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	Type B
Actuator Solenoid	1	by monitoring the circuit for	state of the driver and the actual state of		within limits	< 32 Volts	out of 25	2 trips
Circuit – Bank 1	1	electrical integrity	the control circuit do not match.				samples	
	1				Output driver is commanded on,		250 ms	
	1				Ignition switch is in crank or run position		/sample,	
	1						continuous	
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	200 failures	Туре В
System		by comparing the desired	of (desired position - actual position)] is	Error >	P0010 IntkCMP B1 Circuit	System Voltage < 32 Volts	out of 1000	2 trips
Performance -	1	and actual cam positions	compared to thresholds to determine if		P0340, P0341, Intake B1 Cam sensors	-,	samples	
Bank 1	1	when VVT is activated	excessive	Deg (see Supporting Table)	P0335, P0336, Crank sensors	Desired cam position cannot vary		
	1				P0016, P0017, P0018, P0019 Cam to	more than 7.5 Cam Deg for at		
	1				crank rationality	least		
	1					KtPHSD t StablePositionTimeIc1		
	1					seconds (see Supporting Table)		
	1							
	1				Engine is running		100 ms	
	1				VVT is enabled		/sample	
	1				Desired camshaft position > 0		, oumpro	
	1				Power Take Off (PTO) not active			
	1							
Orealist of Divisi	Dooto	Detecto com to concil			Fraine Speed	< 1200	4 foilures a f	Turne D
Crankshaft Position (CKP)-Camshaft	FUU16	Detects cam to crank misalignment by monitoring	4 cam sensor pulses more than 11 crank degrees before or 11 crank degrees after		Engine Speed Crankshaft and camshaft position signals	< 1200	4 failures out of 5 samples	1 ype B 2 trips
Position (CMP)	1	if cam sensor pulse for bank	nominal position in one cam revolution.		are synchronized		if the engine	z trips
Correlation Bank 1	1	1 sensor A occurs during the	nominal position in one cam revolution.		are synchronized			
Sensor A	1	incorrect crank position					is being assisted by	
Sensor A	1	incorrect crarik position					the starter	
	1						life starter	
	1				Cam phaser is in "parked" position			
	1						24 failures	
	1						out of 30	
	1					D0005 D0000	samples if	
	1				No Active DTCs:	P0335, P0336 P0340, P0341	the engine is	
	1					5VoltReferenceA FA	running	
	1					5VoltReferenceB FA	without	
	1				No Pending DTCs:		assistance	
	1					P0341	from the	
	1							
	1						One sample	
	1						per cam	
O2S Heater	P0030	This DTC checks the Heater	Voltage low during driver open state	l			rotation 20 failures	Turno P
Control Circuit	1 0030	Output Driver circuit for	(indicates short-to-ground or open circuit)		Ian Switch position	= Crank or Run position	out of 25	Type B 2 trips
Bank 1 Sensor 1	1	electrical integrity.	or voltage high during driver closed state		ight ethicht position	11.0 volts < Ign Voltage < 32.0	samples	2 1105
Dalik i Selisol i	1	electrical integrity.	(indicates short to voltage).		Ignition Voltage		oumpioo	
	1		(indicates short to voltage).					
	1				Engine Speed	> 400 RPM	250 ms	
	1						/sample	
	1							
	1						Continuous	
O2S Heater	P0036	This DTC checks the Heater	Voltage low during driver open state	l	1		20 failures	Туре В
Control Circuit	0030	Output Driver circuit for	(indicates short-to-ground or open circuit)		Ian Switch position	= Crank or Run position	out of 25	туре в 2 trips
Bank 1 Sensor 2	i i	electrical integrity.	or voltage high during driver closed state		ight canton position	11.0 volts < Ign Voltage < 32.0	samples	z uips
Dank I Sensul Z	i i	electrical integrity.	(indicates short to voltage).		Ignition Voltage		Campioo	
	i i		(indicates short to voltage).		.g			
	i i				Engine Speed	> 400 RPM	250 ms	
	1						/sample	
	i i						L .	
	1						Continuous	
	<u>i                                    </u>							

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Voltage		20 failures out of 25 samples	Type B 2 trips
					Engine Speed	> 400 KPM	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.		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	Type B 2 trips
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	Type B 2 trips
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	Type B 2 trips
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	Coolant – IAT	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds	Continuous Once per valid cold start	Type B 2 trips
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	Coolant – IAT	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds	Once per valid cold start	Type B 2 trips
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP <u>and</u> MAF do not match estimated engine airflow as established by the TPS		Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM Run/crank voltage or Powertrain	Continuously fail MAP and MAF portions of diagnostic for 0.1875 sec Continuous	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						relay voltage > 6.00 and reduced	in primary processor	
			2) Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage,	Table, f(TPS). See supporting tables				
			then MAF portion of diagnostic fails	Table, f(RPM). See supporting tables				
				Table, f(Volts). See supporting tables				
Radiator Coolant	P00B3	This DTC detects a short to	RCT Resistance	< 45 Ohms			5 failures out	Туре В
Temp Sensor Circuit Low Voltage		ground in the RCT signal circuit or the RCT sensor.	(@ 150°C)		Engine run time Or		of 25 samples	2 trips
					IAT mir	l ≤ 150.0 °C	1 sec /sample	
							Continuous	
Radiator Coolant Femp Sensor Circuit High /oltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT	RCT Resistance (@ -60°C)	> 419000 Ohms	Engine run time Or	> 10.0 seconds	5 failures out of 25 samples	Type B 2 trips
onage		sensor.			IAT mir	≥ -7.0 °C	1 sec /sample	
							Continuous	
Radiator Coolant Femp - 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	1 failure 500 msec /sample	Type B 2 trips
,			1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section		ECT_Sensor_Ckt_FA IgnitionOffTimeValid	Once per valid cold start	
			fail)			TimeSinceEngineRunningValid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			<ul> <li>2) Absolute difference between ECT at power up &amp; RCT at power up is &gt; by 19.3 C and a block heater has not been detected</li> <li>3) ECT at power up &gt; 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</li> </ul>		Engine Off Soak Time Non-volatile memory initization			
				= False (See Supporting Tables)	Test complete this trip Test aborted this trip IAT LowFuel Condition Diag <b>(See Supporting Tables)</b>	= False ≥ -7 ºC		
					Block Heater detecti when either of the fol 1) ECT at power up > IAT at power up by 2) Cranking time	lowing occurs:		
					Block Heater is de diagnostic is aborte occurs. Diagnostic is 3) or 4) occ	d when 1)or 2) s aborted when curs:		
					1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	> 14.9 MPH and 0.00 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 1 °C Within < 30 Seconds > 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	<= 230 kPa*(g/s)	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp	>= 450 RPM <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C		Type B 2 trips
			AND ABS(Measured MAP – MAP Model 2) Filtered	> 12 grams/sec > 15.0 kPa	Intake Air Temp Minimum total weight factor (all factors multiplied together)	< 125 Deg C	every 12.5 msec	
						>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
						Modeled Air Flow multiplied by MAF Residual Weight Factor		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions based on RPM and MAF Residual Weight Factor Based on MAF Estimate	Required	illum.
						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 Ckt FA IAT SensorFA		
						IAT SensorFP CylDeacSystemTFTKO		
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1500 Hz (~ 1.58 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	400 failures out of 500 samples 1 sample every	Type B 2 trips
						>= 1.0 seconds	cylinder firing event	
Mass 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 event	Type B 2 trips
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 > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	<ul> <li>= 450 RPM</li> <li>= 4600 RPM</li> <li>&gt; 7 Deg C</li> <li>&lt; 129 Deg C</li> <li>&gt; 20 Deg C</li> <li>&lt; 125 Deg C</li> <li>&gt;= 0.00</li> <li>Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM</li> <li>MAP Model 1 multiplied by MAP1</li> <li>Residual Weight Factor based on RPM</li> <li>MAP Model 2 multiplied by MAP2</li> <li>Residual Weight Factor based on RPM</li> </ul>	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time	MIL illum.
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	num.
					No Active DTCs:	See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA		
						CrankSensorFA ECT_sensor_FA ECT Sensor FP 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	Type B 2 trips
							every 12.5 msec	
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1 kPa)	Continuous		320 failures out of 400 samples	Type B 2 trips
							1 sample every 12.5 msec	
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 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	50 failures out of 63 samples 1 sample	Type B 2 trips
					NO ACTIVE DICS.	ECT Sensor Ckt FP VehicleSpeedSensorError	every 100 msec	
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed	> 0.0 seconds > -40 deg C <= 318.00 MPH	50 failures out of 63 samples	Type B 2 trips
(Low Temperature)					Engine Air Flow No Active DTCs:	<= 511 gm/sec ECT Sensor Ckt FA ECT Sensor Ckt FP VehicleSpeedSensorError MAF SensorFA MAF SensorFP	1 sample every 100 msec	
	P0116	This DTC detects ECT temp			No Active DTC's	MAF SensorTFTKO VehicleSpeedSensor_FA	1 failure	Туре В
Temperature (ECT) Sensor Performance		sensor stuck in mid range.	A failure will be reported if any of the following occur:			IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid	500 msec /sample	2 trips
				See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section.		TimeSinceEngineRunningValid	Once per valid cold start	
			<ol> <li>ECT at power up &gt; IAT at power up by 19.3 C after a minimum 28800 second soak and a block heater has not been</li> </ol>		Non-volatile memory initization	= Not occurred		
			detected		Test complete this trip	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 <b>(See Supporting Tables)</b>	≥ -7 °C = ⊦alse		
					Block Heater detect		1	
					when either of the fo 1) ECT at power up > IAT at power up by 2) Cranking time	> 19.3 ºC		
					Block Heater is d 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 provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	<ul> <li>&gt; 400 Seconds with</li> <li>&gt; 14.9 MPH</li> <li>0.00 times the seconds with vehicle speed below 1b</li> <li>≥ 3.3 °C</li> </ul>		
					2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed	<ul> <li>&gt; 1 °C Within</li> <li>≤ 30 Seconds</li> <li>&gt; 1800 Seconds</li> </ul>		
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	
							1 sec /sample Continuous	
Engine Coolant	P0118	Circuit Continuity	ECT Resistance				5 failures out	Type B
Temp Sensor Circuit High		This DTC detects a short to high or open in the ECT signal circuit or the ECT		> 419000 Ohms	Or	> 10.0 seconds ≥ -7.0 °C	of 6 samples	
		sensor.					1 sec /sample Continuous	
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the	Secondary TPS1 Voltage < or Secondary TPS1 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 counts	Trips: Type:
		secondary processor but		4.75		be reported for all conditions		A MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		primary processor				No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	ms/count in the secondary processor	YES
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 230 kPa*(g/s) > 12 grams/sec	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 TPS Residual Weight Factor based on RPM	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
						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:	Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensorFA ECT Sensor FP IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO		
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	Primary TPS1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	79 / 159 counts; 57	Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	circuit on both processors or just the primary processor	Criteria	value	Parameters	power is false, else the failure will be reported for all conditions	counts continuous; 3.125 ms	Type: A MIL: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	/count in the primary 19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
Engine Coolant Temperature Below Stat Regulating Temperature (For applications with a two coolant sensors)	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) ECT reaches target temperature of 75.0 °C	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 THMR_ECT_Sensor_Ckt_FA	1 failure to set DTC 1 sec /sample Once per	Type B 2 trips
,			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	ignition key cvcle	
			ECT reaches target temperature of 65.0 °C		Fuel Condition	Ethanol ≤ 87%		
			when IAT min is < 10.0°C and ≥ -7.0°C.		Range #1 (Primary) Test ECT at start run Average Airflow	-7.0 ≤ ECT ≤ 70.0 °C ≥ 17.0 gps		
					Range #2 (Alternate) Test ECT at start run Average Airflow	-7.0 ≤ ECT ≤ 60.0 °C ≥ 17.0 gps	]	
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 40 mvolts	AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control	<ul> <li>Not active</li> <li>Not active</li> <li>Not active</li> <li>10.0 volts &lt; system voltage&lt; 32.0 volts</li> <li>Not active</li> <li>Not active</li> <li>Not active</li> </ul>	285 failures out of 350 samples Frequency: Continuous in 100 milli- second loop	Type B 2 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters AIR Device Control	Conditions	Required	illum.
						= Not active = False		
					Low Fuel Condition Diag	(See Supporting Tables)		
					Equivalence Ratio	$0.9922 \le equiv. ratio \le 1.0137$		
						3 % <= Throttle <= 70 %		
					Fuel Control State			
					Closed Loop Active			
					All Fuel Injectors for active Cylinders			
						Ethanol <= 87%		
						DFCO not active		
					Fuel State	DFCO not active		
					All of the above	e met for	1	
						> 5.0 seconds		
02S Circuit High	P0132	This DTC determines if the	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050	No Activo DTC/o	TPS_ThrottleAuthorityDefaulted	100 failures	Type B
	P0132		Measure Oxygen Sensor Signal.		NO ACTIVE DTC S	1PS_InfottleAuthorityDelauited		
/oltage Bank 1		O2 sensor circuit is shorted		mvolts			out of 125	2 trips
Sensor 1		to high.				MAP_SensorFA	samples	
						MAF SensorFA	Frequency:	
							Continuous	
							in 100 milli -	
						EvapPurgeSolenoidCircuit_FA	second loop	
						EvapFlowDuringNonPurge_FA	0000101000	
						EvapVentSolenoidCircuit FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit FA		
					AIR intrusive test			
					Fuel intrusive test			
					Idle intrusive test			
					EGR intrusive test			
						10.0 volts < system voltage< 32.0		
					System voltage			
					EGR Device Control	volts		
					Idle Device Control			
					Fuel Device Control			
					AIR Device Control	= Not active		
					Low Fuel Condition Diag			
						(See Supporting Tables)		
						0.9922 ≤ equiv. ratio ≤ 1.0137		
						0.0 % <= Throttle <= 70.0 %		1
					Fuel Control State			
						not = Power Enrichment		
					Closed Loop Active			
					All Fuel Injectors for active Cylinders			
						DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above	e met for	1	
						> 2 seconds	1	
2S Slow esponse Bank 1	P0133	This DTC determines if the O2 sensor response time is	The average response time is caluclated over the test time, and compared to the	Refer to "P0133 - O2S Slow Response Bank 1 Sensor 1"	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Sample time is 60	Type B 2 trips
ensor 1		degraded.	threshold.	Pass/Fail Threshold table in the			seconds	po
		dogradou.		Supporting Tables tab.		MAP_SensorFA	0000103	1
				Supporting Tables tab.		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				

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
				when the signal is transitioning		EvapSmallLeak FA		
				between 600 mvolts and 300		EvapEmissionSystem_FA		
				mvolts. An average rich to lean		FuelTankPressureSnsrCkt_FA		
				and lean to rich time are each		FuelInjectorCircuit_FA		
						AIR System FA		
				calculated separately.		EthanolCompositionSensor_FA		
						EngineMisfireDetected FA		
					Deple 4 Concert 4 DTCle and active			
					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	= 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 on for			
					Learned Htr resistance			
					Engine Coolant			
						> -40 °C		
					Engine Run Time			
					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	>= 0 % duty cycle		
						20 gps <= engine airflow <= 85		
					Engine airflow			
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position			
					Low Fuel Condition Diag	= False		
					Low I del Condition Diag	(See Supporting Tables)		
					Fuel Control State			
					Closed Loop Active	= TROE = Enabled. See definition of		
					LTM (Block Learn) fuel cell			
						Multiple DTC Use - Response		
						Cell Enable Table in Supporting		
						Tables tab.		
					Transient Fuel Mass	<= 100.0 mgrams		
						= Not Defaulted		
						not = Power Enrichment		
						DFCO not active		
					Commanded Proportional Gain			
					Commanded Froportional Gall	- 0.0 /0		
					All of the abov	a met for	4	
						> 3.5 seconds	4	
					Time	- 0.0 Seconds		
2S Circuit	P0134	This DTC determines if the	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor	No Active DTC's		400 failures	Туре В
sufficient Activity		O2 sensor circuit is open.		signal < 550 mvolts			out of 500	2 trips
ank 1 Sensor 1						TPS_ThrottleAuthorityDefaulted	samples.	
						MAF_SensorFA		
							Minimum of 0	1
							delta TPS	
						EthonolCompositionSoncer 54	changes	
						EthanolCompositionSensor_FA		
							required to report fail.	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					System Voltage	10.0 volts < system voltage< 32.0	Delta TPS is	
						volts	incremented	
							when the	
							TPS %	
							change >=	
							0.0 %	
					AFM Status	= All Cylinders active	_	
							Frequency:	
					Heater Warm-up delay	= Complete	Continuous	
					Predicted Exhaust Temp (by location)	= warned Up	100msec	
					Engine Run Time	> 200 cocondo	loop	
						<= 87 % Ethanol	юор	
					I dei			
O2S Heater	P0135	This DTC determines if the	Measured Heater Current.	Measured Heater current < 0.3	No Active DTC's		8 failures out	Туре В
Performance Bank	1 0100	O2 sensor heater is		amps		ECT_Sensor_FA	of 10	2 trips
Sensor 1		functioning properly by		-OR-			samples	2 1100
		monitoring the current		Measured Heater current > 3.1	System Voltage	10.0 volts < system voltage< 32.0	Sampies	
		through the heater circuit.		amps	-,;	volts		
		through the heater circuit.		amps			Frequency:	
							1 tests per	
					Heater Warm-up delay	= Complete	trip	
							5 seconds	
							delay	
							between	
							tests and 1	
							second	
							execution	
					B1S1 O2S Heater Duty Cycle	> zero	rate	
					O2S Heater device control	= Not active		
					All of the above	e met for		
					All of the above			
D2S Circuit Low	P0137	This DTC determines if the	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50	All of the above Time	e met for	320 failures	Туре В
	P0137	This DTC determines if the O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	All of the above Time	e met for > 120 seconds	320 failures out of 400	Type B 2 trips
/oltage Bank 1	P0137		Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	e met for > 120 seconds TPS_ThrottleAuthorityDefaulted		
Voltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA</li> </ul>	out of 400 samples	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	e met for > 120 seconds TPS_ThrottleAuthorityDefaulted	out of 400 samples Frequency:	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA</li> </ul>	out of 400 samples Frequency: Continuous	
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA</li> <li>AIR System FA</li> </ul>	out of 400 samples Frequency: Continuous in 100 milli -	
Voltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA AIR System FA</li> <li>Ethanol Composition Sensor FA</li> </ul>	out of 400 samples Frequency: Continuous	
Voltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA AIR System FA</li> <li>Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA</li> </ul>	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	<ul> <li>met for</li> <li>&gt; 120 seconds</li> <li>TPS_ThrottleAuthorityDefaulted</li> <li>MAP_SensorFA AIR System FA</li> <li>Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA</li> <li>EvapVentSolenoidCircuit_FA</li> </ul>	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	a met for         > 120 seconds         TPS_ThrottleAuthorityDefaulted         MAP_SensorFA         AIR System FA         Ethanol Composition Sensor FA         EvapPurgeSolenoidCircuit_FA         EvapPlowDuringNonPurge_FA         EvapVentSolenoidCircuit_FA         EvapNentSolenoidCircuit_FA         EvapSmallLeak_FA	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapEmissionSystem_FA	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test	a met for         > 120 seconds         TPS_ThrottleAuthorityDefaulted         MAP_SensorFA         AIR System FA         Ethanol Composition Sensor FA         EvapPurgeSolenoidCircuit_FA         EvapPlowDuringNonPurge_FA         EvapVentSolenoidCircuit_FA         EvapSmallLeak_FA         EvapEmissionSystem_FA         FuelInarkPressureSnsrCkt_FA         FuelInjectorCircuit_FA         = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test Fuel intrusive test	a met for         > 120 seconds         TPS_ThrottleAuthorityDefaulted         MAP_SensorFA         AIR System FA         Ethanol Composition Sensor FA         EvapPurgeSolenoidCircuit_FA         EvapFlowDuringNonPurge_FA         EvapVentSolenoidCircuit_FA         EvapSmallLeak_FA         EvapEmissionSystem_FA         FuelTankPressureSnsrCkt_FA         = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test Idle intrusive test	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA = Not active = Not active = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AlR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test EGR intrusive test	a met for         > 120 seconds         TPS_ThrottleAuthorityDefaulted         MAP_SensorFA         AIR System FA         Ethanol Composition Sensor FA         EvapPurgeSolenoidCircuit_FA         EvapPengeSolenoidCircuit_FA         EvapPentSolenoidCircuit_FA         EvapPentSolenoidCircuit_FA         EvapEmissionSystem_FA         FuelTankPressureSnsrCkt_FA         FuelInjectorCircuit_FA         = Not active         = Not active         = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AlR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test EGR intrusive test	a met for           > 120 seconds           TPS_ThrottleAuthorityDefaulted           MAP_SensorFA           AIR System FA           Ethanol Composition Sensor FA           EvapPurgeSolenoidCircuit_FA           EvapPlowDuringNonPurge_FA           EvapVentSolenoidCircuit_FA           EvapSmallLeak_FA           EvapEmissionSystem_FA           FuelInakPressureSnsrCkt_FA           FuelInjectorCircuit_FA           = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage	a met for           > 120 seconds           TPS_ThrottleAuthorityDefaulted           MAP_SensorFA           AIR System FA           Ethanol Composition Sensor FA           EvapPurgeSolenoidCircuit_FA           EvapFlowDuringNonPurge_FA           EvapSmallLeak_FA           EvapEmissionSystem_FA           FuelTankPressureSnsrCkt_FA           FuelTinjectorCircuit_FA           = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA = Not active = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control	<pre>&gt; met for &gt; 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapPentSolenoidCircuit_FA EvapVentSolenoidCircuit_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active</pre>	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's No Active DTC's AlR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control	a met for           > 120 seconds           TPS_ThrottleAuthorityDefaulted           MAP_SensorFA           AIR System FA           Ethanol Composition Sensor FA           EvapPurgeSolenoidCircuit_FA           EvapPlowDuringNonPurge_FA           EvapVentSolenoidCircuit_FA           EvapSmallLeak_FA           EvapEmissionSystem_FA           FuelInakPressureSnsrCkt_FA           FuelInjectorCircuit_FA           = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
/oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control AIR Device Control	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmilleak_FA EvapSmilleak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA = Not active = Not active	out of 400 samples Frequency: Continuous in 100 milli -	
Voltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's No Active DTC's AlR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA = Not active = Not a	out of 400 samples Frequency: Continuous in 100 milli -	
oltage Bank 1	P0137	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		All of the above Time No Active DTC's No Active DTC's AlR 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	a met for > 120 seconds TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmilleak_FA EvapSmilleak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA FuelTankPressureSnsrCkt_FA = Not active = Not active	out of 400 samples Frequency: Continuous in 100 milli -	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Jystem	Code	Description	Cinteria	Value	Throttle Position Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition	3 % <= Throttle <= 70 % = Closed Loop = TRUE	Kequireu	mum.
					All of the above	e met for	4	
						> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	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 Closed Loop Active All Fuel Injectors for active Cylinders	<pre>= Not active = Not active = Not active 10.0 volts &lt; system voltage&lt; 32.0 volts = Not active = Not active = Not active = False (See Supporting Tables) 0.9922 ≤ equiv. ratio ≤ 1.0137 3.0 % &lt;= Throttle &lt;= 70.0 % = Closed Loop not = Power Enrichment = TRUE</pre>	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
						Ethanol <= 87%		
					All of the above		1	
						> 2 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	which runs in a DFCO mode		<ol> <li>B1S2 EWMA normalized integral value &gt; 8.2 units</li> <li>OR</li> <li>Accumulated air flow during slow rich to lean test &gt; 75 grams (upper threshold is 500 mvolts</li> </ol>	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for	1 trip Type A EWMA
		to achieve the required response.	Test (between the upper and lower voltage thresholds) is greater than the	and lower threshold is 200 mvolts)		ECT_Sensor_FA IAT_SensorFA	the given	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			airflow threshold.		Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	10.0 volts < system voltage< 32.0 volts = Valid = Not Valid, See detinition 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)) = P013E (and P014A (if applicable)) ons are met: continued	NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich	the threshold.	1) B1S2 EWMA normalized integral value > 8.2 units OR 2) Accumulated air flow during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)		TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA	Frequency: Once per trip NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	1 trip Type A EWMA

