Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
Intake Camshaft	P0010	Detects a VVT system error	The ECM detects that the commanded		System supply voltage is	> 11 Volts, and	20 failures	Trips 2
Actuator Solenoid		by monitoring the circuit for	state of the driver and the actual state of		within limits	< 32 Volts	out of 25	
Circuit – Bank 1		electrical integrity	the control circuit do not match.				samples	В Туре
					Output driver is commanded on,		250 ms	
					Ignition switch is in crank or run position		/sample,	
Intake Camshaft	P0011	Detects a VVT system error	Camshaft position error [absolute value	(Intake cam Bank 1)Cam Position	The following DTC's are NOT active:	System Voltage > 11 Volts, and	continuous 200 failures	Trips 2
	PUUII	by comparing the desired		· /	P0010 IntkCMP B1 Circuit	System Voltage < 32 Volts	out of 1000	B Type
System			of (desired position - actual position)] is	Error >		System voltage < 32 volts		Бтуре
Performance –		and actual cam positions	compared to thresholds to determine if	KtPHSD_phi_CamPosErrorLimIc1		De la deservation de la des	samples	
Bank 1		when VVT is activated	excessive	Deg (see Supporting Table)	P0335, P0336, Crank sensors	Desired cam position cannot vary		
					P0016, P0017, P0018, P0019 Cam to	more than 7.5 Cam Deg for at		
					crank rationality	least		
						KtPHSD_t_StablePositionTimeIc1		
						seconds (see Supporting Table)		
					Engine is running		100 ms	
					VVT is enabled		/sample	
					Desired camshaft position > 0			
					Power Take Off (PTO) not active			
Crankshaft Position	P0016	Detects cam to crank	4 cam sensor pulses more than 11 crank		Engine Speed	< 1200	4 failures out	Туре В
(CKP)-Camshaft		misalignment by monitoring	degrees before or 11 crank degrees after		Crankshaft and camshaft position signals		of 5 samples	2 trips
Position (CMP)		if cam sensor pulse for bank	nominal position in one cam revolution.		are synchronized		if the engine	
Correlation Bank 1		1 sensor A occurs during the					is being	
Sensor A		incorrect crank position					assisted by	
							the starter	
					Com abasan in in "northerd" norition			
					Cam phaser is in "parked" position		24 failures	
							out of 30	
					No Active DTCs:	P0335, P0336	samples if	
					No Active D103.	P0340, P0341	the engine is	
						5VoltReferenceA FA	running	
						5VoltReferenceB FA	without	
					No Pending DTCs:		assistance	
						P0341	from the	
							One sample	
							per cam	
							rotation	
	P0030	This DTC checks the Heater	Voltage low during driver open state				20 failures	2 trips Type
Control Circuit		Output Driver circuit for	(indicates short-to-ground or open circuit)		Ign Switch position	= Crank or Run position	out of 25	В
Bank 1 Sensor 1		electrical integrity.	or voltage high during driver closed state			11.0 volts < Ign Voltage < 32.0	samples	
			(indicates short to voltage).		Ignition Voltage	volts		
					Engine Speed	> 400 RPM	250 ms	
							/sample	
							Continuous	
							Sommuous	
O2S Heater	P0036	This DTC checks the Heater	Voltage low during driver open state			1	20 failures	2 trips Type
Control Circuit		Output Driver circuit for	(indicates short-to-ground or open circuit)		Ian Switch position	= Crank or Run position	out of 25	Z tips Type B
Bank 1 Sensor 2		electrical integrity.	or voltage high during driver closed state		igh owner position	11.0 volts < Ign Voltage < 32.0	samples	В
Darin I OCIISUI Z		cicculcar integrity.			Ignition Voltage			
			(indicates short to voltage).		ighter voltage			
					Engine Speed	> 400 RPM	250 ms	
							/sample	
							Continuous	
	P0050		Voltage low during driver open state				20 failures	2 trips Type
Control Circuit		Output Driver circuit for	(indicates short-to-ground or open circuit)	1	Ian Switch position	= Crank or Run position	out of 25	В

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Bank 2 Sensor 1	Code	electrical integrity.	or voltage high during driver closed state (indicates short to voltage).	Value	Ignition Voltage	11.0 volts < Ign Voltage < 32.0	samples	indin.
					Engine Speed	> 400 RPM	250 ms /sample Continuous	
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 ohms	Coolant – IAT	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	Coolant – IAT	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds	Once per valid cold start	2 trips Type B
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed		20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	-30.0 °C ≤ Coolant ≤ 45.0 °C < 32.0 volts > 28800 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	-30.0 °C ≤ Coolant ≤ 45.0 °C < 32.0 volts > 28800 seconds	Once per valid cold start	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP <u>and MAF</u> do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low). or P0108 (MAP circuit	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			high) have failed this key cycle, then MAP portion of diagnostic fails			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	for 0.1875 sec Continuous in primary processor	MIL: YES
			(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	tables				
				Table, f(Volts). See supporting tables				
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 (@ 150°C)	< 45 Ohms	Engine run time Or IAT mir	e > 0.0 seconds ≤ 150.0 °C	5 failures out of 25 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 (@ -60⁰C)	> 419000 Ohms	Or	e > 10.0 seconds n ≥ -7.0 °C	5 failures out of 25 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:		No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA	1 failure 500 msec /sample	2 trips Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			1) Absolute difference between ECT at	See "P00B6: Fail if power up ECT		IgnitionOffTimeValid	Once per valid cold	
			power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast	exceeds RCT by these values" in the Supporting tables section			start	
			fail).	the Supporting tables section			Start	
			iuny.					
						TimeSinceEngineRunningValid		
			2) Absolute difference between ECT at					
			power up & RCT at power up is > by 19.3					
			C and a block heater has not been					
			detected.					
					Engine Off Soak Time	> 28800 seconds		
					Non-volatile memory initization			
						= Not occurred		
			3) ECT at power up > IAT at power up by					
			19.3 C and the time spent cranking the					
			engine without starting is greater than					
			10.0 seconds with the					
			LowFuelConditionDiag					
				= False	Test sevenlets this trip	Falsa		
				(See Supporting Tables)	Test complete this trip Test aborted this trip			
					Test aborted this trip	= False		
					IAT	≥ -7 °C		
					LowFuel Condition Diag			
					(See Supporting Tables)	= False		
					Block Heater detect	ion is enabled	7	
					when either of the fo	llowing occurs:		
					1) ECT at power up > IAT at power up by	1		
						> 19.3 ⁰C		
					2) Cranking time			
						< 10.0 Seconds		
					Block Heater is d			
					diagnostic is aborte			
					occurs. Diagnostic is 3) or 4) oc			
					1a) Vehicle drive time			
						> 400 Seconds with		
					1b) Vehicle speed			
	1					> 14.9 MPH and		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:			
					1d) IAT drops from power up IAT	0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC		
					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	> 1800 Seconds		
Mass Air Flow System Performance (naturally aspirated)	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)	<= 230 kPa*(g/s) > 12 grams/sec	Engine Speed Engine Speed Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			Filtered	> 15.0 kPa		>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
						Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
						MAP Model 2 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_FA IAT_SensorFA IAT_SensorFP CyIDeacSystemTFTKO		
Mass Air Flow	P0102	Detects a continuous short to	MAF Output	<= 1500 Hz	Engine Run Time		400 failures	Туре В

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
ensor Circuit Low requency		low or a open in either the signal circuit or the MAF sensor		(~ 1.58 gm/sec)	Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	out of 500 samples 1 sample every cylinder firing	2 trips
							event	
∕lass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hz (~ 332.07 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing	Type B 2 trips
							event	
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	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	<= 230 kPa*(g/s) > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C	Continuous Calculations are performed every 12.5 msec	Type B 2 trips
				> 15.0 kPa		>= 0.00		
						Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM		
						MAP Model 2 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 CrankSensorFA ECT_sensorFA ECT_sensorFA IAT SensorFA IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO		
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	Type B 2 trips
							msec	
Anifold Absolute	P0108	Detects an open sensor	MAP Voltage	> 90.0 % of 5 Volt Range (4.5	Continuous		320 failures	Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
Pressure Sensor Circuit High		ground or continuous short to high in either the signal circuit or the MAP sensor.		Volts = 115.1 kPa)			out of 400 samples 1 sample every 12.5 msec	2 trips
Intake Air Temperature Sensor Circuit Low (High Temperature)		Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 0.0 seconds < 150 deg C >= 0.00 MPH ECT Sensor Ckt FA ECT Sensor Ckt FP VehicleSpeedSensorError	50 failures out of 63 sambles 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)		circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input		Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 0.0 seconds > -40 deg C <= 318.00 MPH <= 511 gm/sec ECT Sensor Ckt FA ECT Sensor Ckt FP VehicleSpeedSensorError MAF SensorFA MAF SensorFP MAF SensorTFTKO	50 failures out of 63 sambles 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 lookup value after a minimum 28800 second soak (fast fail).	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section.	No Active DTC's	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid	1 failure 500 msec /sample Once per valid cold	2 trips Type B
			2) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 second soak and a block heater has not been detected		Non-volatile memory initization Test complete this trip		start	
			3) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag					
				= False (See Supporting Tables)	Test aborted this trip IAT LowFuelCondition Diag (See Supporting Tables)	≥ -7 °C		
					Block Heater detecti when either of the fol 1) ECT at power up > IAT at power up by	llowing occurs:		
					2) Cranking time	> 19.3 ℃		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Block Heater is de	Conditions	Required	illum.
					diagnostic is aborte occurs. Diagnostic is 3) or 4) oc	d when 1) or 2) s aborted when		
					1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is	> 400 Seconds with > 14.9 MPH		
					1d) IAT drops from power up IAT	≥ 3.3 °C		
					2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed	≤ 30 Seconds	-	
	_				4) Minimum IAT during test	> 1800 Seconds ≤ -7 °C		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150°C)	< 45 Ohms			5 failures out of 6 samples	2 trips Type B
							1 sec /sample Continuous	
Engine Coolant	P0118	Circuit Continuity	ECT Resistance	110000 Ohmo	Facino run timo	> 10.0 seconds	5 failures out	2 trips Type
Temp Sensor Circuit High		This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	(@ -60°C)	> 419000 Ohms	Or	≥ -7.0 °C	of 6 samples	В
							/sample Continuous	
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 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	Trips: 1 Type: A MIL: YES
						No 5 V reference #2 error	secondary processor	
Throttle Position Sensor	P0121	Determines if the Throttle Position Sensor input is	Filtered Throttle Model Error	> 230 kPa*(g/s)	Engine Speed Engine Speed	No 5 V reference #2 DTC (P0651) >= 450 RPM <= 4600 RPM	Continuous	Type B 2 trips
Performance (naturally aspirated)		stuck within the normal operating range	AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 12 grams/sec	Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	> -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C	Calculation are performed every 12.5 msec	
						>= 0.00 Filtered Throttle Model multiplied		
						by TPS Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
						See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT Sensor FP IAT SensorFA IAT SensorCircuitFP CyIDeacSystemTFTKO		
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS1 Voltage <	0.325		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
TPS1 Circuit High	P0123	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault		See "P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions" in	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted	30 failures to set DTC 1 sec /sample	2 trips Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value the Supporting tables section.	Parameters	Conditions IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA	Required Once per ignition key	illum.
			Range #1 (Primary) ECT reaches 75.0 °C when IAT min is ≤ 54.5°C and ≥ 10.0°C.		Engine not run time Engine run time Fuel Condition	≥ 1800 seconds		
			Range #2 (Alternate)		Range #1 (Primary) Test ECT at start run Average Airflow Vehicle speed			
			ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Range #2 (Alternate) Test ECT at start run Average Airflow Vehicle speed			
					Accumulated Airflow Adjustments			
					 Max. airflow amount added when accumulating airflow is Zero Airflow accumulated when airflow is 	50 gps		
					 With AFM active Airflow added to acculmulated is multiplyed by 	< 12.0 gps		
						50.00%		
					 With Decel Fuel Cut Off active, acculmulated airflow is reduced by multiplying actual airflow by 			
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 17 grams per sec during Range #1 or #2: Range #1 (Primary)	See "P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions" in the Supporting tables section.	No Active DTC's	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA	1 failure to set DTC	2 trips Type B
(For applications with a two coolant sensors)			ECT reaches target temperature of 75.0 °C		For sing and you find	THMR_ECT_Sensor_Ckt_FA	1 sec /sample Once per ignition key	
			when IAT min is < 54.5°C and ≥ 10.0°C. Range #2 (Alternate)		Engine not run time Engine run time	≥ 1800 seconds 10 ≤ Eng Run Tme ≤ 1370 seconds	cvcle	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria ECT reaches target temperature of 65.0	Value	Parameters	Conditions	Required	illum.
			°C			Ethanol ≤ 87%		
			when IAT min is < 10.0°C and ≥ -7.0°C.	4	Range #1 (Primary) Test			
					Average Airflow	-7.0 ≤ ECT ≤ 70.0 °C ≥ 17.0 gps		
							-	
					Range #2 (Alternate) Test			
					Average Airflow	-7.0 ≤ ECT ≤ 60.0 °C ≥ 17.0 gps		
							1	
O2S Circuit Low Voltage Bank 1	P0131	This DTC determines if the O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 40 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	285 failures out of 350	2 trips Type B
Sensor 1		to low.					samples	_
						MAP_SensorFA AIR System FA	Frequency:	
							Continuous	
						Ethanol Composition Sensor FA	in 100 milli -	
						EvapPurgeSolenoidCircuit_FA	second loop	
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
					AIR intrusive test	FuelInjectorCircuit_FA = Not active		
					Fuel intrusive test			
					Idle intrusive test			
					EGR intrusive test System Voltage	= Not active 10.0 volts < system voltage< 32.0		
						volts		
					EGR Device Control Idle Device Control			
					Fuel Device Control			
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False (See Supporting Tables)		
					Equivalence Ratio	$0.9922 \le equiv. ratio \le 1.0137$		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State Closed Loop Active			
					All Fuel Injectors for active Cylinders			
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the abov	e met for	1	
					Time	> 5.0 seconds	Ţ	
O2S Circuit High	P0132	This DTC determines if the	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050	No Active DTC's	TPS_ThrottleAuthorityDefaulted	100 failures	2 trips Type
Voltage Bank 1		O2 sensor circuit is shorted		mvolts			out of 125	В
Sensor 1		to high.				MAP SensorFA	samples	
						MAF_SensorFA	Frequency:	
							Continuous in 100 milli -	
						EvapPurgeSolenoidCircuit_FA	second loop	
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
					AIR intrusive test	FuelInjectorCircuit_FA = Not active		
i i i i i i i i i i i i i i i i i i i	1	1	I	I	AIR INTRUSIVE TEST	= NOL ACTIVE	I	l

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Fuel intrusive test			
					Idle intrusive test			
					EGR intrusive test			
					System Voltage	10.0 volts < system voltage< 32.0		
					FOD Device Control	volts		
					EGR Device Control Idle Device Control			
					Fuel Device Control			
					AIR Device Control			
					Low Fuel Condition Diag	= False		
					2011 - dei contailer Blag	(See Supporting Tables)		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					Fuel Control State			
						not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
						DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above	e met for	1	
					Time	> 2 seconds		
O2S Slow	P0133	This DTC determines if the	The average response time is caluclated	Refer to "P0133 - O2S Slow	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Sample time	2 trips Type
Response Bank 1		O2 sensor response time is	over the test time, and compared to the	Response Bank 1 Sensor 1"		-	is 60	В
Sensor 1		degraded.	threshold.	Pass/Fail Threshold table in the			seconds	
				Supporting Tables tab.		MAP_SensorFA IAT SensorFA		
						ECT_Sensor_FA	Frequency:	
			Or	S/T L/R switches < 3, or S/T R/L		AmbientAirDefault	Once per trip	
				switches < 3		MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA		
			If Slope Time L/R or R/L Switches are	The test averages the signal		EvapFlowDuringNonPurge_FA		
			below the threshold.	response time over 60.0 seconds		EvapVentSolenoidCircuit_FA		
				when the signal is transitioning		EvapSmallLeak_FA		
				between 600 mvolts and 300		EvapEmissionSystem_FA FuelTankPressureSnsrCkt FA		
				mvolts. An average rich to lean and lean to rich time are each		FuelInjectorCircuit_FA		
						AIR System FA		
				calculated separately.		EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
					Bank 1 Sensor 1 DTC's not active			
					System Voltage	10.0 volts < system voltage< 32.0		
						volts		
					EGR Device Control			
					Idle Device Control Fuel Device Control			
					AIR Device Control			
					Low Fuel Condition Diag	= False		
						(See Supporting Tables)		
					Green O2S Condition	= Not Valid, See definition of		
						Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S1,		
						B2S1) in Supporting Tables tab.		
					O2 Heater on for			
					Learned Htr resistance			
					Engine Coolant			
					IA I Engine Run Time	> -40 °C		
					Engine Run Time Time since any AFM status change			
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
						>= 0 % duty cycle		
•	•		1	•				•

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			Unit in		Engine airflow Engine speed Fuel Baro Throttle Position Low Fuel Condition Diag Fuel Control State Closed Loop Active LTM (Block Learn) fuel cell Transient Fuel Mass Baro Fuel Control State	20 gps <= engine airflow <= 85 gps 1200 <= RPM <= 3000 < 87 % Ethanol > 70 kpa >= 5 % = False (See Supporting Tables) = Closed Loop = TRUE = Enabled. See definition of Multiple DTC Use - Response Cell Enable Table in Supporting Tables tab. <= 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active		
						- mat for		
					All of the abov	> 3.5 seconds	4	
						2 0.0 3000103		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	= Wamed Up	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to renort fail Delta TPS is incremented when the TPS % change >= 0.0 % 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.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay B1S1 O2S Heater Duty Cycle O2S Heater device control	> zero	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution	2 trips Type B

System		Description	Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	Code	Description	Chteria	Value	All of the abov		Required	mum.
						> 120 seconds	1	
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA	320 failures out of 400 samples Frequency:	2 trips Type B
						Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA	Continuous in 100 milli - second loop	
						Evaplication Evaplication Evaplication Evaplication EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test System Voltage	= Not active 10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control Low Fuel Condition Diag	= False		
					Equivalence Ratio Throttle Position	(See Supporting Tables) 0.9922 ≤ equiv. ratio ≤ 1.0137 3 % <= Throttle <= 70 %		
					Fuel Control State			
					Closed Loop Active			
						Enabled (On) Ethanol <= 87% DFCO not active		
					All of the above	e met for		
					Time	> 5.0 seconds		
O2S Circuit High F Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts		TPS_ThrottleAuthorityDefaulted MAP_SensorFA	100 failures out of 125 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria	Value	AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State Fuel Control State Fuel Control State Fuel Control State Fuel State Fuel State Fuel Condition	MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Solt active = Talse (See Supporting Tables) 0.9922 s equiv. ratio \$ 1.0137 3.0 % <= Throttle <= 70.0 % = Closed Loop not = Power Enrichment = TRUE Enabled (On) DFCO not active Ethanol <= 87%	Required Frequency: Continuous in 100 milli - second loop	illum.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	the threshold. OR The Accumulated mass air flow monitored during the Slow Response	 B1S2 EWMA normalized integral value > 8.2 units OR Accumulated air flow during slow rich to lean test > 75 grams (upper threshold is 500 mvolts and lower threshold is 200 mvolts) 	No Active DTC's	 > 2 seconds TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013B, P013E, P013F, P2270 or P2271 	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Event Dank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are	1 trips Type A EWMA

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions 10.0 volts < system voltage< 32.0	Required	illum.
					System voltage	volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag Post fuel cell	 Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. False (See Supporting Tables) Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab. 		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					After above conditio DFCO mode is o (wo driver initiated	continued		
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	the threshold. OR The Accumulated mass air flow monitored during the Slow Response	 B1S2 EWMA normalized integral value > 8.2 units OR Accumulated air flow during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts) 	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given End Book OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests	1 trips Type A EWMA
					B1S2 Failed this key cycle	10.0 volts < system voltage< 32.0 volts = Valid	per trip are	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions = Not Valid, See definition of	Required	illum.
					Green O2S Condition	INDEXT Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat		
					Low Fuel Condition Diag Post fuel cell	temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.) = False (See Supporting Tables) = Enabled. See definition of Multiple DTC Use - Block learn		
					DTC's Passed	cells to enable Post oxygen sensor tests in Supporting Tables tab = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable)) = P013F (and P014B (if		
					After above conditi Fuel Enrich mode	continued.		
02 Sanaar Slaw	D0120	This DTC determines if the	The EWMA of the Post O2 sensor	A) B1S2 FWMA permetized	During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10	Frequency	1 tripo Tupo
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The	normalized integral value is greater than the threshold. OR	1) B1S2 EWMA normalized integral value > 8.2 units OR 2) Accumulated air flow during	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc=	1 trips Type A EWMA
		which runs in a DFCO mode to achieve the required response.	monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	slow rich to lean test > 75 grams (upper threshold is 500 mvolts and lower threshold is 200 mvolts)		ECT_Sensor_FA IAT_SensorFA	FALSE for the given OR NaPOPD_b_ RapidRespo nseActive = TRUE,	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	multiple tests per trip are	

Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
				System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag	P2273 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. = False (See Supporting Tables) = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen		
				DTC's Passed	Tables tab = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
				DFCO mode is	continued		
P013D		the threshold.	OR	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip Note: if NaPOPD_b_ ResetEastRe	1 trips Type A EWMA
		The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	2) Accumulated air now during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)		ECT_Sensor_FA IAT_SensorFA	spFunc= FALSE for the given Eval Book OR NaPOPD_b_ RapidRespo nseActive = TRUE,	
				System Voltage	10.0 volts < system voltage< 32.0 volts = Valid	per trip are	
	Code	Code Description P013D This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich	Code Description Criteria P013D This DTC determines if the post catalyst 02 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich The EWMA of the Post 02 sensor normalized integral value is greater than the threshold. OR OR	Code Description Criteria Value P013D This DTC determines if the post catalyst Q2 sensor host catalyst Q2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich runsition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich The EWMA of the Post Q2 sensor normalized integral value is greater than the threshold. 1) B1S2 EWMA normalized integral value > 8.2 units QR QR QR 2) Accumulated air flow during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper thresholds) is greater than the	Code Description" Criteria Value Parameteris 2013 This DTC determines if the proof medices an inclusive test deliver of AF fraits to Rich voltages range during Lean to Rich transition. The degroup during the Store Response deliver of AF fraits to Rich voltages range during Lean to Rich transition. The degroup during the Store Response deliver of AF fraits to Rich voltages range during Lean to Rich transition. The degroup during the Store Response deliver of AF fraits to Rich voltages range during Lean to Rich transition. The degroup during the Store Response deliver of AF fraits to Rich voltages range during Lean to Rich transition. The degroup during the Store Response deliver of AF fraits to ariflow threshold. The EWMA of the Post O2 sensor monitored Integral value is greater than the threshold. 1) B1S2 EWMA normalized integral value is 82 units OR No Active DTC's No Active DTC's Post fuel cell 01 Post transition. The degroup during the Store Response deliver of AF fraits to ariflow threshold. OR 1) B1S2 EWMA normalized integral value is 82 units OR No Active DTC's Post fuel cell integral value is 820 monots and proof threshold is 850 monots) No Active DTC's proof threshold is 850 monots)	Code Description Criteria Value Parameters Conditions Code Description Criteria Value Parameters Conditions System Visings System Visings System Visings System Visings System Visings Learned heater resistance - Valid Conditions Februaries Avaid System Visings Code Data Februaries Avaid System Visings Value Learned heater resistance - Valid Code februaries System Visings System Visings System Visings Low Fuel Condition Dispectification Code februaries System Visings System Visings System Visings Dispectification This DTC determines if the post catalysic 2 sensor fras The EVMA of the Post O2 sensor The EVMA of the Post O2 sensor The DTC determines if the interbold. The Code sensor fras The EVMA of the Post O2 sensor Stow Reporting 1 and the about on Richard Post O2 sensor The EVMA of the Post O2 sensor The EVMA of the Post O2 sensor The Code sensor fras Stow Reporting 1 and Stow Reporting 1 and the first Avaid 1 and post Resource and p	Code Description*** Criteria Value Parametria Conditions Required Disb Production*** Disb Production************************************

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value			Required	illum.
Component/ System	Code	Monitor Strategy Description	Criteria Post O2 sensor cannot go below the threshold voltage.	Threshold Value 1) Post O2S signal > 500 mvolts AND 2) Accumulated air flow during stuck rich test > 78 grams.	Parameters Green Cat System Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed	Conditions is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.) = False (See Supporting Tables) = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab = P013E (and P014A (if applicable)) = P2013F (and P014A (if applicable)) = P2013F (and P014B (if applicable)) = P2013F (and P014B (if applicable)) = P2013F (and P014B (if applicable)) ons are met: continued. 0.95 <= EQR <= 1.10	Required	MIL illum. 2 trips Type B
					B1S2 Failed this key cycle System Voltage Learned heater resistance	MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FugineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts	per trip are	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell	 Not Valid Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. False (See Supporting Tables) Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab P2270 and P2272 (if applicable) \$ 8 cylinders ons are met: 		
					(wo driver initiated			
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	 Post O2S signal < 350 mvolts AND Accumulated air flow during lean to rich test > 1100 grams. 		TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA	Frequency: Once per trip NaPOPD_b_ ResetFastRe spFunc= FALSE for the given CR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	MAP_SensorFA AIR System FA FuelInipectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Parameter's Green Cat System Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed	Conditions is Not Valid, System is not valid until accumulated airflow is greater than 720000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.) = False (See Supporting Tables) = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tahles tah = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
						= P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable)) ≥ 0 cylinders		
					After above condition Fuel Enrich mode			
					During test: Fuel EQR must stay			
					between:	0.95 <= EQR <= 1.10		
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	590 failures out of 740 samples.	2 trips Type B
					System Voltage	MAF_SensorFA EthanolCompositionSensor_FA 10.0 volts < system voltage < 32.0 volts	Minimum of 0 delta TPS changes required to renort fail Delta TPS is incremented when the TPS % change >= 0.0 %	
					Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time	= Wamed Up	100msec loop Frequency: Once per trip for post sensors	
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's System Voltage	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts	8 failures out of 10 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		nnoagn moʻrishisi shoam		ampo	Heater Warm-up delay		Frequency: 1 tests per trip 5 seconds delay between tests and 1	
					B1S2 O2S Heater Duty Cycle O2S Heater device control		second execution	
					All of the abov	e met for	1	
						> 120 seconds	1	
O2 Sensor Delayed Response Rich to		This DTC determines if the post catalyst O2 sensor has	Post O2 sensor cannot go below the threshold voltage.	1) Post O2S signal > 500 mvolts	No Active DTC's		Frequency: Once per trip	2 trips Type B
Lean Bank 2 Sensor 2		an initial delayed response	AND	AND		TPS_ThrottleAuthorityDefaulted	Note: if	D
		to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the	The Accumulated mass air flow monitored during the Delayed Response	2) Accumulated air flow during stuck rich test > 78 grams.			NaPOPD_b_ ResetFastRe spFunc= FALSE for	
		required response.	Test is greater than the threshold.			ECT_Sensor_FA IAT_SensorFA	the given	
							RapidRespo nseActive = TRUE, multiple tests	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014B, P2272 or	per trip are	
					B2S2 Failed this key cycle			
					System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	volts = Valid		
					Low Fuel Condition Diag	Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab.		
						(See Supporting Tables) = Enabled. See definition of		
						Multiple DTC Use - Block learn cells to enable Post oxygen		
					DTC's Passed	sensor tests in Supporting Tables tab = P2270 and P2272 (if applicable)		
					Number of fueled cylinders			
					After above conditi		1	
I	I	I	I	1	DFCO mode is	entered	I	I I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Cinteria	Value	(wo driver initiated		Required	indin.
					(
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response	 Post O2S signal < 350 mvolts AND Accumulated air flow during lean to rich test > 1100 grams. 	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for	2 trips Type B
		ratio to achieve the required rich threshold.	Test is greater than the threshold.			ECT_Sensor_FA IAT_SensorFA	the given OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanoICompositionSensor_FA P013C, P013D, P014A, P2272 or	per trip are	
					Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab.		
						is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)		
						(See Supporting Tables) = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting		
						Tables tab = P2270 (and P2272 (if applicable)) = P013E (and P014A (if		
						applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if		
					DICs Passed Number of fueled cylinders	applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above condition Fuel Enrich mode During test: Fuel EQR must stay between:			
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 40 mvolts	AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition	<pre>= Not active = Not active = Not active 10.0 volts < system voltage< 32.0 volts = Not active = Not active = Not active = Not active = False (See Supporting Tables) 0.9922 ≤ equiv. ratio ≤ 1.0137 3 % <= Throttle <= 70 % = Closed Loop = TRUE</pre>	285 failures out of 350 samoles Frequency: Continuous in 100 milli second loop	2 trips Type B
					All of the above			
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	 > 5.0 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA 	100 failures out of 125 samoles 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.
					AIR intrusive test			
					Fuel intrusive test			
					Idle intrusive test			
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control Low Fuel Condition Diag	= Not active		
					·	= False (See Supporting Tables)		
					Equivalence Ratio	$0.9922 \le \text{equiv. ratio} \le 1.0137$		
						0.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders			
					Fuel State	DFCO not active Ethanol <= 87%		
					All of the above		1	
						> 2 seconds		
O2S Slow	P0153	This DTC determines if the	The average response time is caluclated	Refer to "P0153 - O2S Slow	No Active DTC's		Sample time	2 trips Type
Response Bank 2 Sensor 1		O2 sensor response time is degraded.	over the test time, and compared to the threshold.	Response Bank 2 Sensor 1" Pass/Fail Threshold table in the Supporting Tables tab.		TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA	is 60 seconds	В
			Or	S/T L/R switches < 3, or S/T R/L switches < 3		ECT_Sensor_FA AmbientAirDefault MAF_SensorFA	Frequency: Once per trip	
				The test averages the signal		EvapPurgeSolenoidCircuit_FA		
				response time over 60.0 seconds when the signal is transitioning		EvapFlowDuringNonPurge_FA		
				between 600 mvolts and 300 mvolts. An average rich to lean and lean to rich time are each		EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA		
				calculated separately		FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
						EthanolCompositionSensor_FA		
1						EngineMisfireDetected_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Bank 2 Sensor 1 DTC's not active System Voltage			
					EGR Device Control	= Not active		
					Idle Device Control			
					Fuel Device Control AIR Device Control Low Fuel Condition Diag	= Not active		
					Green O2S Condition	= False (See Supporting Tables)		
					O2 Heater on for	 Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S1, B2S1) in Supporting Tables tab. >= 40 seconds 		
					Learned Htr resistance Engine Coolant IAT			
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change Purge duty cycle Engine airflow	> 0.0 seconds >= 0 % duty cycle 20 gps <= engine airflow <= 85 gps		
					Fuel	1200 <= RPM <= 3000 < 87 % Ethanol > 70 kpa		
					Fuel Control State	·		
					Closed Loop Active LTM (Block Learn) fuel cell	= TRUE = Enabled. See definition of Multiple DTC Use - Response Cell Enable Table in Supporting Tables tab.		
					Transient Fuel Mass Baro	<= 100.0 mgrams = Not Defaulted		
					Fuel Control State Fuel State	not = Power Enrichment DFCO not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Commanded Proportional Gain	>= 0.0 %		
					All of the above	e met for	1 1	
					Time	> 3.5 seconds	Ī	
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts		TPS_ThrottleAuthorityDefaulted MAF_SensorFA	400 failures out of 500 samples.	2 trips Type B
					System Voltage	EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts	Minimum of 0 delta TPS changes required to renort fail Delta TPS is incremented when the TPS % change >=	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	Frequency: Continuous	
					Predicted Exhaust Temp (by location)	-	100msec	
					Engine Run Time Fuel	> 300 seconds <= 87 % Ethanol	loop	
O2S Heater	P0155	This DTC determines if the	Measured Heater Current.	Measured Heater current < 0.3	No Active DTC's		8 failures out	2 trips Type
Performance Bank 2 Sensor 1		O2 sensor heater is functioning properly by		amps -OR-		ECT_Sensor_FA	of 10 samples	В
2 3611501 1		monitoring the current		Measured Heater current > 3.1	System Voltage	10.0 volts < system voltage< 32.0	Samples	
		through the heater circuit.		amps		volts	Frequency:	
					Heater Warm-up delay	= Complete	1 tests per trip	
							5 seconds delay	
							between tests and 1	
					B2S1 O2S Heater Duty Cycle	> 7070	second execution	
					O2S Heater Duty Cycle		roto	
					All of the above Time	> 120 seconds	4	
O2S Circuit Low	P0157	This DTC determines if the	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50	No Active DTC's	TPS_ThrottleAuthorityDefaulted	320 failures	2 trips Type
Voltage Bank 2	1 5157	O2 sensor circuit is shorted		mvolts	No Active DTC 3		out of 400	B
Sensor 2		to low.				MAP_SensorFA	samples	
						AIR System FA	Frequency: Continuous	
						Ethanol Composition Sensor FA	in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA		
1	I	I	1	I	1		1 1	I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test System Voltage	= Not active 10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control Low Fuel Condition Diag			
					Low Fact Contaition Didg	= False (See Supporting Tables)		
						0.9922 ≤ equiv. ratio ≤ 1.0137 3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
						Enabled (On) Ethanol <= 87% DFCO not active		
					All of the abov		1	
						> 5.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA	100 failures out of 125 samples Frequency: Continuous	2 trips Type B
						EvapPurgeSolenoidCircuit_FA	in 100 milli - second loop	
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA		
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Reguired	MIL illum.
Component/ System	Fault Code	Monitor Strategy Description		Threshold Value	Parameters AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	Conditions = Not active = False (See Supporting Tables) 0.9922 ≤ equiv. ratio ≤ 1.0137	Time Required	
					Closed Loop Active All Fuel Injectors for active Cylinders Fuel State Fuel Condition All of the abov	3.0 % <= Throttle <= 70.0 % = Closed Loop not = Power Enrichment = TRUE Enabled (On) DFCO not active Ethanol <= 87% e met for		
					Time	> 2 seconds		
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is above]	> 0.45 EWMA (sec) ≥ 1.80 Seconds > 550 mvolts			Frequency: Once per trip NateSPD_b FastInitRespl sActive = TRUE for the given Fuel Bank OR NateSPD_b_ RapidRespo nselsActive = TRUE,	1 trips Type A EWMA

