	T	T	F	F	T	P1101
T	T	T	F	T	F	P0121
T	T	T	F	T	T	P1101
T	T	T	T	F	F	P1101
T	T	T	T	F	T	P1101
T	T	T	T	T	F	P1101
T	T	T	T	T	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	F	F	F	F	F	F	No DTC
F	F	F	F	F	F	F	T	No DTC
F	F	F	F	F	F	T	F	No DTC
F	F	F	F	F	F	T	T	No DTC
F	F	F	F	F	T	F	F	No DTC
F	F	F	F	F	T	F	T	No DTC
F	F	F	F	F	T	T	F	No DTC
F	F	F	F	F	T	T	T	No DTC
F	F	F	F	T	F	F	F	No DTC
F	F	F	F	T	F	F	T	No DTC
F	F	F	F	T	F	T	F	No DTC
F	F	F	F	T	F	T	T	No DTC
F	F	F	F	T	T	F	F	P1101
F	F	F	F	T	T	F	T	P0121
F	F	F	F	T	T	T	F	P1101
F	F	F	F	T	T	T	T	P0236
F	F	F	T	F	F	F	F	P1101
F	F	F	T	F	F	F	T	P1101
F	F	F	T	F	F	T	F	P1101
F	F	F	T	F	F	T	T	P1101
F	F	F	T	F	T	F	F	P1101
F	F	F	T	F	T	F	T	P1101
F	F	F	T	F	T	T	F	P1101
F	F	F	T	F	T	T	T	P1101
F	F	F	T	T	F	F	F	P1101
F	F	F	T	T	F	F	T	P1101
F	F	F	T	T	F	T	F	P1101
F	F	F	T	T	F	T	T	P1101
F	F	F	T	T	T	F	F	P1101
F	F	F	T	T	T	F	T	P1101
F	F	F	T	T	T	T	F	P1101
F	F	F	T	T	T	T	T	P1101
F	F	T	F	F	F	F	F	P1101
F	F	T	F	F	F	F	T	P1101
F	F	T	F	F	F	T	F	P1101
F	F	T	F	F	F	T	T	P1101
F	F	T	F	F	T	F	F	P1101
F	F	T	F	F	T	F	T	P1101
F	F	T	F	F	T	T	F	P1101
F	F	T	F	F	T	T	T	P1101
F	F	T	F	T	F	F	F	P1101
F	F	T	F	T	F	F	T	P1101
F	F	T	F	T	F	T	F	P1101
F	F	T	F	T	F	T	T	P1101
F	F	T	F	T	T	F	F	P1101
F	F	T	F	T	T	F	T	P1101
F	F	T	F	T	T	T	F	P1101
F	F	T	F	T	T	T	T	P1101
F	F	T	T	F	F	F	F	P1101
F	F	T	T	F	F	F	T	P1101
F	F	T	T	F	F	T	F	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	T	T	F	F	T	T	P1101
F	F	T	T	F	T	F	F	P1101
F	F	T	T	F	T	F	T	P1101
F	F	T	T	F	T	T	F	P1101
F	F	T	T	F	T	T	T	P1101
F	F	T	T	T	F	F	F	No DTC
F	F	T	T	T	F	F	T	No DTC
F	F	T	T	T	F	T	F	No DTC
F	F	T	T	T	F	T	T	No DTC
F	F	T	T	T	T	F	F	P1101
F	F	T	T	T	T	F	T	P1101
F	F	T	T	T	T	T	F	P1101
F	F	T	T	T	T	T	T	P1101
F	T	F	F	F	F	F	F	P1101
F	T	F	F	F	F	F	T	P1101
F	T	F	F	F	F	T	F	P1101
F	T	F	F	F	F	T	T	P0236
F	T	F	F	F	T	F	F	P1101
F	T	F	F	F	T	F	T	P0121
F	T	F	F	F	T	T	F	P1101
F	T	F	F	F	T	T	T	P0236
F	T	F	F	T	F	F	F	P1101
F	T	F	F	T	F	F	T	P1101
F	T	F	F	T	F	T	F	P1101
F	T	F	F	T	F	T	T	P0236
F	T	F	F	T	T	F	F	P1101
F	T	F	F	T	T	F	T	P0121
F	T	F	F	T	T	T	F	P1101
F	T	F	F	T	T	T	T	P0236
F	T	F	T	F	F	F	F	P1101
F	T	F	T	F	F	F	T	P1101
F	T	F	T	F	F	T	F	P1101
F	T	F	T	F	F	T	T	P1101
F	T	F	T	F	T	F	F	P1101
F	T	F	T	F	T	F	T	P1101
F	T	F	T	F	T	T	F	P1101
F	T	F	T	T	F	F	F	P1101
F	T	F	T	T	F	F	T	P1101
F	T	F	T	T	F	T	F	P1101
F	T	F	T	T	F	T	T	P1101
F	T	F	T	T	T	F	F	P1101
F	T	F	T	T	T	T	F	P1101
F	T	F	T	T	T	T	T	P1101
F	T	F	T	T	T	F	F	P1101
F	T	F	T	T	T	F	T	P1101
F	T	F	T	T	T	T	F	P1101
F	T	F	T	T	T	T	T	P1101
F	T	T	F	F	F	F	F	P1101
F	T	T	F	F	F	F	T	P1101
F	T	T	F	F	F	T	F	P1101
F	T	T	F	F	F	T	T	P1101
F	T	T	F	F	T	F	F	P1101
F	T	T	F	F	T	F	T	P1101
F	T	T	F	F	T	T	F	P1101
F	T	T	F	F	T	T	T	P1101
F	T	T	F	T	F	F	F	P1101
F	T	T	F	T	F	F	T	P1101
F	T	T	F	T	F	T	F	P1101
F	T	T	F	T	F	T	T	P1101
F	T	T	F	T	T	F	F	P1101
F	T	T	F	T	T	F	T	P1101
F	T	T	F	T	T	T	F	P1101
F	T	T	F	T	T	T	T	P1101
F	T	T	T	F	F	F	F	P0106
F	T	T	T	F	F	F	T	P0106