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or		
					B1S2 Failed this key cycle System Voltage	P2271 10.0 volts < system voltage< 32.0		
					Learned heater resistance			
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2,		
					Green Cat System Condition	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		
					Low Fuel Condition Diag	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 = P2270 (and P2272 (if		
						= P2270 (and P2272 (if applicable)) = P013E (and P014A (if		
						applicable)) = P013A (and P013C (if		
						applicable)) = P2271 (and P2273 (if		
						applicable)) = P013F (and P014B (if		
						applicable))		
					After above conditi Fuel Enrich mode		Ì	
					During test: Fuel EQR must stay between:			
						0.95 <= EQR <= 1.10		
Response Rich to	P013C	This DTC determines if the post catalyst O2 sensor has	The EWMA of the Post O2 sensor normalized integral value is greater than	1) B1S2 EWMA normalized integral value > 8.2 units	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	1 trip Type A EWMA
ean Bank 2 Sensor 2		Slow Response in a predefined Rich to Lean voltages range during Rich	the threshold.	OR			Note: if NaPOPD b	
		to Lean transition. The		2) Accumulated air flow during slow rich to lean test > 75 grams			ResetFastRe spFunc=	
		which runs in a DFCO mode to achieve the required		(upper threshold is 500 mvolts and lower threshold is 200 mvolts)			FALSE for the given	
		response.	voltage thresholds) is greater than the airflow threshold			ECT_Sensor_FA IAT_SensorFA	Fuel Bank OR	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions		illum.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Parameters B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag	Conditions MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid = Not Valid = Not Valid See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab.	Time Required NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	MIL illum.
						Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tah = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
					After above conditi DFCO mode is (wo driver initiated	ons are met: continued		
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	to Rich transition. The	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	<ol> <li>B1S2 EWMA normalized integral value &gt; 8.2 units</li> <li>OR</li> <li>Accumulated air flow during slow lean to rich test &gt; 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)</li> </ol>	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuelInjectorCircuit_FA	Frequency: Once per trip NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	1 trip Type A EWMA

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		Required	ilium.
						FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
						P013C, P014A, P014B, P2272 or		
					B2S2 Failed this key cycle	P2273		
					System Voltage	10.0 volts < system voltage< 32.0		
					Learned heater resistance	volts		
					ICAT MAT Purpoff dolou	- Not Valid		
					Green O2S Condition	= Not Valid, See definition of		
						Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S2,		
						B2S2) in Supporting Tables tab.		
					Green Cat System Condition	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.)		
					Low Fuel Condition Diag	= False		
					Dest (select)	(See Supporting Tables)		
					Post fuel cell	= Enabled. See definition of Multiple DTC Use - Block learn		
						cells to enable Post oxygen		
						sensor tests in Supporting		
						Tables tab = P2270 (and P2272 (if		
					DTC's Passed	= P2270 (and P2272 (if		
					DTC's Depend	applicable)) = P013E (and P014A (if		
						applicable))		
					DTC's Passed	= P013A (and P013C (if		
						applicable))		
					DTC's Passed	= P2271 (and P2273 (if		
					DTC's Passed	applicable)) = P013F (and P014B (if		
					DICSIASSE	applicable))		
					After above condition			
					Fuel Enrich mode			
					During test: Fuel EQR must stay			
					between:			
						0.95 <= EQR <= 1.10		
Sensor Delayed	D013E	This DTC determines if the	Post O2 sensor cannot go below the	1) Post O2S signal > 500 mvolts	No Active DTC's		Frequency:	Type B
sponse Rich to	1013	post catalyst O2 sensor has	threshold voltage.	1) 1 03t 020 Signal > 500 HIVOIts	NO ACTIVE DICS		Once per trip	
an Bank 1		an initial delayed response		AND		TPS_ThrottleAuthorityDefaulted		
nsor 2		to an A/F change from Rich	AND				Note: if	
		to Lean. The diagnostic is an		2) Accumulated air flow during			NaPOPD_b_	
		intrusive test which runs in a	The Accumulated mass air flow	stuck rich test > 78 grams.			ResetFastRe	
		DFCO mode to achieve the	monitored during the Delayed Response				spFunc= FALSE for	
		required response.	Test is greater than the threshold.				TALSE for the given	
						ECT_Sensor_FA	Fuel Bank	
			1				OR	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum
							NaPOPD_b_	
							RapidRespo	
							nseActive =	
							TRUE,	
							multiple tests	
							per trip are	
						MAF_SensorFA	allowed	
						MAP_SensorFA	anonou	
						AIR System FA		
						FueIInjectorCircuit_FA		
						FuelTrimSystemB1_FA		
				FuelTrimSystemB2_FA				
				EngineMisfireDetected_FA				
				EthanolCompositionSensor_FA				
				P013A, P013B, P013F, P2270 or				
			B1S2 Failed this key cycle	P2271				
					System Voltage	10.0 volts < system voltage< 32.0		
						volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid = Not Valid, See definition of		
					Green O2S Condition	= Not Valid, See definition of		
						Multiple DTC Use_Green		
					Sensor Delay Criteria (B1S2,			
				B2S2) in Supporting Tables tab.				
				Low Fuel Condition Diag	= False			
					(See Supporting Tables)			
			Post fuel cell	= 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)		
					Number of fueled cylinders	≤ 8 cylinders		
					After above condition	ons are met		
					DFCO mode is			
					(wo driver initiated			
					(		1	
Sensor Delayed	P013F	This DTC determines if the	Post O2 sensor cannot go above the	1) Post O2S signal < 350 mvolts	No Active DTC's			Type B
sponse Lean to		post catalyst O2 sensor has	threshold voltage.			TPS_ThrottleAuthorityDefaulted	Once per trip	2 trips
h Bank 1		an initial delayed response		AND			Note: if	
nsor 2		to an A/F change from Lean	AND					
		to Rich. The diagnostic is an		2) Accumulated air flow during			NaPOPD_b_	
		intrusive test which	The Accumulated mass air flow	lean to rich test > 1100 grams.			ResetFastRe	
		increases the delivered A/F	monitored during the Delayed Response				spFunc=	
		ratio to achieve the required	Test is greater than the threshold.				FALSE for	
		rich threshold.				ECT Sensor FA	the given	
						IAT_SensorFA	OR Donk	
		1					NaPOPD_b_	
		1					RapidRespo	
		1					nseActive =	
		1					TRUE,	
							multiple tests	
							per trip are	
					MAF_SensorFA	allowed		
						MAP_SensorFA		
						AIR System FA		
						MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA		

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	EngineMisfireDetected_FA	Required	illum.
						EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or		
					B1S2 Failed this key cycle	P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid = Not Valid, See definition of		
					Green 025 Condition	Multiple DTC Use_Green		
						Sensor Delay Criteria (B1S2,		
					Groop Cat System Condition	B2S2) in Supporting Tables tab.		
					Green Cat System Condition	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.)		
					Low Fuel Condition Diag	(See Supporting Tables)		
					Post fuel cell	= 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))		
					DTC's Passed	= P013E (and P014A (if		
						applicable)) = P013A (and P013C (if		
						applicable))		
					DTC's Passed	= P2271 (and P2273 (if		
						applicable))		
					Number of fueled cylinders	≥ 0 cylinders		
					After above condition			
					Fuel Enrich mod During test: Fuel EQR must stay	e entered.		
					between:			
						0.95 <= EQR <= 1.10		
2S Circuit	P0140	This DTC determines if the	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor	No Active DTC's		590 failures	Туре В
sufficient Activity		O2 sensor circuit is open.		signal < 520 mvolts			out of 740 samples.	2 trips
ank 1 Sensor 2						MAF_SensorFA	samples.	
							Minimum of 0	
							delta TPS changes	
							required to	l
					System Voltage	EthanolCompositionSensor_FA 10.0 volts < system voltage < 32.0	report fail. Delta TPS is	
					System vollage		incremented	
							when the	
							TPS %	
							change >= 0 0 %	
					AFM Status	= All Cylinders active		1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Heater Warm-up delay Predicted Exhaust Temp (by location)	= Complete = Wamed Up	100msec loop Frequency: Once per trip for post	
					Engine Run Time Fuel	> 300 seconds <= 87 % Ethanol	sensors	
O2S Heater Performance Bank	P0141	This DTC determines if the O2 sensor heater is	Measured Heater Current.	Measured Heater current < 0.3 amps	No Active DTC's	ECT_Sensor_FA	of 10	Type B 2 trips
1 Sensor 2		functioning properly by monitoring the current through the heater circuit.		-OR- Measured Heater current > 2.9 amps	System Voltage	10.0 volts < system voltage< 32.0 volts	samples	
					Heater Warm-up delay	= Complete	Frequency: 1 tests per trip	
							5 seconds delay between tests and 1	
				B1S2 O2S Heater Duty Cycle O2S Heater device control		second execution rate		
				All of the above Time	e met for > 120 seconds			
	50444						-	<b>F</b> 5
O2 Sensor Delayed Response Rich to Lean Bank 2	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response	Post O2 sensor cannot go below the threshold voltage.	1) Post O2S signal > 500 mvolts AND	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	Type B 2 trips
Sensor 2		to an A/F change from Rich to Lean. The diagnostic is an	AND	2) Accumulated air flow during			Note: if NaPOPD_b_	
		intrusive test which runs in a DFCO mode to achieve the required response.	The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	stuck rich test > 78 grams.			ResetFastRe spFunc= FALSE for	
						ECT_Sensor_FA IAT_SensorFA	the given Fuel Bank OR	
						NaPOPD_b_ RapidRespo nseActive = TRUE,		
				MAF_SensorFA MAP_SensorFA AIR System FA	multiple tests per trip are allowed			
				FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor FA				
				B2S2 Failed this key cycle System Voltage	10.0 volts < system voltage< 32.0			
					Learned heater resistance ICAT MAT Burnoff delay	= Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum
System	Code	Description	Cinteria	Value	Green O2S Condition	<ul> <li>Not Valid, See definition of Multiple DTC Use_Green</li> <li>Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab.</li> <li>False</li> <li>(See Supporting Tables)</li> <li>Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab</li> <li>P2270 and P2272 (if applicable)</li> </ul>	required	
					After above conditi DFCO mode is (wo driver initiated	entered		
D2 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	<ol> <li>Post O2S signal &lt; 350 mvolts</li> <li>AND</li> <li>Accumulated air flow during lean to rich test &gt; 1100 grams.</li> </ol>	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for	Type B 2 trips
		ratio to achieve the required rich threshold.	Test is greater than the threshold.			ECT_Sensor_FA IAT_SensorFA	rALSE for the given Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P2272 or	per trip are allowed	
					Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	10.0 volts < system voltage< 32.0 volts = Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Griteria	value	Green Cat System Condition	is Not Valid, System is not valid	Required	ilium.
						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		
					Low Fuel Condition Diag	cannot be enabled in service.) = False (See Supporting Tables)		
					Post fuel cell	= Enabled. See definition of Multiple DTC Use - Block learn		
						cells to enable Post oxygen sensor tests in Supporting Tables tab		
						Tables tab = P2270 (and P2272 (if applicable)) = P013E (and P014A (if		
						applicable)) = P013A (and P013C (if		
					DTC's Passed	applicable)) = P2271 (and P2273 (if applicable))		
					Number of fueled cylinders			
					After above conditi	ons are met:	1	
			Fuel Enrich mod	e entered.				
					During test: Fuel EQR must stay between:			
						0.95 <= EQR <= 1.10		
2S Circuit Low oltage Bank 2 ensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 40 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	285 failures out of 350 samples	Type B 2 trips
						MAP_SensorFA AIR System FA	Frequency: Continuous	
						Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA	in 100 milli - second loop	
					AIR intrusive test Fuel intrusive test Idle intrusive test	FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active		
					EGR intrusive test System Voltage			
					EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	= Not active = Not active = Not active		
					Low Fuel Condition Diag			
					Throttle Position	3 % <= Throttle <= 70 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Jysten	Code	Description	Cinteria	value	Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition	= Closed Loop = TRUE Enabled (On) Ethanol <= 87% DFCO not active	Required	mun.
						> 5.0 seconds	1	
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	AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control AIR Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel State Fuel Condition	= 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 $\leq$ equiv. ratio $\leq$ 1.0137 0.0 % <= Throttle <= 70.0 % = Closed Loop not = Power Enrichment = TRUE Enabled (On) DFCO not active Ethanol <= 87%	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
D2S Slow	P0153	This DTC determines if the	The average response time is caluclated	Refer to "P0153 - O2S Slow	No Active DTC's		Sample time	Type B
Response Bank 2 Sensor 1		O2 sensor response time is degraded.	over the test time, and compared to the threshold. Or If Slope Time L/R or R/L Switches are below the threshold.	Response Bank 2 Sensor 1" Pass/Fail Threshold table in the Supporting Tables tab. S/T L/R switches < 3, or S/T R/L switches < 3 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 600 mvolts and 300 mvolts. An average rich to lean and lean to rich time are each		TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_SensorFA EvapPurgeSolenoidCircuit_FA EvapPurgeSolenoidCircuit_FA EvapSensUlcak_FA EvapSmallcak_FA EvapEmissionSystem_FA FueITankPressureSnsrCkt_FA FueInjectorCircuit_FA AIR System FA	Frequency: Once per trip	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria		Parameters	EthanolCompositionSensor_FA	Required	llium.
				calculated separately		EngineMisfireDetected_FA		
					Bank 2 Sensor 1 DTC's not active			
					System Voltage	10.0 volts < system voltage< 32.0		
					-)g-	volts		
					EGR Device Control	= Not active		
					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 on for			
					Learned Htr resistance			
					Engine Coolant	> 50 °C		
					IA I Engine Run Time	> -40 °C		
					Time since any AFM status change			
					Time since Purge On to Off change			
					Time since Purge Off to On change			
					Purge duty cycle	> 0.0 seconds		
					Engine airflow	>= 0 % duty cycle 20 gps <= engine airflow <= 85		
					Engine ainow	abs		
					Engine speed	1200 <= RPM <= 3000		
						< 87 % Ethanol		
						> 70 kpa		
					Throttle Position			
					Low Fuel Condition Diag	= False		
					Eow Fuel Condition Diag	(See Supporting Tables)		
					Fuel Control State			
					Closed Loop Active			
					I TM (Block Learn) fuel cell	= Enabled. See definition of		
						Multiple DTC Use - Response		
						Cell Enable Table in Supporting		
						Tables tab.		
					Transient Fuel Mass			
						= Not Defaulted		
						not = Power Enrichment		
						DFCO not active		
					Commanded Proportional Gain			
					All of the above		]	
					Time	> 3.5 seconds		
2S Circuit	P0154	This DTC determines if the	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor	No Active DTC's	TPS_ThrottleAuthorityDefaulted	400 failures	Туре В
sufficient Activity		O2 sensor circuit is open.		signal < 550 mvolts		-	out of 500	2 trips
ank 2 Sensor 1							samples.	
						MAF_SensorFA		
							Minimum of 0	
							delta TPS	
							changes	
							required to	
		1				EthanolCompositionSensor_FA	report fail	
		1	System Voltage	10.0 volts < system voltage< 32.0				
					Cystom voltago		Delta TPS is	
					Cyclom vollage	volts	incremented	
					Cycloni Volkago		incremented when the	
							incremented	
							incremented when the	
							incremented when the TPS %	

O2S Heater Performance Bank 2 Sensor 1         P0155 This DTC determines if the O2S ensor heater is functioning property by monitoring the eurent through the heater circuit.         Measured Heater Current. amps - OR - OR - OR - OR - OR - OR - Measured Heater current < 0.3 amps - OR - OR - OR - Measured Heater current > 3.1 amps - OR - OR - OR - OR - OR - OR - OR - OR	Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
OZS Heater Performance Bank 2 Sensor 1         P155 C2 sensor heater is functioning trees units brough the heater current.         Measured Heater current < 0.3 angs -QR -QR -QR -QR -QR -QR -QR -QR -QR -QR	System	Code	Description	Cinena	Value	Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time	= Complete = Warned Up > 300 seconds	Frequency: Continuous 100msec	indin.
Performance Bank       22 sensor 1       02 sensor networks is properly monitoring the current is current > 3.1       ampsOR. Measured Heater current > 3.1       System Voltage       ECT_Smare_FA       of 10       10       voltage Samor 1       10.0 volta < system voltage 32.0							<= 87 % Ethanol		
All of the above met for D2S Circuit Low Voltage Bank 2 Sensor 2     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 mvolts     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 mvolts     This DTC determines if the O2 sensor iciuit is shorted to low.     Measure Oxygen Sensor Signal.     Oxygen Sensor signal is < 50 mvolts     No Active DTC's mvolts     This DTC determines if the O2 sensor iciuit is shorted to low.     Measure Oxygen Sensor Signal.     Oxygen Sensor signal is < 50 mvolts     No Active DTC's mvolts     This DTC determines if the O2 sensor iciuit is shorted to low.     Map_SensoriFA AIR System FA EvapProvide information Sensor FA EvapProvide information FA E	Performance Bank	P0155	O2 sensor heater is functioning properly by monitoring the current	Measured Heater Current.	amps -OR- Measured Heater current > 3.1	System Voltage	10.0 volts < system voltage< 32.0 volts	of 10 samples Frequency: 1 tests per trip	l ype B 2 trips
Close         Time         120 seconds         Construit Low         Time         120 seconds         Construit         Construct         Cons								delay between tests and 1 second execution	
O2S Circuit Low Voltage Bank 2 Sensor 2         P0167         This DTC determines if the O2 sensor circuit is shorted to low.         Measure Oxygen Sensor Signal.         Oxygen Sensor signal is < 50 mvolts         No Active DTCS mvolts         TPS_ThrottleAuthorityDefaulted to I 400 samoles         202 failures out of 400 samoles           Sensor 2         P167         This DTC determines if the O2 sensor circuit is shorted to low.         Measure Oxygen Sensor Signal.         Oxygen Sensor signal is < 50 mvolts         No Active DTCS mvolts         TPS_ThrottleAuthorityDefaulted MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapPurgeSolenoidC							1		
Voltage Bank 2 Sensor 2 Voltage Bank 2 Voltage Bank 2 Voltage FA Evapound Source FA									
Throttle Position       3 % <= Throttle <= 70 %	Voltage Bank 2	P0157	O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.		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 Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition	MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInapetorCircuit_FA = Not active = Sol active = Talse (See Supporting Tables) 0.9922 ≤ equiv. ratio ≤ 1.0137 3 % <= Throttle <= 70 % = Closed Loop = TRUE Enabled (On) Ethanol <= 87%	out of 400 samples Frequency: Continuous in 100 milli -	Type B 2 trips
Fuel Condition       Ethanol <= 87%						Fuel State	DFCO not active		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					lime	> 5.0 seconds		
O2S Circuit High Voltage Bank 2	P0158	This DTC determines if the O2 sensor circuit is shorted	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's		100 failures out of 125	Type B 2 trips
Sensor 2		to high.				TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA	samples Frequency: Continuous	
						EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA	in 100 milli - second loop	
						EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test Fuel intrusive test Idle intrusive test	= Not active		
				EGR intrusive test System Voltage	= Not active 10.0 volts < system voltage< 32.0			
					EGR Device Control Idle Device Control Fuel Device Control	= Not active		
			AIR Device Control = Not active Low Fuel Condition Diag = False (See Supporting Tables)					
					Equivalence Ratio Throttle Position Fuel Control State	0.9922 ≤ equiv. ratio ≤ 1.0137 3.0 % <= Throttle <= 70.0 %		
						not = Power Enrichment = TRUE		
					Fuel State	DFCO not active Ethanol <= 87%		
					All of the abov		1	
					Time	> 2 seconds		
O2 Sensor Delayed Response Rich to	P015A	This DTC determines if the pre catalyst O2 sensor has	The EWMA of the Pre O2 sensor normalized R2L time delay value		No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA	Frequency: Once per trip	1 trip Type A EWMA
Lean Bank 1 Sensor 1		an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an	OR	> 0.45 EWMA (sec)		IAT_SensorFA ECT_Sensor_FA AmbientAirDefault	Note: if NaESPD_b_ FastInitRespI	
		intrusive test which runs in a DFCO mode to achieve the required response.	[The Accumulated time monitored during the R2L Delayed Response Test (Gross failure).			MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak FA	sActive = TRUE for the given Fuel Bank OR	
			AND Pre O2 sensor voltage is above]	≥ 1.80 Seconds		EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	NaESPD_b_ RapidRespo nselsActive =	
				> 550 mvolts		AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131	TRUE,	
					System Voltage	P0131 P0132 P0134 10.0 < Volts < 32.0		
					EGR Device Control	= Not active		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Idle Device Control Fuel Device Control	= Not active = Not active		
					AIR Device Control Low Fuel Condition Diag			
					Green O2S Condition	(See Supporting Tables) = Not Valid, See definition of		
						Sensor Delay Criteria (B1S1,		
					O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolan	= Valid > 50 °C		
					IAI Engine run Accum Engine Speed to initially enable test	> -40 °C > 120 seconds		
					Engine Speed range to keep test enabled (after initially enabled)	1100 ≤ RPM ≤ 2500		
						1050 ≤ RPM ≤ 2650		
					Engine Airflow			
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	40.4 ≤ MPH ≤ 82.0		
					Closed Loop Active Evap	36.0 ≤ MPH ≤ 87.0 mph 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge 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		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time Predicted Catalyst temp	≥ 80.0 sec		
						550 ≤ ºC ≤ 900 = DFCO possible		
					All of the above met for at least 2.0 second intrusive stage is			
					Pre O2S voltage B1S1 at end of Cat Rich	≥ 690 mvolts		
					Fuel State Number of fueled cylinders After above conditions are			
					entered (wo driver initia			
O2 Sensor Delayed Response Lean to	P015B	This DTC determines if the pre catalyst O2 sensor has	The EWMA of the Pre O2 sensor normalized L2R time delay value		No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA	Frequency: Once per trip	1 trip Type A EWMA
Rich Bank 1 Sensor 1		an initial delayed response to an A/F change from Lean	, OR	> 0.48 EWMA (sec)		IAT_SensorFA ECT_Sensor_FA	Note: if NaESPD_b_	
		to Rich. The diagnostic is an	The Accumulated time monitored during			AmbientAirDefault MAF_SensorFA	FastInitRespl	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
		an enriched fuel mode to achieve the required response.	the L2R Delayed Response Test (Gross failure).	≥ 2.00 Seconds		EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA	TRUE for the given Fuel Bank OR NaESPD_b_ RapidRespo	
			Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	< 350 mvolts		FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131	nselsActive = TRUE,	
				< 690 mvolts	System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	= Not active = Not active = Not active = False		
					Green O2S Condition O2 Heater (pre sensor) on for Learned Htr resistance	(See Supporting Tables) = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S1, B2S1) in Supporting Tables tab. ≥ 40 seconds = Valid		
						> -40 °C = DFCO inhibit ≥ 2 cylinders ons are met:		
					During test: Engine Airflow must stay between: and the delta Engine Airflow over	5 ≤ gps ≤ 20		
					12.5msec must be :	<= 5.0 gps	4	
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1	P015C	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).	> 0.45 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA	Frequency: Once per trip Note: if NaESPD_b_ FastInitRespl sActive = TRUE for the given Fuel Bank OR	1 trip Type A EWMA
			AND Pre O2 sensor voltage is above]	≥ 1.80 Seconds		EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA	NaESPD_b_ RapidRespo nselsActive = TRUE,	
				> 550 mvolts		FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134		
1		1	l	I	System Voltage	10.0 < Volts < 32.0	I	I I