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Fuel Device Control AIR Device Control			
					Low Fuel Condition Diag			
						(See Supporting Tables)		
					Green O2S Condition	= Not Valid, See definition of Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S1,		
						B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance			
					Engine Coolant			
						> -40 °C		
					Engine run Accum	> 120 seconds		
					Engine Speed to initially enable test	1100 ≤ RPM ≤ 2500		l
					Engine Speed range to keep test enabled			
					(after initially enabled)			
					Engine Airflow	$3 \ge \text{gps} \le 20$		
					Vehicle Speed to initially enable test			
					Vehicle Speed range to keep test			
					enabled (after initially enabled)			
						36.0 ≤ MPH ≤ 87.0 mph		
					Closed loop integral Closed Loop Active	0.74 ≤ C/L Int ≤ 1.08		
						not in control of purge		
					Ethano	not in estimate mode		
					Post fuel cell	= Enabled. See definition of		
						Multiple DTC Use - Block learn cells to enable Post oxygen		
						sensor tests in Supporting		
						Tahles tah		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time Predicted Catalyst temp			
					Tredicted Oddalyst temp	550 ≤ °C ≤ 900		
					Fuel State	= DFCO possible		
						<u> </u>		
					All of the above met for at least 2.0 second			
					Pre O2S voltage B1S1 at end of Cat Rich			
						≥ 690 mvolts		
					Fuel State Number of fueled cylinders	= DFCO active		
					After above conditions are	e met: DFCO Mode	1	
					entered (wo driver initia			
O2 Sensor Delayed	P015B	This DTC determines if the	The EWMA of the Pre O2 sensor		No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency:	1 trips Type
Response Lean to		pre catalyst O2 sensor has	normalized L2R time delay value			MAP_SensorFA IAT_SensorFA	Once per trip	A
Rich Bank 1 Sensor 1		an initial delayed response to an A/F change from Lean	OR	> 0.48 EWMA (sec)		ECT Sensor FA	Note: if NaESPD_b_	EWMA
Sensor I		to Rich. The diagnostic is an	UR			AmbientAirDefault	RaeSPD_b_ FastInitRespl	
		intrusive test which runs in	[The Accumulated time monitored during			MAF_SensorFA	sActive =	
		an enriched fuel mode to	the L2R Delayed Response Test (Gross			EvapPurgeSolenoidCircuit_FA	TRUE for the	
	1	achieve the required	failura	I	I.		airea Erral	l i

Component/ System	Fault Code	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Jystein	COULE	Description achieve the required response.	railure).	value	r arailleters		given Fuer Bank OR	inulli.
		response.	AND	≥ 2.00 Seconds		EvapFlowDuringNonPurge_FA	NaESPD_b_	
			Pre O2 sensor voltage is below]			EvapVentSolenoidCircuit_FA EvapSmallLeak_FA	RapidRespo nselsActive =	
						EvapEmissionSystem_FA	TRUE,	
			OR	< 350 mvolts		FuelTankPressureSnsrCkt_FA	multiple tests per trip are	
			At end of Cat Rich stage the Pre O2			FuelInjectorCircuit_FA AIR System FA	allowed	
			sensor output is			FuelTrimSystemB1_FA FuelTrimSystemB2_FA		
				< 690 mvolts		EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA P0131		
						P0132 P0134		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Contro	I = Not active		
					Idle Device Control	= Not active		
					Fuel Device Contro	= Not active		
					AIR Device Contro Low Fuel Condition Diac			
					Low Fuel Condition Diag	= False		
					Green O2S Conditior	(See Supporting Tables)		
						= Not Valid, See definition of		
						Multiple DTC Use_Green Sensor Delay Criteria (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	r≥ 40 seconds		
					Learned Htr resistance			
						> -40 °C		
					Fuel State	e = DFCO inhibit		
					Number of fueled cylinders	≥ 2 cylinders		
					When above condit Fuel Enrich mode ente		1	
							1	
					During test: Engine Airflow must stay			
					between	:5 ≤ gps ≤ 20		
					and the delta Engine Airflow over	r		
					12.5msec must be		4	
O2 Sensor Delayed	P015C	This DTC determines if the	The EWMA of the Pre O2 sensor		No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency:	1 trips Type
Response Rich to Lean Bank 2		pre catalyst O2 sensor has an initial delayed response	normalized R2L time delay value	> 0.45 EWMA (sec)		MAP_SensorFA IAT_SensorFA	Once per trip Note: if	A EWMA
Sensor 1		to an A/F change from Rich	OR			ECT_Sensor_FA AmbientAirDefault	NaESPD_b_	
		to Lean. The diagnostic is an	IThe Accumulated time monitored during			MAF_SensorFA	FastInitRespl	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters		Required	illum.
		DFCO mode to achieve the	the R2L Delayed Response Test (Gross			EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA	TRUE for the	
		required response.	failure).			EvapVentSolenoidCircuit_FA	given Fuel	
						EvapSmallLeak_FA	Bank OR	
			AND	≥ 1.80 Seconds		EvapEmissionSystem_FA	NaESPD_b_ RapidRespo	
			Pre O2 sensor voltage is above]			FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	nselsActive =	
						AIR System FA	TRUE,	
						FuelTrimSystemB1_FA		
				> 550 mvolts		FuelTrimSystemB2_FA		
						EthanolCompositionSensor_FA EngineMisfireDetected_FA		
						P0131		
						P0132		
						P0134		
						10.0 < Volts < 32.0		
					EGR Device Control Idle Device Control			
					Fuel Device Control			
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
						(See Supporting Tables)		
					Green O2S Condition	= Not Valid, See definition of Multiple DTC Use Green		
						Sensor Delay Criteria (B1S1,		
						B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for			
					Learned Htr resistance			
					Engine Coolant	> 50 °C > -40 °C		
					Engine run Accum			
					Engine Speed to initially enable test			
						1100 ≤ RPM ≤ 2500		
					Engine Speed range to keep test enabled (after initially enabled)			
					(alter initially enabled)			
						1050 ≤ RPM ≤ 2650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 < MPH < 82.0		
					Vehicle Speed range to keep test	10.1 = 111 11 = 02.0		
					enabled (after initially enabled)			
					Closed loop integral	36.0 ≤ MPH ≤ 87.0 mph 0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
						= Enabled. See definition of		
						Multiple DTC Use - Block learn		
						cells to enable Post oxygen sensor tests in Supporting		
						Tables tab		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time Predicted Catalyst temp	≥ 80.0 sec		
					Fredicted Catalyst temp	550 ≤ °C ≤ 900		
					Fuel State	= DFCO possible		
I	l		l	l				

System	Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for at least 2.0 seco intrusive stage is	nds, and then the Force Cat Rich		
						≥ 690 mvolts = DFCO active ≤ 6 cylinders		
					After above conditions are entered (wo driver initia]	
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1	P015D	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	 > 0.48 EWMA (sec) ≥ 2.00 Seconds < 350 mvolts 	No Active DTC's No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant IAT	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134 10.0 < Volts < 32.0 = Not active = Valid	Frequency: Once per trip Note: if NaESPD_b_ FastInitRespI sActive = TRUE for the given Fuel Bank OR NaESPD_b_ RapidRespo nseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Number of fueled cylinders			
					When above condit Fuel Enrich mode ente			
					During test: Engine Airflow must stay between	, 5 ≤ gps ≤ 20		
					and the delta Engine Airflow over 12.5msec must be		-	
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	590 failures out of 740 samples.	2 trips Type B
					System Voltage	EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts	Minimum of 0 delta TPS changes required to renort fail Delta TPS is incremented when the TPS %	
					AFM Status Heater Warm-up delay	= All Cylinders active = Complete	change >= <u>n n %</u> 100msec loop	
					Predicted Exhaust Temp (by location)	= Wamed Up	Frequency: Once per trip	
					Engine Run Time Fue	> 300 seconds <= 87 % Ethanol	for post sensors	
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9	No Active DTC's System Voltage	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts	8 failures out of 10 samples	2 trips Type B
		unougn the neater circuit.		amps	Heater Warm-up delay		Frequency: 1 tests per trip 5 seconds delay between tests and 1	
					B2S2 O2S Heater Duty Cycle O2S Heater device contro		second execution	
					All of the abov	e met for	1	
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition,	The filtered long-term fuel trim metric	>= Long Term Trim Lean Table	Engine speed	 > 120 seconds 375 <rpm< 7000<="" li=""> > 70 kPa </rpm<>	Frequency: 100 ms	2 Trip(s) Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Coolant Temp	Conditions -40 <°C< 150	Required	illum.
		based on the filtered long- term and short-term fuel trim.				10 <kpa< 255<="" td=""><td>Continuous Loop</td><td></td></kpa<>	Continuous Loop	
		term and short term fuer tim.	AND		Inlet Air Temp	-20 <°C< 150	Loop	
			The filtered short-term fuel trim metric	>= 0.100		1.0 <g 510.0<="" s<="" td=""><td></td><td></td></g>		
			(NOTE: any value < 0.95 effectively		Fuel Level	> 10 % or if fuel sender is faulty		
			nullifies the short-term fuel trim criteria)			the diagnostic will bypass the fuel level criteria.		
						level ciliena.		
					Long Term Fuel Trim data accumulation:	> 27.5 seconds of data must]	
						accumulate on each trip, with at		
						least 17.5 seconds of data in the		
						current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim	Please see "Long-Term Fuel	4	
					Cells are not utilized for control and/or	Trim Cell Usage" in Supporting		
					diagnosis	Tables Tab for a list of cells		
					5	utilized for diagnosis		
						-		
					Closed Loop	Enabled		
					Long Term FT	Enabled Please see "Closed Loop		
						Enable Criteria" and "Long		
						Term FT Enable Criteria" in		
						Supporting Tables.		
					Fuel Consumed ("Virtual Flex Fuel	If > 0.3 liters of fuel are consumed		
					Sensor" applications only)	after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic		
						may disable Long Term FT for a		
						few seconds while it "learns" the		
						new ethanol concentration. (VFFS		
						apps only)		
					EGR Diag.	Intrusive Test Not Active	1	
					Catalyst Diag.	Intrusive Test Not Active		
					Post O2 Diag.	Intrusive Test Not Active		
					Device Control EVAP Diag.	Not Active "tank pull down" Not Active		
					_	-		
					No active D]	
					IAC_SystemR MAP_Sens			
					MAP_Sens	orFA		
					MAF_Sensor			
					AIR System			
					EvapPurgeSolenoi			
					EvapFlowDuringNo EvapVentSolenoio			
					EvapSmallLe			
					EvapEmissionS	/stem_FA		
					FuelTankPressureSe			
					Ethanol Compositio FuellnjectorCir			
					EngineMisfireDe			
					EGRValvePerfor	mance_FA		
					EGRValveCire			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			5.1.67 M		Manufacture MAP_EngineVa AmbientAirl O2S_Bank_1_So	cuumStatus Default		
Fuel System Too Rich Bank 1	P0172		Passive Test: The filtered Non-Purge Long Term Fuel Trim metric	<= Non Purge Rich Limit Table		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	2 Trip(s) Type B
		There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	AND The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= Purge Rich Limit Table				
			AND The filtered Non-Purge Long Term Fuel Trim metric	<= Non Purge Rich Limit Table				
			AND The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= 2.000 All of above for 3 out of 5 intrusive segments				
		condition. If the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table the test passes	Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test 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 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria	value	Parameters	Conditions	Required	iiium.
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long- term and short-term fuel trim.	The filtered long-term fuel trim metric	>= Long Term Trim Lean Table	BARO Coolant Temp MAP	375 <rpm< 7000<br="">> 70 kPa -40 <°C< 150 10 <kpa< 255<="" th=""><th>Frequency: 100 ms Continuous Loop</th><th>2 Trip(s) Type B</th></kpa<></rpm<>	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
			AND The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 0.100	MAF	-20 <°C< 150 1.0 <g 510.0<br="" s<="">> 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 27.5 seconds of data must</g>		
						accumulate on each trip, with at least 17.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	Please see "Long-Term Fuel Trim Cell Usage" in Supporting Tables Tab for a list of cells utilized for diagnosis		
					Closed Loop Long Term FT	Enabled Enabled Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.		
					Fuel Consumed ("Virtual Flex Fuel Sensor" applications only)	If > 0.3 liters of fuel are consumed after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic may disable Long Term FT for a few seconds while it "learns" the new ethanol concentration. (VFFS apps only)		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active "tank pull down" Not Active		
					No active E IAC_SystemR MAP_Sens MAF_Sensor MAF_Sensor AIR System	PM_FA orFA orFA TFTKO		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					EvapPurgeSolenoi EvapFlowDuringNe EvapVentSolenoi EvapSmallLe EvapEmissionSy FuelTankPressureSe Ethanol Compositic FuelInjectorCit EngineMisfireDe EGRValvePerfor EGRValvePerfor EGRValvePerfor MAP_EngineVac AmbientAirD O2S_Bank_2_Se	onPurge_FA JCircuit_FA ak_FA sstem_FA nsorCircuit_FA n Sensor FA cuit_FA tected_FA mance_FA suit_FA uumStatus efault		
Fuel System Too	P0175	Determines if the fuel control	Passive Test: The filtered Non-Purge	<= Non Purge Rich Limit Table		Secondary Parameters and	Frequency:	2 Trip(s)
Rich Bank 2	F0175		Long Term Fuel Trim metric			Enable Conditions are identical to those for P0174, with the exception that fuel level is not	100 ms Continuous Loop	Type B
		There are two methods to	AND			considered.		
		determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge	The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
		is enabled. The Intrusive test is described below:						
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= Purge Rich Limit Table				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= Non Purge Rich Limit Table				
			AND	0.000				
			The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= 2.000 All of above for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge	Segment Def'n: Segments can last up to 30 seconds and					
		Long Term fuel trim metric is	are separated by the lesser of 20					
			seconds of purge-on time or enough time to purge 16 grams of vapor.					
		vapor is the cause of the rich	A maximum of 5 completed segments or					
		condition. If the filtered Purge-on Long	20 attempts are allowed for each intrusive test.					
		Term fuel trim > Purge Rich Limit Table the test passes	After an intrusive test report is completed,					
			another intrusive test report is completed,					
		Non-Purge Long Term fuel	300 seconds to allow sufficient time to					
		trim metric.	purge excess vapors from the canister. During this period, fuel trim will pass if					
		· • • • • • • • • • • • • • • • • • • •	the filtered Purge-on Long Term fuel trim					
1		too frequently may also	> Purge Rich Limit Table for at least 200 seconds indicating that the canister has					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		emissions, and the execution frequency of other diagnostics.	booorido, indioduing that the ournotor had					
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.		< 45 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	1 trip(s) Type A
Fuel Composition Sensor Circuit High	P0179	Detects Out of Range High Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.		> 155 Hertz <= 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	1 trip(s) Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1	P0201	This DTC checks the circuit	The ECM detects that the commanded	Value	Powertrain Relay Voltage within range	11 volts ≤ Voltage ≤ 32 volts	20 failures	2 trips Type
injector i	P0201	for electrical integrity during operation.	state of the driver and the actual state of the control ciruit do not match		and stable according to Enable Conditions	greater than 5 seconds	out of 25 samples 250 ms	B
					Engine Running		/sample	
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 5 seconds	20 failures out of 25 samples 250 ms /sample	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 5 seconds	20 failures out of 25 samples 250 ms /sample	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 5 seconds	20 failures out of 25 samples 250 ms /sample	2 trips Type B
Injector 5	P0205	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	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms	2 trips Type B
					Engine Running		/sample	
Injector 6	P0206	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	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms	2 trips Type B
					Engine Running		/sample	
Injector 7	P0207	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	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms	2 trips Type B
					Engine Running		/sample	
Injector 8	P0208	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	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms	2 trips Type B
					Engine Running		/sample	
TPS2 Circuit	P0220	Detects a continuous or intermittent short or open in TPS2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS2 Voltage < or Secondary TPS2 Voltage >			Run/crank voltage or Powertrain relay voltage > 6.00 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	Trips: 1 Type: A MIL: YES
						No 5 V reference #2 error	secondary processor	
						No 5 V reference #2 DTC (P0651)		
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit on both	Primary TPS2 Voltage <	0.25		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	79 / 159 counts; 57 counts	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		processors or just the primary processor				be reported for all conditions	continuous; 3.125 ms /count in the primary	A MIL: YES
			Secondary TPS2 Voltage <	0.25		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS2 Voltage >	4.59		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples	2 trips Type B
					Engine Speed	≥ 0 RPM	250 ms /sample Continuous	
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder	Deceleration index vs. Engine Speed Vs	(>Idle SCD AND > Idle SCD ddt Tables)	Engine Run Time	> 2 crankshaft revolutions	Emission Exceedence	2 Trips
Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected	P0301 P0302	specific misfire is occurring by monitoring crankshaft velocity	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	OR (>SCD Delta AND > SCD Delta ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	ECT If ECT at startup	-7 °C < ECT < 130 °C < -7 °C	= any (5) failed 200 rev blocks out of (16) 200 rev block tests	Type B (Mil Flashes with Catalyst Damaging Misfire)
Cylinder 3 Misfire Detected	P0303		speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	OR (>Cyl Mode AND > Cyl Mode ddt Tables) OR			Failure reported for (1)	
Cylinder 4 Misfire Detected	P0304		uotano.	OR (>Rev Mode Table) OR (> AFM Table in Cyl Deact mode)	ECT System Voltage	21 ºC < ECT < 130 ºC 9.00 <volts< 32.00<="" td=""><td>Exceedence in 1st (16) 200 rev block</td><td></td></volts<>	Exceedence in 1st (16) 200 rev block	
Cylinder 5 Misfire Detected	P0305				- Throttle delta - Throttle delta	< 75.00 % per 25 ms < 75.00 % per 25 ms	tests, or (4) Exceedences thereafter.	
Cylinder 6 Misfire Detected	P0306						any Catalyst Exceedence	
Cylinder 7 Misfire	P0307						= (1) 200 rev block as data	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cylinder 8 Misfire Detected	P0308						supports for catalyst damage.	
			Misfire Percent Emission Failure Threshold	≥ 0.81 % P0300 ≥ 0.81 % emission			Failure reported with (1 or 3) Exceedences	
			Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts		in FTP, or (1) Exceedence outside FTP.	
				(at low speed/loads, one cylinder may not cause cat damage)				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400	Continuous 4 cycle delay	
						Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 5000 rpm		
				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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						If Monitor Rough Road=1 and RoughRoadSource="TOSS"		
						Trans_Gear_Defaulted(TCM) (Auto Trans only) Clutch Sensor FA (Manual Trans only) Trans_Gear_Defaulted(TCM) (Auto Trans only)		
					P0315 & engine speed	> 1000 rpm		
					Low Fuel Condition Diag	= TRUE (See Supporting Tables)	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 (area) Veh Speed	≤ 0 % > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Tanan		4 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 95.00 %	7 cycle delay	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Driveline Ring Filter active	Conditions	Required	illum.
					After a low level misfire, another misfire			
					may not be detectable until driveline			
					ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:			
					Stop filter early:			
						4 engine cycles after misfire 3 Engine cycles after misfire		
						S Engine cycles alter misine		
					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 %		
						> 950 rpm		
						> 3 mph		
						= 4 consecutive cyls		
						= 4 consecutive cyls		
						= 4 consecutive cyls		
					Rough Road Section:			
					Monitor Rough Road	1 (1=Yes)		
					RoughRoadSource	FromABS		
					IF Rough Road is monitored, then ONE of			
					the following Rough Road Sources will be			
					used:			
					Rough Road Source = "TOSS"			
					Rough Road			
					Ĵ			
						detected		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Gitteria	Value	Rough Road Source = "WheelSpeedInECM"	conditions	Required	mum.
					ABS/TCS system			
					RoughRoad	*: ·		
					VSES			
						detected		
					Rough Road Source = "FromABS"			
					ABS/TCS system			
					RoughRoad			
					VSES			
						detected		
Crankshaft Position	P0315	Monitor for valid crankshaft	Sum of Compensation factors	≥ 4.0040	OBD Manufacturer Enable Counter	0	0.50 seconds	
System Variation Not Learned		error compensation factors		OR ≤ 3.9960	-		Frequency Continuous 100 msec	Туре А
Knock Sensor (KS) Module Performance		This diagnostic will detect a failed internal ECM component associated with	Any Cylinder's Avg Gain Signal	> 4.50 Volts	Engine Speed Cylinder Air Mass	≥ 400 RPM > 50 milligrams	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
i chomanec		knock control			No Active DTC's	KS_Ckt_Perf_B1B2_FA	00 Gampica	11103. 2
			or All Cylinder's Raw Signals	≤ 0.20 Volts	Engine Speed	≥ 400 RPM	100 msec rate	
					Cylinder Air Mass	> 50 milligrams		
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor	Gated Low Pass Filter Voltage	> 4.0 Volts or	Diagnostic Enabled (1 = Enabled)	= 1	50 Failures out of	Type: B MIL: YES
		circuit		< 1.24 Volts	Engine Speed ECT	≥ 400 RPM ≥ -40 deg. C	63 Samples	Trips: 2
					Enginer Run Time	≥ 2 seconds	100 msec rate	
					Power Take Off	= Not Active		
14 L Q (167)	D 0007						04.5."	
Knock Sensor (KS) Performance Bank	P0326	overactive knock sensor	Knock Fast Retard (spark degrees)	> (FastRtdMax + 2.5) degrees spark	Diagnostic Enabled (1 = Enabled)	= 1	31 Failures out of	Type: B MIL: YES
1		caused by excessive knock or noisy engine components		See Supporting Tables for	Knock Detection Enabled	> 0	63 Samples	Trips: 2
				FastRtdMax		Knock Detection Enabled is calculated by multiplying the	100 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		2000, provi				following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)		
					Engine Speed MAP	≥ 400 RPM ≥ 10 kPa		
					Power Take Off	= Not Active		
nock Sensor (KS) ircuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line or	> 2.86 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
			Sensor Return Signal Line	< 1.48 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec	
					<u>If Yes:</u> Engine Oil Temp	< 256 deg. C	rate	
					and ValidOilTemp Model	EngOilModeledTemp Valid		
					or No OilTemp Sensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
nock Sensor (KS) Fircuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	< 2.02 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
			Sensor Return Signal Line	> 3.76 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec	11100.2
					<u>If Yes:</u> Engine Oil Temp	< 256 deg. C	rate	
					and ValidOilTemp Model	EngOilModeledTemp Valid		
					or No OilTempSensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
nock Sensor (KS) Fircuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed	= 1 ≥ 400 RPM	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					ECT ECT Enginer Run Time	≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds	100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Ginena	Value	Power Take Off	= Not Active	Kequireu	inum.
nock Sensor (KS)	P0332	This diagnostic checks for an			ECT	≥ -40 deg. C	50 Failures	Type: B
Circuit Low Bank 2		out of range low knock sensor signal	Sensor Input Signal Line	> 2.86 Volts	Enginer Run Time	≥ 2 seconds	out of 63 Samples	MIL: YES Trips: 2
			Sensor Return Signal Line	< 1.48 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec	
					<u>If Yes:</u> Engine Oil Temp	< 256 deg. C	rate	
					and ValidOilTemp Model	EngOilModeledTemp Valid		
					or No OilTempSensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
nock Sensor (KS)	P0333	This diagnostic checks for an			ECT	≥ -40 deg. C	50 Failures	Type: B
Circuit High Bank 2		out of range high knock sensor signal	Sensor Input Signal Line	< 2.02 Volts	Engine Run Time	≥ 2 seconds	out of 63 Samples	MIL: YES Trips: 2
		Sensor Return Signal Line	> 3.76 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec		
					<u>If Yes:</u> Engine Oil Temp	< 256 deg. C	rate	
					and ValidOilTemp Model	EngOilModeledTemp Valid		
					or No OilTempSensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
rankshaft Position CKP) Sensor A tircuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test:		Engine-Cranking Crankshaft Test:		Engine- Cranking Crankshaft	Type B 2 trips
ncuit		Sensor signal			Starter engaged		Test: Continuous every 100	
			Time since last crankshaft position sensor pulse received	>= 4.0 seconds	AND (cam pulses being received		msec	
					OR (DTC P0101	= FALSE		
					AND DTC P0102	= FALSE		
					AND DTC P0103 AND Engine Air Flow	= FALSE > 3.0 grams/second))		
			Time-Based Crankshaft Test:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running		Crankshaft Test: Continuous every 12.5	
					Starter is not engaged		msec	
					No DTC Active:	5VoltReferenceB FA		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			No crankshaft pulses received		Engine is Running OR		2 failures out of 10	
					Starter is engaged		samples	
					No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	One sample per engine revolution	
Crankshaft Position CKP) Sensor A	P0336	Determines if a performance fault exists with the crank	Crank Re-synchronization Test:		Crank Re-synchronization Test:		Crank Re- synchronizati	Type B 2 trips
Performance		position sensor signal	Time in which 25 or more crank re- synchronizations occur		Engine Air Flow Cam-based engine speed	>= 3.0 grams/second > 450 RPM	on Test: Continuous every 250	
				< 20.0 seconds	No DTC Active:	5VoltReferenceB FA P0335	msec	
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		<u>Time-Based</u> Crankshaft	
			No crankshaft synchronization gap found		Engine is Running		Test: Continuous every 12.5	
				>= 0.4 seconds	Starter is not engaged		msec	
					No DTC Active:	5VoltReferenceB FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged		Continuous every 100	
			accounty channel are cynol non Laton gap		AND (cam pulses being received		msec	
					OR (DTC P0101	= FALSE		
					AND DTC P0102	= FALSE		
					AND DTC P0103 AND	= FALSE		
					Engine Air Flow	> 3.0 grams/second))		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		<u>Event-Based</u> Crankshaft Test:	
			Crank Pulses received in one engine	- 51 cocondo	Engine is Running		8 failures out of 10	
			revolution OR	< 51 seconds	OR Starter is engaged		samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Crank Pulses received in one engine revolution	> 65 seconds	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	One sample per engine revolution	mum.
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:		Engine Cranking Camshaft Test: Starter engaged		<u>Engine</u> <u>Cranking</u> Camshaft Continuous	Type B 2 trips
			Time since last camshaft position sensor pulse received OR	>= 5.5 seconds	AND (cam pulses being received		every 100 msec	
			Time that starter has been engaged		OR (DTC P0101	= FALSE		
			without a camshaft sensor pulse	>= 4.0 seconds	AND DTC P0102	= FALSE		
					AND DTC P0103 AND Engine Air Flow	= FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft	
			Fewer than 4 camshaft pulses received in		Engine is Running		Test: Continuous every 100	
			a time	> 3.0 seconds	Starter is not engaged		msec	
			Fast Event-Based Camshaft Test:		No DTC Active: Fast Event-Based Camshaft Test:	5VoltReferenceA FA	Fast Event-	
			No camshaft pulses received during first 24 MEDRES events		Crankshaft is synchronized		Based Camshaft Continuous every	
			(There are 24 MEDRES events per engine cycle)		Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		every MEDRES event	
					No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		<u>Slow Event-</u> <u>Based</u> Camshaft	
					Crankshaft is synchronized		8 failures out of 10 samples	
			The number of camshaft pulses received during 100 engine cycles	= 0	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A	Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Evcle Fast Event- Based Camshaft	Type B 2 trips
1 Sensor A		signal	The number of camshaft pulses received during first 24 MEDRES events is less		Crankshaft is synchronized		Camsnaft Continuous every	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			than 2 or greater than 8		Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		MEDRES event	
			(There are 24 MEDRES events per engine cycle)		No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		<u>Slow Event-</u> <u>Based</u> Camshaft	
			The number of camshaft pulses received		Crankshaft is synchronized		8 failures out of 10 samples	
			during 100 engine cycles OR	< 398 > 402	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Continuous every engine cvcle	
GNITION CONTROL #1 CIRCUIT		This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6	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	> 5.00 Volts	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
		with waste spark)					100 msec rate	
GNITION CONTROL #2 CIRCUIT		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	> 5.00 Volts	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
		(Cylinders 2 and 5 for V6 with waste spark)					100 msec rate	
GNITION CONTROL #3 CIRCUIT		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	> 5.00 Volts	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
		(Cylinders 3 and 6 for V6 with waste spark)					100 msec rate	
GNITION CONTROL #4	P0354	This diagnostic checks the circuit for electrical integrity during expertise. Manitore	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	> 5.00 Volts	50 Failures out of	Type: B MIL: YES
CUIT		during operation. Monitors EST for Cylinder 4 (if applicable)	une control circuit do not match.				63 Samples	Trips: 2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
							100 msec rate	
IGNITION	P0356	This diagnostic checks the	The ECM detects that the commanded		Engine running		50 Failures	Type: B
CONTROL #6 CIRCUIT	1 0000	circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	state of the driver and the actual state of the control circuit do not match.		Ignition Voltage	> 5.00 Volts	out of 63 Samples	MIL: YES Trips: 2
							100 msec rate	
IGNITION	P0357	This diagnostic checks the	The ECM detects that the commanded		Engine running		50 Failures	Type: B
CONTROL #7 CIRCUIT		circuit for electrical integrity during operation. Monitors EST for Cylinder 7 (if applicable)	state of the driver and the actual state of the control circuit do not match.		Ignition Voltage	> 5.00 Volts	out of 63 Samples	MIL: YES Trips: 2
							100 msec rate	
IGNITION	P0358	This diagnostic checks the	The ECM detects that the commanded		Engine running		50 Failures	Type: B
CONTROL #8 CIRCUIT		circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if	state of the driver and the actual state of the control circuit do not match.		Ignition Voltage	> 5.00 Volts	out of 63 Samples	MIL: YES Trips: 2
		applicable)					100 msec rate	
Catalyst System	P0420	Oxygen Storage	Normalized Ratio OSC Value	< 0.350			1 test	Type A
Low Efficiency Bank 1	1 0 120		(EWMA filtered)		Valid Idle Perio	d Criteria	attempted per valid idle period	1 Trip(s)
	-		ins Cerium Oxide. Cerium Oxide reacts		Throttle Position		penod	
			A/F excursions to store the excess oxygen ng rich A/F excursions, Cerium Oxide		Vehicle Speed Engine speed	I < 1.24 MPH > 1300 RPM for a minimum of 20	Minimum of 1	I
			ease this stored oxygen (I.e. Cerium			seconds since end of last idle	test per trip	
			to as the Oxygen Storage Capacity, or			period.	Maximum of	
		through forced Lean and Rick	o "measure" the OSC of the catalyst h A/F excursions.		Engine run time	≥ MinimumEngineRunTime - See Supporting Tables. This is	8 tests per trip	
		1. Raw OSC Calculation = (p	e Calculation Information and Definitions = ost cat O2 Resp time - pre cat O2 Resp			a function of Coolant Temperature.	Frequency: Fueling	
		time) 2. BestFailing OSC value from exhaust gas flow)	m a calibration table (based on temp and		Tests attempted this trip	255	Related : 12.5 ms	
			(based on temp and exhaust gas flow) a = (1-2) / (3-2)		The catalyst diagnostic has not yet	completed for the current trip.	OSC Measuremen	1
		A Normalized Ratio of 1 esse	entially represents a good part and a ratio		Catalyst Idle Conditio		ts: 100 ms	
		of 0 essentially represents a			General Enable r		Temp	
	I	I		I	Valid Idle Period	Uniteria met	Dradiction:	I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green Converter Delay	Not Active	frediction.	
					Induction Air Intrusive test(s):	-20 < ° C < 250		
					Fueltrim			
					Post O2			
					EVAP			
					RunCrank Voltage			
					Ethanol Estimation	NOT in Progress		
			st is done during idle. Several conditions			40 < ° C < 129		
		must be meet in order to exe related values are listed in	cute this test. These conditions and their the secondary parameters area of this		Barometric Pressure	> 70 KPA		
			document.		Idle Time before going intrusive is			
						< 50 Seconds		
					Idle time is incremented if Vehicle speed			
						position < 2.00 % as identified in the Valid Idle Period Criteria		
						section.		
					Short Term Fuel Trim			
					Predicted catalyst temp > MinCatTemp	0.90 < ST FT < 1.10 table (deaC) (refer to "Supporting		
					Tables" tables			
					Engine Airflow > MinAirflowToWarmCatal			
					Tables" tables t			
					0.)			
					for at least 30 seconds with a close			
					consecutively (closed throttle considerat value as stated in the Valid Idle			
					Also, in order to increment the Warmed	HIPEvonto countor (countor must		
					exceed 30 cal value), either the vehicle			
					speed cal or the TPS must exceed the			
					Period Criteria sec	ction above.		
					Closed loop fueli	ng Enabled		
						-		
					Please see "Closed Loop Enable Crite Tables" tab fo			
					PRNDI	L		
					is in Drive Range on an Auto	Transmission vehicle.		
					Idle Stable Criteria :: Must hold true fro			
					Met to the end	d of test		
							-	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
C y c t c m		Decemption						
						4.00 < g/s < 20.00		
					Predicted catalyst temperature			
						< 800 degC		
					Engine Fueling Criteria at Be			
					The following fueling related must also	o be met from between 4 and 7		
					seconds after the Catalyst Idle Conditio			
					at least 4 seconds prior to allo	owing intrusive control		
					Number of pre-O2 switches			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	0.960 < ST FT Avg < 1.040		
					Rapid Step Response (RSR) featur	e will initiate multiple tests:		
					If the difference between current EWN			
					Normalized Ratio value is > 0.620 and th			
					value is < 0	.100		
					Maximum of 24 RSR tests to detect	failure when RSR is enabled		
					Green Converter De	elay Criteria		
					This is part of the check for the Catalyst lo	Ile Conditions Met Criteria section		
					The diagnostic will not be enabled unt	il the following has been met:		
					Predicted catalyst temperature > 0 ° C f	or 0 seconds non-continuously.		
					Note: this feature is only enabled when enabled in se			
							1	
					PTO Not Ac	tive	1	
					General Ena	able		
					DTC's Not MAF_Senso			
					AmbPresDfltd	Status	1	
					IAT SensorCir	cuitFA	1	
					ECT_Sensor	r_FA		
					O2S_Bank_1_Ser O2S_Bank_1_Ser			
					O2S Bank 2 Ser	nsor 1 FA		
					O2S_Bank_2_Ser	isor_2_FA	1	
					FuelTrimSystem FuelTrimSystem		1	
					EngineMisfireDete		1	
			•					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum
0,000		2 COULDING	C. Abria		EvapPurgeSoleno	idCircuit_FA	licquirou	
					IAC_SystemR	PM_FA		
					EGRValvePerfor	mance_FA	1	
					EGRValveCir			
					CamSenso	r_FA		
					CrankSensorFa	aultActive	1	
					TPS_Performa	ance_FA	1	
					EnginePower	Limited	1	
					VehicleSpeedS	ensor_FA	1	
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	<u>Valid Idle Perio</u>	<u>d Criteria</u>	1 test attempted per valid idle period	Type A 1 Trip(s)
	1	The catalyst washcoat cont	ains Cerium Oxide. Cerium Oxide reacts		Throttle Position	< 2.00 %	penou	
			A/F excursions to store the excess oxygen		Vehicle Speed			
			uring rich A/F excursions, Cerium Oxide		Engine speed	> 1300 RPM for a minimum of 20	Minimum of 1	
			release this stored oxygen (I.e. Cerium		Engine opood	seconds since end of last idle	test per trip	
						period.		
			d to as the Oxygen Storage Capacity, or			penou.	Maximum of	
			is to "measure" the OSC of the catalyst				8 tests per	
		through forced L	Lean and Rich A/F excursions		Engine run time	> MinimumEngineRunTime -	trip	
					Engine run une	See Supporting Tables.		
		Normalized Ratio OSC Value	e Calculation Information and Definitions =				Frequency:	
		1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp			This is a function of Coolant	Fueling	
		l · · · · ·	time)			Temperture.	Related :	
		2 BestEailing OSC value fro	om a calibration table (based on temp and					
		2. Desti annig 000 value no	chaust gas flow)				12.5 ms	
		3. WorstPassing OSC valu	e (based on temp and exhaust gas flow)		Tests attempted this trip	< 255	OSC Measuremen	
						200		
		Normalized Ra	tio Calculation = $(1-2) / (3-2)$				ts: 100 ms	
					The catalyst diagnostic has not yet	applated for the current trip	10. 100 1110	
		A Normalized Ratio of 1 ess	entially represents a good part and a ratio		The calaryst diagnostic has not yet	completed for the current trip.	Tomp	
			/ represents a very bad part.				Temp	
		or o essentially	represents a very bad part.		Catalyst Idla Canaliti	na Mat Oritaria	Prediction:	
					Catalyst Idle Conditio		1000ms	
					General Enable r			
					Valid Idle Period	Criteria met		
					Green Converter Delay	Not Active	-	
	1			1	je strates At	20 + 2 C + 250	4	1
	1			1		-20 < °C < 250	4	
					Intrusive test(s):	=Not Active		
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
	1	The Catalyst Monitoring Tes	st is done during idle. Several conditions		ECT	40 < ° C < 129		
			ecute this test. These conditions and their		Barometric Pressure	> 70 KPA	1	
	1		the secondary parameters area of this	1				1
	1		document.	1		İ	1	1
					Idle Time before going intrusive is	< 50 Seconds	1	
			1		Idle time is incremented if Vehicle and	< 1.24 MDH and the threeffle	4	
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 2.00 % as identified in the Valid Idle Period Criteria section.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria	Value	Short Term Fuel Trim	0.90 < ST FT < 1.10	Kequireu	mum.
					Predicted catalyst temp > MinCatTemp ta			
					Tables" ta AND	b)		
					Engine Airflow > MinAirflowToWarmCataly Tables" ta			
					(Based on engine coolant at the time the V			
					0.)			
					for at least 30 seconds with a closed consecutively (closed throttle considerati			
					value as stated in the Valid Idle			
					Also, in order to increment the Warmed			
					exceed 30 cal value), either the vehicle speed cal or the TPS must exceed the T			
					Period Criteria sec	tion above.		
					Closed loop fuelir	a Enabled		
						-		
					Please see "Closed Loop Enable Crite Tables" tab for			
					PRNDL			
					is in Drive Range on an Auto	Transmission vehicle.		
					Idle Stable Criteria :: Must hold true fro Met to the end			
						4.00 < g/s < 20.00		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Be	ginning of Idle Period		
					The following fueling related must als seconds after the Catalyst Idle Condition			
					at least 4 seconds prior to allo			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	0.96 < ST FT Avg < 1.04		
					Rapid Step Response (RSR) featur	e will initiate multiple tests:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					If the difference between current EW Normalized Ratio value is > 0.620 and t value is < 0	MA value and the current OSC he current OSC he current OSC Normalized Ratio		
					Maximum of 24 RSR tests to detect	failure when RSR is enabled.		
					Green Converter D This is part of the check for the Catalyst			
					The diagnostic will not be enabled ur	ntil the following has been met:		
					Predicted catalyst temperature > 0 ° C	-		
					Note: this feature is only enabled when enabled in s			
					PTO Not A			
					General Er DTC's Not			
					MAF_Sens	orFA		
					AmbPresDfltt			
					IAT_SensorC ECT Sensor			
					O2S_Bank_1_Se			
					O2S_Bank_1_Se			
					O2S_Bank_2_Se			
					O2S_Bank_2_Se FuelTrimSyste			
					FuelTrimSyste	mB2_FA		
					EngineMisfireDe			
					EvapPurgeSoleno IAC SystemR			
					EGRValvePerfor			
					EGRValveCir	cuit_FA		
					CamSenso			
					CrankSensorFa TPS Performa			
					EnginePower	Limited		
F	D0 1 10				VehicleSpeedS		0	4.12
Evaporative Emission (EVAP)	P0442	This DTC will detect a small leak (≥ 0.030") in the EVAP	The total delta from peak pressure to peak vacuum during the test is		Fuel Level Drive Time	10 % ≤ Percent ≤ 90 % ≥ 900 seconds	Once per trip, during	1 trip Type A
System Small Leak		system between the fuel fill	normalized against a calibration pressure		Drive length	≥ 5.0 miles	hot soak (up	EWMA
Detected			threshold table that is based upon fuel		ECT	≥ 70 °C	to 2400	
		The engine off natural	level and ambient temperature. (See		Baro	≥ 70 kPa	sec.).	Average run
		vacuum method (EONV) is	P0442: EONV Pressure Threshold Table		Odometer	≥ 10.0 miles		length is 6
		used. EONV is an evaporative system leak	on Supporting Tables Tab). The normalized value is calculated by the				No more than 2	under normal conditions
		detection diagnostic that	following equation: 1 - (peak pressure -				∠ unsuccessful	conditions
			peak vacuum) / pressure threshold. The				attempts	Run length is
		off when enable conditions	normalized value is entered into EWMA				between	3 to 6 trips
		are met. Prior to sealing the	(with 0= perfect pass and 1= perfect fail).				completed	after code
		system and performing the					tests.	clear or non-
		diagnostic, the fuel volatility is analyzed. In an open						volatile reset
		system (Canister Vent			Time since last complete test	> 17 hours		
		Solenoid [CVS] open) high			Time since last complete test	≥ 17 hours		
•		usistility fuel areates analysh	1		1	I	I	• •