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	T	T	T	F	F	T	F	P0106
F	T	T	T	F	F	T	T	P0106
F	T	T	T	F	T	F	F	P1101
F	T	T	T	F	T	F	T	P1101
F	T	T	T	F	T	T	F	P1101
F	T	T	T	F	T	T	T	P1101
F	T	T	T	T	F	F	F	P1101
F	T	T	T	T	F	F	T	P1101
F	T	T	T	T	F	T	F	P1101
F	T	T	T	T	F	T	T	P1101
F	T	T	T	T	T	F	F	P1101
F	T	T	T	T	T	F	T	P1101
F	T	T	T	T	T	T	F	P1101
F	T	T	T	T	T	T	T	P1101
T	F	F	F	F	F	F	F	P1101
T	F	F	F	F	F	F	T	P1101
T	F	F	F	F	F	T	F	P1101
T	F	F	F	F	F	T	T	P0236
T	F	F	F	F	T	F	F	P1101
T	F	F	F	F	T	F	T	P0121
T	F	F	F	F	T	T	F	P1101
T	F	F	F	F	T	T	T	P0236
T	F	F	F	T	F	F	F	P1101
T	F	F	F	T	F	F	T	P1101
T	F	F	F	T	F	T	F	P1101
T	F	F	F	T	F	T	T	P0236
T	F	F	F	T	T	F	F	P1101
T	F	F	F	T	T	F	T	P0121
T	F	F	F	T	T	T	F	P1101
T	F	F	F	T	T	T	T	P0236
T	F	F	T	F	F	F	F	P1101
T	F	F	T	F	F	F	T	P1101
T	F	F	T	F	F	T	F	P1101
T	F	F	T	F	F	T	T	P1101
T	F	F	T	F	T	F	F	P1101
T	F	F	T	F	T	F	T	P1101
T	F	F	T	F	T	T	F	P1101
T	F	F	T	F	T	T	T	P1101
T	F	F	T	T	F	F	F	P1101
T	F	F	T	T	F	F	T	P1101
T	F	F	T	T	F	T	F	P1101
T	F	F	T	T	F	T	T	P1101
T	F	F	T	T	T	F	F	P1101
T	F	F	T	T	T	F	T	P1101
T	F	F	T	T	T	T	F	P1101
T	F	F	T	T	T	T	T	P1101
T	F	T	F	F	F	F	F	P1101
T	F	T	F	F	F	F	T	P1101
T	F	T	F	F	F	T	F	P1101
T	F	T	F	F	F	T	T	P1101
T	F	T	F	F	T	F	F	P1101
T	F	T	F	F	T	F	T	P1101
T	F	T	F	F	T	T	F	P1101
T	F	T	F	F	T	T	T	P1101
T	F	T	F	T	F	F	F	P1101
T	F	T	F	T	F	F	T	P1101
T	F	T	F	T	F	T	F	P1101
T	F	T	F	T	F	T	T	P1101
T	F	T	F	T	T	F	F	P1101
T	F	T	F	T	T	F	T	P1101
T	F	T	F	T	T	T	F	P1101
T	F	T	F	T	T	T	T	P1101
T	F	T	T	F	F	F	F	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	F	T	T	F	F	F	T	P1101
T	F	T	T	F	F	T	F	P1101
T	F	T	T	F	F	T	T	P1101
T	F	T	T	F	T	F	F	P1101
T	F	T	T	F	T	F	T	P1101
T	F	T	T	F	T	T	F	P1101
T	F	T	T	F	T	T	T	P1101
T	F	T	T	T	F	F	F	P0101
T	F	T	T	T	F	F	T	P0101
T	F	T	T	T	F	T	F	P0101
T	F	T	T	T	F	T	T	P0101
T	F	T	T	T	T	F	F	P1101
T	F	T	T	T	T	F	T	P1101
T	F	T	T	T	T	T	F	P1101
T	F	T	T	T	T	T	T	P1101
T	T	F	F	F	F	F	F	P1101
T	T	F	F	F	F	F	T	P1101
T	T	F	F	F	F	T	F	P1101
T	T	F	F	F	F	T	T	P0236
T	T	F	F	F	T	F	F	P1101
T	T	F	F	F	T	T	F	P0121
T	T	F	F	F	T	T	T	P0236
T	T	F	F	T	F	F	F	P1101
T	T	F	F	T	F	F	T	P1101
T	T	F	F	T	F	T	F	P1101
T	T	F	F	T	F	T	T	P0236
T	T	F	F	T	T	F	F	P1101
T	T	F	F	T	T	F	T	P0121
T	T	F	F	T	T	T	F	P1101
T	T	F	F	T	T	T	T	P0236
T	T	F	T	F	F	F	F	P1101
T	T	F	T	F	F	F	T	P1101
T	T	F	T	F	F	T	F	P1101
T	T	F	T	F	F	T	T	P1101
T	T	F	T	F	T	F	F	P1101
T	T	F	T	F	T	F	T	P1101
T	T	F	T	F	T	T	F	P1101
T	T	F	T	F	T	T	T	P1101
T	T	F	T	T	F	F	F	P1101
T	T	F	T	T	F	F	T	P1101
T	T	F	T	T	F	T	F	P1101
T	T	F	T	T	F	T	T	P1101
T	T	F	T	T	T	F	F	P1101
T	T	F	T	T	T	F	T	P1101
T	T	T	F	F	F	F	F	P1101
T	T	T	F	F	F	F	T	P1101
T	T	T	F	F	F	T	F	P1101
T	T	T	F	F	T	F	T	P1101
T	T	T	F	F	T	T	F	P1101
T	T	T	F	F	T	T	T	P1101
T	T	T	F	T	F	F	F	P1101
T	T	T	F	T	F	F	T	P1101
T	T	T	F	T	F	T	F	P1101
T	T	T	F	T	F	T	T	P1101
T	T	T	F	T	T	F	F	P1101
T	T	T	F	T	T	F	T	P1101
T	T	T	F	T	T	T	F	P1101
T	T	T	F	T	T	T	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	T	T	T	F	F	F	F	P1101
T	T	T	T	F	F	F	T	P1101
T	T	T	T	F	F	T	F	P1101
T	T	T	T	F	F	T	T	P1101
T	T	T	T	F	T	F	F	P1101
T	T	T	T	F	T	F	T	P1101
T	T	T	T	F	T	T	F	P1101
T	T	T	T	F	T	T	T	P1101
T	T	T	T	T	F	F	F	P1101
T	T	T	T	T	F	F	T	P1101
T	T	T	T	T	F	T	F	P1101
T	T	T	T	T	F	T	T	P1101
T	T	T	T	T	T	F	F	P1101
T	T	T	T	T	T	F	T	P1101
T	T	T	T	T	T	T	F	P1101
T	T	T	T	T	T	T	T	P1101