System         Code         Description         Criteria         Value         Parameteria         Conditions         Regulard           System         Value         Parameteria         Conditions         Regulard         Name	Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
kill         kill <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>illum.</th></td<>									illum.
Prud Device Control         - No active Autoric Device Control         - No active Autoric Device Control         - No active Autoric Device Control           Core Active Low Function Data         - No active Core Core Control         - No active Autoric Device Control         - No active Core Core Control         - No active Core Core Control         - No active Core Not Site Control           Core Active Core Core Control         - No active Core Not Site Control         - No active Core Not Site Control         - No active Core Not Site Control           Core Active Core Core Control         - No active Core Not Site Control         - No active Core Not Site Control         - No active Core Not Site Control           Core Active Core Core Control         - No active Core Core Not Site Control         - No active Core Core Not Site Control         - No active Core Core Not Site Control           Core Core Control         - No active Core Core Core Not Site Control         - No active Core Core Core Not Site Control         - No active Core Core Core Not Site Control           Core Core Control         - No active Core Core Core Not Site Control         - No active Core Core Core Not Site Control         - No active Core Core Core Not Site Control           Core Core Control         - No active Core Core Core Core Not Site Control         - No active Core Core Core Core Core Not Site Control         - No active Core Core Core Core Core Core Core Core						EGR Device Control	= Not active		
All Device Control       - Mitable         All Device Control       - Mitable         Low Fund Control       - Mitable         Green 028 Control       - Mitable         Dio 8 PM 2000       - Mitable         Engine Addreso       - Mitable         Dio 8 PM 2000       - Mitable         Engine Addreso       - Mitable         Bio 8 PM 2000       - Mitable         Engine Addreso       - Mitable         Cool 8 PM 2000       - Mitable         Engine Addreso       - Mitable         Bio 8 PM 200									
Low Fuel Condens Dag - False Best Systems Tables of Green 028 Constant Best Systems Tables of Best									
2 Sensor Delay College         Sensor									
2 Sensor Deboy       P015       The DTC determines if the       The EWMA of the Pie O2 sensor       No. 3 and a sensor part of the State is the St						Low Fuel Condition Diag	= False		
2 Sensor Deboy       P015       The DTC determines if the       The EWMA of the Pie O2 sensor       No. 3 and a sensor part of the State is the St							= Not Valid See definition of		
server Deby Orienta (1815), D21 Heatar (pre ansator)       Bestin (pre ansator)       Bestin (pre ansator)       Bestin (pre ansator)         C21 Heatar (pre ansator)       40 handed         D22 Heatar (pre ansator)       Composition       20 handed         D22 Heatar (pre ansator)       100 s RPM s 2000         Engine Repeat on initially enables to (offer initially enables)       100 s RPM s 2000         Engine Repeat on initially enables       100 s RPM s 2000         Engine Repeat on initially enables       100 s RPM s 2000         Vehicle Speed to initially enables       36.0 s MPH s 82.0         Vehicle Speed to initially enables       36.0 s MPH s 87.0 mph         Cloaed loss interail       0.1 s RPM s 2000         Vehicle Speed to initially enables       80.0 s MPH s 87.0 mph         Cloaed loss interail       0.1 s RPM s 20.0         Vehicle Speed to initially enables       80.0 s MPH s 87.0 mph         Cloaed loss interail       0.1 s RPM s 20.0         Vehicle Speed to initially enables       80.0 s MPH s 87.0 mph         Cloaed loss interail       0.1 s RPM s 20.0         Vehicle Speed to real base to initial enable       80.0 s MPH s 87.0 mph         Cloaed loss interail       0.1 s RPM s 20.0         Vehicle Speed to real base to initial enables       80.0 s MPH s 87.0 mph         Cloaed l						Green 025 Condition	Multiple DTC Use Green		
22 Starsor Delayer       Philo Direct Addressing Processing       Process									
0.2: Heater (pre served on thick = 0 seconds Example 1: Free seconds Example 1: Free seconds Engine Speed to initially enables (after initially enables)       > Vaid Example 1: Vaid Engine Speed to initially enables (after initially enables)         100 S RPM S 2500       100 S RPM S 2500         Engine Speed to initially enables (after initially enables)       100 S RPM S 2500         Unice Speed to initially enables (after initially enables)       100 S RPM S 2500         Unice Speed to initially enables (after initially enables)       100 S RPM S 2500         Unice Speed to initially enables (after initially enables)       30 S MPH S 87.0 mph Closed to antitally enables (after initially enables)         30 S MPH S 87.0 mph Closed foot integration mode Behaviority (Lose - Block learn of the estimate mode Behaviority (Lose - Block learn of the estimate mode Behaviority (Lose - Block learn Multiple DT Lose - Block learn model is to enable Post on mode Behaviority (Lose - Block learn Multiple DT Lose - Block learn model is to enable Post on mode Behaviority (Lose - Block learn Multiple DT Lose - Block learn model is to enable Post on mode Behaviority (Lose - Block learn model is enable 0: State - DT-CD possible         All of the above end on Time Fredicted Cauly at temps (Lose - Block learn model is enable 0: State - DT-CD possible         All of the above end on Time Fredicted Cauly at temps (Lose - Block Call Rither Multiple DT Lose - Block learn model (Lose - Block learn State - DT-CD possible         All of the above end on the state of a state (Lose - Block Call Rither Multiple DT-CD Model model (Lose - Block Call Rither Multiple DT-CD Model model (Lose - Block Call Rither Multiple DT-CD Model									
2 Sensor Delaye       P015       The EVMA of the Pre Q2 sensor       No. 40%       No. 40%       Polyale conditions       No. 40%         2 Sensor Delaye       P015       The EVMA of the Pre Q2 sensor       No. 40%       Polyale conditions       Polyale cond						O2 Heater (pre sensor) on for	> 40 seconds		
2 Sensor Delayed       P010       No. 40 * 00 * 00 * 00 * 00 * 00 * 00 * 00						Learned Htr resistance	= Valid		
2 Sensor Delayed       P015       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       This DTC determines if the       The EVMA of the Pre 02 sensor       The Pre 20 sensor EVMC Pre 20 sensor       The EVMA of the Pre 02 sensor       The Pre 20 sensor       The Pre 20 sensor       The Pre 20 sensor <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
22 Sensor Delayed       Points       The EWMA of the Pre O2 sensor       No Active       100 sended         22 Sensor Delayed       P015       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active       100 sended         22 Sensor Delayed       P015       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active       100 sended       100 sended         22 Sensor Delayed       P015       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTCS [TPS_Thruttiku/dutholyDelaulided       Frequence; 1									
2 Sensor Delayed       Philo       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCS [TPS_Thrott[AuthorhyDefaultid]       Fingues 7:00 Mode         2 Sensor Delayed       Philo       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCS [TPS_Thrott[AuthorhyDefaultid]       Fingues 7:10 Minute       Fingues 7:10 Minute </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
2 Sensor Delayed       Philo TC determines if the       The EWMA of the Pre 02 sensor       No Adve DTC       100 S RPM 5 2800         100 S RPM 5 2800       Engine Speed range to keep test inabled (after initially enabled (after initially enabled)       1050 S RPM 5 2850       Engine Airford       3 5 gps 5 20         Vehicle Speed range to keep test inabled       30.0 S MPH 5 87.0 mph       30.0 S MPH 5 87.0 mph       30.0 S MPH 5 87.0 mph         Closed Loop Integration (7.4 C/L, Int 5 1.08       Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)         Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)         Closed Loop Integration (7.4 C/L, Int 5 1.08)       Closed Loop Integration (7.4 C/L, Int 5 1.08)       ECR						Engine Speed to initially enable test			
2 Sensor Delayed       PoiD       This DTC determines if the       The EWMA of the Pre 02 sensor       Image: Construct of the production of th						3	1100 ≤ RPM ≤ 2500		
2 Sensor Delayed       PolSD       The EVMA of the Pre O2 sensor       No Active DTCs       The EVMA of the Pre O2 sensor       No Active DTCs       Frequency:       Frequency:       1						Engine Speed range to keep test enabled			
2 Sensor Delayed       Po150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_1 Production <td< td=""><td></td><td></td><td></td><td></td><td></td><td>(after initially enabled)</td><td></td><td></td><td></td></td<>						(after initially enabled)			
2 Sensor Delayed       Po150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_2.0         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       FR9_1 Production       F8_1 Production <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									
2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No. Adive DTCS       FP5_ThrottleAuthorityDefaulted       Frequency:       1         2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre Q2 sensor       No. Adive DTCS       FP5_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre O2 sensor       Wohicits Trees_ThrouteAuthorityOpEnauled       Presume       Pr						Engine Airflow	3 ≤ gps ≤ 20		
2 Sensor Delayed       P0150       This DTC determines if the       The EWMA of the Pre O2 sensor       Wohicits Trees_ThrouteAuthorityOpEnauled       Presume       Pr									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre Q2 sensor       No Active DTCs       TPS_TrouteAuthorityOpEnauted       Frequency: 1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre Q2 sensor       The EWMA of the Pre Q2 sensor       No Active DTCs       TPS_TrotteAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       Integrate       Closed Loop Active = 10CA 10C4 10C4 10C4 10C4 10C4 10C4 10C4 10C4						enabled (after initially enabled)			
2 Sensor Delayed       P15D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       Integrate       Integr							$36.0 \le MPH \le 87.0 mph$		
Closed Loop Active       = TRUE         Evap Inot in control of purge       Ethanol not in control of purge         Ethanol not in estimate mode       Post tile cell         Post tile cell       = nobled. See definition of         Multiple DTC Use - Block learn       estimation of a trained         EGR Intrusive diagnostic       = not active         All post sensor tests in Supporting       Tables         Tables       test on able Post         O2S Heater (post sensor) on Time       ≥ 80.0 sec         Predicted Catalyst temp       50 s °C ≤ 900         Fuel State       = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.         Preo 2S voltage B1S1 at end of Cat Rich       stage 2 690 moils         Fuel State       = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.         Preo 2S voltage B1S1 at end of Cat Rich       stage 2 690 moils         Fuel State       = DFCO possible         All of the above conditions are met: DFCO Mode entered (word wire initiated pedal input).       The EWMA of the Pre O2 sensor         No Active DTCs       TPS_ThrottleAuthorityDefaulted       Frequency: 1						Closed loop integral			
2 Sensor Delayed       P015       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTCS       TPS_ThrottleAuthorityDefaulted       Frequency: 1						Closed Loop Active	= TRUF		
2 Sensor Delayed       P015       This DTC determines if the       The EWMA of the Pre 02 sensor       The EWMA of the Pre 02 sensor       No Active DTC's       TPSThrottleAuthorityDefaulted       Frequency: 1									
Post fuel cell = Enabled. See definition of Multiple DFC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Trahise tab EGR Intrusive diagnostic = not active All post sensor heater delays = not active O2S Heater (post sensor) on Time ≥ 80.0 sec Predicied Catalyst temp 50.0 s°C 5 900 Fuel State = DFCO possible All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. Pre O2S voltage B1S1 at end of Cat Rich stage ≥ 60 modts Fuel State = DFCO active Number of fueled cylinders = 6 cylinders 2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor No Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre Q2 sensor       The EWMA of the Pre Q2 sensor       The EWMA of the Pre Q2 sensor       No Active DTCS<									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       No Active DTC's TPS_ThrottleAuthorityDefaulted       Frequency:       1         2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       No Active DTC's TPS_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       No Active DTCs       TPS_ThrottleAuthorityDefaulted       Frequency:       1         2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTCs       TPS_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       No Active DTC's TPS_ThrottleAuthorityDefaulted       Frequency:       1									
All post sensor heater delays = not active All post sensor heater delays = not active O2S Heater (post sensor) on Time ≥ 80.0 sec Predicted Catalyst temp 550 ≤ °C ≤ 900 Fuel State = DFCO possible All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. Pre O2S voltage B1S1 at end of Cat Rich Stage ≥ 690 mvolts Fuel State = DFCO active Number of fueled cylinders Alter above conditions are met: DFCO determines if the 2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor The EWMA of the Pre O2 sensor The EWMA of the Pre O2 sensor No Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
All post sensor heater delays = not active All post sensor heater delays = not active O2S Heater (post sensor) on Time ≥ 80.0 sec Predicted Catalyst temp 550 ≤ °C ≤ 900 Fuel State = DFCO possible All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. Pre O2S voltage B1S1 at end of Cat Rich Stage ≥ 690 mvolts Fuel State = DFCO active Number of fueled cylinders Alter above conditions are met: DFCO determines if the 2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor The EWMA of the Pre O2 sensor The EWMA of the Pre O2 sensor No Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       O2S Heater (post sensor) on Time Predicted Catalyst temp 550 ≤ °C ≤ 900 = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.       All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.         Pre O2S voltage B1S1 at end of Cat Rich stage       2 690 mvolts         Fuel State       = DFCO active         Number of fueled cylinders       < 6 cylinders						EGR Intrusive diagnostic	= not active		
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       O2S Heater (post sensor) on Time Predicted Catalyst temp 550 ≤ °C ≤ 900 = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.       All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.         Pre O2S voltage B1S1 at end of Cat Rich stage       2 690 mvolts         Fuel State       = DFCO active         Number of fueled cylinders       < 6 cylinders						All post sensor heater delays	- not active		
Predicted Catalyst temp       550 ≤ °C ≤ 900         Fuel State       = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich         intrusive stage is requested.         Pre O2S voltage B1S1 at end of Cat Rich         State         E OPCO active         After above conditions are met: DFCO Mode         entered (wo driver initiated pedal input).         2 Sensor Delayed       P015D         This DTC determines if the       The EWMA of the Pre O2 sensor         No Active DTC's       TPS_ThrottleAuthorityDefaulted         Frequency:       1						All post sensor neater delays			
Predicted Catalyst temp       550 ≤ °C ≤ 900         Fuel State       = DFCO possible         All of the above met for at least 2.0 seconds, and then the Force Cat Rich         intrusive stage is requested.         Pre O2S voltage B1S1 at end of Cat Rich         State         E OPCO active         After above conditions are met: DFCO Mode         entered (wo driver initiated pedal input).         2 Sensor Delayed       P015D         This DTC determines if the       The EWMA of the Pre O2 sensor         No Active DTC's       TPS_ThrottleAuthorityDefaulted         Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       Minimum content of the pre O2 sensor       Stor Server 2000       Fuel State       Stor Server 2000         Number of fueled cylinders       Fre O2S voltage B1S1 at end of Cat Rich stage       Se00 mvolts       Stor Server 2000       Stor Server 2000       Stor Server 2000         After above conditions are met:       DFCO Mode entered (wo driver initiate pedal input).       Stor Server 2000       Stor Server 2000       Stor Server 2000         2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTC's TPS_ThrottleAuthorityDefaulted       Frequency:       1						O2S Heater (post sensor) on Time	≥ 80.0 sec		
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       Minimum content of the pre O2 sensor       Stor Server 1       Stor Server 1         No Active DTC's       TPS_ThrottleAuthorityDefaulted       Frequency:       1						Predicted Catalyst temp			
All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. Pre O2S voltage B1S1 at end of Cat Rich stage ≥ 690 mvolts Fuel State = DFCO active Number of fueled cylinders ≤ 6 cylinders After above conditions are met: DFCO Mode entered (wo driver initiated pedal input). 2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor Mo Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       Image: Content of the pre O2 sensor						Fuel State	= DFCO possible		
e       Pre O2S voltage B1S1 at end of Cat Rich stage       > 600 mvolts       > 600								4	
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       Market Pre O2 sensor       No Active DTC's       TPS_ThrottleAuthorityDefaulted       Frequency:       1						All of the above met for at least 2.0 second	onds, and then the Force Cat Rich		
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       The EWMA of the Pre O2 sensor       No Active DTC's       TPS_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       Main and the pre O2 sensor       No Active DTC's       TPS_ThrottleAuthorityDefaulted       Frequency:       1						Pro O26 voltage P104 at and at 0 v Dist		]	
Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTC's       TPS_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       Number of fueled cylinders       ≤ 6 cylinders       After above conditions are met: DFCO Mode entered (wo driver initiated pedal input).         2 Sensor Delayed       P015D       This DTC determines if the       The EWMA of the Pre O2 sensor       No Active DTC's TPS_ThrottleAuthorityDefaulted       Frequency:       1									
2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor Delayed No Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor On the EWMA of the									
2 Sensor Delayed P015D This DTC determines if the The EWMA of the Pre O2 sensor No Active DTC's TPS_ThrottleAuthorityDefaulted Frequency: 1									
								4	
IMAP SensorFA Once per trip E	2 Sensor Delayed	P015D				No Active DTC's	TPS_ThrottleAuthorityDefaulted		1 trip Type
	esponse Lean to		pre catalyst O2 sensor has	normalized L2R time delay value				Once per trip	EWMA
	ich Bank 2								
In the second se	ensor 1		to an A/F change from Lean	OR		I	ECI_Sensor_FA	NaESPD b	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	[The Accumulated time monitored during the L2R Delayed Response Test (Gross failure).			AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapVlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FueInjectorCircuit_FA	FastInitRespl sActive = TRUE for the given Fuel Bank OR NaESPD_b_ RapidRespo nselsActive =	
			OR At end of Cat Rich stage the Pre O2 sensor output is	< 350 mvolts		AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132	TRUE,	
				< 690 mvolts	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	<ul> <li>Not active</li> <li>Not active</li> <li>Not active</li> <li>False</li> <li>(See Supporting Tables)</li> <li>Not Valid, See definition of</li> <li>Multiple DTC Use_Green</li> <li>Sensor Delay Criteria (B1S1, B2S1) in Supporting Tables tab.</li> <li>40 seconds</li> <li>Valid</li> <li>&gt;50 °C</li> <li>&gt;-40 °C</li> <li>DFCO inhibit</li> </ul>		
					When above condit Fuel Enrich mode enter	ions are met: red (Test begins)		
					During test: Engine Airflow must stay between: and the delta Engine Airflow over	5 ≤ gps ≤ 20		
					12.5msec must be :			
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.		380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	590 failures out of 740 samples. Minimum of 0 delta TPS changes	Type B 2 trips
					System Voltage	EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts	required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location)		100msec loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Unional Contenta		Engine Run Time		Frequency: Once per trip 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 amps	No Active DTC's System Voltage Heater Warm-up delay	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second	Type B 2 trips
					B2S2 O2S Heater Duty Cycle O2S Heater device control All of the above Time	= Not active	execution rate	
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long- term and short-term fuel trim.	f the fuel control A lean condition, the filtered long-term fuel trim metric a lean condition, the filtered long-	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B			
					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 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		
						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		

Component/ Svstem	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Parameters EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. MAF_Senson MAF_Senson MAF_Senson AIR Systen EvapPurgeSoleno EvapPlowDuringN	Conditions Ten Second Prince Planns and new ethanol concentration. (VFFS apps only) Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active "tank pull down" Not Active DTCs: IPM_FA torFA t	Time Required	
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition,	Passive Test: The filtered Non-Purge	<= Non Purge Rich Limit Table	EvapVentSolenoi EvapSmall.e EvapEmissionS FuelTankPressureSc Ethanol Compositic FuelInjectorCi EngineMisfireDe EGRValvePerfor EGRValvePerfor EGRValvePerfor EGRValvePerfor CAPValveCir MAP_EngineVac AmbientAir[ O2S_Bank_1_Sc	eak_FA ystem_FA insorCircuit_FA nrouit_FA tected_FA mance_FA cuit_FA cuit_FA cuit_FA cuit_FA cuit_FA cuit_FA Secondary Parameters and	Frequency: 100 ms	2 Trip(s)
KICH BANK I		System is in a ner condition, based on the filtered long- term fuel trim metric. There are two methods to determine a Rich fault. They are Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria) Intrusive Test: The filtered Purge Long	<= 2.000		Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Continuous Loop	Туре В
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= Purge Rich Limit Table <= Non Purge Rich Limit Table <= 2.000 All of above for 3 out of 5 intrusive segments				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	6006	When the filtered Purge Long Term fuel trim metric is <= Purge Rich Limit Table, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table the test passes	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	value				
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 AND The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= Long Term Trim Lean Table	BARO Coolant Temp MAP Inlet Air Temp MAF	<ul> <li>&gt; 70 kPa</li> <li>-40 &lt;°C &lt; 150</li> <li>10 <kpa 255<="" <="" li=""> <li>-20 &lt;°C &lt; 150</li> <li>1.0 <g 510.0<="" <="" li="" s=""> <li>&gt; 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.</li> <li>&gt; 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.</li> </g></li></kpa></li></ul>	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
					Closed Loop Long Term FT	Enabled Enabled		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Fuel Consumed ("Virtual Flex Fuel	Conditions Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables. If > 0.3 liters of fuel are consumed	Required	illum.
					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		
					Catalyst Diag. Post O2 Diag. Device Control	Intrusive Test Not Active Intrusive Test Not Active Not Active		
					EVAP Diag.	"tank pull down" Not Active		
					No active I IAC SystemF			
					MAP_Sens	sorFA		
					MAF_Sens MAF_Sensor			
					AIR System EvapPurgeSolence	m FA		
					EvapFlowDuringN	onPurge_FA		
					EvapVentSolenoi EvapSmallLe			
					EvapEmissionS	ystem_FA		
					FuelTankPressureSe Ethanol Composition	ensorCircuit_FA on Sensor FA		
					FuelInjectorCi EngineMisfireDe	rcuit_FA		
					EGRValvePerfor	rmance_FA		
					EGRValveCir MAP EngineVac			
					AmbientAir	Default		
					O2S_Bank_2_Se	ensor_1_FA		
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long- term fuel trim metric.	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric	<= Non Purge Rich Limit Table		those for P0174, with the exception that fuel level is not	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
		There are two methods to	AND The filtered Short Term Fuel Trim metric	<= 2.000	1	considered.		
		determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test	(NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
		is described below:						
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= Purge Rich Limit Table				
					1			
			AND		1			1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria           The filtered Non-Purge Long Term Fuel Trim metric           AND           The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)           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.	Value <= Non Purge Rich Limit Table <= 2.000 All of above for 3 out of 5 intrusive segments	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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.					
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample	Type B 2 trips
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	Continuous 20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 Continuous	Type B 2 trips

Component/	Fault	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary	Enable Conditions	Time	MIL
System njector 4	Code P0204	Description This DTC checks the circuit	The ECM detects that the commanded	value	Parameters Powertrain Relay Voltage within range	11 volts ≤ Voltage ≤ 32 volts	Required 20 failures	illum. Type B
njector 4	P0204	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	2 trips
					Engine Running		/sample Continuous	
njector 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 Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
njector 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 Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
njector 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 Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
njector 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 Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample	Type B 2 trips
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 >	0.25 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	Continuous 19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	Trips: 1 Type: A MIL: YES
						No 5 V reference #2 error No 5 V reference #2 DTC (P0651)		
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage <	0.25		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 <	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	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	79 / 159 counts; 57	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		just the primary processor				be reported for all conditions	continuous; 3.125 ms /count in the primary	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	Type B 2 trips
					Engine Speed	≥ 0 RPM	250 ms /sample	
Dan dam Misfini	Docco	These DTO's a 'll datassa'	Deceloration index				Continuous	Turne D
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring	Deceleration index vs. Engine Speed Vs Engine load	(>Idle SCD AND > Idle SCD ddt Tables) OR	Engine Run Time ECT	> 2 crankshaft revolutions -7 °C < ECT < 130 °C	= any (5)	Type B 2 Trips (Mil Flashes
Cylinder 1 Misfire Detected	P0301	by monitoring crankshaft velocity	Deceleration index calculation is tailored to specific veh. Tables used are 1st	(>SCD Delta AND > SCD Delta ddt Tables) OR	If ECT at startup	<-7 ℃	failed 200 rev blocks out of (16)	with Catalyst
Cylinder 2 Misfire Detected	P0302		tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are	(>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) OR	ECT System Voltage	21 ºC < ECT < 130 ºC 9.00 <volts< 32.00<="" td=""><td>200 rev block tests</td><td>Misfire)</td></volts<>	200 rev block tests	Misfire)
Cylinder 3 Misfire Detected	P0303		max of range point. see Algorithm Description Document for additional	(>Cyl Mode AND > Cyl Mode ddt Tables) OR	+ Throttle delta - Throttle delta	<ul> <li>75.00 % per 25 ms</li> <li>75.00 % per 25 ms</li> </ul>	Failure reported for (1)	
Cylinder 4 Misfire Detected	P0304			(>Rev Mode Table) OR			Exceedence any Catalyst Exceedence	
Cylinder 5 Misfire Detected	P0305			(> AFM Table in Cyl Deact mode)			= (1) 200 rev block as data supports for	
Cylinder 6 Misfire Detected	P0306						catalyst damage.	
Cylinder 7 Misfire Detected	P0307		Misfire Percent Emission Failure Threshold	≥ 0.81 % P0300 ≥ 0.81 % emission			Failure reported with	
Cylinder 8 Misfire Detected	P0308		Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts	> 1200 rpm AND > 20 % load AND < 180 counts on one cylinder	(1 or 3) Exceedences in FTP, or (1) Exceedence	
					(at low speed/loads, one cylinder may not cause cat damage)		outside FTP.	
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
							Continuous	]

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MI
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illu
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400	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:		4 cycle delay	
						TPS_FA EnginePowerLimited		
						MAF_SensorTFTKO		
						MAP_SensorTFTKO		
						IAT_SensorTFTKO		
						ECT_Sensor_Ckt_TFTKO		
						5VoltReferenceB_FA CrankSensorTestFailedTKO		
						CrankSensorFaultActive		
						CrankIntakeCamCorrelationFA		
						CrankExhaustCamCorrelationFA		
						CrankCamCorrelationTFTKO AnyCamPhaser_FA		
						AnyCamPhaser_TFTKO		
						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	500 cycle	
						(See Supporting Tables)	delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because	4 cycle delay	
					Fuel System	Transmission in hot mode	4 cycle delay	
					Status	≠ Fuel Cut	. cycle doldy	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine	invalid speed load range in decel	4 cycle delay	
					load region	index tables		
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB	<" Zero torque engine load" in	4 cycle delay	
					approved 3000 rpm to redline triangle.) Below zero torgue:	Supporting Tables tab	4 cycle delay	
					TPS (area)	≤ 0%	- cycle ueldy	
					Veh Speed	> 30 mph		
					EGR Intrusive test	Active	0 cycle delay	
							4 cycle delay	
	1 1				Manual Trans	Clutch shift		
					Throttle Position	> 95.00 %	7 cycle delay	