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		flow to generate a measurable pressure differential relative to atmospheric.			if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing	≥ 10 hours		
					Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	0 °C ≤ Temperature ≤ 34 °C		
			When EWMA is , the DTC light is illuminated.	> 0.71 (EWMA Fail Threshold)	Conditions for Estimate of Ambient Air Temperature to be valid:			
		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	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass Threshold)	 Cold Start Startup delta deg C (ECT-IAT) OR Short Soak and Previous EAT Valid 	≤ 8 °C		
		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			Previous time since engine off OR 3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak	≤ 7200 seconds		
		(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.			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.	7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					OR 4. Not a Cold Start and Previous EAT Not Valid and less than Long 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.	< 25200 seconds Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		
					OR 5. Long Soak Previous time since engine off	≥ 25200 seconds		
				Abort Conditions:	1. High Fuel Volatility			
					During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented.	< -5		
					OR 2. Vacuum Refueling Detected			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					See P0454 Fault Code for information on			
					vacuum refueling algorithm.			
					0 0			
					OR			
					3. Fuel Level Refueling Detected			
					5. Tuel Level Keldeling Delected			
					See P0464 Fault Code for information on			
					fuel level refueling.			
					OR			
					4. Vacuum Out of Range and No			
					Refueling			
					-			
	1							
	1							
					See P0451 Fault Code for information on			
					vacuum sensor out of range and P0464			
					Fault Code for information on fuel level			
					refueling.			
					reidening.			
					25			
					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.			
	1				Ŭ			
	1							
	1							
	1				OR			
					6. Vent Valve Override Failed			
					o. vent valve Overnue Falleu			
	1							
	1							
	1				Device control using an off-board tool to			
	1				control the vent solenoid, cannot exceed			
	1				during the EONV test			
					Contra the LONG TEST	0.50 seconds		
1								
	1							
	•		· ·		•	•	•	•

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
oystem	oode	Description	<u>Unterna</u>	Value	OR 7. Key up during EONV test		Required	indin.
					No active DTCs:	FuelLevelDataFault MAF_SensorFA ECT_SensorFA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0452 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 ≥ 12 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	2 trips Type B
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required with solenoid	illum.
		seconds.					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)	0.2 volts	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	1 trip Type A EWMA Average run length: 6
			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).	0.2 volts			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 seconds to	Run length is 2 trips after code clear or non-volatile reset
			When EWMA is , the DTC light is illuminated.	> 0.73 (EWMA Fail Threshold)				
			The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 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	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up	is 0.10 seconds	80 failures out of 100 samples	2 trips Type B

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			tank pressure sensor is 0.5 volts (~1245		ECM State ≠ crank		100 ms / sample	
			Pa) to 4.5 volts (~ -3736 Pa).				Sample	
			(~ -5750 T a).				Continuous	
					Stops 6.0 seconds after key-off			
uel Tank Pressure	P0453	This DTC will detect a fuel	Fuel tank pressure sensor signal	> 4.85 volts (97% of Vref or ~ -	Time delay after sensor power up for		80 failures	2 trips Type
TP) Sensor		tank pressure sensor signal	1 5	4172 Pa)	sensor warm-up		out of 100	В
ircuit High		that is too high out of range.					samples	
oltage			The normal operating range of the fuel			is 0.10 seconds		
			tank pressure sensor is 0.5 volts (~1245				100 ms /	
			Pa) to 4.5 volts		ECM State ≠ crank		sample	
			(~ -3736 Pa).					
					Change C. O. and and a other large off		Continuous	
					Stops 6.0 seconds after key-off			
uel Tank Pressure	P0454	This DTC will detect	If an abrupt change in tank vacuum is		This test will execute whenever the		This test is	1 trips Type
TP) Sensor		intermittent tank vacuum	detected the engine-off natural vacuum		engine-off natural vacuum small leak test		executed	A
ircuit Intermittent		sensor signals that would	test is aborted due to an apparent		(P0442) executes		during an	
		have caused the engine-off	refueling event. Subsequent to the abort,				engine-off	
		natural vacuum small leak test to abort due to an	a refueling rationality test is executed to confirm that a refueling event occurred. If				natural vacuum	
		apparent re-fueling event.	a refueling is confirmed, then the test				small leak	
		apparent te tueinig event.	sample is considered passing.				test. The	
			Otherwise, the sample is considered				test can only	
			failing indicating an intermittent signal				execute up to	
			problem.				once per	
							engine-off	
							The law off	
							The length of the test is	
							determined	
							by the	
							refueling	
							rationality	
							test, which	
							can take up	
							to 600	
							seconds to	
							complete.	
							The test will	
			An abrupt change is defined as a change				report a	
			in vacuum:				failure if 2 out	
				440 D-			of 3 samples	
			in the span of 1.0 seconds.	> 112 Pa			are failures.	
			in the span of 1.0 seconds.					
			But	< 249 Pa				
			in 12.5 msec.				12.5 ms /	
			A refueling exact is confirmed if the first				sample	
			A refueling event is confirmed if the fuel level has a persistent change				Continuous	
			iever has a persistent change				when vent	
				of 10 %			solenoid is	
			for 30 seconds.				closed	
vaporative	P0455	This DTC will detect a weak vacuum condition (large leak	Purge volume	> 45 liters	Fuel Level System Voltage	$10 \% \le \text{Percent} \le 90 \%$ 11 volts $\le \text{Voltage} \le 32 \text{ volts}$	Once per cold start	2 trips Type B
mission (EVAP)								

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System Detected	Code	Description	Criteria	Value	BARO Parameters	Conditions ≥ 70 kPa	Required Time is	illum.
		EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum		No active DTCs:	MAP SensorFA TPS_FA VehicleSpeedSensor_FA IAT SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0454	dependent on driving conditions Maximum time before test abort is 1000 seconds	
			Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2740 Pa	<u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	≤ 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 (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 99 miles.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Fuel Level in Primary Tank Remains in an Unreadable Range too Long		Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			If fuel volume in primary tank is AND Fuel volume in secondary tank	>= 21.5 liters < 4.0 liters				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			and remains in this condition for	87 miles.				
			OR					
			After Refuel Event					
			If the secondary fuel volume changes by		The shutdown primary tank volume + 3.0			
			14.0 liters from engine "off" to engine "on" the primary volume should change by 3.0		liters must be			
			liters.			< 21.5 liters		
			incro.					
			OR					
			Distance Traveled without a Primary Fuel		·			
			Level Change					
			Delta Fuel Volume change	< 3 liters				
Fuel Level Sensor	P0462	This DTC will detect a fuel	over an accumulated 50 miles. Fuel level Sender % of 5V range		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures	2 trips Type
1 Circuit Low Voltage	1 0 102	sender stuck out of range low in the primary fuel tank.		< 10 %			out of 125 samples	В
Vollage		low in the phinary idei tank.			Run/Crank voltage goes to 0 volts at key			
					off		100 ms / sample	
Fuel Level Sensor	P0463	This DTC will detect a fuel			Durg/Oranie Valtage		Continuous	O tring Turns
1 Circuit High	P0463	sender stuck out ofrange	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125	2 trips Type B
Voltage		high in the primary fuel tank.			Run/Crank voltage goes to 0 volts at key		samples	
					off		100 ms /	
							sample	
Fuel Level Center	P0464	This DTC will detect			The factor in the second second second second		Continuous	A take T as a
Fuel Level Sensor 1 Circuit	P0464	intermittent fuel level sensor	If a change in fuel level is detected, the engine-off natural vacuum test is aborted		This test will execute whenever the engine-off natural vacuum small leak test		This test is executed	1 trips Type
Intermittent		signals that would have	due to an apparent refueling event.		(P0442) executes		during an	~
			Subsequent to the abort, a refueling		(engine-off	
		vacuum small leak test to	rationality test is executed to confirm that				natural	
		abort due to an apparent re-	an actual refueling event occurred. If a				vacuum	
		fueling event.	refueling event is confirmed, then the test				small leak	
			sample is considered passing.				test. The	
			Otherwise, the sample is considered				test can only	
			failing indicating an intermittent signal				execute up to	
			problem.				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	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	by 10 % > 10 %			The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 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 Test time only increments when engine vacuum ≥ 10.0 kPa.	> 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 P0454	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM	Maximum Engine Torque Minimum Engine Torque Maximum Engine Torque in Park or Neutral Minimum Engine Torque in Park or Neutral Minimum Throttle opening	<= 8191.8 N-m >= 68.0 N-m <= 8191.9 N-m >= 90 N-m >= 3.5 %	>= 4.50 sec	Type A 1 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Minimum Engine Speed when there is a	>= 1500 RPM		
					Brake DTC: P0572, P0573, P0703. **Ca			
					Out if matches threshold with below. **			
					Minimum Engine Speed when there is no			
					Brake DTC :P0572, P0573, P0703.	>= 1500 RPM		
					**Cald Out by matched threshold with			
					above **			
					Maximum Engine Speed			
					Maximum Engine Opeed	<= 6500 RPM		
					Minimum Transmission Fluid			
					Temperature			
						10.0.0.0		
						>= -40.0 ° C.		
					Disable P0502 if PTO Active	Enabled		
					Engine Speed	<= 7500 RPM		
						>= 200 RPM		
						for >= 5.0 sec		
					Vehicle Speed	<= 320 MPH		
						for >= 5.0 sec		
					Ignition Voltage	<= 32.0 volts		
					Ignition Voltage	>= 11.0 volts		
					No Active DTCs:	EngineTorqureInaccurate		
						5		
						AcceleratorEffectivePstnValid		
						P0503 Active this Key On		
Transmission	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM	Disable P0502 if PTO Active	Enabled	>= 3.25 sec	Type A
Output Speed		-						1 trips
Sensor (TOSS)					Engine Speed	<= 7500 RPM		
/								
						>= 200 RPM		
						for >= 5.0 sec		
					Vehicle Speed	<= 320 MPH		
						for >= 5.0 sec		
					Institut Valtere	<= 32.0 volts		
					Ignition Voltage			
					Ignition Voltage	>= 11.0 volts		
						>= 11.0 volts		
					Ignition Voltage	>= 11.0 volts		
					Ignition Voltage Time since Selected Gear Range Change	>= 11.0 volts >= 6 sec		
					Ignition Voltage	>= 11.0 volts		
					Ignition Voltage Time since Selected Gear Range Change	>= 11.0 volts >= 6 sec		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change	>= 11.0 volts >= 6 sec		
					Ignition Voltage Time since Selected Gear Range Change	>= 11.0 volts >= 6 sec		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change	>= 11.0 volts >= 6 sec >= 6 sec		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change	>= 11.0 volts >= 6 sec		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change	>= 11.0 volts >= 6 sec >= 6 sec <= 500 RPM For >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change	>= 11.0 volts >= 6 sec >= 6 sec <= 500 RPM For >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change Disabled	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change Disabled For Following	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.		
					Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change Disabled For Following	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec. <= 150 RPM for >= 2 Sec.		
Low Engine Speed	P0506	This DTC will determine if a	Filtered Engine Speed Error	< 91.00 rpm	Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change Disabled For Following DTCS:	>= 11.0 volts >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec.	Diagnostic	2 trips Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Coue	Description	filter coefficient	0.003		> 60 °C and < 125 °C	every 12.5	mum.
				0.003			ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					Ignition voltage		pass or fail in	
						$32 \ge \text{volts} \ge 11$	10	
					Time since gear change	≥ 3 sec	10 sec	
					Time since a TCC mode change	0	once all	
					147	> 3 sec	enable	
					IAT	> -20 °C	conditions	
					Makiala an ed		are met	
					Vehicle speed			
					Commanded RPM delta	s 25 rpm		
					For manual transmissions: Clutch Pedal TOT Threshold			
					or			
					Clutch Pedal BOT Threshold	> 88.00 pct		
						< 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD		
						LowState		
						Off-vehicle device control (service		
						bay control) must not be active.		
						=FALSE		
					Low Fuel Condition Diag			
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
				1		TPS FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						Clutch Sensor FA		
					All of the above met			
				1	for Idle time	. 10		
High Engine Speed	P0507		Filtered Engine Speed Error	> -182.00 rpm	Baro	> 10 sec > 70 kPa		2 trips Type
Idle System		high idle exists	filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	runs in every 12.5	В
							ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
				1	Ignition voltage		pass or fail in	
				ļ		32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec	10 sec	
					Time since a TCC mode change		once all	
	1					> 3 sec	enable	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					IAT		conditions	
					Vehicle speed	> -20 °C	are met	
					Commanded RPM delta		ł	
					For manual transmissions:	2 25 Ipili	1	
					Clutch Pedal TOT Threshold			
					Clutch Fedal TOT Theshold			
					Clutch Pedal BOT Threshold			
					oldiciti cdal bot micshold	> 88.00 pct		
						< 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD		
						LowState		
						Off-vehicle device control (service		
						bay control) must not be active.		
						= FALSE	ł	
					Low Fuel Condition Diag	(See Supporting Tables)		
					Lott i dol condition Diag	(See Supporting Tables)		
							1	
					No active DTCs	AmbientAirDefault	1	
						ECT_Sensor_FA		
						EGRValveCircuit_FA		1
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA FuelLevelDataFault		
						Clutch Sensor FA	ł	
					All of the above met	Clutch Sensor FA	1	
					for Idle time			
						> 10 sec		
Engine Oil	P0521	Determines if the Engine Oil	To fail a currently passing test:		Diagnostic enabled/disabled		Performed	2 trip(s)
Pressure (EOP)		Pressure (EOP) Sensor is	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		-	Enabled	every 100	,
Sensor		stuck or biased in range	The filtered, weighted difference between		Oil Pressure Sensor In Use		msec	Type B
Performance		Ū.	measured EOP and predicted EOP (a			Present	1	
			function of engine speed and engine oil		Filtered engine oil pressure test weighting	>= 0.30 weighting		
			temp.):		(function of engine speed, engine oil			
					temperature, predicted oil pressure, and			
				< -45.0 kPa OR > 45.0 kPa	engine load stability). Details on			
				4 40.0 Ki u OK > 40.0 Ki u	Supporting Tables Tab (P0521 Section)			
			To pass a currently failing test:					
			The filtered, weighted difference between					
			measured EOP and predicted EOP (a					
			function of engine speed and engine oil					
			temp.):					
1								
			1	> -42.0 kPa AND < 42.0 kPa		1	1	1
					No active DTC's	Fault hundles:		
					No active DTC's	Fault bundles: CrankSensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	< 5 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	= True <= 32.0 V and >= 11.0 V Yes	50 failures out of 63 samples Performed every 100	2 trip(s) Type B
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 85 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	Enabled = True <= 32.0 V and >= 11.0 V Yes Enabled	msec 204 failures out of 255 samples Performed every 100 msec	2 trip(s) Type B
Air Conditioning Refrigerant Pressure Sensor Circuit Low Voltage	P0532	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too low	(AC Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s) Type C
					AC pressure sensor present	CAN message from BCM or Not Present in ECM	Performed every 25 msec	
Air Conditioning Refrigerant Pressure Sensor Circuit High	P0533	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too high	(AC Pressure Sensor Voltage) / 5 Volts	> 90.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s) Type C
Voltage					AC pressure sensor present	CAN message from BCM or Not Present in ECM	Performed every 25 msec	
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result of 1 or greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Throttle Area (with idle included) for time period of Ignition Voltage BrkBoostVacDiff For time period of AND Vacuum Delta Diagnostic enabled/disabled No active DTC's	<= 1.2 Percent for > 3 seconds <= 32.0 V and >= 11.0 V > 0.3 kPa >= 0.2 Seconds >= 15 kPa Enabled Fault bundles: MAP_SensorFA GetTPSR_FaultActive_TPS	Pass counter incremented when enable conditions are met, pass achieved Performed every 100 msec	2 trip(s) Type B
			1 st order lag fail threshold	> 0.57031				
			1 st order lag re-pass threshold	< 0.65625				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Brake Booster	P0557	Determines if the Brake	(Brake Booster Pressure Sensor Voltage)		Brake booster diagnostic	Conditions	320 failures	2 trip(s)
Pressure Sensor	1 0001	Booster Pressure Sensor	/ 5 Volts		enabled/disabled		out of 400	2 (1)p(3)
Circuit Low Voltage		circuit voltage is too low				Frehled	samples	
Choun Low Vollage		onour voltage is too low		< 2.0 percent		Enabled	bampieo	
						_		Туре В
					Brake booster pressure sensor present		Performed	
						Yes	every 12.5	
Brake Booster	P0558	Determines if the Brake	(Brake Booster Pressure Sensor Voltage)		Brake booster diagnostic	163	msec 2000 failures	2 trin(s)
Pressure Sensor	1 0000	Booster Pressure Sensor	/ 5 Volts		enabled/disabled		out of 2400	2 thp(3)
Circuit High		circuit voltage is too high	/ 5 / 013		chabica/disabica	Frehled	samples	
Voltage		chedit voltage is tee riigh				Enabled	oumpieo	
voltago								
				> 87.0 percent				Type B
					Brake booster pressure sensor present		Performed	
						Yes	every 12.5	
Cruise Control	P0564	Detect when cruise control	Cruies Control english singuit unliteres			TRUE	msec	Turner
Mutil-Functon	P0564	multi-function switch circuit	Cruise Control analog circuit voltage must be in an "illegal range" for greater		CAN cruise switch diagnostic enable in ECM	TRUE	fail continuously	Type:
Switch Circuit		(analog) voltage is in an	than a calibratable period of time for		ECIM		for greater	
Switch Circuit		illegal range	cruise switch states that are received				than 0.750	
		lilegarrange	over serial data				seconds	С
			over serial data				3600103	MIL:
								NO
								Trips:
								1
Cruise Control	P0567	Detects a failure of the	Cruise Control Resume switch remains		CAN cruise switch diagnostic enable in	TRUE	fail	Type:
Resume Circuit		cruise resume switch in a	applied for greater than a calibratable		ECM		continuously	
		continously applied state	period of time for architecture where				for greater	
			cruise switch states are received over				than 90.000	
			serial data				seconds	
								С
								MIL:
								NO
								Trips:
	Dococ	Detectory follows of the				TOUE	(- 1)	1
Cruise Control Set	P0568	Detects a failure of the	Cruise Control Set switch remains		CAN cruise switch diagnostic enable in	TRUE	fail	Type:
Circuit		cruise set switch in a	applied for greater than a calibratable		ECM		continuously	
		continously applied state	period of time for architecture where				for greater	
			cruise switch states are received over				than 90.000	
			serial data			1	seconds	
						1		
						1		
								С
								MIL:
		1	1	1		1	1	NO