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 Airflow 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)

Remove for applications with single coolant sensor

	IAT Range											
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	65.0 ° C	990	990	990	990	990	947	888	821	725	595	399
Alternate	-7.0 ° C	10.0 ° C	947	947	947	897	833	778	698	586	440	190	130

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

	0.000	0.020	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.100	0.110	0.120	0.130	0.140	0.150	0.160	1.000
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.120	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.140	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.150	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.160	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
1.000	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

Green Sensor Delay Criteria:

The specific diagnostic (from summary table) will not be enabled until the next ignition cycle after the airflow criteria below (by sensor location) has been met:

* B1S1 Airflow greater than 23 gps for 60000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 23 gps for 60000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 23 gps for 60000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 23 gps for 60000 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

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P0324/P0326 Abnormal Noise Threshold (same table used for both):

X-axis: Engine Air Flow (mg per cylinder)

Y-axis: Engine Speed (RPM)	100	300	700	1200
500	0.1329	0.1329	0.1329	0.1329
1000	0.1343	0.1343	0.1343	0.1343
1500	0.1401	0.1401	0.1401	0.1401
2000	0.1495	0.1495	0.1495	0.1495
2500	0.1618	0.1618	0.1618	0.1618
3000	0.1764	0.1764	0.1764	0.1764
3500	0.1926	0.1926	0.1926	0.1926
4000	0.2099	0.2099	0.2099	0.2099
4500	0.2275	0.2275	0.2275	0.2275
5000	0.2447	0.2447	0.2447	0.2447
5500	0.2610	0.2610	0.2610	0.2610
6000	0.2757	0.2757	0.2757	0.2757
6500	0.2881	0.2881	0.2881	0.2881
7000	0.2976	0.2976	0.2976	0.2976
7500	0.3035	0.3035	0.3035	0.3035
8000	0.3051	0.3051	0.3051	0.3051
8500	0.3018	0.3018	0.3018	0.3018

P0325/P0330

Two methods are used for the Knock Sensor Open Circuit Diagnostic:

1) 20 kHz Method: 20 kHz signal is internally injected on one sensor line (Signal) and the output of the differential op-amp is checked to verify the 20 kHz travels through the sensor and back to the second sensor
2) Normal Noise: The amplitude of the FFT (in the knock frequency range) is checked to verify there is a knock signal within an expected range

KtKNKD_e_OpenMethod is the cal table used to determine which Open Circuit method is used: '0' = Disabled; '1' = 20 kHz Method; '2' = Normal Noise Methoc

	X-axis: Engine Air Flow (mg per cylinder)			
Y-axis: Engine Speed (RPM)	100	300	700	1200
500	1	1	1	1
1000	1	1	1	1
1500	1	1	1	1
2000	1	1	1	1
2500	1	1	1	1
3000	1	1	1	1
3500	1	1	1	1
4000	1	1	1	1
4500	2	2	2	2
5000	2	2	2	2
5500	2	2	2	2
6000	2	2	2	2
6500	2	2	2	2
7000	2	2	2	2
7500	2	2	2	2
8000	2	2	2	2
8500	2	2	2	2

Open Circuit Thresholds:

1. 20 kHz Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	3.9761	3.8123	3.7256	3.6926	3.6902	3.6953	3.6846	3.6350	3.5234	3.3264	3.0210	2.7612	2.4705	2.0596	1.5103	0.8040	0.0000

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	8.3774	8.0647	7.9126	7.8672	7.8738	7.8789	7.8279	7.6667	7.3413	6.7976	5.9814	4.8384	3.3147	1.3560	0.0000	0.0000	0.0000

2. Normal Noise Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	0.3374	0.2490	0.1863	0.1458	0.1240	0.1179	0.1243	0.1394	0.1604	0.1836	0.2063	0.2246	0.2354	0.2351	0.2209	0.1899	0.1379

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	4.3928	2.7952	1.6602	0.9209	0.5115	0.3650	0.4148	0.5947	0.8379	1.0779	1.2483	1.2827	1.1143	0.6760	0.0000	0.0000	0.0000

P06B6/P06B7

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshLo	0.1484	0.1360	0.1328	0.1411	0.1628	0.2007	0.2563	0.3323	0.4307	0.5537	0.7036	0.8823	1.0923	1.3359	1.6150	1.9319	2.2888