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

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters Rough Road Source = "FromABS"	Conditions	Required	illum.
					ABS/TCS system			
					RoughRoad	detected		
					VSES	active		
Crankshaft Position	P0315	Monitor for valid crankshaft	Sum of Compensation factors	≥ 4.0040	OBD Manufacturer Enable Counter	0	0.50 seconds	1 Trips
System Variation Not Learned		error compensation factors		OR ≤ 3.9960			Frequency Continuous 100 msec	Type A
Knock Sensor (KS)	P0324	This diagnostic will detect a	Any Cylinder's Avg Gain Signal	450 1/14	Engine Speed	≥ 400 RPM	50 Failures	Туре: В
Module Performance		failed internal ECM component associated with knock control		> 4.50 Volts	Cylinder Air Mass No Active DTC's	> 50 milligrams KS_Ckt_Perf_B1B2_FA	out of 63 Samples	MIL: YES Trips: 2
			or All Cylinder's Raw Signals	≤ 0.20 Volts	Engine Speed Cylinder Air Mass	≥ 400 RPM > 50 milligrams	100 msec rate	
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	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		
Knock Sensor (KS) Performance Bank	P0326	This diagnostic checks for an 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 following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	100 msec rate	
					Engine Speed MAP	≥ 400 RPM ≥ 10 kPa		
					Power Take Off	= Not Active		
Knock Sensor (KS) Circuit Low Bank 1		This diagnostic checks for an out of range low knock	Sensor Input Signal Line	> 2.86 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of	Type: B MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		sensor signal	or Sensor Return Signal Line	< 1.48 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	63 Samples	Trips: 2
					<u>If Yes:</u> Engine Oil Temp and	< 256 deg. C	100 msec rate	
					ValidOilTemp Model	EngOilModeledTemp Valid		
					or No OilTemp Sensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line or	< 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			
			<u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model	< 256 deg. C EngOilModeledTemp Valid	100 msec rate			
					or No OilTempSensor DTC's	EngOilTempSensor CircuitFA		
					<u>If No:</u> No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or	Diagnostic Enabled (1 = Enabled)	= 1	50 Failures out of	Type: B MIL: YES Trips: 2
		circuit		< 1.24 Volts	Engine Speed ECT Enginer Run Time	≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds	63 Samples 100 msec	mps. z
					Power Take Off	= Not Active	rate	
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	> 2.86 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	< 1.48 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0		11105. 2
				<u>If Yes:</u> Engine Oil Temp and	< 256 deg. C	100 msec rate		
				ValidOilTemp Model or No OilTempSensor DTC's	EngOilModeledTemp Valid EngOilTempSensor			
					<u>If No:</u> No Eng Oil Temp enable criteria	CircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	< 2.02 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
		School Signal	Sensor Return Signal Line	> 3.76 Volts	Valid Oil Temp Required? (1= Yes, 0 = No)	= 0		11100.2
					<u>If Yes:</u> Engine Oil Temp and	< 256 deg. C	100 msec rate	
					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 Sircuit	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
ircuit		Sensor Signal	Time since last crankshaft position sensor pulse received		Starter engaged		Test: Continuous every 100	
				>= 4.0 seconds	AND (cam pulses being received		msec	
					OR ( DTC P0101 AND DTC P0102	= FALSE		
					AND DTC P0103	= FALSE = FALSE		
					AND Engine Air Flow	> 3.0 grams/second))		
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		<u>Time-Based</u> Crankshaft Test:	
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5	
					No DTC Active:	5VoltReferenceB FA	msec	
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		<u>Event-Based</u> Crankshaft	-
			No crankshaft pulses received		Engine is Running		Test: 2 failures out	
					OR Starter is engaged		of 10 samples	
					No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340	One sample per engine	
rankshaft Position CKP) Sensor A	P0336	Determines if a performance fault exists with the crank	Crank Re-synchronization Test:		Crank Re-synchronization Test:	P0341	revolution Crank Re- synchronizati	Type B 2 trips
Performance		position sensor signal	Time in which 25 or more crank re-		Engine Air Flow	>= 3.0 grams/second	on Test: Continuous	- 1100

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			synchronizations occur		Cam-based engine speed	> 450 RPM	every 250	
				< 20.0 seconds			msec	
					No DTC Active:	5VoltReferenceB FA P0335		
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		<u>Time-Based</u> Crankshaft	
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running		Test: Continuous every 12.5	
					Starter is not engaged		msec	
					No DTC Active:	5VoltReferenceB FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged		Crank: Continuous every 100	
			detecting crankshart synchronization gap		AND (cam pulses being received		msec	
					OR ( DTC P0101 AND DTC P0102	= FALSE		
						= FALSE		
					AND DTC P0103	= FALSE		
					AND Engine Air Flow	> 3.0 grams/second ) )		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		<u>Event-Based</u> Crankshaft	
			Crank Pulses received in one engine revolution	< 51 seconds	Engine is Running		Test: 8 failures out of 10	
			OR	05	OR Starter is engaged		samples	
			Crank Pulses received in one engine revolution	> 65 seconds	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA		
						P0340 P0341	One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1	P0340	Determines if a fault exists with the cam position bank 1	Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft	Type B 2 trips
Sensor A		sensor A signal	Time since last camshaft position sensor	>= 5.5 seconds	Starter engaged		Continuous	
		pulse received		AND (cam pulses being received		every 100 msec		
			OR Time that starter has been engaged	>= 4.0 seconds	OR			
		without a camshaft sensor pulse	- 4.0 3000103	( DTC P0101 AND DTC P0102	= FALSE			
					AND DTC P0103	= FALSE		
					AND	= FALSE		
					Engine Air Flow	> 3.0 grams/second ) )		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		<u>Time-Based</u> Camshaft	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Fewer than 4 camshaft pulses received in a time		Engine is Running		Test: Continuous every 100	
			a ume	> 3.0 seconds	Starter is not engaged		msec	
					No DTC Active:	5VoltReferenceA FA		
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event- Based	
			No camshaft pulses received during first 24 MEDRES events		Crankshaft is synchronized		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		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	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized		of 10 samples	
					No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Continuous every engine	
Camshaft Position CMP) Sensor	P0341	Determines if a performance fault exists with the cam	Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event- Based	Type B 2 trips
Performance Bank Sensor A		position bank 1 sensor A signal	The number of camshaft pulses received		Crankshaft is synchronized		Camshaft Continuous	
			during first 24 MEDRES events is less 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		every 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> Based	
			The number of camshaft pulses received during 100 engine cycles	< 398	Crankshaft is synchronized		Camshaft 8 failures out of 10	
			OR	> 402	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	samples Continuous every engine cvcle	
GNITION CONTROL #1	P0351	This diagnostic checks the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of	Type: B MIL: YES

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
CIRCUIT		during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	the control circuit do not match.				63 Samples 100 msec rate	Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (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 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	EST for Cylinder 7 (if	Criteria	value	Farameters	Conditions	Required	illum.
		applicable)						
							100 msec rate	
							late	
IGNITION CONTROL #8	P0358	This diagnostic checks the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of	Type: B MIL: YES
CIRCUIT		during operation. Monitors	the control circuit do not match.		Ignition voltage		63 Samples	Trips: 2
		EST for Cylinder 8 (if						
		applicable)					100	
							100 msec rate	
							lato	
Catalyst System	P0420	Oxygen Storage	Normalized Ratio OSC Value	< 0.350			1 test	Туре А
Low Efficiency	1 0120	oxygon otorago	(EWMA filtered)	10.000	Valid Idle Perio	d Criteria	attempted	1 Trip(s)
Bank 1	-	The establish sector shows the sector's			These titles Describes		per valid idle	
			ns Cerium Oxide. Cerium Oxide reacts A/F excursions to store the excess oxygen		Throttle Position Vehicle Speed		period	
			ng rich A/F excursions, Cerium Oxide			> 1300 RPM for a minimum of 20	Minimum of 1	
		reacts with CO and H2 to rele	ease this stored oxygen (I.e. Cerium			seconds since end of last idle	test per trip	
			o as the Oxygen Storage Capacity, or		Engine run time	period. > MinimumEngineRunTime -		
		through forced Lean and Rich	o "measure" the OSC of the catalyst		5	See Supporting Tables. This is	Maximum of	
		through foreca Lean and file				a function of Coolant	8 tests per trip	
	1.		Calculation Information and Definitions =		Tests attempted this trip	Temperature	u.p	
			ost cat O2 Resp time - pre cat O2 Resp		The catalyst diagnostic has not yet		Frequency:	
		time) 2 BestFailing OSC value from	n a calibration table (based on temp and				Fueling Related :	
		exhaust gas flow)	naust gas flow)		Catalyst Idle Conditio	ons Met Criteria	12.5 ms	
			based on temp and exhaust gas flow)		General Enable r			
		Normalized Ratio Calculation	= (1-2) / (3-2)		Valid Idle Period	Criteria met	OSC	
		A Normalized Ratio of 1 esse	ntially represents a good part and a ratio		Green Converter Delay	Not Active	Measuremen ts: 100 ms	
		of 0 essentially represents a v				-20 < °C < 250	10. 100 110	
					Intrusive test(s): Fueltrim		Temp	
					Post O2		Prediction: 1000ms	
					EVAP		1000ms	
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress	1	
			st is done during idle. Several conditions ecute this test. These conditions and their		ECT Barometric Pressure	40 < ° C < 129		
			the secondary parameters area of this		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	0.90 < ST FT < 1.10		
					Predicted catalyst temp > MinCatTemp Tables" ta			
					AND	<i>10j</i>		
					Engine Airflow > MinAirflowToWarmCatal			
					Tables" ta			
					(Based on engine coolant at the time the 0.)	varmedUpEvents counter resets to		
					0.7			
					for at least 30 seconds with a close			
	1	1			consecutively (closed throttle considerat	ion involves having the TPS < the	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time Demuined	MIL
System	Code	Description	Criteria	Value	Parameters value as stated in the Valid Idle	Conditions Period Criteria Section) .	Required	illum.
					Also, in order to increment the Warmed	dUpEvents counter (counter must		
					exceed 30 cal value), either the vehicle			
					speed cal or the TPS must exceed the			
					Period Criteria see			
					Cleared learn fuel	an English	-	
					Closed loop fueli	ng Enabled		
					Please see "Closed Loop Enable Crite	aria" agation of the "Sumporting		
					Tables" tab fo			
					Tables tab to	r details.		
					PRNDI	L		
					is in Drive Range on an Auto	Transmission vehicle.		
					Idle Stable Criteria :: Must hold true fro	om after Catalvst Idle Conditions		
					Met to the end			
						4.00 < g/s < 20.00		
					Predicted catalyst temperature		-	
					Engine Fueling Criteria at Be	eginning of tale Period		
					The following fueling related must also	so be met from between 4 and 7		
					seconds after the Catalyst Idle Condition	ons Met Criteria has been met for		
					at least 4 seconds prior to all	lowing intrusive control		
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avo	0.960 < ST FT Avg < 1.040	1	
					Rapid Step Response (RSR) featu			
					If the difference between current EW			
					Normalized Ratio value is > 0.620 and t			
					value is < 0	0.100		
					Maximum of 24 RSR tests to detect	t failure when RSR is enabled.	1	
					Green Converter D	Delay Criteria		
					This is part of the check for the Catalyst	Idle Conditions Met Criteria section	1	
					The diagnostic will not be enabled un	ntil the following has been met:		
					Predicted catalyst temperature > 0 ° C	for 0 seconds non-continuously	{	
					i redicted catalyst temperature > 0 C	ior o seconds non-continuously.		
					Note: this feature is only enabled when	the vehicle is new and cannot be		
					enabled in s			
					chabled in s			
				1			4	
				1	PTO Not A	ctive	J I	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria	value	General E		Required	mum.
					DTC's No			
					MAF_Sens		1	
					AmbPresDflt	dStatus	1	
					IAT_SensorC		]	
					ECT_Sens			
					O2S_Bank_1_Se	ensor_1_FA		
					O2S_Bank_1_Se			
					O2S_Bank_2_Se			
					O2S_Bank_2_Se FuelTrimSyste		-	
					FuelTrimSyste		1	
					EngineMisfireDe			
					EvapPurgeSolence	idCircuit FA		
					IAC_SystemF	RPM_FA	1	
					EGRValvePerfor		1	
					EGRValveCir		]	
					CamSenso	pr_FA		
					CrankSensorF			
					TPS_Perform			
					EnginePower			
Natali int Orietain	D0 400	Oversee Sterees	Normalized Ratio OSC Value	< 0.350	VehicleSpeedS	ensor_FA	4 4 4 4 4	Turne A
ow Efficiency	P0430	Oxygen Storage	(EWMA filtered)	< 0.350	Valid Idle Perio	od Criteria	1 test attempted	Type A 1 Trip(s)
Bank 2		The catalyst washcoat cont	ains Cerium Oxide. Cerium Oxide reacts		Throttle Positior	2 00 %	per valid idle	
			A/F excursions to store the excess oxygen		Vehicle Speed		period	
			uring rich A/F excursions, Cerium Oxide		Engine speed	> 1300 RPM for a minimum of 20		
			release this stored oxygen (I.e. Cerium		Engine opeca	seconds since end of last idle	Minimum of 1	
			d to as the Oxygen Storage Capacity, or			period.	test per trip	
			is to "measure" the OSC of the catalyst			ponou.		
			Lean and Rich A/F excursions				Maximum of	
		tillough loiced i	Lean and Rich A/F excursions		Engine run time	> MinimumEngineRunTime -	8 tests per	
		Normalized Patio OSC Value	e Calculation Information and Definitions =			See Supporting Tables.	trip	
			post cat O2 Resp time - pre cat O2 Resp			This is a function of Coolant		
		1. Raw 000 Calculation = (	time)			Temperture.	Frequency:	
		2 BestFailing OSC value fro	om a calibration table (based on temp and				Fueling	
			chaust gas flow)				Related :	
			ie (based on temp and exhaust gas flow)				12.5 ms	
		o. Wordt dooling CCC valu	is (based on temp and exhaust gas now)		Tests attempted this trip		OSC	
		Normalized Ra	tio Calculation = (1-2) / (3-2)		The catalyst diagnostic has not yet	completed for the current trip.	Measuremen	
		A Normalized Ratio of 1 ess	entially represents a good part and a ratio		Catalyst Idle Condition	ons Met Criteria	ts: 100 ms	
		of 0 essentially	represents a very bad part.		General Enable		Temp	
					Valid Idle Period	Criteria met	Prediction:	
							1000ms	
					Green Converter Delay	Not Active	<b> </b>	
					Induction Ai	r -20 < °C < 250	]	
					Intrusive test(s):	=Not Active	1	
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
						40.00 \/alta	4	
					RunCrank Voltage		4	
					Ethanol Estimation	NOT in Progress		
		The Catalyst Monitoring Ter	st is done during idle. Several conditions		FCI	√ 40 < ° C < 129	1	
			ecute this test. These conditions and their		Barometric Pressure	> 70 KPA	1	
						P		
		related values are listed in	the secondary parameters area of this					

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle		
					fale time is incremented in vehicle speed	position < 2.00 % as identified in		
						the Valid Idle Period Criteria		
						section.		
					Short Term Fuel Trim	0.90 < ST FT < 1.10		
					Predicted catalyst temp > MinCatTemp 1	able (degC) (refer to "Supporting		
					Tables" ta			
					AND			
					Engine Airflow > MinAirflowToWarmCatal	yst table (g/s) (refer to "Supporting		
					Tables" ta			
					(Based on engine coolant at the time the	NarmedUpEvents counter resets to		
					0.)			
					for at least 30 seconds with a close			
					consecutively (closed throttle considerat			
					value as stated in the Valid Idle	Period Criteria Section) .		
					Also, in order to increment the Warmed	II In Events counter (counter must		
					exceed 30 cal value), either the vehicle			
					speed cal or the TPS must exceed the			
					Period Criteria sec			
					i choù chiena sec			
					Closed loop fueli	ng Enabled		
					Please see "Closed Loop Enable Crite	eria" section of the "Supporting		
					Tables" tab for			
					PRNDI	-		
					is in Drive Range on an Auto	Transmission vehicle.		
					Idle Stable Criteria :: Must hold true fro			
					Met to the end	l of test		
					MAF	4.00 < g/s < 20.00		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Be	ainning of Idle Period		
						Symming of fulle Ferrou		
					The following fueling related must also			
					seconds after the Catalyst Idle Condition			
					at least 4 seconds prior to all	owing intrusive control		
					Number of pre-O2 switches	>= 2		
						>= 2 0.96 < ST FT Avg < 1.04		
					Rapid Step Response (RSR) feature			
					If the difference between current EW	MA value and the current OSC		
1		l I	I			who value and the cullent USC	· I	

Component/	Fault	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary	Enable Conditions	Time	MIL
System	Code	Description	Criteria	value	Parameters Normalized Ratio value is > 0.620 and t	÷	Required	illum.
					value is <			
					Maximum of 24 RSR tests to detec	t failure when RSR is enabled.		
					Green Converter L	Polov Critoria		
					This is part of the check for the Catalyst			
					<b>77</b>			
					The diagnostic will not be enabled un	ntil the following has been met:		
					Predicted catalyst temperature > 0 ° C	for 0 seconds non-continuously.		
					Note: this feature is only enabled wher enabled in s			
					PTO Not A			
					General El DTC's No			
					MAF_Sens			
					AmbPresDflt			
					IAT_SensorC ECT_Sensor			
					O2S_Bank_1_Se			
					O2S_Bank_1_Se	ensor_2_FA		
					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			
					VehicleSpeedS	ensor_FA		
Evaporative	P0442	This DTC will detect a small	The total delta from peak pressure to		Fuel Level	10 % ≤ Percent ≤ 90 %	Once per	1 trip
Emission (EVAP)		leak (≥ 0.030") in the EVAP	peak vacuum during the test is		Drive Time Drive length	≥ 900 seconds ≥ 5.0 miles		Type A
System Small Leak Detected		system between the fuel fill cap and the purge solenoid.	normalized against a calibration pressure threshold table that is based upon fuel		ECT	≥ 70 °C	hot soak (up to 2400	EWINA
Delected		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	300.).	length is 6
		used. EONV is an	on Supporting Tables Tab). The				No more than	under normal
		evaporative system leak	normalized value is calculated by the				2	conditions
		detection diagnostic that	following equation: 1 - (peak pressure -				unsuccessful	
			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 system and performing the	(with 0= perfect pass and 1= perfect fail).				completed tests.	after code clear or non-
		diagnostic, the fuel volatility					18515.	volatile reset
		is analyzed. In an open			Time since last complete test			
		system (Canister Vent				≥ 17 hours		
		Solenoid [CVS] open) high			if normalized result and EWMA is passing			
		volatility fuel creates enough						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description flow to generate a	Griteria	value	Farameters	Conditions	Required	mun.
		measurable pressure differential relative to			0.5			
		atmospheric.			OR Time since last complete test			
						≥ 10 hours		
					if normalized result or EWMA is failing			
					Estimated ambient temperature at end of			
					drive			
						0 °C ≤ Temperature ≤ 34 °C		
					Estimate of Ambient Air Temperature Valid			
					Vand			
			When EWMA is	> 0.71	Conditions for Estimate of Ambient Air		1	
				(EWMA Fail Threshold)	Temperature to be valid:			
			, the DTC light is illuminated.					
		After the volatility check, the			1. Cold Start			
		vent solenoid will close.	The DTC light can be turned off if the		Startup delta deg C (ECT-IAT)	≤ 8 °C		
		After the vent is closed, typically a build up of	EWMA is	≤ 0.35				
		pressure from the hot soak		(EWMA Re-Pass Threshold)	OR 2. Short Soak and Previous EAT Valid			
		begins (phase-1). The pressure typically will peak	and stays below the EWMA fail threshold		2. Short Soak and Frevious EAT Valid			
		and then begin to decrease	for 2 additional consecutive trips.					
		as the fuel cools. When the			Previous time since engine off	≤ 7200 seconds		
		pressure drops (-62.27) Pa from peak pressure, the vent						
		is then opened for 60			OR			
		seconds to normalize the system pressure. The vent			3. Not a Cold Start and Previous EAT			
		is again closed to begin the			Valid and between Short and Long Soak			
		vacuum portion of the test (phase-2). As the fuel			Suak			
		temperature continues to fall,						
		a vacuum will begin forming.						
		The vacuum will continue until it reaches a vacuum			Previous time since engine off	7200 seconds < Time < 25200		
		peak. When the pressure				seconds		
		rises 62.27 Pa from vacuum peak, the test then			AND Must expire Estimate of Ambient	Vahiala Spaad > 0.0 mph		
		completes. If the key is			Must expire Estimate of Ambient Temperature Valid Conditioning Time.	Vehicle Speed ≥ 9.9 mph AND		
		turned on while the			"P0442: Estimate of Ambient	Mass Air Flow ≥ 0 g/sec		
		diagnostic test is in progress, the test will abort.			Temperature Valid Conditioning Time" in Supporting Tables Tab.			
ļ					1			

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.	Vehicle Speed ≥ 9.9 mph AND		
					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			
					See P0454 Fault Code for information on vacuum refueling algorithm.			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
					OR 3. Fuel Level Refueling Detected			
					See P0464 Fault Code for information on fuel level refueling.			
					OR 4. Vacuum Out of Range and No Refueling			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR 5. Vacuum Out of Range and Refueling Detected			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR 6. Vent Valve Override Failed			
					Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test			
						0.50 seconds		
					OR 7. Key up during EONV test			
					No active DTCs:	FuelLevelDataFault MAF_SensorFA ECT_SensorFA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	Type B 2 trips
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.	OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE	< -623 Pa > 1245 Pa > 2989 Pa ≥ 12 liters	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 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	Type B 2 trips
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 commanded closed for 15 seconds.	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 with solenoid operation	Type B 2 trips
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	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts)		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off	1 trip Type A EWMA Average run

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
- ononnanoo		or phase-2 portions of the engine-off natural vacuum small leak test.	Upper voltage threshold (voltage addition above the nominal voltage)	0.2 volts			natural vacuum small leak test. The number of	length: 6
			Lower voltage threshold (voltage subtraction below the nominal voltage)	0.2 volts			times that it executes car range from zero to two per engine- off period.	Run length is 2 trips after code clear or
			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).				The length o the test is determined by the refueling rationality test, which can take up to 600 seconds to	non-volatile f 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	≤ 0.40 (EWMA Re-Pass Threshold)				
			and stays below the EWMA fail threshold for 2 additional consecutive trips.					
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up	is 0.10 seconds	80 failures out of 100 samples	Type B 2 trips
			tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).		ECM State ≠ crank		100 ms / sample Continuous	
					Stops 6.0 seconds after key-off			
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel	> 4.85 volts (97% of Vref or ~ - 4172 Pa)	Time delay after sensor power up for sensor warm-up	is 0.10 seconds	80 failures out of 100 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Reguired	MIL illum.
Jystem	Coue	Description	Pa) to 4.5 volts	Value	ECM State ≠ crank	conditions	sample	mum.
			(~ -3736 Pa).					
			× ,		Stopp 6.0 opponde offer kov off		Continuous	
					Stops 6.0 seconds after key-off			
Fuel Tank Pressure (FTP) Sensor	P0454	This DTC will detect intermittent tank vacuum	If an abrupt change in tank vacuum is detected the engine-off natural vacuum		This test will execute whenever the engine-off natural vacuum small leak test		This test is executed	1 trips Type
Circuit Intermittent		sensor signals that would	test is aborted due to an apparent		(P0442) executes		during an	A
		have caused the engine-off	refueling event. Subsequent to the abort,		(1 0 1 12) 0/000000		engine-off	
		natural vacuum small leak	a refueling rationality test is executed to				natural	
		test to abort due to an	confirm that a refueling event occurred. If				vacuum	
		apparent re-fueling event.	a refueling is confirmed, then the test sample is considered passing.				small leak test. The	
			Otherwise, the sample is considered				test can only	
			failing indicating an intermittent signal				execute up to	
			problem.				once per	
							engine-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	t
				> 112 Pa			of 3 samples	
			in the span of 1.0 seconds.	> 112 Pa			are failures.	
			But in 12.5 msec.	< 249 Pa			10 5 /	
			In 12.5 msec.				12.5 ms / sample	
			A refueling event is confirmed if the fuel					
			level has a persistent change				Continuous	
				of 10 %			when vent solenoid is	
			for 30 seconds.				closed	
Evaporative	P0455	This DTC will detect a weak	Purge volume while	> 45 liters	Fuel Level	10 % $\leq$ Percent $\leq$ 90 % 11 volts $\leq$ Voltage $\leq$ 32 volts	Once per	Type B 2
Emission (EVAP) System Large Leak		vacuum condition (large leak or purge blockage) in the	Tank vacuum	≤ 2740 Pa	System Voltage	$11 \text{ volts} \leq \text{voltage} \leq 32 \text{ volts}$	cold start	trips
Detected		EVAP system.			BARO	≥ 70 kPa	Time is	
		-	After setting the DTC for the first time, 2			MAD Sensor	dependent	
		Purge valve is controlled (to	liters of fuel must be consumed before setting the DTC for the second time.		No active DTCs:	MAP SensorFA TPS_FA	on driving conditions	
		allow purge flow) and vent valve is commanded closed.				VehicleSpeedSensor_FA		
		vaive is commanueu ciused.					Maximum	
						IAT SensorCircuitFA ECT_Sensor_FA	time before test abort is	
						AmbientAirDefault	1000	
						EnginePowerLimited	seconds	
			Weak Vacuum Follow-up Test (fuel cap			P0443 P0449		
			replacement test) Weak Vacuum Test failed.			P0449 P0452		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Passes if tank vacuum	≥ 2740 Pa		P0453 P0454		
			Note: Weak Vacuum Follow-up Test can only report a pass.		Cold Start Test 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	Type B 2 trips
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample	Type B 2 trips
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	Continuous 100 failures out of 125 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re- fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.	1 trips Type A