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required fail	illum. Trips:
							continuously for greater than 90.000 seconds	1
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	TRUE	10 / 16 counts	Type: C
Brake Pedal	P057B	This diagnostic monitors the	DTC Fail:		Brake Pedal Position Range Diagnostic		Performed	MIL: NO Trips: 1 Type:
Position Sensor Circuit Range/Performanc		Brake Pedal Position Sensor for a stuck in range failure			Enable		every 25 msec	A
e			Calculated brake pedal position delta and		Ignition voltage	TRUE > 10 volts	-	MIL:
			resulting filtered EWMA calculation(supporting table) is less than a value for a calibratable number of		EWMA Filter Value	0.3	-	YES Trips: 1
			complete EWMA tests):	0.4 threshold / 2 counts				·
			DTC Pass: Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is greater than a value for a calibratable number of EWMA tests):					
					No active DTC's Criteria to Run Complete Test:	P057C / P057D		
					shift lever	In park at least once this key on		
					shift lever position	≠ park		
					vehicle speed accelerator pedal position	> 20 < 5		
					calculated brake pedal position delta samples	1000 samples	Each calculated difference test is a minimum of 25 seconds (1000 counts	
					Fast Test To Pass Criteria:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						50 samples	Each calculated difference test is a minimum of seconds (1000 counts	
Brake Pedal Position Sensor Circuit Low	P057C	Detects low circuit failure when brake pedal position is below calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	5	Brake Pedal Position Diagnostic Enable	TRUE	20 / 32 counts	Type: A MIL: YES Trips: 1
Brake Pedal Position Sensor Circuit High	P057D	Detects high circuit failure when brake pedal position is above calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	95	Brake Pedal Position Diagnostic Enable	TRUE	20 / 32 counts	A MIL: YES Trips:
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect			PCM State	= crank or run	Diagnostic runs continuously in the Diagnostic reports a fault if 1 failure occurs on the first Diagnostic reports a fault if 5 failures occur after the first	1 Type A 1 trips
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 PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup	Type A 1 trips
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic	Type A 1 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
							reports a fault if 1	
ECM RAM Failure	P0604	Indicates that the ECM is	Primary processor data pattern written	1 count if found on first memory			Will finish	Trips:
		unable to correctly read data					first memory	1
		from or write data to RAM	>	subsequent scans.			scan within	Type:
							30 seconds	A
							at all engine	MIL:
							conditions -	YES
							diagnostic	
							runs	
			Secondary processor battery backed				Completion	
			RAM failed checksum twice for original				at intilization,	
			values at power up and the defaulted				<500 ms	
			values					
			Secondary processor copy of calibration	2 counts			Completion	
			area to RAM failed for a count >				at intilization,	
							<500 ms	
			0				MCH C	
			Secondary Processor data pattern written				Will finish	
			doesn't match the pattern read consecutive times				within 30 seconds at	
			consecutive times				all engine	
							conditions.	
			Secondary Processor TPS or APPS				0.0625 sec	
			minimum learned values fail compliment				continuous	
			check continuously					
ECM Processor	P0606	Indicates that the ECM has	When drag is active Secondary			Run/crank voltage or Powertrain	0.1875 sec in	Trips:
		detected an internal	processor detects Primary's calculated			relay voltage > 6.00 and reduced	the	1
		processor integrity fault	throttle position is greater > than	0.00.0/		power is false, else the failure will	secondary	Type:
			Secondary Processor calculated Throttle	0.00 %.		be reported for all conditions	processor	A MIL:
			Position by					YES
								TEO
							-	
			Secondary processor detects Primary's	7.57 %.		Run/crank voltage or Powertrain		
			calculated throttle position is greater > than Secondary's calculated Throttle			relay voltage > 6.00 and reduced power is false, else the failure will		
			Position when driver is commanding the throttle from APP by			be reported for all conditions		
]	
			Secondary processor detects Primary's	39.26 %.		Run/crank voltage or Powertrain		
			calculated throttle position is greater >			relay voltage > 6.00 and reduced		
			than Secondary's calculated Throttle			power is false, else the failure will		
			Position when reduce engine power is			be reported for all conditions		
			active by					
1	l				I			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			Software tooks on the Drimon Dreessor	0.0625 and continuous		Dun/erenk voltege er Dewertrein	0.0625 sec	
			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or	0.0625 Sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	continuous	
			were not executed in the correct order.			power is false, else the failure will	oontinuouo	
						be reported for all conditions		
			Software tasks on the Primary Processor	0.1250 sec continuous		Run/crank voltage or Powertrain	0.1250 sec	
			in the 25 ms loop were not executed or			relay voltage > 6.00 and reduced	continuous	
			were not executed in the correct order.			power is false, else the failure will		
						be reported for all conditions		
			Software tasks on the Primary Processor	0.2500 sec continuous		Run/crank voltage or Powertrain	0.2500 sec	
			in the 50 ms loop were not executed or			relay voltage > 6.00 and reduced	continuous	
			were not executed in the correct order.			power is false, else the failure will		
						be reported for all conditions		
				0.5000 sec continuous		Run/crank voltage or Powertrain	0.5000 sec	
			in the 100 ms loop were not executed or			relay voltage > 6.00 and reduced	continuous	
			were not executed in the correct order.			power is false, else the failure will be reported for all conditions		
				1.2500 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	1.2500 sec continuous	
			in the 250 ms loop were not executed or were not executed in the correct order.			power is false, else the failure will	continuous	
						be reported for all conditions		
			The first completion of the RAM	360.0000 sec continuous		Run/crank voltage or Powertrain	360.0000 sec	
			diagnostic on the Primary Processor was			relay voltage > 6.00 and reduced	continuous	
			completed > the amount of time			power is false, else the failure will		
						be reported for all conditions		
			The first completion of the ROM	360.0000 sec continuous		Run/crank voltage or Powertrain	360.0000 sec	
			diagnostic on the Primary Processor was			relay voltage > 6.00 and reduced	continuous	
			completed > the amount of time			power is false, else the failure will		
						be reported for all conditions		
			Cofficient tooling on the Conservation			Due /ereel. usite as as Device the 's	05	
			Software tasks on the Secondary Processor were not executed or were not	Two Consecutive Loops (12.5ms *		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	25 ms	
			executed in the correct order.	2/20110		power is false, else the failure will		
						be reported for all conditions	1	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the primary processor, 159 / 400 counts intermittent or 15 counts continuous; 39 counts continuous @ initialization	
			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			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the secondary processor 0.4750 sec at initialization, 0.1750 sec continuous or 20 / 200 intermittent.	
			secondary processor by verifing the hardware line toggle between the two processors toggles within the threshold values	9.3750 ms and 15.6250 ms		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	9 counts continuous at initialization or 9 counts continuous; 12.5 ms /count in the primary processor	
			Primary Processor TPS or APP minimum learned values fail compliment check The ocillator failed for the Primary processor where the clock is outside the threshold	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1000 sec continuous 100 ms continuous	
			The secondary check of the ALU failed to compute the expected result			be reported for all conditions Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5 ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Secondary processor failed configuration check of the registers.			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5 ms continuous	
			Secondary processor checks stack beginning and end point for pattern written at initialization.			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
			Secondary processor check that the Primary processor hasen't set a select combination of internal processor faults			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
			The primary processor check of the ALU failed to compute the expected result	Two Consecutive Times		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
			Primary processor failed configuration check of the registers.			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
/lain & MHC state f health fault	P0607		Primary state of health (SOH) discrete line is not toggling between the two processors for a time >	0.4875 sec		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4875 sec continuous	Trips: 1 Type: C MIL:
Control Module Accelerator Pedal Position (APP) System Performance	P060D	Verify that the indicated accelerator pedal position calculation is correct	PPS sensor switch fault - When the APP sensor 2 is shorted to ground, the sensor value is >	41		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Engine Running	Consecutive checks within 200ms or 2 / 2 counts; 175 ms/count	NO Trips: 1 Type: A MIL: YES
						TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only		
			Difference between primary processor indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		applicable for Legacy accelerator pedals) Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	44 / 40 counts or 39 counts continuous; 12.5 ms/count in tho	
						Primary processor Pedal Sync Error is FALSE	the secondary	I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required processor	MIL illum.
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at	Type B 2 trips
5 Volt Reference #1 Circuit	t1 Circuit intermitt	Detects a continuous or intermittent short on th 5 volt reference circuit #1	Primary Processor Vref1 < or Primary Processor Vref1 > or the difference between Primary filtered Vref1 and Primary Vref1 >	4.875 5.125 0.05		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	Dowerup 19 / 39 counts or 0.1875 continuous; 12.5 ms/count in primary processor	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref1 < or Secondary Processor Vref1 >	4.875 5.125		be reported for all conditions	19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary	
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	2 trip Type B
5 Volt Reference #2 Circuit	#2 Circuit interr	Detects a continuous or intermittent short on th 5 volt reference circuit #2	Primary Processor Vref2 < or Primary Processor Vref2 > or the difference between Primary filtered Vref2 and Primary Vref2 >	4.875 5.125 0.05		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuous 19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in primary processor	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref2 < or Secondary Processor Vref2 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary	
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	≥ 18 volts	Powertrain relay commanded "ON"		5 failures out of 6 samples	
			Stuck Test:		No active DTCs:	PowertrainRelayStateOn_FA	1 second / sample	

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'	> 3 volts			Stuck Test: 100 ms/ sample Continous	
							failures ≥ 4 seconds	
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions- Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
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 Control Module Emissions- Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
Clutch Pedal Position Sensor Circuit Range /	P0806	range indicative of a vehicle	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear		N/V Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop	1 Trip(s)
Performance		NOT in gear, when the vehicle is determined to be		> 1 %	Transfer Case	Not in 4WD Low range	Continuous	
		in gear. Gear determination is made by verifying that			vehicle speed Engine Torque	> 0.0 MPH > EngTorqueThreshold Table	25 ms loop 1 Trip	Туре А
		engine RPM/ Vehicle Speed (N/V) ratio represents a valid gear.			Clutch Pedal Position	< ResidualErrEnableLow Table		
					OR Clutch Pedal Position	> ResidualErrEnableHigh Table		
					No Active I		-	
					ClutchPositionSen ClutchPositionSen CrankSens VehicleSpeedS	sorCktHi FA orFA		
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit		Engine Not Cranking System Voltage		25 ms loop	
			for	< 4 % of Vref 200 counts out of 250 samples	-	> 9.0 Volts	Continuous	1 Trip(s)
								Туре А
Clutch Pedal Position Sensor	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit		Engine Not Cranking System Voltage		25 ms loop	
Circuit High				> 96 % of Vref	_	> 9.0 Volts	Continuous	1 Trip(s)
			for	200 counts out of 250 samples				Туре А

Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
			Value		Conditions	Required	illum. 1 Trip(s)
PUOUA	Pedal Fully Applied Learn Position values		< 9.0 %		= 0	250 ms loop Continuous	Type A
		0.0		_			
		Fully Applied Learn Position	> 30.0 %	-			
P080C	and shorted low circuit while the device is commanded			Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	5 failures out of 6 samples	
				Engine Speed	> 600 RPM	250 ms / sample	
P080D	This DTC checks for a	The FCM detects that the commanded		Run/Crank Voltage	11 volts < Voltage < 32 volts	Continuous with device off	2 trips Type
10000	shorted high circuit while the device is commanded on.					of 6 samples	
				Engine Speed	> 600 RPM	250 ms / sample Continuous	
P0856	Determines if torque request from the EBTCM is valid	With GMLAN:		With GMLAN:		With device With GMLAN:	1 trip Type C
		Serial Communication 2's complement message - (\$140 for PPEI2 or \$1C7/\$1C9 for PPEI3 engine torque or \$1CA for PPEI3 axle torque)	Message <> 2's complement of	Serial communication to EBTCM (U0108) Power Mode Engine Running	No loss of communication = Run = True	Count of 2's complement values not equal >= 10	
		OR Serial Communication message (\$140 for PPEI2 or \$1C7/\$1C9 for PPEI3 engine torque or \$1CA for PPEI3 axle torque) rolling count value	message	Status of traction in GMLAN message (\$380 for PPEI2 or \$4E9 for PPEI3)	= Traction Present	OR 6 rolling count failures out of 10 samples	
		OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi- transitions out of 5 samples	
	Code P080A P080C	Code Description P080A Monitor for Valid Clutch Pedal Fully Applied Learn Position values P080C This DTC checks for an oper and shorted low circuit while the device is commanded off. P080D This DTC checks for a shorted high circuit while the device is commanded on. P080D This DTC checks for a shorted high circuit while the device is commanded on. P0856 Determines if torque request	Code Description Criteria P080A Monitor for Valid Clutch Position values Fully Applied Learn Position P080C This DTC checks for an open and shorted low 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. P080D This DTC checks for a shorted high 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. P080D This DTC checks for a shorted high 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. P0856 Determines if torque request from the EBTCM is valid With GMLAN: Serial Communication 2's complement message - (\$140 for PPEI2 or \$1C781C9 for PPEI3 angine torque or \$1CA for PPEI3 axle torque) OR Serial Communication message (\$140 for PPEI2 or \$1C771C9 for PPEI3 angine torque or \$1CA for PPEI3 axle torque) roling count value OR Serial Communication message (\$140 for PPEI2 or \$1CA for PPEI3 axle torque) roling count value	Code Description Criteria Value P080A Monitor for Valid Clutch Pedal Fully Applied Learn Position values Fully Applied Learn Position < 9.0 %	Code Description Criteria Value Parameteris P080A Monitor Valid Cluban Pedal Fully Applied Learn Position values Fully Applied Learn Position < 9.0 %	Code Description Criteria Value Parameters Conditions P080A Monitor Valid Cutch Folly Applied Learn Position 50.0 % 0BD Manufacturer Enable Counter -0 P080F Folly Applied Learn Position > 50.0 % -0 -0 -0 P080F This DTC checks for an open and shorted low circuit while state of the driver and the actual state of the device is commanded The ECM detects that the commanded state of the driver and the actual state of the control circuit while state of the driver and the actual state of the control circuit do not match. RunCrank Voltage 11 volts 4 Voltage 5.32 volts P080D This DTC checks for a rot. Instead of the driver and the actual state of the control circuit do not match. Engine Speed > 500 RPM P080D This DTC checks for a rot. Instead of the driver and the actual state of the control circuit do not match. Engine Speed > 500 RPM P080D This DTC checks for a rot. Instead of the driver and the actual state of the control circuit do not match. Instead of the driver and the actual state of the control circuit do not match. No loss of communication State of the control circuit do not match. P080D Intermines of thorque requests Yell GMLAN: Serial Communication to EBTCM (U0108) State o	Code Description* Criteria Value Parameteria Conditions Required P0848 Montor Value Chart Position Value ************************************

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
0,000			Torque request greater than allowed				>= 6 out of 10 samples above 200 Nm	
			With PWM: PWM Duty cycle	< 5 Pct	With PWM: Traction Status for PWM (\$2B3C Class2		Performed every 25 With PWM:	
			OR PWM Duty cycle	> 95 Pct	message) Engine Run Time	= Traction Present > 2 Seconds	12 failures out of 30 Performed every 50	
nlet Airflow System Performance naturally aspirated applications)	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	<= 230 kPa*(g/s) > 12 grams/sec > 15.0 kPa) > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	 >= 450 RPM <= 4600 RPM > 7 Deg C < 129 Deg C > 20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weight Factors". MAP_SensorCircuitFA EGRValve FP 	msec Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
						MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorFA		
EngineMetal	P1258	The objective of the	Engine Coolant	> 120 °C	Engine Run Time	CvIDeacSystemTFTKO ≥ 10 Seconds	Fault present	1 trine Type
OvertempActive	F 1230	algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	For	≥ 10 seconds	If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the		for ≥ 0 seconds	A
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.		= FALSE	Vehicle Speed Engine Speed Engine Load	VSS ≥ 5 mph rpm < 8192 load < 60	40 failures out of 80 samples 250 ms /sample	1 Trips Type C "Special Type C"
					RunCrankActive Active DTC	= TRUE P0300, MIL Request	Continuous	
ABS System Rough Road	P1381	This diagnostic detects if the rough road information is no	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= FALSE	Vehicle Speed	VSS ≥ 5 mph	40 failures out of 80	1 Trips
Detection Communication Fault		longer being received from the ABS controller, and misfire is present. When this			Engine Speed	rpm < 8192	samples	Туре С
T duit		occurs, misfire will continue to run.			Engine Load	load < 60	250 ms /sample	"Special Type C"
					RunCrankActive Active DTC	= TRUE P0300, MIL Request	Continuous	
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) > 1.60 KJ/s (low RPM failure mode)	Cold Start Emission Reduction Strat considered active if either the Spark cat li are considered Spark CLO is considered active when th (function of idle RPM and air per cylinder engine run time) <= 11.00 Idle CLO is considered active if the desire (function of coolant) plus an RPM offset considered catalyst light off is also a fur	ght off or Idle cat light off strategies d active. e CatLightOffDesiredSparkRetard r and scaled based on coolant and 0 degrees of Spark ed RPM exceeds a base RPM value . The amount of RPM offset to be	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes	Type A 1 Trip(s)
					gear state. Refer to "Support	ting Tables" for details.	after 10 seconds of accumulated qualified data	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					OBD Manufacturer Enable Counte	r		
						0		
					Throttle Position	< 1.0 percent		
					A change in throttle position (tip-in/tip	o-out) will initiate a delay in the		
					calculation of the average qualified resid			
					5.00 seconds the diagnostic wil			
					5.00 seconds the diagnostic will	Continue the calculation.		
					For Manual Transmission vehicles, th	e clutch must be fully engaged	-	
					Clutch Pedal Pos			
					Ciulcii Fedal Fos	11011 < 1578		
					OR			
					The clutch must be fu	Illy disengaged.		
					Clutch Pedal Pos	ition > 88%		
							-	
					General Er		-	
					DTC's Not	Set		
					MAF_Sens	orFA		
					MAP_Sens			
					IAT_SensorC	ircuitFA		
					IAT2_Sensor	CircuitFA		
					ECT_Senso	or_FA		
					CrankSensorFa			
					IAC_SystemR	PM_FA		
					TPS_F	A		
					VehicleSpeedS	ensor_FA		
					EngineMisfireDe			
					IgnitionOutputE	Driver_FA		
					ControllerProces	sorPerf_FA		
					5VoltReferen	ceA_FA		
					5VoltReferen	ceB_FA		
					FuellnjectorCi	rcuit_FA		
					TransmissionEnga	gedState_FA		
					Clutch Sens			
					P050A (ColdStrt_L	AC_SysPerf)		
					P050B (ColdStrtlg	nTmngPerf)		
Transmission	P150C	Determines if engine speed	Serial Communication rolling count value	+ 1 from previous \$19D message	Diagnostic enable bit	1	Diagnostic	2 trips Type
Engine Speed		request from the TCM is	5	(PTEI3)	(1 = Enabled)		runs in 12.5	в
Request Circuit		valid		()	(ms loop	_
- isqueet on our								
			Transmission engine speed protection	not equal to 2's complement of	Engine run time	0.50 sec		1
			··	transmission engine speed				
				request + Transmission alive				
				rolling count				
			1	1	# of Protect Errors	10 protect errors out of 10		1
						samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10		1
					# OF AIVE ROUNTY ETTOIS	samples		
		<u> </u>		1	1			1
I	1	L	1			L		L

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters No idle diagnostic 506/507 code	Conditions IAC_SystemRPM_FA	Required	illum.
					No fue diagnostic 500/507 code			
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		
Throttle Actuator	P1516	Detect a throttle positioning	The throttle model and actual Throttle			Run/crank voltage or Powertrain	0.1875 sec in	Trips:
Control - Position		error	position differ by >			relay voltage > 6.00 and reduced	the	1
Performance			or	7.568 %.		power is false, else the failure will	secondary	Type: A
			The actual Throttle position and throttle			be reported for all conditions	processor	MIL:
			model differ by >					YES
				7.568 %.				
					Engine Running or Ignition Voltage >	11		
					and Ignition Voltage >	11		
						5.4		
					and Throttle is being Controlled			
					and Communication Foult (SDI is not act)			
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			
					Ignition voltage failure is false (P1682)			
		Detect throttle control is	Thottle Position >	39.761 %.	(Throttle is being Controlled and	Run/crank voltage or Powertrain	0.1375 sec	
		driving the throttle in the				relay voltage > 6.00 and reduced	continuous	
		incorrect direction			TPS minimum learn is active) or	power is false, else the failure will		
						be reported for all conditions		
					Reduce Engine Power is Active			
		Degraded Motor	Desired throttle position is stable within			Run/crank voltage or Powertrain	0.4875 sec	
			0.25 for 4.0000 sec and the delta			relay voltage > 6.00 and reduced	continuous	
			between Indicated throttle position and			power is false, else the failure will	on secondary	
			desired throttle position in greater than			be reported for all conditions	processor	
			2.00 %					
					Engine Running or Ignition Voltage >	11		
					and Ignition Voltage >			
					and Throttle is being Controlled	5.4		
					and module is being controlled			
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Ignition voltage failure is false (P1682)	Conditions	Required	illum.
					Ignition voltage failure is faise (P1002)			
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank	Run/Crank – PT Relay Ignition >	3.00 Volts			240 / 480 counts or 0.1750 sec	Trips: 1 Type: A
		Ignition Voltage & the Powertrain Relay Ignition Voltage			Powertrain commanded on and (Run/crank voltage > or PT Relay Ignition voltage >	Table, f(IAT). See supporting tables	continuous; 12.5 msec/count in main processor	MIL: YES
					and Run/crank voltage >	5.5 5.5	p	
Fuel Level Sensor	P2066	This DTC will detect a fuel			Engine Running		250 ms /	2 trips Type
2 Performance		sender stuck in range in the			No active DTCs:		sample	В
(For use on		secondary fuel tank.			No active DTCs.	VehicleSpeedSensor_FA	Continuous	
vehicles with			Fuel Level in Secondary Tank Remains in				_	
mechanical transfer pump dual fuel			an Unreadable Range too Long					
tanks)								
			If fuel volume in primary tank is	>= 21.5 liters				
			AND					
			Fuel volume in secondary tank	< 4.0 liters				
			and remains in this condition for					
			OR	100 miles				
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank	< 21.5 liters				
			AND					
			Volume in Secondary Tank	> 4 liters				
			and remains in this condition for					
			OR	2400 seconds				
			Distance Traveled without a Secondary Fuel Level Change		•]	
			If the vehicle is driven a distance of 100		Volume in Secondary Tank		-	
			miles without the secondary fuel level					
1		ļ	changing by 3 liters, then the sender must	t	I	>= 4.0 liters	I	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	be stuck.	Value	rarameters	Conditions	Keyuneu	inum.
Fuel Level Sensor	DOOGZ	This DTC will detect a fuel	Fuel level Cander % of 51/ renge		Pup/Crook Voltogo	11 volto < Voltogo < 20 volto	100 failuraa	2 tring Turns
2 Circuit Low	P2067	sender stuck out of range	Fuel level Sender % of 5V range		Run/Crank Voltage	11 volts \leq Voltage \leq 32 volts	100 failures out of 125	2 trips Type B
Voltage		low in the secondary fuel					samples	5
-		tank.		< 10 %				
					Run/Crank voltage goes to 0 volts at key			
					off		100 ms / sample	
							Sample	
							Continuous	
Fuel Level Sensor	P2068	This DTC will detect a fuel	Fuel level Sender % of 5V range		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures	2 trips Type
2 Circuit High		sender stuck out of range					out of 125	В
Voltage		low in the secondary fuel tank.					samples	
				> 60 %				
					Run/Crank voltage goes to 0 volts at key			
					off		100 ms /	
							sample	
							Continuous	
Post Catalyst Fuel	P2096	Determines if the post	Pich Fail Counts:	> 500 out of 1000 samples	The following must be true for:		Frequency:	2
Trim System Low	1 2030	catalyst O2 sensor based		> 500 out of 1000 samples	The following must be true for.	> 0.0 sec	Continuous	Trip(s) Type
Limit Bank 1 (Too		fuel control system has been		Note: 10 sample counts = 1	PTO:	NOT active	Monitoring in	В
Rich)		unable to adapt to a rich exhaust gas condition that	dition that reached, a fail is reported and the diagnostic will not report again until the		Intrusive diagnostic fuel control:	FALSE (i.e. catalyst monitor diagnostic)	100ms loop	
		results in an emissions correlated failure.			Long Term Secondary Fuel Trim Enabled	Please see "Long Term	-	
			reached before a fail is reported, a pass			Secondary Fuel Trim Enable		
			is reported, the counters are reset to 0,			Criteria" in Supporting Tables		
			and evaluation starts again.		Ambient air pressure			
						>= 70 kPa >= 0 g/s and	-	
					Engine air flow	<= 10000 a/s		
					Intake manifold air pressure	>= 0 kPa and <= 200 kPa		
					Induction air temperature	>= -20 °C and	_	
					Start up coolant temperature	<= 45 °C	_	
						> -20 °C		
					NO ACTIVE AmbientAirD		_	
					AIR System	n FA		
					Ethanol Compositio ECT_Senso			
					EGRValveCiro			
					EGRValvePerfor	mance_FA		
					IAT_Senso CamSnsrLctn			
					EvapEmissionS			
					EvapFlowDuringNo	onPurge_FA		
					FuelTankPressureSe EvapPurgeSolenoi			
					EvapSmallLe	eak_FA		
					EvapVentSolenoid	dCircuit_FA		

System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MI illu
<u>ystelli</u>	Code			I value	FuellnjectorCii MAF_Sens MAF_Sensor MAP_Sens MAP_EngineVac EngineMisfireDe A/F Imbalance O2S_Bank_1_Se	cuit_FA orFA TFTKO orFA uumStatus tected_FA 9 Bank1 nsor_1_FA	Required	
					O2S_Bank_1_Se	nsor_2_FA		
		Additional notes, strategy a					1	
		If the post catalyst O2 voltage is outside a control	The above specified Sample Counter w The current post O2 airflow mode is a sele			See supporting tables: Selected	1	
		window, the integral offset is	AND			Cells	-	
		adjusted in an attempt to	Accumulated Cell Count is greater than (counts spent in the given cell while enable	ed)		See supporting tables: Cell Accum Min		
		the control window. The	The above specified Fail Counter will in	crement if the Sample Counte	r increments AND:		-	
		offset value is used to adjust the front O2 sensor control to	Filtered post O2 voltage is beyond the fail	threshold:		See supporting tables: > O2 Rich Thresh		
		bias the bulk average exhaust air/fuel ratio either lean or rich. The integral			for more than this many counts:	See supporting tables: Out of Window Count		
		offset value is retained between trips.	AND The post catalyst O2 integral offset is:			See supporting tables: <= Integral Offset Min]	
					Note - the Post O2 filter coefficient is:	See supporting tables: Post O2 Filt Coefficient		
		Re-Pass Feature If a fault is active from a prior trip and the above fail		>= 800 counts	If neither a pass nor a fail can be reported before the sample counter reaches its			
		If a fault is active from a prior	This counter will increment if neither the filtered post O2 voltage nor the integral	>= 800 counts Note: 10 sample counts = 1 second				
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported.	This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above)	>= 800 counts Note: 10 sample counts = 1 second	before the sample counter reaches its threshold, no report is made (indeterminate state).			
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported. High Vapor (HV) Delay Feat The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the	This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above) ure Canister purging is active and Long term fuel correction for	>= 800 counts Note: 10 sample counts = 1 second	before the sample counter reaches its threshold, no report is made (indeterminate state). Filtered post O2 voltage is outside the window defined by:	See supporting tables: HV Post Low and HV Post High	When these conditions are met, HV is detected and the	
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported. High Vapor (HV) Delay Feat The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the fuel control system are present. This HV condition is indicated when the criteria	This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above) ure Canister purging is active and Long term fuel correction for	>= 800 counts Note: 10 sample counts = 1 second <= 0.82 >= 5.0 sec	before the sample counter reaches its threshold, no report is made (indeterminate state).	See supporting tables: HV Post Low and	conditions are met, HV is detected and the diagnostic will	
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported. High Vapor (HV) Delay Feat The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the fuel control system are present. This HV condition	This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above) ure Canister purging is active and Long term fuel correction for	>= 800 counts Note: 10 sample counts = 1 second <= 0.82 >= 5.0 sec	before the sample counter reaches its threshold, no report is made (indeterminate state). Filtered post O2 voltage is outside the window defined by: Integral offset is outside the window	See supporting tables: HV Post Low and HV Post High See supporting tables: HV Integral Offset Low and	conditions are met, HV is detected and the diagnostic	