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshHi	0.2615	0.2595	0.2954	0.3701	0.4841	0.6389	0.8350	1.0735	1.3552	1.6814	2.0527	2.4702	2.9348	3.4475	4.0095	4.6211	5.2837

P0068: MAP / MAF / TPS Correleation

X-axis is TPS (%)
Data is MAP threshold (kPa)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	36.00	44.27	31.10	37.10	40.30	25.87	255.00	255.00	255.00

X axis is TPS (%)
Data is MAF threshold (grams/sec)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	10.98	19.90	13.54	17.07	25.10	29.60	511.99	511.99	511.99

X axis is Engine Speed (RPM)
Data is max MAF vs RPM (grams/sec)

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	3.00	16.00	16.00	17.00	18.00	45.00	45.00	50.00	60.00

X axis is Battery Voltage (V)
Data is max MAF vs Voltage (grams/sec)

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	278.00	278.00	278.00	278.00	278.00	278.00	278.00	278.00	278.00

P1682: Ignition Voltage Correleation

X-axis is IAT (DegC)
Data is Voltage threshold (V)

X-axis	23.00	85.00	95.00	105.00	125.00
Data	7.00	8.70	9.00	9.20	10.00

P0606: Processor Performance Check - ETC software is not executed in proper order

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

	CePISR_e_6 p25msSeq	CePISR_e_1 2p5msSeq	CePISR_e_2 5msSeq	CePISR_e_L ORES_C
X-axis				
Data	0.175	0.175	0.175	409.594

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

	CePISR_e_6 p25msSeq	CePISR_e_1 2p5msSeq	CePISR_e_2 5msSeq	CePISR_e_L ORES_C
X-axis				
Data	1	1	1	0

P16F3: No fast unmanaged retarded spark above the applied spark

X-axis is Erpm
Y-axis is Air per Clyinder (mg)
Data is spark delta threshold (kPa)

KtSPRK_phi_DeltTorqueScrtyAdv

APC/Erpm	500.00	980.74	1461.48	1942.23	2422.97	2903.71	3384.45	3865.20	4345.94	4826.68	5307.42	5788.16	6268.91	6749.65	7230.39	7711.13	8191.88
80.00	42.73	39.73	41.13	38.94	45.06	47.48	46.11	38.61	38.22	40.55	42.11	42.41	40.77	40.31	40.31	40.31	40.31
160.00	40.08	36.30	35.23	36.02	45.66	47.48	45.14	36.13	35.47	38.02	39.56	39.77	37.88	37.36	37.36	37.36	37.36
240.00	37.72	33.44	30.81	33.55	40.86	42.17	40.09	32.56	32.33	34.84	35.98	36.20	35.00	34.67	34.67	34.67	34.67
320.00	35.64	31.00	27.38	30.06	35.95	37.33	35.53	28.63	28.19	30.27	31.97	32.83	32.36	32.22	32.22	32.22	32.22
400.00	33.77	28.91	24.64	26.36	32.11	33.48	31.80	25.20	24.77	26.73	28.53	29.73	30.02	30.09	30.09	30.09	30.09
480.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
560.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
640.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
720.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
800.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
880.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
960.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
1040.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
1120.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
1200.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
1280.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36
1360.00	32.20	26.25	22.13	23.63	29.20	30.56	28.98	22.70	22.28	24.13	25.94	27.36	28.16	28.36	28.36	28.36	28.36

P16F3: Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event

X-axis is engine torque (Nm)
Data is MAP delta threshold (kPa)

X-axis	0.00	50.00	100.00	150.00	200.00	300.00
Data	25.87	25.87	25.87	25.87	25.87	25.87

P16F3: Table to calculate limit for predicted torque for zero pedal determination.

X-axis is engine oil temp in C deg
Y-axis is engine speed RPM
Data is Torque (Nm)

	-40.00	-20.00	-10.00	0.00	50.00	90.00
200.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
500.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
750.00	21.48	20.14	19.73	19.43	17.91	17.19
850.00	21.95	20.41	19.78	19.23	18.00	17.36
900.00	22.18	20.54	19.80	19.13	18.05	17.45
1000.00	21.79	19.99	19.33	18.76	17.74	17.11
1100.00	21.39	19.43	18.86	18.39	17.43	16.78
1200.00	21.00	18.88	18.39	18.02	17.13	16.44
1350.00	21.23	18.01	17.64	17.86	16.91	16.17
1500.00	21.46	17.14	16.89	17.71	16.68	15.89
2000.00	22.23	14.25	14.39	17.19	15.94	14.98
2500.00	22.99	11.35	11.89	16.68	15.20	14.07
3000.00	23.76	8.46	9.39	16.16	14.46	13.16
3500.00	24.53	5.56	6.90	15.65	13.72	12.24
4500.00	26.06	-0.23	1.90	14.62	12.24	10.42
5500.00	39.60	5.99	8.90	25.59	22.75	20.60
6500.00	53.13	12.20	15.90	36.56	33.27	30.77

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	30	30	30	45	60	60	60	75	90	90	90	90	90	90	90	90	90

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	40
6	40
12	40
19	40
25	40
31	40
37	40
44	40
50	40
56	39
62	38
69	36
75	35
81	34
87	33
94	31
100	30

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

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table — **axis is Percent Clutch Pedal Position, 0 = bottom of travel**

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

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 Clutch Pedal Position Status (analog Clutch Pedal Position Sensor applications only):

Clutch Pedal Top of Travel Achieved criteria

The clutch pedal Top of Travel state will transition from FALSE to TRUE when the following occurs:

Clutch Pedal Position	<= 88 %	
for	> 93 counts	each count is equal to 12.5ms

Clutch Disengaged criteria

The clutch state will transition from engaged to disengaged when the following occurs:

Clutch Pedal Position	<= 40 %	
for	> 3 counts	each count is equal to 12.5ms

Clutch Pedal Bottom of Travel Achieved criteria

The clutch pedal Bottom of Travel state will transition from FALSE to TRUE when the following occurs:

Clutch Pedal Position	< 25 %	
for	> 3 counts	each count is equal to 12.5ms

FASD Section

P0171, P0172, P0174, P0175

The following table defines the Long Fuel Trim cells utilized for FASD diagnosis (cells identified with a "Yes" are enabled, and with a "NO" are disabled)

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

Closed Loop Enable Criteria

Engine run time greater than
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	155.0	155.0	135.0	60.0	19.0	16.0	15.0	14.0	13.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

and pre converter 02 sensor voltage less than

KfFULC_U_O2_SensorReadyThrshLo

Voltage *milliVolts*	*< 1100*

for
KcFULC_O2_SensorReadyEvents

Time (events * 12.5 milliseconds)	*> 20 events*

and
COSC (Converter Oxygen Storage Control) not enabled
and
Consumed AirFuel Ratio is stoichiometry i.e. not in component protection
and
POPD or Catalyst Diagnostic not intrusive
and
Turbo Scavenging Mode not enabled
and
All cylinders whose valves are active also have their injectors enabled
and
O2S_Bank_ 1_TFTKO, O2S_Bank_ 2_TFTKO, FuelInjectorCircuit_FA and CylnderDeacDriverTFTKO = False

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

Coolant	*> 40 Celcius*

or less than
KfFCLL_T_AdaptiveHiCoolant

Coolant *Celcius*	*< 120*

and
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	65	70	75	80	85	90	95	100	105
Manifold Air Pressure	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

and
TPS_ThrottleAuthorityDefaulted = False
and
Flex Fuel Estimate Algorithm is not active
and
Excessive fuel vapors boiling off from the engine oil algorithm (BOFR) is not enabled
and
Catalyst or EVAP large leak test not intrusive

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

Voltage *milliVolts*	*< 1100*

for
KcFCLP_Cnt_O2RdyCyclesThrsh

Time (events * 12.5 milliseconds)	*> 80 events*

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

	X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	100.0	100.0	100.0	100.0	100.0	100.0	75.0	50.0	50.0	50.0	50.0	40.0	40.0	25.0	25.0	25.0	25.0

Plus

KtFCLP_t_PostIntglRampInTime

	X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

and

KeFCLP_T_IntegrationCatalystMax

< 900

Modeled Catalyst Temperature *Celcius*

and

KeFCLP_T_IntegrationCatalystMin

> 350

Modeled Catalyst Temperature *Celcius*

and

PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes								
York	Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagFA	AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024	
York	Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagTFTKO	AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024	
York	Dilution PDT	PHSR	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	EGRR	GetEGRR_b_EGR_ValveCkt_FA	EGRValveCircuit_FA	P0403	P0404	P0405	P0406					
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValveFP	EGRValve_FP	P0405	P0406	P042E						
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValveCktTFTKO	EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406					
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerfTFTKO	EGRValvePerformance_TFTKO	P0401	P042E							
Genslak		CATR	GetCATR_b_CatSysEffLoB1_FA	CatalystSysEfficiencyLoB1_FA	P0420								
			GetCATD_b_CatSysEffLoB2_FA	CatalystSysEfficiencyLoB2_FA	P0430								
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
Wiggins	Air Measurement	AAPR	GetAAPR_b_AAP_SnsrFA	AAP_SnsrFA	naturally aspirated:	P2227	P2228	P2229	P2230				
					turbocharged:	P0237	P0238						
			GetAAPR_b_AAP_SnsrCktFP	AAP_SnsrCktFP	naturally aspirated:	P2228	P2229						
					turbocharged:	P0237	P0238						
			GetAAPR_b_AAP_SnsrTFTKO	AAP_SnsrTFTKO	naturally aspirated:	P2227	P2228	P2229	P2230				
					turbocharged:	P0237	P0238						
			GetAAPR_b_AAP2_SnsrFA	AAP2_SnsrFA	P2227	P2228	P2229	P2230					

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetAAPR_b_AAP2_SnsrCktFP	AAP2_SnsrCktFP	P2228 P2229
			GetAAPR_b_AAP2_SnsrTFTKO	AAP2_SnsrTFTKO	P2227 P2228 P2229 P2230
			GetAAPR_b_TC_BoostPresSnsrCktFA	TC_BoostPresSnsrCktFA	P0237 P0238
			GetAAPR_b_TC_BoostPresSnsrFA	TC_BoostPresSnsrFA	P0236 P0237 P0238
			GetAAPR_b_AmbPresSnsrCktFA	AmbPresSnsrCktFA	P2228 P2229
			GetAAPR_b_AmbPresSnsrCktFP	AmbPresSnsrCktFP	P2228 P2229
			GetAAPR_b_AmbientAirPresDfltd	AmbientAirDefault	baro or TIAP sensor: P2227 P2228 P2229 P2230
					no baro or TIAP sensor: P0101 P0102 P0103 P0106 P0107 P0108 P0111 P0112 P0113 P0114 P0121 P0122 P0123 P012B P012C P012D P0222 P0223 P1221
			GetAAPR_e_AmbPresDfltdStatus	AmbPresDfltdStatus	baro or TIAP sensor: P2227 P2228 P2229 P2230
					no baro or TIAP sensor: P0101 P0102 P0103 P0106 P0107 P0108 P0111 P0112 P0113 P0114 P0121 P0122 P0123 P012B P012C P012D P0222 P0223 P1221
Wiggins	Air Measurement	EITR	GetEITR_b_IAT_SnsrCktTFTKO	IAT_SensorCircuitTFTKO	P0112 P0113
			GetEITR_b_IAT_SnsrCktFA	IAT_SensorCircuitFA	P0112 P0113
			GetEITR_b_IAT_SnsrCktFP	IAT_SensorCircuitFP	P0112 P0113
			GetEITR_b_IAT_SnsrTFTKO	IAT_SensorTFTKO	P0111 P0112 P0113
			GetEITR_b_IAT_SnsrFA	IAT_SensorFA	P0111 P0112 P0113
			GetEITR_b_IAT_2_SnsrCktTFTKO	IAT2_SensorCktTFTKO	IAT2 Present P0097 P0098
					IAT2 Not Present P0112 P0113
			GetEITR_b_IAT_2_SnsrCktFA	IAT2_SensorCircuitFA	IAT2 Present P0097 P0098
					IAT2 Not Present P0112 P0113