Component/	Fault Code	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable	Time	MIL
System	Code	Description	Criteria 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.	Value by 10 % > 10 %	Parameters	Conditions	Required       The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to       The test will report a failure if 2 out of 3 samples are failures.	illum.
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 P0443 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	Type B 2 trips
Low Engine Speed I dle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 91.00 rpm 0.003	Coolant Temp	> 70 kPa > 60 °C and < 125 °C	Diagnostic rur every 12.5 ms	trips loop
					Engine run time		Diagnostic rep	
				1	Ignition voltage Time since gear change		pass or fail in 10 sec	
				1			once all enabl	
				1	Time since a TCC mode change	> 3 sec > -20 °C		
							conditions are	met
			L	1	Vehicle speed			
					Commanded RPM delta	≥ ∠5 IPM		
					For manual transmissions: Clutch Pedal TOT Threshold or Clutch Pedal BOT Threshold	< 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD	-	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Off-vehicle device control (service bay control) must not be active.		
					Low Fuel Condition Diag	=FALSE		
						(See Supporting Tables)		
					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		
						TPS_FA TPS Performance FA		
						VehicleSpeedSensor_FA FuelLevelDataFault		
						Clutch Sensor FA		
					All of the above met	Clutch Sensor FA		
					for Idle time	> 10 sec		
igh Engine Speed P0507 lle System	This DTC will determine if a high idle exists	Filtered Engine Speed Error	> -182.00 rpm	Baro	> 70 kPa	Diagnostic rur	Type B 2 trips	
le System			filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	every 12.5 ms	
					Engine run time	≥ 60 sec	Diagnostic rep	
					Ignition voltage	32 ≥ volts ≥ 11	pass or fail in	
					Time since gear change	≥ 3 sec	10 sec	
					Time since a TCC mode change	> 3 sec	once all enabl	е
					IAT	> -20 °C	conditions are	met
					Vehicle speed	≤ 1.24 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions:			
					Clutch Pedal TOT Threshold or			
					Clutch Pedal BOT Threshold	< 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service		
				+	Low Fuel Condition Diag	bay control) must not be active.		
					Low Fuel Condition Diag	= FALSE (See Supporting Tables)		
				+	No active DTCs	AmbientAirDefault		
				+		ECT Sensor FA		
				+		EGRValveCircuit_FA		
		<u> </u>		+		EGRValvePerformance_FA		
				+		IAT_SensorCircuitFA		
		<u> </u>		1		EvapFlowDuringNonPurge_FA		
		<u> </u>		1		FuelTrimSystemB1_FA		
				+		FuelTrimSystemB1_FA		
		<u> </u>		+		FuelInjectorCircuit_FA		
				+		MAF SensorFA		
		<u>├</u>	+	+				
				+		EngineMisfireDetected_FA		<u> </u>
				+				
		1	1			EnginePowerLimited		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Cinteria	Value	Farameters	TPS FA	Required	inum.
						TPS Performance FA	+	+
						VehicleSpeedSensor_FA	+	+
						FuelLevelDataFault	+	+
						Clutch Sensor FA		
					All of the other sector	Clutch Sensor FA	───	4
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP)	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is	To fail a currently passing test:		Diagnostic enabled/disabled	Enabled	Performed every 100	2 trip(s)
Sensor		stuck or biased in range	The filtered, weighted difference between measured EOP and predicted EOP (a		Oil Pressure Sensor In Use	Present	msec	Type B
Performance			function of engine speed and engine oil		Filtered engine oil pressure test weighting		1	
					(function of engine speed, engine oil	1		
			temp.):		temperature, predicted oil pressure, and	1		
						1		
				< -45.0 kPa OR > 45.0 kPa	engine load stability). Details on	1		
					Supporting Tables Tab (P0521 Section)	1		
			To pass a currently failing test:			1		
			The filtered, weighted difference between			1		
			measured EOP and predicted EOP (a					
						1		
			function of engine speed and engine oil			1		
			temp.):			1		
				> -42.0 kPa AND < 42.0 kPa		1		
				> 42.0 KI & AND < 42.0 KI &		>= 0.30 weighting		
					No active DTC's	Fault bundles:		
						CrankSensorFA		
						ECT Sensor FA		
						MAF SensorFA		
						IAT_SensorFA		
						EOPCircuit_FA		
Engine Oil	P0522	Determines if the Engine Oil	(Engine Oil Pressure Sensor Circuit		Engine Running	= True	50 failures	2 trip(s)
Pressure (EOP)	TOOLL	Pressure (EOP) Sensor	Voltage) / 5 Volts			_ 1100	out of 63	2 (1) (0)
Sensor Circuit Low		circuit voltage is too low	voltage)/ 5 volta	< 5 percent	Ignition Voltage	<= 32.0 V and >= 11.0 V	samples	Type B
Voltage		circuit voltage is too low			Sensor Present	Yes	Performed	TYPE D
voltage					Diagnostic enabled/disabled		every 100	
					Blaghootio chablea/dioablea	Enabled	msec	
Engine Oil	P0523	Determines if the Engine Oil	(Engine Oil Pressure Sensor Circuit		Engine Running	= True	204 failures	2 trip(s)
Pressure (EOP)		Pressure (EOP) Sensor	Voltage) / 5 Volts		3 3		out of 255	- 1 (- /
Sensor Circuit High		circuit voltage is too high		> 85 percent	Ignition Voltage	<= 32.0 V and >= 11.0 V	samples	Type B
Voltage		onount voltage to too riight			Sensor Present	Yes	Performed	
voltage					Diagnostic enabled/disabled		every 100	
					3	Enabled	msec	
Air Conditioning	P0532	Determines if the Air	(AC Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s)
Refrigerant		Conditioning Refrigerant			ů.			Type C
Pressure Sensor		Pressure circuit voltage is				1		
Circuit Low Voltage		too low			AC pressure sensor present	CAN message from BCM or Not	Performed	
2 San 2017 Vonago						Present in ECM	every 25	
		1		<u> </u>		-	msec	
Air Conditioning	P0533	Determines if the Air	(AC Pressure Sensor Voltage) / 5 Volts	> 90.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s)
Refrigerant		Conditioning Refrigerant	<b>, , , , , , , , , ,</b>		5	1		Type C
Pressure Sensor		Pressure circuit voltage is				1	1	
Circuit High		too high			AC pressure sensor present	CAN message from BCM or Not	Performed	
Groutrign		iso mgn				Present in ECM	every 25	
Voltago							msec	
Voltage		Detect when cruise control	Cruise Control analog circuit voltage		CAN cruise switch diagnostic enable in	TRUE	fail	Type:
Ŭ	P0564			1			continuously	,
Cruise Control	P0564		must be in an "illegal range" for greater		IECM	Į		
Cruise Control Mutil-Functon	P0564	multi-function switch circuit	must be in an "illegal range" for greater		ECM			С
Cruise Control Mutil-Functon	P0564	multi-function switch circuit (analog) voltage is in an	than a calibratable period of time for		ECM		for greater	C MII ·
Cruise Control Mutil-Functon	P0564	multi-function switch circuit	than a calibratable period of time for cruise switch states that are received		ECM		for greater than 0.750	C MIL: NO
Ŭ	P0564	multi-function switch circuit (analog) voltage is in an	than a calibratable period of time for		EGM		for greater	C MIL: NO Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		2000 prom	0.00.00					
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips:
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE	fail continuously for greater than 90.000 seconds fail continuously for greater than 90.000 seconds	Type: C MIL: No Trips: 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 MIL: No Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State	= crank or run	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass. Diagnostic reports a fault if 5 failures occur after the first pass is	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			= crank or run PCM is identified through	complete. Diagnostic runs at powerup	Type A 1 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
						calibration as a Service PCM		
Control Module	P0603	Non-volatile memory	Checksum at power-up does not match				Diagnostic	Туре А
Long Term Memory		checksum error at controller	checksum at power-down				runs at	1 trips
Reset		power-up					powerup Diagnostic	-
							reports a	
							fault if 1	
							failure occurs	
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	doesn't match the pattern read for a count				first memory	1
		from or write data to RAM	>	subsequent scans.			scan within 30 seconds	Type: A
							at all engine	MIL:
							conditions -	YES
							diagnostic	
							runs	
							continuously	
			Secondary processor battery backed				Completion	
			RAM failed checksum twice for original				at intilization,	
			values at power up and the defaulted				<500 ms	
			values					
								1
				2 counts			Completion	
			area to RAM failed for a count >				at intilization, <500 ms	
							<500 ms	
			Secondary Processor data pattern written				Will finish	
			doesn't match the pattern read				within 30	
			consecutive times				seconds at	
							all engine conditions.	
								1
			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 integrity fault	processor detects Primary's calculated throttle position is greater > than			relay voltage > 6.00 and reduced power is false, else the failure will	the secondary	Type:
		processor integrity radit	Secondary Processor calculated Throttle	0.00 %.		be reported for all conditions	processor	A
			Position by			be reported for all conditions	p10000001	MIL:
								YES
								1
							1	
							]	
			Secondary processor detects Primary's	7.57 %.		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 driver is commanding the			be reported for all conditions		
			throttle from APP by				1	1
	l	I	1	I		1	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	39.26 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions		
			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or were not executed in the correct order.	0.0625 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.0625 sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or	0.1250 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	0.1250 sec	
			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 in the 50 ms loop were not executed or were not executed in the correct order.	0.2500 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.2500 sec continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.5000 sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1.2500 sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	360.0000 sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was	360.0000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	360.0000 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
- Cystom		Decomption	completed > the amount of time		, arantotora	power is false, else the failure will be reported for all conditions	noquirou	dill.
			Software tasks on the Secondary Processor were not executed or were not executed in the correct order.	Two Consecutive Loops (12.5ms * 2) 25ms		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	25 ms	
			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.	
			Primary processor check of the 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			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	
			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	100 ms continuous	
			The secondary check of the ALU failed to compute the expected result			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	12.5 ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						be reported for all conditions		
			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	
Main & MHC state of 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: NO
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 >			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Consecutive checks within 200ms or 2 / 2 counts; 175 ms/count	Trips: 1 Type: A MIL: YES
						Engine Running TPS minimum learn is not active		163
						No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)		
			Difference between primary processor indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		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	
						Primary processor Pedal Sync	the	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Gintena	Value	rarameters	Error is FALSE	processor	indiri.
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	P0641	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 > Secondary Processor Vref1 < or Secondary Processor Vref1 >	4.875 5.125 0.05 4.875 5.125		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	nowerun 19 / 39 counts or 0.1875 continuous; 12.5 ms/count in primary processor 19 / 39 counts or 15 counts continuous; 12.5	Trips: 1 Type: A MIL: YES
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	ms/count in secondary 20 failures out of 25 sambles 250 ms / sample	Type B 2 trip NO MIL
5 Volt Reference #2 Circuit	P0651	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 >			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	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref2 < or Secondary Processor Vref2 >	0.05 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	Type B 2 trips
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"		Continuous 5 failures out of 6 samples	
I			Stuck Test:		No active DTCs:		1 second /	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System	Code	Description	Criteria	value	Farameters	PowertrainRelayStateOn_FA	sample	mum.
			PT Relay feedback voltage is when commanded 'OFF'	> 3 volts			Stuck Test: 100 ms/ sample Continous failures ≥ 4	
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	seconds Continuous	1 trip Type A (No MIL)
Inlet Airflow System Performance (naturally aspirated applications)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model 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 Intake Air Temp Minimum total weight factor (all factors multiplied together)	<ul> <li>&gt;= 450 RPM</li> <li>&lt;= 4600 RPM</li> <li>&gt; -7 Deg C</li> <li>&lt; 129 Deg C</li> <li>&gt; -20 Deg C</li> <li>&lt; 125 Deg C</li> <li>&gt;= 0.00</li> </ul> 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 1 multiplied by MAP1 Residual Weight Factor based on RPM	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
					No Active DTCs:	MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor FP IAT SensorFA IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	Engine Coolant For	≥ 129 °C ≥ 10 seconds	Engine Run Time If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip.	≥ 10 Seconds	Fault present for ≥ 0 seconds	1 trip Type 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 RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid		+ 1 from previous \$19D message (PTEI3) not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Diagnostic enable bit (1 = Enabled) Engine run time	1 0.50 sec	Diagnostic runs in 12.5 ms loop	Type B 2 trips
					# of Protect Errors # of Alive Rolling Errors	10 protect errors out of 10 samples 6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code No Serial communication loss to TCM Engine Running Power mode	IAC_SystemRPM_FA (U0101) = TRUE Run Crank Active		
Throttle Actuator Control - Position Performance	P1516	Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The actual Throttle position and throttle model differ by >	7.568 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL: YES
				7.568 %.	Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set)	11 5.4		
	Detect throttle control is driving the throttle in the incorrect direction				and TPS minimum learn is not active Ignition voltage failure is false (P1682)			
		driving the throttle in the	Thottle Position >	39.761 %.	(Throttle is being Controlled and TPS minimum learn is active) or	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Reduce Engine Power is Active			
		Degraded Motor	Desired throttle position is stable within 0.25 for 4.0000 sec and the delta between Indicated throttle position and desired throttle position in greater than 2.00 %			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 on secondary processor	,
					Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled	11 5.4		
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			
					Ignition voltage failure is false (P1682)			
gnition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	Run/Crank – PT Relay Ignition  >	3.00 Volts	Powertrain commanded on and (Run/crank voltage > or PT Relay Ignition voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240 / 480 counts or 0.1750 sec continuous; 12.5 msec/count in main processor	Trips: 1 Type: A MIL: YES
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too	P2096	Determines if the post catalyst O2 sensor based fuel control system has been		> 500 out of 1000 samples Note: 10 sample counts = 1	The following must be true for: PTO:	> 0.0 sec NOT active	Frequency: Continuous Monitoring in	Type B 2 Trips
Rich)		unable to adapt to a rich exhaust gas condition that results in an emissions	Note: If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the	second	Intrusive diagnostic fuel control: Long Term Secondary Fuel Trim Enabled	FALSE (i.e. catalyst monitor diagnostic) Please see "Long Term	100ms loop	
		correlated failure.	next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0,			Secondary Fuel Trim Enable Criteria" in Supporting Tables		
			and evaluation starts again.		Ambient air pressure	>= 70 kPa	4	
					Engine air flow Intake manifold air pressure	>= 0 g/s and <= 10000 g/s >= 0 kPa and	-	
					make mannou an pressure	<= 200 kPa		

Code Description	Criteria	Value	Parameters Induction air temperature Start up coolant temperature	<u>Conditions</u> >= -20 °C and <= 45 °C	Required	ill
			Start up coolant temperature			
				<= 45 °C		
	1 1			00.00		
			NO ACTIVE	> -20 °C		
			AmbientAirD			
			AIR System			
			Ethanol Compositio	n Sensor FA		
			ECT_Senso			
			EGRValveCirc	cuit_FA		
			EGRValvePerforu IAT Senso			
			CamSnsrLctn/			
			EvapEmissionSy			
			EvapElinssions			
			FuelTankPressureSe			
			EvapPurgeSolenoi			
			EvapSmallLe	ak_FA		
			EvapVentSolenoid			
			FuelInjectorCir			
			MAF_Sens			
			MAF_Sensor MAP_Sens			
			MAP_Sens MAP EngineVac			
			EngineMisfireDe			
			Ă/F Imbalance	Bank1		
			O2S_Bank_1_Se			
			O2S_Bank_1_Se	nsor_2_FA		
Additional notes, strategy	and enable requirements:					L
If the post catalyst O2	The above specified Sample Counter wil	l increment if:				
voltage is outside a control	The current post O2 airflow mode is a select	ted cell:		See supporting tables: Selected		
window, the integral offset is	AND			Cells		
adjusted in an attempt to	Accumulated Cell Count is greater than	0		See supporting tables: Cell		
move the voltage back insid	e (counts spent in the given cell while enabled The above specified Fail Counter will inc		r incremente AND:	Accum Min		
the control window. The	Filtered post O2 valtage is hovered the fail th		a increments and.	See supporting tables:		
offset value is used to adjust				> O2 Rich Thresh		
the front O2 sensor control t	٥ <u>ــــــــــــــــــــــــــــــــــــ</u>					
bias the bulk average exhaust air/fuel ratio either			for more than this many counts:			
lean or rich. The integral				Window Count		
	AND					
	The post catalyst O2 Integral offset IS:					
botwoon upo.			Note - the Post O2 filter coefficient is:	<= Integral Offset Min See supporting tables: Post O2		
offset value is retained between trips.	The post catalyst O2 integral offset is:		Note - the Post O2 filter coefficient is:	See supporting tables: <= Integral Offset Min See supporting tables: Post O2 Filt Coefficient		-

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		High Vapor (HV) Delay Feat	ure					
		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	<= 0.82 >= 5.0 sec	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			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	> 0.85			stop evaluation.	
		subsides, evaluation will resume.	101	>= 20.0 sec		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	>= 20.0 sec		immediately resume evaluation.		
Post Catalyst Fuel Trim System High imit Bank 1 (Too ean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt to a lean exhaust gas condition that results in an emissions correlated failure.	Note: If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0,	> 300 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions)		Frequency: Continuous Monitoring in 100ms loop	Type B 2 Trips
			and evaluation starts again.					
		Additional notes, strategy a	nd anable requirements:					
		If the post catalyst O2	The above specified Sample Counter with	ill increment if:				
		voltage is outside a control window, the integral offset is	The current post O2 airflow mode is a sele AND	cted cell:		See supporting tables: Selected Cells		
		adjusted in an attempt to	Accumulated Cell Count is greater than	1 a al \		See supporting tables: Cell		
		move the voltage back inside the control window. The	(counts spent in the given cell while enab The above specified Fail Counter will in		increments AND:	Accum Min		
		offset value is used to adjust	Filtered post O2 voltage is beyond the fail			See supporting tables: < 02 LeanThresh		
	the front O2 sensor control to bias the bulk average exhaust air/fuel ratio either			for more than this many counts	See supporting tables: Out of	-		
		lean or rich. The integral	AND			Window Count	J	
		offset value is retained between trips.	The post catalyst O2 integral offset is:		Note the Dest OO films of films	See supporting tables: >= Integral Offset Max	-	
					Note - the Post O2 filter coefficient is:	See supporting tables: Post O2 Filt Coefficient		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum
			P2096, P2097, P2098, P2099 (see P2096					
			ure: same as rich fault for bank 1 (see F		-		1_	
ost Catalyst Fuel rim System Low mit Bank 2 (Too ich)	P2098	Same as bank 1 rich fault (see P2096)			Same enable conditions for P2096, P enable con-		Frequency: Continuous Monitoring in 100ms loop	Type B 2 Trips
					NOTE: The Bank1 faults listed in the P2			
					A/F Imbaland O2S_Bank_2_S O2S Bank_2 S	ensor_1_FA		
		Additional notes, strategy a	nd enable requirements: same as bank	1 rich fault (see P2096)	020_Baim_2_0		1	
			P2096, P2097, P2098, P2099 (see P2096	for details)				
		High Vapor (HV) Delay Feat	Canister purging is active and Long term	1	Filtered post O2 voltage is outside the	Cas supporting toblas	When these	
	The diagnostic is at risk of reporting a false fail when excessively High Vapor (H\ conditions that impact the fuel control system are	hen fuel correction is for <= 0.82 = 5.0 sec dition criteria this If HV has caused the diagnostic to stop	<= 0.82	window defined by:	See supporting tables: HV Post Low and HV Post High	conditions are met, HV is detected		
fuel control sy present. This is indicated wi to the right are	tuel control system are present. This HV condition is indicated when the criteria to the right are met. In this			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	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	ł		
			evaluation, evaluation will resume when			immediately resume evaluation.		
				>= 20.0 sec				
	2099 Same as bank 1 lean fault Lea (see P2097) Note: Same as bank 1		> 300 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P enable con		Frequency: Continuous Monitoring in 100ms loop	Type B 2 trips	
					NOTE: The Bank1 faults listed in the P2	096 section are replaced by:	-	
					A/F Imbaland O2S_Bank_2_S O2S_Bank_2_S	ensor_1_FA		
			nd enable requirements: same as bank				·	
			P2096, P2097, P2098, P2099 (see P2096					
	P2101		ure: same as rich fault for bank 2 (see The throttle model and actual Throttle	P2098)		Run/crank voltage or Powertrain		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control - Position Performance		error	position differ by > 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 %.	Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled	11 5.5		
					and Communication Fault (SPI is not set) and TPS minimum learn is not active			
					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 power is false, else the failure will be reported for all conditions	11 counts; 12.5 msec/count in the primary	
			Thottle Position >	39.06 %.	Reduce Engine Power is Active	be reported for all conditions		
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	Trips: 1 Type: A MIL: YES
						No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	processor	
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		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	Primary APP1 Voltage >			Run/crank voltage or Powertrain	the secondary 19 / 39	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Jystem	Code	intermittent short in APP1 circuit on both processors or just the primary processor	Unteria .	4.75	r anneters	relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts or 14 counts continuous; 12.5 ms/count in the primary	1 Type: A MIL: YES
			Secondary APP1 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	
APP2 Circuit	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the secondary processor but sensor is in range on the primary processor	or Secondary APP2 Voltage >	0.325 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 msec/count in the	Trips: 1 Type: A MIL: YES
						No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	secondary processor	
inte AP pro	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 No 5 V reference #1 DTC (P0641)	19/39 counts or 14 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 or just the primary processor	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 continuous; 12.5 ms/count in the secondary	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(TP) Sensor 1-2 Correlation		intermittent correlation fault between TPS sensors #1 and #2 on primary or secondary processor	Difference between (normalized min	position with a linear threshold to 9.698 % at max. throttle position		relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts or 58 counts continuous; 3.125 ms/count in the primary processor	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; 12.5 ms/count in the	
			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)	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	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System Minimum Throttle	Code P2176	Description TP sensors were not in the	Criteria During TPS min learn on the Primary	Value	Parameters	Conditions Run/crank voltage or Powertrain	2.0 secs	illum. Trips:
Position Not	12170	minmum learn window after	processor, TPS Voltage >			relay voltage > 6.00 and reduced	continuous	1
Learned		multiple attempts to learn the		0.005		power is false, else the failure will		Type:
		minimum.		0.935		be reported for all conditions		A MIL:
			or					YES
			During TPS min learn on the Secondary		No TPS circuit errors			
			processor, TPS Voltage >					
					No TPS circuit faults			
				0.935	P1682 is not active			
					Minimum TPS learn active			
			and					
			Number of learn attempts >	10 counts				
			AND					
			TPS2 Voltage >	1.789	Throttle de-energized			
			On the Primary processor		No TPS circuit faults			
			OR TPS1 Voltage >	1.689	PT Relay Voltage >	5.5		
			AND TPS2 Voltage >	1.789		5.5		
			On the Secondary processor					
Cooling System	P2181	This DTC detects thermostat	Engine Coolant Temp (ECT) is ≤ target				30 failures	Туре В
Performance		malfunction (i.e. stuck open)	temperature of 75 Deg C and normalized				out of 90	2 trips
			ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.				samples	
			Tor more than 5 seconds, fair counts start.				1 sec	
					No Active DTC's	MAF_SensorFA IAT_SensorFA	/samnle	
			Engine total airgrams is accumulated	1			Once per	
			when 17 ≤ AirFlow ≤ 450 grams per				ignition key	
			second.	4		THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	cvcle	
			Ratio Definition:	1	Engine not run time			
			Current temp difference between ECT					
			and RCT minus PwrUp difference divided by total airgrams.					
			Note: Minimum total airgrams is 500.0					
			drame			$90 \le \text{Time} \le 1370 \text{ seconds}$ Ethanol $\le 87\%$		
						$-7.0 \le ECT \le 70.0$ °C		
					IAT min	-7°C ≤ IAT ≤ 55°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:	Туре В
Bank 1		delivery system is		at any time during the trip	ECT	> -20 degC	Continuous	2 trips
		imbalanced by monitoring the pre and post catalyst O2			Engine Run Time	>= 10 seconds	Monitoring of O2 voltage	
		sensor voltage			Engine speed	1250 <= rpm <= 3750	signal in	
		characteristics.	OR Bank 1 AFM (DoD) Filtered Length Ratio	> 1.00	4		12.5ms loop	
			variable (AFM applications only)	at any time during the trip				
					Engine speed change during the curren	t	The AFIM	
					3.13 sec sample period is <=	8192 rpm	Filtered	
		To improve S/N, pre-catalyst	AND		Mass Airflow	10.0 <= g/s <= 510.0	Length Ratio	