Prote Cataloysi Fuel P2007 Determine all file post cataloy CD encret blocks cataloy CD en	Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
Part Database Full Part Da	System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
Poil Cability FLM P2027 Reservices If the purge value datases for catalyse 102 strained in a constrained in a constrain				evaluation evaluation will resume when			immediately resume evaluation.		
Productably File Part Control Some models conditions for P2006, P2008 (see P2008 enable for Control is an order 1000 samples is an enable conditions for P2006, P2008 (see P2008 enable for Control is an order 100 minute is additional intercent is an enable conditional interc									
Point Catabyle Fuel Ins System High Lam B ank 1 (Too Line n) which is a sum would in an emission correlated failure. Lean Fail Counts Lean Fail Counts Nue: 10 sumple counts = 1 Nue: 10 sumple counts = 1 Nue cou									
Part Catalyse Fuel Part Catalyse Fuel Res System Hug Line Bank 1 Too Line Bank 1 Too L									
Part Catalyse Fuel models in Times years head calked to a least results in an emissione correlated failure. Leas Fail Counts Least Fail Counts Net: 10 surgle cauts = 1 Net: 10 surgl									
Part Catalyse Fuel models in Times years head calked to a least results in an emissione correlated failure. Leas Fail Counts Least Fail Counts Net: 10 surgle cauts = 1 Net: 10 surgl					>= 20.0 sec				
This Species High- Lean 2014 (To C) served to based based on a new specified species to a served to distributed is performed and is reported and is reported and and contrast of the served to distribute is performed and is reported and is reported and and contrast of the served to distribute is performed and is reported and is reported and and contrast of the served to distribute is performed and is reported and is reported and is reported in the result of the served to distribute is performed and is reported and is reported in the result of the served to distribute is performed before and is reported and is reported in the result of the report again until the result of our distributies is reported and is reported and is reported in the result of the contrast are report to our distributies is reported and is reported and is reported in the result of the contrast are report to our distributies is reported and is reported and is reported in the result of the contrast are report to our distributies is reported and is reported in the result of the contrast are report to our distributies is reported and is reported in the result of the contrast are report to our distributies is reported in the result of the contrast and report is reported in the result of the contrast and report is reported in the report of the contrast are report to report the report of the contrast are reported in the report of th		D0007	Determine With a set			O a second de la constituir de la Doopoo		F	
Link Bank 11 Tio Lany) Lany Share 10 and picto a lasm is been much be to depict to a lasm of the air gas condition that methanic gas condit that methanic gas condition th		P2097		Lean Fail Counts:	> 300 out of 1000 samples				
Lean) Lean Lean Lean Lean Lean Lean Lean Lean					Nata: 10 annuals accusts 1				
Posture dge conduitor that results in a emissions correlated failure. The acheory again will be mat by: The sample count threshold is results and evaluation attrate again. Image: conduition of the counter will be mather backers again. Image: conduition of the counter will be mather backers again. Additional notes, strategy and enable requirements: The post Catibyle O2. The above specified Sample Counter will norment if: voltage is outside a control woldage. The above specified Sample Counter will norment if: the above specified Sample Counter will norment if: voltage is outside a control woldage. The above specified Sample Counter will norment if: the above specified Sample Counter will norment if: voltage is outside a control woldage. The above specified Sample Counter will norment if: the above specified Fail Counter will increment if: voltage is outside a control woldage. The above specified Sample Counter will norment if: voltage is outside a control woldage. The above specified Sample Counter will norment if: voltage is outside a control woldage. The above specified Fail Counter will woldage. Partial Counter will be above approximation of the above approximation o						conditions)			
Pertor Catalyati Fuel Pass Feature: same for P2006, P2007, P2008, P2007 (cee P2006 for details) Image: source server ser	Lean)							rooms loop	1
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Peter Catalyst Fuel Peter Catalyst Fuel Page Past Feature: same for P2096, P2097, P2096, P2096 (see P2096 for details) Intervent of the Name as bank 1 not hank 1 (see P2006) Same enable conditions of P2096, P2097, P2096, P2096 (see P2096 for details) Prequency: 2			correlated failure.						1
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Post Catalyst Fuel P208 Same as bank 1 rich fault P2096 P2096 Frequency: 2 P2096 Frequency: 2 Trp(s) Type							See supporting tables: Selected		
Adjusted namestempt to adjusted namestempt to move the voltage back inside the control window. The control window. The control window. The offset value is used to adjust the form O2 sensor control to bias the bulk average exploration table is: the post ocalisyst O2 integral offset is:									
Post Catalyst Fuel P2096, P2097, P2098, P2099 (see P2096 for details) High Vapor (HV) Delay Feature: same as rich fault for bank 1 (ice P2096), P2097, P2098, P2099 (see P2096 for details) Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details) High Vapor (HV) Delay Feature: same as sinch fault for bank 1 (ice P2096), P2097, P2098, P2099 (see P2096 for details) Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond Note: Same as bank 1 rich fault (see gecond P2096)									
Post Catalyst Fuel P208 Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details) Rich Fail Counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Frequency: 2 2 Continuous Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Timit Bank 2 (Too Rich) Note: Same as bank 1 rich fault (see second P2006) Note: 10 sample counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Frequency: 2 2 Continuous 2 Note: Same as bank 1 rich fault (see second P2006) Note: Same as bank 1 rich fault (see second P2006) Note: 10 sample counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Frequency: 2 2 Continuous 100ms loop				(counts spent in the given cell while enab					
Post Catalyst Fuel P2096 P2096, P2097, P2098, P2099 (see P2096 for details) Rich Fail Counts Se supporting tables: < 22 LeanThresh				The above specified Fail Counter will in	crement if the Sample Counter i	increments AND:			
Post Catalyst Fuel P2096 Same as bank 1 rich Fail Courts: Same as bank 1 rich fault (see p2096) Same as bank 1 rich fault (see p2096) Frequency: 2 2 Rich) Note: Same as bank 1 rich fault (see p2096) Note: 10 sample counts = 1 Same as bank 1 rich fault (see p2096) Same as bank 1 rich fault (see p2096) Same as bank 1 rich fault (see p2096) Frequency: 2 2 Continuous Trip(S) Typ Note: Same as bank 1 rich fault (see p2096) Note: Same as bank 1 rich fault (see p2096) Note: 10 sample counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096) Frequency: 2 7				Filtered post O2 voltage is beyond the fail	threshold:				
bias the buk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained between trips. bias the buk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained between trips. Image: Control offset Max See supporting tables: Out of <u>Window Count</u> AND The post catalyst O2 integral offset is: See supporting tables: See supporting tables: See supporting tables: See supporting tables: See supporting tables: See supporting tables: Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details) High Vapor (HV) Delay Feature: same as rich fault for bank 1 (see P2096) Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich) P2088 Same as bank 1 rich fault (see P2096) Rich Fail Counts: > 500 out of 1000 samples Note: 10 sample counts = 1 Note: Same as bank 1 rich fault (see P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) Frequency: Trip(S) Typ Continuous Note: 10 sample counts = 1 Note: Same as bank 1 rich fault (see P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) Trip(S) Typ Continuous Note: 10 sample counts = 1 Note: Same as bank 1 rich fault (see P2096)							< O2 LeanThresh		
Post Catalyst Fuel Irin System Low Limit Bank 2 (Too P2098 Same as bank 1 rich fault Rich Fail Counts: > 500 out of 1000 samples Note: Same as bank 1 rich fault (see second P2096) Note: Same as bank 1 rich fault (see second P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 Frequency: P2098 2 Same enable conditions 2 Same enable conditions Prevent P2096, P2097, P2098, P2099 (see P2096 2 Continuous Monitoring in 100ms loop						for more than this more second	One was at the table of the f	-	
Image: Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich) P2096 P2096, P2097, P2098, P2099 (see P2096 for details) Rich) Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich) P2098 Same as bank 1 rich fault (see second P2096) Same as bank 1 rich fault (see second P2096) Same as bank 1 rich fault (see second P2096) Same as bank 1 rich fault (see second P2096) Panel Continuous Con						for more than this many counts:			
Offset value is retained between trips. The post catalyst 02 integral offset is: >= Integral offset Max >= Integral offset Max See supporting tables: >= Integral offset Max See supporting tables: Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details) Filt Coefficient See supporting tables: >= Integral offset Max See supporting tables: Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich) P2098 Same as bank 1 rich fault (see P2096) Frequency: Note: Same as bank 1 rich fault (see second P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) Frequency: Continuous Monitoring in 100ms loop 2 Trip(s) Typ B									
Post Catalyst Fuel Rich P2098 P2098 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Post Catalyst Fuel Rich P2098 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Mote - the Post O2 filter coefficient is: See supporting tables: Post O2 Filt Coefficient Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Note: Same as bank 1 rich fault Rich Fail Counts Note: 10 sample counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 for details) Note: Same as bank 1 rich fault (see second P2096) Note: 10 sample counts = 1 Note: The Bank1 faults listed in the P2096 section are replaced by: Note: The Bank1 faults listed in the P2096 section are replaced by:			offset value is retained				See supporting tables:	1	
Note - the Post O2 filter coefficient is: See supporting tables: Post O2 Filt Coefficient Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details) High Vapor (HV) Delay Feature: same as bank 1 rich fault (see P2096) Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich) P2098 Same as bank 1 rich fault (see P2096) Same as bank 1 rich fault (see P2096) Same as bank 1 rich fault (see P2096) Frequency: Continuous Note: 10 sample counts = 1 Note: 10 sample counts = 1 Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) Frequency: Continuous Noticiring in 100ms loop Z Trip(s) Typ			between trips.	The poor data for of integral encorter					
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Trim System Low Limit Bank 2 (Too Rich) (see P2096) (see P2096) Note: 10 sample counts = 1 P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096) enable conditions) Continuous Monitoring in 100ms loop Trip(s) Typ B Note: 10 sample counts = 1 P2096) Note: 10 sample counts = 1 P2096) Same enable conditions for P2096, P2097, P2098, P2099 (see P2096) enable conditions) Continuous Monitoring in 100ms loop Trip(s) Typ B		L							
Limit Bank 2 (Too Rich) Note: Same as bank 1 rich fault (see P2096) P2096) Note: 10 sample counts = 1 NOTE: The Bank1 faults listed in the P2096 section are replaced by:		P2098		Rich Fail Counts:	> 500 out of 1000 samples				
Rich) Note: Same as bank 1 rich fault (see P2096) 100ms loop NOTE: The Bank1 faults listed in the P2096 section are replaced by: 100ms loop			(see P2096)						Trip(s) Type
P2096) NOTE: The Bank1 faults listed in the P2096 section are replaced by:						enable cond	itions)		В
NOTE: The Bank1 faults listed in the P2096 section are replaced by:	Rich)							100ms loop	1
				P2096)					1
									1
						NOTE: The Bank1 faults listed in the P20	96 section are replaced by:	1	1
A/F Imbalance Bank2									1
						A/F Imbalance	e Bank2	1	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Oyotom	0000	Description	ontona	Value	O2S_Bank_2_Se O2S_Bank_2_Se	ensor_1_FA	Required	
			nd enable requirements: same as bank		020_bank_2_00	511301_2_1 A		
		Re-Pass Feature: same for High Vapor (HV) Delay Feat	P2096, P2097, P2098, P2099 (see P2096	for details)				
		The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the	Canister purging is active and Long term fuel correction is	<= 0.82	Filtered post O2 voltage is outside the window defined by:	See supporting tables: HV Post Low and HV Post High	When these conditions are met, HV is detected	
		fuel control system are present. This HV condition is indicated when the criteria to the right are met. In this		>= 5.0 sec	Integral offset is outside the window defined by:	See supporting tables: HV Integral Offset Low and HV Integral Offset High	and the diagnostic will temporarily	
		situation, the diagnostic will temporarily stop evaluation. When the HV condition	If HV has caused the diagnostic to stop evaluation, evaluation will resume when long term fuel correction is for				stop evaluation.	
		subsides, evaluation will resume.		> 0.85		Note: When either the filtered post O2 voltage or the integral offset returns to the above defined windows, the diagnostic will		-
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for			immediately resume evaluation.		
				>= 20.0 sec				
Post Catalyst Fuel Trim System High .imit Bank 2 (Too .ean)	P2099	Same as bank 1 lean fault (see P2097)			Same enable conditions for P2096, P2 enable cond		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Typ B
					NOTE: The Bank1 faults listed in the P20	096 section are replaced by:	1	
					A/F Imbalanc O2S_Bank_2_Se O2S_Bank_2_Se	ensor 1 FA		
		Additional notes, strategy a	ind enable requirements: same as bank	1 lean fault (see P2097)				
			P2096, P2097, P2098, P2099 (see P2096					
hrottle Actuator	P2101		ure: same as rich fault for bank 2 (see The throttle model and actual Throttle	r2098)		Run/crank voltage or Powertrain	15 / 15	Trips:
Control - Position Performance		error	or The actual Throttle position and throttle model differ by >	7.568 %.		relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts; 12.5 msec/count in the primary	1 Type: A MIL: YES
				7.568 %.			Droceeor	
					Engine Running or Ignition Voltage > and Ignition Voltage >	11 5.5		
					and Throttle is being Controlled			
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Ignition voltage failure is false (P1682)			
		Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Thottle Position >	39.26 %.	TPS minimum learn is active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	11 counts; 12.5 msec/count in the	
			Thottle Position >	39.06 %.	Reduce Engine Power is Active	power is false, else the failure will be reported for all conditions	primary	
APP1 Circuit	P2120	Detects a continuous or intermittent short or open in APP1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP1 Voltage < or Secondary APP1 Voltage >	0.463 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES
APP1 Circuit Low	P2122	Detects a continuous or intermittent short or open in APP1 circuit on both processors or just the primary processor	Primary APP1 Voltage <	0.463		No 5 V reference #2 DTC (P0651) Run/crank voltage or Powertrain relay voltage > 6.00 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	Trips: 1 Type: A MIL: YES
			Secondary APP1 Voltage <	0.463		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	the primary 19 / 39 counts or 14 counts continuous; 12.5 ms/count in	
APP1 Circuit High	P2123	Detects a continuous or intermittent short in APP1 circuit on both processors or just the primary processor	Primary APP1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	the secondary 19 / 39 counts or 14 counts continuous; 12.5 ms/count in	Trips: 1 Type: A MIL: YES
			Secondary APP1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	the primary 19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
APP2 Circuit	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the	Secondary APP2 Voltage < or Secondary APP2 Voltage >	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false. else the failure will	19 / 39 counts or 14	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	secondary processor but sensor is in range on the primary processor	Gittena	2.6	r aranieters	be reported for all conditions	continuous; 12.5 msec/count	A MIL: YES
						No 5 V reference #1 error	in the secondary processor	
						No 5 V reference #1 DTC (P0641)		
PP2 Circuit Low P2127 Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 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 primary	Trips: 1 Type: A MIL: YES		
		Secondary APP2 Voltage <	0.325		No 5 V reference #1 error	19 / 39 counts or 14		
				No 5 V reference #1 DTC (P0641)	counts continuous; 12.5 ms/count in the secondary			
PP2 Circuit Low P2128 Detects a continuous or intermittent short in APP2 circuit on both processors of just the primary processor	intermittent short in APP2 circuit on both processors or	Primary APP2 Voltage >	2.6		Run/crank voltage or Powertrain relay voltage > 6.00 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 primary	Trips: 1 Type: A MIL: YES	
		Secondary APP2 Voltage >	2.6		No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary		
P2135 Detects a continuous or P) Sensor 1-2 prrelation P2135 Detects a continuous or intermittent correlation fau between TPS sensors #1 and #2 on primary or secondary processor	intermittent correlation fault between TPS sensors #1 and #2 on primary or	Difference between (normalized min	6.998 % offset at min. throttle position with a linear threshold to 9.698 % at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the primary processor	Trips: 1 Type: A MIL: YES	
			TPS1) and (normalized min TPS2) >	4.999 % Vref		No TPS sensor faults (P0120, P0122, P0123, P0220, P0222, P0223) No 5V reference error or fault for # 2 5V reference circuit (P0651)		
		Difference between TPS1 displaced and TPS2 displaced >	6.998 % offset at min. throttle position with a linear threshold to 9.698 % at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 15 counts continuous:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Difference between (normalized min TPS1) and (normalized min TPS2) >	5.000 % Vref		No TPS sensor faults (P0120, P0122, P0123, P0220, P0222, P0223) No 5V reference error or fault for # 2 5V reference circuit (P0651)	12.5 ms/count in the secondary processor	
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on primary or secondary processor	Difference between (normalized min	10.001 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 15 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			APP1) and (normalized min APP2) >	5.000 % Vref		No APP sensor faults (P2120, P2122, P2123, P2125, P2127, P2128) No 5V reference error or fault for #1 or # 2 5V reference circuits (P0641, P0651)		
				10.001 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 15 counts continuous; 12.5 ms/count in the secondary	
			Difference between (normalized min APP1) and (normalized min APP2) >	5.000 % Vref		No APP sensor faults (P2120, P2122, P2123, P2125, P2127, P2128) No 5V reference error or fault for #1 or # 2 5V reference circuits (P0641, P0651)	processor	
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ target temperature of 75 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.				30 failures out of 90 samples 1 sec /sample	2 trips Type B
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.		No Active DTC's	MAF_SensorFA IAT_SensorFA	Once per ignition key cycle	
						THMR_RCT_Sensor_Ckt_FA		
						THMR_ECT_Sensor_Ckt_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		Engine not run time	≥ 1800 seconds		
					ECT at Power Up	90 ≤ Time ≤ 1370 seconds Ethanol ≤ 87%		
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 Primary processor, TPS Voltage > or	0.935		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2.0 secs continuous	Trips: 1 Type: A MIL: YES
			During TPS min learn on the Secondary processor, TPS Voltage >	0.935	No TPS circuit errors No TPS circuit faults P1682 is not active Minimum TPS learn active			
			and Number of learn attempts > AND TPS2 Voltage > On the Primary processor OR TPS1 Voltage > AND TPS2 Voltage > On the Secondary processor	10 counts 1.789 1.689 1.789	Throttle de-energized No TPS circuit faults PT Relay Voltage >	5.5		
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ target temperature of 75 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start. Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.		No Active DTC's	MAF_SensorFA IAT_SensorFA	30 failures out of 90 samples 1 sec /sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
- Cystem	0000	Description	Gradia	value			Required	
						THMR_ECT_Sensor_Ckt_FA		
			Ratio Definition:		Engine not run time	≥ 1800 seconds		
			Current temp difference between ECT					
			and RCT minus PwrUp difference divided					
			by total airgrams. Note: Minimum total airgrams is 500.0					
			grams.					
						$90 \le \text{Time} \le 1370 \text{ seconds}$		
					ECT at Power Up	Ethanol ≤ 87%		
						-7.0 ≤ ECT ≤ 70.0 °C		
						$-7^{\circ}C \le IAT \le 55^{\circ}C.$		
					Airflow	17.0 ≤ Airflow ≤ 450.0 GPS		
Air Fuel Imbalance	P219A	Determines if the air-fuel	Bank 1 Filtered Length Ratio variable	> 1.90	System Voltage	10 <= V <= 32 for >= 4 seconds	Frequency:	2
Bank 1		delivery system is		at any time during the trip	ECT	> -20 degC	Continuous	Trip(s) Type B
		imbalanced by monitoring the pre and post catalyst O2			Engine Run Time		Monitoring of O2 voltage	в
		sensor voltage					signal in	
		characteristics.	OR		Engine speed	1250 <= rpm <= 3750	12.5ms loop	
			Bank 1 AFM (DoD) Filtered Length Ratio	> 1.00	-			
			variable (AFM applications only)	at any time during the trip				
					Engine speed change during the current		The AFIM	
					3.13 sec sample period is <=	8192 rpm	Filtered	
		To improve S/N, pre-catalyst	AND			10.0 <= g/s <= 510.0	Length Ratio	
		O2 voltages between 1000 and 0 millivolts are ignored.	Bank 1 Filtered Post catalyst O2 voltage is NOT between		Air Per Cylinder	120 <= mg/cylinder <= 680	variable is	
		This feature is enabled at Air	13 NOT Detween	1000 and 0 millivolts			updated after every 3.13	
		Per Cylinder values <= 0	Note: If the first voltage value is >= the				seconds of	
		mg/cylinder.	second voltage value, this is an indication				valid data.	
		Note: If the first voltage	that the post catalyst O2 data is not used for diagnosis on this application.		Air Per Cylinder change during the			
		value is >= the second	for diagnosis on this application.		current 3.13 sec sample period is <= % Ethanol	8192 mg/cylinder <= 87 %	The first	
		voltage value, AND/OR the			Positive (rising) Delta O2 voltage during	<= 87 % > 5.0 millivolts	report is delayed for	
		Air Per Cylinder value is			previous 12.5ms is		131 seconds	
		equal to zero, the feature is not used on this application			OR		to allow time	
		and the full pre-catalyst O2			Negative (falling) Delta O2 voltage during		for the AFIM	
		voltage range is utilized.			OR		Filtered Length Ratio	
					Negative (falling) Delta O2 voltage during	< -5.0 millivolts	variable to	
					previous 12.5ms is		saturate.	
							This	
					For AFM (Cylinder Deactivation) vehicles	No AFM state change during	minimizes the	
					only	current 3.13 second sample	possibility of	
						period.	reporting a	
					O2 sensor switches	>= 1 times during current 3.13	pass before a potential	
						second sample period	failure could	
					Quality Factor	~ -0.74 in the ourrest energy is	be detected.	
		Monitor Strategy Notes: The	The AFIM Filtered Length Ratio is the	The Quality Factor (QF)	Quality Factor	>= 0.74 in the current operating region		
		AFIM Filtered Length Ratio	difference between the measured String	calibrations are located in a 17x17	No EngineMisfireDetected_FA		1	
1		is derived from the pre-O2	Length and a 17x17 table lookup	lookup table versus engine speed	No MAP_SensorFA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code		5		No MAF_SensorFA	Conditions	Required	mum.
		sensor voltage metric known	value, divided by the same lookup value,	and load (see Supporting Tables).	No ECT Sensor FA			
		as String Length. String	and finally multiplied by a Quality Factor	A QF of "1" is an indication that	No Ethanol Composition Sensor FA			
		Length is simply the curve	(the latter ranges between 0 and 1, based		No TPS_ThrottleAuthorityDefaulted			
		length of the O2 sensor	on robustness to false diagnosis in the	4sigma/2sigma robustness in that	No FuelInjectorCircuit_FA			
		voltage over a fixed time	current operating region). The reason we	speed/load region. QF values less	No AIR System FA			
		period of 3.13 seconds. The	use a ratio of the String Lengths is so that	than "1" indicate that we don't	No O2S_Bank_1_Sensor_1_FA			
		reason we use String Length	we can normalize the failure metric over	have 4sigma/2sigma robustness	No O2S_Bank_2_Sensor_1_FA			
		is because it comprehends	various engine speed and load regions	in that region. The quality of the	No EvapPurgeSolenoidCircuit FA			
		both O2 signal frequency	since engine speed and load directly	data is determined via statistical	No EvapFlowDuringNonPurge_FA			
		and amplitude in one metric.	impact pre-O2 String Length, especially	analysis of String Length data. QF	No EvapVentSolenoidCircuit_FA			
		The busier the O2 voltage	when AFIM failures are present. In order	values less than 0.74 identify	No EvapSmallLeak FA			
		(an indication of imbalance),	to filter out signal noise (to avoid false	regions where diagnosis is not	No EvapEmissionSystem_FA			
					No FuelTankPressureSensorCircuit_FA			
		the longer the String Length	failures), the Length Ratio is filtered using		Device Control Not Active			
		will be.	a common first-order lag filter. The result		Intrusive Diagnostics Not Active			
			is the AFIM Filtered Length Ratio.		Engine OverSpeed Protection Not Active			
					Reduced Power Mode (ETC DTC) Not Active	in co		
					PTO Not Active	live		
					Traction Control Not Active			
					Traction Control Not Active			
					Evel Querter I	0 1-1		
					Fuel Control			
					Closed Loop	Enabled		
					Long Term FT	Enabled		
						Please see "Closed Loop		
						Enable Criteria" and "Long		
						Term FT Enable Criteria" in		
					Supporting Tables.			
						eappering ranicer		
					Cumulative (absolute) delta MAF during	< 500 q/s		
					the current 3.13 second sample period is	0		
					···· · · · · · · · · · · · · · · · · ·	Note: This protects against false		
					Note: This protects against false	diagnosis during severe transient		
						с с		
					diagnosis during severe transient	maneuvers.		
					Data collection is suspended under the	- for 0.5 seconds after AFM		
					following circumstances:	transitions		
					following circumstances.			
						- for 0.5 seconds after Closed		
						Loop transitions from Off to On		
						 for 0.5 seconds after purge 		
						transitions from Off to On or On to		
						Off		
						- for 0.5 seconds after the AFIM		
						diagnostic transitions from		
						Disabled to Enabled		
	D0/							
r Fuel Imbalance	P219B	Determines if the air-fuel	Bank 2 Filtered Length Ratio variable	> 1.90	System Voltage	10 <= V <= 32 for >= 4 seconds	Frequency:	2
ank 2		delivery system is		at any time during the trip			Continuous	Trip(s) Typ
		imbalanced by monitoring				> -20 oC	Monitoring of	В
		the pre and post catalyst O2			Engine Run Time		O2 voltage	
		sensor voltage				>= 10 seconds	signal in	
		characteristics.			Engine speed	1250 <= rpm <= 3750	12.5ms loop	
		0110100(01101103.	OR				12.0113 100p	
			Bank 2 AFM (DoD) Filtered Length Ratio	> 1.00	1			
			variable (AFM applications only)	at any time during the trip				
			(anabio () a mappiloations only)	at any time during the trip				
					Engine speed change during the current		The AFIM	
					3.13 sec sample period is <=			
		To improve S/N pro potchist	AND	!		$10.0 \le q/s \le 510.0$	Filtered	
		To improve S/N, pre-catalyst	AND				Length Ratio	
		O2 voltages between 1000 and 0 millivolts are ignored.	Bank 2 Filtered Post catalyst O2 voltage is NOT between		Air Per Cylinder	120 <= mg/cylinder <= 680	variable is	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MI
System	Code	Description	Criteria	Value 1000 and 0 millivolts	Parameters	Conditions	Required	illur
		This feature is enabled at Air	Neter If the first value or value is the	1000 and 0 minivoits			every 3.13	
		Per Cylinder values <= 0	Note: If the first voltage value is >= the				seconds of	
		mg/cylinder.	second voltage value, this is an indication				valid data.	
		Number of the Contraction	that the post catalyst O2 data is not used		Air Per Cylinder change during the			
		Note: If the first voltage	for diagnosis on this application.		current 3.13 sec sample period is <=	8192 mg/cylinder	The first	
		value is >= the second			% Ethanol	<= 87 %	report is	
		voltage value, AND/OR the			Positive (rising) Delta O2 voltage during	> 5.0 millivolts	delayed for	
		Air Per Cylinder value is			previous 12.5ms is		150 seconds	
		equal to zero, the feature is			OR		to allow time	
		not used on this application			Negative (falling) Delta O2 voltage during		for the AFIM	
		and the full pre-catalyst O2			previous 12 5ms is		Filtered	
		voltage range is utilized.			Negative (falling) Delta O2 voltage during	- E 0 millivalto	Length Ratio	
						< -5.0 millivolts	variable to	
					previous 12.5ms is		saturate.	
							This	
							minimizes	
					For AFM (Cylinder Deactivation) vehicles	No AFM state change during	the	
					only	current 3.13 second sample	possibility of	
					-	period.	reporting a	
							pass before	
					O2 sensor switches	>= 1 times during current 3.13	a potential	
						second sample period	failure could	
					Quality Factor	>= 0.74 in the current operating	be detected.	
		Monitor Strategy Notes: The	The AFIM Filtered Length Ratio is the	The Quality Factor (QF)		1 0		
		AFIM Filtered Length Ratio	difference between the measured String	calibrations are located in a 17x17	No EngineMisfireDetected FA	reaion		
		is derived from the pre-O2	Length and a 17x17 table lookup	lookup table versus engine speed	No MAP SensorFA		1	
			value, divided by the same lookup value,	and load (see Supporting Tables).	No MAF_SensorFA		1	
			and finally multiplied by a Quality Factor	A QF of "1" is an indication that	No ECT_Sensor_FA		1	
		Length is simply the curve	(the latter ranges between 0 and 1, based	we were able to achieve at least	No Ethanol Composition Sensor FA			
		length of the O2 sensor	on robustness to false diagnosis in the	4sigma/2sigma robustness in that	No TPS_ThrottleAuthorityDefaulted			
		voltage over a fixed time	current operating region). The reason we		No FuelInjectorCircuit_FA		-	
			use a ratio of the String Lengths is so that		No AIR System FA		-	
			we can normalize the failure metric over	have 4sigma/2sigma robustness	No O2S_Bank_1_Sensor_1_FA No O2S Bank 2 Sensor 1 FA		-	
		is because it comprehends	various engine speed and load regions	in that region. The quality of the	No EvapPurgeSolenoidCircuit_FA		-	
		both O2 signal frequency	since engine speed and load directly	data is determined via statistical	No EvapFlowDuringNonPurge FA		-	
			impact pre-O2 String Length, especially	analysis of String Length data. QF	No EvapVentSolenoidCircuit_FA		-	
		The busier the O2 voltage	when AFIM failures are present. In order	values less than 0.74 identify	No EvapSmallLeak FA		- 1	
		(an indication of imbalance),	to filter out signal noise (to avoid false	regions where diagnosis is not	No EvapEmissionSystem_FA		1	
			failures), the Length Ratio is filtered using		No FuelTankPressureSensorCircuit_FA		1	
		will be.	a common first-order lag filter. The result	1	Device Control Not Active		_	
			is the AFIM Filtered Length Ratio.		Intrusive Diagnostics Not Active		-	
					Engine OverSpeed Protection Not Active		-	
					Reduced Power Mode (ETC DTC) Not Ac	tive	-	
					PTO Not Active Traction Control Not Active		-	
					Traction Control Not ACtive			
					Fuel Control	Status	1	
					Closed Loop	Enabled	1	
					Long Term FT	Enabled		
						Please see "Closed Loop		
						Enable Criteria" and "Long		
						Term FT Enable Criteria" in		
						Supporting Tables.		
						500 //	-	
					Cumulative (absolute) delta MAF during	< 500 g/s		
					the current 3.13 second sample period is	Nata This and starts and start t		
						Note: This protects against false		
					Note: This protects against false	diagnosis during severe transient		
1								

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Data collection is suspended under the following circumstances:	- for 0.5 seconds after AFM transitions - for 0.5 seconds after Closed Loop transitions from Off to On - for 0.5 seconds after purge transitions from Off to On or On to Off - for 0.5 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Fuel Conductivity Out Of Range (water in fuel)	P2269	Detects the presence of High Conductivity Fuel (e.g. water in fuel) via a specific range of sensor frequency. High conductivity in the fuel causes a significant upward shift in the sensor's output frequency.	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samoles 100 ms loop Continuous	1 trip(s) Type A
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.	The Accumulated mass air flow monitored during the Stuck Lean Voltage	1) Post O2S signal < 830 mvolts AND 2) Accumulated air flow during stuck lean test > 230 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given CR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are clowed	2 trips Type B
					B1S2 Failed this key cycle System Voltage	EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Jystem	Code	Description	ontena	Value	ICAT MAT Burnoff delay		Required	indin.
					Green O2S Condition Low Fuel Condition Diag	 Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. = False (See Supporting Tables) 		
					Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)			
					Engine Airflow	1050 <= RPM <= 2650 3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)			
						36.0 mph <= Veh Speed <= 87.0 mph		
						0.74 <= C/L Int <= 1.08		
					Ethanol	= TRUE not in control of purge not in estimate mode = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab.		
					Power Take Off	= not active		
					EGR Intrusive diagnostic			
					All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State	>= 80.0 sec		
					All of the above met f seconds, and then the For stage is requ	ce Cat Rich intrusive		
					During Stuck Lean te must stay TRUE or th Commanded Fuel	e test will abort		
						0.95 <= EQR <= 1.10		[