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetEITR_b_IAT_2_SnsrCktFP	IAT2_SensorcircuitFP	IAT2 Present P0097 P0098 IAT2 Not Present P0112 P0113
			GetEITR_b_IAT_2_SnsrTFTKO	IAT2_SensorTFTKO	IAT2 Present P0096 P0097 P0098 IAT2 Not Present P0111 P0112 P0113
			GetEITR_b_IAT_2_SnsrFA	IAT2_SensorFA	IAT2 Present P0096 P0097 P0098 IAT2 Not Present P0111 P0112 P0113
			GetEITR_b_ThrotTempSnsrTFTKO	ThrotTempSensorTFTKO	IAT2 Present P0096 P0097 P0098 IAT2 Not Present P0111 P0112 P0113
			GetEITR_b_ThrotTempSnsrFA	ThrotTempSensorFA	IAT2 Present P0096 P0097 P0098 IAT2 Not Present 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

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes			
			GetIFRR_b_TIAP_SnsrPerfFault	TIAP_SensorPerfFA	P0236			
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_MAP_SnsrCktFP	MAP_SensorCircuitFP	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	AfterThrottlePressureFA	naturally aspirated, turbocharged	P0106	P0107	P0108
					supercharged	P012B	P012C	P012D
			GetMAPR_b_AftThrotVacSnsr_TFTKO	AfterThrottleVacuumTFTKO	naturally aspirated, turbocharged	P0106	P0107	P0108
					supercharged	P012B	P012C	P012D

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012C P012D
			GetMAPR_b_AftThrotPresSnsrTFTKO	AfterThrottlePressTFTKO	naturally aspirated, turbocharged P0106 P0107 P0108 supercharged 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

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
			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
Wiggins	Engine Moding	EMDR	GetEMDR_b_EngModeNotRunTmErr	EngModeNotRunTmErr	P2610											
Siekkinen	Cooling System PDT	ECTI	NeECTI_b_ECT_SnsrCktFA	ECT_Sensor_Ckt_FA	P0117	P0118	P0119									
			NeECTI_b_ECT_SnsrCktTPTKO	ECT_Sensor_Ckt_TPTKO	P0117	P0118	P0119									
			NeECTI_b_ECT_SnsrCktTFTKO	ECT_Sensor_Ckt_TFTKO	P0117	P0118	P0119									
			NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125								
			NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128							
			NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125	P0119							
			NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116											
			VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117	P0118										
			GetECTI_b_ECT_SnsrCktHiFP	ECT_Sensor_Ckt_High_FP	P0118											

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetETCl_b_ECT_SnsrCktLoFP	ECT_Sensor_Ckt_Low_FP	P0117
		THMD	NeTHMD_b_InsuffClntFlwFA	THMR_Insuff_Flow_FA	P00B7
			NeTHMD_b_ThstCntrlFA	THMR_Therm_Control_FA	P0597 P0598 P0599
			NeTHMD_b_ERTSnsrCktFA	THMR_RCT_Sensor_Ckt_FA	P00B3 P00B4
			NeTHMD_b_ECTSnsrCktFA	THMR_ECT_Sensor_Ckt_FA	P0117 P0118 P0116 P0125 P00B6
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 P015A P015B P0030
			NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A P013B P013E P013F P2270 P2271 P0137 P0138 P0140 P0141 P0054 P0036
			NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03 P0151 P0152 P0153 P0154 P0155 P0059 P1153 P015C P015D P0050
			NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C P013D P014A P014B P2272 P2273 P0157 P0158 P0160 P0161 P0060 P0056
			NeOXYI_b_PO2_CntrlBank1Snsr2_FA	PO2S_Bank_1_Snsr_2_FA	P0137 P0138 P0140 P0036 P0054 P0141 P2270 P2271
			NeOXYI_b_PO2_CntrlBank2Snsr2_FA	PO2S_Bank_2_Snsr_2_FA	P0157 P0158 P0160 P0056 P0060 P0161 P2272 P2273
Miller		FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208 P0261 P0264 P0267 P0270 P0273 P0276 P0279 P0282 P0262 P0265 P0268 P0271 P0274 P0277 P0280 P0283 P2147 P2150 P2153 P2156 P216B P216E P217B P217E P2148 P2151 P2154 P2157 P216C P216F P217C P217F P1248 P1249 P124A P124B P124C P124D P124E P124F
		FULR	GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208 P0261 P0264 P0267 P0270 P0273 P0276 P0279 P0282 P0262 P0265 P0268 P0271 P0274 P0277 P0280 P0283 P2147 P2150 P2153 P2156 P216B P216E P217B P217E P2148 P2151 P2154 P2157 P216C P216F P217C P217F P1248 P1249 P124A P124B P124C P124D P124E P124F