Component/ Svstem	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	M illu
System	Code		Bank 1 Filtered Post catalyst O2 voltage	value		120 <= mg/cylinder <= 680	<u> </u>	IIIU
		O2 voltages between 1000	is NOT between		Air Per Cylinder	$120 \le mg/cylinder \le 680$	variable is	
		and 0 millivolts are ignored.	IS NOT between	1000 and 0 millivolts			updated after	
		This feature is enabled at Air	Nata 16 the Contraction and a factor the	1000 and 0 minivolts			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.	
			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 <=		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	2 0.0 minivoita		
		equal to zero, the feature is			OR		131 seconds	
		not used on this application			-		to allow time	
		and the full pre-catalyst O2			Negative (falling) Delta O2 voltage during		for the AFIM	
		voltage range is utilized.			OR		Filtered	
		voltage fallge is utilized.			Negative (falling) Delta O2 voltage during	< -5.0 millivolts	Length Ratio	
					previous 12.5ms is	< 0.0 minvoits	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	
					only		reporting a	
						period.		
					O2 sensor switches	>= 1 times during current 3.13	pass before	
					OZ SENSOR SWITCHES	second sample period	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)	Guanty Factor	region		
AFIM F	AFIM Filtered Length Ratio	o difference between the measured String	calibrations are located in a 17x17 lookup table versus engine speed	No EngineMisfireDetected FA	Treation			
	is derived from the pre-O2			No MAP_SensorFA				
		sensor voltage metric known	value, divided by the same lookup value,	and load (see Supporting Tables).	No MAF_SensorFA			
				A QF of "1" is an indication that	No ECT_Sensor_FA			
		as String Length. String	and finally multiplied by a Quality Factor		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		1	
		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		No EvapPurgeSolenoidCircuit_FA		1	
		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		1	
		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	
		the longer the String Length	failures), the Length Ratio is filtered using		No FuelTankPressureSensorCircuit_FA		1	
		will be.	a common first-order lag filter. The result		Device Control Not Active		1	
		will be.	is the AFIM Filtered Length Ratio.		Intrusive Diagnostics Not Active			
			is the Arim Filtered Length Ratio.		Engine OverSpeed Protection Not Active		1	
					Reduced Power Mode (ETC DTC) Not Ac	tive		
					PTO Not Active		7	
					Traction Control Not Active		ן ר	
							]	
					Fuel Control	Status		
					Closed Loop	Enabled		
					Long Term FT	Enabled		
						Please see "Closed Loop		
						Enable Criteria" and "Long		
						Term FT Enable Criteria" in		
						Supporting Tables.		
						Supporting rapies.		
				Currenteting (abaaluta) dalta MAE during	500/.	<b>-</b> 1		
				Cumulative (absolute) delta MAF during	< 500 g/s			
					the current 3.13 second sample period is	< 500 g/s		

Arr Fuel Instance Bark 2         P319         Optimizer if the arrhout diagroup of a constraint faile and possible of an expension of a constraint faile diagroup of a constraint disto constraint faile diagroup of a constraint faile diagro	Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
Are Fuel Instance         P2192         Determines if the archard service in another the archard instance in a specific in a spec	System	Code	Description	Criteria	Value		с с	Required	illum.
Bank 2       delivery system is implanced by monitoring the pre and post catalyst C2 characteristics.       at any time during the trip the pre and post catalyst C2 characteristics.       at any time during the trip the pre and post catalyst C2 characteristics.       implance continuous the pre characteristics.       implancet continuous the pre						Data collection is suspended under the	- 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		
imbalanced by monitoring the pre and post outside characteristics.     imbalanced by monitoring earlies outside characteristics.     imbalanced by monitoring can do not study.     imbalanced by monitoring can d		P219B		Bank 2 Filtered Length Ratio variable		System Voltage	10 <= V <= 32 for >= 4 seconds		
Image: Provide catality Column Sensor voltage characteristics.         Image: Column Colu	Bank 2				at any time during the trip	ECT	> 30.00		2 trips
Bit of preservoiting in orgeneration only in the feature is and a first orgeneration on the full pre-contays.     Bit X: 2 AFM (DOD) Filtered Length Ratio Visition on Visition Visition on Visition Visition on Visition Visition on Visition Visite Visition Visition Visition Visition Visition Visition V									
Anotorising     OR     100       Bank 2 AFM (DoD) Filtered Length Ratio     at any time during the trip       To improve SN, pre-catalyst     AND       C2 voltages between 1000     and C1 millivolts       O2 voltages between 1000     Bank 2 Filtered Post catalyst 02 voltage       Bank 2 Filtered Post catalyst 02 voltage     Interview       Note: If the first voltage voltage value, HMOOR the AFF Clipter value is equal to 2 voltage tating     Interview       AF Per Cylinder value is equal to 2 voltage tating     Interview       Bank 2 Filtered Post Catalyst 02 voltage tating     Interview       Voltage targe tating tating tating tating     Interview       Bank 2 Filtered Post Catalyst 02 voltage tating     Interview       Voltage targe tating     Interview       Bank 2 Filtered Post Catalyst 02 voltage									
Amount of the second values and the second values of the second value and the second value				OR		<u> </u>			
To improve SN, pre-catalyst       AD       3.33 ase is angle period is <= 61/32 rpm			characteristics.	( ), S				12.0113 1000	
To improve SN, pre-catalyst       AD       3.33 ase is angle period is <= 61/32 rpm						Engine speed change during the current		-	
To improve SN, pre-catalyst       max       AND       Mass Airliow       Length Ratio         Q2 voltages between 100d and 0 millivolts are ignored. This feature is enabled at Ar Per Cylinder values <= 0 m(cylinder.       Bark 2 Filtered Post catalyst Q2 voltage is NOT between       100 and 0 millivolts       I/20 <= mg/cylinder							8102 rom		
O2 voltages between 1000 and 0 millivolts       Bank 2 Filtered Post catalyst 02 voltage is NOT between       Bank 2 Filtered Post catalyst 02 voltage is NOT between       Ar Per Cylinder       120 <= mg/cylinder <= 680			To improve S/N pro establish	AND					
and 0 millivoits are ignored.       is NOT between       is NOT between       is NOT between       ignored of this source in this sour									
Phis feature is enabled at Ar PC Vilider values s = 0 mg/cylinder.       Note: If the first voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.       Note: If the first voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.       Air Per Cylinder value is = the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.       The first voltage value, AND/R the post catalyst O2 data is not used for diagnosis on this application.       The first voltage value, AND/R the post catalyst O2 data is not used for diagnosis on this application.       The first voltage value, AND/R the post catalyst O2 data is not used for diagnosis on this application.       The first voltage value is = the second voltage value, AND/R the first voltage value is = the second voltage value is = the voltage value is = the second voltage value is = the value is = the second voltage value is = the value value is = the second voltage value is = the value is = the value value is = the va						Air Per Cylinder	120 <= mg/cylinder <= 680		
Per Cylinder values c = 0 mg/cylinder.       Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalys to 2 data is not used for diagnosis on this application.       Air Per Cylinder change during the current 3.13 sec sample period is <= 0 Positive (rising) Delta O2 voltage during previous 12.5ms is       The first voltage value, this is an indication that the post catalys to current 3.13 sec sample period is <= 0 Positive (rising) Delta O2 voltage during previous 12.5ms is       The first output to current 3.13 sec sample period is <= 0 Positive (rising) Delta O2 voltage during previous 12.5ms is       The AFIM Filtered Length Ratio is the difference between the measured String as String Length. String Length S tring Length				IS NOT between	1000 and 0 millivolts				
mg/cy/inder.       second voltage value, this is an indication       Air Per Cy/inder change during the post calability of an indication.       Valid data.       Valid data.         Note: If the first voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene second voltage value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value is seene value, ADD/OR the Air Per Cy/inder value, Addet value, Add				Nata If the Contraction states in the	1000 and 0 minivolts				
Monitor Strategy Notes: The AFINE Fittered Length Ratio is derived from the pre-O2 sensor voltage metric Anona as String Length. String Length is simply the curve       The AFIM Fittered Length Ratio is the displaced in the fittered Length Ratio is the displaced in the fittered Length Ratio is in the displaced in the pre-O2 sensor voltage metric Known as String Length String Length Comparison Com									
Note: If the first voltage value, AND/OR the Air Per Cylinder value is end search of the second voltage value, AND/OR the Air Per Cylinder value is end to account the second voltage value, AND/OR the feature is equal to zero, the feature is equal to zero, the feature is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage frame catalyst O2 voltage frame cata			mg/cylinder.					valid data.	
Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.       for diagnosis on this application. <u>eurent 3.13 sec sample period is &lt;= 8128 mg/cylinder</u> <u>the first voltage during</u> previous 12.5ms is OR       >5.0 millivolts       delayed for 100 seconds to allow time for the AFIM         Voltage range is utilized.       Veltage the second voltage range is utilized.       Negative (falling) Delta O2 voltage during previous 12.5ms is OR       >6.0 millivolts       The AFIM Filtered Length Ratio is derived from the pre- oze         Monitor Strategy Notes: is derived from the pre- String Length String Length is simply the curve as String Length String Length						Air Per Cylinder change during the			
Value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized. <u>% Ethanol</u> <u>% Staturate</u> <u>% Staturate</u>				for diagnosis on this application.				The first	
Voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.       > 5.0 millivoits       delayed for 150 seconds to allow time for the AFIM         Voltage range is utilized.       Negative (falling) Delta O2 voltage during previous 12.5ms is       > 5.0 millivoits       delayed for 150 seconds to allow time for the AFIM         Monitor Strategy Notes: is derived from the pre-O2 sensor voltage metric known as String Length. String Length of the ozy ensor to face (the tater ranges between 0 and 1, basen to choice sto take out on previous as String Length. String Length is simply the curve length of the O2 sensor.       The AFIM Filtered Length Ratio value 12/5 Tratege stores to face and locad (see Supporting Tables), an indicad is the difference between the measured String Length is simply the curve length of the O2 sensor.       The Quality Factor (QF) value divided by the same lockup value an indicad (see Supporting Tables), an indicad is the difference between to and 1, 2x17 table lockup value divided by the same lockup value (the tater ranges between 0 and 1, basen of a vir)       The Quality Factor (QF) value divided by the same lockup value and inally multiplied by a Quality Factor (the tater ranges between 0 and 1, basen of a vir) value divided by the same lockup value value divided by the			value is >= the second						
Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.       Image: previous 12.5ms is OR       Image: previous 12.5ms is OR       Image: previous 12.5ms is OR         Negative (falling) Delta O2 voltage during revious 12.5ms is       Image: previous 12.5ms is OR       Image: previous 12.5ms is OR       Image: previous 12.5ms is OR       Image: previous 12.5ms is OR         Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length Strate (Length and a 17X17 table lookup and inally multiplied by a Quality Factor (the latter ranges between 0 and 1, beta and low time previous 12.5ms is       The Quality Factor (QF) calibrations are located in a 17X17 No MAP_SensorFA and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, beta and low time previous 12.5ms is       No AFM state change during previous 12.5ms is       Image: previous 12.5ms is         Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length String Length of to O2 sensor       The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length String Length of to O2 sensor       The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, beta and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, beta and provide set in the on robustress to fabe datposis in the difference between 0 and 1, beta and box (see supporting Tables) and finally multiplied by a Quality Factor       No MAP_SensorFA No MAP_SensorFA       No MAP_			voltage value, AND/OR the						
equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized. <ul> <li>Negative (falling) Delta O2 voltage during previous 12.5ms is</li> <li>Negative (falling) Delta O2 voltage during previous 12.5ms is</li> <li>Negative (falling) Delta O2 voltage during previous 12.5ms is</li> </ul> <ul> <li>Negative (falling) Delta O2 voltage during previous 12.5ms is</li> <li>Negative (falling) Delta O2 voltage during previous 12.5ms is</li> <li>No AFM state change during previous 12.5ms is</li> <li>For AFM (Cylinder Deactivation) vehicles No AFM state change during current 3.13 second sample period</li> <li>period</li> <li>pass before apass before apass before apass before and the full previous 12.5ms is</li> <li>The AFIM Filtered Length Ratio is the difference between the measured String is derived from the pre-O2 sensor switches</li> <li>Second sample period</li> <li>activate the apart of the application and that a 17x17 table lookup value, and finally multiplied by a Quality Factor (QF)</li> <li>and tad (see Supporting Tables), No ECT_ Sensor FA</li> <li>No ECT_ Sensor FA</li></ul>			Air Per Cylinder value is						
Image: construction and the full pre-catalyst O2 voltage range is utilized.       Image: construction constructin construction construction constructing constru			equal to zero, the feature is						
and the full pre-catalyst O2       voltage range is utilized.       In the AFIM       Previous 12 Sms is       In the AFIM         voltage range is utilized.       Negative (failing) Delta O2 voltage during current 3.13 second sample period.       Length Ratio variable to saturate.       This         Monitor Strategy Notes: The AFIM Filtered Length Ratio is the difference between the measured String Length and al TX17 table lookup value for an indication that as String Length. String Length String Length String Length String Length String Length String Length the Curve energy between 0 and 1, based on the Q2 sensor FA       The Quality Factor (QF) calibration that difference between the measured String Length and al TX17 table lookup value on the Gee Supporting Tables, and finally multiplied by a Quality Factor (the date ranges between 0 and 1, based on the Q2 sensor FA       No MAF_ SensorFA       No MAF_ SensorFA         No TPS_ThrottleAuthorityDefaulted       No TPS_ThrottleAuthorityDefaulted       No TPS_ThrottleAuthorityDefaulted       No TPS_ThrottleAuthorityDefaulted       No TPS_ThrottleAuthorityDefaulted			not used on this application			-			
voltage range is utilized.       ritleted       ritleted       ritleted         voltage range is utilized.       Negative (falling) Delta O2 voltage during previous 12.5ms is       <-5.0 millivolts						provious 12 Emeric			
Monitor Strategy Notes: The AFIM Filtered Length Ratio is the AFIM Filtered Length Ratio is the AFIM Filtered Length Ratio is the difference between the measured String Length at 17x17 table lookup value, and finally multiplied by a Quality Factor (QF) calibration star location that a 17x17 table lookup value, and finally multiplied by a Quality Factor (QF) calibration star location that the tatter ranges between 0 and 1, based on robustness to false diagnosis in the difference between reference on robustness to false diagnosis in the difference between of the measured String Length. String Length String Len						OR			
Monitor Strategy Notes: The AFIM Filtered Length Ratio is the associated in a 17x17 table lookup table value, divided by the same lookup value, d						Negative (falling) Delta O2 voltage during	< -5.0 millivolts		
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-02 sensor voltage metric known as String Length. String Length of the Q2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length is simply the curve length of the Q2 sensor       The Quality Factor (QF) calibrations are located in a 17x17 table lookup length of the Q2 sensor       The Quality Factor (QF) calibrations are located in a 17x17 table lookup length of the Q2 sensor       No EngineMisfireDetected_FA No MAP_SensorFA No MAP_SensorFA No MAP_SensorFA No MAP_SensorFA No MAP_SensorFA No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted       No Factor table to achieve at least table to achieve at least table to achieve at least table to achieve at least table to achieve at least       No TPS_ThrottleAuthorityDefaulted table to achieve at least table to achieve at least       No TPS_ThrottleAuthorityDefaulted table to achieve at least       No TPS_ThrottleAuthorityDefaulted table to achieve at least       No TPS_ThrottleAuthorityDefaulted table to achieve at least						previous 12.5ms is		saturate. This	
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length of the O2 sensor       The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted No TPS_ThrottleAuthorityDefaulted       No AFS_SensorFA No Ethanol Composition Sensor FA No Ethanol Composition Sensor FA       No Hanol Composition Sensor FA No Ethanol Composition Sensor FA						For AEM (Cylinder Departicular)	No AEM state abanas during		
Monitor Strategy Notes: The AFIM Filtered Length Ratio is the sensor voltage metric known as String Length String Length String Length String Length is simply the curve length of the Q2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the Q2 sensor       The Quality Factor (QF) calibration state lockup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       The Quality Factor (QF) calibration state lockup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       The Quality Factor (QF) calibration state lockup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       The Quality Factor (QF) calibration state lockup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       The Quality Factor (QF) calibration state lockup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       The Quality Factor (QF) calibration state lockup value, divided by the same lookup value, divided by the versus engine speed and local (see Supporting Tables), and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based       No TFS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted         No TPS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted       No TFS_ThrottleAuthorityDefaulted									
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length as imply the curve length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The Quality Factor (the latter ranges between 0 and 1, based versue able to achieve at least the Signma/2signma robustness in that       No EngineMisfireDetected_FA No EngineMisfi						oniy		reporting a	
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). No MAF_SensorFA No Ethanol Composition Sensor FA No Ethanol Composition Sensor FA       No MAF_SensorFA No Ethanol Composition Sensor FA						O2 sensor switches	>= 1 times during current 3.13		
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables), AGP of "1" is an indication that be detected.       No MAP_SensorFA         No MAF_SensorFA       No MAF_SensorFA       No MAF_SensorFA         No the latter ranges between 0 and 1, based       we were able to achieve at least signa/2sigma robustness in the       No TPS_ThrottleAuthorityDefaulted									
Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the value, divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based length of the O2 sensor       The AFIM Filtered Length Ratio is the difference between 0 and 1, based we were able to achieve at least hos TPS_ThrottleAuthorityDefaulted       No TPS_ThrottleAuthorityDefaulted									
AFIM Filtered Length Ratio       difference between the measured String       calibrations are located in a 17x17       No EngineMisfireDetected_FA         is derived from the pre-O2       Length and a 17x17 table lookup       Longth and a 17x17 table lookup       lookup table versus engine speed       No MAP_SensorFA         as String Length. String       and finally multiplied by a Quality Factor       A GF of "1" is an indication that       No MAF_SensorFA         length of the O2 sensor       on robustness to false diagnosis in the       4 sigma/2sigma robustness in that       No TPS_ThrottleAuthorityDefaulted			Monitor Strategy Notes: The	The AFIM Filtered Length Ratio is the	The Quality Factor (QF)			So doleoled.	
is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor in the 12ter ranges between 0 and 1, based is derived from the pre-O2 sensor voltage metric known as String Length. String Length as the 2 sensor in the 12ter ranges between 0 and 1, based is derived from the pre-O2 sensor voltage metric known as String Length. String Length of the O2 sensor in the 12ter ranges between 0 and 1, based is derived from the pre-O2 sensor voltage metric known and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based is grang/2sigma robustness in that is grang/2sigma robustness in that is grange robustness in t						No EngineMisfireDetected_FA		1	
sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor I control data frant basic locked value, divided by the same lockup value, and lock (see Supporting Tables). A QF of "1" is an indication that simply the curve length of the O2 sensor on robustness to false diagnosis in the length of the O2 sensor						No MAP_SensorFA		1	
as String Length. String Length is simply the curve length of the O2 sensor on robustness to false diagnosis in the								]	
Length is simply the curve (the latter ranges between 0 and 1, based we were able to achieve at least length of the O2 sensor on robustness to false diagnosis in the diagnosis								]	
length of the O2 sensor on robustness to false diagnosis in the 4sigma/2sigma robustness in that No IPS_InfromeAutiontryDefaulted								1	
								4	
	1	l				No FuelInjectorCircuit_FA		]	1