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System O2 Sensor Signal	Code P2271	Description This DTC determines if the	Criteria Post O2 sensor cannot achieve the lean	1) Post O2S signal > 150 mvolts	Parameters No Active DTC's	Conditions	Required Frequency:	illum. 2 trips Type
Stuck Rich Bank 1	F Z Z I I	post catalyst O2 sensor is	threshold voltage.	T) Post 023 signal > 150 monts	No Active DTC 3		Once per trip	B
Sensor 2		stuck in a normal rich		AND			ence per aip	5
		voltage range and thereby	AND			TPS_ThrottleAuthorityDefaulted		
		can no longer be used for		2) Accumulated air flow during			Note: if	
		post oxygen sensor fuel	The Accumulated mass air flow	stuck rich test > 82 grams.			NaPOPD_b_ ResetFastRe	
		control or for catalyst	monitored during the Stuck Rich Voltage				spFunc=	
		monitoring. The diagnostic is an intrusive test which	Test is greater than the threshold before the above voltage threshold is met.				FALSE for	
		requests the DFCO mode to	the above voltage threshold is met.			FOT OLIVE FA	the given	
		achieve the required lean				ECT_Sensor_FA IAT_SensorFA	OR Dook	
		threshold.					NaPOPD b	
							RapidRespo	
							nseActive =	
						TRUE,		
						multiple tests		
					MAF_SensorFA	per trip are		
						MAP_SensorFA	allowed	
			AIR System FA					
						FuelInjectorCircuit_FA FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
						P013A, P013B, P013E, P013F or		
					B1S2 Failed this key cycle	P2270		
					System Voltage	10.0 volts < system voltage< 32.0		
						volts		
					ICAT MAT Burnoff delay	= Not Valid		
						= Not Valid, See definition of		
						Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S2,		
					Green O2S Condition	B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
						(See Supporting Tables)		
					Engine Speed	1100 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	40.4 mph <= Veh Speed <= 82.0		
						mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethano	not in estimate mode		
					Post fuel cell		1	
						Multiple DTC Use - Block learn	1	
						cells to enable Post oxygen sensor tests in Supporting	1	
						Tables tab.	1	
					Power Take Off			
						not optivo		
I	I	1	I	I	EGR Intrusive diagnostic	= not active	1	I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State DTC's Passed DTC's Passed	= not active >= 80.0 sec 550 °C <= Cat Temp <= 900 °C = DFCO possible = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) ons are met: continued		
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 830 mvolts AND 2) Accumulated air flow during stuck lean test > 230 grams.	B2S2 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Not Valid = Not Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. = False (See Supporting Tables)	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Encl Dool OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are offormed	2 trips Type B
					System Voltage ICAT MAT Burnoff delay Green O2S Condition	FuelTrimSystemB1_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Not Valid = Not Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. = False (See Supporting Tables)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Reguired	MIL illum.
					Engine Speed range to keep test enabled (after initially enabled)			
						1050 <= RPM <= 2650		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	40.4 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	36.0 mph <= Veh Speed <= 87.0 mph 0.74 <= C/L Int <= 1.08		
					Ethanol	= TRUE not in control of purge not in estimate mode = Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab.		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time Predicted Catalyst temp Fuel State	>= 80.0 sec 550 °C <= Cat Temp <= 900 °C = DFCO possible		
					All of the above met f seconds, and then the intrusive stage is	Force Cat Rich		
					During Stuck Lean te must stay TRUE or th Commanded Fuel			
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	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	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before	 Post O2S signal > 150 mvolts AND Accumulated air flow during stuck rich test > 82 grams. 	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for	2 trips Type B
		is an intrusive test which requests the DFCO mode to	the above voltage threshold is met.			ECT_Sensor_FA IAT_SensorFA	the given	

Component/ System	Fault Code	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Oystein	ooue	Description achieve the required lean threshold.	Onena	Value	T arameters	Conditions	NaPOPD_b_	indin.
		unesnoid.					RapidRespo nseActive =	
							TRUE, multiple tests	
						MAF_SensorFA	per trip are	
						MAP_SensorFA AIR System FA	allowed	
						FuelInjectorCircuit_FA		
						FuelTrimSystemB1_FA FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA P013C, P013D, P014A, P014B or		
					B2S2 Failed this key cycle	P2272 10.0 volts < system voltage< 32.0		
					System Voltage			
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid		
						= Not Valid, See definition of Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S2,		
					Low Fuel Condition Diag	B2S2) in Supporting Tables tab.		
						= False (See Supporting Tables)		
					Engine Speed	1100 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 gps 40.4 mph <= Veh Speed <= 82.0		
					Vehicle Speed			
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= Enabled. See definition of Multiple DTC Use - Block learn		
						cells to enable Post oxygen sensor tests in Supporting		
						Tables tab.		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays			
					O2S Heater on Time	>= 80.0 sec		
					Fuel State	550 °C <= Cat Temp <= 900 °C = DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if		
					DTC's Passed	applicable)) = P013A (and P013C (if		
I	I	I			l	applicable))		I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditi DFCO mode is (wo driver initiated	continued		
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 Message <> previous message rolling count value + one Transmission torque request value or request type dual store not equal > 450 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic enabled/disabled Power Mode Engine Running Run/Crank Active	Enabled = Run = True > 0.50 Sec	 >= 16 Protect errors during key cycle >= 6 Rolling count errors out of ten samples >= 3 RAM errors during key cycle >= 3 out of 10 samples >= 3 multi- transitions out of 5 Performed every 12.5 msec 	2 trip(s) Type B
Torque Management Request Input Signal B	P2548	Determines if the performance launch torque request is valid	Protect error - Serial Communication message - (\$1C8 Message)	Message <> two's complement of message	Diagnostic enabled/disabled Run/Crank Active and Above minimum voltage threshold	Enabled > 0.50 Sec	>= 10 Protection	2 trip(s) Type B
			OR <u>Rolling count error</u> - Serial Communication message (\$1C8) rolling count value	Message <> previous message rolling count value + one	Voltage No serial communication loss to EBTCM (U0121)	> 6.00 Volts	errors during key cycle >= 3 Rolling count errors out of 10 samples Performed	-
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine off timer does not initialize or count properly. Clock rate test: Checks the accuracy of the 1	Initial value test: Initial ignition off timer value OR Initial ignition off timer value	< 0 seconds > 10 seconds	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	every 100 msec Initial value test: 3 failures 1.375 sec / sample	2 trips Type B DTC sets on next key cvcle if

Component/ System	Fault Code	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description second amer by companing it with the 12.5 ms timer	Clock rate test: Time between ignition off timer increments	< 0.8 seconds	Faralleters	Conditions	Clock rate test: 8 failures out	failure detected
			Time between ignition off timer increments	> 1.2 seconds			of 10 samples	
			Time since last ignition off timer increment				1 second / sample	
				≥ 1.375 seconds			test runs once each key-off	
			Current ignition off time < old ignition off time				Key-on	
			Current ignition off timer minus old ignition off timer	≠ 1				
Engine Serial Number (ESN) Not Programmed or Incompatible	P264F	This DTC will be stored if the Engine Serial Number (ESN) has not been programmed.	Any ESN digits	= FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A 1 trips
(OBD_HD >14K only)								
Deactivation	P3400	Detects a "failed to deactivate" condition when	ABS(Measured MAP – MAP Model 2) Filtered		DIAGNOSTIC ENABI	E CONDITIONS	100 cylinder	
System Performance		Deactivation Mode allowed:	AND ((Measured MAP – MAP Model 2) filtered) (stored from previous all-Cylinder mode event) - ((Measured MAP – MAP	< -8 kPa	Total filtered residual weight factors ECT IAT Engine RPM	>= 0.1 factor > -7 and < 125 Deg C > -20 and < 125 Deg C > 450 and < 8000 RPM	deactivation lag residual failures out of 200 samples	2 trip(s) Type B
			Model 2) filtered) (<i>current</i>)	> 10 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual Weighting Factors	Performed once every 100 msec	
							_	
					CYLINDER DEACTIVATION (Conditions below must be met for > deactivation w	= 0.25 seconds before cylinder		
					Engine running Engine RPM	> 60.0 seconds > EngSpeedLwrLimitEnableTable		
						AND < EngSpeedUprLimitEnableTable Details on Supporting Tables Tab (P3400 Section)		
					Engine coolant	>= 78.0 and <= 126.5 Deg C		
					Ignition voltage Pedal Commanded Throttle Area	>= 11.0 and <= 32.0 Volts		
					Brake booster vacuum	< 6 Percent >= 45.0 kPa		
					Engine oil temp	>= 18 and <= 130 Deg C		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Transmission gear	Conditions HalfCylDisabledTransGr and	Required	illum.
					Transmission gear	HalfCylDisabledTransGrDeviceCo		
						ntrol (when in device control) -		
						See details on Supporting Tables		
						Tab (P3400 Section)		
					Vehicle speed	>= 14 MPH		
					FCO not active for	>= 3.0 Seconds		
					Time since last cylinder deac mode event			
						>= 3.0 Seconds		
					Gear shift	Not currently in progress		
					AC Obstate transition			
					AC Clutch transition Tip In Bump	Not currently in progress Not active		
					Accelerator pedel delta			
						<= 50.0 Percent in 12.5 ms		
					Engine oil pressure	>= 172 and <= 470 kPa		
					Filtered engine vacuum	> AllCylToHalfCylVacuum or		
						EcoAllCyIToHalfCyIVacuum (in		
						Eco mode) - See details on Supporting Tables Tab (P3400		
						Section) for 0.0 sec.		
					PRNDL state	HalfCylDisabledPRNDL and		
					PRINDL STATE	HalfCylDisabledPRNDLDeviceCo		
						ntrol tables (when in device		
						control) - See details on		
						Supporting Tables Tab (P3400 Section)		
					Oil aeration present			
						Aeration enabled by engine RPM		
						> 3100 for 10 seconds, disabled		
						by engine RPM < 3000 for 50		
					After exiting deac mode, must be in all	seconds		
					cylinder mode for			
					DFCO mode	>= 60 seconds Not currently in DFCO		
					Fuel shut off mode other than DFCO			
						Not currently in fuel shut-off		
					ETC Power management mode			
						Not active		
					Heater performance	Not in Heater Performance Mode		
					POSD Intrusive	POSD diagnostic not active		
					POPD Intrusive	POPD diagnostic not active		
					Low range 4WD	Not in Low Range 4WD		
					AFM is disabled at high percent ethanol	-		
						Ethanol concentration > 95 % disables AFM. Once disabled,		
						ethanol concentration must be <		
•	•		· ·		-	•	. 1	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions 85 % to re-enable	Required	illum.
					If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress			
						Feature is Disabled		l
					IF DEACTIVATED, ANY OF THE CON CYLINDER REA			
					If deactivation mode is active for	>= 480 seconds		
					then reactivation will occur if:	>= 600 seconds		
					Deac mode active			
					Delta vacuum Engine RPM	> 5 or < -5 kPa		1
					Engine KPM	> EngSpeedLwrLimitDisableTable AND < EngSpeedUprLimitDisableTable - Details on Supporting Tables Tab (P3400 Section)		
					Engine power limited mode Pedal Commanded Throttle Area Piston protection	Active > 6 Percent Active		
					Engine oil temperature Engine oil pressure	< 18 or > 130 Deg C < 172 or > 470 kPa		
					Oil aeration present	Aeration enabled by engine RPM > 3100 for 10 seconds, disabled by engine RPM < 3000 for 50 seconds		
					Engine metal overtemp protection			
					Accelerator pedel delta	Active		
					In device control only, if PNDRL in Park or Neutral, vehicle speed	<= 50.0 percent in 12.5 ms		
					Transmission gear	<= 5.0 MPH HalfCylDisabledTransGr and HalfCylDisabledTransGrDeviceCo ntrol (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					PRNDL state	HalfCyIDisabledPRNDL and HalfCyIDisabledPRNDLDeviceCo ntrol tables (when in device control) - See details on		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions Supporting Tables Tab (P3400 Section)	Required	illum.
					Ignition voltage Engine coolant	< 11.0 or > 32.0 Volts >= 78.0 and <= 126.5 Deg C		
					Vehicle speed Brake booster vacuum Filtered engine vacuum	< 5 MPH < 40.0 kPa > HalfCyIToAllCyIVacuum or EcoHalfCyIToAllCyIVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					ETC Power management mode			
					Converter overtemp protect Hot coolant mode Engine running	Active Active Active = False		
					Engine overspeed protection Engine metal overtemp protect	Active		
					Cat. temp low POSD Intrusive FWD Engine misfire Heater performance	Active Active In low range Detected		
					POPD Intrusive	Active Active		
					No active DTC's	Fault bundles: Map SensorFA VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CyInderDeacDriverTFTKO FourWheelDriveLowStateValid EngineTorqueEstInaccurate TransmissionGearDefaulted EnginePowerLimited		
Cylinder 1 Deactivation	P3401	Circuit electrical integrity for	The ECM detects that commanded state of driver and actual state of the control		Engine RPM	>= 400.0 RPM	20 failures out of 25	
Solenoid Control Circuit		cylinder #1	circuit do not match. (Short to ground, short to voltage, open circuit)		Ignition Voltage	<= 32.0 and >= 11.0 Volts	samples	2 trip(s) Type B
I					Diagnostic enabled/disabled			,,,,_

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions Enabled	Required Performed	illum.
						Linabled	every 250	
Cylinder 4 Deactivation	P3425	Circuit electrical integrity for	The ECM detects that commanded state of driver and actual state of the control		Engine RPM	>= 400.0 RPM	254 failures out of 25	
Solenoid Control Circuit		cylinder #4	circuit do not match. (Short to ground, short to voltage, open circuit)		Ignition Voltage	<= 32.0 and >= 11.0 Volts	samples	2 trip(s) Type B
					Diagnostic enabled/disabled	Enabled	Performed every 250 msec	71
Cylinder 6 Deactivation	P3441	Circuit electrical integrity for	The ECM detects that commanded state of driver and actual state of the control		Engine RPM	>= 400.0 RPM	254 failures out of 25	2 trip(s)
Solenoid Control cylinder #6 Dircuit	cylinder #6	circuit do not match. (Short to ground, short to voltage, open circuit)		Ignition Voltage	<= 32.0 and >= 11.0 Volts	samples	Type B	
					Diagnostic enabled/disabled	Enabled	Performed every 250 msec	
Cylinder 7 Deactivation	P3449	Circuit electrical integrity for	The ECM detects that commanded state of driver and actual state of the control		Engine RPM	>= 400.0 RPM	254 failures out of 25	2 trip(s)
Solenoid Control Circuit		cylinder #7	circuit do not match. (Short to ground, short to voltage, open circuit)		Ignition Voltage	<= 32.0 and >= 11.0 Volts	samples	Z (fip(s) Type B
					Diagnostic enabled/disabled	Enabled	Performed every 250 msec	
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 5 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		Туре В
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 many counts	12 counts	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	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Туре В
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters A message has been selected to monitor.	Conditions	Required	illum.
					· · · · · · · · · · · · · · · · · · ·			
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this many counts	12 counts	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	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Туре В
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
				Normal Transmit capability is TRUE				
					The diagnostic system is not disabled			
					The bus has been on for	> 5 seconds		
					A message has been selected to monitor.			
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this many counts	12 counts	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	1 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Туре С
					Communication bus is not OFF			Special Type C
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 5 seconds	1	

17 OBDG06 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					A message has been selected to monitor.			
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for this many counts	12 counts	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	1 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Туре С
					Communication bus is not OFF			Special Type C
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

FAPD Section

P2096, P2097, P2098, P2099 Cell Accum Min Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Heavy Bank1 Heavy Post O2 Air Flow Mode Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Accel Accel Accel Accel Accel

P2097, P2099 Integral Offset Max

 P2007, P2009 Integral Offset Max

 Post C2 Air Flow Mode Decel
 Idle
 Cruise
 Light Accel
 Heavy Accel

 Post C2 Integral Offset
 Max [mV]
 130
 130
 380
 380

P2096, P2098 Integral Offset Min

Post O2 Air Flow Mode Decel Idle Cruise Light Accel Heavy Accel Post 02 Air How mode Jeruen . Post 02 Integral Offset Min ImVI -140 -140 -390 -390 -390

P2097, P2099 O2 Lean Thresh

P.29/, 2029 Oztean Infrees Bank 2 Decel Bank 2 Decel Bank 2 Decel Bank 2 Decel Accel 670 O2 Lean Threshold [mV] 670

P2096, P2098 O2 Rich Thresh

 Bank1
 Bank2
 Bank1 Light
 Bank1 Heavy
 Bank1 Heavy

 Post 02 Airflow Mode Cell Bank2 Decel
 Bank1 Idle
 Bank2 Cruise
 Cruise
 Accel
 Accel</td O2 Rich Threshold [mV] 820 820 820 820

P2096, P2097, P2098, P2099 Out Of Window Count

Post O2 Airflow Mode Cell Decel Idle Cruise Light Accel Heavy Accel Out of Window Count (10 0 0 0 0 0 counts = 1 sec.)

P2096, P2097, P2098, P2099 Selected Cells

Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Accel Accel Accel Accel Accel Accel Accel Post O2 Airflow Mode 0 0 0 0 1 1 1 1 1 1 Selected Cell

0 if not selected, 1 if selected

P2096 P2097 P2098 P2099 HV Post Low

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Heavy Bank2 Heavy Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Accel Post 02 Artillow mode Cell Latin Court - -----KaFAPD_U_HV_PO2_Filt 695 695 695 695 695 695 695 695 695 695 695

P2096, P2097, P2098, P2099 HV Post High

Pader, Pader, Pader, Pader Pader, Pader Pa KaFAPD_U_HV_PO2_Filt HiThresh 795 795 795 795 775 775 785 785

785 785 P2096, P2097, P2098, P2099 HV Integral Offset Low

Bank1 Bank2 Bank1 Light Bank1 Heavy Bank2 Heavy Post 02 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Acce KaFAPD_U_HV_PO2_IntO ffLoThresh -115 -115 -115 -365 -365 -365 -365 -365 -365

P2096, P2097, P2098, P2099 HV Integral Offset High

- Bank1 Bank2 Bank1 Light Bank1 Light Bank1 Heavy Bank2 Heavy Post 02 Airtlow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Accel Accel Accel Accel
 KarAPD_UHV_PO2_IntO
 KarAPD_UTV_FO2_IntO
 KarAPD_UTV_FO2_IntO 355 355 355

P2096, P2097, P2098, P2099 Post O2 Filt Coefficient

Bank 1 Index Bank 2 Index Bank 1 Index Bank 2 Index Bank 1 Index Bank 2 Index Bank 1 Index Bank 2 Index Bank 1 Index Bank 1 Index Bank 2 Index Bank and Index 0 0 1 1 2 2 3 3 4 4 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 Filter Coefficient Current Filtered Post O2 0 0 500 500 600 600 700 700 800 800 Voltage

P0068: MAP / MAF / TPS Correlation

X-axis is TPS (%)

		Data is MAP	threshold (kPa)					
X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	34.1953	32.3125	30.2031	25.6172	23.5313	22.3281	21.7734	100.0000	100.0000
		X axis is TPS	(%)						
		Data is MAF	threshold (grar	ns/sec)					
X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	26.9766	29.7813	31.2813	36.2813	44.2734	63.9844	69.0078	255.0000	255.0000
		X axis is Eng	ine Speed (RP	M)					
		Data is max M	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	25.0000	60.0000	100.0000	140.0000	180.0000	220.0000	250.0000	280.0000	300.0000
		X axis is Batt	ery Voltage (V))					
		Data is max M	AF vs Voltage	e (grams/sec)					
X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	0.0000	18.0000	40.0000	75.0000	135.0000	250.0000	500.0000	500.0000	500.0000

P1682: Ignition Voltage Correlation

		X-axis is IAT	(DegC)			
		Data is Voltag	e threshold (V)		
X-axis	23.0000	85.0000	95.0000	105.0000	125.0000	
Data	7.0000	8.6992	9.0000	9.1992	10.0000	l

D0226	Knock	Detection	Enchlod	Fastara
P0326	кпоск	Detection	Enabled	Factors:

326 Knock Detect		neu i actora.																	
FastRtdMax:				K - axis = Engir Y - axis = Manif															
20 30 40 50 60 70 80 90 100 110 120 130 130 140 150 160 170 180		0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	512 0.0	1024 0.0 0.0 3.0 3.5 4.0	1536 0.0 0.0 0.0 5.0 6.0	2048 0.0 0.0 5.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6	2560 0.0 0.0 5.0 6.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7	3072 0.0 4.0 5.0 7.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8	3584 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10	4096 0.0 4.0 5.0 10.0 10.0 10.0 10.0 10.0 10.0 10.	4608 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10	5120 0.0 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	5632 0.0 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	6144 0.0 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	66556 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	7168 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10	7680 0.0 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	8192 0.0 0.0 4.0 5.0 7.5 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	
Knock Detection E			on Enabled =	FastAttackRat	e * FastAttack	CoolGain * Fa	stAttackBaroG	iain											
FastAtta	ckRate:	RPM:	0 0.00	512 2.50	1024 3.00	1536 4.00	2048 4.50	2560 4.50	3072 4.25	3584 4.00	4096 3.75	4608 3.50	5120 3.50	5632 3.50	6144 3.50	6656 3.50	7168 3.50	7680 3.50	8192 3.50
	F	(deg. C): FastAttack CoolGain:	-40 0.00	-30 0.00	-20 0.00	-10 0.00	0 0.00	10 0.00	20 0.25	30 0.50	40 0.75	50 1.00	60 1.00	70 1.00	80 1.00	90 1.00	100 1.00	110 1.10	120 1.20
		Baro: FastAttack BaroGain:	55.00 1.00	61.25 1.00	67.50 1.00	73.75 1.00	80.00 1.00	86.25 1.00	92.50 1.00	98.75 1.00	105.00 1.00								
bles supporting P			inostics:																
19A GFlow / AvgRPM	40 80 120 240 240 280 320 360 440 480 520 560 640 720 800	250 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	500 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	750 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	1000 90000 90000 11536 11552 90000 90000 90000 90000 90000 90000 90000 90000 90000	1250 90000 90000 13968 12752 11536 11552 12992 14608 16752 17808 17840 18416 20528 20528 90000 90000	1500 90000 12480 13216 13968 13024 12688 13024 12688 14448 14608 17808 17808 17808 17852 17808 17852 18416 20528 20528 20528 20528 20500 90000 90000	1750 90000 12480 14512 15632 16384 19216 17776 18856 18384 20366 19744 21648 23664 32576 32576 90000	KtOXYD_cr 2000 90000 11408 11464 12960 17728 18208 17056 20704 22112 24464 22112 24464 25120 24736 25596 32576 32576 90000	np_AFIM_Lny 2250 90000 11408 11408 15728 14768 15312 15024 14672 15952 15220 19712 15952 15220 19712 18224 17728 26832 26832 90000	gthThrsh1 2500 90000 17968 17968 20128 17856 13600 14912 16688 21360 20240 17984 19808 21312 27392 27392 90000	2750 90000 97968 19328 20672 16592 14256 14432 14552 16560 18000 21616 22464 23040 25216 27392 90000	3000 90000 90000 21792 21792 21776 26032 30560 36408 35468 3648 34484 34464 32880 90000 90000	3500 90000 90000 21792 24176 26576 31008 32592 32240 37696 337596 44272 45344 39104 43280 90000 90000	4000 90000 90000 26576 31008 32592 32240 37696 37536 44272 45344 45344 45344 45344	4500 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	5000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	6000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	
1 9B JFlow / AvgRPM		250	500	750	1000	1250	1500	1750	2000	np_AFIM_Ln 2250	2500	2750	3000	3500	4000	4500	5000	6000	
	40 80 120 200 240 280 320 360 400 440 480 520 560 640 720 800	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 90000 10848 11568 11568 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 9664 9664 11968 10848 11568 12928 16336 16160 20512 23728 32912 40288 40288 90000 90000 90000	90000 9664 9664 13088 13168 13120 14288 16336 16160 20512 23728 32912 40288 40288 90000 90000 90000	90000 11520 12976 13264 12224 15248 17392 15008 19328 22192 22704 31920 26592 28656 28656 28656 90000	90000 11264 11264 13216 12288 13760 12720 14496 14800 15760 16816 18384 17552 21264 28656 28656 28656 90000	90000 8640 8640 13376 13472 14016 15408 14304 14576 15952 16160 17760 19504 21936 30464 30464 90000	90000 11008 11008 15216 16832 15504 17184 18864 20464 22752 23840 26320 28464 40080 90000	90000 14352 14352 16560 17856 17888 16208 21232 22304 24608 25760 29904 34992 40080 90000	90000 14352 16720 19088 22752 26384 28304 27344 29136 35424 41856 43072 44192 52192 52192 90000 90000	90000 90000 19088 19088 24080 25424 32672 37760 39904 49088 42000 47744 46432 49312 52192 90000 90000	90000 90000 90000 25424 25424 32672 37760 39904 49088 42000 47744 46432 46432 46432 46432 90000 90000 90000	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000 90000	
19A gElow / AvgRPM	40 80 120 200 240 320 320 360 400 440 480 520 560 640 720 800	250 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	500 0.00 0.00 0.00 0.00 0.00 0.00 0.00	$\begin{array}{c} 750\\ 0.00\\ $	1000 0.00 0.00 0.00 0.00 0.00 0.00 0.00	$\begin{array}{c} 1250\\ 0.00\\ 0.00\\ 0.00\\ 1.00\\ 0.00\\$	$\begin{array}{c} 1500\\ 0.00\\ 0.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 0.00\\$	$\begin{array}{c} 1750\\ 0.00\\ 0.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 1.00\\ 0.00\\$	KtOXYD_1 2000 0.00 0.00 0.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00	K_AFIM_Qua 2250 0.00 0.00 0.00 1.00 1.00 1.00 1.00 1.	IFactor1 2500 0.00 0.00 0.85 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00	2750 0.00 0.00 0.90 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	3000 0.00 0.00 0.00 1.00 1.00 1.00 1.00	3500 0.00 0.00 0.00 0.00 0.85 0.90 1.00 1.00 1.00 1.00 1.00 0.00 0.00	4000 0.00 0.00 0.00 0.00 0.00 0.00 0.00	4500 0.00 0.00 0.00 0.00 0.00 0.00 0.00	5000 0.00 0.00 0.00 0.00 0.00 0.00 0.00	6000 0.00 0.00 0.00 0.00 0.00 0.00 0.00	

P219B KLOXYD_K_AFIM_QualFactor2
AvgFbw/ AvgRPM 250 500 750 1000 1250 1500 1750 2000 2250 2500 2750 3000 300 4000 4500 5000 6000 40 0.00 0.00 0.00 0.00 0.00 0.00 0.0
80 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0
200 0.00 0.00 0.00 0.00 1.00 1.00 1.00 1
P2198 KiOXYD_K_APIM_QualFactor2 (Continued) AvgFlow/ AvgRPM 250 500 750 1000 1250 1500 1575 2000 2250 2750 3000 3500 4000 4500 5000 6000
400 0.00 0.00 0.00 1.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00 0.00 440 0.00 0.00 0.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00 0.00 440 0.00 0.00 0.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00 0.00 480 0.00 0.00 0.00 1.00 1.00 1.00 1.00 0.00 0.00 0.00
520 0.00 0.00 0.00 0.00 0.00 1.00 1.00 1.
640 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.00 1.00 1.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 720 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0
Tables supporting Brake Pedal Position Sensor Diagnostic P057B
CmplTestPointWeight Axis 0.00 0.05 0.35 0.45 0.75 1.00 Curve 0.0 0.1 0.4 1.0 1.0 1.0
FastTestPointWeight Axis 0.00 0.05 0.03 0.45 0.55 0.75 1.00 Curve 0.2 0.5 1.0 1.0 1.0 1.0 1.0
Tables supporting Clutch Diagnostics:
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 30.0 30.0 30.0 30.0 30.0 68.0 80.0 80.0 80.0 85.0 -8192.0 -8192.0 -8192.0 -8192.0 -8192.0 -8192.0 -8192.0
ResidualFrorEnable.towTable axis is Gear Axis 1st 2:nd 3:rd 4th 5th 6th rev neutral
Curve 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0
ResidualErrorEnableHigh Table axis is Gear Axis 1st 2nd 3rd 4th 5th 6th rev neutral
Curve 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
P0171 & P0174 Long Term Trim Lean (Laan Faith threshold) % Ethanol 0.00 6.25 12.50 18.75 25.00 56.25 62.50 68.75 75.00 81.25 87.50 100.00 Long Term Fuel Trim Lean 1 1.295 1.295 1.295 1.295 1.295 1.295 1.295 1.295
P0172 & P0175 Non Purge Rich Limit (Rich Fail threshold) % Elbanol 0.00 6.25 12.50 31.25 37.50 43.75 50.00 56.25 62.50 68.75 75.00 81.25 87.50 93.75 100.00 Long Term Fuel Non-Purge 0.770 0.770 0.770 0.770 0.770 0.770 0.770 0.770 0.770 0.770
P0172 & P0175 Purge Rich Limit (Triggers Rich Intrusive test)
% Ethanol 0.00 6.25 12.50 18.75 25.00 31.25 37.50 43.75 50.00 56.25 62.50 68.75 75.00 81.25 87.50 93.75 100.00 Long Term Fuel Purge Rich 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775 0.775
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) P0171. P0172. P0174. and P0175
Long-Term Fuel Trim Cell Usage Cell ID. CeFADR_e_Cell00_PurgOnAirMode5 CeFADR_e_Cell01_PurgOnAirMode4 CeFADR_e_Cell02_PurgOnAirMode5 CeFADR_e_Cell03_PurgOnAirMode5 CeFADR_e_Cell03_PurgOnCeFADR_e_Cell03_PurgOfAirMode5 FADD ceFADD_e_SelectedPurgeCell CeFADD_e_SelectedPurgeCell CeFADD_e_SelectedPurgeCell CeFADD_e_SelectedPurgeCell CeFADD_e_SelectedPurgeCell CeFADD_e_SelectedPurgeCell CeFADD_e_Select
FASD Enabled In Coll? Yes Yes Yes Yes Yes Yes Yes Yes
Coll ID. CeFADP. Cell 05. PurgOf(AirMode4 CeFADP. Cell 10. PurgOf(AirMode5 CeFADP. Cell 10. PurgOf(AirMode7 CeFADP. CeFADP. Cell 10. PurgOf(AirMode7 CeFADP. CeFADP. Cell 10. PurgOf(AirMode7 CeFADP. Cell 10. PurgOf(AirMode7 CeFADP. Cell 10. PurgOf(AirMode7 CeFA
P1400 Detail
KnIDLC_T_ECT_Axis Coolant Temperature -11 -10 5 7 8 17 38 39 100
KalDLC_n_CLO_TINshOfstfCliDLR_DR] RPM Olfset to be considered Cai Light Off 1000 125 125 125 125 125 120 1000 1000
KalDLC n. CLO_Thrshofst[CilDLR_PN]
RPM Olfset to be considered Cat Light Off 1000 1000 1000 125 125 125 1000 1000
KalDLC_n_EngDsrdBase(CilDLR_PN) Coolant Temperature -40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152
Base RPM 850 850 850 850 825 780 650 650 600 550 550 550 550 550 550 55
KalDLC_n_EngDsrdBase(CilDLR_DR] Coolant Temperature -40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152 Base RPM 850 850 850 80 92 104 116 128 140 152
Base RPM 850 850 850 850 850 850 825 780 650 650 600 550 550 550 550 550 550 55
MinimumEngineRunTime Coclant Temp 40 50 60 70 80 Endine Run Time 300 300 300 300

MinCatTemp	X_AX	KIS_PTS
CATD_ExhaustWarmMin_Lo	400	0
CATD_ExhaustWarmMin_Lo	400	1
CATD_ExhaustWarmMin_L(400	2
CATD_ExhaustWarmMin_L(400	3
CATD_ExhaustWarmMin_Lo	400	4
CATD_ExhaustWarmMin_L(400	5
CATD_ExhaustWarmMin_Lo	400	6
CATD_ExhaustWarmMin_Lo	400	7