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
		FHPR	GetFHPR_b_PumpCkt_FA	FHPR_b_PumpCkt_FA	P0090 P0091 P0092 P00C8 P00C9 P00CA
		FHPR	GetFHPR_b_PumpCkt_TFTKO	FHPR_b_PumpCkt_TFTKO	P0090 P0091 P0092 P00C8 P00C9 P00CA
		FHPR	GetFHPR_b_FRP_SnsrCkt_FA	FHPR_b_FRP_SnsrCkt_FA	P0192 P0193
		FHPR	GetFHPR_b_FRP_SnsrCkt_TFTKO	FHPR_b_FRP_SnsrCkt_TFTKO	P0192 P0193
		EMOR	GetEMOC_b_EngMetalOvertempActv true for calibrated time	EngineMetalOvertempActive	P1258
Andersson	Charging Controls PDT	BSTR	GetBSTR_b_PCA_CktFA	BSTR_b_PCA_CktFA	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
			GetBSTR_b_PCA_CktTFTKO	BSTR_b_PCA_CktTFTKO	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
			GetBSTR_b_PCA_CktLoTFTKO	BSTR_b_PCA_CktLoTFTKO	P0034 P0047 P0245 P0249
			GetBSTR_b_PstnCntrlFA	BSTR_b_PstnCntrlFA	P166D P166E
			GetBSTR_b_PstnCntrlTooLoTFTKO	BSTR_b_PstnCntrlTooLoTFTKO	P166D P166E
			GetBSTR_b_PstnCntrlTooHiTFTKO	BSTR_b_PstnCntrlTooHiTFTKO	P166D P166E
			GetBSTR_b_PCA_PstnSnsrFA	BSTR_b_PCA_PstnSnsrFA	P003A P2564 P2565
			GetBSTR_b_PCA_PstnSnsrTFTKO	BSTR_b_PCA_PstnSnsrTFTKO	P003A P2564 P2565
			GetBSTR_b_TurboBypassCktFA	BSTR_b_TurboBypassCktFA	P0033 P0034 P0035 P00C0 P00C1 P00C2
			GetBSTR_b_TurboBypassCktTFTKO	BSTR_b_TurboBypassCktTFTKO	P0033 P0034 P0035 P00C0 P00C1 P00C2
			GetBSTR_b_IC_PmpCktFA	BSTR_b_IC_PmpCktFA	P023A P023C
			GetBSTR_b_PCA_FA	BSTR_b_PCA_FA	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
			GetBSTR_b_PCA_TFTKO	BSTR_b_PCA_TFTKO	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
			GetBSTR_b_ExcsvBstFA	BSTR_b_ExcsvBstFA	P226B
			GetBSTR_b_ExcsvBstTFTKO	BSTR_b_ExcsvBstTFTKO	P226B
			GetBSTR_b_PresCntrlTooLoTFTKO	BSTR_b_PresCntrlTooLoTFTKO	P0299

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes									
			GetBSTR_b_PresCntrlTooHiTFTKO	BSTR_b_PresCntrlTooHiTFTKO	P0234									
			GetBSTR_b_TurboBypB_CktFA	BSTR_b_TurboBypB_CktFA	P00C0	P00C1	P00C2							
			GetBSTR_b_TurboBypB_CktTFTKO	BSTR_b_TurboBypB_CktTFTKO	P00C0	P00C1	P00C2							
Sawdon	Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333	P06B6	P06B7
Sawdon	Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358		
Kar	Speed Control PDT	SPDR	GetSPDR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506	P0507								
Kar	Speed Control PDT	TESR_MSG	GetDFIR_e_TCM_EngSpdReqCkt	TCM_EngSpdReqCkt	P150C									
Worthing	ETC	APSR	GetAPSR_PPS_1_OOR_Flt_Composite()	PPS1_OutOfRange_Composite	P2122	P2123	P06A3							
			GetAPSR_PPS_2_OOR_Flt_Composite()	PPS2_OutOfRange_Composite	P2127	P2128	P0697							
			GetAPSR_b_PPS_1_OOR_Flt_Cmposite()	PPS1_OutOfRange_Composite	P2122	P2123	P06A3							
			GetAPSR_b_PPS_2_OOR_Flt_Cmposite()	PPS2_OutOfRange_Composite	P2127	P2128	P0697							
			GetAPSR_b_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2123								
			GetAPSR_b_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2128								
			GetAPSR_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2123								
			GetAPSR_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2128								
			GetAPSR_b_PedalFailure	AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0697	P06A3			
		MEMR	GetMEMR_b_CM_RAM_ErrFA()	ControllerRAM_Error_FA	P0604									
		PISR	GetPISR_b_ECU_ProcPerf_FA()	ControllerProcessorPerf_FA	P0606									
		TPSR	GetTPSR_b_TPS1_OOR_FltComposite()	TPS1_OutOfRange_Composite	P0122	P0123	P06A3							