System C	pe re is bo ar TI (a th	eason we use String Length because it comprehends oth O2 signal frequency nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), le longer the String Length ill be.	Criteria Current operaning region). The reason we- use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio.	have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	Parameters           No AIR System FA           No O2S_Bank_1_Sensor_1_FA           No O2S_Bank_2_Sensor_1_FA           No EvapPurgeSolenoidCircuit_FA           No EvapPurgeVentSolenoidCircuit_FA           No EvapPurgeSolenoidCircuit_FA           No EvapPurgeVentSolenoidCircuit_FA           No EvapPurgeSolenoidCircuit_FA           No EvapEmissionSystem_FA           No FuelTankPressureSensorCircuit_FA           Device Control Not Active           Engine OverSpeed Protection Not Active           Reduced Power Mode (ETC DTC) Not Active           Traction Control Not Active           Fuel Control           Not Active		Required	illum.
	re is bo ar TI (a th	eason we use String Length because it comprehends oth O2 signal frequency nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), le longer the String Length ill be.	use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	No O2S_Bank_1_Sensor_1_FA No O2S_Bank_2_Sensor_1_FA No EvapPurgeSolenoidCircuit_FA No EvapFlowDuringNonPurge_FA No EvapFlowDuringNonPurge_FA No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	is bo ar TI (a th	because it comprehends oth O2 signal frequency nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), le longer the String Length ill be.	various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	No O2S_Bank_2_Sensor_1_FA No EvapPurgeSolenoidCircuit_FA No EvapFlowDuringNonPurge_FA No EvapVentSolenoidCircuit_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Active Traction Control Not Active <u>Fuel Control</u> Closed Loop	Status		
	bo ar TI (a th	oth O2 signal frequency nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), le longer the String Length ill be.	since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	No EvapPurgeSolenoidCircuit_FA No EvapFlowDuringNonPurge_FA No EvapVentSolenoidCircuit_FA No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active <b>Fuel Control</b> Closed Loop	Status		
	bo ar TI (a th	oth O2 signal frequency nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), le longer the String Length ill be.	since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	No EvapFlowDuringNonPurge_FA No EvapVentSolenoidCircuit_FA No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	ar TI (a th	nd amplitude in one metric. he busier the O2 voltage an indication of imbalance), he longer the String Length ill be.	impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not	No EvapVentSolenoidCircuit_FA No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	TI (a th	he busier the O2 voltage an indication of imbalance), he longer the String Length ill be.	when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	values less than 0.74 identify regions where diagnosis is not	No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	(a th	an indication of imbalance), ne longer the String Length ill be.	to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result	regions where diagnosis is not	No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	th	e longer the String Length ill be.	failures), the Length Ratio is filtered using a common first-order lag filter. The result		No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
		ill be.	a common first-order lag filter. The result	possible.	Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
	W				Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
			is the AFIM Filtered Length Ratio.		Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
					Reduced Power Mode (ETC DTC) Not Act PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
					PTO Not Active Traction Control Not Active Fuel Control Closed Loop	Status		
					Traction Control Not Active Fuel Control Closed Loop			
					Fuel Control			l
					Closed Loop			
					Closed Loop			
						Franka		
					Long Term FT	Enabled		
						Please see "Closed Loop		
						Enable Criteria" and "Long		
						Term FT Enable Criteria" in		
						Supporting Tables.		
					Cumulative (absolute) delta MAF during	< 500 g/s		1
					the current 3.13 second sample period is	1 000 g/0		
					the current 3.13 second sample period is	Nata. This must sta susing the las		
						Note: This protects against false		
					Note: This protects against false	diagnosis during severe transient		
					diagnosis during severe transient	maneuvers.		
					Data collection is supported under the	- for 0.5 seconds after AFM		
					Data collection is suspended under the			
					following circumstances:	transitions		
						<ul> <li>for 0.5 seconds after Closed</li> </ul>		
						Loop transitions from Off to On		
						<ul> <li>for 0.5 seconds after purge</li> </ul>		
						transitions from Off to On or On to		
						Off		
						- for 0.5 seconds after the AFIM		
						diagnostic transitions from		
						Disabled to Enabled		
Sensor Signal P22	2270 TI	his DTC determines if the	Post O2 sensor cannot achieve the rich	1) Post O2S signal < 830 mvolts	No Active DTC's		Frequency:	Type B
ick Lean Bank 1			threshold voltage.	,			Once per trip	
nsor 2		tuck in a normal lean	anoonola voltago.	AND		TPS_ThrottleAuthorityDefaulted	choc per trip	2 1103
IISUF Z				AND			Note: if	
			AND					
		an no longer be used for		2) Accumulated air flow during			NaPOPD_b_	
	po	ost oxygen sensor fuel	The Accumulated mass air flow	stuck lean test > 230 grams.			ResetFastRe	
			monitored during the Stuck Lean Voltage	-			spFunc=	
			Test is greater than the threshold before				FALSE for	
		n intrusive test (during					the given	
			the above voltage threshold is met.			ECT_Sensor_FA	Eucl Dank	
		past) which increases the				IAT_SensorFA	OR	
		elivered fuel to achieve the					NaPOPD_b_	
	re	equired rich threshold.					RapidRespo	
		-					nseActive =	
							TRUE,	
							multiple tests	
						MAE SopcorEA	per trip are	
						MAF_SensorFA		
				1		MAP SensorFA	allowed	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
						FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F, P2270 or P2271		
					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 Low Fuel Condition Diag	B2S2) in Supporting Tables tab. = False		
					Engine Speed to initially enable test Engine Speed range to keep test enabled	(See Supporting Tables) 1100 <= RPM <= 2500		
					(after initially enabled)	1050 <= RPM <= 2650 3 gps <= Airflow <= 20 gps 40.4 mph <= Veh Speed <= 82.0		
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	36.0 mph <= Veh Speed <= 87.0 mph		
					Closed Loop Active	0.74 <= C/L Int <= 1.08 = TRUE 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		
					Power Take Off EGR Intrusive diagnostic	= not active		
					All post sensor heater delays O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 °C <= Cat Temp <= 900 °C = DFCO possible		
					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		-	
						0.00 - LON - 1.10	1	_
uck Rich Bank 1	P2271	This DTC determines if the post catalyst O2 sensor is	Post O2 sensor cannot achieve the lean threshold voltage.	1) Post O2S signal > 150 mvolts	No Active DTC's		Frequency: Once per trip	Type B 2 trips
ensor 2		stuck in a normal rich voltage range and thereby	AND	AND		TPS_ThrottleAuthorityDefaulted		
		can no longer be used for post oxygen sensor fuel		2) Accumulated air flow during stuck rich test > 82 grams.			Note: if NaPOPD_b_	
		control or for catalyst monitoring. The diagnostic	monitored during the Stuck Rich Voltage Test is greater than the threshold before	giuno.			ResetFastRe spFunc=	
		is an intrusive test which	the above voltage threshold is met.				FALSE for the given	
		requests the DFCO mode to achieve the required lean				ECT_Sensor_FA IAT_SensorFA	Evol Book OR	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description threshold.	Criteria	Value	Parameters	Conditions	Required	illum.
		tilleshold.					NaPOPD_b_	
							RapidRespo	
							nseActive =	
							TRUE,	
							multiple tests	
							per trip are	
						MAF_SensorFA	allowed	
						MAP_SensorFA		
						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,		
						B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag			
					Eow Fuel Condition Diag	(See Supporting Tables)		
					Engine Speed	1100 <= RPM <= 2500		
						3 gps <= Airflow <= 20 gps		
					Vehicle Speed	40.4 mph <= Veh Speed <= 82.0		
					Venicle Opeed	mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active			
						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		
						Tahles tah		
					Power Take Off			
					EGR Intrusive diagnostic			
					All post sensor heater delays			
		1			O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 °C <= Cat Temp <= 900 °C		
						= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if		
		1				applicable))		
					DTC's Passed	= P013E (and P014A (if		
		1				applicable))		
		1			DTC's Passed	= P013A (and P013C (if		
						applicable))		
		1			After above condition	ons are met:	1	
		1			DFCO mode is o	continued		
					(wo driver initiated	pedal input).		
							Ī	
2 Sensor Signal	P2272	This DTC determines if the	Post O2 sensor cannot achieve the rich	1) Post O2S signal < 830 mvolts	No Active DTC's		Frequency:	Type B
				,				
uck Lean Bank 2		post catalyst O2 sensor is	threshold voltage.				Once per trip	2 trips

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	1		Value	Parameters	Conditions		illum.
Component/ System	Fault Code	Monitor Strategy Description 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.	Criteria AND The Accumulated mass air flow monitored during the Stuck Lean Voltage	Threshold Value 2) Accumulated air flow during stuck lean test > 230 grams.	B2S2 Failed this key cycle System Voltage	Conditions ECT_SensorFA IAT_SensorFA 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 See definition of	Time Required Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are	MIL illum.
					System Voltage	P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Not Valid = Not Valid, See definition of Multiple DTC Use_Green Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab.		
					Engine Airflow Vehicle Speed to initially enable test	1100 <= RPM <= 2500 1050 <= RPM <= 2650 3 gps <= Airflow <= 20 gps 40.4 mph <= Veh Speed <= 82.0 mph		
					Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active Evap	36.0 mph <= Veh Speed <= 87.0 mph 0.74 <= C/L Int <= 1.08		
						= Enabled. See definition of Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests in Supporting Tables tab		
					Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State	= not active = not active = not active		
					All of the above met f seconds, and then the intrusive stage is	or at least 2.0 Force Cat Rich requested.		
					During Stuck Lean te must stay TRUE or th Commanded Fuel	st the following e test will abort  0.95 <= EQR <= 1.10		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Signal Stuck Rich Bank 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 is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	<ol> <li>Post O2S signal &gt; 150 mvolts</li> <li>AND</li> <li>Accumulated air flow during stuck rich test &gt; 82 grams.</li> </ol>	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 Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE,	Type B 2 trips
					Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Post fuel cell Post fuel cell Post fuel cell Post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State DTC's Passed	10.0 volts < system voltage< 32.0 volts = Not Valid = Not Valid, See definition of <b>Multiple DTC Use_Green</b> Sensor Delay Criteria (B1S2, B2S2) in Supporting Tables tab. = False (See Supporting Tables) 1100 <= RPM <= 2500 3 gps <= Airflow <= 20 gps 40.4 mph <= Veh Speed <= 82.0 mph 0.74 <= C/L Int <= 1.08 = 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 tah = not active = not active = not active = not active = NO sec 550 °C <= Cat Temp <= 900 °C = DFCO possible = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))	multiple tests per trip are allowed.	

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	ons are met: continued		
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message - (\$199 - PTEI3) OR	Message <> two's complement of message			>= 16 Protect errors during key cycle >= 6 Rolling	Type B 2 trips
			Rolling count error - Serial Communication message (\$199 - PTEI3) rolling count value OR	Message <> previous message rolling count value + one	Diagnostic enabled/disabled Power Mode	Enabled = Run	count errors out of ten samples	
			RAM Error - Internal ECU fault	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 3 RAM errors during key cycle	
			OR <u>Range Error</u> - Serial Communication message - (\$199 - PTEI3) TCM Requested Torque Increase	> 450 Nm			>= 3 out of 10 samples	-
			OR <u>Multi-transition error</u> - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi- transitions out of 5 Performed	-
							every 12.5 msec	
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:	Initial value test: Initial ignition off timer value OR Initial ignition off timer value	< 0 seconds	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample	Type B 2 trips DTC sets on next key
		Checks the accuracy of the 1 second timer by comparing it with the 12.5 ms timer	Clock rate test: Time between ignition off timer increments	< 0.8 seconds			Clock rate test: 8 failures out of 10	cycle if failure detected
			Time between ignition off timer increments	> 1.2 seconds			samples 1 second /	
			Time since last ignition off timer increment	≥ 1.375 seconds			sample test runs	
			Current ignition off time < old ignition off time				once each kev-off	
			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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(OBD_HD >14K only)								
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	Type B 2 trips
2007101			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		
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 loop.	Type B 2 trips
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					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 loop.	1 Trip(s) Special Type C
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			1
				1	or is typed as a C code			
				1	Normal Communication is enabled			1
				1	Normal Transmit capability is TRUE			1
				1	The diagnostic system is not disabled	1		1
				1	The bus has been on for	> 3.0000 seconds		t
				1	A message has been selected to monitor.			1

#### FAPD Section

#### P2096, P2097, P2098, P2099 Cell Accum Min

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Bank2 Post O2 Air Flow Mode Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel Cell Accum Min Count (10

counts = 1 sec.) 300 300 300 300 0 0 300 300 300 300

#### P2097, P2099 Integral

Offset Max Post O2 Air Flow Mode Decel Idle Cruise Light Accel Heavy Accel Post O2 Integral Offset

Max [mV] 130 130 380 380 380

#### P2096, P2098 Integral Offset Min

Post O2 Air Flow Mode Decel Idle Cruise Light Accel Heavy Accel

Post O2 Integral Offset Min -140 -140 -390 -390 -390

[mV]

### P2097, P2099 O2 Lean

Thresh

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel 670 670 670 670 670 670 670 O2 Lean Threshold [mV] 670 670 670

#### P2096. P2098 O2 Rich

Thresh Bank1 Light Bank2 Light Bank1 Bank1 Bank2 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel O2 Rich Threshold [mV] 820 820 820 820 800 800 810 810 810 810

#### 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 counts = 1 sec.) 0 0 0 Ω 0

#### P2096, P2097, P2098, P2099 Selected Cells

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel Post O2 Airflow Mode

Selected Cell 0 0 1 1 1 1 0 if not selected, 1 if selected

#### P2096, P2097, P2098, P2099 HV Post Low

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel KaFAPD\_U\_HV\_PO2\_FiltL oThresh 695 695 695 695 695 695 695 695 695 695

#### P2096, P2097, P2098, P2099 HV Post High

Bank1 Bank1 Light Bank2 Light Bank1 Bank2 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel 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 Light Bank2 Light Bank1 Bank1 Bank2 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel KaFAPD\_U\_HV\_PO2\_IntO -115 -115 -365 -365 ffLoThresh -115 -115 -365 -365 -365 -365

#### P2096, P2097, P2098, P2099 HV Integral Offset High

Bank1 Bank2 Bank1 Light Bank2 Light Bank1 Bank2 Post O2 Airflow Mode Cell Bank1 Decel Bank2 Decel Bank1 Idle Bank2 Idle Cruise Cruise Accel Accel Heavy Accel Heavy Accel KaFAPD U HV PO2 IntO ffHiThresh 105 355 355 355 105 105 105 355 355 355

#### P2096, P2097, P2098, P2099 Post O2 Filt Coefficient

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

### P0068: MAP / MAF / TPS Correlation

		X-axis is TPS	(%)						
		Data is MAP	threshold (kPa	a)					
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	(%)						
			hreshold (gra	ms/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	no Spood /PE	(					
M and a	000.00		/AF vs RPM (		0000.00	1000.00	5400.00	0000 00	7000.00
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 Voltag	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

F1002. Ignition v	ollage correlation					
		X-axis is IAT	(DegC)			
		Data is Voltag	ge threshold (\	/)		
X-axis	23.0000	85.0000	95.0000	105.0000	125.0000	
Data	7.0000	8.6992	9.0000	9.1992	10.0000	í

#### P0326 Knock Detection Enabled Factors:

FastRtdMax:

			Y - axis = Ma	nifold Pressure	e (kPa)												
	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
20	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
30	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
40	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
50	0.0	0.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60	0.0	0.0	3.5	6.0	6.0	6.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
70	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
80	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
90	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
110	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
120	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
130	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
140	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
150	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
160	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
170	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
180	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

#### Knock Detection Enabled Factors:

Knock Detection Enabled = FastAttackRate \* FastAttackCoolGain \* FastAttackBaroGain

X - axis = Engine Speed (RPM)

FastAttackRate:	RPM:	<b>0</b> 0.00	<b>512</b> 2.50	<b>1024</b> 3.00	<b>1536</b> 4.00	<b>2048</b> 4.50	<b>2560</b> 4.50	<b>3072</b> 4.25	<b>3584</b> 4.00	<b>4096</b> 3.75	<b>4608</b> 3.50	<b>5120</b> 3.50	<b>5632</b> 3.50	<b>6144</b> 3.50	<b>6656</b> 3.50	<b>7168</b> 3.50	<b>7680</b> 3.50	<b>8192</b> 3.50
	eg. C): stAttack olGain:	<b>-40</b> 0.00	<b>-30</b> 0.00	<b>-20</b> 0.00	<b>-10</b> 0.00	<b>0</b> 0.00	<b>10</b> 0.00	<b>20</b> 0.25	<b>30</b> 0.50	<b>40</b> 0.75	<b>50</b> 1.00	<b>60</b> 1.00	<b>70</b> 1.00	<b>80</b> 1.00	<b>90</b> 1.00	<b>100</b> 1.00	<b>110</b> 1.10	<b>120</b> 1.20
	Baro:	<b>55.00</b> 1.00	<b>61.25</b> 1.00	<b>67.50</b> 1.00	<b>73.75</b>	<b>80.00</b> 1.00	<b>86.25</b> 1.00	<b>92.50</b> 1.00	<b>98.75</b> 1.00	<b>105.00</b> 1.00								

BaroGain:

#### Tables supporting P219A and P219B Diagnostics:

P219A AvgFlow / AvgRPM

							KtO	XYD_cmp_AF	-IM_LngthThr	sh1							
Г	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	90000	90000	12480	12480	11408	11408	90000	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	90000	90000	13968	13216	12480	11408	11408	17968	17968	90000	90000	90000	90000	90000	90000
160	90000	90000	90000	11536	12752	13968	14512	14464	15728	17968	19328	21792	21792	90000	90000	90000	90000
200	90000	90000	90000	11536	11536	13024	15632	12960	14768	20128	20672	21792	24176	26576	90000	90000	90000
240	90000	90000	90000	11552	11552	12688	16384	17728	15312	17856	16592	18768	26576	26576	90000	90000	90000
280	90000	90000	90000	11552	12992	14448	19216	18208	15024	13600	14256	21776	31008	31008	90000	90000	90000
320	90000	90000	90000	90000	14608	14608	17776	17056	14672	14912	14432	26032	32592	32592	90000	90000	90000
360	90000	90000	90000	90000	16752	16752	18656	20704	15952	16688	14752	30560	32240	32240	90000	90000	90000
400	90000	90000	90000	90000	17808	17808	18384	22112	15280	21360	16560	35408	37696	37696	90000	90000	90000
440	90000	90000	90000	90000	17840	17840	20336	24464	19712	20240	18000	35136	37536	37536	90000	90000	90000
480	90000	90000	90000	90000	18416	18416	19744	25120	18224	17984	21616	30448	44272	44272	90000	90000	90000
520	90000	90000	90000	90000	20528	20528	21648	24736	17136	19808	22464	34464	45344	45344	90000	90000	90000
560	90000	90000	90000	90000	20528	20528	23664	25696	17728	21312	23040	32880	39104	45344	90000	90000	90000
640	90000	90000	90000	90000	90000	90000	32576	32576	26832	27392	25216	32880	32880	90000	90000	90000	90000
720	90000	90000	90000	90000	90000	90000	32576	32576	26832	27392	27392	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

#### P219B

KtOXYD\_cmp\_AFIM\_LngthThrsh2 90000 AvgFlow / AvgRPM 90000 160 240 400 90000 560 640 

P219A

AvgFlow /	AvgRPM
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							RI NI		I_QualFactor								
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.85	0.90	0.90	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.85	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00		0.95	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	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	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

KIOXVD K AEIM QualEactor1

P219B AvgFlow / AvgRPM

								KtOXYD_K	_AFIM_Qua	IFactor2							
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.80	0.75	0.85	0.90	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.90	0.85	0.85	0.80	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.95	0.75	0.80	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.80	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	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	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#### The following tables define the Lean and Rich failure thresholds for FASD

P0171 & P0174	Long Term Trim	n Lean (Lean I	Fail threshold	)													
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Trim Lear	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295
P0172 & P0175	Non Purge Rich	Limit (Rich F	ail threshold)														
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Non-Purg	e 0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770
P0172 & P0175	Purge Rich Limi	it (Triggers R	ich Intrusive t	est)													
% 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 Ric	h 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	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 I.D. CeFADR\_e\_(CeFADR\_e\_(CeFADR\_e\_CEFADR\_E\_CEFADR\_E\_

#### P0420 / P0430 Detail

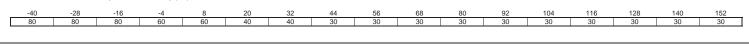
1 0420 / 1 0400 Detail					
MinimumEngineRunTime					
Coolant Temp	40	50	60	70	80
Engine Run Time	300	300	300	300	300
MinCatTemp	X_A	XIS_PTS			
CATD_ExhaustWarmMin_L	400	0			
CATD_ExhaustWarmMin_L	400	1			
CATD_ExhaustWarmMin_L	400	2			
CATD_ExhaustWarmMin_L	400	3			
CATD_ExhaustWarmMin_L	400	4			
CATD_ExhaustWarmMin_L	400	5			
CATD_ExhaustWarmMin_L	400	6			
CATD_ExhaustWarmMin_L	400	7			
MinAirflowToWarmCatalyst					
Engine Coolant	0	45	90		
MinAirFlowToWrmCat	20	18	18		

### P0101, P0106, P0121, P012B, P1101: IFRD Residual Weighting Factors

	TPS Residua	I Weight Fact	or based on I	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 Residua	al Weight Fact	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 Residua	al Weight Fact	tor Based on	MAF Estimate	e												
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 Residu	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 Residu	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

### 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)

																152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

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

(For applications with a t coolant sensors)	wo	X axis is ECT Y axis is IAT i	Temperature	me failure thre at Power up (° t (° C )		ds)							
	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\_PostCellEnbl - 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

Z axis is the pass/fail result (see note below) X axis is Lean to Rich response time (msec) Y axis is Rich to Lean response time (msec)

Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	0.000	0.010	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

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

	0.000	0.010	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

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

	0.0	500.0	1000.0	1500.0	2000.0
0.0	1.1201	1.1201	1.1201	1.1201	1.1201
25.0	1.1201	1.1201	1.1201	1.1201	1.1201
50.0	1.1299	1.1299	1.1299	1.1299	1.1299
75.0	1.1401	1.1401	1.1401	1.1401	1.1401
100.0	1.1499	1.1499	1.1499	1.1499	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 Equiv ratio during the test Y axis is MAP (kpa) X axis RPM

#### 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 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
- \* B1S2 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
- \* B2S1 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
- \* B2S2 Airflow 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

#### P0300-P0308: Idle SCD

load Load

load

D		100	(decel index (							1000	1000	1.100	1800	1000
		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
	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	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
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

#### P0300-P0308: Idle SCD ddt

	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
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	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
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

#### P0300-P0308: SCD Delta

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

load

1	0	а	d	

ila				200 2000 001		Denta dat Tai	5103))							
		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
Г	8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
	9	565	420	275	210	135	100	85	65	50	32767	32767	32767	32767
	11	480	400	320	195	135	100	80	60	48	32767	32767	32767	32767
	12	480	400	320	200	140	115	80	60	50	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
ſ	17	820	600	380	300	230	160	115	90	55	32767	32767	32767	32767
ſ	19	975	700	425	370	270	180	130	105	80	32767	32767	32767	32767
ſ	22	1100	800	500	430	320	230	150	125	90	32767	32767	32767	32767
ſ	25	1050	900	750	500	360	240	190	150	110	32767	32767	32767	32767
ſ	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
ſ	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
ſ	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
ſ	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

#### P0300-P0308: SCD Delta ddt

load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
9	565	420	275	210	135	100	85	65	50	32767	32767	32767	32767
11	500	400	300	197	135	100	80	60	45	32767	32767	32767	32767
12	490	400	310	200	140	115	80	60	50	32767	32767	32767	32767
13	680	500	320	220	160	125	90	65	50	32767	32767	32767	32767
15	750	550	350	240	190	130	95	80	50	32767	32767	32767	32767
17	820	600	380	350	250	160	115	90	55	32767	32767	32767	32767
19	975	700	425	420	300	180	130	105	80	32767	32767	32767	32767
22	1100	800	500	500	360	230	150	125	90	32767	32767	32767	32767
25	1050	900	750	550	450	240	190	150	110	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle Cyl Mode

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

		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
load	8	1800	1400	1000	600	450	300	200	160	120	100	80	65	45
Load	9	1700	1300	900	550	425	300	200	160	120	100	80	65	45
	11	1600	1200	800	550	425	300	200	160	120	100	80	65	50
	12	1600	1000	775	550	425	300	200	170	120	100	80	65	50
	13	1700	1200	750	575	425	310	200	180	135	110	80	65	50
	14	1750	1250	750	575	400	310	200	180	140	110	85	75	55
	15	1800	1300	800	575	390	310	200	180	150	110	90	75	60
	16	1800	1325	800	600	380	310	200	180	150	120	95	80	70
	17	1800	1350	900	650	390	330	210	175	150	120	100	85	75
	18	1700	1375	1050	825	400	340	240	180	150	120	100	90	75
	19	1600	1400	1200	900	450	375	275	190	150	125	100	95	80
	21	1690	1450	1210	950	500	400	275	210	160	130	100	100	90
	22	1780	1500	1220	1000	600	450	275	220	180	140	130	120	90
	24	1865	1550	1235	1050	700	500	300	220	180	150	140	125	95
	25	1950	1550	1250	1100	800	550	325	230	190	155	150	125	100
	27	2100	1600	1300	1150	850	600	375	300	210	170	175	150	125
	29	2100	1600	1300	1150	850	600	450	325	250	180	175	150	125

### P0300-P0308: Idle Cyl Mode ddt

load

load Load

-		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
	8	1800	1400	1000	600	450	300	200	160	120	100	80	65	45
	9	1700	1300	900	550	425	300	200	160	120	100	80	65	45
	11	1600	1200	800	550	425	300	200	160	120	100	80	65	50
	12	1600	1000	775	550	425	300	200	170	120	100	80	65	50
	13	1700	1200	750	575	425	310	200	180	135	110	80	65	50
	14	1750	1250	750	575	400	310	200	180	140	110	85	75	55
	15	1800	1300	800	575	390	310	200	180	150	110	90	75	60
	16	1800	1325	800	600	380	310	200	180	150	120	95	80	70
	17	1800	1350	900	650	390	330	210	175	150	120	100	85	75
	18	1700	1375	1050	825	400	340	240	180	150	120	100	90	75
	19	1600	1400	1200	900	450	375	275	190	150	125	100	95	80
	21	1690	1450	1210	950	500	400	275	210	160	130	100	100	90
	22	1780	1500	1220	1000	600	450	275	220	180	140	130	120	90
	24	1865	1550	1235	1050	700	500	300	220	180	150	140	125	95
	25	1950	1550	1250	1100	800	550	325	230	190	155	150	125	100
	27	2100	1600	1300	1150	850	600	375	300	210	170	175	150	125
	29	2100	1600	1300	1150	850	600	450	325	250	180	175	150	125

#### P0300-P0308: Cyl Mode

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

Jo: Cyrwode				OR (decer inc	Jex > Cyr Woule	AND > Cyr Ivi	oue uut Table	:5))										
		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
	8	1800	1400	1000	600	375	280	200	170	120	70	45	35	35	25	20	15	12
	9	1700	1300	900	550	340	270	160	160	120	65	37	30	25	18	17	12	12
	11	1600	1200	800	500	350	250	200	150	115	60	40	35	25	18	16	12	9
	12	1400	1100	800	500	375	280	200	140	120	65	45	35	26	22	16	13	11
	13	1650	1200	750	575	425	300	200	165	125	70	45	35	28	22	20	15	12
	15	1800	1300	800	550	450	320	200	190	110	75	50	35	30	25	24	18	14
	17	1800	1350	900	750	550	375	225	225	150	90	60	45	35	30	25	20	15
	19	1600	1400	1200	900	600	425	275	250	200	110	75	55	45	40	30	25	18
	22	1780	1500	1220	1000	750	550	375	300	220	130	85	65	55	45	38	28	22
	25	1950	1600	1250	1100	800	580	450	340	250	150	100	80	65	50	40	34	25
	29	2100	1700	1300	1150	850	600	500	400	290	175	125	95	75	60	45	38	28
	33	2200	1800	1400	1200	900	650	550	450	320	200	140	110	80	70	55	43	33
	38	2000	1800	1600	1400	1000	700	600	500	350	220	160	120	100	80	60	47	38
	42	2200	2000	1800	1600	1100	750	650	550	400	240	180	140	110	90	70	55	43
	48	2200	2000	1800	1600	1200	800	700	700	500	280	200	170	135	100	75	60	48

#### P0300-P0308: Cyl Mode (Continued...)

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
54	2200	2000	1800	1600	1200	900	800	750	650	280	230	180	140	115	85	65	50
61	2200	2000	1800	1600	1200	1000	850	800	750	400	270	200	155	120	90	70	65