 MinAirflowToWarmCatalyst

 Engine Coolant
 0
 45
 90

 MinAirFlowToWrmCat
 20
 18
 18

P0101, P0106, P0121, P012B, 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	0.782	0.770	0.669	0.581	0.540	0.537	0.527	0.527	0.556	1.000	1.000	1.000	1.000
	MAF Residu	al Weight Fac	tor based on	RPM													
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	0.763	0.756	0.699	0.679	0.628	0.620	0.592	0.553	0.537	0.534	0.531	0.534	0.527	1.000	1.000	1.000	1.000
	MAF Residu	al Weight Fac	tor 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	0.909	0.836	0.773	0.719	0.660	0.584	0.501	0.408	0.336	0.294	0.268	0.243	0.219	0.191	0.159
	MAP1 Resid	ual Weight Fa	ctor based or	n RPM													
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	0.705	0.679	0.699	0.845	0.787	0.795	0.833	0.688	0.714	0.709	0.787	0.755	0.632	1.000	1.000	1.000
	MAP2 Resid	ual Weight Fa	ctor based or	n RPM													
RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	0.929	0.762	0.743	0.833	0.787	0.744	0.870	0.894	0.938	0.642	0.769	1.000	1.000	1.000	1.000	1.000

	ercharger Inta					
DTC Set	TPS Model			MAP 2 Model		SCIAP 2
	Failure	Failure	Failure	Failure	Model	Model
					Failure	Failure
No DTC	F	F	F	F	F	F
No DTC	F	F	F	F	F	Т
No DTC	F	F	F	F	Т	F
P012B	F	F	F	F	Ť	Ť
No DTC	F	F	F	T	F	F
P1101	F	F	F	T	F	T
P1101	F	F	F	T	Т	F
P1101	F	F	F	T	Т	Т
No DTC	F	F	Т	F	F	F
P1101	F	F	Т	F	F	Т
P1101	F	F	Т	F	Т	F
P1101	F	F	Т	F	Т	Т
P0106	F	F	Т	T	F	F
P1101	F	F	Ť	Ť	F	Ť
P1101						
	F	F	T	T	T	F
P1101	F	F	Т	Т	Т	T
No DTC	F	Т	F	F	F	F
P0101	F	Т	F	F	F	Т
No DTC	F	Т	F	F	Т	F
P0101, P012B	F	T	F	F	Т	Т
P1101	F	Т	F	Т	F	F
P0101	F	Ť	F	T	F	T
P1101	F	Ť	F	Ť	Ť	F
P0101, P012B	F	T	F	T	T	T
P1101	F	Т	Т	F	F	F
P1101	F	Т	Т	F	F	Т
P1101	F	Т	Т	F	Т	F
P1101	F	Т	Т	F	Т	Т
P1101	F	Т	Т	T	F	F
P1101	F	Т	Т	Т	F	Т
P1101	F	Т	Т	Т	Т	F
P1101	F	Т	Т	Т	Т	Т
P0121	Ť	F	F	F	F	F
No DTC	T	F	F	F	F	T
P0121	T	F	F	F	T	F
P1101	Т	F	F	F	T	Т
P1101	Т	F	F	T	F	F
P1101	Т	F	F	T	F	Т
P1101	Т	F	F	Т	Т	F
P1101	Т	F	F	Т	Т	Т
P0121	Т	F	Т	F	F	F
P1101	Ť	F	Ť	F	F	Ť
P0121	Ť	F	Ť	F	T	F
P1101	T	F	T	F	T	T
P1101 P1101	T	F	T	T	F	F
P1101	Т	F	Т	Т	F	Т
P1101	Т	F	Т	Т	т	F
P1101	Т	F	Т	Т	т	Т
P0121	Т	Т	F	F	F	F
P1101	T	T	F	F	F	T
P0121	Ť	Ť	F	F	Ť	F
P1101	T	T	F	F	T	T
P1101 P1101	T	T	F	T	F	F

	Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Continued)													
Г	DTC Set	TPS Model	MAF Model	MAP 1 Model	MAP 2 Model	SCIAP 1	SCIAP 2							
		Failure	Failure	Failure	Failure	Model	Model							
						Failure	Failure							
Г	P1101	Т	Т	F	Т	Т	F							
Г	P1101	Т	Т	F	Т	Т	Т							
	P0121	Т	Т	Т	F	F	F							
	P1101	Т	Т	Т	F	F	Т							
	P0121	Т	Т	Т	F	Т	F							
	P1101	Т	Т	Т	F	Т	Т							

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)



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)

 80
 92
 104
 116
 128
 140
 152

 30
 30
 30
 30
 30
 30
 30
 30
 80 80 80 60 60 40 40 30 30 30

P0128: Maximum Accum	ulated Airflow	for IAT and S	tart-up ECT c	onditions									
		Z axis is the a X axis is ECT	ccumulated ai	rflow failure th		5)							
		Y axis is IAT r			- ()								
	IAT I	Range	-										
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	11149	11149	11149	11149	11149	10312	9474	8637	7800	6962	6125
Alternate	-7.0 ° C	10.0 ° C	11022	11022	11022	9957	8892	7826	6761	5696	4630	4630	4630
P0128: Maximum Accum	ulated Time fo	r IAT and Star	t-up ECT con	ditions									
		Z axis is the a	ccumulated tir	ne failure thre	shold (seconds	;)							
(For applications with a two	2	X axis is ECT	Temperature	at Power up (°	°C)								
coolant sensors)		Y axis is IAT r	nin during test	(°C)									
	IAT I	Range											
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	950	865	780	695	610	525	440	355	270	185	100
Alternate	-7.0 ° C	10.0 ° C	870	785	700	615	530	445	360	275	190	105	20

Multiple DTC Use - Response Cell Enable Table KaEOSD, RespCellEnbl - Block learn cells in which to enable the Oxygen Sensor Response test Note: When Table column headings match, that individual cell is enabled

Adaptive Block Learn Cells:	Post Oxygen Sensor Enable Cells:	
CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell00_PurgOnAirMode5	Enabled
CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell01_PurgOnAirMode4	Enabled
CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell02_PurgOnAirMode3	Enabled
CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell03_PurgOnAirMode2	Enabled
CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell04_PurgOnAirMode1	Enabled
CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell05_PurgOnAirMode0	Enabled
CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell06_PurgOnIdle	Enabled
CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell07_PurgOnDecel	Enabled
CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell08_PurgOffAirMode5	Enabled
CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell09_PurgOffAirMode4	Enabled
CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell10_PurgOffAirMode3	Enabled
CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell11_PurgOffAirMode2	Enabled
CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell12_PurgOffAirMode1	Enabled
CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell13_PurgOffAirMode0	Enabled
CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell14_PurgOffIdle	Enabled
CeFADR e Cell15 PurgOffDecel	CeFADR_e_Cell15_PurgOffDecel	Enabled

Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests KaPOPD_PostCellErbl - A table of adaptive (Block Learn) cells in which to enable the post oxygen sensor tests. Note: When Table columns match, the cell is enabled.

Adaptive Block Learn Cells:	Post Oxygen Sensor Enable Cells:	
CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell07_PurgOnDecel	Enabled
CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell15_PurgOffDecel	CeFADR_e_Cell15_PurgOffDecel	Enabled

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

ensor 1* 7435/Fail Investing table Zaxis is the passfail 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	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000
0.000	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	1	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	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.120	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

ensor 1 vassrall intersonatable Zaxis is the passfall 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	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000
0.000	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	1	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	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.120	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ó	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2 Rich Equiv Ratio

1.1201
1.1201
1.1299
1.1401
1.1499

Z axis is Equiv ratio during the test Y axis is MAP (kpa) X axis RPM

P2271/P2273 - O2 Sensor Signal Stuck Rich Bank 1/2 Sensor 2 Lean Equiv Ratio

_	0.0	500.0	1000.0	1500.0	2000.0
0.0	0.8999	0.8999	0.8999	0.8999	0.8999
25.0	0.8999	0.8999	0.8999	0.8999	0.8999
50.0	0.8999	0.8999	0.8999	0.8999	0.8999
75.0	0.8999	0.8999	0.8999	0.8999	0.8999
100.0	0.8999	0.8999	0.8999	0.8999	0.8999
-		Z axis is Equi Y axis is MAP X axis RPM	v ratio during th (kpa)	he test	

Multiple DTC Use_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 Airlow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
 B1S2 Airlow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
 B2S1 Airlow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
 B2S2 Airlow greater than 22 gps for 120000 grams of accumulated flow non-continuously.

Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

load						ddt Tables))								
		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
	8	600 565	450 420	300 275	220	150 140	120	90 85	70	55 50	32767 32767	32767	32767 32767	32767 32767
Jau	11	480	400	320	195	135	100	80	60	50	32767	32767	32767	32767
	12	480	400	320	200	140	100	80	60	50	32767	32767	32767	32767
	13	680	500	320	220	145	100	80	60	50	32767	32767	32767	32767
	14	715	525	275	225	150	90	80	60	50	32767	32767	32767	32767
	15	750	425	300	230	150	100	85	50	60	32767	32767	32767	32767
	16	785	440	320	240	180	110	85	55	65	32767	32767	32767	32767
	17	800	500	350	250	190	120	90	60	65	32767	32767	32767	32767
	18	900	550	400	335	200	130	105	70	70	32767	32767	32767	32767
	19	950	625	425	370	240	140	110	85	75	32767	32767	32767	32767
	21	975	700	450	400	295	150	120	90	85	32767	32767	32767	32767
	22	1000	800	500	430	320	160	130	95	90	32767	32767	32767	32767
	24	1050	850	625	465	340	165	140	100	95	32767	32767	32767	32767
	25	1050	900	750	500	360	240	190	130	100	32767	32767	32767	32767
	27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
0300-P0308: Idle SC	29 D ddt	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
ad	8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
	9	565	420	275	210	140	100	85	65	50	32767	32767	32767	32767
	11	480	400	320	195	135	100	80	60	50	32767	32767	32767	32767
	12	480	400	320	200	140	100	80	60	50	32767	32767	32767	32767
	13	680	500	320	220	145	100	80	60	50	32767	32767	32767	32767
	14	715	525	275	225	150	90	80	60	50	32767	32767	32767	32767
	15	750	425	300	230	150	100	85	50	60	32767	32767	32767	32767
	16	785	440	320	240	180	110	85	55	65	32767	32767	32767	32767
	17	800	500	350	250	190	120	90	60	65	32767	32767	32767	32767
	18	900	550	400	335	200	130	105	70	70	32767	32767	32767	32767
	19	950	625	425	370	240	140	110	85	75	32767	32767	32767	32767
	21	975 1000	700 800	450	400 430	295 320	150	120	90 95	85 90	32767 32767	32767	32767	32767 32767
	22	1000	800 850	500 625	430 465	320	160 165	130 140	95 100	90	32767	32767 32767	32767 32767	32767
	24	1050 1050	850 900	625 750	465 500	340	165 240	140 190	100	95 100	32767 32767	32767 32767	32767 32767	32767
	27 29	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767	32767 32767
	29	J2/0/	32/0/	52/0/	32/0/	32101	32/0/	32/0/	32/0/	J2/0/	32/0/	32/0/	32/0/	32101
0300-P0308: SCD De	elta	400	OR (decel in 500	dex >SCD Delt 600	aAND > SCD 700	Belta ddt Tabl	es)) 900	1000	1100	1200	1400	1600	1800	2000
ad	8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
ad	9	565	430	275	220	130	120	90	65	50	32767	32767	32767	32767
Jau	11	480	420	320	195	135	100	80	60	48	32767	32767	32767	32767
	12	480	400	320	200	135	115	80	60	48	32767	32767	32767	32767
	13	680	500	320	220	160	125	90	65	50	32767	32767	32767	32767
	15	750	550	350	230	190	130	95	80	50	32767	32767	32767	32767
	17	820	600	380	300	230	160	115	90	55	32767	32767	32767	32767
	19	975	700	425	370	270	180	130	105	80	32767	32767	32767	32767
	22	1100	800	500	430	320	230	150	125	90	32767	32767	32767	32767
	25	1050	900	750	500	360	240	190	150	110	32767	32767	32767	32767
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	29	32767	32767	32767	32767	32767	32767	32767	32767		32767			
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
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	33 38	32767 32767 32767	32767 32767 32767	32767	32767 32767 32767	32767	32767 32767 32767	32767 32767 32767	32767 32767 32767	32767	32767 32767 32767	32767 32767 32767	32767 32767 32767	32767 32767 32767
	33 38 42 48 54	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767
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	33 38 42 48 54 61	32767 32767 32767 32767 32767 32767 32767 400	32767 32767 32767 32767 32767 32767 32767 500	32767 32767 32767 32767 32767 32767 32767 600	32767 32767 32767 32767 32767 32767 32767 700	32767 32767 32767 32767 32767 32767 32767 800	32767 32767 32767 32767 32767 32767 32767 900	32767 32767 32767 32767 32767 32767 32767 1000	32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 1600	32767 32767 32767 32767 32767 32767 32767 1800	32767 32767 32767 32767 32767 32767 32767 2000
	33 38 42 48 54 61 9lta ddt	32767 32767 32767 32767 32767 32767 32767 400 600	32767 32767 32767 32767 32767 32767 32767 500 450	32767 32767 32767 32767 32767 32767 32767 600 300	32767 32767 32767 32767 32767 32767 32767 700 220	32767 32767 32767 32767 32767 32767 32767 800 150	32767 32767 32767 32767 32767 32767 32767 900 120	32767 32767 32767 32767 32767 32767 32767 1000 90	32767 32767 32767 32767 32767 32767 32767 1100 70	32767 32767 32767 32767 32767 32767 32767 1200 55	32767 32767 32767 32767 32767 32767 32767 1400 32767	32767 32767 32767 32767 32767 32767 32767 1600 32767	32767 32767 32767 32767 32767 32767 32767 1800 32767	32767 32767 32767 32767 32767 32767 32767 2000 32767
	33 38 42 48 54 61 9lta ddt	32767 32767 32767 32767 32767 32767 32767 400	32767 32767 32767 32767 32767 32767 32767 500	32767 32767 32767 32767 32767 32767 32767 600 300 275	32767 32767 32767 32767 32767 32767 32767 700	32767 32767 32767 32767 32767 32767 32767 800	32767 32767 32767 32767 32767 32767 32767 900	32767 32767 32767 32767 32767 32767 32767 1000	32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 1200	32767 32767 32767 32767 32767 32767 32767 1400 32767 32767	32767 32767 32767 32767 32767 32767 32767 1600 32767 32767	32767 32767 32767 32767 32767 32767 32767 1800 32767 32767	32767 32767 32767 32767 32767 32767 2000 32767 32767
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	33 38 42 48 54 61 61 0lta ddt 8 9 11 12	32767 32767 32767 32767 32767 32767 32767 400 600 565 500 490 680 750	32767 32767 32767 32767 32767 32767 32767 500 450 450 420 400 400 500 550	32767 32767 32767 32767 32767 32767 32767 32767 300 275 300 310 320 350	32767 32767 32767 32767 32767 32767 32767 220 210 197 200 220 240	32767 32767 32767 32767 32767 32767 32767 800 150 135 135 140	32767 32767 32767 32767 32767 32767 32767 120 120 100 100 115 125 130	32767 32767 32767 32767 32767 32767 32767 1000 90 85 80 80 80 90 95	32767 32767 32767 32767 32767 32767 32767 1100 70 65 60 65 60 65 80	32767 32767 32767 32767 32767 32767 32767 1200 55 50 45 50	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 2000 32767 32767 32767 32767
	33 38 42 48 54 61 9 11 12 13 15 17	32767 32767	32767 32767 32767 32767 32767 32767 32767 450 450 420 400 400 500 550 600	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 3200 310 310 320 350 380	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 3270 200 220 210 197 200 220 220 240 350	32767 325 325 325 325 325 325 325 325 325 325	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 120 120 120 120 120 120 120 120 120 120	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 826 80 80 80 80 80 90 95 115	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 60 60 60 60 60 60 60 60 60 60 80 90	32767 355 55 50 50 50 50 50 50 50 50 50 50 50 5	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767
	33 38 42 48 54 61 61 61 11 12 13 15 17 19	32767 32767 32767 32767 32767 32767 32767 400 600 565 500 490 680 750 820 975	32767 32767 32767 32767 32767 32767 32767 32767 450 450 420 400 400 500 550 550 600 700	32767 32767 32767 32767 32767 32767 32767 32767 300 275 300 275 300 310 320 350 380 425	32767 32767 32767 32767 32767 32767 32767 220 210 197 200 220 220 220 220 220 240 350 420	32767 32767 32767 32767 32767 32767 32767 32767 32767 135 135 135 135 140 160 190 250 300	32767 32767 32767 32767 32767 32767 32767 120 100 100 100 115 125 130 160 180	32767 32767 32767 32767 32767 32767 32767 1000 90 85 80 80 80 80 90 90 95 115 130	32767 32767 32767 32767 32767 32767 32767 1100 65 65 60 65 60 65 80 90 105	32767 32767 32767 32767 32767 32767 32767 55 50 45 50 45 50 50 50 55 80	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767
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	33 38 42 48 54 61 30 42 48 9 11 12 13 15 17 17 19 22 25 29	32767 32767 32767 32767 32767 32767 32767 400 600 565 500 490 680 750 820 975 1100 1050 32767	32767 32767 32767 32767 32767 32767 450 450 420 400 400 400 550 600 550 600 700 800 800 900 32767	32767 32767 32767 32767 32767 32767 32767 300 275 300 310 320 350 380 425 500 750 32767	32767 32767 32767 32767 32767 32767 220 210 210 210 200 220 220 220 240 350 420 550 550 32767	32767 32767 32767 32767 32767 32767 150 150 135 135 135 135 135 140 160 190 250 300 300 360 450 32767	32767 32767 32767 32767 32767 32767 120 100 100 115 125 130 160 180 230 240 32767	32767 32767 32767 32767 32767 32767 90 85 80 80 80 90 95 115 130 150 190 32767	32767 32767 32767 32767 32767 32767 70 65 60 60 65 60 60 65 80 90 90 105 125 150 32767	32767 32767 32767 32767 32767 32767 1200 55 50 50 50 50 50 50 50 50 50 50 50 50	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767
	33 38 42 48 54 61 9 11 12 13 15 17 19 22 25 29 33	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 880 680 975 820 975 820 975 1100 1050 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 450 400 400 400 400 400 550 600 700 800 900 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 300 275 300 310 320 350 380 425 505 500 750 32767	32767 32767 32767 32767 32767 32767 32767 32767 220 210 220 240 240 240 240 240 240 250 250 550 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 3260 450 360 450 32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 120 100 100 100 100 100 100 100 100 100	32767 32767 32767 32767 32767 32767 32767 32767 32767 80 80 90 90 95 95 115 130 150 190 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 60 60 60 60 60 60 60 60 60 60 60 60 60	32767 32767 32767 32767 32767 32767 32767 32767 32767 55 50 55 50 50 55 50 50 55 50 50 55 50 50	32767 32767	32767 32767	32767 32767	32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767 32767
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 | 170 | 120
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| load | 8
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 | 25 | 20 | 15 | 10
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 | 38 | 28 | 22 | 15
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| P0300-P0308: Cyl Mod | ie aat
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	All Cylinders	active		
RPM	Pct load	-	Baro KPa	Multiplie
400	11.00		65	0.82
500	10.00		70	0.85
600	9.00		75	0.88
700	8.00		80	0.90
800	8.00		85	0.93
900	8.00		90	0.95
1000	8.00		95	0.97
1100	8.00		100	1.00
1200	8.00		105	1.03
1400	8.00			
1600	8.00			
1800	8.00			
2000	8.00			
2200	8.50			
2400	8.50			
2600	8.90			
2800	9.00			
3000	9.10			
3500	11.92			
4000	14.13			
4500	16.35			
5000	18.57			
5500	20.79			
6000	23.00			
6500	25.22			
7000	27.44	1		

RPM	Pct load	_
400	11.00	
500	10.00	
600	9.00	1
700	8.00	
800	8.00	1
900	8.00	Note
1000	8.00	shift
1100	8.00	1
1200	8.00	
1400	8.00	1
1600	8.00	
1800	8.00	1
2000	8.00	
2200	8.50	1
2400	8.50	
2600	8.90	1
2800	9.00	
3000	9.10	1
3500	11.92	
4000	14.13	1
4500	16.35	
5000	18.57	1
5500	20.79	
6000	23.00	1
6500	25.22]
7000	27.44	1

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

	0	1000	2000	3000	4000	5000	6000	7000
0	11	11	11	7	6	5	5	5
10	11	11	8	6	6	5	5	5
20	11	11	8	6	5	5	5	5
30	11	11	8	6	5	5	5	5
40	11	11	8	5	5	5	5	5
50	10	8	6	5	5	5	5	5
60	8	8	5	5	5	5	5	5
70	7	6	5	5	5	5	5	5
80	6	6	5	5	5	5	5	5
90	6	5	5	5	5	5	5	5
100	5	5	5	5	5	5	5	5

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	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.04

P0442: EONV Pressure Threshold Table (in Pascals)

load Load

X axis is fuel level in %

	Y axis is temp	erature in deg (2														
	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	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
-4.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
1.2500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
6.8750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
12.5000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
18.1250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
23.7500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
29.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
35.0000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
40.6250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
46.2500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
51.8750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
57.5000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
63.1250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
68.7500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
74.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
80.0000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis is Ignition	on Off Time (in se
Axis	Curve
0	200
600	200
1200	200
1800	200
2400	200
3000	200
3600	200
4200	200
4800	200
5400	200
6000	200
6600	200
7200	200
7800	200
8400	200
9000	200
9600	200
10200	200
10800	200
11700	200

P0442: Estimate of Ambient Temperature Valid Conditioning Time (Continued....)

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

Axis is Igniti	on Off Time (in s
Axis	Curve
12600	200
13500	
14400	200
15300	
16200	200
17100	
18000	200
19200	
20400	200
21600	
22800	200
24000	200
25200	200

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)

Purge Valve	Leak Test Engir
Axis is Fuel I	Level in %
Axis	Curve
0	58
6	57
12	55
19	53
25	52
31	50
37	48
44	46
50	45
56	43
62	41
69	40
75	38
81	36
87	34
94	33
100	31

KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C

	Ŷ	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	152.000
400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
1200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
1600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
2000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
2400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
2800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
3200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
3600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
4000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
4400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
4800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
5200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
5600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
6000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
6400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000
6800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.000

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	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350

Closed Loop Enable Criteria

Coolant greater than KtFULC_T_AF_ClosedLoopTe	mp																
Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Coolant	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0
and engine run time greater the																	
KtFULC_t_AF_ClosedLoopTir	ne																
Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	120.0	90.0	65.0	45.0	16.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
and pre converter 02 sensor v		ter than															
KfFULC_U_02_SensorReady																	
> 5	50																
Voltage mil	Volts 1																
or lose than																	

or less than KfFULC_U_O2_SensorReadyThrshLo

Volta	< 350 age milliVolts																
and COSC (Converter Oxyg	en Storage Control) not enabled															
and Consumed AirFuel Rati and	io is stoichiometry	i.e. not in com	nponent prote	ction													
POPD or Catalyst Diagr and	nostic not intrusive																
All cylinders whose val and	lves are active also	have their inj	ectors enable	d													
O2S_Bank_ 1_TFTKO, 0		KO, Fuellnject	orCircuit_FA	and CylnderDe	acDriverTFT	KO = False											
Long Term FT Enable C																	
Closed Loop Enable an Coolant greater than KtFSTA_T_ClosedLoop Start-Up Cool Cool	oTemp ant -40	-28 80.0	-16 75.0	-4 65.0	8 45.0	20 39.0	32 39.0	44 39.0	56 39.0	68 39.0	80 39.0	92 39.0	104 39.0	116 39.0	128 39.0	140 39.0	152 39.0
and KtFSTA_T_ClosedLoop Start-Up Cool	oTime ant -40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
and KfFCLL_T_AdaptiveLot		90.0	65.0	45.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
or less than KfFCLL_T_AdaptiveHi0	Coolant																
and MAP less than KtFCLL_p_AdaptiveLov Barometric Press Manifold Air Press	ure 65	70 20.0	75 20.0	80 20.0	85 20.0	90 20.0	95 20.0	100 20.0	105 20.0								
and TPS_ThrottleAuthorityI and																	
Flex Fuel Estimate Algo and Catalyst or EVAP large																	
Secondary Fuel Trim E																	
Closed Loop Enable an KfFCLP_U_O2ReadyTh	nd arshLo age < 350 milliVolts																
for																	
KcFCLP_Cnt_02RdyCy (events * 12.5 millisecon																	
KcFCLP_Cnt_02RdyCy	ids) > 10 events	riteria															
KcFCLP_Cnt_02RdyCy (events * 12.5 millisecon Long Term Secondary I KtFCLP_t_PostIntg/Dis Start-Up Cool Post Integral Enable Ti	ds) > 10 events Fuel Trim Enable C ableTime ant -40	riteria -29 150.0	-18 150.0	-6 150.0	5 150.0	16 150.0	28 150.0	39 150.0	50 150.0	61 150.0	73 150.0	84 150.0	95 150.0	106 150.0	118 150.0	129 150.0	140 150.0
KcFCLP_Cnt_02RdyCy (events * 12.5 millisecon Long Term Secondary I Start-Up Coch Post Integral Enable Ti Plus KtFCLP_t_PostIntg/Rar Start-Up Coch Post Integral Ramp In Ti	dds) > 10 events Fuel Trim Enable C cableTime lant -40 ime 150.0 mpInTime lant -40	-29			5 150.0 5 60.0												
KCFCLP_Cnt_02240/02 (events*12.5 millisecon Long Term Secondary I KLFCLP_LPostIntgiDis Start-Up Cool Post Integral Enable Ti Plus KLFCLP_LPostIntgiRa Start-Up Cool Post Integral Ramp In Ti and KGFCLP_T_Integration Modeled Catalays Tempe	ds) > 10 events Fuel Trim Enable C ableTime ant -40 ime 150.0 mpInTime ant -40 ime 60.0 CatalystMax	-29 150.0 -29	-18	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KEFCLP_Cnt_ORAGV (events *12.5 millisecon Long Term Secondary I KEFCLP_L_PostIntgIDis Start-Up Cool Post Integral Rable T Pus KIFCLP_L_PostIntgIDa KIFCLP_L_PostIntgIDa Cool The Cool The Cool Notelled Catalyst Tempe and KeFCLP_T.Integrationt Modeled Catalyst Tempe and	ds) > 10 events Fuel Trim Enable C ableTime ant 40 mme 150.0 mpInTime ant -40 ime 60.0 CatalystMax wrat 950 Calclus CatalystMin CatalystMin	-29 150.0 -29	-18	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_	ds) > 10 events Fuel Trim Enable C ableTime ant ant 40 imme 150.0 mpInTime ant 400 imme 260 Calclus CatalystMax CatalystMax CatalystMaria CatalystMaria static ant -40 Calclus static ant -74 Celclus	-29 150.0 -29	-18	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_CLP_	ds) > 10 events Fuel Trim Enable C ableTime ant ant 40 met ant 40 ant 40 ant 40 ant 40 CatalystMin rational > 74 Celoius sh ant -38 Percent	-29 150.0 -29	-18	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CI	ds) > 10 events Fuel Trim Enable C ableTime ant -40 mme 155.0 mpinTime -40 mat -40 mat -40 catalystMin -0.0 CatalystMin	-29 150.0 -29 60.0 -29 60.0 -29 60.0	150.0 -18 60.0 2. PostCat2 1000 1000 1000	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CI	ds) > 10 events Fuel Trime ableTime ableTime ant0 monose ableTime ant0 monose ableTime ant0 CatalystMan CatalystMan ant0 CatalystMan ant0 CatalystMan ant0 CatalystMan0 CatalystMan ant0 CatalystMan0 CatalystMan _	-29 150.0 -29 60.0 -29 60.0 -29 60.0 -2 -29 60.0 -2 -29 60.0 -2 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -29 60.0 -20 -20 60.0 -20 -20 -20 -20 -20 -20 -20 -20 -20 -2	150.0 -18 60.0 -18 60.0 -18 -18 -10 -10 -100 -1000 -1000 -1000 -1000 -1000	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CI_Cont_O2R4(by) (events *12.5 millisecon Long Term Secondary J KFCLP_L_PostingIDis Start-Up Cool Post Integral Rabie T Pus KFCLP_L_CostingIDa KFCLP_L_CostingIDa KFCLP_T_Integrationt Modeled Catalyst Tempe and KFCLP_T_Integrationt Modeled Catalyst Tempe and KFCLP_T_Integrationt Modeled Catalyst Tempe and KFCLP_T_CoolantThr Cool and (CFL Path CatAccu Post Integral - KAFCLP X axis: Post C2 Senso 2 : Post Integral Interaction 2 : Post Integral Interaction Core and CFL	ds) > 10 events Fuel Trim Enable C ableTime ant 40 ant 40 ant 40 ant 60.0 ant 40 ant 50.0 CatalystMin 50 ant > 74 Celclus 51 SiphrPostDabi 39 Percent y=U_SiphrintglOfest 20 y=U_LiphAccel CIC CLP_HeavyAccel FA and PO2S_Ban	-29 -29 -29 60.0 Thrsh) 2 PostCat1 02 1000 1000 1000 1000 1000 1000	150.0 -18 60.0 -18 60.0 -18 -18 -10 -10 -100 -1000 -1000 -1000 -1000 -1000	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CLP_Cott 02R40yC (events *12.5 millisecon Long Term Secondary I KFCLP_LP_ostIntglRa Start-Up Cod Post Integral Rable Ti Plus KFCLP_LP_ostIntglRamp In Ti and KFCLP_T_Integrationt Modeled Catalys Tempe and KFCLP_T_Integrationt Modeled Catalys Tempe and (KFCLP_T_CoolantThr Coli Catal Modeled Conventer sulfur and (KFCLP_PC_CATACEU Modeled conventer sulfur and integral KAFCLP Post Integral KAFCLP Sa Sile Post O2 Mode 2. Post Integral KAFCLP Coli Cipi	ds) > 10 events Fuel Trim Enable C ableTime ant 40 ant 40 ant 40 ant 60.0 ant 40 ant 50.0 CatalystMin 50 ant > 74 Celclus 51 SiphrPostDabi 39 Percent y=U_SiphrintglOfest 20 y=U_LiphAccel CIC CLP_HeavyAccel FA and PO2S_Ban	-29 -29 -29 60.0 Thrsh) 2 PostCat1 02 1000 1000 1000 1000 1000 1000	150.0 -18 60.0 -18 60.0 -18 -18 -10 -10 -100 -1000 -1000 -1000 -1000 -1000	-6	5	150.0	150.0	150.0 39	150.0 50	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CLP_Cnt_02R4yOy (events *12.5 millisecon Long Term Secondary I KFCLP_LP_SetIntglDis Start-Up Cool Post Integral Rabie Ti Plus KFCLP_LP_SetIntglRamp In Ti and NeFCLP_T_Integrationt Modeled Catalyst Tempe and KFCLP_T_Integrationt Modeled Catalyst Tempe and (KFCLP_Pet_CatAccu Modeled conventer sulfur model Modeled Catalyst Tempe and (KFCLP_Pet_CatAccu Modeled conventer sulfur Post Integral KsFCLP V axis: Post 02 Sensor Y axis: Post 04 Sensor Y axis: Po	dd) > 10 events Fuel Trim Enable C ableTime ableTime add int add int add int add ant add ant add catalystMax catalystMax catalystMax catalystMax catalystMax catalystMax ant >24 Colclus Sh Strong -38 Percent -20 SiphtningtOftst, SiFCLP_Decel -37 FOLP_MaxCeel -57 CLP_MaxCeel -57 A and PO2S_Ban ctivation System Pol EngSpeedLwrL	-29 -29 -29 -29 -29 -29 -20 -29 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20	150.0 -18 60.0 2 PostCat2 1000 1000 1000 1000 FA = False ble	-6 -6 60.0	5 60.0 S is Gear Sta	160.0 16 60.0 16 60.0	150.0 28 60.0	150.0 39 60.0	150.0 50 60.0	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0
KFCLP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CIP_CI	dd) > 10 events Fuel Trim Enable C ableTime	-29 -29 -29 -29 -29 -0.0 -29 -0.0 -29 -0.0 -29 -0.0 -0	150.0 -18 60.0 -18 60.0 -18 -18 -10 -10 -100 -100 -100 -1000 -1000 -1000 -1000 -1000 -1000 -1000 -1000 -1000 -1	1500 -6 60.0 3 4 4 5 7 5 4 4 3 5 4 4 3 4 3 4 3 4 3 4 3 4 4 3 4 3	S is Gear Sta Gear fith 575 S is Gear Sta Gear fith	te, Curve is E Gear Ne 675 te, Curve is Ne	150.0 28 60.0 6	150.0 39 60.0 60.0 75 Pari Pari Pari Pari	150.0 50 60.0 60.0 675	150.0	150.0	150.0	150.0 95	150.0	150.0	150.0	150.0

HalfCyIToAll	CylVacuum			Horizontal A	XIS is Gear St	ate, Vertical a	xis is Engine	RPM	
RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0	6	6	6	6	6	6	6	6	6
100	5	5	5	5	5	5	5	5	5
200	4	4	4	4	4	4	4	4	4
300	4	4	4	4	4	4	4	4	4

P3400 (Continued....)