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetTPSR_b_TPS2_OOR_FltComposite()	TPS2_OutOfRange_Composite	P0222 P0223 P06A3
			GetTPSR_b_FaultActive_TPS()	TPS_FA	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_TFTKO_TPS()	TPS_TFTKO	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_PerfFaultActive_TPS()	TPS_Performance_FA	P0068 P0121 P1104 P2100 P2101 P2102 P2103
			GetTPSR_b_PerfTFTKO_TPS()	TPS_Performance_TFTKO	P0068 P0121 P1104 P2100 P2101 P2102 P2103
			GetTPSR_FaultPending_TPS()	TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_FaultPending_TPS()	TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
			GetTPSR_ThrotAuthDefault()	TPS_ThrottleAuthorityDefaulted	P0068 P0122 P0123 P0222 P0223 P16F3 P1104 P2100 P2101 P2102 P2103 P2135
		SRAR	GetSRAR_b_EnginePowerLimited()	EnginePowerLimited	P0068 P0122 P0123 P0222 P0223 P0606 P16F3 P1104 P2100 P2101 P2102 P2103 P160E P160D P0191 P0192 P0193 P00C8 P00C9 P00CA P0090 P0091 P0092 P228C P2135 P2138 P2122 P2123 P2127 P2128 P228D P06A3 P0697
		VLTR	GetVLTR_b_V5A_FA()	5VoltReferenceA_FA	P0641
			GetVLTR_b_V5B_FA()	5VoltReferenceB_FA	P0651
			GetVLTR_b_MAP_OOR_Flt()	5VoltReferenceMAP_OOR_Flt	P0697
Jackson	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
Jackson	Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495
			GetFANR_b_OutputDriver_FA	FanOutputDriver_FA	P0480 P0481 P0482
Jackson	Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461 P0462 P0463 P2066 P2067 P2068

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
Jackson	Engine Interface	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682
			GetPMDC_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685
			GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685
			GetPMDR_b_IgnOffTmFA	IgnitionOffTimer_FA	P2610
			GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610
			GetEMDR_b_EngModeNotRunTmErr	EngineModeNotRunTimerError	P2610
			GetEMDR_b_EngModeNotRunTmFA	EngineModeNotRunTimer_FA	P2610
Jackson	Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
			GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502 P0503 P0722 P0723
Pellerito	Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaulted	MYD/MYC/MYB: P182E P1915 M30/M32/M70: P1915 P182A P182C P182D P182E P182F
		TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	MYD/MYC/MYB: P182E P1915 M30/M32/M70: P1915 P182A P182C P182D P182E P182F
			GetTOSR_b_TOS_FA	Transmission Output Shaft Angular Velocity Validity	MYD/MYC/MYB: P0722 P0723 P077D P077C M30/M32/M70: P0722 P0723
			GetSHPR_b_ShfSlndFlt	**no validity name is assigned to this fault bundle**	**P0751 P0752 P0756 P0757 P0973 P0974 P0976 P0977**
			GetTOSR_b_OutRotRollgCntValid	**Trans Output Rotations Rolling Count Validity**	**P0722 P0723 P077C P077D**
			GetTGRR_TransGrDfltd	**Transmission Actual Gear Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P182E P1915**

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes									
			GetTRGR_b_TransEngdStEmisFlt	Transmission Engaged State Validity		P182E	P1915							
			GetTGRR_TransGrDfltd	Transmission Estimated Gear Validity		P182E	P1915							
			GetTRTR_GearRatioValidity	Transmission Gear Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	
			GetTRGR_PRNDL_StateDfltd	Transmission Gear Selector Position Validity		P182E	P1915							
			GetTFTR_b_TransOilVld	Transmission Oil Temperature Validity		P0667	P0668	P0669	P0711	P0712	P0713			
			GetTRTR_b_TransOveralRatioVld	Transmission Overall Actual Torque Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	P182E	P1915
			GetTRTR_b_TransOveralRatioVld	Transmission Overall Estimated Torque Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	P182E	P1915
			GetTRGR_PRNDL_StateDfltd	Transmission Shift Lever Position Validity		P182E	P1915							
			GetTBNR_TurbineSpdValid	Transmission Turbine Angular Velocity Validity		P0716	P0717	P07BF	P07C0					
Jess	Oil Attributes PDT	EOTR												
		If sensor application	GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197	P0198								
		if modeled	GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Sensor_FA	IAT_SensorCircuitFA								
Jess	Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522	P0523								
			GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521	P0522	P0523							
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449			

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes							
Kaiser	AFM PDT	BTRR	GetBBVR_b_BrakeBoostVacFA	BrakeBoosterSensorFA	P0556	P0557	P0558					
		If sensor application	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556	P0557	P0558					
		if modeled	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleSpeedSensor_FA	MAP_SensorFA						
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	
Kaiser	Engine Torque PDT	ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqueEstInaccurate	EngineMisfireDetected_FA	FuelInjectorCircuit_FA	FuelInjectorCircuit_TFTKO	FuelTrimSystemB1_FA	FuelTrimSystemB2_FA	MAF_SensorTFTKO	MAP_SensorTFTKO	EGRValuePerformnce_FA
MacEwen	FASD	FADR	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171	P0172						
			GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174	P0175						
			GetFADR_b_FuelTrimSysB1_TFTKO	FuelTrimSystemB1_TFTKO	P0171	P0172						
			GetFADR_b_FuelTrimSysB2_TFTKO	FuelTrimSystemB2_TFTKO	P0174	P0175						
MacEwen	AFIM	OXYR	GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB1)	A/F Imbalance Bank1	P219A							
			GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB2)	A/F Imbalance Bank2	P219B							
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_ClchPstnEmisFA	Clutch Sensor FA	P0806	P0807	P0808					

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo)	ClutchPositionSensorCircuitLo FA	P0807
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)	ClutchPositionSensorCircuitHi FA	P0808
MacEwen	Closed Loop Fuel	E85R	GetE85R_b_FFS_CompFA	Ethanol Composition Sensor FA	P0178 P0179 P2269
			Other Definitions		
Jackson	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

Long Name	Short Name
Bank	B
Brake	Brk
Circuit	Ckt
Engine	Eng
Fault Active	FA
Intake	Intk
Naturally Aspirated	NA
Performance	Perf
Position	Pstn
Pressure	Press
Sensor	Snsr
Supercharged	SC
System	Sys
Test Failed This Key On	TFTKO
Rough Road	RR