P0300-P0308: Cyl Mode (Continued....)

load Load

load

load

load

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

	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	10	7	6	6	6	6	6	6	6
9	9	6	5	5	5	5	5	5	5
11	8	5	5	5	5	5	5	5	5
12	8	5	4	5	5	5	5	5	5
13	8	5	4	4	4	4	4	4	4
15	9	6	5	4	4	4	4	4	4
17	10	6	5	4	4	4	4	4	4
19	12	7	6	4	3	3	3	3	3
22	15	9	6	5	4	3	3	3	3
25	17	10	7	5	4	4	4	4	4
29	19	12	8	5	4	4	4	4	4
33	22	14	9	6	4	4	4	4	4
38	27	16	10	6	5	5	5	5	5
42	30	18	12	7	6	5	5	5	5
48	35	20	14	9	7	6	6	6	6
54	40	22	16	11	10	8	8	8	8
61	45	24	18	13	11	10	10	10	10

#### P0300-P0308: Cyl Mode ddt

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
8	1800	1400	1000	600	350	280	200	170	110	70	45	30	15	25	16	11	10
9	1700	1300	900	550	300	250	150	150	110	65	35	30	20	15	18	10	10
11	1550	1200	850	550	350	275	200	150	120	70	40	35	30	25	20	13	10
12	1350	1100	850	500	350	280	200	150	110	75	50	35	26	20	16	13	10
13	1250	1000	750	500	375	300	200	175	115	80	50	35	28	22	20	15	12
15	1800	1300	800	600	450	375	200	215	140	85	60	40	30	25	24	18	14
17	1800	1350	900	750	600	450	225	250	175	90	75	45	35	30	25	20	15
19	1500	1400	1300	900	625	475	275	300	200	130	90	55	45	40	30	25	20
22	1650	1500	1350	1000	850	550	425	350	250	150	100	65	55	45	40	30	22
25	1850	1600	1350	1100	950	675	500	400	300	180	120	80	60	50	45	35	25
29	2050	1700	1350	1150	1000	700	650	450	325	200	150	100	75	60	50	40	30
33	2100	1800	1500	1200	1000	750	700	580	350	225	160	110	80	70	60	45	35
38	2000	1800	1600	1400	1100	800	750	600	400	250	180	120	100	80	60	50	40
42	2200	2000	1800	1600	1200	850	800	650	450	275	200	140	100	90	70	60	43
48	2200	2000	1800	1600	1200	900	850	750	550	300	220	170	135	100	80	65	50
54	2200	2000	1800	1600	1200	1000	900	800	650	325	250	180	140	115	90	70	55
61	2200	2000	1800	1600	1200	1100	950	850	750	400	270	200	155	120	100	80	70

### P0300-P0308: Cyl Mode ddt (Continued...)

	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	9	0	0	0	0	0	0	0	0
9	8	0	0	0	0	0	0	0	0
11	9	0	0	0	0	0	0	0	0
12	10	0	0	0	0	0	0	0	0
13	10	0	0	0	0	0	0	0	0
15	10	0	0	0	0	0	0	0	0
17	11	0	0	0	0	0	0	0	0
19	15	0	0	0	0	0	0	0	0
22	18	0	0	0	0	0	0	0	0
25	22	0	0	0	0	0	0	0	0
29	25	0	0	0	0	0	0	0	0
33	30	0	0	0	0	0	0	0	0
38	33	0	0	0	0	0	0	0	0
42	36	0	0	0	0	0	0	0	0
48	40	0	0	0	0	0	0	0	0
54	45	0	0	0	0	0	0	0	0
61	55	0	0	0	0	0	0	0	0

#### P0300-P0308: Rev Mode Table

OR (decel index > Rev Mode Table)

		1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
	8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	85	50	45	35	25	25	25	25	25
ĺ	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	75	50	35	35	30	30	24	24	24
ĺ	11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	80	60	40	35	30	30	25	25	25
ĺ	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	90	70	45	40	30	30	26	26	26
ĺ	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	100	80	55	40	35	35	28	28	28
ĺ	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	110	90	60	45	40	40	30	30	30
ĺ	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	130	100	70	50	45	45	35	35	35
ĺ	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	150	120	80	60	50	50	40	40	40
ĺ	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	140	90	70	55	55	45	45	45

#### P0300-P0308: Rev Mode Table (Continued...)

		1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
[	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	200	160	110	80	60	60	55	55	55
[	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	220	180	130	90	70	70	70	70	70
[	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	260	200	150	100	90	90	85	85	85
[	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	300	240	170	120	100	100	100	100	100
[	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	360	260	190	130	110	110	110	110	110
[	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	380	300	200	140	120	120	125	125	125
- [	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	320	240	160	130	130	135	135	135
[	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	500	350	260	180	150	150	150	150	150

#### P0300-P0308: Zero torque engine load

 Zero Torque: All Cylinders active

 RPM
 Pct load

 400
 11.00

 500
 10.00

1000

1800 2000

2200 2400

2600 2800

3000

3500

4000

4500

5000 5500

6000 6500 7000

t load	Baro KPa	Multiplier
11.00	65	0.82
10.00	70	0.85
9.00	75	0.88
8.00	80	0.90
8.00	85	0.93
8.00	90	0.95
8.00	95	0.97
8.00	100	1.00
8.00	105	1.03
8.00		
8.00		
8.00		

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

Load

Catalyst Damaging	Misfire Percentage	

8.00

8.50 8.50

8.90 9.00

9.10

11.92

14.13

16.35

18.57 20.79 23.00 25.22 27.44

	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)

X axis is fuel level in %

1	Y axis is tempe	erature in deg	C														
Г	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 seconds) Axis is Ignition Off Time (in seconds)

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
	12600	200
	13500	200
	14400	200
	15300	200
	16200	200
	17100	200
	18000	200
	19200	200
	20400	200
	21600	200
	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) Axis is Fuel 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

	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	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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000
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	8.0000

#### KtPHSD\_t\_StablePositionTimeIc1

X axis is Deg C Y axis is RPM

-	I dais is refive																
	-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																	
Start-Up Coolant Coolant	-40 -40.0	-28 -40.0	-16 -40.0	-4	-40.0	20 -40.0	32 -40.0	44 -40.0	56 -40.0	68 -40.0	80 -40.0	92 -40.0	104 -40.0	116 -40.0	128 -40.0	140 -40.0	152 -40.0
and engine run time greater th	an	-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
KtFULC_t_AF_ClosedLoopTim	-40	20	40	4	0	20	20	44	56	60	80	92	404	110	100	140	450
Start-Up Coolant Close Loop Enable Time	-40	-28 90.0	-16 65.0	-4 45.0	8 16.0	20 12.0	32 12.0	12.0	12.0	68 12.0	12.0	92	104 12.0	116 12.0	128 12.0	12.0	152 12.0
and pre converter 02 sensor ve	oltage greate																
KfFULC_U_O2_SensorReadyT > 55																	
Voltage milli																	
or less than																	
KfFULC_U_O2_SensorReadyT < 35																	
Voltage milli																	
and COSC (Converter Oxygen Stor	age Control	) not enabled															
and Consumed AirFuel Ratio is sto			ponent prote	ction													
and POPD or Catalyst Diagnostic n and	ot intrusive																
All cylinders whose valves are	active also	have their inj	ectors enable	d													
and O2S_Bank_ 1_TFTKO, O2S_Ba	ank 2 TFTM	(O. FuelIniect	orCircuit FA	and Cylnder	DeacDriverTF	TKO = False											
Long Term FT Enable Criteria		to, i uoinijoot	oronoun <u>_</u> r,r														
Closed Loop Enable and																	
Coolant greater than																	
KtFSTA_T_ClosedLoopTemp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	450
Start-Up Coolant Coolant	-40 85.0	-28 80.0	-16 75.0	-4 65.0	8 45.0	39.0	32 39.0	44 39.0	39.0	39.0	39.0	92 39.0	39.0	39.0	39.0	39.0	152 39.0
and																	
KtFSTA_T_ClosedLoopTime Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Coolant	120.0	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
and KfFCLL_T_AdaptiveLoCoolant	Celcius																
Coolant																	
or less than KfFCLL_T_AdaptiveHiCoolant																	
< 14																	
Coolant <u>Celo</u>	cius																
and MAP less than KtFCLL_p_AdaptiveLowMAP_	Limit																
Barometric Pressure	65	70	75	80	85	90	95	100	105								
Manifold Air Pressure and	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0								
TPS_ThrottleAuthorityDefaulte	ed = False																
and Flex Fuel Estimate Algorithm i	e not active																
and																	
Catalyst or EVAP large leak test		ive															
	interna																
Closed Loop Enable and KfFCLP_U_O2ReadyThrshLo																	
< 35 Voltage <u>milli</u>																	
for KcFCLP_Cnt_O2RdyCyclesTh (events * 12.5 milliseconds) > 10																	
Long Term Secondary Fuel Tri		riteria															
KtFCLP_t_PostIntglDisableTin	ne	1					1	1									
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time Plus	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
KtFCLP_t_PostIntglRampInTin																	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

and			
KeFCLP T IntegrationCa	atalystMax		
0	< 950		
Modeled Catalyst Tempera	at Celcius		
and			
KeFCLP T IntegrationCa	atalystMin		
	> 450		
Modeled Catalyst Tempera			
and	000000		
KfFCLP T CoolantThrsh			
THI CEP_1_COOLAILTHISI	> 74 Celcius	1	
0			
Coolan			
and			
(KeFCLP_Pct_CatAccuS			
	< 38 Percent		
Modeled converter sulfur p	e		
and			
Post Integral < KaFCLP_	U_SIphrIntglOf	st_Thrsh)	
X axis: Post O2 Sensor		O2_PostCat1	O2_PostCat2
Y axis: Post O2 Mode	iFCLP Decel	1000	1000
Z: Post Integral threshold	CiFCLP_Idle	1000	1000
- (	CiFCLP Cruise	1000	1000
	LP LightAccel		1000
	P HeavyAccel		1000
	- , ,		

and PO2S\_Bank\_1\_Snsr\_2\_FA and PO2S\_Bank\_2\_Snsr\_2\_FA = False

P0521

	EngSpeedW	eightFactorTa	able		AXIS is Engi	ne RPM, Curv	e is Weight F	actor		
Axis	0	500	900	1000	2000	3000	3500	4000	5000	
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.20	0.00	
	EngOilTemp	WeightFactor	Table		AXIS is Engi	ne Oil Temp [	Deg C, Curve i	s Weight Fac	tor	
Axis	-10	-5	60	80	90	100	120	130	140	
Curve	0.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00	
Curve		0.70		0.70			0.70 is Weight Fac		0.00	
Curve				0.70					0.00	
			actorTable		AXIS is Delta	APC, Curve	is Weight Fac	tor		
Axis	EngLoadSta 0 1.00	bilityWeightF	actorTable 10 1.00	20	AXIS is Delta 30 0.00	<b>APC, Curve</b> 50 0.00	is Weight Fac 100 0.00	tor 200 0.00	399	on Weight
Axis	EngLoadSta 0 1.00	bilityWeightF 5 1.00	actorTable 10 1.00	20	AXIS is Delta 30 0.00	<b>APC, Curve</b> 50 0.00	is Weight Fac 100 0.00	tor 200 0.00	399 0.00	on Weight

### **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: i) 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)

CATALYST TEMPERATURE i) once enabled, disables if Catalyst temperature exceeds 1000.0 ii) once disabled 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) Transmission is not shifting if already not in DFCO d) P2270 (POPD) requesting DFCO or inhibit DFCO e) EVAP does not inhibit DFCO f) Throttle is not in default mode

#### 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

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 Clute	h UNI OCK and	P2270 test n	ot requested		DECO disabl	les if RPM dra	ons 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
Torque Converter Clute Axis: Gear State	th LOCK and P2 1st Gear	270 test not r 2nd Gear	equested (PC 3rd Gear	PD OFF): DF 4th Gear	CO enables a 5thGear	above RPM 6th Gear	Neutral	Reverse	Park
Torque Converter Clute	h LOCK and P2	270 test not r	equested (PC	PD OFF): DF	CO enables a	above RPM			
Curve: RPM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0
	th LOCK and P2	270 test not r 2nd Gear	equested (PC 3rd Gear	PD OFF): DF 4th Gear	CO disables 5thGear	f RPM drops 6th Gear	below Neutral	Reverse	Park
Torque Converter Clute Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral		_
	1st Gear 1100.0	2nd Gear 1100.0						Reverse 1100.0	
Axis: Gear State Curve: RPM DFCO_Vehicle Speed e	1st Gear 1100.0	2nd Gear 1100.0	3rd Gear	4th Gear	5thGear	6th Gear	Neutral		Park 1100.0

Vehicle speed drops below DFCO disables														
Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear								
Curve: KPH	25.0	30.0	35.0	35.0	35.0	35.0								

DFCO Load Criteria Air Per Cylinder must b	e less than																
Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: APC	107.3	106.9	106.0	110.0	109.0	107.0	104.5	102.3	98.3	95.0	93.0	91.8	91.8	91.8	91.8	91.8	91.8
Continues unless APC																	
Axis: RPM Curve: APC	0 121.6	512 121.3	1024 121.3	1536 128.0	2048 127.0	2560 125.0	3072 122.5	3584 120.3	4096 116.3	4608 113.0	5120 111.0	5632 109.8	6144 109.8	6656 109.8	7168 109.8	7680 109.8	8192 109.8
	121.0	121.0	121.0	120.0	121.0	120.0	122.0	120.0	110.0	110.0	111.0	100.0	100.0	100.0	100.0	100.0	100.0
TPS % DFCO Enables Enabled if TPS % is les	s than																
Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: TPS %	0.10	0.10	0.10	0.10	0.10	0.10	0.22	0.42	0.61	0.90	1.24	1.54	1.80	1.80	1.80	1.80	1.80
Continues unless TPS																	
Axis: RPM Curve: TPS %	0.20	512 0.20	1024 0.20	1536 0.20	2048 0.20	2560 0.20	3072 0.37	3584 0.57	4096 0.76	4608 1.05	5120 1.39	5632 1.69	6144 1.95	6656 1.95	7168	7680	8192 1.95
Cuive. IF3 %	0.20	0.20	0.20	0.20	0.20	0.20	0.37	0.57	0.76	1.05	1.39	1.09	1.95	1.95	1.95	1.95	1.95
Low Fuel Condition Dia	g Flag set to TRUE AND No Active DTCs: for at least 30 se	Fu P0 P0	: 10.0 % lelLevelDataFar 1462 1463	ult													
Dilution Definitions																	
Exhaust Cam Pher Ena ExhRunTime is Enable	Exhaust Cam Ph Exhaust Cam Ph AND DTCs not set: C AND Engine Power Lir AND ExhRunTime is I AND ExhEngineSpee AND ExhCilPressure AND ExhEngineOilTr	aser is Preser ankSensorT nited = FALSE Enabled (see d is Enabled is Enabled (s emp is Enable	nt: No estFailedTKO, E below) (see below) ee below) ad (see below)	tPresent ExhaustCa	mSensor_TFTI	KO, CrankEx	haustCamCor	тFA									
Cold Start Enar	AND		с														
	Engine RPM > 70 AND	0.000															
	Engine RPM > 8	000.0															
OR Engine Burg tin																	
Engine Run tir 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	5.0
ExhEngineSpeed: Enabled when: RPM Greater th	an																
Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	
and Less th									50		00						1000.0
and Less th Axis: Coolant Temp Curve: RPM		-28 0.0	-16 0.0	-4 0.0	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	116 0.0	128 0.0	140 0.0	1000.0 152 0.0
Axis: Coolant Temp Curve: RPM Disables when:	an -40 0.0																152
Axis: Coolant Temp Curve: RPM Disables when: Less th	an -40 0.0	0.0				0.0			0.0	0.0		0.0			0.0		152 0.0
Axis: Coolant Temp Curve: RPM Disables when: Less th Axis: Coolant Temp Curve: RPM	an -40 0.0 an -40 750.0		0.0	0.0			0.0	0.0			0.0		0.0	0.0		0.0	152
Axis: Coolant Temp Curve: RPM Disables when: Less th Axis: Coolant Temp	an -40 0.0 an -40 750.0	-28	-16	-4	0.0	0.0	0.0	0.0	0.0	68	0.0	0.0	0.0	0.0	0.0	0.0	152 0.0 152

ExhOilPressure is Enab																	
If an oil pressure sensor AND		Present															
is being used: then use oil pressure.		InUse															
Oil Press greater the Axis: Coolant Temp Curve: kPa	-40 180.0	-28 180.0	-16 180.0	-4 180.0	8 180.0	20 180.0	32 180.0	44 180.0	56 180.0	68 180.0	80 180.0	92 180.0	104 180.0	116 180.0	128 180.0	140 180.0	152 180.0
for Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds and Disables if less the Axis: Coolant Temp	300.0 han -40	-28	-16	-4	40.0	15.0 20	9.0	5.0	5.0	5.0 68	4.0	4.0	4.0	4.0	5.0 128	5.0 140	5.0 152
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 senso	or is Not Present	PI	resent														
OR is Not Being Used: then use RPM.		In	Use														
RPM greater the Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM for Axis: Coolant Temp	-40	-28	-16	-4	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0 68	1000.0	1000.0 92	1000.0	1000.0	1000.0	1000.0	1000.0 152
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	5.0
ExhEngineOilTemp:		N	otPresent														
If an oil temperature ser AND is being used:	nsor is present:		otInUse														
OR Oil temperature is mode		Modeled															
then use Oil Temperat Enabled when:		1															
Oil Temp greater the and Less the Disables when:																	
Less the or Great		degC degC															
Intake Cam Phsr Enable	Intake Cam P	hsr Enable = TR haser is Present		sent													
	DTCs not set: AND	CrankSensorT Limited = FALS		IntakeCamS	ensor_TFTKC	, CrankIntak	eCamCorrFA										
	AND IntRunTime is	s Enabled (see															
		ed is Enabled (	see below)														
	AND IntOilPressur AND	e is Enabled (se	e below)														
	IntEngineOil	Temp is Enable	d (see below)														
IntRunTime is Enabled Cold Start Enab	when: ble Engine Run 1 AND	īme > 60.00 se	с														
	Engine RPM : AND	7000.0															
OR	Engine RPM :	> 8000.00															
Engine Run tin Axis: Coolant Temp Curve: Seconds	-40 300.0	-28 250.0	-16 200.0	-4 100.0	8 60.0	20 60.0	32 60.0	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
IntEngineSpeed: Enabled when			k	<b>I</b>									I				
RPM Greater the Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM and Less the Axis: Coolant Temp	an -40	900.0	900.0	900.0	875.0	875.0 20	875.0	875.0 44	875.0 56	875.0 68	875.0 80	875.0 92	950.0	1000.0	1250.0	1400.0	1900.0 152
Curve: RPM	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

### Disables when:

Disables when:																	
Less than	10		10						= 0				101		100		150
Axis: Coolant Temp Curve: RPM	-40 800.0	-28 800.0	-16 800.0	-4 800.0	8 750.0	20 750.0	32 750.0	44 750.0	56 750.0	68 750.0	80 750.0	92 750.0	104 750.0	116 750.0	128 800.0	140 800.0	152 800.0
or Greater	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
Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	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
	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
IntOilPressure is Enabled:																	
If an oil pressure sensor is pres	ent: Pre	sent															
AND																	
and is being used:	InU	se															
then ues oil pressure. Oil Press greater than																	
Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa	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
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	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
and Disables if less than																	
Axis: Coolant Temp	-40 125.0	-28 125.0	-16 125.0	-4 125.0	8	20 125.0	32 125.0	44 125.0	56 125.0	68 125.0	80	92 125.0	104 125.0	116 125.0	128 125.0	140 125.0	152 125.0
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 is Not I OR is not being used: then use RPM. RPM greater than	InU	se															(50)
Axis: Coolant Temp Curve: RPM	-40 900.0	-28 900.0	-16 900.0	-4 900.0	8 875.0	20 875.0	32 875.0	44 875.0	56 875.0	68 875.0	80 875.0	92 875.0	104 950.0	116 1000.0	128 1250.0	140 1400.0	152 1900.0
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	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
				1	1	1		1	1	1		-1		-1			
IntEngineOilTemp: If an oil temperature sensor is p AND and is being used: OR		Present InUse															
Oil temperature is modeled: then use Oil temperature. Enabled when:	Mo	deled															
Oil Temp greater than	0.0 deg	IC															
and Less than	160.0 deg	IC															
Disables when:																	
Less than	-2.0 deg																
or Greater	170.0 deg	IC															

# 17 OBDG05 Diagnostic Summary Table - ECM

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
N1A	100000 D0007 D0000 D0000
NA	P2096 P2097 P2098 P2099
A/F Imbalance Bank1	P219A
A/F Imbalance Bank1	P219A
A/F IMpalance Bankz	12190
EngineMetalOvertempActive	P1258
FuelInjectorCircuit FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
CatalystSysEfficiencyLoB1_FA	P0420
CatalystSysEfficiencyLoB2_FA	P0430
	, e tot
AmbientAirPressCktFA	P2228 P2229
AmbientAirPressCktFA NoSnsr	P0106 P0107 P0108
AmbientAirDefault	For Naturally Aspirated Engines: P0106 P0107 P0108 P2227 P2228 P2229
	For Enginese 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

# 17 OBDG05 Diagnostic Summary Table - ECM

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
	P012B P012C P012D
SCIAP_SensorFA	P012B P012C P012D
SCIAP_SensorTFTKO	
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
EngineMisfireDetected_TFTKO	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308
EngineMisfireDetected_FA	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308
CrankCamCorrelationTFTKO	P0016 P0017 P0018 P0019
CrankSensorFA	P0335 P0336
CrankSensorTFTKO	P0335 P0336
CamSensorFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391

# 17 OBDG05 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
CamSensorTFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CrankIntakeCamCorrelationFA	P0016 P0018
CrankExhaustCamCorrelationFA	P0017 P0019
IntakeCamSensorTFTKO	P0016 P0018 P0340 P0341 P0345 P0346
IntakeCamSensorFA	P0016 P0018 P0340 P0341 P0345 P0346
IntakeCamSensor FA	P0016 P0018 P0340 P0341 P0345 P0346
IntakeCamSensor TFTKO	P0016 P0018 P0340 P0341 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 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CamSensorAnyLocationFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CamSensor_TFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
EvapPurgeSolenoidCircuit_FA	P0443
EvapFlowDuringNonPurge_FA	P0496
EvapVentSolenoidCircuit_FA	P0449
EvapSmallLeak_FA	P0442
EvapEmissionSystem_FA	P0455 P0446
FuelTankPressureSnsrCkt_FA	P0452 P0453
FuelLevelDataFault	P0461 P0462 P0463 P2066 P2067 P2068
PowertrainRelayFault	P1682
PowertrainRelayStateOn_FA	P0685
PowertrainRelayStateOn_Error	P0685
IgnitionOffTimer_FA	P2610
IgnitionOffTimeValid	P2610
EngineModeNotRunTimerError	P2610
EngineModeNotRunTimer_FA	P2610
	D0500 D0500 D0700
VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
VehicleSpeedSensorError	P0502 P0503 P0722 P0723
LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 %
	AND
	No Active DTCs: FuelLevelDataFault P0462
	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

17 OBDG05 Diagnostic	Summary Table - ECM
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Cert Doc Bundle Name									Pcodes								
EngOilPressureSensorCktFA	P0522	P0523							FCOUES	<b>`</b>							
EngOilPressureSensorFA	P0522	P0523	DOFOO														
EngOliPressureSensorFA	P0521	P0522	P0523														
EngineTorqueEstInaccurate	Engine	√Fuellnje	ec Fuellnje	ec Fuel Trir	m FuelTrir	mMAF_S	eMAP_S	eEGRVa	luePerfor	amnce_F	Ā						
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															
1055_Fault	TCM: P0502	P0503 P0723															
ShiftSolenoidFaults (TCM)	M30/M70: P0751		P0756	P0757													
	MYC/MYD: P0751	P0752	P0756	P0757	P0973	P0974	P0976	P0977									
TransTurbineSpeedValid(TCM)	M30/M70: P0716	P0732	10730	1 01 31	1 0313	1 0314	1 0310	1 0311									
	MYC/MYD: P0716	P0717	P07BF	P07C0													
Trans_Gear_Defaulted(TCM)	M30/M70: P0705	P1810	P1815	P1816	P1817	P1818	P1915	P1820	P182A	P1822	P182C	P1823	P182D	P1825	P182E	P1826	P182F
			5000-		5000-	B	5000-										
KS_CktPerfB1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333									
EST DriverFltActive	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358									