P3400 (Continued....)

B0 B0<	0 80 80 100 80 4 200 80 4 300 80 4 400 80 4 500 80 4 500 80 4 600 80 4 700 80 4 900 74 4 1000 74 4 1000 74 4 1000 74 4 1600 74 4 1600 74 4 1600 74 4 1600 74 4 1600 74 4 1600 74 4 1000 74 4 1000 74 4 1000 74 4 1000 74 4 1000 74 4 1000 74 4 2000 74	80 80 80 52 74 52 74 52 74 52 74 52 74 52 52	80 80 80 80 80 80 80 80 80 70 65 55 55 55 55 55 55 55 55 52 52 52 52 52	80 80 80 80 80 80 80 80 80 80 80 80 80 8	80 80 80 80 80 80 80 80 80 70 65 58 53 51 49 49 49 49 49	64 62 59 57 54 54 53 53 52 52 51 51 51 51 51 53 54 56 57 57	64 62 59 57 54 53 53 52 52 51 51 51 53 53 54 55 55 57	
B0 B0<	200 80 1 300 80 1 400 80 1 500 80 1 500 80 1 700 80 1 900 74 1 900 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 1000 74 1 2000 74 2 2000 74	80 80 80 <	80 80 80 80 65 55 53 52 52 52 52 52 52 52 52 52 52 52 52 52	80 80 80 80 80 70 65 55 55 55 52 52 52 52 52 52 52 52 52 52	80 80 80 80 80 65 53 51 49 49 49 49 49 49	59 57 54 53 53 52 52 51 51 51 53 53 54 56 57 57	59 57 54 53 53 52 52 51 51 51 51 53 54 56 57	59 57 54 54 53 53 53 52 52 52 52 51 51 51 51 53
B0 B0<	200 80 1 300 80 1 400 80 1 501 80 1 501 80 1 600 80 1 701 80 1 900 74 1 100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74 1 1100 74	80 80 80 <	80 80 80 80 65 55 53 52 52 52 52 52 52 52 52 52 52 52 52 52	80 80 80 80 80 70 65 55 55 55 52 52 52 52 52 52 52 52 52 52	80 80 80 80 80 65 53 51 49 49 49 49 49 49	59 57 54 53 53 52 52 51 51 51 53 53 54 56 57 57	59 57 54 53 53 52 52 51 51 51 51 53 54 56 57	59 57 54 54 53 53 53 52 52 52 52 51 51 51 51 53
B0 B0<	300 80 400 80 1 500 80 1 500 80 1 600 80 1 700 80 1 800 74 1 900 74 1 1000 74 1 1000 74 1 1300 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 1 1600 74 2 1900 74 2 2000 74 2 2000 74 2 2000 74 2 2000 74 2 2000 74 2	80 80 80 <	80 80 80 70 65 58 55 53 52 52 52 52 52 52 52 52 52 52 52 52 52	80 80 80 80 65 58 55 55 55 52 52 52 52 52 52 52 52 52 52	80 80 80 80 70 65 58 53 51 49 49 49 49 49 49	57 54 53 53 52 52 51 51 51 51 53 54 56 57 57	57 54 54 53 53 52 52 51 51 51 51 51 51 53 54 56 57	57 54 54 53 52 52 52 51 51 51 51 51
B0 B0<	400 80 400 80 500 80 600 80 700 80 700 74 900 74 1000 74 1100 74 1200 74 1300 74 1400 74 1500 74 1600 74 1600 74 1600 74 1600 74 1000 74 1000 74 1000 74 1000 74 1000 74 1000 74 1000 74 1000 74 2000 74 2000 74 2000 74 2000 74 2000 74 2000 74 2000 74 2000 74 2000 74 </td <td>80 80 80 <</td> <td>80 80 80 65 58 55 52 52 52 52 52 52 52 52 52 52 52 52</td> <td>80 80 80 65 55 53 52 52 52 52 52 52 52 52 52 52 52</td> <td>80 80 80 70 65 58 53 51 49 49 49 49 49 49 49</td> <td>54 53 53 52 52 51 51 51 53 53 54 56 57 57</td> <td>54 54 53 52 52 51 51 51 53 53 54 56 57</td> <td>54 54 53 53 52 52 51 51 51 51</td>	80 80 80 <	80 80 80 65 58 55 52 52 52 52 52 52 52 52 52 52 52 52	80 80 80 65 55 53 52 52 52 52 52 52 52 52 52 52 52	80 80 80 70 65 58 53 51 49 49 49 49 49 49 49	54 53 53 52 52 51 51 51 53 53 54 56 57 57	54 54 53 52 52 51 51 51 53 53 54 56 57	54 54 53 53 52 52 51 51 51 51
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	1600 48 1700 48 1800 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 2000 48 3000 48	48 48 48 48	48 48 48 48 48 48 48 48 48 48 48 48 48 4	48 48 48 48 48 48 48 48 48 48 48 48 48 4	48 48 48 48 48 48 48 48 48 48 48 48 48 4	48 48 48 48 48 48 48 48 48 48 48 48 48 4	48 48 48 48 48 48 48 48 48 48 48 48 48 4	48 48 48 48 48 48 48 48 48 48 48 48 48 4

Curve Axis Curve

Axis

P0521 Axis Curve Axis Curve

 EngOilPredictionWeightFactorTable
 AXIS is Predicted Engine Oil Pressure, Curve is Engine Oil Prediction Weight Factor

 0
 170
 250
 275
 380
 375
 400
 500
 600

 0.00
 0.10
 1.00
 1.00
 1.00
 0.75
 0.00

DFCO Enable Conditions

COOLANT ENABLE CRITERIA
Coolant temperature > 30.0 °C and will disable if drops below 25.0 °C
RUN TIME ENABLE CRIETRIA
Engine run time > 2 seconds + Supporting Table DFCO_DelayAfterStart_Time
ENGINE SPEED ENABLE CRITERIA
TORQUE CONVERETR CLUTCH UNLOCKED
P2270 Test not requested (POPD OFF):
i) enabled when engine speed > 1500 + supporting table values DFCO_Engine Speed Enables
ii) once enabled continue to be enabled until engine speed < 1100 + supporting table values DFCO_Engine Speed Enables
P2270 Test requested (POPD ON):
i) enabled when engine speed > 1000.0
ii) once enabled continue to be enabled until engine speed < 900.0
TORQUE CONVERETR CLUTCH LOCKED
P2270 Test not requested (POPD OFF):
i) enabled when engine speed > 1500 + supporting table values DFCO_Engine Speed Enables
ii) once enabled continue to be enabled until engine speed < 1100 + supporting table values DFCO_Engine Speed Enables
P2270 Test requested (POPD ON):
i) enabled when engine speed > 1000.0
ii) once enabled continue to be enabled until engine speed < 900.0

VEHICLE SPEED CRITERIA: i) enabled when vehicle speed > 40 + supporting table value DFCO_Vehicle Speed enables ii) once enabled continue to be enabled until vehicle speed < 35 + supporting table values DFCO_Vehicle Speed enables

LOAD CRITERIA : i) enabled when air per cylinder is < 107.0 + supporting table values DFCO Load Criteria ii) once enabled, disabled if < 125.0 + supporting table values DFCO Load Criteria

% THROTTLE POSITION CRITERIA: 1) enabled when TPS % is < (0.101 + supporting table values TPS % DFCO Enables) ii) once enabled, disabled if TPS % > (0.201 and supporting table valuesTPS % DFCO Enables)

Charly ST TEMPERATURE
 (acable if Catalyst temperature exceeds 100.0
 () once disable for Catalyst temperature, re-enables when Catalyst temperature < 900.0
 (OTHER CONDITIONS:
 a) Transmission is not about to unlock
 b) Engine not about to stall
 c) Tabout to stall
 c) TABOUT ST CONDITIONS:
 a) Transmission is not about to unlock
 b) Engine not about to stall
 c) TABOUT ST CONDITIONS:
 c) TABOUT ST CONDITIONS:
 c) Tabout to stall
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 c) Tabout to stall
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No Active DTCs:

for at least 30 seconds.

FuelLevelDataFault P0462 P0463

DFCO_DelayAfterStart_Time

Axis: Gear State	TGRR_Gear1	TGRR_Gear2	TGRR_Gear3	TGRR_Gear4	TGRR_Gear5	TGRR_Gear6
Curve: time(s)	1.5	1.5	1.5	1.5	1.5	1.5

DFCO_Engine Speed Enables

Torque Converter Clu		d P2270 test no	ot requested (POPD OFF):	DFCO enable	s above RPM								
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park					
Curve: RPM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0					
Torque Converter Clu		d D2270 toot n	at requested		DECO diashl	o if DDM dros	na halaw							
Axis: Gear State		2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear		ID	Park					
	1st Gear						Neutral	Reverse						
Curve: RPM	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0					
Torque Converter Clu														
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park					
Curve: RPM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0					
Torque Converter Clu	utch LOCK and P	2270 test not r	equested (PC	PD OFF): DF	CO disables i	f RPM drops I	below							
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park					
Curve: RPM	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0					
DFCO Vehicle Speed	i enables													
Vehicle speed above		ibles					_							
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear								
Curve: KPH	30.0	35.0	40.0	40.0	40.0	40.0]							
Vehicle speed drops	below DECO dis:	ables												
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	٦							
Curve: KPH	25.0	30.0	35.0	35.0	35.0	35.0	-							
DFCO Load Criteria Air Per Cylinder mus Axis: RPM		0 512	1024	1536	5 2048	3 2560	307	2 358	4096	4608	5120	5632	6144	e
Curve: APC	107.									95.0	93.0	91.8	91.8	
CUIVE. AFC	107.	3 100.9	106.0	110.0	109.0	J 107.0	104.	102	.3 90.3	95.0	93.0	91.0	91.0	
Continues unless AP										1000				
Axis: RPM		0 512								4608	5120	5632	6144	
Curve: APC	121.	6 121.3	121.3	128.0	127.0	125.0	122.	5 120	.3 116.3	113.0	111.0	109.8	109.8	1
TPS % DFCO Enables Enabled if TPS % is I														
Axis: RPM		0 512	1024	1536	5 2048	3 2560	307:	2 358	4096	4608	5120	5632	6144	6
Curve: TPS %	0.1									0.90	1.24	1.54	1.80	
50146. 11 5 %	0.1	0 0.10	0.10	0.11	0.10	0.10	0.2	. 0.4	0.01	0.30	1.24	1.54	1.00	
Continues unless TP	S % is graatar the	an												
Axis: RPM		0 512	1024	1536	5 2048	3 2560	307	2 358	4096	4608	5120	5632	6144	(
Curve: TPS %	0.2									1.05	1.39	1.69	1.95	
Low Fuel Condition E		0.20	0.20	0.2		0.20	0.0	0.0	0.10	1.00	1.00	1.00	1.00	
	Flag set to T	RUE if fuel leve	el < 10.0 %											
	AND													

7168 91.8

> 7168 109.8

> > 7168

7680 91.8

> 7680 109.8

> > 7680 1.80

7168 7680 8192 1.95 1.95 1.95

8192 91.8 8192 109.8

> 8192 1.80

												0		••			
Dilution Definitions Exhaust Cam Phsr Enab	le																
	Exhaust Cam Phs Exhaust Cam Pha	r Enable = TF	RUE if:	tPresent													
	AND																
	DTCs not set: Cra AND			ExhaustCam	Sensor_TFTK	O, CrankExh	naustCamCorr	FA									
	Engine Power Lim AND	ited = FALSE															
	ExhRunTime is E	nabled (see	below)														
	AND ExhEngineSpeed	l is Enabled ((see below)														
	AND ExhOilPressure is	s Enabled (se	e below)														
	AND ExhEngineOilTe																
		IIIP IS ETIADIO	d (see below)														
ExhRunTime is Enabled Cold Start Enabl	when: le Engine Run Time	> 60.00 se	c														
	AND Engine RPM > 700																
	AND																
OR	Engine RPM > 80	00.0															
Engine Run tim Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	40.0	15.0	9.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	152 5.0
ExhEngineSpeed:																	
Enabled when: RPM Greater that	in																
Axis: Coolant Temp Curve: RPM	-40 1000.0	-28 1000.0	-16 1000.0	-4 1000.0	8 1000.0	20 1000.0	32 1000.0	44 1000.0	56 1000.0	68 1000.0	80 1000.0	92 1000.0	104 1000.0	116 1000.0	128 1000.0	140 1000.0	152 1000.0
and Less that	-40			-4				44						116			
Axis: Coolant Temp Curve: RPM	-40	-28 0.0	-16 0.0	-4	8 0.0	20 0.0	32 0.0	44 0.0	56 0.0	68 0.0	80 0.0	92 0.0	104 0.0	0.0	128 0.0	140 0.0	152 0.0
Disables when:																	
Less tha Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0
or Greate Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ExhOilPressure is Enabl	ed.																
If an oil pressure sensor is	s present: Pres	sent															
AND is being used:	InU	se															
then use oil pressure. Oil Press greater tha	in																
Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa for	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
Axis: Coolant Temp Curve: Seconds	-40 300.0	-28 250.0	-16 200.0	-4 100.0	8 40.0	20 15.0	32 9.0	44 5.0	56 5.0	68 5.0	80 4.0	92 4.0	104 4.0	116 4.0	128 5.0	140 5.0	152 5.0
and Disables if less th Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0
		_															
If an oil pressure sensor OR	' is Not Present:		esent														
is Not Being Used: then use RPM.		Inl	Jse														
RPM greater that	in				-								101				1.88
Axis: Coolant Temp Curve: RPM	-40 1000.0	-28 1000.0	-16 1000.0	-4 1000.0	1000.0	20 1000.0	32 1000.0	44 1000.0	56 1000.0	68 1000.0	80 1000.0	92 1000.0	104 1000.0	116 1000.0	128 1000.0	140 1000.0	152 1000.0
for Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	40.0	15.0	9.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	152 5.0
ExhEngineOilTemp:																	
If an oil temperature sen	sor is present:	No	resent														
AND is being used:		No	tInUse														
OR Oil temperature is mode	led: Mov	deled															
then use Oil Temperatu	ire.																
Enabled when: Oil Temp greater that	n -10.0 degi	с															
and Less tha Disables when:	in 135.0 degi	с															
Less that		c															
or Greate	er 140.0 degi	6															
Intake Cam Phsr Enable	Intake Cam Phsr E Intake Cam Phase AND	er is Present:	Pre	sent													
	DTCs not set: Cra AND	ankSensorTe	stFailedTKO,	IntakeCamSe	nsor_TFTKO,	, CrankIntake	CamCorrFA										
	Engine Power Lim	ited = FALSE															
	AND IntRunTime is Ena	abled (see b	elow)														
	AND IntEngineSpeed is																
	AND																
	IntOilPressure is AND																
	IntEngineOilTem	np is Enabled	(see below)														

e Run Tim e RPM > 7 e RPM > 8 -40 300.0		-16 200.0	-4													
9 RPM > 7 9 RPM > 8 -40	-28	-16	-4													
e RPM > 8	-28		-4													
-40	-28		-4													
			-4													
			-4	· · · · · ·												
300.0	250.0	200.0		8	20	32	44	56	68	80	92	104	116	128	140	152
		200.01	100.0	60.0	60.0	60.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
900.0	900.0	900.0	900.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	950.0	1000.0	1250.0	1400.0	1900.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
800.0	800.0	800.0	800.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	800.0	800.0	800.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152 5.0
			·	•												
-40 125.0	-28	-16 125.0	-4 125.0	8 125.0	20 125.0	32 125.0	44 125.0	56 125.0	68 125.0	80 125.0	92 125.0	104	116	128	140	152 125.0
10																
																152 1900.0
-40	-28	-16 200.0	-4	60.0	60.0	32 60.0	44 5.0	56	68 5.0	80 4.0	92 4.0	104	4.0	128	140 5.0	152 5.0
No	otInUse															
	-40 -40 -40 -40 -40 -40 -40 -40 -40 -40	-40 -28 -40 -28 300.0 -28 7000.0 7000.0 -40 -28 7000.0 7000.0 -40 -28 150.0 150.0 -40 -28 300.0 250.0 -40 -28 125.0 125.0 sent: Present InUse -40 -28 300.0 260.0	8800.0 6800.0 6800.0 40 -28 -16 900.0 800.0 800.0 40 -28 -16 7000.0 7000.0 7000.0 40 -28 -16 7000.0 7000.0 7000.0 40 -28 -16 150.0 150.0 150.0 40 -28 -16 125.0 125.0 125.0 40 -28 -16 105.0 125.0 125.0 sent: Present InUse -16 40 -28 -16 900.0 900.0 900.0 -40 -28 -16 900.0 900.0 900.0 -40 -28 -16 900.0 900.0 900.0 -40 -28 -16 900.0 900.0 900.0 ant: NotPresent NothUse NothUse	6800.0 6800.0 6800.0 6800.0 -40 -28 -16 -4 900.0 800.0 800.0 800.0 -40 -28 -18 -4 7000.0 7000.0 7000.0 7000.0 -40 -28 -16 -4 150.0 150.0 150.0 150.0 -40 -28 -16 -4 125.0 125.0 125.0 125.0 -40 -28 -16 -4 125.0 125.0 125.0 125.0 sem: Present InUse -40 -28 -46 -40 -28 -16 -4 900.0 900.0 900.0 900.0 -40 -28 -16 -4 900.0 900.0 900.0 900.0 -40 -28 -16 -4 900.0 900.0 900.0 100.0 -40 -28 -16 -4	6800.0 6800.0 6800.0 6800.0 6800.0 -40 -28 -16 -4 8 00.0 800.0 800.0 750.0 -40 -28 -16 -4 8 7000.0 7000.0 7000.0 7000.0 7000.0 -40 -28 -16 -4 8 7000.0 7000.0 7000.0 7000.0 7000.0 -40 -28 -16 -4 8 105.0 150.0 150.0 150.0 150.0 -40 -28 -16 -4 8 125.0 125.0 125.0 125.0 125.0 sem: Present InUse -46 8 8 -40 -28 -16 -4 8 900.0 900.0 900.0 875.0 -40 -28 -16 -4 8 900.0 250.0 200.0 100.0 60.0 -40 <td>6800.0 750.0 750.0 750.0 750.0 750.0 7000.0</td> <td>6800.0 32 -40 -28 -16 -4 8 20 32 7000.0</td> <td>6800.0 750.0 7000.0 70</td> <td>6800.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 7000.0 70</td> <td>6800.0 750.0 7</td> <td>6800.0 750.0 75</td> <td>6800.0 750.0 750.0</td> <td>6800.0 750.0 <</td> <td>6800.0 750.0 750.0</td> <td>6800.0 750.0 750.0</td> <td>esoon esoon <th< td=""></th<></td>	6800.0 750.0 750.0 750.0 750.0 750.0 7000.0	6800.0 32 -40 -28 -16 -4 8 20 32 7000.0	6800.0 750.0 7000.0 70	6800.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 750.0 7000.0 70	6800.0 750.0 7	6800.0 750.0 75	6800.0 750.0 750.0	6800.0 750.0 <	6800.0 750.0 750.0	6800.0 750.0 750.0	esoon esoon <th< td=""></th<>

Diagnostic Supporting Tables 16 of 16

Cert Doc Bundle Name	Pcodes
IAC_SystemRPM_FA	P0506 P0507
TCM_EngSpdReqCkt	P150C
FuelTrimSystemB1_FA	P0171 P0172
FuelTrimSystemB2_FA	P0174 P0175
FuelTrimSystemB1_TFTKO	P0171 P0172
FuelTrimSystemB2_TFTKO	P0174 P0175
NA	P2096 P2097 P2098 P2099
A/F Imbalance Bank1	P219A
A/F Imbalance Bank2	P219B
EngineMetalOvertempActive	P1258
FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
CatalystSysEfficiencyLoB1_FA	P0420
CatalystSysEfficiencyLoB2_FA	P0430
AmbientAirPressCktFA	P2228 P2229
AmbientAirPressCktFA_NoSnsr	P0106 P0107 P0108
AmbientAirDefault	For Naturally Aspirated Engines: P0106 P0107 P0108 P2227 P2228 P2229
	For Engines with no Baro Sensor: P0106 P0107 P0108
IAT_SensorCircuitTFTKO	P0112 P0113
IAT SensorCircuitFA	P0112 P0113
IAT_SensorCircuitFP	P0112 P0113
IAT_SensorTFTKO	P0111 P0112 P0113
IAT SensorFA	P0111 P0112 P0113
IAT2_SensorCktTFTKO	P0097 P0098
IAT2_SensorCktTFTKO_NoSnsr	P0112 P0113
IAT2_SensorCircuitFA	P0097 P0098
 IAT2_SensorCircuitFA_NoSnsr	P0112 P0113
IAT2_SensorcircuitFP	P0097 P0098
IAT2_SensorcircuitFP_NoSnsr	P0112 P0113
IAT2_SensorTFTKO	P0096 P0097 P0098
IAT2_SensorTFTKO_NoSnsr	P0111 P0112 P0113
IAT2_SensorFA	P0096 P0097 P0098
IAT2_SensorFA_NoSnsr	P0111 P0112 P0113
MAF_SensorPerfFA	P0101
MAF_SensorPerfTFTKO	P0101
MAP_SensorPerfFA	P0106
MAP_SensorPerfTFTKO	P0106
ThrottlePositionSnsrPerfFA	P0121
ThrottlePositionSnsrPerfTFTKO	P0121

Cert Doc Bundle Name	Pcodes
MAF_SensorFA	P0101 P0102 P0103
MAF_SensorTFTKO	P0101 P0102 P0103
MAF_SensorFP	P0102 P0103
MAF_SensorCircuitFA	P0102 P0103
MAF_SensorCircuitTFTKO	P0102 P0103
MAP_SensorTFTKO	P0106 P0107 P0108
MAP_SensorFA	P0106 P0107 P0108
SCIAP_SensorFA	P012B P012C P012D
SCIAP_SensorTFTKO	P012B P012C P012D
SCIAP_SensorCircuitFP	P012C P012D
AfterThrottlePressureFA_NA	P0106 P0107 P0108
AfterThrottlePressureFA_SC	P012B P012C P012D
AfterThrottleVacuumTFTKO_NA	P0106 P0107 P0108
AfterThrottleVacuumTFTKO_SC	P012B P012C P012D
SCIAP_SensorCircuitFA	P012C P012D
AfterThrottlePressTFTKO_NA	P0106 P0107 P0108
AfterThrottlePressTFTKO_SC	P012B P012C P012D
MAP_SensorCircuitFA	P0107 P0108
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending
ECT_Sensor_Ckt_FA	P0117 P0118
ECT_Sensor_Ckt_TPTKO	P0117 P0118
ECT_Sensor_Ckt_TFTKO	P0117 P0118
ECT Sensor DefaultDetected	P0117 P0118 P0116
ECT_Sensor_FA	P0117 P0118 P0116 P0128
ECT_Sensor_TFTKO	P0117 P0118 P0116
ECT_Sensor_Perf_FA	P0116
ECT_Sensor_Ckt_FP	P0117 P0118
ECT_Sensor_Ckt_High_FP	P0118
ECT_Sensor_Ckt_Low_FP	P0117
THMR_Insuff_Flow_FA	P00B7
THMR_Therm_Control_FA	P0597 P0598 P0599
THMR_RCT_Sensor_Ckt_FA	P00B3 P00B4
THMR_ECT_Sensor_Ckt_FA	P0117 P0118 P0116 P00B6
O2S Bank 1 TFTKO	P0131 P0132 P0134 P2A00
O2S_Bank_ 2_TFTKO	P0151 P0152 P0154 P2A03
O2S Bank 1 Sensor 1 FA	P2A00 P0131 P0132 P0133 P0134 P0135 P0053 P1133 P015A P015B P0030
O2S_Bank_1_Sensor_2_FA	P013A P013B P013E P013F P2270 P2271 P0137 P0138 P0140 P0141 P0054 P0036
O2S Bank 2 Sensor 1 FA	P2A03 P0151 P0152 P0153 P0154 P0155 P0059 P1153 P015C P015D P0050
O2S Bank 2 Sensor 2 FA	P013C P013D P014A P014B P2272 P2273 P0157 P0158 P0160 P0161 P0060 P0056
PO2S Bank 1 Snsr 2 FA	P0137 P0138 P0140 P0036 P0054 P0141 P2270 P2271
PO2S_Bank_2_Snsr_2_FA	P0157 P0158 P0160 P0056 P0060 P0161 P2272 P2273
FUZO_DANK_Z_ONSI_Z_FA	FU137 FU130 FU100 FU000 FU101 F2212 F2213

Cert Doc Bundle Name								Pcodes	6			
ngineMisfireDetected_TFTKO	P0300	P0301 P0	302 P030	3 P0304	P0305	P0306	P0307	P0308				
ngineMisfireDetected_FA	P0300 I	P0301 P0	302 P030	B P0304	P0305	P0306	P0307	P0308				
CrankCamCorrelationTFTKO	P0016	P0017 P0	018 P001	9								
CrankSensorFA	P0335	P0336										
CrankSensorTFTKO	P0335	P0336										
CamSensorFA	P0016	P0017 P0	018 P001	9 P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
CamSensorTFTKO	P0016	P0017 P0	018 P001	9 P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
rankIntakeCamCorrelationFA	P0016	P0018										
CrankExhaustCamCorrelationFA	P0017	P0019										
ntakeCamSensorTFTKO	P0016	P0018 P0	340 P034	1 P0345	P0346							
ntakeCamSensorFA	P0016	P0018 P0	340 P034	1 P0345	P0346							
ntakeCamSensor_FA	P0016	P0018 P0	340 P034	1 P0345	P0346							
ntakeCamSensor_TFTKO	P0016	P0018 P0	340 P034	1 P0345	P0346							
CrankIntakeCamCorrFA	P0016	P0018										
CrankExhaustCamCorrFA	P0017	P0019										
CrankSensorFaultActive	P0335	P0336										
CrankSensor_FA	P0335	P0336										
CrankSensorTestFailedTKO	P0335	P0336										
CrankSensor_TFTKO	P0335	P0336										
CamSensor_FA	P0016 I	P0017 P0	018 P001	9 P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
CamSensorAnyLocationFA	P0016	P0017 P0	018 P001	9 P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
CamSensor_TFTKO	P0016	P0017 P0	018 P001	9 P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
vapPurgeSolenoidCircuit_FA	P0443											
vapFlowDuringNonPurge_FA	P0496											
vapVentSolenoidCircuit_FA	P0449											
vapSmallLeak_FA	P0442											
vapEmissionSystem_FA	P0455 I	P0446										
uelTankPressureSnsrCkt_FA	P0452	P0453										
uelLevelDataFault	P0461	P0462 P0	463 P206	6 P2067	P2068							
	D1692											

P1682
P0685
P0685
P2610
P2610
P2610
P2610
P0502 P0503 P0722 P0723

VehicleSpeedSensorError P0502 P0503 P0722 P0723

Cert Doc Bundle Name	Pcodes
LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 % AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
AnyCamPhaser_FA	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
AnyCamPhaser_TFTKO	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
IntkCamPhaser_FA	P0010 P0011 P0020 P0021
EngOilPressureSensorCktFA	P0522 P0523
EngOilPressureSensorFA	P0522 P0523
EngineTorqueEstInaccurate	EngineMisfireDetected_FA FueIInjedtorCircuit_FA FueIInjedtorCircuit_TFTKO FueITrimSystemB1_FA FueITrimSystemB2_FA MAF_SensorTFTKO MAP_SensorTFTKO EGRValuePerforamnce_FA
PPS1_OutOfRange_Composite	P2122 P2123 P0651
PPS2_OutOfRange_Composite	P2127 P2128 P0641
PPS1_OutOfRange_Composite	P2122 P2123 P0651
PPS2_OutOfRange_Composite	P2127 P2128 P0641
PPS1_OutOfRange	P2122 P2123
PPS2_OutOfRange	P2127 P2128
PPS1_OutOfRange	P2122 P2123
PPS2_OutOfRange	P2127 P2128
AcceleratorPedalFailure	P2122 P2123 P2127 P2128 P2138 P0641 P0651
ControllerRAM_Error_FA	P0604
ControllerProcessorPerf_FA	P0606
TPS1_OutOfRange_Composite	P0122 P0123 P0651
TPS2_OutOfRange_Composite	P0222 P0223 P0652
TPS_FA	P0120 P0122 P0123 P0220 P0222 P0223 P2135
TPS_TFTKO	P0120 P0122 P0123 P0220 P0222 P0223 P2135
TPS_Performance_FA	P0068 P0121 P1516 P2101
TPS_Performance_TFTKO	P0068 P0121 P1516 P2101
TPS_FaultPending	P0120 P0122 P0123 P0220 P0222 P0223 P2135
TPS_ThrottleAuthorityDefaulted	P0068 P0120 P0122 P0123 P0220 P0222 P0223 P1516 P2135 P2176
EnginePowerLimited	P0068 P0606 P0120 P0122 P0123 P0220 P0222 P0223 P0641 P0651
	P1516 P2101 P2120 P2122 P2123 P2125 P2127 P2128 P2135 P2138 P2176
5VoltReferenceA_FA	P0641
5VoltReferenceB_FA	P0651
TOSS_Fault	ECM: P0502 P0503 TCM: P0722 P0723

Cert Doc Bundle Name									Pcodes	6							
ShiftSolenoidFaults (TCM)		P0752															
	MYC/MYD: P0751	P0752	P0756	P0757	P0973	P0974	P0976	P0977									
TransTurbineSpeedValid(TCM)	M30/M70: P0716	D0717															
	MYC/MYD: P0716		P07BF	P07C0													
Trans_Gear_Defaulted(TCM)	M30/M70: P0705	P1810	D1815	P1816	D1817	D1818	P1015	P1820	D182A	D1822	P182C	D1823	P182D	P1825	D182E	P1826	D182E
Trans_Geal_Delauted(TOW)	10705	1 1010	1 1015	1 1010	1 1017	1 1010	1 1910	1 1020	1 102A	1 1022	1 1020	1 1025	1 1020	1 1025	TTOZL	1 1020	1 1021
KS_CktPerfB1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333									
EST DriverFltActive	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358									